FinTech and Risk Governance: New Risks and Challenges in the Digital Economy

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ՖինՏեխ և ռիսկերի կառավարում, նոր ռիսկեր ու մարտահրավերներ թվային տնտեսությունում

Մարդոյան Աշոտ Վ.
Տնտեսագիտության թեկնածու, դոցենտ, Ֆինանսական շուկաներ և ինստիտուտներ ամբիոնի վարիչ,
Հայաստանի պետական տնտեսագիտական համալսարան (Երևան, ՀՀ)
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Ամփոփագիր. Ֆինտեխը և ռիսկերի կառավարումը դարձել են հիմնական գործոններ թվային դարաշրջանում բանկային համակարգի կայունության ապահովման գործում: Թվային տեխնոլոգիաների, ինչպիսիք են բլոկչեյնը, մեծ տվյալները և թվային նորարարությունները, արագ զարգացումը մեծացնում է բանկերի գործառնությունների արդյունավետությունը՝ հնարավորություն տալով բարելավել վարկերի վերլուծությունը և հաճախորդների բավարարվածությունը: Այս տեխնոլոգիաներն ընդունելով՝ նոր ռիսկեր են առաջանում, որոնք կապված են տվյալների անվտանգության, ցանցային խոցելիության, ինչպես նաև կանոնակարգերի անբավարարության հետ: Գիտական աշխատությունը վերլուծում է թվային փոփոխությունների ազդեցությունը ֆինանսական կայունության վրա՝ համեմատելով ավանդական և թվային բանկային համակարգերի ռիսկերի կառավարման մոտեցումները: Ուսումնասիրությունները ցույց են տալիս, որ ֆինտեխը կարող է նվազեցնել ռիսկերը՝ բարձրացնելով գործառնությունների ճշգրտությունը, սակայն նաև նոր խնդիրներ են ի հայտ գալիս, որոնք կապված են թվային գործիքների օգտագործման հետ, ինչպիսիք են տեղեկատվական անվտանգության բացերը և ռիսկերի կառավարման նոր պահանջները: Աշխատանքը ընդգծում է, որ նոր տեխնոլոգիաների կիրառումը պահանջում է նոր ռիսկերի կառավարման ռազմավարությունների մշակում՝ ապահովելու համար ֆինանսական կայունություն և խուսափելու թվային դարաշրջանի ծագող մարտահրավերներից: Ավելին, Ֆինտեխը նաև բարելավում է ռիսկերի բազմազանությունը՝ օգտագործելով բլոկչեյն և մեծ տվյալներ՝ կանխելու խաբեություններ և ֆինանսական վնասներ, սակայն այս տեխնոլոգիաներն ունեն նաև իրենց սպառնալիքներ՝ կապված կիբեռանվտանգության, տվյալների գաղտնիության և օրենսդրական կարգավորումների հետ:
Հանգուցաբառեր և բառակապակցություններ՝ ֆինտեխ, ռիսկերի կառավարում, թվային վերափոխում, ֆինանսական կայունություն, բլոկչեյն, տվյալների անվտանգություն, ռիսկերի կառավարման ռազմավարություններ, վարկային ռիսկ, թվային բանկային նորարարություններ

ФинТех и управление рисками: новые риски и вызовы в цифровой экономике

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Аннотация. ФинТех и управление рисками стали ключевыми факторами обеспечения стабильности банковской системы в цифровую эпоху. Быстрое развитие цифровых технологий, таких как блокчейн, большие данные и цифровые инновации, повышает эффективность операций банков, улучшая анализ кредитов и удовлетворенность клиентов. Однако внедрение этих технологий также порождает новые риски, связанные с безопасностью данных, уязвимостью сетей и недостаточностью нормативных требований. Научная работа анализирует влияние цифровых изменений на финансовую стабильность, сравнивая подходы управления рисками в традиционных и цифровых банковских системах. Исследования показывают, что ФинТех может снизить риски, повышая точность операций, однако возникают и новые проблемы, связанные с использованием цифровых инструментов, такие как уязвимости в информационной безопасности и новые требования к управлению рисками. Работа подчеркивает, что применение новых технологий требует разработки новых стратегий управления рисками для обеспечения финансовой стабильности и предотвращения возникающих вызовов цифровой эпохи. Более того, ФинТех также улучшает диверсификацию рисков, используя блокчейн и большие данные для предотвращения мошенничества и финансовых потерь, однако эти технологии также имеют свои угрозы, связанные с кибербезопасностью, конфиденциальностью данных и законодательными нормами.

