Opportunities and Risks of Artificial Intelligence in Investment Markets

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September 2024

Executive Summary

Artificial Intelligence (AI) technology has the potential to deliver opportunities for investors and investment firms. For investors, AI may expand access to higher-quality products and services, bring greater participation in markets, lower costs, improve the user experience, enhance decision making, and ultimately provide better outcomes. For firms, AI may bring greater efficiency and productivity, better resource allocation and customer service, and enhanced risk management and regulatory compliance.

However, the use of AI also carries potential risks, including "AI washing," unsound retail investor-facing products and services, "black box" risk, model and data risk, lack of clear disclosures of AI-associated risks, bias and conflicts of interest, privacy concerns, inadequate due diligence and monitoring of third-party service providers, systemic risk, and enabling bad actors' malicious practices. These risks will escalate if firms embrace a "move fast and break things" mentality to their development and deployment of AI-based products and services. To the extent AI is deployed at massive speed and scale, potential harms could affect a substantial number of people very quickly and ripple throughout the economy.

The rapid evolution of AI technologies may also make it challenging for regulators to keep pace. One challenge for regulators would be if market participants use AI-based tools in ways that are technically legal, but nonetheless harmful to investors or market integrity. Another challenge would be if market participants use AI-based tools to engage in unlawful activity that is difficult for regulators to detect. A lack of data and model transparency could add to regulators' difficulties in detecting misconduct. These challenges will intensify if regulators do not have sufficient resources to monitor and address harmful uses of AI.

Regulators and market participants must take proactive, not reactive, approaches to address these risks. In addition to regularly engaging all stakeholders, regulators should use their examination and supervision authority to learn how firms are developing and deploying AI technology. Regulators should also develop their own technology that detects misuse of AI technology in the market. To do so, regulators need sufficient resources. Firms also must take meaningful steps to ensure that their development and deployment of AI-based tools do not harm investors or market integrity.

If complexity, opacity, unreliability, bias, conflicts of interest, or data insecurity infect AI applications, investors could receive suboptimal products and services, harming their financial security, and eroding their trust and confidence in AI-based tools and investment markets more broadly. However, if firms and regulators take proactive approaches to addressing these risks, AI's potential could be fulfilled.

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What is AI

While there is no widely agreed upon definition of artificial intelligence (AI), it is an umbrella term that generally refers to the development of computer systems that can perform automated tasks that "traditionally have required human intelligence."[1] These tasks include learning, problem-solving, and language understanding. AI operates through algorithms that process data, recognize patterns, and make predictions or generate new content based on available information. Although the use of AI is not new, it is rapidly evolving as computing power increases and the availability of data expands. One subset of AI is Machine Learning (ML), which refers to algorithms that "process large amounts of data and learn from it … without being explicitly programmed to do so."[2] The extent of human involvement can vary based on the particular application.

AI is also typically subdivided into two branches: predictive AI and generative AI. Predictive AI focuses on making predictions about future outcomes based on historical data. For example, predictive AI includes models for forecasting stock values or analyzing customer behavior. In contrast, generative AI focuses on creating new content that resembles existing data. Generative AI produces outputs such as text, images, audio, and video that can be similar to what humans might produce.[3] ChatGPT uses generative AI to respond to users' prompts.

Generative AI models are trained on massive data sets to recognize patterns and relationships within that data. In some instances, that data can include everything that is found on the internet—both the accurate and reliable data, as well as the inaccurate and unreliable data. In other instances, that data can be limited[4] – in some cases limited data sets can help ensure higher-quality data, in other cases, it can result in reliance on data that is not representative.[5]

Large Language Models (LLMs) are designed to understand and generate language like a human, based on large amounts of training data. LLMs have the ability to understand the context of

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[1] *See* Financial Stability Board, Artificial intelligence and machine learning in financial services, Market developments and financial stability implications, November 1, 2017, https://www.fsb.org/wp-content/uploads/P011117.pdf

[2] *See* FINRA, Artificial Intelligence (AI) in the Securities Industry, June 2020, https://www.finra.org/sites/default/files/2020-06/ai-report-061020.pdf ("FINRA AI Report").

[3] McKinsey, What is generative AI, April 2, 2024, https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai ("Outputs from generative AI models can be indistinguishable from human-generated content, or they can seem a little uncanny. The results depend on the quality of the model—as we've seen, ChatGPT's outputs so far appear superior to those of its predecessors—and the match between the model and the use case, or input.").

[4] BlackRock, How AI is transforming investing, July 29, 2024, https://www.blackrock.com/institutions/en-us/insights/ai-investing ("Our models are trained on a smaller set of data inputs but are expected to deliver a high level of accuracy in performing the specific task that they've been trained and fine-tuned for. While the accuracy of OpenAI's model improved considerably from GPT-3.5 to GPT-4, both OpenAI models demonstrate a lower level of predictive performance than our proprietary model that's been trained and fine-tuned for this particular purpose.").

[5] FINRA AI Report ("Depending on the use case, data scarcity may limit the model's analysis and outcomes, and could produce results that may be narrow and irrelevant. On the other hand, incorporating data from many different sources may introduce newer risks if the data is not tested and validated, particularly if new data points fall outside of the dataset used to train the model.").

words and generate coherent and contextually relevant responses.[6] For example, chatbots use large language models to engage in conversation.

