

Exploring Risks and Issues Related to Policy Making and Regulation in FinTech

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Abstract

This paper aims to highlight the role of FinTech in today's modern financial industry. FinTechs are often concentrated in specific activities for which they try to offer a comparative (and competitive) advantage in terms of quality or price, which is achieved through two main ways: (a) by improving the efficiency of companies through cost reduction and productivity enhancement and thus increasing profitability; and (b) by improving the quality of financial services and products offered to consumers. Then, the paper attempts to lay out and address potential risks related to: the financial institutions, consumers or customers and investors, and the pro-cyclicality and systemic risk in the markets. This requires the interaction and intervention of policy makers and regulators. Therefore, the assessment of FinTech's benefits and risks ended up with recommendations for policy makers and regulators aimed at supporting innovation in the field of finance, while ensuring that the use of FinTechs is consistent with promoting financial stability, competition and market integrity, and guaranteeing the protection of consumers and financial investors. The paper concludes that in order to keep up on these changes while upholding high standards for security, stability and consumer protection, more agile and proportional forms of regulation must be established through closer cooperation among public authorities. Given the changing financial sector, the new technology will be a lever of innovation for regulatory authorities, too.

Keywords: finance; FinTech; policies; regulations.

JEL Classification: G23, G28, K22, K33, O31

1. Introduction

FinTech is a financial industry that uses new technologies to optimize financial services. This rather broad framing thus allows us to include incremental innovations such as Application Programming Interface (APIs) and electronic signatures, but also potentially more disruptive innovations such as blockchain, AI and machine learning. These have already transformed, or have the potential to revolutionize, how financial systems work and how companies finance themselves, for example through crowdfunding or initial coin offerings (ICOs)².

For instance, Machine Learning (ML) models use big data to learn and improve predictability and performance automatically through experience and data, without being programmed to do so by humans. The deployment of artificial intelligence in finance is expected to increase the competitive advantages of financial companies, by improving their efficiency through the reduction of costs and the enhancement of productivity, as well as the improvement of the quality of services and products provided to consumers. In turn, these competitive advantages can benefit consumers by providing customized and quality products. AI enables the extraction of information lurking in data to unlock insights to be harnessed in investment strategies and possibly enhance financial inclusion by allowing creditworthiness analysis of customers with limited credit history (such as thin file small and medium-sized companies, i.e. limited data). At the same time, the applications of artificial intelligence in the field of finance may engender or intensify financial and non-financial risks and bring about potential risks and considerations related to the protection of financial consumers and investors (such as the risks of biased, unfair or discriminatory consumer results, or concerns relating to data usage and management)³. Therefore, this research paper attempts to answer the following question: what is expected from regulators and policy makers when dealing with FinTechs?

Although many of the potential risks associated with FinTech are not unique to this domain,

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² P. Schueffel, 'Taming the Beast: A Scientific Definition of Fintech', *Journal of Innovation Management*, vol. 4, no. 4, 2016, p. 32.

³ „Financial law, whose objective is the reduction of the investors' exposure to default, aims to mitigate this risk.” in Rocco Steffenoni, (2016) *Reducing legal risk within the financial sector: the European approach on financial collateral arrangements and its limits*, Law and Financial Markets Review, 10:2, 102-110, DOI: 10.1080/17521440.2016.1213553. In this matter become important the establish of new investment standards. See Cristina Elena Popa Tache, *International investment protection in front of the states role in crisis times to managing disputes*, „Juridical Tribune - Tribuna Juridica”, volume 10, issue 3, December 2020, pp. 456: „In times of crisis, security and investment protection face dramatic national security”.

the use of these technologies can amplify these vulnerabilities due to their complexity, dynamic adaptability and their level of autonomy. The lack of explainability of FinTechs models' operations could lead to potential systemic and pro-cyclical risks in the markets, and could lead to a potential misalignment with existing financial oversight and internal regulatory and governance frameworks, which could challenge the technology-neutral approach adopted in policy making and regulatory frameworks. This paper attempts to help policy makers and regulators assess the implications of employing these new technologies and identify the benefits and risks associated with their use. It proposes policy responses and pro-active regulatory directions aimed at supporting AI innovation in finance while ensuring that its use is consistent with promoting financial stability, market integrity and fair competition, while ensuring the protection of financial consumers and investors. The risks arising from the deployment of AI technologies must be identified and mitigated in order to support and enhance the use of responsible AI. Existing regulatory and supervisory requirements may need to be revised and modified at times, as appropriate and needed, to address some of the perceived incompatibilities of existing policies and regulatory frameworks with AI applications.

