ARTIFICIAL INTELLIGENCE IN ROBO-ADVISING:

RISKS AND CONSIDERATIONS

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INTRODUCTION

With the growing adoption of Artificial Intelligence (AI) in the financial services industry, regulators and supervisors are increasingly concerned about its application. While AI's adoption by financial advisory firms is still in its formative stages, its progression brings new risks for both consumers and the firms.

AI intensifies existing financial and non-financial risks in advisory services, posing significant threats to consumer protection. The inherent opacity of many AI models adds to these risks, making it challenging to both prevent and identify potential issues (Gurrea-Martinez et al., 2021). Nonetheless, with appropriate safeguards, AI can be a powerful tool for achieving efficient and profitable outcomes in financial services.

Data-driven models, although accurate and efficient, often sacrifice explainability. The complex ways these algorithms detect patterns can inadvertently embed biases that remain unnoticed for extended periods. When AI systems use data from unconventional sources, they may process it in ways that are hard to understand and regulate (Belanche et al., 2019). Furthermore, AI can make assumptions when interpreting consumer responses from traditional robo-advising surveys, potentially leading to less than optimal outcomes.

To effectively navigate the risks and advantages of AI in Robo-Advising, it's crucial to evaluate existing compliance processes, identify potential issues, and understand how regulatory frameworks must evolve. This approach will aid in developing strategies to preempt and resolve problems (IOSC, 2020). It's important to recognize that the limitations of human advisors and AI-enabled robo-advisors differ significantly. Transitioning to AI-driven decision-making technologies in asset management and advisory services will necessitate a tailored framework to mitigate associated risks.

SHIFT TOWARDS AI

Presently, most robo-advisors operate on rule-based algorithms, which are straightforward to comprehend and interpret. These systems gather client data primarily through online surveys, focusing on goals, preferences, and basic information like gender, income, and current asset allocation. The robot-advisor processes this data to construct a client profile and inform investment decisions (Bhatia et al., 2020). However, transitioning to AI will enhance the intricacy of these decisions and expand the data set used for crafting investment strategies.

Robo-advisors serve a diverse consumer base with varying levels of financial understanding and distinct investment goals. A significant challenge arises because these systems depend heavily on limited information obtained from a set of standard questions. Any approach assuming uniformity in clients' understanding of concepts like goals and risk tolerance is inherently flawed. In contrast, human advisors can leverage both verbal and nonverbal cues during conversations to gain a more holistic understanding, which is advantageous in devising tailored investment plans for their clients (Maume, 2021).

Artificial Intelligence can generate more nuanced investor profiles using advanced statistical techniques and broader data sets. AI systems can analyze various financial activities, including credit card usage and previous investment behaviors, to better comprehend each client's preferences and risk tolerance. Furthermore, AI enables ongoing analysis of each client, detecting subtle shifts in their circumstances or behavior.

These systems can interpret changes in client activity, prompting reviews of earlier assumptions about the client. While these advancements may enhance the precision and effectiveness of investment advice, they also introduce new complexities, raising additional risks and regulatory challenges (Bhatia et al., 2020).

POTENTIAL RISKS

Recognizing the impact of Artificial Intelligence (AI) on existing regulations and requirements for robo-advising is crucial. In many countries, robo-advisor firms are obligated to clearly disclose the risks and benefits of their services to consumers. However, integrating AI could complicate, or even render impossible, compliance with these regulations. For instance, numerous AI models function as 'black boxes', obscuring the rationale behind specific decisions. If the firms themselves can't interpret these models, consumers will inevitably struggle to understand their

potential risks. Consequently, without changes to current regulations, several AI approaches in robo-advising may become unviable (OECD, 2021).

From a regulatory standpoint, formulating rules is challenging when the risks associated with emerging technologies are not fully understood. The speculative nature of these risks complicates the establishment of comprehensive regulatory frameworks. The inherent lack of transparency in AI results further complicates risk assessment. Historically, regulators have struggled with technology oversight, often resorting to reactionary, ex-post measures that have proven largely ineffective in preempting risk events (Daldaban, 2019).