How AI is Being Used in Investment Markets

The use of AI in investment markets is not new. AI has been used in different ways in this context for decades.[7] However, recent advancements in computing power and the growing availability of large volumes of data, including novel types of data,[8] are enabling firms to use AI in new ways. Broadly, firms are using AI in their investor-facing communications, investment processes, and internal operations.[9] A brief, non-exhaustive overview of how firms are using AI is provided below.[10]

Investor-facing communications

Firms are using AI in their investor-facing services, including their marketing, customer service, and provision of advice and recommendations.[11] Some firms are using AI to target potential customers, predicting which potential customers are most likely to be interested in a particular product or service, or who are likely to be profitable to the provider. AI is also being used to provide curated content to potential customers that is likely to appeal to them.

Some firms are using chatbots and virtual assistants that answer customers' questions.[12] Chatbots are designed to provide immediate assistance, resolve customer problems, and enhance the firm's efficiency in responding to customer inquiries. Virtual assistants can provide customers with

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[6] *See* IBM, What are large language models (LLMs), https://www.ibm.com/topics/large-language-models

[7] BlackRock, How AI is transforming investing, July 29, 2024, https://www.blackrock.com/institutions/en-us/insights/ai-investing ("For decades, we've been applying natural language processing ("NLP") techniques across a wide range of text sources including broker analyst reports, corporate earnings calls, regulatory filings, and online news articles. When analyzed at scale, each individual insight can be combined into an aggregate view that helps inform our return forecasts. The more effectively we're able to extract and understand these insights, the more of an investment edge they may be able to provide.").

[8] This includes unstructured data that is not organized or formatted in a way that can be processed easily, such as video, audio, and images, and nontraditional data, such as consumers' purchase practices, online search histories and app usage, social media use, health information and biometrics, and location tracking.

[9] Financial market regulators, such as the SEC, CFTC, and FINRA are also using AI/ML-driven technology to oversee regulated entities within their jurisdiction, including to help detect market manipulation and perform market and risk surveillance. *See* A Primer on Artificial Intelligence in Financial Markets, LabCFTC, www.cftc.gov/LabCFTC.

[10] *See* FINRA AI Report; IOSCO, The use of artificial intelligence and machine learning by market intermediaries and asset managers, Final Report, September 2021, https://www.iosco.org/library/pubdocs/pdf/IOSCOPD684.pdf ("IOSCO Report").

[11] Magnifi, an investment adviser, states that investors should, "Think of Magnifi like a co-pilot for your investing — like Siri or Alexa went to investment school." Magnifi, AI for your financial future, https://magnifi.com/ (last visited September 16, 2024). Magnifi further states that, "Through a chat bot experience, Magnifi gives users access to conversational investing guidance, portfolio insights, market intelligence, and educational resources to help investors make more informed decisions." Form ADV Part 2A, Magnifi, June 30, 2024, https://files.adviserinfo.sec.gov/IAPD/Content/Common/crd_iapd_Brochure.aspx?BRCHR_VRSN_ID=918164

[12] Examples include Schwab Assistant, Fidelity Assistant, and Bank of America Erica.

more tailored services, including providing investors with individualized information about their accounts, advice and recommendations, and handling certain transactions.[13]

Investment processes

Firms are also using AI to identify and assess investment opportunities and risks, and manage portfolios.[14] For example, some firms are using AI to buy or sell securities that have particular characteristics, or to design portfolio strategies.[15] In addition, firms are using AI to route and execute trades more efficiently.[16]

Internal operations

Firms are also using AI in their internal operations to enhance efficiencies by automating routine tasks that were previously handled manually.[17] This includes, for example, transcribing and summarizing client meeting notes, managing and directing emails and calls, aggregating large, diverse datasets to provide employees with the ability to search information quickly, and enhancing customer/client relationship management.

Additionally, AI is being used to improve firms' operational risk management and regulatory compliance.[18] For example, firms are increasingly using AI to supervise various functions across their firm and employees, help with customer identification, and financial crime detection. In addition, firms are using AI to automate and streamline regulatory disclosures and reporting.

Opportunities and Risks of AI in Investment Markets

Use of AI has the potential to provide opportunities for investors and firms. For investors, AI may expand access to higher-quality products and services, bring greater participation in markets, lower costs, improve the user experience, enhance decision making, and ultimately provide better outcomes.[19] For firms, AI may bring greater efficiency and productivity, better

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[13] The Use of Chatbots and Virtual Assistants in Financial Services, Finance Magnates, April 27, 2023, https://www.financemagnates.com/institutional-forex/technology/the-use-of-chatbots-and-virtual-assistants-in-financial-services/

[14] *See* FINRA AI Report, IOSCO Report.

