

Risk Control: A Multi-Dimensional Review of Risk-Taking, Liquidity Creation, and Green Credit with ESG

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Abstract

This paper explores the multi-dimensional impact of FinTech on commercial banks' risk control from the perspectives of risk-taking, liquidity creation, and green credit with ESG. Based on a review of existing literature and theoretical analysis, this study finds that FinTech exerts a dual effect on bank risk management. On the one hand, technologies such as big data and artificial intelligence improve risk identification efficiency, optimize liquidity allocation, and enhance green credit and ESG performance by alleviating information asymmetry between banks and borrowers. On the other hand, intensified market competition may induce excessive risk-taking, while technical integration barriers, data governance defects, and regulatory lag constrain the positive role of FinTech. The effects also exhibit significant heterogeneity across banks with different ownership structures, scales, and digital capabilities, with state-owned banks generally better positioned to leverage the advantages of FinTech than small private banks. The synergy between internal governance and external supervision is therefore critical for balancing FinTech innovation and risk control. This study enriches the theoretical framework linking FinTech and bank risk control and provides practical references for commercial banks to strengthen risk management and for regulators to formulate targeted policies that promote the healthy integration of FinTech and traditional banking.

Keywords

FinTech, commercial banks, risk-taking, liquidity creation, green credit

1. Introduction

The rapid penetration of FinTech, represented by technologies such as big data, artificial intelligence, and blockchain, into the banking sector has triggered intense academic and practical debate regarding its net impact on systemic risk and bank performance. A critical theoretical and policy gap remains in understanding how FinTech reshapes financial stability amid increasingly complex market competition and diversified risk factors. Liu et al. [1] find that FinTech amplifies systemic risk by altering banks' credit allocation strategies and leverage levels, with significant heterogeneous effects across different types of banks, including state-owned and private institutions. Notably, their research also indicates that despite heightened risk-taking behavior, FinTech can still improve banks' risk-adjusted performance through efficiency optimization. Elekdag et al. [2] further confirm that greater FinTech presence in the financial market is associated with increased risk-taking by financial intermediaries, thereby strongly supporting the competition-fragility hypothesis. However, they also emphasize that strong domestic supervision and sound internal governance mechanisms can effectively

mitigate this negative effect. In contrast, Fan and Zhu [3] present an opposing perspective, demonstrating that FinTech capability can significantly reduce systemic risk by improving banks' investment efficiency, with this stabilizing effect being particularly prominent for state-owned banks during periods of economic expansion. These conflicting findings reveal unresolved tensions in the literature: some studies regard FinTech as a risk amplifier [1,2], whereas others identify it as a stabilizing force [3]. Existing studies have not fully reconciled these competing perspectives or adequately explored how regulatory instruments, such as the regulatory sandbox model proposed by Liu et al. [1], interact with FinTech's dual effects. Against this background, this paper re-examines the multi-dimensional impact of FinTech on systemic risk by explicitly analyzing the mechanisms underlying these contradictory conclusions. Drawing on the core insights of studies [1-3], this paper develops an integrated analytical framework to comprehensively examine both the risk-taking incentives and efficiency gains associated with FinTech, with the ultimate goal of providing theoretical support and practical guidance for the formulation of more balanced and effective financial regulatory policies.

