

A Review of the Impact of Capability Illusions Induced by Generative Artificial Intelligence on Individual Investors' Overconfidence: From the Perspective of Heterogeneity in Investment Decision Efficiency and Risk Preferences

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Abstract

With the rapid commercialisation of Generative Artificial Intelligence (GenAI) in the field of financial investment, the illusion and overconfidence of individual investors' skills have become an important factor affecting the efficiency of investment decision-making. This review brings together the research published by Web of Science, Google Scholar and CNKI from 2020 to 2026. It is found that GenAI greatly increases the skill fantasy of retail investors, which makes their overconfidence stronger. The efficiency of investment decision-making is a bit like a bridge in this relationship, and the difference of risk preference is an important variable, which changes the intensity of this effect among different investor groups. This paper summarises the researchers' thoughts today, shows the differences and unknown contents, and puts forward ideas for future research. The purpose of this review is to provide theoretical reference for the interdisciplinary study of GenAI and investor behaviour. It also provides some practical suggestions, which could help individual investors avoid misjudgement and help financial institutions improve their services based on artificial intelligence.

Keywords

illusion of competence, overconfidence, investment decision efficiency, heterogeneity of risk preferences, behavioural finance

1. Introduction

In recent years, generative artificial intelligence and generalised language model (LLM) have been widely used in many fields, especially in the field of financial investment. This provides convenient help for individual investors to process information, analyse data, get advice and make decisions. As an important participant in the financial market, the market are increasingly using these generative AI tools to gain insights faster and make better choices. However, the characteristics of technology itself, such as content illusion, logical problems and fabrication of facts, may bring risks to investment decisions [1, 2]. The output produced by

artificial intelligence looks “smooth” and “very professional”, and it is easy for investors to believe that the auxiliary functions of artificial intelligence are actually their own, which has caused a major cognitive prejudice called “ability illusion” [3]. This illusion further aggravates the overconfidence of individual investors, which leads them to overestimate the accuracy of AI forecasting, underestimate the market risk and reduce the prudence of decision-making.

At the same time, the effectiveness of investment decision reflects the rationality of investors' investment behaviour. The heterogeneity of risk preference determines the sensitivity of investors to artificial intelligence information and cognitive bias. Despite the rapid development of artificial intelligence research in the financial field, few studies can integrate it into a single analytical framework: ability illusion, overconfidence, investment decision efficiency and heterogeneity of risk preference caused by artificial intelligence. This has left a huge gap in the scientific literature.

2. Research Objective

Organise and present the history of research on artificial intelligence, the illusion of ability and the overconfidence of individual investors in an organised manner. In light of behavioural finance theory, the technology acceptance model and the risk decision theory have been used to acquire new knowledge about cognitive biases in artificial intelligence from real cases. This paper will extend the application of behavioural finance in the era of digital finance and improve the research system of artificial intelligence combined with investor behaviour. This paper will focus on the practical problems of artificial intelligence generation and will not be a theoretical discussion; it will add some academic content and provide a systematic theoretical basis for subsequent empirical research.

This article would help the public make better use of artificial intelligence technology in their own lives. It can reduce the people's dependence on artificial intelligence for investment decisions and help them overcome the negative effects of ability illusion and overconfidence to improve the quality of decision-making. It offers some ideas for intelligent investment advisory services and improves the risk-control system of banks. Provide some actual data to help the developers and regulators of artificial intelligence promote the goal of advancing open financial innovation in an orderly manner.

Research objective 1: To explain the cognitive black box of “ability illusion” created by generative artificial intelligence, and reveal the psychological transmission mechanism of fuzzy boundary between man and machine increasing investors' overconfidence.

Research objective 2: To evaluate the mediating effect of investment decision-making efficiency and risk preference heterogeneity on it to clarify the boundary conditions under which cognitive bias can cause actual investment losses.

Research Objective 3: To form a concept of governance and an intervention plan for all sides, and to provide empirical evidence that can reduce the risk of a single culture and improve investor flexibility in the era of digital finance.

3. Theoretical Foundation

3.1 Behavioural Finance Theory

Behavioural finance theory challenges the traditional efficient market hypothesis. It shows that investors are not always rational, but they are influenced by cognitive limitations and personal prejudice [4]. As part of this paper on the generation of artificial intelligence, the theory will be used to study the formation of “ability illusion”. Unlike the older algorithmic trading tools, the new artificial intelligence is able to talk to users, and by displaying some emotions, it makes people feel working together. According to behavioural finance theory, investors usually attribute the complex output of artificial intelligence to their own questioning and analysis ability, rather than the powerful processing ability of artificial intelligence [5]. This biased tendency may make investors more confident. This leads them to overestimate their ability to predict market trends and perform other related tasks. Therefore, from the perspective of behavioural finance theory, generative artificial

intelligence not only provides information, but also changes the way of thinking of investors. This may reduce the quality of investment decisions, lead to excessive trading or take other risky actions, because they judge themselves wrong [6].

