The Prospect Theory and The Stock Market

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Abstract. This paper is aimed to investigate the important principle of behavioral economics , prospect theory and applies prospect theory to stock market. Based on the former studies, there are three features at the core of prospect theory, and they are in turn the reference point, a principle of diminishing sensitivity and loss aversion. Prospect theory focus on how people make decisions in an uncertain situation and it combines psychology to research economic man's choice behavior rather than research rational people's economic behavior like expected utility theory. Therefore, the prospect theory has more value and more practical to apply in the stock market and be studied to predict investors behavior. In this essay, case analysis method and theoretical analysis method will be used to explore the prospect theory and stock market. It found that prospect theory can conduct investors gain more profit because of stock reverse transaction strategy. And loss aversion, the most important factor of reversal effect, point out that when face the uncertainty, people won't keep completely rational as the utility theory said. What's more, it suggests the exist of reverse effect in Chinese stock market. The research contributed to present understanding of the prospect theory in China's stock market, and further explores that the stock reversal strategy is more conducive to investors' profits in China's stock market. A large part of the reasons for this phenomenon can be explained by prospect theory, while expected utility theory cannot.

Keywords: The prospect theory, stock market, stock reverse transaction strategy, reversal effect.

1. Introduction

The prospect theory was first put up forward by Daniel Kahneman and Amos Tversky when they stumbled on the central flaw in Bernoulli's theory. And they put forward that the prospect theory is more complex than utility effect. Utilizing psychology, scholars explained people's economic behavior and three characteristics. First is the reference point. For example, the reference point of financial outcomes is the state quo. Outcomes that are higher than the reference points are gains. Second is the principle of diminishing sensitivity. Decreasing sensitivity, that is, the condition of diminishing sensitivity decreases with the increasing marginal value of gains or losses. The last is loss aversion. When compare the gains and losses, losses loom larger than gains. The prospect theory has been applied in many domains, for instance, medical aspect and insurance research and so on. Through this essay, its analysis the principle of reverse transaction strategy in Chinese stock market and recovery investor psychology in the face of uncertainty. In addition, it uses prospect theory to explain the reverse effect and provide an angle to research the gain and loss of stock market.

This paper use theorical analysis method to explain the prospect theory and distinguish it with utility effect. The former is to study how people make choices with uncertainty, whether to take risks or avoid risks, when to take risks, when to avoid risks. In investing, people often face decision, so it can use prospect theory to research many situations in stock market. Using case analysis method to explore Chinese stock market and the stock reverse transaction strategy. The rest of the paper is divided into four parts. They are literature review, theory analysis, application and conclusion. Literature review mainly talks about some aspects that has applied prospect theory. Theory analysis explain the prospect theory by using function model and also introduce the utility theory. And application is related to stock market. Through the prospect theory, scholars can futher research the rules of the stock market transaction.