2. Theoretical Background

The theoretical foundation of FinTech's influence on banks is primarily based on two core frameworks: the competition-fragility/efficiency trade-off hypothesis and the resource-based view (RBV) of the firm. These theories explain how technological adoption reshapes bank performance, risk profiles, and competitive dynamics, while cross-country evidence reveals divergent outcomes associated with different regulatory environments and organizational capabilities. The competition-fragility hypothesis focuses on market dynamics and emphasizes how intensified competition influences banks' risk-taking behavior, whereas RBV highlights the importance of internal resources and organizational capabilities in determining a bank's ability to utilize new technologies effectively. The interaction between these two perspectives is crucial for understanding the dual effects of FinTech on banks, as technological innovation simultaneously intensifies market competition and provides strategic resources that improve operational efficiency. From the perspective of competition, Kalai and Toukabri [4] argue that FinTech adoption expands opportunities for regulatory arbitrage and creates asymmetric impacts across markets. In fragmented regulatory systems such as that of the United States, FinTech generates stronger performance gains for commercial banks, while integrated sandbox frameworks in Canada slow adoption rates, reflecting the tension between innovation promotion and financial stability oversight. This finding is consistent with the competition-fragility hypothesis, according to which FinTech-driven competition pressures banks to assume greater risks in order to maintain market share, particularly in less regulated environments where profit margins are more vulnerable to digital entrants. From the RBV perspective, Bian et al. [5] demonstrate that FinTech adoption functions as a strategic resource, with heterogeneous effects linked to organizational capabilities such as digital infrastructure, talent reserves, and technological integration capacity. Their analysis of Chinese banks shows that FinTech's performance-enhancing effects are more pronounced in banks with technologically capable management teams, as these institutions are better equipped to utilize technological resources to optimize operations and capture market share. This argument is further supported by Goel and Kashiramka [6], who use Indian banking data to show that FinTech directly improves cost efficiency, especially among private and small banks that are more flexible in adopting new technologies to streamline processes and reduce operational costs compared with large state-owned banks characterized by more rigid decision-making systems. Taken together, these studies help reconcile the dual theoretical perspectives. While competition-driven pressures may increase risk under certain conditions, FinTech as a strategic resource can also generate efficiency gains that mitigate such risks. The divergent findings across countries further highlight the critical role of regulatory and institutional factors in determining whether FinTech acts as a destabilizing force or a performance-enhancing capability for banks, thereby bridging the gap between theoretical frameworks and real-world banking practices [4-6].

3. Literature Review

3.1 FinTech Development and Its Influence on Commercial Banks' Risk-Taking Behavior

FinTech exerts a complex two-sided influence on bank risk-taking, with empirical findings often conflicting and challenging theoretical consistency. This complexity arises from heterogeneous FinTech applications and differences in bank characteristics such as scale, ownership, and digital maturity, making a unified conclusion difficult. On the risk-reducing side, Ngo et al. find that FinTech tools such as AI and big data analytics

significantly enhance banks' ability to assess borrower risk, enabling more accurate pricing and portfolio allocation, thereby reducing excessive risk-taking [7]. Their study of Vietnamese banks shows that FinTech improves cost efficiency and real-time monitoring, lowering the probability of poor lending decisions in emerging markets. Similarly, Duan and Liu demonstrate that FinTech combined with green credit policies reduces bank risk-taking in China and strengthens the risk-mitigating effect of green finance initiatives [8]. In contrast, other studies highlight risk-enhancing effects. Li et al. argue that FinTech increases competitive pressure by eroding traditional banking margins, especially in retail banking, prompting banks to engage in higher-risk lending to maintain profitability [9]. Wu et al. further show that while FinTech may reduce insolvency risk, it increases credit and liquidity risk in Chinese banks, particularly joint-stock banks under performance pressure [10]. These contrasting findings indicate that FinTech simultaneously operates as a risk-control tool and a competition-driven risk amplifier, requiring further synthesis of underlying mechanisms.