3.2 Technology Acceptance Model (TAM)

Behavioural finance studies psychological effects; the Technology Acceptance Model (TAM) is for how people learn to use new technology and may give them a false sense of capability. According to the model of information system research, the willingness to use technology is determined by whether the public believe it can be helpful and is simple to operate [3]. GenAI tools have been very effective in some areas of financial investment to help people better understand the data and achieve higher returns. However, due to the high acceptance by the public, a cycle of dependence has formed. When investors are presented with a convenient and efficient instrument, they may become more trusting of it and thus fail to feel the changes in their investment circumstances in time; they attribute this success to their own judgement rather than to the algorithm itself [5]. The combination of human intuition and artificial intelligence computing gives people the impression of being very intelligent, and although they do not fully understand how it works internally, they feel that they have obtained a powerful tool [3]. Therefore, TAM can help to understand why investors still use AI technology despite the errors, and the Design of the interface itself gives people a sense of control.

3.3 Risk Decision Theory

Risk decision theory studies how people evaluate uncertain results and make choices when there may be gains and losses. The basic idea of this theory is that people have different ways of dealing with risk in their decisions, and thus the results will differ significantly depending on whether everyone is comfortable or uncomfortable with risk [6]. Cognitive biases are related to final investment behaviour and thus provide a link. The effect of the AI illusion will be on investors' sense of risk. For example, after being advised by artificial intelligence, the investors have become too confident and now believe that high-risk assets are low-risk investments after careful study [3]. This change in risk appetite is very important because it determines the way funds are used. Risk decision theory tells that when you feel more capable, the expected utility of your imaginary venture capital will also increase. This makes people more willing to take risks [6]. Therefore, this paper helps to understand the interaction between prejudice and risk preference caused by AI. This is very important to explain the difference of investment decision-making efficiency among different investor groups.

4. Literature Review

4.1 Generative AI and the Illusion of Individual Investors' Capabilities

Integrating Generated Artificial Intelligence (GenAI) into the retail investment platform has completely changed the way that users interact with technology. Research shows that the way these systems will produce a psychological phenomenon: investors begin to combine the results of artificial intelligence calculation with their own analytical ability. Like the old algorithm tool, GenAI can also converse with us. It can be used to deceive people and create a sense of intimacy. Therefore, investors often mistakenly believe that machines can predict the future of finance; thus, they believe they have more control over the market than they actually do.

Cognitive distortions are more pronounced in the environment of digital information. Recently, some research has shown that the design of platforms for algorithm recommendation and instant notification is changing people's focus of attention [7]. Because the users have always seen the same information, they are more likely to believe what they have already thought. Therefore, it is the problems that users raise which drive the development of artificial intelligence. Combining people's instructions with the results of machines creates a cycle, which not only makes AI look more capable than it, but also keeps investors away from reality [7].

4.2 The Impact of Illusion of Competence on Individual Investors' Overconfidence

It is one of the principal problems in behavioural finance that one is too easily fooled by a temporary sense of ability and loses the ability to manage their own money. Therefore, it will stimulate the first cognitive bias in investors. As a result, they may be overly optimistic about the stability and certainty of the market and

therefore overestimate the accuracy of their forecasts [6]. According to statistics, many people have a good self-assessment and are therefore less likely to look elsewhere for confirmation. Therefore, they do not carry out traditional verification and are only based on the results of artificial intelligence [8].

The other reason for this is the digital interface of the new trading platform. Continuous updates of real data and a game-like Design of the trading window may make investors want to buy or sell; they may therefore be more willing to believe that it is right [7]. However, this is not always the case for all people. In the study of middle-aged and elderly investors, when the brain works harder, the effect will be weakened, especially when remembering things and calculating with numbers. It's strange, but people with low cognitive ability are often overconfident. This is because it is difficult for them to carefully understand the limitations of artificial intelligence [9]. In short, although GenAI usually makes users feel safer, the degree to which they feel safe depends on everyone's cognitive characteristics.

