

Irrational Investor Behavior from a Prospect Theory Perspective: An Analysis of the Chinese Stock Market

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Abstract. Traditional finance generally takes rational decision-making and market efficiency as its starting point, assuming that investors process information rationally. In actual trading, however, investors are influenced by reference points, their response to losses, and subjective judgment. Focusing on the Chinese stock market, this paper reviews and compares existing studies to explain prospect theory through three elements: the value function, loss aversion, and decision weights. It then discusses the disposition effect, differences across investor groups, and heterogeneous beliefs. The literature shows that individual investors are especially susceptible to behavioral biases because of limits on attention and information processing. Institutional investors may also be influenced by agency problems, performance evaluation, and organizational decision-making. Prospect theory extends traditional financial models by offering a better account of actual choices, but whether individual biases develop into persistent market anomalies also depends on how information spreads, trading constraints, and the strength of arbitrage.

Keywords: prospect theory, investor behavior, Chinese stock market, behavioral finance

1. Introduction

Traditional finance generally assumes that investors can process information fully and make consistent choices based on risk and return. Yet some common decisions in stock investing are difficult to explain with traditional models. An investor may buy a stock only after a substantial rise, for example, while continuing to wait for another loss-making stock to "break even." Behavioral finance brings psychological factors into financial research and asks how investors actually make judgments, rather than focusing only on the rational choices assumed in models [1].

Prospect theory provides an important framework for explaining such behavior. It argues that people do not care only about final wealth. Instead, they distinguish gains from losses around a reference point and place greater psychological weight on losses [2]. Guo et al.'s review of the theory's development, together with the introduction of cumulative prospect theory, further refined the analysis of reference points, value functions, and probability weighting [3, 4]. Recent research continues to examine the conditions under which the original and cumulative models apply [5].

Individual investors trade actively in China's stock market, where market themes also change quickly. At the same time, the growing professionalization of institutional investors has not eliminated behavioral biases, making the market a useful setting in which to examine these issues.

This paper uses a literature review and comparative analysis. It first reviews the relevant research, then explains the core mechanisms of prospect theory, and finally discusses loss aversion, the disposition effect, differences across investor groups, and heterogeneous beliefs. The aim is not to attribute every market movement to psychology, but to identify the conditions under which behavioral biases may affect trading and prices. The analysis may help investors and financial institutions recognize common decision biases and improve risk management. It may also offer a reference for later studies choosing behavioral variables and comparing investor groups in the Chinese market.

2. Literature review

2.1. Development of prospect theory

Kahneman and Tversky developed prospect theory to describe choices under risk that expected utility theory struggles to explain. In the model, decision-makers first edit and simplify the available options, then evaluate them using a value function and decision weights [2]. The original model can violate first-order stochastic dominance when choices have several outcomes. Cumulative prospect theory therefore applies weights to cumulative probabilities, improving the model's consistency [4]. Mononen further shows that the two models treat common outcomes and stochastic dominance differently [5].

Prospect theory has also been applied to more complex intertemporal choices. In an experiment, Lampe and Weber show that weighting the probabilities of discounted utility or the present value of cash flows predicts participants' choices reasonably well; the estimated probability-weighting function has an inverse-S shape [6]. The result is relevant to stock investment because returns involve not only outcomes and probabilities but also the timing of realization. Parameters obtained from static experiments should therefore not be transferred directly to long-term holding decisions.

2.2. Research on the Chinese market

Research on the Chinese market has mainly examined the disposition effect, loss aversion, overconfidence, and herding. Account data from the Shanghai stock market show that small and medium-sized investors are particularly reluctant to realize losses, whereas the disposition effect is weaker among large investors and institutions [7]. Account-level data record actual trades, but they do not reveal the reference points or subjective expectations investors had at the time.

Survey and asset-pricing studies add two other types of evidence. In a sample of 996 respondents, Lan et al. find that individual investors show a higher overall degree of irrationality, although institutional investors also display marked preference reversals and disposition effects [8]. Using trading data from 1997 to 2020, Li et al. construct a measure of irrational beliefs and find that it negatively predicts future returns. A model that includes a belief factor explains several stock anomalies relatively well [9]. These studies suggest that behavioral biases appear not only in individual trades but may also be reflected in asset prices.

