



August 12, 2024

Jeanette Quick
Deputy Assistant Secretary for Financial Institutions Policy
U.S. Department of the Treasury

Re: [Request for Information Regarding the Uses, Opportunities, and Risks of Artificial Intelligence in the Financial Services Sector](#)

Dear Ms. Quick,

On behalf of the Data Science and Analytics Committee (DSAC) of the American Academy of Actuaries (Academy),¹ I appreciate the opportunity to provide information in response to the Department of Treasury's (Department) [Request for Information](#) (RFI) regarding the uses, opportunities, and risks of artificial intelligence in the financial services sector. The DSAC was pleased to see the questionnaire reflecting your desire to engage with external stakeholders on this topic, as it has been a key focus of our professional research and development over the past five years. We have framed our responses below in the context of the insurance subsector of the financial services sector.

It is important to note that the responses included in this letter are reflective of the collective experience and expertise of the members of the DSAC solely.

The use of statistical theory and methods can be traced back to ancient civilizations. However, recent advances in computing power have increased the scale of statistical analysis on large data sets (i.e., big data) to mine it for predictive insights for insurance applications. The term "machine learning" (ML) is often understood to mean insight drawn from data by machines using advanced statistical techniques. The insights insurers draw from data can aid in mitigating risk, and any resulting cost savings could be transferred to consumers through reduced premiums. We use the term "cost savings" with this context in our responses below.

Question 1: Is the definition of AI used in this RFI appropriate for financial institutions? Should the definition be broader or narrower, given the uses of AI by financial institutions in different contexts? To the extent possible, please provide specific suggestions on the definitions of AI used in this RFI.

Response 1: Perception is a human quality, not a machine quality. At best, machines can mimic perception. Ascribing this human quality to machines may encourage blind trust in AI technologies when it is important to critically review algorithmic results for accuracy and bias. We have learned this much from the issues with generative AI (GenAI). Instead, the

¹ The American Academy of Actuaries is a 20,000-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States

DSAC would recommend the term “Artificial Intelligence Systems”² be used. Doing so would be consistent with the use by others, including the National Institute of Standards and Technology (NIST), the Organisation for Economic Co-operation and Development (OECD), and the National Association of Insurance Commissioners (NAIC). The first sentence of the proposed definition is similar to the NAIC definition for “AI System” but not “Artificial Intelligence.” We suggest modification of “AI System” to include the underlying and outcome data, which are important to interrogate for bias. The Department may want to review the NAIC’s definition of artificial intelligence, as it suggests AI mimics human cognitive functions, rather than implying that AI innately possesses cognitive abilities. The NAIC definition states:

“Artificial Intelligence (AI)” refers to a branch of computer science that uses data processing systems that perform functions normally associated with human intelligence, such as reasoning, learning, and self-improvement, or the capability of a device to perform functions that are normally associated with human intelligence such as reasoning, learning, and self-improvement. This definition considers machine learning to be a subset of artificial intelligence.”³

We would note a concern that the Department’s proposed definition may include general business rules coded into insurance systems, which would be considered an AI system when they were not derived using AI. There is consensus among DSAC members contributing to this letter that general rules that are not machine learning-based should be explicitly excluded from a definition of AI. For example, a rule preventing a company from writing life insurance business on lives over 75 is more of a business decision, rather than an AI model derivation. The Department may want to consider amending this definition or providing explanatory guidance on what is not considered to be AI.

Question 2: What types of AI models and tools are financial institutions using? To what extent and how do financial institutions expect to use AI in the provision of products and services, risk management, capital markets, internal operations, customer services, regulatory compliance, and marketing?

Response 2: The NAIC has recently surveyed more than 300 life and property/casualty companies on their use of AI and ML in their insurance operations under its State Market Conduct Exam Authority.⁴ This authority obliges insurers to disclose such information about their insurance operations to regulators. The NAIC compiled and aggregated the survey data to prevent the possibility of identifying any individual company and [published public reports](#) of the findings. The reports are extensive and will most likely offer useful insights to the Department. The AI/ML survey for health insurers is currently under development, with results anticipated in spring 2025.

The Academy’s paper, [Big Data and Algorithms in Actuarial Modeling and Consumer Impacts](#), offers extensive insights on the issues surrounding the use of big data and AI in insurance. This perspective may be helpful for the Department, as the use of big data and algorithms in insurance continues to evolve rapidly.