Another significant challenge for regulators is keeping pace with rapid AI advancements. Governmental agencies often face difficulties in attracting and retaining skilled technical personnel, particularly in comparison to technology firms that offer more competitive salaries and benefits. Furthermore, the infrastructure and operational capabilities of regulatory bodies are frequently inadequate for effective monitoring of well-resourced and financially superior firms.

Moreover, the implementation of AI and Machine Learning could exacerbate existing regulatory issues, such as those concerning record-keeping and data governance. What regulators currently deem as minor deficiencies in data collection, governance, and processing could become more serious as data increasingly drives automated decision-making.

Ultimately, the quality and efficacy of AI models hinge on the foundation of data. The integrity, completeness, and security of this data are essential for reliable outcomes. Therefore, regulators must not only focus on AI systems but also reevaluate and reinforce their approach to data governance (OECD, 2021).

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A FIRM PERSPECTIVE

The rush to implement Artificial Intelligence (AI) systems for efficiency gains and competitive edge in robo-advising introduces new challenges for firms. These include risk management, regulatory compliance, and organizational changes. A thorough strategy is essential to navigate these emerging pressures effectively. Firms will not only confront new risks but also deal with familiar risks manifesting in unfamiliar ways. Additionally, there's a need to determine accountability for AI-driven decisions and mitigate any unintended negative outcomes.

Many firms incorporating AI into their advisory services fail to update their governance and infrastructure accordingly. Issues like incompatible databases, outdated infrastructure, and communication barriers between business units can hinder effective data application. Introducing AI without resolving these issues may inadvertently heighten risk and regulatory exposure (Fong et al., 2021).

Effective and informed senior leadership is crucial for adopting AI and Machine Learning (ML) techniques. However, many leaders are not fully aware of how these technologies differ from existing ones and may not be prepared for the associated technical risks. This uncertainty about accountability, where responsibility lies with senior leaders, can pose significant challenges. Furthermore, compliance staff may lack the training needed to identify potential risks with new AI systems (Fong et al., 2021).

As robo-advising increasingly adopts AI, there is a growing debate about assigning legal personhood to these systems (Kerikmäe et al., 2020). The traditional legal framework for financial professionals may not be effective for AI. Yet, current regulatory bodies do not consider this perspective. A 2020 UNESCO document suggests that responsibility should always lie with a natural or legal person and not be delegated to an AI system (UNESCO, 2020). While the legal personhood for robo-advisors is not a widely accepted concept now, it is an area to watch as technology evolves.

Beyond corporate infrastructure, AI's implementation can disrupt an organization's culture and talent strategy. Introducing AI systems can significantly alter employee roles and responsibilities. The competition for skilled candidates, already scarce in the job market, might lead to high turnover rates or hiring underqualified individuals. Consequently, in the event of AI failure or inadequacy, there may be insufficient staff to address issues or revert to manual operations (Belanche et al., 2019).

Moreover, adopting AI necessitates a cultural shift towards embracing scientific processes. Many firms apply AI sporadically, lacking a holistic approach. Leadership skepticism can result in reduced investment in AI, creating organizational tension and a fragmented AI framework. Training AI models demands considerable time and resources, a challenge that varies across firms (ISIC, 2020).

THE PATH FORWARD

HYBRID ADVISORS

The integration of hybrid-advisors, combining human and robo-advisory capabilities, can offer effective and efficient results while addressing various regulatory concerns. In this model, Artificial Intelligence (AI) systems automate tasks that would otherwise consume considerable time for human advisors. This not only fosters the growth of specialized roles but also allows advisors to dedicate more time to client interactions. Consequently, AI systems in this context don't replace human advisors but enhance the quality and efficiency of their services. This approach is gaining popularity and effectively mitigates some risks associated with AI in robo-advising (OECD, 2020).

Hybrid advisors often present a viable alternative for investment strategies, especially favored by traditional investment firms. They inspire confidence across a diverse client base,

including both older clients who may prefer face-to-face interactions and younger clients who value the efficiency and accessibility of robo-advisors (Fisch et al. 2020).