3. Core mechanisms of prospect theory

3.1. Reference points and the value function

Expected utility theory usually evaluates final wealth, whereas investors in actual markets often judge gains and losses against the purchase price, a previous peak, or a target return. Depending on

the reference point, the same price movement can be seen either as a gain or as a failure to meet expectations. Reference points may also change with new information and the investor's experience of holding the asset. This flexibility is central to the explanatory power of prospect theory, but it also makes the reference point difficult to measure empirically.

The value function has a different shape on either side of the reference point: it is generally concave for gains, convex for losses, and steeper in the loss domain [2, 3]. This means that investors usually prefer to lock in a certain gain, but may accept more risk when facing a loss in the hope of breaking even. Loss aversion does not mean that people always avoid risk. It means that a loss of a given size generally produces a stronger psychological response than an equal gain.

3.2. Decision weights

Decision weights capture the psychological weight investors assign to different outcomes and are not the same as objective probabilities. Small probabilities tend to be overweighted, while moderate and high probabilities may be underweighted, producing an inverse-S-shaped weighting function [3, 4]. In stock trading, a story about a very unlikely price surge may attract more attention than a modest but more probable return. Investors may therefore pay a premium for stocks that offer the prospect of an exceptional gain.

Cumulative prospect theory orders outcomes and applies weights to cumulative probabilities, reducing the original model's violations of stochastic dominance [4, 5]. In actual markets, however, return probabilities are usually unknown, so investors must first form beliefs about the future distribution of returns. Probability weighting therefore often appears alongside selective use of information, overconfidence, and attention bias. It cannot be treated as a fixed function that can be observed directly.

4. Irrational investor behavior in the Chinese stock market

4.1. Loss aversion and the disposition effect

Loss aversion means that a loss generally produces a stronger psychological response than an equal-sized gain [2, 3]. In the Chinese stock market, investors often use the purchase price as the reference point for judging gains and losses. When the price is above the purchase price, selling means realizing a gain; when it is below the purchase price, selling means acknowledging an error and realizing a loss. As a result, the past purchase cost continues to affect later decisions. Investors may sell winning stocks too soon while keeping loss-making stocks even after their fundamentals deteriorate. This pattern of "selling winners and holding losers" is the disposition effect. It is closest to the bias described by prospect theory when trading decisions systematically depend on unrealized gains and losses rather than expected risk and return.

Account data from the Shanghai stock market show a stronger disposition effect among small and medium-sized investors and a weaker one among large investors and institutions [7]. A scenario-based survey of the Chinese market, however, finds that institutional investors may also be influenced by performance evaluation, professional reputation, and agency problems [8]. The two findings are not necessarily contradictory. In the Chinese stock market, individual investors are more likely to be influenced by personal wealth and the desire to break even, while institutional investors may adjust the timing of a sale to confirm short-term performance or delay revealing a mistake. The form taken by the disposition effect therefore also depends on the type of investor and the decision setting.

4.2. Differences between individual and institutional investors

Individual investors are usually at a disadvantage in access to information, analytical tools, and specialization. They are also more likely to rely on recent price movements, market themes, and advice from acquaintances. When time and knowledge are limited, such shortcuts reduce decision costs, but they can also lead investors to overlook base rates and long-term fundamentals, allowing momentum chasing, frequent trading, confirmation bias, and loss aversion to appear together. Survey evidence from Chinese investors likewise finds a higher overall degree of irrationality among individual than institutional investors [8].

Institutional investors in China's stock market have research teams and risk-control procedures that can reduce some cognitive biases, but their decisions are still shaped by organizational constraints. Relative rankings, short-term evaluation, redemption pressure, and professional reputation may encourage fund managers to follow their peers or avoid strategies that take a long time to validate. In the Chinese market, the difference between individual and institutional investors is therefore better understood as a difference in the sources of bias, rather than a simple division between an irrational group and a rational one [8].