Accordingly, using a descriptive analytical approach, the research paper, in its first part, deals with the areas of FinTech's application, for the sake of simplification and concise explanation, such as the payment services. The second part deals with the potential risks associated with these applications while the final part suggests recommendations for policy makers and regulators in order to support and enhance the use of responsible FinTechs.

2. Prominent areas of FinTech's application

FinTechs first proved themselves in payment systems. The EU's first directive on payment services (PSD 1 in 2007) allowed businesses other than banks to offer new payment services under an adapted framework of prudential regulation.⁴ These "neo-banks" could thus offer everyday banking services without necessarily having bank accreditation (which cost more). Since January 2018, the second directive on payment services (PSD 2) has set up a regulatory framework for the aggregators of online information about payment services and "payment initiation services".⁵ These players run platforms that have gradually expanded into other services: financial advice, bookkeeping, multiservice intermediation, etc.

FinTechs have also shown interest in investment services. Many of them are trying to improve their investment counseling via new interfaces and innovative algorithms. In addition, blockchain technology could renovate postmarket activities and security trading. In another field, several startups are offering services to insurance companies and brokers: proposals for using big data for setting fee schedules, underwriting or detecting fraudulent activities, or for using connected devices for risk prevention or the development of new sales tools (such as chatbots). For instance, FinTechs are applied in asset management and market buying activity for asset allocation and stock selection based on the ability of machine learning ML models to identify signals and capture key relationships in big data, as well as for improving workflow and risk management⁶. The use of AI and ML in asset management has the potential to increase the efficiency and accuracy of operational workflows, enhance performance, strengthen risk management, and improve customer experience⁷. Natural Language Generation (NLG), a subset of artificial intelligence, can be used by financial advisors to "humanize" and simplify data analysis and reporting for clients⁸, since ML models can monitor

⁴ Directive 2007/64/EC of the European Parliament and of the Council of 13 November 2007 on payment services in the internal market, available at <https://eur-lex.europa.eu/eli/dir/2007/64/oj>.

⁵ Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, available at <https://eur-lex.europa.eu/eli/dir/2015/2366/oj>.

⁶ OECD (2021), *Artificial Intelligence, Machine Learning and Big Data in Finance: Opportunities, Challenges, and Implications for Policy Makers*, <https://www.oecd.org/finance/artificial-intelligence-machine-learningbig-data-in-finance.htm>, p. 21.

⁷ Deloitte, 'Artificial intelligence: The next frontier for investment management firms', *deloitte* [website], <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Financial-Services/fsi-artificial-intelligence-investment-mgmt.pdf> (accessed 12 December 2022).

⁸ M. Gould, 'Why the Finance Industry is Ripe for AI Disruption', *Techonomy* [website], <https://techonomy.com/2016/09/why-the-finance-industry-is-ripe-for-ai-disruption/> (accessed 20 December 2022).

thousands of risk factors on a daily basis, testing portfolio performance against thousands of market/economic scenarios, the technology can enhance risk management for asset managers, asset managers and other large institutional investors. In terms of operational benefits, the use of AI can reduce back-office costs for investment managers, and offset extensive manual reconciliations with automated ones, potentially contributing to lower costs and increased speed. FinTechs allow asset managers to digest massive amounts of data from multiple sources and unlock insights from the data to inform their strategies in extremely short time frames. Investment hedge funds are at the forefront of FinTech users, and use big data, AI and ML algorithms for transaction execution and back office functions⁹. A class of hedge funds "AI pure play" has emerged in recent years which are entirely AI and ML based e.g. Aidiya Holdings, Cerebellum Capital, Taaffeite Capital Management and Numerai¹⁰.

FinTech lenders use AI and big data to assess the creditworthiness of potential borrowers and make underwriting decisions, both functions pivotal in finance. In the context of credit assessment and scoring, ML models are used to predict borrower defaults with superior predictive accuracy compared to standard statistical models (e.g. logic regressions) especially when working with limited information¹¹. Moreover, AI-based systems can be used to detect fraud, as well as to analyze the degree of interdependence among borrowers, which in turn allows them to better manage their lending portfolio. AI-powered credit scoring and scoring models combine the use of traditional credit information, when available, with big data that is not intuitively related to creditworthiness (such as social media data, digital fingerprints, and transaction data accessible through open banking initiatives). FinTech models for credit assessment can lower the cost of underwriting, while allowing analysis of the creditworthiness of customers with limited credit history "thin filed customers whose files and accounts do not give a clear picture of the borrower," potentially enhancing financial inclusion by scaling up and extending credit to companies that are viable and cannot prove their viability through historical performance data or tangible collateral assets. This would in turn enhance access to credit and support the growth of the real economy by easing restrictions on financing small and medium enterprises. The empirical analysis of the short period, and relatively recent, of these SMEs can reduce the need for collateral by relatively eliminating the information asymmetry prevalent in credit markets¹².

