How Artificial Intelligence Effect the Fairness of Financial Industry

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Abstract. The development of the financial industry has always been closely intertwined with technological advancements. In this Internet age, artificial intelligence (AI) emerges as a pivotal force driving the new round of scientific revolution and industrial transformation, penetrating nearly every aspect of financial sector, becoming a non-negligible factor in financial area. This article examines and analyses the impact of AI on the fairness of financial industry. It argues that the comprehensive information processing capabilities AI has do facilitate fairness people expected, specifically reflected in these three aspects: narrowing service quality disparities through personalized services for users, enhancing the inclusivity of the financial industry through the proliferation of technology, and fostering fair competition in financial sector through digitally driven regulatory methods. However, due to the information biases and the adaption limitations AI has, problems like algorithms discrimination and digital gap may occur, ends up with exacerbating the social inequity existing in financial industry.

Keywords: Artificial intelligence, financial industry, fairness.

1. Introduction

As the influence of technology on economic development becomes increasingly pronounced, artificial intelligence has moved into view. Serving as the core technology of the Fourth Industrial Revolution, AI shows subversive innovative power in propelling societal structural change and energizing the development of human civilization. Artificial intelligence does not exist in isolation, in fact, it is closely related to big data, blockchain and other advanced technology, jointly weaving the grand blueprint of technological empowerment for industrial development [1]. Evolutionarily speaking, the development of artificial intelligence, from weak to strong, not only makes the progress of artificial intelligence go beyond simple data analysis, judgement, and prediction, but also demonstrates powerful potential in both extensively collecting datasets and constructing the underlying logic in training model, therefore, the new database can be formed on these bases. This transition accelerates the speed of information processing, enabling the extraction process to become more convenient and more efficient, and significantly enhancing the problem-saving ability of AI to adapt to new situations. As the great increase of activities themed on artificial intelligence can be seen, people become more convinced of AI for its high intelligence. It can be said that the application of artificial intelligence has broken down the silos in data domains, covering a wider sourcing of data as the result of it [2].

In such human-computer-interaction engagement model, the application of artificial intelligence has various and broad nature. But the power of AI to disrupt industry dynamics seems to appear to be tightly connected to the nature of the information problems being solved. Taking the financial industry as an example, it has shown brilliant adaptability since the emergence of AI and has become a laboratory to explore the effect of AI. This is mainly because of the high level of digitization financial industry has. It focuses on information processing capabilities and possesses cumulative data accumulating in daily transaction processing. Arguably, AI and the financial industry naturally complement each other.

With its strong capacity on data storage and professional ability of data analysis, AI provides powerful support for improving decision-making efficiency in financial services industry. Since modern computerized equipment can now replace some simple tasks traditionally assigned to finance

staff and accounting personnel, intelligent auditing and smart index have become reality. Meanwhile, AI, with its prominent characteristics of theoretical innovation and application scenarios, has also spawned various basic, universal, and personalized applications including intelligent customer service, robo-advisors, credit scoring and risk management, further boosting the coordinated development of theoretical mechanism, economic effects, and risk control in the field of finance. From the perspective of emerging technologies applications, there is no doubt that AI is changing the industry structure of financial market. Therefore, this article centralizing on financial sector, analyzing, and researching the impact of artificial intelligence posing on the fairness of financial industry, aiming for a more comprehensive and objective assessment of the changes and challenges brought about by AI.

2. Fair Promotion

2.1. Personalized Services

Artificial intelligence is driving the financial services industry to make more impartial and objective decisions. With the new round of technological revolution and industrial transformation, data has become a strategic national resource and a new factor of production and is the basis for decision-making. AI is more advantageous than human beings when it comes to gather a comprehensive investigation and fully exploiting the asset values of data. Constrained by the threshold effect of financial investment products, the core target group of traditional financial industry is those high-net-worth customers. Compared to ordinary clients, high-net-worth individuals can provide more lucrative sources of profit for businesses. Therefore, financial institutions tailor more refined and diverse services for them and are more inclined to actively establish deep relationships with them, resulting in quality disparities in services received by different customer groups. With the technological development in the field of communication, social space and activity patterns nowadays gradually shift from offline to online. The use of mobile devices has broadened the channels for artificial intelligence to obtain information, expanding the richness of data resources [3]. Intelligent decision-making based on artificial intelligence as the main thrust and the integration of various digital technologies such as big data and blockchain, effectively captures the numeral associations between various elements of the financial system, achieving a closed-loop data value excavation throughout the entire process of data collection, organization, and analysis in financial system. With the support given by massively parallel processors and algorithm optimization for efficient data acquisition, data elements providing for decision-making have now been scientific, real-time, accurate and comprehensive. It is precisely because of such comprehensive information processing capabilities and decision-making levels of algorithmically objective analysis that portrayal of user characteristics has become feasible. Through high-definition holographic portraits of customer behavior preferences, AI realizes the quantitative analysis of customer sentiment, thus can establish personalized behavior models, and provide customized services to meet user needs [4]. This targeted service optimizes resource allocation and service process and creates significant non-economic value in terms of the realization of user needs and the satisfaction of user experiences, effectively narrowing the quality disparities in services received by different customers [3]. This is what customer service stuff cannot achieve based on the simple rule analysis they usually do. In addition, since there are several elements effecting the process when human try to solve something, such as the limited capacity to process complex information, the potential influences of emotional concepts and constraints of environmental conditions, subjective judgments made by human are prone to neglect and preference, which makes the results of financial services have great human interference [5].