² “[NAIC Model Bulletin: Use of Artificial Intelligence Systems by Insurers](#)”; National Association of Insurance Commissioners; December 4, 2023.

³ Ibid.

⁴ The life survey was conducted in 2023 and the P/C surveys were conducted in 2021.

Question 4: Are there challenges or barriers to access for small financial institutions seeking to use AI? If so, why are these barriers present? Do these barriers introduce risks for small financial institutions? If so, how do financial institutions expect to mitigate those risks?

Response 4: Smaller insurance companies may have less financial or personnel resources to explore internal uses of cutting-edge AI. As evidenced in their rating plans, some smaller carriers don't have sufficient data or the internal resources to create an ML model for pricing or other use cases. It may be even more challenging for them to explore more modern-use cases, such as GenAI claims summarization. GenAI claims summarization tools create an overall status summary of a claim by reading through all claims adjuster notes to increase efficiency. All decisions are still made by the human in the loop or an adjuster who can verify any needed detail by reviewing the actual claims notes.⁵ There is risk to individual firms if, due to these barriers, access to material innovations to create new markets, reduce expenses, or reduce claim costs is lost. There is significant risk to consumers should firms use AI without appropriate governance and transparency.

Actuaries not only follow the laws and regulations that govern all businesses in the U.S., but are also professionally bound by the [Code of Professional Conduct](#). This Code refers to actuarial standards of practice (ASOPs), which apply to all actuarial practices, including those that involve the application of AI to pricing and reserving models. Specifically, relevant ASOPs include ASOP No. 12, [Risk Classification](#), ASOP No. 23, [Data Quality](#), ASOP No. 41, [Actuarial Communications](#), and ASOP No. 56, [Modeling](#). Actuaries may also contact the Actuarial Standards Board for Counseling and Discipline (ABCD) if they have questions on the appropriate way to handle concerns that may arise with their use of big data and AI.

Small companies (and to a lesser extent large companies) often work with external third-party vendors and data provider to gain AI capabilities, but company management remains responsible to regulators for the governance and transparency of any third-party models and data utilized in insurance applications.

Question 5: What are the actual and expected benefits from the use of AI to any of the following stakeholders: financial institutions, financial regulators, consumers, researchers, advocacy groups, or others? Please describe specific benefits with supporting data and examples. How has the use of AI provided specific benefits to low-to-moderate income consumers and/or underserved individuals and communities (e.g., communities of color, women, rural, tribal, or disadvantaged communities)? How has AI been used in financial services to improve fair lending and consumer protection, including substantiating information? To what extent does AI improve the ability of financial institutions to comply with fair lending or other consumer protection laws and regulations? Please be as specific as possible, including details about cost savings, increased customer reach, expanded access to financial services, time horizon of savings, or other benefits after deploying AI.

⁵ https://www.linkedin.com/posts/ali-riza-saral-6b48b73_as-we-begin-2024-i-am-delighted-to-share-activity-7149796474464243712-jsLM/

Response 5: Depending on the use case, actual benefits from the use of AI may not be validated for an extended time, as some expected insurance realizations may take many years to become apparent.

To varying degrees, expected benefits may include expense savings, increased access to insurance, and improved risk mitigation. More specifically:

- **Greater efficiency gains** due to more accurate results and less manual research, analytics, or mappings. This may lead to more accurate risk pricing, resulting in cost savings for consumers or less volatile profits for insurers.
- **More appropriate risk classifications.** The use of AI can identify and mitigate disparities among marginalized groups and, with the proper governance, identify misclassifications. This may also lead to increased access to insurance for marginalized groups.
- **Improved quality control** of insurance processes and applications. For example, an important use of AI is checking for consistent language across contract revisions to mitigate legal liabilities.
- **Accelerated underwriting (AU)** facilitated by ML. AI could reduce the use of more expensive underwriting approaches and lower underwriting expenses. This could result in an improved customer experience, faster processing, ease of access, less intrusive underwriting, and cost savings that could be passed on to consumers.
- **Improved fraud detection.** The use of AI may lead to lower costs when savings from fraud detection and mitigation could be passed on to consumers. It is important to note that fraudsters may use these techniques as well.
- **Risk mitigation support.** The use of AI may help avoid situations that lead to a claim event.