So, the technological factors have helped lower the costs of market entry. Having reckoned with the massive use of smartphones and high-speed Internet connections, FinTechs have centered the main of their activities on the Web and mobile telephones. As a consequence, they have much lower operational costs than what is needed to run a network of agencies or pay a staff heavy with personnel. Many FinTechs also resort to cloud computing services for their data processing and even lodge their information systems in the cloud.

3. Exploring FinTech's risks, issues and challenges

The widespread use of FinTechs can amplify the risks that already exist in financial markets due to their ability to learn and dynamically adapt to evolving conditions in a completely independent manner, which will lead to the emergence of new challenges and dominant risks. The use of big data in AI-powered applications can also create an important source of non-financial risk-driven challenges and risks related to the quality of the data used; data privacy and confidentiality; electronic security; and considerations of non-discrimination and fairness. Depending on how they are used, FinTechs can either contribute to avoiding discrimination based on human interactions, or intensify biases, unfair treatment and discrimination in financial services. AI bias and discrimination can result

⁹ W. Kaal, 'Financial Technology and Hedge Funds', *Oxford Handbook of Hedge Funds 2019*, <https://papers.ssrn.com/abstract=3409548> (accessed 21 December 2022).

¹⁰ Bny Mellon, 'Artificial Intelligence Sweeps Hedge Funds', *bnymellon* [website], <https://www.bnymellon.com/us/en/insights/all-insights/artificial-intelligence-sweeps-hedgefunds.html> (accessed 21 December 2022).

¹¹ S. Albanesi & D. Vamossy, 'Predicting Consumer Default: A Deep Learning Approach', *SSRN Electronic Journal*, <http://arxiv.org/abs/1908.11498> (accessed 18 December 2022).

¹² Bis, 'Data vs collateral', *bis* [website], <http://www.bis.org> (accessed 11 December 2022).

from the use of poor quality, defective, or insufficient data in ML models, or unintentionally through inference and authorization (for example, inferring gender by looking at purchasing activity data)¹³. In addition to financial consumer protection considerations, there are potential competition issues arising from the use of big data and ML models, with respect to high concentration among market providers in certain markets or increased risks of tacit and silent collusion. The most well-known challenge to machine learning models is the difficulty in understanding why and how the model generates results, generally described by the term "explainability" associated with a number of important risks. The inability to interpret and explain is not compatible with current laws, regulations and policies, but also with the internal governance, risk management and control frameworks of financial service providers¹⁴. This limits users' ability to understand how their models affect markets or contribute to market shocks and can amplify systemic risks related to pro-cyclicality. Most importantly, the inability of users to adjust their strategies in times of stress may exacerbate market volatility and bouts of illiquidity during periods of stress and acute stress, exacerbating flash crash events. Financial market players who use FinTech models should continue and amplify their efforts to improve the explainability of such models so that they can better understand their behavior in normal market conditions and in times of stress, and manage the risks associated with them. The technology-neutral approach applied by many legal systems (legislations) to regulate financial market products may be challenged by the increasing complexity of some innovative use cases for AI in finance¹⁵. Potential inconsistencies with current legal and regulatory frameworks may arise from the use of advanced FinTechs (for example, due to the lack of explainability or adaptability of deep learning models). Furthermore, there may be a potential risk of fragmentation of the regulatory framework in relation to FinTechs at the national, international and sectoral level. In addition to the current regulations that apply to FinTech models and systems, many published AI principles, guidelines, and best practices have been developed in recent years. Although the industry considers all of these to be valuable in addressing potential risks, opinions differ about their practical value and the difficulty of translating these principles into effective practical guidance (eg through real-life examples). That is why clear governance frameworks that define clear lines of responsibility for AI-based systems throughout their lifecycle, from development to deployment, can enhance the model's existing governance arrangements and frameworks. Clear accountability mechanisms are also becoming increasingly important, as AI models are deployed in critical or high-value decision-making use cases (such as access to credit)¹⁶. Risks also arise when it comes to outsourcing FinTechs to third parties, both in terms of accountability and in terms of competitive dynamics (such as concentration risk and dependency risk). The financial industry's application of FinTechs may also lead to potentially significant job losses across the industry, giving rise to employment challenges. Accordingly, there will be a need to enhance skill sets to develop and manage risks arising from FinTechs. When FinTech applications become prevalent in finance, AI in finance should be seen as a technology that augments rather than replaces human capabilities. A combination of "man and machine" in which AI contributes to rather than replaces human judgment (helping with decision-making rather than taking charge of decision-making), can allow the benefits of technology to be realized, while maintaining safeguards of accountability and oversight in relation to final decision-making.