From a regulatory standpoint, the hybrid model facilitates human oversight, potentially mitigating several AI-related risks in robo-advice. Direct interaction with a financial advisor allows for a more thorough analysis of a customer's financial knowledge and true risk tolerance, aspects challenging to capture solely through surveys and financial data. Simultaneously, AI can help reduce risks associated with human advisors, such as conflicts of interest and biases towards certain investment portfolios that may not align with the client's actual needs and preferences.

Furthermore, a hybrid model clarifies accountability in AI-assisted decision-making. While human advisors are not responsible for the AI model's training and implementation, their involvement provides an additional layer of scrutiny to AI decisions. By treating AI systems as one of many tools available to an advisor, the model leverages technological efficiency while ensuring effective oversight and challenge to the outcomes.

In the evolving landscape of robo-advice, adopting a hybrid model instead of relying solely on AI-powered robo-advisors facilitates a more gradual introduction of AI in robo-advising. This phased approach gives regulators time to identify and address emerging risks. Additionally, it allows firms to integrate AI more seamlessly into their operations, creating a sustainable environment for the technology and avoiding the pitfalls associated with abrupt cultural and organizational changes.

EXPLAINABLE AI

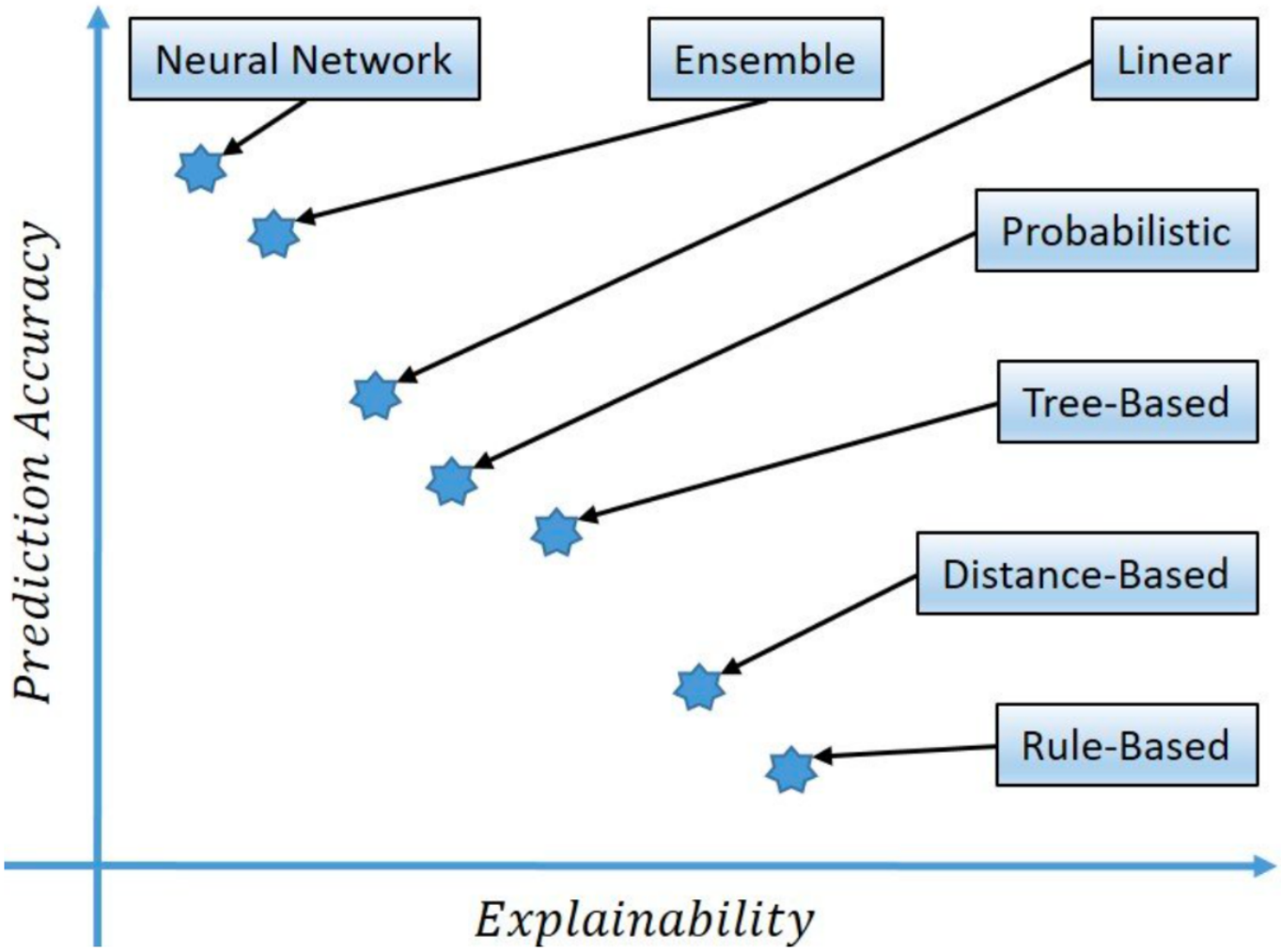
The increasing reliance on opaque Artificial Intelligence (AI) techniques, especially in deep learning and neural networks, has sparked a demand for 'explainability' in these systems' outcomes. 'Explainable AI' (XAI), a response to concerns raised by regulators, aims to develop algorithms whose operations or predictions can be comprehensible to users (Brière & Bianch, 2021). XAI goes beyond merely interpreting results; it requires a human grasp of the internal processes that occur during a model's training and decision-making phases (Linardatos et al., 2021).