[15] *See* AI for portfolio management: Overview, benefits, use cases, implementation and ethical considerations, https://www.leewayhertz.com/ai-for-portfolio-management/#How-does-AI-in-portfolio-management-work. *See e.g.,* JPMorgan, Quest IndexGPT: Harnessing generative AI for investable indices, July 22, 2024, https://www.jpmorgan.com/insights/markets/indices/indexgpt; AlphaAI, About, https://www.alphaai.capital/about; Amplify ETFs, AIEQ®, Amplify AI Powered Equity ETF, https://amplifyetfs.com/aieq/ QRAFT AI ETFs, QRFT, Qraft AI-Enhanced U.S. Large Cap ETF, https://www.qraftaietf.com/qrft.

[16] NASDAQ, a securities exchange, recently introduced the first artificial intelligence-powered order type approved by the SEC designed to improve liquidity, execution quality, and fill rates in the markets. According to NASDAQ Chair and CEO Adena Friedman, there has been a 20% increase in volumes for the order type and a 20% improvement in fill rates. "Our clients get huge value out of it," Friedman stated. "It's a really nice way to get a higher fill rate in size at the midpoint." Shanny Basar, NASDAQ Finalizes Rollout of AI Order Type, Traders Magazine, July 26, 2024, https://www.tradersmagazine.com/xtra/nasdaq-finalizes-rollout-of-ai-order-type/

[17] *See* FINRA AI Report, IOSCO Report. *See also* Melat Kassa, Here's How Fund Shops Are Using Generative AI, Ignites, March 4, 2024, https://www.ignites.com/c/4443004/578464?referrer_module=article&referring_content_id=4569214&referring_issue_id=600404

[18] *Id.*

[19] *See* Christine Schmid, AI in Wealth: from Science Fiction to Science Fact, FinExtra, June 8, 2023, https://www.finextra.com/blogposting/24323/ai-in-wealth-from-science-fiction-to-science-fact

resource allocation and customer service, and enhanced risk management and regulatory compliance.[20]

While AI has the potential to provide opportunities to investors and firms, use of AI also carries potential risks, which will escalate if firms embrace a "move fast and break things" approach to their development and deployment of AI-based products and services. To the extent AI is deployed at massive speed and scale, potential harms could affect a substantial number of people very quickly and ripple throughout the economy.

A recent survey by *Ignites Research* suggests asset management firms are rapidly adopting AI tools; however, workers in these firms are concerned about: inaccuracies in AI outputs (69% of surveyed workers answered); complying with existing regulations (51%), cybersecurity (45%) and the ability to explain AI's decisions (33%).[21] One respondent stated, "AI has been used in applications for automating tasks, though the success percentage is not adequate." More concerning, just 37% of surveyed workers said their firms had established AI policies, which suggests firms may be rapidly adopting AI tools without sufficient safeguards.[22]

Some of the key risks to investors associated with firms' use of AI tools are discussed below.

"AI washing"

"AI washing" is a term used to describe the practice of companies' exaggerating or misrepresenting their use of AI technology in their products, services, or operations to attract customers and increase revenues.[23] Given that such characterizations may create the impression of using cutting-edge technology, firms may have an incentive to engage in AI washing. Recent analysis suggests companies that advertise use of AI experience better investment performance. Specifically, S&P 500 companies that cited "AI" on 2023 Q4 earnings calls experienced a better average stock price performance over 12 months compared to S&P 500 companies that did not cite "AI" in 2023 Q4 earnings calls.[24]

AI washing can mislead investors by causing them to overestimate a company's level of innovation and the value of a product or service. This can result in an inflated stock price that

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[20] *See* Melat Kassa, Here's How Fund Shops Are Using Generative AI, Ignites, March 4, 2024, https://www.ignites.com/c/4443004/578464?referrer_module=article&referring_content_id=4569214&referring_issue_id=600404

[21] *Id*.

[22] Melat Kassa, Generative AI Is Booming But Can Policy Keep Up?, Ignites, February 26, 2024, https://www.ignites.com/research/c/4434404/576534/?preview=1&cache=0&experimentChoice=0&referrer_module=article&referring_content_id=4443004&referring_issue_id=578464

[23] Richard Vanderford, SEC Head Warns Against 'AI Washing,' the High-Tech Version of 'Greenwashing,' Wall Street Journal, December 5, 2023, https://www.wsj.com/articles/sec-head-warns-against-ai-washing-the-high-tech-version-of-greenwashing-6ff60da9

[24] For S&P 500 companies that cited "AI" on Q4 earnings calls, the average change in price was 28.6%. For S&P 500 companies that did not cite "AI" on Q4 earnings calls, the average change in price was 16.8%. John Betters, Second-Highest Number of S&P 500 Companies Citing "AI" on Earnings Calls Over Past 10 Years, FactSet, March 15, 2024, https://insight.factset.com/second-highest-number-of-sp-500-companies-citing-ai-on-earnings-calls-over-past-10-years#:~:text=It%20is%20interesting%20to%20note,AI%E2%80%9D%20on%20Q4%20earnings%20calls.%20https://insight.factset.com/highest-number-of-sp-500-companies-citing-ai-on-earnings-calls-over-past-10-years

does not accurately reflect the company's fundamental value, leading investors to overpay for shares. It can also cause investors to sell at a loss when the stock returns to its fundamental value.