2. Literature Review

Daniel Kahneman and Amos Tversky were firstly put forward the prospect theory. And more scholars have further research in this filed. Puppo Bruna and so on researched the multicriteria decision trading system [1]. The finding reveals that, compared to Buy-and-Hold, a TSO based on TODIM delivers the same level of performance with a lower degree of hazard exposure. Srivastava and so on have research portfolio selection by cumulative prospect theory [2]. They propose a new model based on the CPT for the issue of portfolio selection in uncertainty with ambiguity. And the theory of cumulative prospects (CPT) has become an essential method to evaluate the actions of decision makers ambiguously under uncertainty. The prospect theory also can be applied in demand for weather index insurance among smallholder farmers. Shin Soye and so on found that insurance demand is decreasing in loss aversion, and with respect to base risk and the insurance premium, the negative marginal effect of loss aversion on insurance demand increases [3]. CabedoPeris Javier and so on studied decision making in addictive behaviors [4]. Users of addictive substances were discovered to have a lower aversion to loss than non-users. Those results cannot be passed on to pathological gamblers. And there are scholars used prospect theory to explain cryptocurrency returns. Chen Rongxin and so on found that cryptocurrencies with higher prospect theory attractiveness yield lower future returns and tend to be expensive.[5]. Kluczek Aldona and so on research the energy sustainable industry 4.0[6]. The findings demonstrate that PT may be implemented in Industry 4.0 using a decision-making model for sustainable energy. For the investigated technology options, decision probability was accomplished utilizing a behavioral strategy similar to CPT. Hwang In Do explore the prospect theory and insurance demand, it postulates that if a person considers their wealth level to be "the status quo wealth level when they do not engage in insurance contracts," a decline in insurance demand will be triggered because of loss aversion.[7]. By demonstrating that the passive connection isn't present in the purchase of auto insurance, one of the most commonly used insurance products and is frequently treated as a necessity. Combined with the COVID-19 epidemic in recent years, Xie, Xiaofeng and so on research the prevention and control of COVID-19 risks for long-term care facilities [8]. The research is crucial in both theory and practice for managing COVID-19 hazards in long-term care settings. Yousra Trichilli and so on analyze the realistic cases, Islamic and conventional banks [9]. The paper aims at explaining the risk taking in Islamic and conventional banks from a behavioral prospect. Actually, policymakers and banks' administrators can get more inspirations from this result to better supervise the banking system. As it shows, prospect theory can help manage the bank systems. Do Nascimento Junior Arnaldo João and so on studied prospect theory and narrow framing bias [10]. In every instance, they used empirical research to establish the prospect theory's ability to forecast stock returns. In each country, there are differences in the relationship between prospect theory and stock returns, and these differences may be influenced by culturally specific factors.

3. Theory Analysis

3.1. Expected Utility Theory

Expected utility theory describes rational people's choice of consumption and investment under the environment of risk or uncertainty. However, in fact, many people are not rational. For instance, expected utility theory cannot explain the allaix paradox and ellsberg paradox. Expected utility theory thinks that the utility of lossed is equal to the utility of gained. It uses expected utility function to measure people 's utility like figure 1. The precondition of this theory is ture are two. The first is the information is complete, and second is the people is rational.

$$U\left(\sum_{i=1}^{n} p_i x_i \right) = \sum_{i=1}^{n} p_i U(x_i)^1 .$$

Figure 1. Utility Function

3.2. Prospect Theory

Daniel Kahneman and Amos Tversky found the flaw of utility theory. Prospect theory recovers the illogical psychological elements that influence choosing behavior from the perspective of human psychological features and behavior factors, utilizing the long-term rational man hypothesis. Prospect theory can be explained by value function (Figure 2).

