



The Task Force on Climate-related Financial Disclosures (TCFD)

What Actuaries Need to Know





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Introduction and Background

This paper has been published by the Catastrophe and Climate Strategic Research Program of the Society of Actuaries (SOA) and is intended to be a part of ongoing education for actuaries on the topic of climate risks. The purpose of the paper is to facilitate understanding of the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) and its ramifications on actuarial work.

Many forward-thinking investors and other company stakeholders are recognizing the need for information regarding how climate change will impact a company's financial performance and are demanding that it be disclosed in its financial statements. Without consistency in the reporting provided, i.e., if some companies provide a lot of relevant information and others provide little of use, it is likely that sufficient incentives for meaningful disclosure will not exist.

The Financial Stability Board (FSB) sought to establish guidelines that could be used across industries and geographies, especially by those issuing public debt and equity. They created the Task Force in 2015, which recommended a set of voluntary disclosures. Within the financial sector, groups specifically targeted include banks, insurance companies, asset managers and asset owners. These Disclosures are aimed to allow an early assessment of climate risks and encourage systemic analysis. In 2017, the Task Force released¹ its recommendations, implementation details and a technical supplement on using scenario analysis. In addition, supplemental guidance by industry covering strategy, risk management and metrics/targets was also published. These recommendations are supported by many CEOs and have expanded the supply and demand for, and shape of, this type of disclosure.

Financial markets have reacted to this desire for transparency by increasingly demanding it from companies. The TCFD reports², as of February 2020, over 1,000 organizations have declared their support for these recommendations. One of the goals of the TCFD is to have them evolve from good practice at some companies to best practice at many companies over a period of just a few years.

Unsustainable activities do not contribute to building resilience, especially in the transition to a lower-carbon economy. Those who practice enterprise risk management will recognize in the TCFD recommendations an attempt to increase transparency using higher order impacts, holistic analysis and a range of time horizons. In addition to direct analysis where actuaries work for companies that accept climate risk, actuaries may act as reporters of indirect risks as an asset owner.

¹TCFD (2020) *Publications*. Available at <https://www.fsb-tcfid.org/publications/>

²TCFD (2020) *TCFD Overview Booklet*. Available at https://www.fsb-tcfid.org/wp-content/uploads/2020/03/TCFD_Booklet_FNL_Digital_March-2020.pdf

Goals of TCFD

The TCFD had several goals in putting forth its recommendations. They include enhanced access to capital by companies that effectively manage their climate risks. Internally, climate-related risks and opportunities should result in improved strategic planning efforts. By implementing an enhanced and consistent reporting framework, disclosures should allow an early assessment of climate risks and encourage systemic analysis.

Risks considered should include shocks from natural disasters, trends (e.g., sea level rise), changing consumer preferences (e.g., away from fossil fuel production and use), investor sentiment, widening spreads and depleted rainy-day funds. Non-diversifiable systemic risks are of primary concern, but localized risks that can change the way we consider and approach risk should also be evaluated.

Principles for Effective Disclosure

The TCFD recommendations included a list of key principles for effective disclosures regarding environmental, social and governance (ESG) risks. They indicate that disclosures should:

- *Represent relevant information.* They should relate to the liability and invested asset portfolios of the organization, rather than consisting of boiler-plate language that covers general environmental and social risks that affect the entire world.
- *Be specific and complete.* They should represent particular risks that the company is exposed to and how it is responding to these risks. The disclosure should present a discussion of all the key environmental and social risks of the company.
- *Be clear, balanced (objective) and understandable.* The disclosures should be straight-forward and understandable to the expected users of the financial statements. The presentation should not be overly optimistic and, where applicable, present a reasonable range of expected results of the company's actions.
- *Be consistent over time.* The disclosures should provide a comparison using consistent formats, language and metrics to prior experience. If the methodology used to develop the disclosures has changed, include restated past values, where appropriate.
- *Be comparable among organizations within a sector, industry or portfolio.* Where available, the methodology, assumptions and scenarios used should be consistent and comparable with those of peers or industry, as applicable.
- *Be reliable, verifiable and objective.* Where quantitative assessments are included, ensure that values disclosed are accurate and peer reviewed, where applicable.
- *Be provided on a timely basis.* The information and data disclosed should include a current assessment, based on the most reliable and recent available information, on at least an annual basis.

Scenarios

The earth's climate is a complex adaptive system³, interconnected with the atmosphere, oceans and land surface. Greenhouse gas emissions from our power generation, transportation and agricultural systems jeopardize that balance within the earth system, as does urbanization. The resultant systemic risks of climate change impact all our lives. More droughts, wildfires, storms and floods are hugely disruptive risks to our livelihoods, property and

³ National Research Council (2010) *Advancing the Science of Climate Change*. Washington, DC: The National Academies Press. Available at <https://www.nap.edu/read/12782/chapter/5#29>

environment. These are examples of what are known as physical risks. Transitioning away from reliance on fossil fuels is a means of escape, but not without its own risks (and opportunities) for individuals and organizations. For example, a coal company or miner may not welcome a transition in the same way as early shareholders in Tesla. These are examples of transition risks and opportunities.

