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HAL, the Terminator, and Agent Smith entered a bar; Regulation of Artificial Intelligence in the United States

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"Hello, Dave. You're looking well today." In the iconic science fiction movie, 2001: A Space Odyssey, the HAL 9000 computer courteously greeted its astronaut human companion Dave Bowman. HAL was a Heuristically programmed ALgorithmic computer designed to control the systems of the Discovery One spacecraft on which Dave and his fellow astronauts travelled. HAL went on to eliminate members of the crew and attempted to eliminate Dave. For several decades, the fear of artificial intelligence ("AI") was perpetuated by movies including 2001: A Space Odyssey, The Terminator and The Matrix.[1] In late 2013, the fear of AI garnered new attention when two Oxford academics released a paper claiming that 47 per cent of current American jobs are at "high risk" of being automated within the next 20 years.[2]

Introduction

When regulators and some scholars think of the interactions between humans and AI, some still fear HAL and other forms of AI portrayed in movies.[3] The reality is that AI is coming to many industries, including the financial services industry. The growth of AI presents a real opportunity to revolutionise the financial services industry, creating efficiencies and reducing costs. Luckily, not all regulators fear HAL or other forms of AI.

In 2017, Michael Piwowar, the acting Chairman of the U.S. Securities and Exchange Commission ("SEC") noted: "As technology continues to improve and make profound changes to the financial services industry, it's important for regulators to assess its impact on U.S. markets and give thoughtful guidance to market participants."[4] Piwowar's sentiments were echoed in guidance the SEC published earlier that year to the public and registered investment advisers on the growing field of automated investment advisory platforms, more commonly known as robo-advisers.[5] The guidance was welcome in an industry that had seen rapid growth. The guidance followed the SEC Office of Compliance Inspection and Examinations' priorities letter in January 2017,[6] which identified electronic investment advice as an area of focus for 2017, and the 2016 FinTech Forum, where the growth of robo-advisers was discussed in depth.[7] The SEC's guidance included a series of recommendations for robo-advisers to help them meet the disclosure, suitability and compliance obligations under the Investment Advisers Act of 1940 ("Advisers Act"). The guidance consisted of both elevated level as well as more specific recommendations to help ensure compliance in these areas. The SEC guidance focused on retail robo-advisers that provide their services to clients over the internet. The guidance is instructive for all robo-advisers.

The SEC appears ready to abandon this approach to the regulation of the use of AI by investment advisers and broker-dealers. In the fall of 2023, the SEC proposed rules with

respect to the use of AI that have been widely criticised by the industry and only garnered support from organisations that routinely support the SEC's approach to protecting the public while disregarding one of the other duties of the SEC – promoting capital formation.[8] In stark contrast to the SEC's expansive approach to the regulation of AI, earlier this year the U.S. Commodity Futures Trading Commission ("CFTC") published a more measured Request for Comments ("RFC") on a variety of issues related to the use of AI. Similarly, the Office of the Comptroller of the Currency ("OCC") has provided guidance that establishes an approach that banks should follow as they look to implement AI.

This chapter introduces the reader to AI, and discusses guidance and proposed rules from the SEC, the CFTC and the OCC with respect to the use of AI by entities subject to regulation in the United States, including broker-dealers, investment advisers, exchanges, designated contract markets and banks.

Moore's Law

The use of AI is increasing due to the declining cost of computing power. In 1965, Gordon Moore, the founder of Intel, coined what would later be termed "Moore's Law", which predicted that integrated circuit technology would improve exponentially about every two years and costs would fall correspondingly, leading to rapid technological progressions.[9] Since the 1960s, computing power and capacity have grown better, faster, smaller and cheaper.[10] Commonly used personal computing devices including the iPhone and the iPad have more computing power than all of the computers used by NASA during the Apollo space program that carried astronauts from the Earth to the moon.[11] The iPhone has more than 100,000 times the computing power of the computers used to land on the moon.[12]