4.3. Heterogeneous beliefs and price anomalies

In the Chinese stock market, investors may extrapolate recent returns into the future after a sustained rise and overweight the chance of an exceptional gain. When prices fall, fear and the pressure of losses may instead trigger concentrated selling. Limited attention can also produce an initial underreaction to new information, followed by overreaction as market narratives strengthen and herding takes hold. Even so, trend trading in the Chinese market may reflect the gradual diffusion of information or liquidity needs. Price movements alone are not proof of irrationality.

Heterogeneous beliefs provide a more specific link between individual judgments and market prices. Using Chinese stock market data from 1997 to 2020, Li et al. construct a measure of irrational beliefs and find that it negatively predicts future returns. A model that includes a belief factor also explains several stock anomalies relatively well [9]. This result suggests that when some investors remain excessively optimistic and short selling and arbitrage are constrained, biased beliefs may enter current prices and be followed by lower returns as those beliefs are corrected. Disagreement among Chinese investors may also come from differences in information and models, however. It should be treated as irrational only when beliefs continue to be shaped by selective attention, overconfidence, or errors in judging probabilities.

5. Practical implications and limitations of prospect theory in the Chinese stock market

5.1. Implications for investment practice

For individual investors in the Chinese stock market, prospect theory suggests that reducing bias requires more than a reminder to "stay rational"; it requires changes to the decision process. Before buying, investors can record their valuation rationale and exit conditions, assess risk at the portfolio rather than the single-stock level, and set rules for position size and rebalancing. These steps may reduce the tendency to search for reasons to justify a decision around the purchase price. The rules still need to change when the fundamentals change; mechanical stop-loss orders are not the theory's only implication.

Institutional investors in China's stock market should also pay attention to biases created by the organization. They might lengthen evaluation periods, keep a record of dissenting views, and assess decision quality separately from short-term outcomes. For regulators and securities firms, investor education can also use concrete examples involving reference points, loss aversion, and the pursuit of market themes. Risk warnings would then go beyond product volatility and help investors understand their own decision-making.

5.2. Theoretical limitations

A major difficulty with prospect theory is that reference points, value functions, and probability weights are not readily observable or directly recoverable from trading records. They also vary across investors, market conditions, and holding periods. Estimates from laboratory studies may not represent actual trading in the Chinese stock market; account data from the Shanghai market, investor surveys, and nationwide market indicators also observe different groups. Studies of the Chinese market therefore need to combine several types of data for cross-checking and distinguish between investor groups and market periods.

Prospect theory is useful for describing choices, but it cannot predict prices in the Chinese stock market on its own. Whether individual biases produce persistent anomalies in China depends on whether investors trade in the same direction, whether arbitrage is constrained, how information spreads, and the broader market institutions. Prospect theory is therefore better used as one explanatory framework, together with heterogeneous beliefs, limits to arbitrage, and market microstructure.

6. Conclusion

This paper uses prospect theory to examine the mechanisms behind irrational investor behavior in the Chinese stock market. Reference dependence leads investors to evaluate outcomes as relative gains and losses rather than final wealth. The asymmetry of the value function makes them more cautious when they are in profit, but more willing to take risk in the loss domain in order to return to the reference point. Nonlinear decision weights also increase the appeal of low-probability, extreme returns.

Existing studies suggest that the disposition effect, buying after rises and selling after declines, and heterogeneous beliefs can be partly explained by these mechanisms. Individual investors are more likely to be affected by limits on information processing and attention, as well as by changes in their own wealth. Institutional investors, in contrast, may be influenced by agency relationships, evaluation periods, and organizational decision-making. The two groups do not simply represent irrational and rational investors; the sources and forms of their biases differ.

The study nevertheless has several limitations. It relies mainly on existing literature and does not independently test account-level or market data. It also does not observe how reference points change over the holding period. Future research could combine account-level transactions, follow-up surveys, and text-based sentiment data to distinguish reasonable differences in information from irrational beliefs produced by psychological bias. It could then test more directly the conditions under which individual biases develop into persistent price anomalies.

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