Ключевые слова и словосочетания: ФинТех, управление рисками, цифровая трансформация, финансовая стабильность, блокчейн, безопасность данных, стратегии управления рисками, кредитный риск, инновации в цифровом банкинге

Introduction

The rise of FinTech – a rapidly growing sector encompassing technologies like blockchain, artificial intelligence, big data, and cloud computing - has significantly transformed the financial services industry. While these innovations offer substantial improvements in efficiency, accessibility, and cost-effectiveness, they also introduce new and complex risks that financial institutions must address to maintain stability and ensure resilience. As financial systems become increasingly digital, traditional risk governance models must adapt to effectively manage these emerging risks, including cybersecurity threats, data privacy concerns, regulatory challenges, and operational disruptions. The digitalization of financial markets has shifted the landscape of risk management. In the past, banks and financial institutions focused primarily on traditional risks such as credit, market, and liquidity risks. However, with the advent of FinTech, new types of risk – such as those related to digital assets, AI-driven decision-making, and distributed ledgers – have emerged, requiring innovative governance strategies. Furthermore, cybersecurity risks, including potential breaches of sensitive customer data and disruptions to financial operations, have become top priorities for financial regulators and institutions alike.

This paper explores the challenges and opportunities associated with risk governance in the age of digital transformation. It examines how FinTech innovations offer solutions to some financial risks while simultaneously creating new vulnerabilities. Additionally, the study delves into the role of regulatory frameworks in managing these risks, with a focus on ensuring the stability of the global financial system amidst ongoing technological advancements. By analyzing the evolving landscape of financial risk and governance, this paper aims to propose strategies that can help financial institutions successfully navigate the complexities of a digital-first financial ecosystem.

Research methodology

This study adopts a qualitative research approach, utilizing a comprehensive literature review to explore the intersection of FinTech, risk governance, and digital transformation. The research examines both theoretical frameworks and empirical studies to assess how digital technologies impact financial stability and risk management practices. Additionally, case studies of financial institutions adopting FinTech solutions are analyzed to understand the practical challenges and opportunities they encounter in implementing risk governance strategies. The research also draws on regulatory reports and policy documents to evaluate the evolving role of financial regulations in managing digital risks.

Literature review

The concept of risk has been extensively examined across economic and interdisciplinary literature, leading to diverse interpretations shaped by theoretical perspectives, analytical contexts, and methodologies. Commonly, risk is understood as uncertainty, involving both the probability of loss and the consequences associated with decision-making under imperfect information [**9**]. Early economic theories predominantly treated risk as a

negative phenomenon tied to potential losses arising from uncertain outcomes [**27**]. According to Arrow (1971) [**3**], risk in economics often refers to the probability of negative outcomes, which, when expressed in monetary terms, translates into financial loss.

Linguistically, risk is often defined as exposure to harm or adverse consequences. The Greek word for risk relates to dangerous situations, such as cliffs or rocks, while Arabic interpretations incorporate both uncertainty and divinely granted opportunity. Similarly, the French term *risque* acknowledges danger but also the potential for gain, encapsulated in the proverb "nothing ventured, nothing gained" [**39**].