4.3 The Mediating Role of Investment Decision Efficiency

The efficiency of investment decision-making is the main way that psychological bias affects actual financial results. Based on the previous studies, it has been found that investors' cognitive biases do not directly impact investment outcomes; instead, they affect the quality and reasonability of decision-making [6]. With the development of Generative AI, this intermediary has also begun to change. When investors fall into the illusion of proficiency, they often mistakenly think that AI has provided all the information, so they no longer actively look for news. This dependence on artificial intelligence reduces their ability to obtain information, changes the decision-making efficiency from a positive intermediary to a negative intermediary, and finally makes their investment portfolio worse [8].

In addition, the empirical research in the field of enterprise financing is consistent with the research results at the individual level. The research on the application of artificial intelligence at the enterprise level shows that when the technology is well integrated, it can improve the decision-making efficiency by improving the quality of resource allocation and capital allocation [10]. It can be seen from the above that decision-making efficiency may be a limiting factor. Too much faith in the system may be unwise for the general public, and they have lost touch. At the same time, organised structured artificial intelligence can be used in the enterprise to increase efficiency by means of organised data processing [10]. The difference is that people often personify tools; thus, companies tend to view them as mere instruments.

4.4 The Moderating Role of Heterogeneity of Risk Preference

The distortion caused by artificial intelligence will not affect everyone in the same way. The impact largely depends on investors' different risk preferences. Literature has shown that people with a high tolerance for basic risks are more easily harmed by the negative effects of overconfidence [6]. These investors are thus motivated by the desire to be good-willed. Therefore, they can buy high-debt and high-risk assets under the premise that the risk is “manageable” [11].

There are other reasons why a person has a certain level of overall risk tolerance. Research shows that the ability of investors to process large amounts of information, that is to say their cognitive processing power, will affect how they use artificial intelligence. People with high cognitive abilities are better at recognising the flaws in AI's results and can thus form a kind of guardrail against blind trust [9]. On the other hand, people with low cognitive ability may be mistaken about the probability of artificial intelligence and think that its results are definite. A combination of high cognitive ability and a sense of risk is a specific type; however, people who are more inclined to take risks but have weak cognitive awareness are more susceptible to the “ability illusion” and, therefore, often have very poor investment decision-making efficiency [9, 11].

5. Key Finding

At present, academic research mainly focuses on the dual effects of generating artificial intelligence (GenAI) on retail investment. An important research point, and discuss how the interactivity of GenAI interface distorts investors' metacognitive ability. According to existing empirical studies, the interactive nature of these systems has given rise to a phenomenon called boundary ambiguity; thus, investors have mistakenly believed that the

processing power of artificial intelligence is their own analytical ability and thus overestimated the results of self-evaluation [5].

Recently, some research has explored how this “ability illusion” is constructed and has started to focus on people-oriented design features in many types of language models. Studies have found that a confident style of language and quick responses from artificial intelligence (GenAI) may make people feel safer and be less sceptical than they normally would. At the same time, research has begun to focus on the cooperation model of humans and artificial intelligence. The goal is to explore how to create an interface that reduces cognitive dependence, and at the same time proves that the value of generative artificial intelligence lies in enhancing human judgement, not automating everything [12].

From the commercial and regulatory point of view, the wide application of general artificial intelligence in the financial field is a double-edged sword. Although these tools can easily access complex analytical services, they can also reduce humans’ independent decision-making and turn critical thinking into simple passive dependence on algorithms [1]. For financial institutions, the challenge is to create systems that help people make better decisions without using interfaces that make them overconfident or lazy. Companies that use artificial intelligence to make better investments focus on the right combination of resources and management rules. This enables technology to help people with monitoring work, but it cannot replace them [10].

In addition, the emergence of artificial intelligence agents has introduced new systemic problems. With the combination of algorithmic trading and the amplification of retail investor sentiment by social media, there is now a risk of behaviour synchronisation and algorithm-driven resonance in the market [7]. Therefore, regulators should not only protect individual investors but also do more. They need to begin addressing the problem of collective risk and form information cocoons and behavioural deviations that spread via network effects. For enterprises, the strategic focus should be on how to implement the “de-prejudice” mechanism. These include transparency and disclosure frameworks, and designing friction points in the trading interface. This helps to reduce the psychological traps found in the literature on this subject [1].

6. Discussion

6.1 Research Controversies

At present, there is a great debate about how the excessive trust caused by artificial intelligence affects investment, which is neither simple nor direct. The traditional financial theory holds that the prejudice of the mind always makes the decision worse, but the new research on behaviour shows that things are much more complicated. Some studies show that overconfidence, coupled with the desire to take risks, does not always cost you money. For some types of investors, having more confidence may encourage them to take risks to take advantage of market defects. This shows that the “cost” of psychological prejudice depends on people's understanding of financial and market conditions. Theoretically, this creates a paradox: it is hardly to know whether GenAI really helps small investors, or whether it just increases the risk of the whole system [11].