While the fundamental drivers of climate change are well understood, the system is too complex to allow the extent and timing of detailed impacts to be accurately predicted. Similarly, the extent and pace of energy transition depends on policy decisions not yet taken and other unknowns. The TCFD has recommended that, in the face of these uncertainties, organizations use scenario analysis to make sense of future possibilities. Scenarios comprise plausible future outcomes. They are not forecasts. They are not representations of a single event from a single perspective. Rather, they can provide a view of the aggregated outcome of our world's interrelated natural and human systems.

Perhaps COVID-19 is a topical example that illustrates the complex interrelationships among nature to health, political, social and economic systems. SOA research papers have demonstrated that a pandemic was included in our view of plausible risks, but how many of us foresaw, let alone were prepared for, the speed and magnitude of its ripple effects?

At a minimum, two scenarios might be considered: (1) a transition consistent with the objectives included in the Paris Agreement⁴ having greater transition risk / lesser physical risk and (2) a set of more limited (business-as-usual) climate policy actions, with resulting greater physical risk / lesser transition risk. However, the most relevant scenarios for a specific organization will depend on its unique risk profile. For example, property & casualty insurers may be more focused on physical risk manifested in storm, flood and wildfire and less focused on the underwriting appetite implications of climate liability risk and transition risk. In contrast, life & health insurers and pension funds may see mortality and morbidity implications in both physical and transition risk scenarios. Life insurers, pension funds and asset managers may be focused on the implications for investment returns. Insurers may see a concentration of physical risks in their portfolios and wonder how or if they can further spread their risks through reinsurers or public agencies.

Models are now emerging that coherently combine the natural and economic aspects of potential scenarios. For example, a joint paper of the Institute and Faculty of Actuaries (IFoA)'s Resource and Environment Board and Ortec Finance⁵ examined the relative impacts of three scenarios called Paris Orderly Transition, Paris Disorderly Transition and Failed Transition compared to a base economic model that assumes no climate change. A key takeaway from this paper is that all the modelled climate scenarios result in lower Gross Domestic Product (GDP) and investment returns than the baseline. Therefore, expected returns may be overstated if the interrelationship of the economy and climate change is not recognized. This relatively new research area looks worth monitoring, as more sophisticated climate-financial modelling approaches are applied and consensus develops.

⁴ UNFCCC (2015) *Paris Agreement*. Bonn, Germany: United Nations Framework Convention on Climate Change Secretariat. Available at <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>.

⁵ IFoA (2020) *Climate scenario analysis: An illustration of potential long-term economic & financial market impacts*, Institute and Faculty of Actuaries Authors Luca Bongiorno, Andrew Claringbold, Lisa Eichler Claire Jones, Bert Kramer, Louise Pryor and Nick Spencer. Available at <https://www.actuaries.org.uk/practice-areas/resource-and-environment/resource-and-environment-practice-area-practical-guides>

Benefits of the TCFD Recommendations

The benefits of implementing the TCFD guidance include:

Provides a unified framework to structure a response to risks and opportunities posed by climate change. Developing a common vocabulary, definition of risk metrics, emphasis on adequate disclosures of processes, methodology and mitigation protocols reduce friction in dissemination and evaluation of information by key stakeholders – insurers, banks, asset managers, asset owners, regulators, and the government.

Encourages consistent and reliable reporting, which is needed for like-to-like comparisons to be meaningful. It also reduces the room for malfeasance due to incomplete and misleading disclosures – selecting data, scope, criteria and results to fit a narrative – instead of the other way around.

Fosters a culture of climate-awareness throughout the organization. Sound governance encourages appointment of a committee that reports to the Board, which analyzes, reports and manages climate related risks and opportunities. Formal separation of responsibility has a positive downstream impact on monitoring, frequency of reporting and integration into strategy, risk-management, investing and budgeting.

Such a committee could help break down silos, creating a formal two-way channel of communication between the Board and the personnel at the frontline. This can markedly improve internal risk-assessment culture and increases the likelihood that climate related financial information is conveyed to investors in its entirety.

Provides a flexible approach that allows organizations to measure and disclose information that is relevant to their context by application of the Supplemental Guidelines by industry.

Facilitates easier access to capital by increasing investors’ and lenders’ confidence that the company’s climate-related risks are being appropriately assessed and managed. Following the TCFD recommendations can close the data gap and meet the growing investor demands for relevant disclosures.