Big Data and electronic trading

With the growth of personal computing and the internet, we have seen a dramatic rise in the data generated by the public ("Big Data"). Big Data has spurred the development of new analytical models that use the data.[13] While Big Data has been used by a variety of industries, the financial services industry was an early adopter of the use of the data. Early applications of Big Data have included electronic brokerage, high-frequency trading and algorithmic trading. The growth of Big Data and the development of machine learning have fuelled the use of AI in the financial services industry.[14]

The development of AI also presents new challenges and opportunities for traditional financial services firms, including exchanges, broker-dealers, investment advisers and banks.[15] The growth of trading volumes on alternative trading systems in the late 1990s, and the development of high-frequency trading in the early 21st century, have changed the way securities are traded around the world.[16] Today, the majority of the trading of equities listed on the Nasdaq and the NYSE takes place in electronic exchanges.[17]

The Terminator

In The Terminator, the hero, Kyle Reese noted the: "Terminator is out there…It can't be reasoned with. It doesn't feel pity, or remorse, or fear. And it absolutely will not stop, ever, until you are dead!"[18] At times, members of the FinTech community believe SEC Chairman Gary Gensler is the Terminator. While Chairman Gensler is not a cyborg sent from the future to eliminate the threat to SkyNet, the SEC has proposed rules with respect to the use of AI by broker-dealers and investment advisers that some believe will impair the use of AI in the financial services industry.

Proposed rules

The SEC has proposed new rules that would require broker-dealers and investment advisers (collectively, "firms") to take certain steps to address conflicts of interest associated with their use of predictive data analytics and similar technologies to interact with investors to prevent firms from placing their interests ahead of investors' interests. Chairman Gensler noted last year that, "[w]e live in an historic, transformational age with regard to predictive data analytics, and the use of artificial intelligence".[19] Gensler stated:

> "Today's predictive data analytics models provide an increasing ability to make predictions about each of us as individuals. This raises possibilities that conflicts may arise to the extent that advisers or brokers are optimizing to place their interests ahead of their investors' interests. When offering advice or recommendations, firms are obligated to eliminate or otherwise address any conflicts of interest and not put their own interests ahead of their investors' interests. I believe that, if adopted, these rules would help protect investors from conflicts of interest — and require that, regardless of the technology used, firms meet their obligations not to place their own interests ahead of investors' interests."[20]

In recent years, financial services firms have increasingly adopted technology to enhance business operations and create investment efficiencies, ideally broadening market access and increasing returns. This use of technology does not come without risks, however. The SEC views the use of AI in a securities context as a potential threat to consumers, particularly when applied in novel contexts. As Chair Gensler has stated, "[g]iven the scalability of these technologies and the potential for firms to reach a broad audience at a rapid speed, any resulting conflicts of interest could cause harm to investors in a more pronounced fashion and on a broader scale than previously possible".[21]

The SEC contends that the proposed rules expand upon existing legal norms. The proposed rules require firms to assess whether their use of certain technologies in engaging with investors poses a conflict of interest, prioritising the firm's interests over those of investors. These rules would require firms to eliminate or mitigate such conflicts, allowing them to utilise tools tailored to the specific technologies they employ. Finally, the proposed rules require firms to maintain written policies and procedures aimed at ensuring adherence to these rules.

SEC regulation of robo-advisers[22]

In addition to the SEC's recent efforts to regulate the use of AI, the SEC has focused for several years on a growing number of investment advisory firms that have begun offering investment advice through digital platforms using proprietary algorithms instead of traditional human advisors. Robo-adviser services are being offered through fully automated means in which the customer only interacts with the digital platform, as well as through hybrid means in which human services are paired in varying degrees with the digital offerings.[23] In both circumstances, the advisory firm is able to offer their services to clients at a lower cost by offering them passive investments that do not need a human adviser and the fees that come with it. The popularity of robo-advisers is growing rapidly, with major financial firms such as Charles Schwab and Goldman Sachs developing online advisory platforms.[24] Robo-advisers "create personalized investment portfolios, obviating the need for stockbrokers and financial advisers".[25]