There have been several recent regulatory actions focused on AI washing. Specifically, the SEC settled charges against two investment advisers, Delphia (USA) Inc. and Global Predictions Inc., for making false and misleading statements about their purported use of AI. [25] According to SEC Chair Gary Gensler, "Delphia and Global Predictions marketed to their clients and prospective clients that they were using AI in certain ways when, in fact, they were not."[26]

Unsound investor-facing products and services

Heightened risks are associated with retail investor-facing uses of AI. For example, certain customer service applications such as chatbots and virtual assistants often fall short of consumers' reasonable expectations. They can be unresponsive to inquiries, fail to resolve customer problems, and lead users into a frustrating "doom loop" of repetitive and unhelpful responses.[27] Flawed responses could also harm investors by causing them to make investment decisions that are not in their best interest.

Another major risk with customer-facing AI applications is the possibility of the AI "hallucinating" – producing inaccurate or unreliable responses.[28] If investors rely on those inaccurate or unreliable responses, investors may be exposed to undue risks based on made-up content or flawed analysis.

"Black box" risk, model risk, and data risk

Many AI models, particularly complex ones, may operate as "black boxes," where it is difficult, if not impossible, to understand or explain how the models function, including what drives the models' outputs and the data that the models rely upon to generate their outputs.[29] It can be especially challenging to understand or explain how models function when a model has inconsistent outputs – when it provides different responses when prompted with the same question.[30] As a result, it can be challenging to know whether models and the data that they rely upon are accurate, reliable, complete, current, and free of bias. Without an adequate understanding of how a model functions, it is difficult to assess whether it is reliable and trustworthy.

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[25] Press Release, SEC, "SEC Charges Two Investment Advisers with Making False and Misleading Statements About Their Use of Artificial Intelligence," March 18, 2024, https://www.sec.gov/newsroom/press-releases/2024-36
[26] *Id*.
[27] *See* CFPB, Chatbots in consumer finance, June 6, 2023, https://www.consumerfinance.gov/data-research/research-reports/chatbots-in-consumer-finance/chatbots-in-consumer-finance/#note33 (citing one survey finding that 80% of consumers who interacted with a chatbot left feeling more frustrated and 78% needed to connect with a human after the chatbot failed to serve their needs.).
[28] IBM, What are AI hallucinations?, https://www.ibm.com/topics/ai-hallucinations
[29] *See* Sohnke M. Bartram, Jurgen Branke & Mehrshad Motahari, Artificial Intelligence in Asset Management, CFA Institute, 2020, https://www.cfainstitute.org/-/media/documents/book/rf-lit-review/2020/rflr-artificial-intelligence-in-asset-management.ashx ("Understanding and explaining the inferences made by most AI models is difficult, if not impossible. As the complexity of the task or the algorithm grows, opacity can render human supervision ineffective, thereby becoming an even more significant problem.").
[30] AI models can be probabilistic, not deterministic, meaning if you ask the same question twice, you might not get the same answer.

Market participants' disclosures underscore the high degree of uncertainty firms have about the quality of the AI tools they are using. For example, one investment adviser's disclosure states, "AI Tools can make wrong decisions based on incorrect inferences that have captured spurious or irrelevant patterns in the data … In many instances, neither the developer nor the user may have enough insight to understand how, or even if, the decision is wrong."[31] The disclosure further states, "As AI Tools become more complex and harder to analyze, the outputs of AI Tools may be accepted without analyzing how such outputs were generated. Therefore, identifying data-related issues by evaluating the outputs from AI Tools might be extremely difficult or impossible." [32]

Additionally, market participants' disclosures highlight the fact that flawed models and data could have harmful consequences on investors. For example, one investment adviser states in its disclosures, "Errors may arise from inaccurate data, limitations of the models, implementation of the models, the choice of models, or application of such models, any of which could result in erroneous investment recommendations, decisions or other actions that could negatively impact investment performance."[33] Similarly, another investment adviser states that, "There is a risk that inaccurate system inputs, data and assumptions could result in outputs or illustrative recommendations that are misaligned with Client goals."[34]

According to an investment company's disclosures, "The Fund relies heavily on a proprietary artificial intelligence selection model as well as data and information supplied by third parties that are utilized by such model. To the extent the model does not perform as designed or as intended, the Fund's strategy may not be successfully implemented, and the Fund may lose value. If the model or data are incorrect or incomplete, any decisions made in reliance thereon may lead to the inclusion or exclusion of securities that would have been excluded or included had the model or data been correct and complete."[35]

It is not clear what investors should do with this information, especially given that there is no way of knowing the likelihood of erroneous outputs or the magnitude of harm resulting from such erroneous outputs.