Garthwaite, Birdsall, and France (2023) explore risk as a multifaceted phenomenon, emphasizing its subjective nature. In their study, risk is analyzed through four distinct "Cultural Types" (Nature Benign, Nature Tolerant, Nature Ephemeral, and Nature Capricious) that reflect different perspectives on risk, highlighting the complexity of how individuals perceive and interpret risk in contentious socio-scientific issues [**17**, pp. 1195-1222].

Rani, Singh, Prajapati, and Tejesh (2025) explore risk management strategies in financial institutions, focusing on systemic, operational, market, credit, and liquidity risks. They highlight the use of stress testing, modeling, and hedging for risk mitigation, emphasizing the importance of Basel II and III frameworks and a strong risk culture. The authors advocate for a proactive risk management approach to ensure long-term financial stability [**37**].

Makhija, Kumar, Chacko, Mishra, and colleagues (2026) analyze the impact of climate risks on financial resilience. Their study highlights how climate-related disruptions, such as supply chain disturbances and asset damage, threaten businesses' creditworthiness and financial stability. The authors argue that addressing climate risks through resilience planning and low-carbon strategies is essential for long-term financial health and systemic stability [**32**, pp. 237-249].

Bao, Chen, and Chen (2024) examine the impact of Local Government Financing Vehicles debt on corporate risk-taking in China. The study finds that LGFV debt generally reduces corporate risk-taking, with smaller firms being more affected than larger ones. However, land transfer income moderates this effect, suggesting that firms with higher land transfer income are less constrained by LGFV debt. This research highlights the crowding-out effect of local government debt, which limits firms' access to capital, forcing them to either take on more risk or cut back on essential investments [**6**].

Song et al. (2026) finds that digital transformation in Chinese banks significantly reduces risk-taking, as measured by non-performing loans. By lowering management costs and improving operational efficiency, digitalization mitigates risk. External factors, such as banking sentiment and monetary policy, also moderate this relationship [**41**].

Nahar, Jagannath, and Chauhan (2025) explore how bank undercapitalization, caused by the Reserve Bank of India's Asset Quality Review, raises stock price crash risk for borrowing firms [**36**, pp. 1-18]. They find that weakened bank monitoring encourages managers to hoard bad news, especially in firms with higher default risk. External monitoring, like auditor scrutiny, helps mitigate this effect. The study highlights an unintended consequence of the AQR, which, while aimed at stabilizing the banking sector, increases stock price crash risk for firms relying on capital-constrained banks.

Huynh (2026) examines the impact of bank competition on corporate risk-taking in Vietnam from 2007 to 2022 [**25**]. The study finds that greater bank competition encourages firms to take on more risk, particularly by increasing debt with longer maturities. This effect is stronger for firms with closer bank relationships and more investment opportunities. The research also notes that this risk-taking behavior is amplified during periods of expansionary monetary policy, but diminishes during crises.

In Risk Management and Governance: Concepts, Guidelines, and Applications, Aven and Renn (2010) present an interdisciplinary approach to risk, integrating engineering, statistical, and social science perspectives [**4**]. Using the International Risk Governance Council framework, they address risk identification, assessment, management, and communication. Contemporary theories view risk as a multidimensional construct—encompassing threat, vulnerability, and exposure—where any change in these elements directly impacts the overall risk level. This broader framework moves beyond loss-focused perspectives to incorporate both negative and positive outcomes, reflecting the uncertainty inherent in economic systems [**33**, pp. 77-91].

Li, Li, and Shen (2026) examine the impact of the expected loss provisioning model under impairment accounting standard reforms on systemic risk. Their model shows that while EL can reduce systemic risk during small shocks, it may increase risk when losses are overestimated. The effectiveness of EL depends on the size of the shock and the banks' provisioning behavior, highlighting the need for regulatory oversight [**29**].

Ly and Pham (2025) analyze the effect of "too-big-to-fail" status on capital buffers and insolvency risk in European banks. Their study finds that TBTF banks in countries with stricter regulations are required to hold higher capital buffers, but income diversification reduces the need for such buffers during economic booms. However, regulatory measures failed to curb risk-taking, especially during the 2007-2009 crisis [**31**].