Chatbots and other techniques could lead to better customer experience and lower cost, addressing most common queries in an efficient manner.

Question 6: To what extent are the AI models and tools used by financial institutions developed in-house, by third-parties, or based on open-source code? What are the benefits and risks of using AI models and tools developed in-house, by third-parties, or based on open-source code? To what extent are a particular financial institution's AI models and tools connected to other financial institutions' models and tools?

Response 6: The answers to this question are likely to vary by the type of financial institution. Specifically, contagion risk is a concern for financial institutions due to their use of leverage to facilitate growth, investment, and lending. The regulatory priority for insurance is to maintain sufficient capital and safeguards so that a company's individual failure is largely contained within the financial resources of that specific company.

Insurers are using models developed both in-house and by third parties in varying degrees. Both may be heavily influenced by the perceived importance of the use case, as well as the size of the carrier. For example, large language models (LLMs) are highly unlikely to be created from the ground up by any individual carrier; instead, carriers are likely to leverage commercial or open-source offerings. This is due to the intensive resources needed to create the LLM, in addition to the application of LLMs largely being in low-risk use cases, such as a summarization of a large body of text. However, for use cases that have a large

societal impact and are also believed to be a competitive advantage, such as pricing insurance contracts, carriers may prefer to create these in-house, if they have adequate size and skill. Certain inputs may come from pre-built vendor models. For use cases that fall in between, such as the triaging of new insurance claims, carriers seem equally likely to explore vendor-based solutions as they are to build the needed model or leverage a consulting firm to build the model for them.

With increasing frequency, open-source packages are being utilized in the creation of models, and these open-source techniques are often leveraged upon vendor-provided platforms, such as building an open-source XGBoost model on AWS Sagemaker. However, some smaller insurers use both open-source software and open-source algorithms. Because open-source algorithms can be created and peer-reviewed by the community using a Github-style repository, it should allow for the most advanced techniques being correctly calculated, yielding results to a consumer that are appropriate.

Question 7: How do financial institutions expect to apply risk management or other frameworks and guidance to the use of AI, and in particular, emerging AI technologies? Please describe the governance structure and risk management frameworks financial institutions expect to apply in connection with the development and deployment of AI. Please provide to establish to ensure compliance with fair lending and other consumer-related laws for AI models and tools prior to deployment and application? examples of policies and/or practices, to the extent applicable. What types of testing methods are financial institutions utilizing in connection with the development and deployment of AI models and tools? Please describe the testing purpose and the specific testing methods utilized, to the extent applicable. What challenges exist for addressing risks related to AI explainability? What methodologies are being deployed to enhance explainability?

Response 7: In the insurance space, some firms have implemented AI risk/governance frameworks, while others are still in the formulation phase. The functional responsibility of models within a company can vary widely. However, the commonality is a cross-functional, multi-disciplinary team with responsibility for the development, implementation, and monitoring for continued applicability. It is the responsibility of insurance companies to monitor the latest compliance and regulation developments and comply with applicable laws, regulations, and other binding authority.

The testing methods vary based on use case. For example, when a carrier starts to internally leverage an LLM for claim notes summarization, they may employ an A/B test where part of the department will leverage the tool and another part will not. This is a low-risk use case, where the human in the loop is still making decisions and has access to all underlying information to verify important information as needed. Other use cases leveraging AI/ML models are similar or the same as other statistical methodologies that have been in use for many years. Specifically, models created are split into training, validation, and holdout datasets to gauge the generalization on unseen data. It is worth noting that each carrier is modeling on data assets that it owns, therefore not all carriers are working off of the same information and no carrier has knowledge of a true population dataset. While more sophisticated models utilize multivariate interactions, humans have difficulty understanding more than a few interactions. As such, various techniques have been developed to help understand the impact of a particular variable within a model. Two of the most prominent interpretability techniques are SHAP (SHapley Additive exPlanations) Values and LIME

(Local Interpretable Model-Agnostic Explanations).⁶ For use cases with high-stakes impact to consumers, several insurers prefer to utilize GLMs (generalized linear models) and GAMs (generalized additive models), techniques that naturally express the impact of a particular variable. It's worth noting that while some techniques, like decision trees, may be difficult for people to understand due to the quantity of variable interactions, they are often considered fully transparent.