6.2 Research Gaps

Despite these advances, there is still a major gap in current research. Mainly due to the lack of detailed psychological analysis. Although the general concept of “overconfidence” is often mentioned, the secondary dimensions (such as cognitive bias and control illusion) have not been fully applied in the field of general artificial intelligence (GenAI). People need to know which specific expressions of overconfidence are caused by the interaction with artificial intelligence in order to develop targeted interventions [13].

There is also a problem in the current research that it is too short-term and mainly employs a static research design. Therefore, they no longer know how dependent the user has become over time. New research should also solve the new problem of too many algorithms being used at present. When many people use the same general artificial intelligence tools, there will be group behaviour and the entire system will be weak. In addition, these models are “black boxes”, the public cannot know how they work internally, and do not know who to hold accountable in case of a problem. When the illusion produced by artificial intelligence leads to

financial collapse, it is very difficult to decide who should be responsible and how to punish it. This is a challenge to the law and investor protection, which needs to be solved in the future.

6.3 Future Research Directions

Based on the above defects, the following four directions will be the focus of future studies. First of all, scholars should avoid the method of static investigation and employ longitudinal study and experiments. Mark the key and track the development of the “ability illusion” over time. Whether the initial overconfidence of investors is stable or has changed after experience and loss. Therefore, it is necessary to develop dynamic evaluation indicators that can show the changes in trust of the public towards artificial intelligence [5].

The second is that detailed maps should be constructed at the level of psychology. In the future, it is proposed that “overconfidence” should be divided into several types, such as misjudgement of ability, control illusion and expectation deviation, and then determine which types are more likely to trigger interaction with GenAI. Santos Pinto and De La Rosa (2020) have been studying the basic research of labour economics, and overconfidence is not a single phenomenon. Therefore, the market need to decide whether the main reason for GenAI bias is ability misjudgement (overestimation of absolute ability) or control illusion (overestimation of relative position) and then take appropriate intervention measures to reduce prejudice.

Thirdly, the problem of algorithm homogeneity and system risk in the research needs to be solved. With the spread of some basic models among retail investors, in the future scholars will need to investigate how to exploit the loopholes in artificial intelligence (such as certain types of cognitive biases) to trigger synchronous trading behaviour and market fluctuations. At the same time, scholars need to investigate the phenomenon of “cognitive deprivation”, that is to say, how exactly artificial intelligence replaces human thinking in the field of retail investment. Therefore, the construction of the rule of law should focus on safeguarding people's cognitive freedom and not merely be about automatic operations [1].

Finally, the context boundary condition still needs to be specified. Artificial intelligence can help the company better coordinate and manage resources to speed up the speed of decision-making [10], but in the future, it will be necessary to determine whether these mechanisms can also be applied to individual investors. Determine whether the absence of organisational supervision in the retail environment will make people feel more that there is a lack of regulations, or if the reduction in reliance on algorithms is due to an increase in people's risk-seeking behaviour. The two will help investor decide whether the generation of artificial intelligence (GenAI) is in fact a thinking tool or a thinking trap.

7. Conclusion

This systematic review brings together more and more research between generative artificial intelligence (GenAI) and behavioural finance. It is about how people are influenced in their investment behaviour. As a result of the analysis above, GenAI's interactive architecture may give some individual investors the impression that they have gained the ability to do so. By blurring the line between machine computing and human intuition, these tools can make people believe that the results of algorithms are their own financial ideas and thus increase their overconfidence.

The first purpose of this paper is to explain how psychological bubbles are formed. It is found that the efficiency of investment decision plays an important role as an intermediary. Skillful illusion reduces the quality of decision-making, prompting investors to skip normal inspection and rely on artificial intelligence to create decision-making narrative. This has led to poor allocation of funds. In addition, this effect is different for everyone; different risk preferences play a moderate role. Investors who can better withstand risks are more susceptible to artificial intelligence bias, because technology confirms and strengthens their betting tendency.

From a business point of view, these findings pose a double challenge. For financial institutions and financial technology developers, the challenge is to rebuild the artificial intelligence interface to reduce the dependence on thinking and turn the development of automation into enhanced interaction. For regulators, the rise of algorithmic monopoly culture and “deprivation of mind” quickly require new transparency and investor protection rules. Although this review integrates the cognitive biases related to artificial intelligence that understand at present, the rapid development of extensive language models still needs researchers' attention.

Future research needs to go beyond static analysis to understand the dynamic interaction between human thinking and artificial intelligence in the increasingly complex financial ecosystem.

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Conflicts of Interest

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