

# Evidences and Explanations for the Momentum Effect in the World: A Literature Review

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## ABSTRACT

Momentum effect is a common phenomenon in stock markets. This study reviews a few literatures to investigate the evidences of momentum effect and its rational explanations in the stock markets worldwide. Based on our analysis, evidences for momentum effect are summarized and categorized. It is concluded that momentum effect differs in different countries and regions. Specifically, time scales for the phenomenon in non-Asian countries are significantly longer than those in Asian countries. In terms of explanations for the momentum effect, existing theories can be divided into three genres: traditional finance based on a risk-return framework, behavioral finance stretched from prospect theory, as well as non-behavioral finance correlated. Our findings show that risk-based analysis in traditional finance cannot fully explain the momentum effect. Positive feedback mode, overreaction and underreaction characterized by anchoring effect and disposition biases will offer much more reasonable explanations for the momentum effect in different perspectives under behavioral finance framework. In reality, market states and other conditional exogenous factors (e.g., non-behavioral) sector sometimes make sense. These results make a vivid glimpse of momentum effect and shed light for researchers to get a profound insight into the core of stock market.

**Keywords:** *momentum effect, evidences, traditional finance, behavioral finance*

## 1. INTRODUCTION

Momentum effect was proposed by Jegadeesh and Titman, who found that good or bad performance of stocks continued over time in an investigation of intermediate-horizon stock price behaviors and defined this phenomenon as momentum effect [1]. As one of the strongest evidences against the efficient market hypothesis, the momentum phenomenon has been investigated widely and deeply by economists around the world since it was first proposed. Generally, there are two main directions in these studies, one is to find the characteristics of momentum effect in different regions, the other is to explain the causes of momentum effect.

Due to the different characteristics of financial markets in different regions, many researchers have found momentum effects of different time lengths and magnitudes all over the world. Jegadeesh and Titman first discovered the momentum effect in the US market [1]. After that, many scientists have proved that

momentum effect could obtain effective benefits in the markets of Europe, America, Australia, etc[2-6]. But others have found some different phenomena. Hung and Banerjee [7] analyzed stock markets in Taiwan, Hong Kong and Korea and found that average momentum profits were close to zero in all these three markets. In China's A-share market, Wang and Zhong [8] found that there was a super-short-term momentum effect and Gao et al. [9] even argued that there is no traditional short-term momentum in China.

Besides, there are many different explanations for the momentum effect. Initially, Jegadeesh and Titman [1] tried to use capital asset pricing model (CAPM) to explain momentum effect, but found that the market risk of momentum portfolio was not enough to explain its high return. On the basis of CAPM, Fama and French [10] added scale and more risk factors into the model, but the return of momentum effect was still not well explained. With the development of behavioral finance, scientists in this field have given more explanations from

the perspective of investors' psychological state. Daniel, Hirshleifer and Subrahmanyam [11] explained it by the overconfidence in personal judgment, which would lead to the continuous rise or fall of the stock price. The academic community has not yet reached a consensus. To demonstrate it more clearly, we make a category of the explanations in three sections of traditional, behavioral and non-behavioral finance.

In numerous studies, researchers have found different types of momentum effects and provided various explanations for the causes of momentum effects. In this paper, we sort out the findings and results of these momentum effect researches in different markets and try to summarize different causes of momentum effect. Through analyzing and comparing the complex explanations proposed in the literature, we aim to provide a clear context and framework about the characteristics and causes of momentum effect for future researchers.

## **2. THE TIME SCALE OF MOMENTUM EFFECT**

Momentum effect is also called inertia effect. It was proposed by Jegadeesh and Titman in 1993, they found that good or bad performance of stocks continued over time in an investigation of intermediate-horizon stock price behaviors. Specifically, the stock with higher return in the past would still get higher return in the future than the stock with lower return in the past [1]. They defined this phenomenon as momentum effect.

In terms of time scale, there seems to be evidence that short-term, medium-term and long-term price momentum exist in both the composite market and the cross-range (e.g., across specific stocks). In different types of markets, investment returns based on momentum effect have different durations. Jegadeesh and Titman [1] found that there was a significant momentum effect in the US market for 12 months (from 13 months ago to 1 month ago). Subsequently, studies found that momentum effect also existed in other countries and regions. Rouwenhurst [3] studied the data from 1980 to 1995 of 12 European countries (Australia, Belgium, Germany, France, Denmark, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom), and found that momentum effect (3 months) existed in all mature markets except Japan. In the study of China's A-share market, Wang and Zhong [8] studied the momentum strategy return in a shorter time (holding period of 1-4 weeks). They found that there was a super-short-term (1-2 weeks) momentum effect in China's A-share market, which was different from the results of the medium-term (3 months) momentum effect in the US market [8]. These studies indicate that the duration of momentum effect is

different in different markets and investment environments.

