Written evidence submitted by the Edinburgh Centre for Financial Innovations, University of Edinburgh

Executive Summary

In March 2025, the Edinburgh Centre for Financial Innovations (ECFI), University of Edinburgh conducted a survey on academics' views concerning 'AI in Financial Services'. This report presents the findings and feedback on the UK Parliamentary Call for Evidence. The contents of this report reflect the insights from University of Edinburgh colleagues who possess relevant expertise in AI and financial services. We acknowledge and appreciate contributions from all participating colleagues across the School of Informatics, Business School, School of Mathematics, and School of Engineering.

Disclaimer

This report is supported by ECFI, University of Edinburgh, aimed at contributing to the UK Parliamentary Call for Evidence: AI in Financial Services. It should not be relied upon as legal or professional advice. ECFI accepts no liability for any errors, omissions, or mistakes contained within this document.

Please note that while not all opinions can be addressed in discourse, we will diligently correct any reported factual inaccuracies.

The Leadership Team, Edinburgh Centre for Financial Innovations

Overview: AI is extensively used across various financial sectors, including retail and investment banking, insurance, and pensions. This inquiry into AI in financial services seeks to determine how these services can optimally harness AI opportunities while mitigating risks to financial stability and protecting consumers, especially the vulnerable ones.

How is AI currently used in different sectors of financial services and how is this likely to change over the next ten years?

• AI adoption in financial services ranges from customer service chatbots, automation in data collection to sophisticated uses in customers' profiling, products recommendation, and algorithmic trading. AI is adopted in insurance for business processing and AI-based incident coverage, financial documents analysis and risk management systems. The utilization of quantum AI and machine learning in credit scoring and fraud detection is becoming increasingly common.

• Time-series prediction using AI significantly boosts the competitiveness of commercial financial products, such as high-frequency trading algorithms and behaviour analysis tools. AI-driven chatbots in customer services are evolving to undertake higher-risk, more autonomous operations, thereby reducing operational costs.

• Particularly, AI has been widely adopted for trading financial markets, especially algorithmic trading that utilizes Nature Language Processing (NLP) and generative AI (GenAI) models for real-time price and order flow forecasting and decision-making.

• Speech technologies such as AI-driven chatbots are evolving to take over riskier and more autonomous operations in financial services such as banks customer services, which reduce operation costs.

• Overall, the use of GenAI and large language models (LLMs) in finance is also a frequent topic of discussion, which is at the exploratory stage as machine and deep learning were ten years ago.

To what extent can AI improve productivity in financial services?

• AI notably improves productivity by automating tasks such as due diligence for private equity and start-up ventures, enhancing the credit scoring processes and fraud detection. It also supports financial documents analysis, summarization for asset managers, data cleaning and data processing.

• It is worth noting that AI improves productivity primarily by task automation while pocketing savings. Additionally, there is potential for AI to improve systems' efficiency by triaging tasks.

• Remarkably, AI not only substitutes for human roles, like portfolio management, it also complements them by aiding in information summary and better decision-making.

• AI is used in financial services as automation copilots in financial software development, financial markets and company analysis, and assistance for financial services survey/research. Such productivity enhancement will greatly reduce the cost of financial service providers and potentially allow individual customers to explore potentially using GenAI tools (e.g., ChatGPT for financial services recommendation) to conduct analysis which they could not achieve previously.

• AI is used as a replacement of the portfolio manager in terms of automated decision-making based on data to eliminate human bias on the one hand, and that of AI as a support tool for the portfolio manager to summarise information and enable better human decision-making. It may also help to inform better financial decisions, help people understand policies and their rights.

What are the risks to financial stability arising from AI and how can they be mitigated?

• One significant risk to address is that AI models may rely on biased or tainted datasets, introducing vulnerabilities. This issue is particularly acute when such datasets involve minority demographics. Ignoring these biases can cause financial institutions to prioritize profit over consumer safety, triggering doubts about the foundational models' trustworthiness, fairness, transparency, and explainability.