Supporters of digital investment advice have argued that robo-advisers are able to handle all of an investor's portfolio needs while keeping costs low and avoiding potentially costly human error and bias that can occur in investment services.[26] Properly constructed

and tested robo-advisers may also help to reduce the incidence of fraud and errors in the provision of advisory services by eliminating humans that are at times driven by greed or other nefarious motives. Critics argue that while robo-advisers may be able to complement the services provided by traditional human advice, the former will never replace the latter due to the personal element provided by traditional investment services and the nuances involved in investment advice.[27]

Regardless of one's opinion on the virtues of robo-advice, the growth of the industry raises a unique set of regulatory questions such as how exactly robo-adviser services fit under existing supervisory frameworks. While the SEC has not adopted new rules that are tailored to robo-advisers, SEC guidance has sought to guide robo-advisers compliance with existing laws. The SEC has encouraged robo-advisers to provide clear disclosures, in addition to what is usually required of advisers on the Form ADV, including information about the adviser's specific business model and related risks. The SEC has noted the disclosures should include "[a] statement that an algorithm is used to manage individual client accounts" and "[a] description of the particular risks inherent in the use of an algorithm to manage client accounts".[28] The SEC believes the disclosures help to familiarise customers with how robo-advisers make investment determinations and what specific risks are inherent with such a business model.

The SEC believes that risks include issues related to algorithms, such as problems with automatic rebalancing of client accounts, or the possibility that an algorithm may not have the capacity to address prolonged changes in market conditions.[29] While robo-advisers bring added efficiency, the technology presents unique problems which in the SEC's view justify additional disclosures. A robo-adviser should carefully consider the disclosures it plans to make to its customers. The disclosures should be based on the list provided in the SEC's guidance and any unique factors in its product offerings that may create risks beyond what is already noted.

Trust but verify – effective compliance

Like traditional investment advisers, robo-advisers must comply with Rule 206(4)-7 of the Advisers Act. Rule 206(4)-7 requires advisers to establish an internal compliance program to ensure compliance with the Advisers Act. Such compliance includes developing policies and procedures "reasonably designed to prevent violations of the Advisers Act" while taking into consideration the nature of the firm's operations and the specific risks. The SEC guidance notes the robo-adviser business model is unique, raising novel compliance concerns. Such concerns include the increased risks created by the robo-adviser providing advisory services over the internet. The risks should be addressed in the adviser's written policies and procedures and in disclosures to the client regarding changes in the underlying algorithm and the ongoing prevention and detection of cyber security threats.[30] The SEC believes robo-adviser services have unique compliance requirements that go beyond the traditional requirements under the Advisers Act. Robo-advisers must be cognisant of the risks associated with their products and services and must design a compliance program that addresses those issues with sufficient particularity and present forth a plan for continued protections as the underlying technology continues to develop.

The sparring room – testing of algorithms

In the Matrix, the heroes used the sparring room to train before entering the Matrix.[31] Robo-adviser compliance programs must include a mechanism for testing the code that underpins the algorithms that drive the advisory platform. Such testing must be combined with continued monitoring of its performance. Digital advisory services offer the potential for

great cost-savings and efficiency by using computer programs rather than traditional human advisers. The use of code, however, presents a unique set of challenges to ensure that the advice provided is accurate and that client funds are kept safe. Proper vetting of the code can help mitigate these risks, as can continued monitoring.

<u>Rogue programs</u>

The issues that befell Knight Capital Group in August of 2012 provide a clear example of what can happen when algorithms are not properly tested and monitored. Due to an undetected error in the software behind their market-making platform, the group lost $440 million in 30 minutes.[32] The error caused erratic trades to be made on nearly 150 different stocks, buying high and selling low.[33] The error caused a loss that was larger than Knight's market cap of $296 million at the time, putting the firm's future in jeopardy.[34]

Firms can reduce to the likelihood of such issues through effective testing and monitoring procedures. Robo-advisers should use caution as they develop the algorithms and software that underlie their services. The SEC has focused on the importance of testing and monitoring algorithms as a key component of an effective compliance program. Robo-advisers must focus on the algorithms that are the basis of their service offerings and should subject the algorithms to critical testing and monitoring to ensure clients are not improperly advised or that their funds are not misused.