## **3. EVIDENCES OF MOMENTUM EFFECT**

As one of the strongest evidences against the efficient market hypothesis, the momentum phenomenon has been investigated widely and deeply by economists around the world since it was first proposed by Jegadeesh and Titman in 1993 [1]. As a result, there are a lot of evidences to support the momentum effect, which are summarized in Table 1. However, it is also noteworthy that there exist notable exceptions in Asian stock markets. The next two paragraphs will demonstrate the differences in evidences of momentum in non-Asian markets and Asian markets.

In non-Asian markets, numerous strong evidences support the existence of momentum effect, where stocks will continue their past performance in the short term and middle term. Momentum effect was first proposed and proved in America, so there's no doubt that momentum phenomenon exists in USA. In other regions except Asia, momentum effect is also observed. Boussaidi and Dridi [2] showed that the momentum strategy caused huge profits from December 1999 to January 2016 in Tunisian stock market: selling short the loser portfolios and buying winner ones could earn significant profit in 14 out of 16 strategies. According to Hofmann and Keiber [6], based on the data analysis for the stocks listed on the Frankfurt Stock Exchange from January 1978 to December 2017, the decile spread portfolio earned an excess return of 233 basis points per month, which means the 12-month traditional momentum strategies can successfully predict the performance of stocks (Table 1). In Australia, it was also investigated that S&P/ASX200 Index earned 9.51% per annum using momentum strategy in the sample period from January 2001 to December 2010 [5] (Table 1). Therefore, momentum strategy could earn huge profits in other stock markets in most cases except Asian regions.

However, when it comes to Asian stock markets, the conclusion seems to change since there is no significant momentum effect in Asian stock markets, especially in East Asia stock markets. It is commonly acknowledged that the momentum effect is weak in Japanese stock markets. According to Ref. [4], most researches done argued that momentum did not exist in Japanese stock market, while the author found that momentum strategies could earn profits only when the market state was stable (Table 1). When it comes to China, the conclusion is almost the same. In the research conducted by Gao et al. [9], it is proved that there is no evidence for the traditional short-term momentum in China (Table 1). Other regions in East Asia are alike. Chi-Hsiou et al. [7] analyzed stock movements in Taiwan, Hong Kong and Korea and concluded that average momentum profits

were close to zero in all these three markets (Table 1). As a result, the Asian stock markets are often regarded as exceptions to momentum. This anomaly may arise because of different market states. In these articles, the

authors argued that Asian markets were quite unstable. When markets were stable, they found that momentum strategies in East Asian stock markets could earn huge profits as well.

**Table 1.** Studies on Momentum effects in different countries/regions

Author(s)	Countries/Region(s)	Time span	Sample size	Main findings
Ramzi Boussaidi, Ghada Dridi	Tunis	January 1999 - December 2016	From 45 firms in 1999 to 81 firms in 2016	Momentum strategies earn high profits in most periods in Tunisian stock markets. Political turmoil and economic difficulties affect momentum profits.
Daniel Hofmann , Karl Ludwig Keiber	Frankfurt, Germany	January 1978 - December 2017	Ranging from less than 130 to about 850	A classical momentum strategy based on the past 12 months is significantly profitable. The data of past 2-5 years could be used to predict future performance of stocks, but the statistics of more than 6 years are useless.
Bob Li, Hong Nee Ang, Thomas Stork, Daniel Chai, Mong Shan Ee	Australia	January 2001 - December 2010	The 200 largest stocks	By using momentum strategy on S&P/ ASX200, researchers generate high abnormal returns. Momentum is remarkable in Australia.
Ya Gao, Bin Guo, Xiong Xiong	China mainland	July 1997- September 2018	2825 stocks	Traditional short-term momentum strategy is not successful in Chinese stock markets; if market states are the same, then momentum exists.
Matthias Hanauer	Japan	October 1986 - September 2012	Ranging from 803 stocks in 1986 to 3814 stocks in 2008	Momentum profits are higher when the market state stays unchanged, while profits are quite low or even negative if the market condition reverses.
Chi-Hsiou D. Hung, Anurag N. Banerjee	Taiwan Hongkong Korea	January 1986 - December 2011	803 stocks	Momentum profits in all these markets are quite insignificant, and the momentum decile portfolio even cannot outperform naive strategies.

#### 4. EXPLANATIONS OF MOMENTUM EFFECT

Roughly speaking, the source and the interpretation of evidence of momentum remain unclear since it's difficult to reach an agreement. However, a number of empirical and statistical analyses were carried out, which could provide some explanations listed as follows. To demonstrate it more clearly, we first divide the explanations into three categories: traditional finance, behavioral finance correlated and non-behavioral finance correlated.

##### 4.1. Explanations from the Perspective of Traditional Finance

In traditional finance theories, researchers tend to explain momentum effect under a risk-return matching framework.