• Risks to consumers include the loss of data privacy, potential increases in systemic biases through AI algorithms, and the chance of misinformation or "hallucinations" from AI systems, all of which could tarnish the reputation of financial institutions.

• In financial markets, trading algorithms can induce market volatility and erratic behaviour, a major concern. High-frequency trading, for instance, significantly alters market dynamics while connections between AI-driven trading algorithms can escalate the risk of flash market crashes.

• GenAI models, in particular, are susceptible to inaccuracies and hallucinations. These models often depend on large-scale training datasets, which not only need to be extensive but also of high quality. A major concern is the unlawful disclosure of data, as it might occur if information protected under GDPR or other regulations is used in externally hosted models. This data could become part of the model's ongoing training data.

Choices for customized models shall be available to help organizations mitigate such security risks.

• The development of LLMs is primarily concentrated within major technology firms, due to the substantial data and computational demands. Consequently, software and data-related risks, managed by these tech giants, are passed on to users when financial institutions use third-party AI services. This includes the risks associated with agent-based chatbots and confabulation in customer interactions with financial institutions. There are also concerns about the challenges of integrating such AI technologies without disrupting existing financial services.

• The dominance of only a handful of GenAI models and LLMs presents a risk, compounded by their opaque nature, adding another layer of risk.

• Additional concerns include cybersecurity risks posed by sophisticated AI-enabled attacks and the potential for data leaks. The risks of over-reliance on automation and system failure also pose challenges, indicating a need for human oversight.

How can government and financial regulators strike the right balance between seizing the opportunities of AI but at the same time protecting consumers and mitigating against any threats to financial stability?

• AI offers significant benefits for the financial services sector, including personalized services, enhanced information accessibility, and potentially lower costs due to increased operational efficiencies.

• The importance of regulatory frameworks cannot be overstated — they are essential for ensuring consumer protection while fostering innovation. These frameworks should include strict but balanced guidelines for AI applications in credit assessments, trading systems, and the analysis of individual behaviour data.

• Financial institutions are keen to leverage AI in their operational services. One notable application is in enhancing the confidentiality of statistical data. Although banking laws rightly restrict the public sharing of potentially identifying information, the exploration of synthetic data generation offers a promising alternative. This can provide a more open option compared to other restricted-access solutions such as labs located on regulatory premises or data sharing agreements encumbered by stringent application processes, like those requiring external queries to be executed by the institution itself.

• A major barrier to the adoption of AI in the financial industry is the complex landscape of regulation and legal considerations. For regulators, data privacy laws hinder initiatives aimed at

building trust through transparency. Moreover, the requirement to disclose reasoning behind investment decisions, for instance, in cases of suspected insider trading, highlights the challenge of using opaque 'black-box' AI models in investment management. Despite these challenges, there is a pressing need for contributions from diverse expert groups in shaping regulations. It's crucial to note, however, that regulatory standards can vary widely between different regions, adding another layer of complexity to the regulatory landscape for AI adoption in financial services.

• Maintaining an ongoing dialogue among stakeholders — including government bodies, AI technologists, financial institutions, and consumers — is critical for properly managing the integration of AI into financial services. AI should primarily be used to enhance the quality of financial services and foster financial innovation. While it is necessary for regulations to protect consumers and ensure fairness, these rules should be carefully crafted by policymakers to avoid stifling innovation and hampering healthy market competition.

Summary of general observations and recommendations:

• We recommend increased collaboration across financial service sectors, clear communication of potential risks, and the development of robust strategies for risk mitigation. These measures are essential to maximize the benefits of AI while minimizing its potential downsides.

• The importance of explainable AI cannot be overstated—it is crucial for ensuring transparency and maintaining compliance with regulatory standards. This underscores the need for high data quality and the effective mitigation of biases during AI training processes.

• To foster innovation and strengthen the UK's role as a global leader in financial AI technology, there is a pressing need to boost research funding in this area. Increased investment will not only accelerate innovation but also provide regulators with valuable insights derived from cutting-edge research.

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