3.2 FinTech Applications in Promoting Green Credit and ESG Performance of Commercial Banks

FinTech applications in commercial banks often suffer from a range of challenges, including inconsistent integration frameworks, mismatched data governance standards, and heterogeneous regulatory requirements across regions and institutions. These practical obstacles hinder the deep integration of technology and green finance, as banks lack unified norms for connecting FinTech systems with green credit business processes, leading to disjointed data flow and inefficient operation. Moreover, these issues significantly impact the reliability of green credit allocation and ESG performance evaluation of banking institutions, unstandardized data governance makes it difficult to accurately quantify the environmental benefits of green projects, while fragmented regulations lead to inconsistent standards for ESG assessment. In the context of global sustainable development, such issues not only reduce the operational efficiency of green finance but also weaken the guiding role of banks in green transformation, failing to effectively guide social capital to flow into high-quality green projects. According to Cicchiello et al., the positive effect of FinTech acquisitions on banks' ESG performance has a significant lag effect, which means short-term evaluation cannot fully reflect real improvement, creating great uncertainty in performance measurement and making it hard for banks to adjust their green strategies in a timely manner [11]. Sassi stressed that disparities in technological capacity and resource input across banks have resulted in imbalanced FinTech penetration, which further leads to diverging performance and uneven progress in sustainable finance. This issue is more prominent in emerging markets with inadequate infrastructure and regulatory frameworks, where small and medium-sized banks are generally incapable of deploying sophisticated FinTech solutions [12]. Furthermore, Qian et al. noted that the restraining influence of banking FinTech on corporate greenwashing displays distinct firm-level and regional discrepancies. It exerts a more pronounced effect on large firms with standardized information disclosure practices compared with micro and small enterprises, and works more efficiently in developed regions than in underdeveloped areas, thereby generating evident heterogeneity in the quality and practical outcomes of green credit initiatives [13]. Beyond that, You and Liu further pointed out that inappropriate or excessive adoption of FinTech may fail to curb excessive risk-taking behaviors in green finance businesses. Overdependence on technological tools tends to overlook the inherent risks embedded in green projects, which in turn undermines the long-term sustainable development of green credit [14]. In summary, the application of FinTech in green credit and ESG practice is restricted by multiple problems, including technical integration barriers, data governance defects, and regulatory inconsistencies. These limitations collectively indicate that it is urgent to build robust standardized frameworks and improved regulatory mechanisms to unify standards for FinTech integration and data management, regulate the rational application of technology, and clarify regulatory requirements across regions. Only in this way can we ensure the effectiveness of FinTech in promoting green credit and ESG performance, laying a solid foundation for further in-depth analysis and empirical testing on the synergistic development of FinTech and green finance.

3.3 The Effect of FinTech on Bank Liquidity Creation and Stability

Existing studies on the relationship between FinTech and bank liquidity creation and stability remain highly divided and yield inconsistent empirical conclusions across different national contexts, research samples and time periods. The divergence mainly stems from differences in the measurement of FinTech development, the selection of bank samples (such as the distinction between listed and non-listed banks, large and small banks), and the differences in macroeconomic environments of various countries, which makes it difficult to form a

unified theoretical consensus and unified practical policy implication. Therefore, it is necessary to sort out and synthesize representative research findings in this field, clarify the core mechanisms and influencing factors behind the inconsistent conclusions, and provide a clear theoretical basis for subsequent research and practical guidance. This paper briefly reviews four key existing studies to clarify the heterogeneous effects and contradictory mechanisms of FinTech affecting bank liquidity creation and operational stability, and lays a foundation for reconciling the differences in existing research. Fang et al. adopt the panel data of Chinese listed banks covering the period 2007–2021, and their empirical results reveal that FinTech development, including big data risk assessment, intelligent customer service and digital loan processing, can significantly promote the overall level of bank liquidity creation by improving service efficiency and expanding service coverage. Meanwhile, such liquidity expansion effect also stimulates banks' latent risk-taking behavior through the intermediary channel of asset-liability business adjustment, as banks may relax lending standards to further expand credit scale and enhance liquidity creation capacity [15]. Liao et al. focus on the sample of Chinese commercial banks from 2009 to 2023, and further illustrate that FinTech optimization effectively alleviates bank liquidity mismatch. It achieves this positive effect by driving non-interest income growth (reducing reliance on traditional interest income), expanding rational credit scale expansion (avoiding blind credit expansion), and upgrading internal risk management capability (reducing the probability of liquidity risks caused by bad debts) [16]. Grover and Aggarwal carry out relevant research based on Indian commercial banks during 2016–2022, and confirm that FinTech adoption, such as digital payment systems and online lending platforms, remarkably enhances banks' liquidity creation capacity, and such improvement is mainly reflected through on-balance sheet business activities, including increasing short-term loans and optimizing the structure of deposit and loan business [17]. By contrast with the viewpoint of Fang et al., Wang et al. hold an opposite conclusion, pointing out that bank digitalization, as the core component of FinTech, tends to reduce banks' willingness to take excessive risks by improving risk identification and control capabilities, thereby restraining excessive liquidity creation that may bring liquidity pressure, and ultimately helping strengthen the overall financial stability of the banking sector [18].