Models are often created or overseen by actuaries who are bound to ASOPs and are required to adhere to laws and regulations.

Question 8: What types of input data are financial institutions using for development of AI models and tools, particularly models and tools relying on emerging AI technologies? Please describe the data governance structure financial institutions expect to apply in confirming the quality and integrity of data. Are financial institutions using “non-traditional” forms of data? If so, what forms of “non-traditional” data are being used?

Response 8: Insurance companies are primarily governed by the states. Many insurance companies are using nontraditional forms of data, which is called External Consumer Data and Information Sources (ECDIS) by states such as Colorado and New York. These states have regulations regarding the use of such data.

The national member organization for state insurance commissioners and their staff is the NAIC, which provides expertise, data, and analysis for insurance commissioners to effectively regulate the insurance industry and protect consumers. One of the ways the NAIC provides support to state insurance commissioners and the insurance industry is in the creation of model regulations and other language that states may adopt and use as regulatory tools. A recent publication adopted by the NAIC is the December 2023 “[Model Bulletin on the Use of Artificial Intelligence Systems by Insurers](#)” (Bulletin). The Bulletin includes language on governance, risk management and internal controls, third-party AI systems and data, regulatory oversight and examination considerations, and documentation. It is a principles-based framework that recognizes state considerations in implementing actionable strategies to govern AI systems. As of August 5, 2024, the Bulletin [has been adopted](#) by 15 states.

The NAIC is also working on a recommended framework for governing third-party data and models. The NAIC’s [Third-Party Data and Models \(H\) Task Force](#) has adopted charges in 2024 to develop and propose a framework for the regulatory oversight of third-party data and predictive models, as well as monitor and report on state, federal, and international activities related to governmental oversight and regulation of third-party data and model vendors and their products and services. To support these goals, the NAIC task force met in July 2024 to hear presentations on U.S. risk-based regulatory frameworks, including financial analysis and examinations including [Own-Risk and Solvency Assessment](#) (ORSA), market analysis and examinations, and Colorado’s “Trust but Verify” approach. The NAIC will continue to review and consider other frameworks to inform its strategy for governing third-party data and models.

⁶ [A Unified Approach to Interpreting Model Predictions](#); 31st Conference on Neural Information Processing Systems; 2017.

Question 9: How are financial institutions evaluating and addressing any increase in risks and harms to impacted entities in using emerging AI technologies? What are the specific risks to consumers and other stakeholder groups, including low- to moderate- income consumers and/or underserved individuals and communities (e.g., communities of color, women, rural, tribal, or disadvantaged communities)?

Response 9: To the extent that a statute exists, carriers are being conscious to comply. For example, several states do not allow auto rates to vary based on gender. The risks to consumers include 1) if there is a true difference in price between genders, then individuals may not be paying their share, and 2) simply restricting the use of known information does not guarantee the problem is removed. Protected class information is key for the insurance industry and regulators to address harms or potential harms to marginalized groups. For example, while gender is readily available, self-reported race is not. Some regulators are accepting insurers use of inference methods such as Bayesian Improved First Name Surname Geocoding⁷ to analyze algorithmic outcomes by race.

The Academy has been working with individual states—most recently with [Colorado](#), [New York](#), and the [District of Columbia](#)—as they considered legislative and regulatory language in the casualty, health, and life insurance markets. The broader actuarial profession continues to conduct research on issues impacting communities of color regarding the use of these methods, including the:

1. Society of Actuaries (SOA) [Diversity, Equity, and Inclusion \(DEI\) Research Repository](#).
2. Casualty Actuarial Society (CAS) [Approach to Race and Insurance Pricing](#).
3. CAS [Research Paper Series on Race and Insurance Pricing](#).

Question 10: How are financial institutions addressing any increase in fair lending and other consumer-related risks, including identifying and addressing possible discrimination, related to the use of AI, particularly emerging AI technologies? What governance approaches throughout the development, validation, implementation, and deployment phases do financial institutions expect? How are consumer protection requirements outside of fair lending, such as prohibitions on unfair, deceptive and abusive acts and practices, considered during the development and use of AI? How are related risks expected to be mitigated by financial institutions using AI?

Response 10: The insurance sector is governed by the state regulatory systems. States are in the process of addressing these issues. The responses to questions 8 and 9 also contain relevant information. Additionally, the Treasury may want to review [this issue brief](#), which describes different types of discrimination in ML and AI.