###### 4.1.1. Expanding the sources of risk

Jegadeesh and Titman [1] tried to explain momentum effect with a capital asset pricing model (CAPM) and found that the market risk taken by the momentum portfolio was not sufficient to explain its high returns. Fama and French [10] analyzed both the size and value risk factors and found that they could explain many other financial anomalies, but still cannot explain the momentum effect quite well for the reason that the

momentum effect is more pronounced after the three-factor risk correction.

4.1.2. *Introducing a time-varying price of risk*

Wu [12] added macro factors as conditional information to the three-factor model and derived a time-varying risk factor model that can fit the momentum effect. Whereas, Chordia and Shivakumar [13] argued that the momentum effect reflected the time-varying expectations of stock market participants.

Johnson [14] proposed a time-varying model of expected dividend growth, arguing that the occasional "persistent dividend" shock can explain many market anomalies, including the momentum effect. In contrast, Griffin and Martin [15] found that the correlation between momentum returns and macro risk was not significant.

To sum up, researchers didn't reach an agreement in explanations based on traditional theories. Specifically, it can be ascribed to huge amount of momentum effects compared to systematical risk as well as unproven robustness under massive parameters.

4.2. *Behavioral Finance Sectors*

One key difference of the explanations between behavioral finance and traditional finance is the hypothesis about utility. Kahneman and Tversky [16] put forward the Prospect Theory, which is one of the foundations of behavioral finance. They stated that the utility function is an "S" shape but not simply concave (seen from Fig. 1). As shown in Fig. 2, the utility function is concave within the profit range while convex within the loss range.

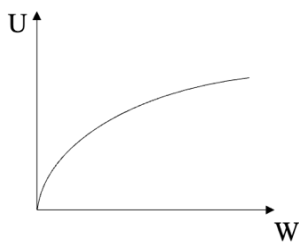


Figure 1 Utility Function in Traditional Finance

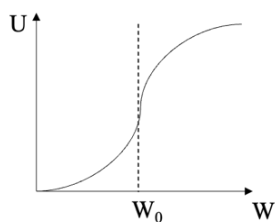


Figure 2 Utility Function in Prospect Theories. The  $W=W_0$  (dash line) corresponds to turning point of the utility function.

Under such a framework, behavioral finance derives basically three kinds of explanation about momentum effects: underreaction, overreaction and positive feedback mode. The anchoring biases and disposition effects in the list of underreaction suppose the lack of investor response to information, which causes slow reaction of stock prices to the information, and thus a momentum effect.

4.2.1. *Anchoring effect and disposition biases in underreaction hypothesis*

Barberis, Shleifer and Vishny [17] constructed a classic model, which stated that investors have anchoring biases. On this basis, past price would directly affect judgement to the future price of stocks and thus investors showed conventional biases. They tended to hold original thoughts when the price changes, which lead to underreaction in short term, i.e. the momentum effect. The unified theory of Hong and Stein [18] explained the existence of underreaction from the perspective of slow information transmission. In addition, it attributed the momentum effect to the game of different types of traders rather than the cognitive biases of traders.

Barberis, Huang, and Santos [19] attributed the underreaction to the disposition effect caused by investors' loss aversion. On this occasion, investors tend to sell profitable stocks quickly and delay cashing in losing stocks, thus creating a momentum effect.

Hur and Singh found out that when the anchoring and disposition biases reinforce each other, it leads to stronger momentum in stock returns. In addition, the presence of retail investors, weak analyst coverage, and illiquid stocks contribute to the anchoring and disposition biases to further exacerbate the momentum in stock returns. The primary channel, which the anchoring and disposition biases add to the momentum in stock returns, is achieved by delaying the incorporation of good (bad) news in recent winning (losing) stocks. When the disposition effect of current stockholders and the prospective shareholders' anchoring bias reinforce each other regarding the mispricing of stocks, the momentum profits are strong. However, when the two effects offset each other, the momentum profits become weak or even disappear.

Another study about these two charming effects was done by Chen et al. [23]. They constructed "relative price" momentum portfolios simply based on the anchoring bias and disposition effect. It is found that after controlling the classical momentum effect and systematic risk factors, relative price effect still holds.

On the other hand, if the relative price momentum effect has been controlled, the classical momentum effects would disappear. In other words, “anchoring bias” and “disposition effect” have high explanation power in momentum effect in the Chinese stock market. However, in the Chinese stock market, it is not apparent to make usage of momentum strategy. According to Zhu and Wu [24], due to the immature features in the Chinese stock market, there was no significant momentum effect in the monthly tests of the Chinese stock market. Moreover, momentum profits were only present in weekly strategies with formation and holding periods of four weeks or less. In terms of theoretically speaking, if we consider transaction cost, investors in China could not benefit from momentum strategies, which are in line with the results given by Rong Chen. These findings offer statistical verification and indicates that anchoring bias and disposition effect do affect the momentum effect and that high transaction costs would hinder the arbitrary.