4. Discussion

4.1 Comparative Analysis

FinTech exhibits clear dual effects across the dimensions of risk-taking, liquidity creation, and ESG/green credit. These heterogeneous outcomes are mainly driven by differences in institutional environments, ownership structures, internal digital capabilities, and regulatory intensity. In terms of risk-taking, FinTech compresses traditional banking profit margins in the digital era. Under weak regulatory conditions, some banks expand high-risk assets to compensate for losses, thereby amplifying risk exposure. In contrast, banks with mature digital risk management systems leverage big data and AI to improve risk identification and constrain excessive risk-taking. For liquidity creation, banks with strong digital capabilities expand service coverage and accelerate capital turnover, thereby increasing liquidity creation. However, banks lacking effective monitoring systems under loose supervision may expand excessively, resulting in hidden risks. The alignment between digital capacity and regulatory strength is essential for operational stability. In green credit and ESG, large banks with sufficient resources build advanced evaluation systems and actively promote green finance projects. However, uneven digital adoption, inconsistent regulatory frameworks, and insufficient investment in small banks hinder FinTech's effectiveness, leading to obvious structural disparities. In summary, FinTech's dual effects stem from mismatches between internal capabilities and external regulatory environments.

4.2 Challenges

The application of FinTech in commercial banks' risk control faces multiple prominent challenges that hinder its in-depth integration and effective implementation. Firstly, technological integration barriers exist, as many banks' traditional risk control systems are incompatible with new FinTech tools, leading to disjointed data flow and inefficient risk management. Secondly, data security and privacy risks are prominent; the extensive use of big data and AI requires collecting massive user information, which may trigger data leakage and violate privacy protection regulations. Thirdly, regulatory lag is a critical issue, FinTech develops rapidly, while relevant regulatory frameworks and standards update slowly, resulting in regulatory arbitrage and unclear responsibility division. Additionally, the lack of professional talents with both financial and

technological literacy restricts banks' ability to optimize FinTech applications, making it difficult to fully exploit the technology's potential in risk control. These challenges collectively affect the stability and effectiveness of FinTech-driven risk control.

4.3 Future Research Directions

Future research can focus on several key directions to address existing gaps and promote the in-depth integration of FinTech and commercial bank risk control. Firstly, it is necessary to explore more scientific measurement methods for FinTech's impact, to accurately quantify its dual effects on risk-taking and efficiency, considering the dynamic changes of the market environment. Secondly, research can focus on the heterogeneous effects of FinTech in different types of banks, clarifying how factors like ownership, scale and regional development level affect its application effect. Thirdly, further study on the coordination mechanism between FinTech applications and regulatory policies is needed to provide more targeted suggestions for regulatory optimization. Additionally, exploring the application of emerging technologies in green credit and ESG risk control, and how to solve data governance and technical integration problems, will be important research directions to promote the sustainable development of banks. These directions can enrich the research system and provide more practical guidance for banks' digital risk control transformation.

5. Conclusion

This study investigates the multi-dimensional impact of FinTech on commercial banks' risk control from the perspectives of risk-taking, liquidity creation, and green credit with ESG. The findings reveal that FinTech exerts a dual effect on bank risk control, acting as both a risk stabilizer and a potential risk amplifier, with heterogeneous outcomes across different bank types and regulatory environments. Specifically, state-owned banks with stronger institutional advantages and technical reserves tend to better leverage FinTech's risk-mitigating effects, while small and private banks are more vulnerable to competition-driven risk-taking pressures. Technologically, FinTech empowers banks with big data and AI to enhance risk identification, optimize liquidity allocation, and facilitate green credit evaluation, thereby alleviating information asymmetry and improving risk-adjusted performance. However, intensified market competition driven by FinTech may push banks to expand high-risk businesses, while inconsistent technical standards and regulatory lags restrict the effectiveness of FinTech in green finance and ESG governance. These constraints are particularly prominent in emerging markets, where inadequate digital infrastructure and fragmented supervision hinder the full play of FinTech's positive role. The reconciliation of these dual effects relies on the synergy between internal bank capabilities and external supervision. Sound digital infrastructure and governance enable banks to leverage FinTech's efficiency gains, while robust regulation mitigates excessive risk-taking and regulatory arbitrage. Banks should strengthen digital talent cultivation and technological integration, while regulators need to update regulatory frameworks in a timely manner to keep pace with FinTech development. This research enriches the integrated analytical framework of FinTech and bank risk control, offering practical guidance for commercial banks to optimize risk management systems and balance innovation with stability. It also provides evidence-based implications for regulators to formulate targeted policies, promoting the sustainable and integrated development of FinTech and commercial banking risk control. Limitations of this study and directions for future research are also briefly noted, laying a foundation for further in-depth empirical exploration.

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