The abovementioned risks can be summarized as follows:

¹³ White & Case, 'Algorithms and bias: What lenders need to know', *White & Case* [website], <https://www.jdsupra.com/legalnews/algorithms-and-bias-what-lenders-need-67308/> (accessed 12 December 2022).

¹⁴ G. Gensler & L. Bailey, 'Deep Learning and Financial Stability', *SSRN Electronic Journal*, <https://ssrn.com/abstract=3723132> (accessed 23 December 2022).

¹⁵ Federal Reserve, 'The Fed - Supervisory Letter SR 11-7 on guidance on Model Risk Management -- April 4, 2011', *federalreserve* [website], <https://www.federalreserve.gov/supervisionreg/srletters/sr1107.html> (accessed 10 December 2022); EBA, 'Guidelines on loan origination and monitoring', *eba* [website], [https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Guidelines/2020/Guidelines on loan origination and monitoring/884283/EBA GL 2020 06 Final Report on GL on loan origination and monitoring.pdf](https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Guidelines/2020/Guidelines%20on%20loan%20origination%20and%20monitoring/884283/EBA%20GL%202020%2006%20Final%20Report%20on%20GL%20on%20loan%20origination%20and%20monitoring.pdf) (accessed 10 December 2022).

¹⁶ European Commission, 'On Artificial Intelligence - A European approach to excellence and trust: White Paper on Artificial Intelligence a European approach to excellence and trust', *ec* [website], https://ec.europa.eu/commission/sites/beta-political/files/political-guidelines-nextcommission_en.pdf (accessed 11 December 2022).

- a. Non-financial risk (data, equity and fairness)
 - Biases, unfair treatment and discriminatory outcomes (inadequate use of data or/ or poor quality data).
 - Data privacy and confidentiality.
- b. Explanation “Explainability”
 - Why and how the model generates results.
 - Inability to adjust strategies in a time of stress Systemic risk amplification, pro-cyclicality.
 - Not compliant with regulatory/supervisory frameworks and internal governance.
 - Difficult to moderate and supervise AI/ML models.
- c. Strength “robustness” and resilience
 - Unintended consequences at the company/market level.
 - Model overfits, deviations and drifts (data, concept of drifts).
 - Correlations are interpreted as causation, this requires human involvement.
- d. Governance and accountability
 - Arrangements and settings of the governance model
 - Accountability and limits of responsibility
 - Outsourced infrastructure models
- e. Policy and regulatory frameworks
 - The complexity of FinTechs challenges to the neutral approach to technology (eg, explainability, self-learning, dynamic adjustment).
 - Potential incompatibilities with existing legal/regulatory frameworks
 - Risks of fragmentation of policies and legal frameworks (across sectors)
 - Skills and Employment

4. Recommended proactive policies and regulations

Regulations are an asset in terms of client and investor confidence. It promotes the sustainable growth of FinTechs. Policy makers and regulators play a key role in ensuring that the use of FinTechs is in line with regulatory objectives to enhance financial stability, protect financial consumers, and enhance market integrity and competition. They should consider supporting FinTech innovations while protecting financial consumers and investors and promoting fair, orderly and transparent markets. Accordingly, the application of regulatory and supervisory requirements to artificial intelligence techniques can be considered within a contextual and proportional framework. The European Union, for example, is studying requirements related to documentation of disclosure of programming methodologies, training, processes and techniques used to build, test and validate FinTech (AI) systems, including algorithm documentation. Additionally, human supervision may be required starting from product design and throughout the life cycle of FinTech (AI) products and systems as a precaution¹⁷. Policy makers should consider urging financial sector companies to increase their focus on better data management, with the aim of enhancing consumer protection through AI applications in finance. Policy makers should consider disclosure requirements about the use of FinTechs in the provision of financial services that may affect client outcomes¹⁸. Those responsible for regulatory and legal frameworks should consider how to overcome the perceived mismatch between the lack of explainability in FinTechs and current laws and regulations. Policy makers should also consider making explicit model governance frameworks a requirement and put an emphasis on accountability in order to help build trust in FinTech-driven systems. Providing increased guarantees by financial firms about the robustness and resilience of AI models is essential as policy makers seek to guard against the buildup of systemic risks, which will help FinTechs gain