Agarwal and Goel (2024) discuss the symbiotic relationship between bank regulation and supervision, highlighting how supervisory assessments, like stress tests, help determine capital requirements. They argue that noisy supervision can distort incentives and increase risk-taking, recommending that when defaults are costlier, regulators should aim to reduce false negatives, even at the expense of more false positives [**2**].

Lucchetta (2025) explores how monetary policy and capital regulation interact to influence bank risk-taking under uncertainty. The study finds that uncoordinated policies, particularly restrictive monetary policy combined with stringent capital requirements, can amplify systemic risk by increasing banks' risk appetite. The paper argues that aligning monetary and regulatory policies reduces excessive risk-taking and promotes financial stability [**30**, pp. 379-390].

Buchak et al. (2025) empirically examine two adjustment margins in banking: the shadow bank substitution margin, where shadow banks replace traditional banks for easily sold loans, and the balance sheet retention margin, where banks shift between lending and selling based on balance sheet strength. These margins impact policy responses, with secondary-market disruptions like quantitative easing having a larger effect on lending than capital requirements [**10**, pp. 379-390].

Bauer, Bernanke, and Milstein (2023) explore the "risk-taking channel" of monetary policy, showing that unexpected changes in policy significantly affect risk appetite across equity, fixed-income, credit, and foreign exchange markets. Their findings suggest that monetary policy influences asset prices primarily through its impact on investor risk appetite, with implications for financial stability [**7**, pp. 77-100].

Overall, the literature demonstrates that risk is a complex, multifaceted phenomenon that goes beyond potential loss. Contemporary approaches increasingly recognize both the negative and positive dimensions of risk, reflecting its central role in decision-making under uncertainty.

Analysis

The digital transformation in the financial sector, driven by FinTech innovations, has drastically reshaped traditional financial systems and risk management practices. While these innovations have enabled more efficient, accessible, and cost-effective financial services, they also present new challenges in terms of risk governance. This section analyzes how FinTech and the digital era influence financial stability, risk exposure, and governance practices, focusing on both the opportunities and the risks that arise.

Financial risk refers to the probability of incurring financial losses or encountering unfavorable financial outcomes due to a range of complex factors, including market volatility, credit risks, and operational challenges [**14**, pp. 147-166]. Adler and Dumas (2023) approach the analysis of financial risk through quantitative models, which assess the likelihood and potential impact of various risk factors [**1**, pp. 41-50]. These models enable organizations and investors to make informed decisions by quantifying possible losses and identifying strategies for risk mitigation. Consequently, such frameworks allow stakeholders to effectively navigate the financial landscape and implement sound risk management practices. Gabriel and Baker (2022) offer a comprehensive examination of financial risk, with a particular focus on market risk, which pertains to the potential for losses arising from shifts in market conditions, particularly fluctuations in asset prices and interest rates, thereby reflecting the inherent uncertainty within the broader market environment [**16**, pp. 560-564].

The relationship between FinTech adoption and bank risk-taking has been the subject of extensive international research, though findings on its impact remain mixed. Some studies suggest that FinTech can reduce bank risk by enhancing operational efficiency, improving customer satisfaction, and fostering innovation in business models [**5**; **11**; **23**]. Other studies highlight FinTech’s role in strengthening financial stability by improving profitability, reducing costs, and optimizing resource allocation [**13**, pp. 2959-2981; **42**; **43**]. Additionally, FinTech adoption enables better credit risk assessment, particularly for SMEs, by refining lending technologies and reducing information asymmetry [**40**]. For example, in Vietnam, Hoque et al. (2024) found that digital transformation significantly reduces credit and insolvency risk through lower operating costs and enhanced data integration [**24**].

Rice and Guerrini (2026) analyze the impact of the ECB's 2022–2023 interest rate hikes on euro area banks, revealing that unrealized losses averaged 30% of equity. The study finds that banks with stickier deposits faced larger losses and slower deposit rate adjustments. A 10% run on uninsured

deposits could push some banks into negative net worth [**38**].