Lack of clear disclosures of AI-associated risks

Another related risk with the use of AI is that securities market participants may not disclose sufficiently to investors the nature and extent of the risks associated with their use of AI. They may state the general risks associated with their use of models and data, but may not provide enough information for investors to make fully informed decisions. Disclosing generally the risk

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[31] Form ADV Part 2A, Magnifi, June 30, 2024,
https://files.adviserinfo.sec.gov/IAPD/Content/Common/crd_iapd_Brochure.aspx?BRCHR_VRSN_ID=918164
[32] *Id*.
[33] Form ADV Part 2a, alphaAI, August 15, 2023, https://cdn.prod.website-files.com/64d7b43c3365e9c6598e016e/6515c66223136576c46c07ff_ALPHAAI%20CAPITAL%20MANAGEMENT%20BROCHURE.pdf
[34] Form ADV Part 2A, Magnifi, June 30, 2024,
https://files.adviserinfo.sec.gov/IAPD/Content/Common/crd_iapd_Brochure.aspx?BRCHR_VRSN_ID=918164
[35] Prospectus, QRAFT AI-Enhanced U.S. Large Cap ETF, August 28, 2024,
https://static1.squarespace.com/static/5e99253e8e3ed61586e534b6/t/66cfbf09fc8e706ce827d925/1724890893361/Qraft_Prospectus.pdf

of model breakdowns that could negatively impact investors is unlikely to give investors the information they need to make fully informed decisions.

As discussed above, several of the disclosures highlighted in the previous section do not provide sufficient information about the likelihood of erroneous outputs or the potential magnitude of harm resulting from such erroneous outputs. It is also not always clear from firms' disclosures the extent to which investment decisions are ultimately controlled by AI or humans, and under what circumstances humans would intervene when models are determined to have broken down.

Bias and conflicts of interest

AI models may also exhibit bias or conflicts of interest that can harm investors. For example, they may preference lower-quality products or services with higher costs for investors over higher-quality, lower cost reasonably available alternatives. AI models may also withhold investors' access to higher-quality products or services, even when they are reasonably available. AI models might also prioritize the interests of financial institutions over those of investors. For example, an AI-driven broker-dealer or investment adviser might "learn" to recommend products or services that generate higher revenues for the firm rather than ones that generate the best outcomes for the investor.

Many AI systems depend on large volumes of historical data for predictions and decision-making. If this data includes explicit or implicit biases, such as demographic-related biases, the AI systems may inadvertently perpetuate and even amplify those biases. One example of potential bias in the consumer lending market is credit scoring.[36] If an AI model is trained on data that reflects historic lending discrimination, it could perpetuate discriminatory lending practices. An example of potential bias in the auto insurance market is insurers' use of socioeconomic factors that disproportionately hurt people of color.[37] If an AI model is trained on data that reflects historic auto insurance rate discrimination, it could perpetuate discriminatory insurance rate practices.

Although discrimination in the investment context has historically been less overt than in the above contexts, Black/African American and Hispanic/Latino investors face ongoing challenges in building wealth and saving for retirement, as compared with White investors.[38] For example, as with other investors with low account balances, Black/African American and Hispanic/Latino investors are more likely than White investors to receive investment advice from non-fiduciary

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[36] *See* Edmund L. Andrews, How Flawed Data Aggravates Inequality in Credit, Stanford University Human-Centered Artificial Intelligence, August 6, 2021, https://hai.stanford.edu/news/how-flawed-data-aggravates-inequality-credit

[37] *See* Douglas Heller and Michael DeLong, The One Hundred Percent Penalty: How Auto Insurers' Use of Credit Information Increases Premiums for Safe Drivers and Perpetuates Racial Inequality, Consumer Federation of America, July 31, 2023, https://consumerfed.org/wp-content/uploads/2023/07/Official-CFA-Credit-Score_2023-FINAL-REPORT.pdf

[38] *See* Michelle Singletary, The legacy of slavery made my grandmother fear investing, Washington Post, October 9, 2020, https://www.washingtonpost.com/business/2020/10/09/black-slavery-investment-stock-market/; Ariel Investments, Schwab, 2022 Black Investor Survey, Report of Findings, April 2022, https://content.schwab.com/web/retail/public/about-schwab/Ariel-Schwab_Black_Investor_Survey_2022_findings.pdf; Investors of Color in the United States, A Report of the FINRA Foundation National Financial Capability Study, FINRA Investor Education Foundation, January 2024, https://finrafoundation.org/sites/finrafoundation/files/investors-of-color-in-the-us.pdf

financial professionals, according to the broker-dealer and insurance industry's own estimates.[39] These professionals often have financial incentives to steer these investors into high-cost, low-quality investments. This can result in their investing in products with excessive fees and suboptimal performance that undermines their financial security. To the extent AI models continue these trends, there is potential to perpetuate existing biases, conflicts of interest, and resulting harms. Moreover, the complexity and opacity of AI models could make it harder to detect such practices.

Privacy concerns

AI applications in financial markets often depend on access to vast amounts of personal data, which raises concerns about data privacy and the potential for misuse of sensitive information. For example, AI-driven customer service tools often collect and use information about consumers' purchase practices, online search histories and app usage, social media use, health information and biometrics, and location tracking. If such sensitive information is misused by firms, such as through predatory conduct that puts the firm's interests ahead of their customers and clients, or is not appropriately safeguarded by firms and leads to unauthorized access to customers' and clients' accounts, these investors could suffer harm.

Inadequate due diligence and monitoring of third-party service providers

Because it is very costly to develop AI tools, large incumbents that have the necessary resources will likely develop these technologies in-house. Smaller firms, who do not have the necessary resources, will instead likely rely on third-party technology providers for their AI-related applications.