Agent Smith

"Oh, I'm not so bad, once you get to know me!"[35] In the Matrix, the villainous Agent Smith often confronted the heroes with gems of wisdom that were a window into the Matrix. AI is also not *so bad once you get to know it.* While not acknowledged by the FinTech industry, regulators, including the CFTC, routinely share thoughts with the industry that are meant to shape how industry participants may use technology, including AI.

<u>The CFTC seeks answers</u>

On January 25, 2024, the CFTC published an RFC,[36] in which it articulated its approach to the regulation of the use of AI by CFTC-regulated entities. The CFTC wanted to determine: (i) how AI was being used by commodity market participants; (ii) the inherent risks of use of this technology by such participants; (iii) what the CFTC should do in response to the proliferation of AI; and (iv) how the use of AI fits within the existing regulatory framework established by the CFTC, the National Futures Association and prevailing market practices. In the RFC, the CFTC recognised entities and registrants, (collectively "CFTC regulated entities")[37] and other market participants are increasingly exploring and using AI and related technologies. The CFTC noted the "use of AI may lead to significant benefits in derivatives markets, but such use may also pose risks relating to market safety, customer protection, governance, data privacy, mitigation of bias, and cybersecurity, among other issues".[38]

The RFC is part of an effort by the CFTC to monitor the adoption of AI by CFTC-regulated markets.[39] The RFC was also prompted, in part, by AI-related guidance issued by the White House. In particular, on October 30, 2023, the White House issued an Executive Order encouraging federal agencies, such as the CFTC, to "consider using their full range of authorities to protect American consumers from fraud, discrimination and threats to privacy and to address other risks that may arise from the use of AI".[40]

<u>AI risks in CFTC-regulated markets</u>

The CFTC noted the predictions, recommendations or decisions made by AI may create or heighten risks that vary based on the specific application of AI.[41] If not responsibly

managed, these risks could cause significant harms. The CFTC noted: the use of AI in trading applications could contribute to inappropriate trading behaviour or market disruptions;[42] AI-based customer interactions could lead to unintended biases and deceptive or misleading communications;[43] and when used for any critical business process, AI could exacerbate risks to operational resiliency.[44] The CFTC acknowledged that while AI may present unique challenges to CFTC-regulated entities' ability to identify and manage certain risks, not all of the potential risks associated with the use of AI in CFTC-regulated markets are unique to AI. The CFTC noted the types of potential risks can appear similar because AI, like other technologies, processes, tools or models, does not change the underlying activity for which it is being used but the manner in which the activity is being conducted.[45]

The CFTC concluded the complexity and autonomy of some AI, deployed in a context of ever-increasing datasets and computing power, also presents unique challenges to CFTC-regulated entities in identifying and managing risks. Some of these unique challenges may relate to the ability to explain the results produced by AI.[46] Use of an AI model may introduce risks if the predictions, recommendations or decisions made by the AI model cannot be fully explainable.

The WOPR

Like the WOPR ("War Operation Plan Response") program in the movie War Games,[47] which was based on a quaint, massive computer system used by the U.S. military, many banks are reliant on systems that are cyber brethren to the WOPR. Unfortunately, the OCC is charged with the supervision of banks that use these metaphorical cyber dinosaurs. As banks explore the use of AI, the OCC faces a combination of technologies that are analogous to Agent Smith (AI) and the T-Rex from Jurassic Park (legacy bank systems).