2.2. Financial Inclusion

The impact of artificial intelligence on the breadth of financial services mainly manifests in the enhancement of financial inclusion [6]. The cost components of applying artificial intelligence in the financial sector mainly covers data collection and cleaning, algorithm development and optimization,

and infrastructure procurement for hardware devices. With iteration of technology and the growth of application volume, the appearance of scale effect reduces the marginal cost of finance combined with artificial intelligence. This allows those small and medium-sized enterprises (SMEs) and low-income groups in the long tail market to access and enjoy convenient and efficient financial services, thus extending the service boundaries of the financial market.

Financial institutions, through the application of artificial intelligence technology, have successfully built digital customer acquisition channels, greatly improving their ability to acquire customers in bulk and operational efficiency enhancement. By constructing a comprehensive and three-dimensional touch system that integrates both online and offline, financial institutions can now free from spatial and temporal limitations, scale up access to services, innovate financial products, optimize service models, lower service thresholds, improve service experiences, and bring financial services enter millions of households.

Take robo-advisor as an example. This application relies on artificial intelligence and integrate technologies such as big data and cloud computing, bringing new expressions to financial services. Through accurate analysis of decision-making data, risk preferences, and property credit status of customers, robo-advisor, compared to traditional investment advisors, have lower costs and reliable business capabilities, making investment activities benefit more income levels and social groups. For small and medium-sized enterprises in financial industry, difficulty in financing and high financing costs have always been their pain points. Apart from the entry barriers that are difficult to overcome on the demand side, the low level of digitization of service quality on the supply side and high-risk control costs also constrain the development of these enterprises. But the application of artificial intelligence technology can provide effective solutions to this problem. By innovating risk assessment exercise and establishing sound credit evaluation systems, AI now raises the efficiency of loan approval process, increases availability to credit for SMEs and promotes overall optimization of funding costs. In terms of operations, by building a scientific cost accounting system and smoothing service channels, the explicit costs SMEs paid in customer acquisition, human resources, and operations have reduced a lot, which creates more profit space for these cooperate and enhances the competitiveness and sustainable development capabilities of enterprises.

2.3. Financial Regulation

The application of artificial intelligence in financial regulation can effectively promote the establishment and consolidation of a fair competition environment. At the current stage of accelerated digitization, traditional supervisory philosophy, and human-based analysis, often referred to as the "huge-crowd strategy", are no longer adequate to cope with the ginormous amount of data and such increasingly complex financial transactions nowadays [7]. How financial regulatory agencies can fully leverage digital elements and implement penetrative supervision is viewed as an unavoidable challenge. Intelligent supervision based on artificial intelligence can monitor risk propagation paths in real-time, accurately identify risk points, effectively assess risk levels, and provide timely alerts, finally establish a cross-regional, cross-industry, and cross-market systemic comprehensive regulatory ecosystem. Such digital-driven regulatory approaches not only enhance the efficiency of financial resource allocation, but also effectively address issues such as the contagiousness of financial risks, regulatory arbitrage, regulatory lag, and regulatory ambiguity. For instance, in the realm of transactions, the application of artificial intelligence extends far beyond the verification systems of biometric technologies that commercial banks use. The multidimensional and Mult situation dynamic risk assessment employed in monitoring many credit card and electronic payment transactions helps regulatory agencies insightfully observe changes in purchasing activities, promptly identify potential risks, thus can transform corrective actions to proactive solutions and reduce occurrences of fraudulent behavior. This protects the property safety of customers, upholds the fairness and order of financial markets, which is conducive to the construction of a healthy and stable financial environment. Additionally, the application of artificial intelligence improves the efficiency of financial regulation, primarily manifested in the coordination and cooperation between regulatory

agencies, financial institutions, and real enterprises. Through information sharing, data integration, and coordinated monitoring, the working mechanisms and the layouts among different entities have been optimized, and the efficiency and accuracy of regulation have been improved.