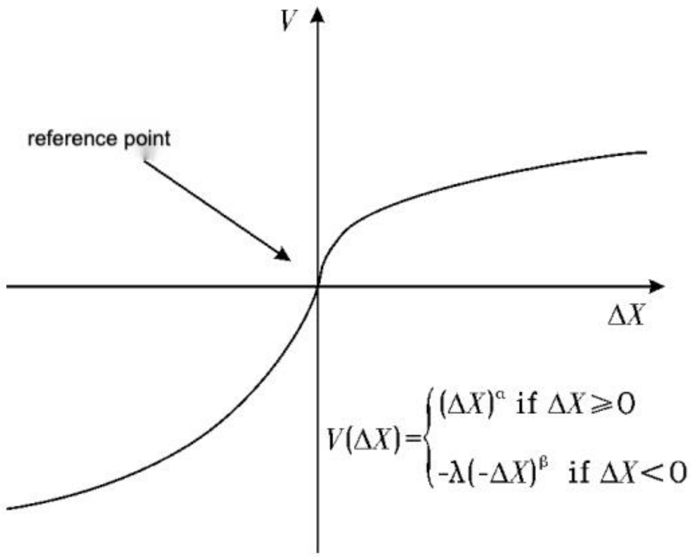

Figure 2. Value Function

Prospect theory holds that what people care about in the real world is the change amount of wealth instead of the absolute amount, thus value function is for describing people's response to the change amount of wealth. Value function synthesis reflects three basic viewpoints of prospect theory: (1) Individual risk aversion in the face of acquisition situation; (2) Individual risk chasing in the face of deficit situation; (3) Individual react to losses more strongly than to gains. Specifically, the value function takes Δxi, the change of wealth relative to the personal wealth reference point x0, as the independent variable, exhibiting a marginal decreasing rule. With reference point x0 as the boundary, it is divided into two curves in the shape of S. If the profit and loss is better than the reference point, individuals are profitable and tend to choose the conclusive programme. Individuals are in the convex part of the curve of value function. When the gains and losses is less than the reference point, the individual is in a loss scenario and is more likely to take a risky course of action, exhibiting the risk-chasing leader behavior. At this time, the people are in the concave part. Different frames of reference will influence the person's assessment of a gain or loss scenario, which will influence the person's attitude toward risk. Determining the reference points is subjective and depends upon the current level of wealth or the level of wealth you are trying to reach.

Nowadays, two theories are to interpret people's choice behavior when they are uncertain: expected utility theory and prospect theory. But expected utility theory has many flaws. It only says people take notice of the absolute amount of the final state of wealth. But in fact, people have many subjective factors to influence their choices in economics. Rational people are only an ideal hypothesis. According to prospect theory, the objective risk with low probability is given a higher subjective psychological evaluation, while vice versa. What’s more, the prospect theory describes a short time behavior, and utility theory describe a long-time behavior. The prospect theory uses value function to take place of the utility function of expected utility function.

4. Application

Accurately identifying the future trend of stock prices is of great significance to stock investment management and seeking stable and effective trading strategies is a constant concern in the field of stock investment. Traditional financial theory is not valid if there are no efficient market hypothesis and rational man, and holds that investors in the market have the same level of cognition, and is on the strength of all the information in the market to maximize the benefit of rational decisions. When the reversal effect and momentum effect were put forward, many scholars use these to forecasting Chinese stock market. However, the results were not satisfying. So, if studies based on the behavioral financial, using the prospect theory, the phenomenon will be settled reasonably. In behavioral financial, investor will be swayed by many subjective factors such as emotion, cognitive level and psychology and so on. In the state of bounded rationality, decision maker won't let the prices wander randomly. And more scholars did research along the way of behavioral financial, formed four typical models.

The first is BSV model (Barberis and so on). They think investors have two biases. The first is representative inspiration that investors place too much stress on the stock return weight and ignore the credibility of the event itself. In this state, investors think equity returns will be subject to a reversion, so they overreact to new information, and equity prices and yields will show a reversal effect. The next is conservatism, that is, investors place too much stress on the reliability of the event and neglect the weight of the influence of the event itself on stock returns.

The second model is DHS (Danial and so on). In this model, the person in the know determines the price of the stock and actually plays the role of the momentum trader in the market, while the uninformed person plays the role of the reverse trader.

The third model is HS (Hong and Stein). They think there have two kinds of people in the invest market, the newa-watchers and momentum trade.

The fourth model is BHS (Barbetis and so on). They introduced the prospect theory into the asset pricing mode. And explain stock reverse transaction using investors' variable psychological factors. Studies point out that investors exist the loss aversion, and the level of aversion depends on previous investment performance.

After the BHS model, more studies prefer to use behavioral theory like prospect theory to explain the stock reverse transaction.

5. Conclusion

This paper center on prospect theory and presented some research result in many fields via a lot of literatures. And that suggest the prospect theory has been applied in many aspects. Then the essay takes the stock market as an example, further research the stock reverse transaction.

Prospect theory combine psychology with economics' choices to explore people's behavior and it is more reasonable than utility theory. Via the value function, it can better understand the reference point, a principle of diminishing sensitivity and loss aversion. And scholars provided BHS model to introduce the prospect theory into the asset pricing mode. The result found that prospect theory can explain the stock reverse transaction and how do people make better decisions in the stock market.

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