The OCC, along with its sister prudential regulators the FDIC and the Fed, have long embraced the concept of "*responsible innovation*" – a policy balancing act recognising the need to continually evolve as an industry to meet customer demand for financial services without sacrificing the safety and soundness of the U.S. financial system. In the fall 2023 publication of the OCC's semiannual risk report, the OCC identified AI as a "special topic in emerging risk".[48] The OCC appropriately identified technological advancements in AI and the opportunities available to banks to leverage this technology to improve risk management controls, enhance data analytical techniques, and combat money laundering and other fraudulent activities. However, the OCC also recognised that technological innovation also came with heightened challenges and risks related to over-reliance on large data sets, unintended bias, consumer data privacy and third-party vendor risk. The potential benefits of AI are significant so long as banks appropriately navigate this balancing act; as with any significant technological innovation deployed at a bank, regulators will certainly scrutinise the implementation to ensure that the bank continues to operate in a safe manner.

Consistent with existing supervisory guidance, banks are expected to use a risk-based approach when deploying AI such that the bank's use of AI is commensurate with the complexity and risk profile of the bank's business activity that supports AI usage. Specifically, a bank considering AI should have policies, procedures and controls in place that enable it to identify, measure, monitor and control risks arising from AI use as they would for the use of any other technology or business activity. In other words, technological advances do not preclude the bank from complying with existing regulation and supervisory expectation and, despite the level of automation that technology may impart to a bank, a bank is never permitted to simply rely on AI to meet its supervisory and compliance

burdens. Although existing guidance may not expressly address AI use, the supervision risk management principles contained in OCC issuances provide a framework for banks that implement AI to operate in a safe, sound and fair manner.[49]

Key risks

The identification of AI as an emerging risk in the report comes as no surprise given earlier comments from Deputy Comptroller for Operational Risk Kevin Greenfield. On May 13, 2022, Mr. Greenfield discussed the opportunities, benefits and challenges AI presents for banks.[50] Mr. Greenfield is well known in the financial services community as an expert on risk management practices and has served in various leadership roles at the OCC since 2014. His testimony on AI included a written statement describing the OCC's views on AI, key risks that are implicated by AI, and some of the agency's supervisory expectations for the banks that it regulates. Mr. Greenfield outlined four key risks associated with the use of AI in his written testimony:[51]

1. *Explainability*

Explainability refers to the bank personnel's ability to understand and explain the outcomes of its AI processes, including understanding the data inputs that drive AI algorithms and how these algorithms process this data and provide the outcome (i.e., information output). Employing qualified personnel is a critical function associated with using AI because a failure to understand an AI process or outcome could result in an adverse, or even non-compliant, outcome for the bank. For example, an over-reliance on AI outcomes, particularly with respect to credit risk underwriting of borrowers, could lead to unfair or discriminatory lending practices. Furthermore, the absence of qualified personnel also will hinder the ability of the Bank to be responsive to inevitable regulatory scrutiny regarding the deployment of AI systems within a bank. In other words, during an examination, a regulator would require a bank to explain in great detail the AI system and how information is processed and acted upon by the bank; an inability to explain such processes is likely *indicia* of unsafe and unsound practices.

2. *Data management*

Data management and governance refers to the risk that inferior quality data may be used by an AI process in a way that results in incorrect predictions or outcomes containing unfair or discriminatory bias. The potential for creating such bias becomes even more acute when bank personnel lack sufficient training to assess the data quality powering the AI algorithm. As Mr. Greenfield noted in his testimony, "[b]ecause the AI algorithm is dependent upon the quality of the data used and the effectiveness of the training, an AI system generally reflects the limitations of that dataset".[52]

3. *Privacy and security*

Consumer privacy and data security is the risk that an AI process may expose sensitive consumer data to compromise. Some uses of AI may implicate restrictions on processing certain types of consumer data.

4. *Third-party providers*

Many AI technologies rely on third-party providers for development or implementation. In the last three years, the federal bank regulators have issued extensive guidance on third-party vendor risk management, including supervisory expectations as to vendor due diligence and ongoing supervision and oversight of these third-party vendors. These third parties may pose a risk to a bank's operations and use of AI depending on the criticality of the technology or the service being provided by the third party, particularly if a bank

does not possess sufficient controls to ensure the vendors themselves have implemented appropriate controls to ensure that data is being processed in a manner consistent with the bank's risk controls and expectations.