A market participant's use of third-party service providers' AI technology raises questions about that market participant's ability to conduct due diligence prior to engaging the AI provider and to periodically monitor the AI tool's performance to ensure that it continues to function as intended.[40]

There is a significant risk of investor harm when a market participant, such as an investment adviser, broker-dealer, or investment company, outsources critical services without proper oversight. These risks are heightened when the outsourced services are highly technical, proprietary, or require expertise that the market participant lacks.

Systemic risk

The use of AI can increase risks within the financial system more broadly in a number of ways.

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[39] *See, e.g.,* "Analysis of the Effects of the 2016 Department of Labor Fiduciary Regulation on Retirement Savings and Estimate of the Effects of Reinstatement," prepared by Quantria Strategies, LLC for the Hispanic Leadership Fund, November 8, 2021.
https://www.acli.com/-/media/public/pdf/leadership-initiatives/consumer-protection/acliltrdolfiduciary010224.pdf
To be clear, we reject this "study's" conclusion that these investors were harmed as a result of the fiduciary rule. Investors are harmed when they receive conflicted, low-quality advice. To the extent such advice is no longer provided, that is a benefit to investors.
[40] *See* SEC Rule Proposal, Outsourcing by Investment Advisers, Release Nos IA-6176, https://www.sec.gov/files/rules/proposed/2022/ia-6176.pdf; FINRA Regulatory Notice 21-29, FINRA Reminds Firms of their Supervisory Obligations Related to Outsourcing to Third-Party Vendors, August 13, 2021, https://www.finra.org/rules-guidance/notices/21-29.

First, models may react with one another in unexpected ways. To the extent the models make similar decisions based on similar data, it could lead to herd-like behavior, which could increase systemic risk and market volatility, potentially leading to financial crises. For example, the 2010 flash crash was exacerbated by high-frequency traders' using similar algorithms and withdrawing from the markets at the same time.[41]

Second, the concentration of AI tools among a few systemically important providers may give rise to systemic risk. This could happen if a firm's failure would jeopardize the rest of the economy. Relatedly, outsourcing may increase concentration risk. If many smaller firms rely on a few third-party technology providers, it could lead to a concentration of firms' using the same underlying models or data. This could exacerbate systemic risk, to the point that the failure of a single service provider could cause operational failures of many users of the service provider.[42]

Bad actors' malicious use of AI

Bad actors can exploit AI technology in investment markets through various malicious activities, including market manipulation, spreading disinformation using "deep fakes,"[43] and engaging in "data poisoning" to corrupt AI models.[44] Bad actors may also use AI to engage in phishing, identity theft, and account takeovers. Malicious use of AI in investment markets undermines market integrity, investor confidence, and can lead to significant financial losses.

Regulatory Implications

The rapid evolution of AI technologies may make it challenging for regulators to keep pace. One challenge for regulators would be if market participants use AI-based tools in ways that are technically legal, but nonetheless harmful to investors or market integrity. Another challenge would be if market participants use AI-based tools to engage in unlawful activity that is difficult for regulators to detect. A lack of data and model transparency could add to regulators' difficulties in detecting misconduct. It also may be challenging for regulators to determine ultimate responsibility – and liability – for AI-driven decisions. These challenges will intensify if regulators do not have sufficient resources to monitor and address harmful uses of AI.

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[41] Ben Rooney, Trading program sparked May 'flash crash', CNN, Oct. 1, 2010, https://money.cnn.com/2010/10/01/markets/SEC_CFTC_flash_crash/index.htm

[42] One example where the failure of a service provider had a broad impact occurred when a corrupted software update to accounting systems at a widely used fund accounting provider caused industry-wide concern over the accuracy of fund values for several days. An estimated 66 advisers and 1,200 funds were unable to obtain system-generated net asset values ("NAVs") for several days. *See* Maria Armental, BNY Mellon to Pay $3 Million to Resolve Massachusetts Probe Over Glitch, The Wall Street Journal, March 21, 2016, https://www.wsj.com/articles/bny-mellon-to-pay-3- million-to-resolve-massachusetts-probe-over-glitch-1458581998.

[43] A deep fake is when a generative AI application creates or alters images, audio, or videos that are not real, yet they can deceive people into thinking they are real. https://www.nasaa.org/70997/nasaa-investor-alert-artificial-intelligence-and-investment-fraud-2/ In 2023, "an ominous image of black smoke billowing from what appeared to be a government building near the Pentagon set off investor fears, sending stock tumbling…It may have been the first time an A.I.-generated image moved markets, according to Bloomberg." Andrew Ross Sorkin, An A.I.-Generated Spoof Rattles the Markets, NYT Dealbook Newsletter, May 23, 2023, https://www.nytimes.com/2023/05/23/business/ai-picture-stock-market.html

[44] "Data poisoning" is when false or misleading data is introduced into a model's training dataset in order to distort the model's learning process, leading to incorrect or unreliable outputs.

To mitigate these risks, regulatory oversight of firms' use of AI must be proactive, not reactive. In addition to regularly engaging all stakeholders, regulators should use their examination and supervision authority to learn how firms are developing and deploying AI technology. Regulators should also develop their own technology that detects misuse of AI technology in the market. To do so, regulators need sufficient resources.