Hanson, Lucca, and Wright (2021) argue that the increased sensitivity of long-term rates to monetary policy implies that changes in short-term rates should influence the term premium in the same direction, at least temporarily [**22**, pp. 1719-1981]. This suggests a connection between short-term rate adjustments and movements in long-term rates via the term premium. Gertler and Karadi (2015) show that monetary policy affects credit costs primarily through its impact on term premiums and credit spreads, rather than through changes in the safe interest rate [**18**, pp. 44-76]. This view is consistent with Gilchrist, Lopez-Salido, and Zakrajsek (2015), who also emphasize the role of the risk-taking channel in transmitting monetary policy effects to credit markets [**19**, pp. 77-109]. In addition, Bekaert, Hoerova, and Lo Duca (2013) developed proxies for risk and uncertainty levels and found that both, especially risk, respond to changes in the stance of monetary policy [**8**, pp. 771-788]. Finally, Miranda-Agrippino and Rey (2020) show that easier U.S. monetary policy increases the returns on risky assets globally, highlighting the broader implications of monetary policy for financial markets [**35**, pp. 2754-2776].

Mazzolini and Kaufmann (2024) decompose the flows of corporate bonds and equity funds into various shocks by applying sign restrictions within a Bayesian vector autoregression framework [**34**]. The results, based on European-focused bond funds between 2007 and 2023, as presented in Chart 1, indicate that 44% of the variation in fund flows can be attributed to factors related to monetary policy, both domestic and international. Additional contributing factors include the domestic and international macroeconomic environment, as well as investor risk sentiment, which played a significant role in the unprecedented outflows from the investment fund sector at the onset of the Covid-19 pandemic.

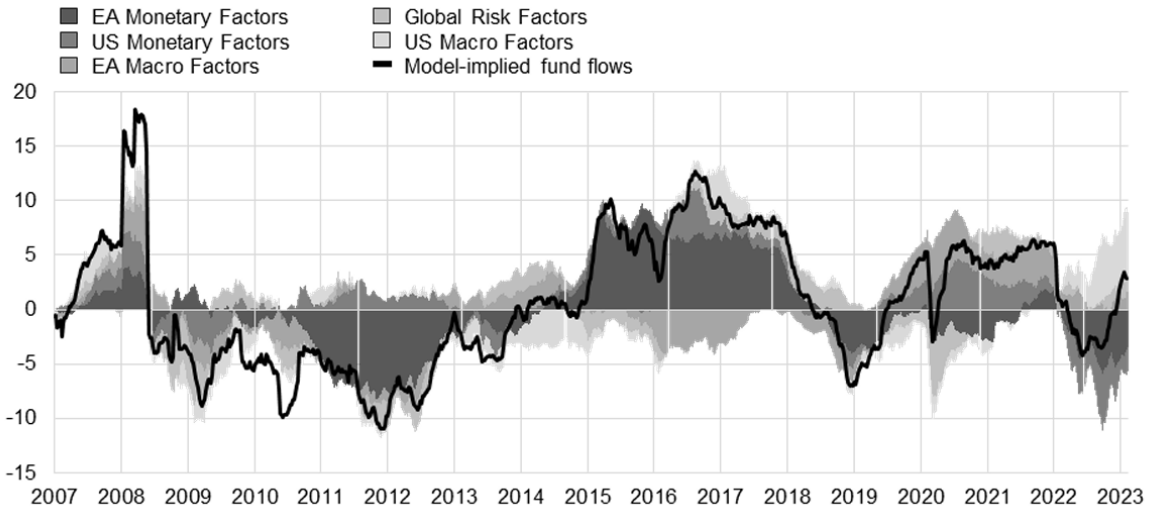

Chart 1. *Decomposition of cumulative flows into European bond funds* [**20**]

In terms of underlying mechanisms, Feroli et al. (2014) argue that monetary policy loosening, by driving up asset valuations, can generate momentum in returns from investment funds [**15**]. Due to pro-cyclical flow-performance dynamics, as discussed in the works of Chen et al. (2010) and Goldstein, Jiang, and Ng (2017), investment funds may attract further inflows, reinforcing the initial effect [**21**, pp. 592-613].