Supervisory expectations

Mr. Greenfield identified several key supervisory expectations that the OCC has for banks that use AI:[53]

1. Risk-based supervision

The OCC expects a bank to have well-designed compliance management systems and risk management controls to address AI use in banks. Banks are expected to follow a risk-based approach and tailor their systems to the individual risk profile of the bank as well as the bank's scope of activities using AI. For example, banks – large or small – intending to deploy AI enterprise-wide would be expected to comply with heightened prudential standards and have more robust risk and compliance controls to ensure that AI use is performed in a safe manner given the risk profile of the bank. Furthermore, systems should be in place to enable banks to conduct appropriate due diligence and risk assessments when evaluating new activities that utilise AI.

2. Model risk management

In 2021, the OCC issued a statement related to model risk management in the context of BSA/AML compliance, as well as broader revisions to the OCC Comptroller's handbook regarding sound model risk management practices. It is likely that AI algorithms and processes would fall within this model risk management guidance and, as a result, a bank should ensure that its controls (e.g., due diligence, risk management/assessment, governance and monitoring) are appropriate and comply with OCC guidance.

3. Third-party risk management

The OCC expects banks to have an effective third-party risk management program that includes robust due diligence, effective contract management and ongoing oversight of third parties.[54] For AI, this typically means that a bank should have controls over the deployment of the technology in the bank and should monitor the third party's performance, including its use of data, on an ongoing basis.

4. Responsible use of data

The OCC expects banks to understand the data inputs flowing through AI systems and evaluate the resultant output against any potential unfair or discriminatory bias that could result in adverse consumer actions or even failure to comply with certain statutes such as the obligations set forth under the Community Reinvestment Act. As a result, banks should be cautious with over-reliance on large data and alternative sets powering the AI engine and build controls around maintaining data integrity to ensure actions taken as a result of AI-predicted outcomes are not only performed in a safe and sound manner but also in a manner that does not run afoul of consumer protection laws.

Conclusion

While the development of AI is extremely promising, like a good parent there is a key role for humans in the development, training and operation of AI. Developers must be careful not to give AI instructions that are confusing like the instructions given to HAL. Developers also must have a relationship with AI that is built on reliable data and supervision. Finally, developers should listen to the thoughts on the development, testing and operation of AI that are shared with them by Agent Smith – we mean the regulators.

The authors envision humans and machines developing a symbiotic relationship. We believe humans and machines will work together in a fashion similar to HAL and Dave before their unfortunate misunderstanding. Humans and machines will work together to design, build and test the proper functioning of computerised systems.[55] Finally, the authors dismiss as misguided the claims that AI is devoid of the awareness, sophistication and judgment of human intelligence.[56]

It remains to be seen whether the SEC, the CFTC and the OCC will take specific actions that focus on the use of AI by entities regulated by U.S. federal regulators. Any firm that is planning to use AI should proceed with caution. Similarly, anyone looking to use robo-adviser services should make sure the adviser offering the services is registered with the SEC and should carefully review the disclosures by the adviser. Due to the lack of clearly defined guidance with respect to how existing laws, rules and regulations apply to AI, it is important that anyone contemplating the use of AI in financial services engages experienced counsel to assist in navigating the regulatory requirements that may apply to such business.

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Endnotes

1. HAL is one of the earliest motion picture representations of a malevolent or emotionally obtuse form of AI. Other motion picture AI villains including SkyNet from the Terminator movies, the WOPR from War Games, the villainous Agent Smith of the Matrix movies and the Cylons of Battlestar Galactica. Of course, the authors mean the 2000s version of Battlestar Galactica and not the original version that was cancelled in 1979. More approachable forms of AI include IBM's Watson and ChatGPT. For the purposes of this chapter the authors use the term AI to include machine learning and algorithms.

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