Firms also must take steps to ensure that their development and deployment of AI-based tools do not harm investors or market integrity. The securities laws are technology-neutral and therefore provide a helpful starting point for regulated firms to comply with the policies and purposes underlying the securities laws, regardless of the technology they use.[45] However, in some areas, regulatory updates may be needed to address certain gaps in protections. Several key areas of focus are discussed below.

Reasonably designed policies and procedures

First, firms should be required to adopt and implement reasonably designed policies and procedures that are tailored to their business and adequately reflect the unique risks associated with their use of AI.[46] This includes having reasonably designed policies and procedures addressing model and data risk management and technology governance, privacy, recommendations and advice, communications with the public, and use of third-party service providers, among others.

As part of their policies and procedures, firms developing and deploying AI must understand fully how outputs of their models are derived in order to ensure that those models work as intended. They must also ensure that the data the models rely upon are accurate, reliable, complete, current, and free of bias. Importantly, firms must manage these risks *before* deploying the technology rather than simply reacting *after* any damage has been done. Moreover, firms must actively monitor, test, and validate the models to ensure they continue to function as intended, given the heightened risk that data inputs and model outputs may change over time. In addition, human oversight and accountability should be a central component of AI applications so that humans can manage any model break downs and ultimately be responsible for any AI-related harms. This should strengthen incentives within firms to proceed with appropriate caution.

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[45] *See* FINRA Regulatory Notice 24-09, FINRA Reminds Members of Regulatory Obligations When Using Generative Artificial Intelligence and Large Language Models, June 27, 2024, https://www.finra.org/rules-guidance/notices/24-09

[46] FINRA Rule 3110 (Supervision) requires firms to establish and maintain a system to supervise the activities of its associated persons that is reasonably designed to achieve compliance with the applicable securities laws and regulations and FINRA rules. This rule applies to all activities of a firm's associated persons and its businesses, regardless of the use of technology. https://www.finra.org/rules-guidance/rulebooks/finra-rules/3110 Section 206(4) of the Investment Advisers Act and Rule 206(4)-7 thereunder require, among other things, that a registered investment adviser adopt and implement written policies and procedures reasonably designed to prevent violations of the Advisers Act and the Rules adopted thereunder. https://www.law.cornell.edu/cfr/text/17/275.206(4)-7 Rule 38a-1 of the Investment Company Act requires investment companies to adopt and implement written policies and procedures reasonably designed to prevent violation of the federal securities laws, review those policies and procedures annually for their adequacy and the effectiveness of their implementation, and designate a chief compliance officer to be responsible for administering the policies and procedures. https://www.law.cornell.edu/cfr/text/17/270.38a-1

Critically, firms should adopt risk-based frameworks when developing and implementing their policies and procedures. For example, firms that deploy retail investor-facing uses of AI should be particularly cautious and develop enhanced safeguards, given the heightened risks that model malfunctions may have on these investors. To the extent firms adopt retail investor-facing uses of AI, firms should be able to explain in plain language to these investors how the technology works, the particular risks and limitations of the technology, and the likelihood of an AI application malfunctioning and the associated potential gravity of harm.

However, given the inherent complexities and lack of transparency of AI technology, even the best disclosure is unlikely to fully inform investors about the risks that they face. Accordingly, disclosure is necessary but not sufficient to protect investors from the potential risks they may be subject to. This further underscores the need for firms to adopt and implement strong policies and procedures.

Advertising

Broker-dealers and investment advisers are subject to advertising rules when communicating with the public. When a broker-dealer makes the same communication to more than 25 retail investors within a 30-day period, it is subject to content standards, approval, recordkeeping, and filing requirements.[47] Among other content requirements, the communication must be fair and balanced and must not omit any material fact if the omission, in light of the context presented, would cause the communication to be misleading. The SEC's marketing rule for investment advisers has analogous requirements, except the rule applies to communications to more than one person.[48]

If a broker-dealer uses AI technology to communicate with the public, and the communications provide the same responses to more than 25 retail investors, those responses would be subject to FINRA's retail communications rule. However, if a broker-dealer's AI technology provides slightly different communications to more than 25 retail investors, those communications would not appear to be subject to FINRA's retail communications rule, even if the overall message is virtually the same. FINRA has provided guidance to firms on how they should supervise the use of chatbots in this context.[49] However, given the potential for firms' advertising practices to not be covered under this rule, FINRA should continue to monitor broker-dealers' use of chatbots and other AI-based technology to determine if any regulatory modifications are needed.

Professional standards of conduct for recommendations and advice

Broker-dealers and investment advisers are subject to professional standards of conduct when providing investment recommendations and advice, regardless of the technology that they use.

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[47] FINRA Rule 2210, Communications with the Public, https://www.finra.org/rules-guidance/rulebooks/finra-rules/2210

[48] Section 206(4) of the Investment Advisers Act and Rule 206(4)-1 thereunder, prohibit any registered investment adviser from, directly or indirectly, disseminating any advertisement that, among other things, includes any untrue statement of material fact, or omits to state a material fact necessary in order to make the statement made, in the light of the circumstances under which it was made, not misleading or include information that would reasonably be likely to cause an untrue or misleading implication or inference to be drawn concerning a material fact relating to the investment adviser. https://www.sec.gov/files/rules/final/2020/ia-5653.pdf

[49] FINRA, Frequently Asked Questions About Advertising Regulation, B.4. Supervising Chatbot Communications, https://www.finra.org/rules-guidance/guidance/faqs/advertising-regulation#b4

Both Regulation Best Interest (Reg. BI) for broker-dealers and the Investment Advisers Act fiduciary duty for investment advisers are drawn from key fiduciary principles that include an obligation to act in the retail investor's best interest and not to place their own interests ahead of the investor's interest.