In reality, underreaction hypothesis was tested in Tunisian stock market. Boussaidi and Dridi [2] examined two controversial explanations for the momentum in the Tunisian stock market: the risk hypothesis and the underreaction hypothesis.

The five-factor model of Fama and French (2015) was used to estimate the momentum profits. A strong evidence of risk-adjusted momentum profits indicating that the risk cannot explain the momentum effect. They found that good earnings news was followed by positive abnormal returns. Whereas, bad earnings news was followed by negative abnormal returns over 12 months after the announcement date. Consistent with the underreaction hypothesis, these findings indicated that the market slowly adjusts in the same direction to the unexpected earnings, which rejected the semi-strong form of the efficient market hypothesis. They extended the five-factor model of Fama and French (2015) to include a zero-investment portfolio that is short on the lowest unexpected earnings portfolio and long on the highest unexpected earnings portfolio and test whether this factor captures the momentum profits. Based on the results, they found that most of momentum strategies were no longer profitable, which confirmed that the momentum effect is explained by the underreaction hypothesis.

#### *4.2.2. Overreaction*

Daniel, Hirshleifer and Subrahmanyam [10] thought that investors are overconfident in the "private information" they have and thus overreact to the news, causing stock prices to continue to rise or fall.

Moreover, Chen [20] discussed the phenomenon of stock price overreaction, and argued that a large number of empirical tests by Chinese scholars on the existence

of overreaction in the Chinese stock market had different degrees of methodological bias. He then incorporated the BSV model and the DHS model into the noise trading framework. Based on the introduction of arbitrage momentum traders, the HS model was improved to explain the formation process of price volatility in the presence of good news and bad news under different market conditions that allow short selling and short selling constraints. It is demonstrated that good news is much more likely to be overreacted under the short selling constraint than under the short selling allowed condition, and the degree of its overreaction is much greater. Whereas, bad news is more likely to be underreacted within the short selling constraint than within the allowed short selling condition. Therefore, he gave us an explanation in behavioral finance for the momentum effect in terms of overreaction.

#### *4.2.3. Positive feedback mode*

In De long, Shleifer and Summers' model [21], winners continue to win while losers continue to lose under the positive feedback trade of "chasing the upside and killing the downside" by investors (so-called sheep effect).

### **4.3. Non-Behavioral Finance Sectors**

#### *4.3.1. Industry-driven momentum effect and common risk factors cannot be fully accountable, conditional exogenous factors matters*

Li et al. [5] found that existing Australian evidence on the momentum effect is contradictory and limited, partly due to differences in empirical designs, sample periods and stock populations. Neither an industry-driven momentum effect nor common risk factors can fully account for the momentum effect.

Stock price momentum most pronounced at longer investment horizons. Further, the stock momentum profits congregate on the long side of momentum portfolios. On the other hand, Moskowitz and Grinblatt found that momentum at an industry level can explain the cross-sectional variation of mean stock returns. No evidence supports that the momentum abnormal return is compensation for firm's beta and size differences. By a process of elimination, they concluded that momentum returns found at the stock level may be conditional on some exogenous factor(s) precluded from our model.

#### *4.3.2. Market states strong related in China*

Gao et al. [9] had used a traditional method to construct the momentum strategy and found momentum performance in China is strongly related to market

states. It existed when the market continues in the same state during the formation to holding periods, while reversed when the market transited in two periods.

Additionally, an early research in 2004 demonstrated that the momentum effect is related to the overall market trend in China [22]. Besides, it is significantly stronger than the reversal effect when the stock market is in a bull market and vice versa when it is in a bear market.

## 5. CONCLUSION

In summary, we have reviewed 24 articles on the evidence and its causes of momentum effect. Based on the literature review, we conclude that momentum effect differs in accordance with different countries and regions. In non-Asian countries and regions, the momentum effect has a time of duration of 3-12 months, while shortening to less than 1 month in Asian stock markets. Moreover, some studies also showed that momentum effect was quite weak in Asian stock markets, especially in East Asian markets, which may be due to the unstable market state. Behavioral finance including underreaction (anchoring biases and disposition effects), overreaction and positive feedback mode accounts a lot for momentum effect. On the contrary, traditional finance like the market risk cannot explain this phenomenon well. However, conditional exogenous factors matter. These findings reviewed in this paper could be helpful for investors interested in the investigation of momentum effect in Asian stock markets and underdeveloped markets. Furthermore, as a strong evidence against the efficient market hypothesis, the momentum effect should be investigated more widely and deeply in the future.

## AUTHORS' CONTRIBUTIONS

These authors contributed equally.

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