However, the development and application of XAI encounter several challenges. A major hurdle is the lack of a concrete definition for 'explainability', leading to a diversity of techniques claiming to provide explainability in various models. Future efforts might necessitate mathematical precision and rigor in constructing XAI systems, possibly accompanied by specific metrics to establish a standard for explainability (Linardatos et al., 2021).

Additionally, 'explainable AI' might imply the use of models that are inherently simpler than others. It's crucial to recognize the inherent trade-off between accuracy and interpretability/explainability. This balance is illustrated in a comparison of different Machine

Learning techniques, highlighting the variations in accuracy and explainability among these methods (Lin et al., 2021).

Fig 1. (:Hacker et al., 2020)



For the purpose of this figure, explainability is defined as a combination of transparency, or how easily a model can be interpreted by algorithmic transparency and post-hoc interpretability, as well as how easily a decision can be explained (Hacker et al., 2020). Going forward, it will be necessary for firms and regulators to find a balance between explainability and accuracy for the application of robo-advising. This will likely be incorporated in the firm's risk appetite, and be subjected to regulatory review.

CONCLUSION

Numerous challenges arise in identifying and mitigating the risks that Artificial Intelligence (AI) presents to robo-advisors. The specific risks introduced by AI systems are difficult to fully predict and prevent, likely necessitating a new regulatory framework or significant

adjustments to existing ones. Sustainable AI implementation in robo-advising will benefit from cross-industry and international cooperation, ensuring the adoption of best practices.

Robo-advisory firms integrating AI systems must reevaluate their data and risk management practices to comply with regulations and minimize risk exposure. Additionally, the transition to an AI-driven ecosystem will necessitate a cultural shift, potentially leading to internal tensions. As firms move away from simpler rule-based algorithms, there will be heightened pressure on risk and compliance teams to comprehend technology that is inherently complex and often uninterpretable.

However, as the field evolves, strategies are emerging to mitigate AI-related risks in robo-advisory. Implementing hybrid-advisors, for instance, can enhance understanding of AI risks and its judicious use to support human decision-making. This hybrid approach facilitates a more gradual transition in organizational and cultural aspects of the existing robo-advising model.

Critical to the adoption of AI systems is the ability to interpret and justify decision-making processes. The deployment of Explainable AI (XAI) is essential to navigate complex models and meet supervisory and regulatory demands. The effectiveness of AI integration will rely on transparently explaining results to investors, regulators, and key stakeholders.

Effective regulation and risk management are crucial for firms incorporating AI into their robo-advisory operations. A robust risk framework enhances customer trust, potentially increasing demand and reducing skepticism towards AI models. Adopting a human-centric approach to AI can strengthen collaboration between supervisors and robo-advisory firms, fostering greater efficiency and a safer advisory service environment.

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