Although an investment adviser's fiduciary duty applies to all advisory clients (whether retail investors or otherwise) and applies to the entire advisory relationship, Reg. BI applies only if a broker-dealer makes a recommendation to retail customers. To the extent a broker-dealer uses AI technology that influences, prompts, or steers investors to take a particular course of action without providing an explicit recommendation, Reg. BI would not apply. For instance, if a firm employs AI-based digital engagement practices on a trading platform, and these practices do not rise to the level of a recommendation but nonetheless prompt investors to trade more frequently or to engage in complex, costly, or risky strategies, Reg. BI would not apply. Yet investors receiving such prompts would still risk being harmed by such activity, just as if a recommendation were made.

To address this potential gap, the SEC proposed a rule that would require broker-dealer and investment adviser firms to identify and neutralize conflicts of interest that may arise from firms' using predictive data analytics tools and related technologies.[50] We expect the SEC to re-propose this rule in the near future.

In our view, firms using AI-based tools to interact with retail investors should be required to comply with both care and conflict obligations to ensure that those tools are serving investors' best interests, and not placing the firm's interest ahead of investors' interest. Similar to the firm policies and procedures discussed above, this would include having a reasonable belief that the AI-based tool works as intended and in the best interest of the retail investors that the firm is serving. Consistent with a risk-based compliance framework, the level of firm diligence should increase as the risks to investors increase. In addition, firms should mitigate any conflicts of interest associated with the AI-tool that place the firm's interest ahead of retail investors' interests.

These obligations should be subject to a negligence standard—in other words, firms would violate these obligations if they know or should know that the AI-based tool does not function as intended, that the firm does not have a reasonable belief that the AI-based tool works in the best interest of the retail investors that the firm is serving, or the AI-based tool places the firm's interest ahead of investors' interest. Moreover, the SEC should provide guidance on the types of beneficial interactions that, by themselves, would not be deemed to violate this best interest framework, such as prompting investors to save more, to periodically rebalance their portfolios, or to consider the tax consequences of their investment decisions.

Data privacy

Broker-dealers, investment advisers, and investment companies are subject to SEC Regulation S-P (Privacy of Consumer Financial Information and Safeguarding of Personal Information), which

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[50] SEC, Rule Proposal, Conflicts of Interest Associated with the Use of Predictive Data Analytics by Broker-Dealers and Investment Advisers, Release Nos. 34-97990; IA-6353, https://www.sec.gov/files/rules/proposed/2023/34-97990.pdf

requires them to have written policies and procedures in place to address the protection of customer information and records.[51] Data privacy may be implicated in firms' use of AI in several ways – first, with data that firms use to train models, and second, with data that investors enter into generative AI tools, such as chatbots. In both instances, firms need to ensure that their records remain secure and confidential.

Use of third-party service providers

While some large incumbent firms will develop their AI tools in-house, it is likely that most firms will use third-party service providers of AI technology, given how costly the development of such technology is likely to be. Firms must remember that while they can outsource functions, they are still ultimately legally responsible for those functions.[52]

Firms that outsource AI-based technology must exercise due diligence and ongoing oversight over third-party providers. However, it may be challenging for firms to do so, given the potential complexity and lack of transparency in AI tools. Nonetheless, firms must understand that no reasonable investor would agree to engage a market participant that would outsource critical functions to a third-party service provider without effective oversight over that service provider.[53] Securities regulations should espouse that principle.

Conclusion

While AI has the potential to deliver significant benefits to investors, it also poses significant risks. If complexity, opacity, unreliability, bias, conflicts of interest, or data insecurity infect AI applications, investors could receive suboptimal products and services, harming their financial security, and eroding their trust and confidence in AI-based tools and investment markets more broadly. However, if firms and regulators take proactive approaches to addressing these risks, AI's potential could be fulfilled.

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[51] SEC, Regulation S-P, https://www.sec.gov/spotlight/regulation-s-p.htm
[52] FINRA AI Report ("Firms are reminded that outsourcing an activity or function to a third-party does not relieve them of their ultimate responsibility for compliance with all applicable securities laws and regulations and FINRA rules. As such, firms should review and update their WSPs to ensure that they appropriately address outsourcing arrangements (see, e.g., Notice to Members 05-48 (Outsourcing)).".
[53] The SEC has proposed a rule on investment adviser outsourcing that would establish a set of minimum and consistent due diligence and monitoring obligations for investment advisers that outsource certain functions to third-party service providers. These obligations would help to ensure that advisers maintain sufficient oversight over third parties so advisers can fulfill their fiduciary duty, comply with the federal securities laws, and protect clients from potential harm. https://www.sec.gov/files/rules/proposed/2022/ia-6176.pdf