¹⁷ European Commission, ‘The Digital Services Act package | Shaping Europe’s digital future’, ec [website], <https://ec.europa.eu/digital-single-market/en/digital-services-act-package> (accessed 11 December 2022).

¹⁸ Rocco Steffenoni, *op. cit.*, 2016, p. 102-110, DOI: 10.1080/17521440.2016.1213553. See also Hussein Ahmed Alshari & M. A. Lokhande, (2022) *The impact of demographic factors of clients’ attitudes and their intentions to use FinTech services on the banking sector in the least developed countries*, Cogent Business & Management, 9:1, DOI: 10.1080/23311975.2022.2114305.

trust and confidence. Regulators should consider promoting continuous monitoring and validation of FinTechs, which are central to their risks, as one of the most effective ways to enhance model resilience, prevent and address model drifts or deviations. Appropriate focus can be placed on human primacy in decision-making when it comes to use cases of higher value and importance, such as lending decisions that significantly affect consumers.

There have been attempts and efforts to supervise and regulate Fintechs, in May 2019, the OECD released a set of principles for AI focusing on how governments can shape a people-centred approach to a trustworthy AI, and aiming to promote the use of Fintech in a way that is innovative, trustworthy, and respectful of human rights. In 2020, the European Commission released a technical book containing policy and regulatory options for an 'Artificial Intelligence Ecosystem of Excellence and Trust'. On April 21, 2021, the European Commission published a proposal for a regulation aimed at addressing the risks of artificial intelligence and establishing harmonized rules on the use of artificial intelligence across its sectors of activity, while also proposing the creation of a European Council on Artificial Intelligence¹⁹. Efforts have also been made at the national level. In 2018, the French ACPR established a working group comprising professionals from the financial industry (business associations, banks, insurance companies, the financial technology sector and public authorities to discuss the current and potential uses of artificial intelligence in the financial industry, the opportunities and risks associated with them, as well as Challenges Facing Supervisors²⁰. The Bank of England and the Financial Conduct Authority launched the Public and Private AI Forum in 2019. The Russian Federation enacted a National Strategy for the Development of AI in 2019, and a concept for the development of the regulatory framework for AI and robotics technologies in 2020.

5. Conclusion

We have recently witnessed an acceleration and intensification of the digitization trend in the form of the use of FinTechs, which was observed well before the pandemic. Global spending on FinTech is expected to double during the period from 2020 to 2024, growing from \$50 billion in 2020 to more than 110 billion US dollars in 2024²¹. The abundance of available big data and increased and affordable computing power opened the door to the massive adoption of FinTechs. This research paper contributed to the literature by highlighting the role of these FinTech applications in increasing the competitive advantages of financial companies, by improving the efficiency of companies through cost reduction and productivity enhancement and thus increasing profitability; and by improving the quality of financial services and products offered to consumers. Nevertheless, the paper outlined numerous potential risks that have been discussed and analyzed in order to find ways and means, in the form of policies and regulations, to manage and deal with these risks in a proactive manner.

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¹⁹ European Commission, 'Proposal for a Regulation laying down harmonised rules on artificial intelligence | Shaping Europe's digital future', *ec* [website], <https://digital-strategy.ec.europa.eu/en/library/proposal-regulation-laying-down-harmonised-rules-artificial-intelligence> (accessed 19 December 2022).

²⁰ ACPR, 'Artificial intelligence: challenges for the financial sector', *acpr* [website], https://acpr.banque-france.fr/sites/default/files/medias/documents/2018_12_20_intelligence_artificielle_en.pdf (accessed 19 December 2022).

²¹ IDC, 'Worldwide Spending on Artificial Intelligence Is Expected to Double in Four Years, reaching \$110 Billion in 2024, According to New IDC Spending Guide', *idc* [website], <https://www.idc.com/getdoc.jsp?containerId=prUS46794720> (accessed 23 December 2022).

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