3. Fair Resistance

3.1. Algorithmic Biases

There are algorithmic biases inherent in artificial intelligence [8]. Programmers influenced by their own values and experiences might consciously or unconsciously inject biases into algorithm designs, leading to unfair outcomes. What is even more complex is the significant impact that the collection and usage methods of data will have on results. This is due to the large volume of data collected from customers as training data and model inputs and is specifically reflected in the following steps. Firstly, when conducting cost analyses to determine the sample types of target customers, the misunderstanding of AI on business backgrounds and its sample basis may lead to errors in both sample types and model selection. Equally important are subsequent data input and model construction process. On the one thing, data quality directly impacts the accuracy and stability of models. When the data is unbalanced, overfitted, mislabeled or ambiguous, it can easily cause model drift or performance decline. Correspondingly, improper model selection affects data capture patterns, resulting in biases in data interpretation and generalization. In addition, models in AI deep learning mode, such as large language models, are often labeled as "black boxes", for the reason of the opacity and lack of interpretability of the decision-making process [9]. The high-dimensional data used in the "black box" model is complex and difficult to capture. These models not only have many complex parameters, but also often have nonlinear relationships which are difficult to explain simply. Moreover, the characteristic "black box" shows in featuring automatic selection makes the decision-making process lacking transparency, which prevents users from understand the feature factors that play a key role in decision-making, further increasing the hidden potential risk of discrimination. Ultimately, algorithmic biases have impacts on the financial industry. For example, algorithmic biases in credit scoring systems can decrease credit accessibility for biased groups, resulting in resource misallocation.

3.2. Digital Gap

The application of artificial intelligence in financial sector exacerbates the digital divide [10]. This digital gap refers to the large disparity between different social groups in terms of access to and use of digital technologies and the resources and services they bring. The utilization of artificial intelligence is heterogeneous. From a regional point of view, affected by the limitations of natural geographical conditions and the economic technological influences, the degree of development varies from place to place, and the application of artificial intelligence in the local financial field is different. The more developed regions benefit from resource allocation in communication equipment, policy support, and capital investment, therefore the development of the financial industry in this area is on the right track, with broad coverage of artificial intelligence and high rates of application and efficiency conversion. Conversely, remote, and underdeveloped areas suffer from the limitations of infrastructure and resources. There are difficulties in accessing of artificial intelligence, restricting the expansion of financial services with shallow depth and narrow scope. Additionally, lacking data empowerment, these areas struggle to rapidly achieve digital transformation, thus missing out on the benefits of injecting new momentum into the financial industry through artificial intelligence. From an industry perspective, the high training costs of AI learning models and the high requirements for real-time data processing pose significant challenges to financial companies, especially for those smaller enterprises. Established banks and longstanding corporations with substantial funds can afford these costs and consequently share the benefits brought by technology, then the new and higher digital barriers for smaller enterprises can be set up [11]. Meanwhile, different sectors of financial industry exhibit have different needs and adaptability for artificial intelligence. While AI can indeed

help various branches of business improve decision-making, its impact on certain domains, such as fund management, is transformative, while in others, like the loan sector, it is gradual. This implies that the difficulty of leveraging artificial intelligence to enhance efficiency and service quality varies among enterprises and branches. Therefore, artificial intelligence may hinder the fairness of financial services, further exacerbating unequal resource distribution and widening the digital gap.

4. Conclusion

While artificial intelligence has paid huge dividends for financial industry, it also brings about challenges. On one hand, its comprehensive and objective information processing capabilities integrating with other cutting-edge technologies effectively promote fairness in finance. By delivering personalized service, AI significantly narrowed disparities in service quality, enabling each customer to enjoy more precise financial services. The popularity of technology also greatly improves financial inclusion, allowing more people to enjoy the convenience presented by the financial services. Moreover, digital-driven supervisory method makes the playing field in financial industry become fairer and more transparent. But on the other hand, issues such as information biases and adaptation limitations may lead to algorithmic discrimination and digital divides, exacerbating unfairness in financial services. Therefore, while promoting development of artificial intelligence, it is necessary to be vigilant and respond to these potential issues to create the right environment for the healthy, equitable and sustainable development of financial industry.

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