Furthermore, Kaufmann et al. (2024) provide evidence that insurance companies, as the second-largest type of non-bank financial institutions by assets, also experience significant growth when interest rates fall [**26**]. They argue that monetary loosening stimulates demand for insurance products, benefiting from its expansionary effects on real economic activity and household income. This increased demand translates into larger total assets under management by insurers, and consequently, higher asset demand. In contrast, when interest rates rise, insurance assets tend to decrease, as policyholders surrender contracts that have become less attractive due to reduced guaranteed returns [**28**].

One of the most significant advantages of FinTech is its ability to enhance risk management. The integration of technologies like blockchain, artificial intelligence, and big data analytics provides financial institutions with more powerful tools for predicting, assessing, and mitigating risks. For instance, AI and machine learning algorithms can analyze vast amounts of financial data to predict credit risk, detect fraud, and assess liquidity in real-time.

FinTech improves risk diversification, with blockchain enhancing transparency and security through its decentralized, tamper-proof ledger, reducing fraud and data breach risks. Big data also improves creditworthiness assessments, aiding lending decisions, especially for small and medium-sized enterprises. However, FinTech introduces new risks, particularly cybersecurity threats like data breaches, ransomware, and denial-of-service attacks. The rise of digital currencies and cryptocurrencies adds further risks, including volatility, fraud, and regulatory uncertainty.

As financial systems evolve, regulatory compliance has become more complex. Traditional frameworks often fail to address the challenges posed by FinTech innovations, such as blockchain and cryptocurrencies, creating risks of non-compliance, especially in regions with evolving regulations. Data privacy is another major concern, as FinTech companies rely on large amounts of personal and financial data. Improper data handling can lead to customer trust issues and regulatory penalties. Additionally, third-party integrations, like cloud services, can introduce security vulnerabilities if their protocols are insufficient.

As FinTech continues to evolve, so too must the strategies for risk governance. Traditional risk management models are insufficient to handle the complexities of a digital financial ecosystem. Financial institutions must invest in advanced technologies for risk monitoring, establish more agile governance frameworks, and ensure collaboration between regulatory bodies, tech companies, and financial institutions. Moreover, as digital transformation accelerates, risk culture must evolve to include not only financial risks but also technological, regulatory, and reputational risks.

Conclusions

This study underscores the need for financial institutions, especially Tier III banks, to adapt their risk governance frameworks to the evolving landscape of FinTech and digital transformation. While FinTech innovations such as blockchain, big data, and AI offer improved efficiency and cost-effectiveness, they introduce new risks, including cybersecurity threats, data privacy concerns, and challenges in regulatory compliance. The research emphasizes the importance of adopting advanced technological solutions, such as upgrading IT systems and implementing robust security measures, to mitigate the risk of cyberattacks. Employee training programs also play a crucial role in minimizing human error and ensuring better adherence to changing regulatory frameworks. Regarding credit risk, the diversification of loan portfolios and the integration of AI-driven credit scoring models are essential for improving credit risk assessment and reducing exposure to volatile sectors. Liquidity risk management is another critical area that requires improvement. The study advocates for Tier III banks to diversify their financing sources and perform comprehensive stress testing to strengthen their liquidity resilience. Ultimately, the paper highlights that an integrated risk governance approach, combining both traditional and FinTech-driven strategies, is vital. Financial institutions can better navigate digital risks by leveraging technologies like AI, blockchain, and big data analytics for more accurate risk prediction and management. By fortifying risk governance structures, Tier III banks can bolster their financial stability, minimize losses, and foster long-term growth in an increasingly complex digital economy.

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