

Written Testimony before

**The Task Force on Artificial Intelligence of the
House Financial Services Committee**

Hearing entitled:

**Ending Perspectives on Artificial Intelligence: Where We Are and the Next
Frontier in Financial Services**

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Chairwoman Waters, Ranking Member McHenry, and distinguished members of the Task Force. I am honoured by the invitation to appear before you today at this important hearing on the implications of the growing use of Artificial Intelligence in financial services.

By way of background, the World Economic Forum is a Swiss not-for-profit International Organization for public-private cooperation. It is an independent and impartial organization with a mandate to serve as a neutral platform to support political, business and other societal leaders in shaping of global, regional, and industry agendas. Currently, significant organizational focus is devoted to understanding, and responding to, the 'Fourth Industrial Revolution' – a series of transformative technological breakthroughs in a range of fields (including artificial intelligence) that are disrupting traditional business models and straining traditional approaches to policy-making.

My work within the World Economic Forum is primarily focused on exploring the role that new technologies, including artificial intelligence, are playing in the rapid transformation of the financial system. This work includes: investigating the impact of new technologies on the operating models of financial institutions across a range of sub-sectors and geographies, analysing the shifting competitive dynamics of the industry, and identifying the challenges to effective governance of the financial system that may emerge as a result of these changes.

The testimony that follows is drawn from two documents. The first is a World Economic Forum report titled 'The New Physics of Financial Services – How Artificial Intelligence is Transforming the Financial Ecosystem' which was made publicly available on August 15th, 2018. The second is an, as yet untitled, World Economic Forum report currently under development that explores a range of

governance questions emerging from AI's application in the financial sector. This second report is tentatively scheduled for release in September of 2019. The content of both reports has been compiled through a mix of secondary research and in-depth interviews with subject matter experts including representatives from the financial sector, emerging fintechs, large technology companies and regulatory/supervisory authorities. Additional insights were gathered through a series of workshops, conducted around the world, that convened a sub-set of interviewees for structured discussions on the future of financial services. (N.B. All interviews and workshops were conducted under 'Chatham House Rule' where the general findings of the discussions may be publicly disseminated, but the identity and affiliation of individuals may not be shared).

The following testimony is organized around seven key points that summarize for this taskforce what I believe to be the most salient insights from these reports. It is important to understand that these reports, and the points drawn from them, seek to provide useful context and forward-looking insights about potential evolutionary paths for the financial ecosystem. However, they do not seek to diagnose specific regulatory and policy issues related to the technological transformation of the financial sector – nor do they seek to prescribe specific regulatory or policy approaches.

1. A fundamental lack of understanding of what AI is and how it works poses a serious impediment to effective governance

The computer systems that we refer to as 'artificial intelligence' possess capabilities that differ innately from those of human beings. Despite this, there is a strong bias to think of AI and its capabilities in human terms. This tendency can lead observers to deploy numerous unhelpful cognitive biases in their analysis of AI, resulting in both the overestimation and underestimation of AI capabilities. For example, we might assume that if a computer can be programmed to perform a task that most humans would find complex – such as analysing the many possible outcomes of a Chess game – that performing the motions necessary to fold laundry must be trivially easy, when in fact the opposite is the case. This inherent foreignness of AI makes it difficult to understand – and to some degree, predict – how AI systems will behave, making fear of these systems a natural response.

To make matters worse, despite being a frequent topic of discussion and debate, the very term 'artificial intelligence' lacks a consistent and broadly accepted definition even among technical experts in the field. This lack of precision can lead to significant confusion and disagreement when it

comes to evaluating the governance requirements and potential impacts of this technology. For the purposes of this testimony, I will employ a very expansive definition of AI: any analytical technique that uses a degree of self-learning for adaptive and predictive purposes. Moreover, rather than focusing on the underlying technical approaches used, this testimony will focus primarily on the ways in which the technology is being used to create value for financial institutions and their clients.

2. AI's near-term impact on finance is best understood through the capabilities it enables.

We identified four primary ways in which the suite of technologies commonly called AI are being used to drive value within the financial sector. The first is to improve the speed and efficiency of existing financial processes. Such techniques enable financial institutions to reduce operational costs, while at the same time often improving the experience of their customers. Examples of this category of AI application include the use of machine vision to automate the processing of minor 'scratch and dent' insurance claims and the use of natural language processing to more rapidly onboard complex corporate banking clients with less manual intervention.