Question 14: As states adopt the NAIC's Model Bulletin on the Use of Artificial Intelligence Systems by Insurers and other states develop their own regulations or guidance, what changes have insurers implemented and what changes might they implement to comply or be consistent with these laws and regulatory guidance? How do insurers using AI make certain that their underwriting, rating, and pricing practices and outcomes are consistent with applicable laws addressing unfair discrimination?

Response 14: Insurer adoption of AI governance frameworks that address areas laid out in the NAIC's "Model Bulletin on the Use of Artificial Intelligence Systems by Insurers" is still evolving

⁷ ["Using First Name Information to Improve Race and Ethnicity Classification"](#); *Statistics and Public Policy*; 2018.

and most insurer practices are proprietary. The NAIC is following up with property & casualty (P/C) companies to understand how their use of AI/ML has progressed since the NAIC AI/ML P/C surveys were conducted and how the NAIC can help with the implementation of the Bulletin. States need time to work through the Bulletin and decide what to adopt from it. As we noted in Question 8, as of August 5, 2024, 15 states have adopted the NAIC's Bulletin in whole or in part.

Question 15: To the extent financial institutions are relying on third-parties to develop, deploy, or test the use of AI, and in particular, emerging AI technologies, how do financial institutions expect to manage third-party risks? How are financial institutions applying third-party risk management frameworks to the use of AI? What challenges exist to mitigating third-party risks related to AI, and in particular, emerging AI technologies, for financial institutions? How have these challenges varied or affected the use of AI across financial institutions of various sizes and complexity?

Response 15: Actuaries are frequently called upon by their employers to perform actuarial services for the purposes of enterprise risk management (ERM). As organizations look to mitigate risks throughout their lines of business—while remaining aware of their legal and regulatory obligations in terms of solvency and other financial risks—actuaries are frequently the experts leveraged to ensure that existing and emerging risks are appropriately addressed in strategic planning and engagement. The actuarial profession has professional standards—ASOPs—that govern the work actuaries perform. ERM-related standards were originally developed in 2012, when ERM as a field of practice for actuaries was in fledgling form and a relatively small number of actuaries had experience in the area. Since then, actuarial practice in the field has evolved considerably, with many actuaries now working as risk practitioners and a number working in senior risk roles, including chief risk officer. When working within the ERM space, actuaries are frequently involved in aspects that include how risk is monitored and measured, an organization's risk appetite, the setting of limits, and how risks are managed. The ERM framework, as developed by the organization, is managed by a continuous process from identification and classification of risks to risk appetite setting and mitigation, all of which are roles that actuaries are uniquely qualified to perform.

Beyond ERM, there are three specific ASOPs relevant to this question:

1. ASOP No. 23, *Data Quality*
2. ASOP No. 41, *Actuarial Communications*
3. ASOP No. 56, *Modeling*

As discussed in Response 8, the NAIC is currently drafting a model governance framework to govern third-party data and models that states can consider adopting in whole or in part. The DSAC recently published an [issue brief](#) addressing how to identify bias in data, including third-party data, and considerations for measuring data bias and conducting a bias analysis.

The General Accountability Office's (GAO) 2019 publication, [Insurance Markets: Benefits and Challenges Presented by Innovative Uses of Technology](#), identifies new uses of technologies and potential benefits and challenges for insurers and their customers and discusses what stakeholders identified as key challenges that could affect the adoption of new technologies, and actions taken to address those challenges. There was a concern over

the growing use of nontraditional data, such as data taken from social media, to analyze policyholder risk and the use of AI and complex algorithms to reduce costs by automating information-gathering and risk assessment. The GAO paper identifies both benefits and potential harms, as well as nontraditional data being used in insurance modeling. The Academy was interviewed by the GAO to offer insights into the uses of big data and algorithms in insurance operations. The GAO also interviewed federal and state regulators, technology companies, insurers, and consumer groups.

Response 4 touches upon challenges with the use of AI and the particular impact on smaller insurers.

The DSAC appreciates the opportunity to respond to the Department's RFI. If you have any questions or would like to discuss any of our comments, please contact Will Behnke, the Academy's risk management and financial reporting policy analyst (behnke@actuary.org).

Sincerely,

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