The second category of value being created through the deployment of AI are improvements to the performance of existing activities. This is often achieved by combining new data points with advanced analytical techniques to identify new risks and opportunities that might not have been perceived using traditional methods. For example, certain hedge funds may use machine readable news and machine vision analysis of satellite imagery to identify new investment opportunities. Many new consumer lenders have sought to use non-traditional data inputs, such as bill payments or social graphs, to expand their lending operations to 'thin file' clients who might not have had enough traditional credit history to receive a loan.

The third category of value being enabled by AI is the deployment of entirely new value propositions. These are new sources of revenue, typically based on the analysis of data already being collected by the organization. For example, some payment networks may be able to offer macro-economic forecasting services based on the analysis of high-level metadata flowing through their networks, while a growing number of insurers are exploring opportunities to leverage AI's real-time analytic capabilities to help them stop incidents before they happen.

The fourth way in which financial institutions are using AI to create value is the deployment of highly personalized products and advice specifically calibrated to meet customer's needs. While such

offerings have always been possible, AI allows them to be deployed at near zero marginal cost. Many such offerings remain relatively nascent, but a growing number of personal financial advisors look to provide mass-market clients with real-time advice that helps them to better understand their financial situation and spending patterns.

3. As the adoption of these AI becomes ubiquitous access to data will become a core strategic priority of financial institutions, driving a shift in the competitive landscape of the industry

The capabilities discussed above represent a remarkable opportunity for financial institutions to differentiate themselves in terms of their efficiency, performance, and customer engagement; establishing an extremely strong rationale for investment in AI-enabled capabilities. Our research suggests that as the number of financial institutions focused on deploying these capabilities grows the implications may extend well beyond the performance of individual institutions – driving a foundational shift in the basis on which financial institutions compete.

To understand the reason for this, we must consider the ‘ingredients’ required to deploy AI-enabled capabilities. At their core, the majority of AI models are a combination of two parts: an ‘algorithm’ that takes certain inputs, analyses them, and provides specific outputs, and a dataset that is used to ‘train’ the algorithm to perform the required task. While the ‘algorithm’ can appear to be complex to the layman, a wide array of cutting-edge algorithms are available for free from open-source communities. This means that the other part – the dataset – is the critical component of any institution’s effort to build unique, high-quality AI models.

As a result, financial institutions’ appetite for data are likely to grow at an accelerating pace to feed the development of their AI systems; this will occur across three dimensions:

- Depth: data that is granular and specific, to develop nuanced understandings and deep insights that create real value for customers
- Breadth: data that spans across a wide set of use cases, to develop robust models that can adapt to a variety of situations
- Exclusivity: data that other institutions cannot easily replicate or procure, to provide value that cannot be replicated by others and create sustained competitive differentiation

This growing importance of data is likely to further underline existing discussion on the importance of adequate data protection that have surfaced in the wake of several high-profile data scandals in

recent years. Numerous contributors to our research stressed that the growing demand for data – particularly where that data is of personal or sensitive nature – will demand the development of improved systems for both safeguarding personal data and enabling customers to share their data in a secure easy to understand fashion.

4. The early adopters of AI may be well-positioned to establish and entrench their market dominance in specific activities, leading to a more interconnected financial system

Many contributors to our research stressed that the competitive dynamics of markets where businesses seek to differentiate themselves based on AI capabilities differ significantly from the dynamics in more traditional markets. A key reason for this is that AI systems tend to create a self-reinforcing loop, wherein the improvement of a product attracts more users who then provide the system with additional data, leading to further improvements in the product. This loop – sometimes referred to as the AI flywheel, tends to create a ‘winner take all’ dynamic where certain products secure a degree of performance and quality that other competitors cannot compete with, making it difficult for them to access the data needed to make improvements.

It is likely that early movers in the deployment of AI capabilities who successfully establish flywheel effects will be able to establish difficult-to-challenge offerings around specific service offerings. In some cases, these will be end-customer facing offerings, while in others they may be back- and middle-office capabilities. Success in the later would create an impetus for institutions to consider if it is rational to continue performing those activities in house, or if it would be more reasonable to outsource those activities to the third party whose AI has established itself as best-in-class at that activity. The provider of such services might be a competing financial institution, a large technology firm, or even a highly specialized fintech. As adoption of such services became more common, the landscape of financial services would be fundamentally transformed as complex interconnections between more specialized financial institutions (and non-financial entities such as cloud service providers) became typical.

5. The shifting landscape of financial services resulting from increased use of AI will create new uncertainties and has the potential to drive governance gaps

As financial institutions seek to incorporate AI-enabled capabilities into their operating models and brace themselves for longer-term changes to their competitive environment, it is unsurprising that

members of both the public and private sector are concerned about ensuring good governance and stability. Over the course of the last eight months we have conducted workshops and interviews with experts from leading financial institutions, emerging fintechs, and regulatory authorities around the world. Three issues that were commonly raised by stakeholder from a variety of organizations were the following:

Systemic risk: As AI becomes more ubiquitous and as financial institutions become more interconnected (relying on one-another for core capabilities as proposed in point four) new vectors for the propagation of systemic risk could emerge that existing prudential models are not equipped to identify or defend against.

Bias: In seeking an ‘information edge’, financial institutions are increasingly using new types of data (e.g., social media data, telecom data) to inform their AI systems. The use of new forms of data could potentially allow for bias to be propagated through the financial ecosystem and lead to unfair outcomes for specific populations.

Explainability: Understanding AI models is difficult – sophisticated systems can involve orders of magnitude more intermediary steps than traditional systems. This makes it almost impossible to follow how the provided inputs led to the outputs of an AI model, and often even the developers who built a model cannot fully explain how it works. This creates significant complexity in adequately governing AI systems both from an internal business perspective and a regulatory perspective.

6. While AI may demand changes to existing regulatory and governance practices it does not require a fundamental re-thinking of regulatory principles and objectives

The risks and potential governance gaps illustrated in point five are clearly serious: ensuring the continued stability of the financial system is critical to enabling growth in the broader economy and safeguarding the fairness of the financial system is a cornerstone of the industry’s social licence. At the same time, it is important to highlight that few, if any, of the risks raised by the increased use of AI in financial services demand a fundamental rethinking of the objectives of financial regulation or the high-level principles that the financial system should be held to. Instead, establishing effective governance requires a granular investigation of how best to achieve these objectives in the context

of new tools and operating models. For example, when we consider the case of the three risks identified in point five, it is critical to keep in mind that...

Systemic risk: New supervisory capabilities supported by AI can augment regulator's ability to monitor and proactively respond to emerging systemic risks against a changing financial landscape. This potentially allows the increasing complexity of the financial ecosystem to be balanced out by the increasing sophistication of oversight and governance mechanisms.

Bias: Extensive work has been and continues to be done on limiting the propagation of bias in financial decision-making systems. Many well-established techniques exist to safeguard against the introduction of bias via human factors, decision-making systems, and the input data that informs the decision-making system. Additional techniques can be used to identify unfair outcomes across various 'fairness metrics'; proactive and reactive techniques to managing bias can both still be used in AI contexts.

Explainability: 'Explaining' a model can take on many forms and providing full interpretability of a model may not be necessary in all cases, depending on the need that an explanation seeks to fill. Other techniques, such as 'guard-rails', context generation engines, and the ability to interrogate limited portions of a model may be sufficient to deliver the level of context, transparency and control deemed necessary to have informed trust in a model for a particular use case.

7. The use of AI in financial services introduces both opportunities and risks – effectively balancing them is the responsibility all stakeholders of the financial system

As discussed in point one, popular discourse around AI is often tinged by fear and frustrated by the highly complex nature of this topic. Many of the concerns around AI's deployment in financial services – including but by no means limited to systemic risk, bias, and explainability – require close consideration.

However, it is critical to recall that when strong governance practices can be put in place and risks can be suitably managed, that AI has the potential to deliver significant benefits to end-users of financial products and services – particularly individuals and small businesses. AI can help provide faster and more efficient processing of customer requests, increase accessibility by opening models

up to new data points, and improve the quality of financial advice by allowing institutions to more deeply understand their customers.

The core challenge for this committee, the regulatory apparatus of the US financial system, and the financial institutions that it regulates will be to effectively navigate the balancing of these risks and opportunities based on the specific context of individual use cases of the technology. AI is not inherently good nor evil; it is a toolkit that has many potential benefits, but like any toolkit, needs to be used responsibly.