Drives an actively managed planned transition, which can prevent a sudden mark-down related to stranded assets, which typically occurs after the financial markets have priced in the loss of economic value. There are many factors that influence transition risk - market and technological shifts, emerging policy and legal requirements, mounting reputational pressures and investor sentiment. Their interplay can be considered through systemic scenario analysis as recommended by the TCFD.

Streamlines the alphabet soup of reporting and standards and helps address inconsistencies in how climate-related information is communicated to the market. Currently, the reporting landscape for climate change is diverse and organizations use a range of reports and standards to disclose climate related information to different stakeholders. The TCFD recommendations can serve as a foundation for effective global climate-related disclosures.

This doesn’t mean that readers of financial reports don’t retain their responsibility to complete their own due diligence. For example, some companies may not self-report a complete overview of material risks. This could be especially true in the early years of these disclosures as stakeholders define the information that interests them regarding climate change.

Reducing information asymmetry is an important stepping stone toward efficient capital allocation. However, forward-looking comprehensive risk assessments are just as important in determining the financial viability and resilience of the business.

The TCFD recommendations are the overarching global framework adopted by regulators (supervisors) and referenced in emerging regulations in several jurisdictions. The [Corporate Reporting Dialogue \(CRD\)’s](#) Better

Alignment Project (BAP) initiative⁶ is working to align and harmonize participant frameworks and standards to TCFD recommendations. For [Principles for Responsible Investment \(PRI\)](#)⁷ signatories, climate-related reporting introduced in 2018 based on TCFD recommendations made the Governance and Strategy indicators mandatory to report starting 2020.

Touchpoints for Actuaries

Leveraging their training and experience, actuaries are developing a toolkit to identify, assess and manage climate risks, conduct analysis, report results and discuss climate impacts on their organization. They are also able to interpret and learn from the disclosures of other organizations. Described in more detail below, these are various ways in which actuaries can be involved in the TCFD process for an organization.

Identifying, assessing and managing climate risks

Actuaries have worked with a range of risks that differ by practice area, including all types of adverse events and conditions (e.g., mortality, morbidity, longevity, property damage and liability) and investment returns. In addition to direct impacts, climate risks also have second-order impacts on each of these risks. To assess climate risks in the context of primary actuarial practice areas, the time horizon of climate impacts needs to be considered, alongside the risks' time horizon. For example, climate risks will likely be realized in an increasing fashion over a long period of time. To provide perspective, mortality risks in life insurance policies also increase over time, with present values determined at the present time, while in the case of homeowners policies that are often provided through annual term periods, short-term perils are usually more important than long-term climate risk. Nevertheless, the impacts of storm frequency and severity or flood incidence likely increase, even over the shorter term, meaning less certain estimation and more volatile experience than otherwise expected.

Once their financial impacts are quantified, actuaries can help manage those risks in a manner similar to other types of perils and coverages, using risk management tools that they are familiar with.

Scenario analysis – explaining physical, transition and liability risk

Actuaries can also help organizations better understand and put into perspective the three types of risk that the TCFD principles address. Further, they can facilitate understanding of how these types of risk can impact their entire organization, including the compound nature of these risks that is important to understand, disclose and manage. Actuaries can work with, consult or research the findings of climate science experts to provide for *physical risks*. *Transition risks*, associated with working to achieve carbon emission goals (decarbonization), can be driven by regulation, consumer or investor market forces. Actuaries can translate these factors to the operations of their companies and advise accordingly. For *liability risks*, that is, the risk that those who have suffered the effects of climate trends will seek compensation from those they hold responsible, insurers that offer liability cover to 'emitters' may face claims far into the future, and actuaries can help to reflect and appropriately disclose these risks today.

⁶ CRD (2019) *Driving Alignment in Climate-related Reporting: Year One of the Better Alignment Project*. London, UK: International Integrated Reporting Council. Available at <https://corporatereportingdialogue.com/climatereport2019/>

⁷ PRI (2020) *PRI climate snapshot 2020*. London, UK: PRI Association. Available at <https://www.unpri.org/climate-change/pri-climate-snapshot-2020/6080.article>

Preparing parts of the reporting of TCFD

TCFD reporting seeks to inform investors using a consistent framework from which they can compare risks and their management by organizations to make knowledge-based decisions. Since a consistent framework is sought, organizations need to view how the Recommendations are applicable to them. Actuaries can explain to organizations key elements of reporting, risk assessments and disclosures, and can work with reporting teams who prepare the final information to ensure that the reporting is an accurate, meaningful and valuable effort.

Identification of organizational climate impacts

In addition to identifying specific climate risks and helping to develop disclosures, actuaries can see the big picture in terms of how the three types of risk affect the organization at an enterprise level. Working with the risk team, climate risks can be incorporated into the overall Governance, Strategy, Risk Management and Metrics portions of the thematic areas of the recommended disclosures.

Learning from disclosures of other organizations

As of February 2020, over 1,000 organizations have declared themselves to be TCFD Supporters. Those that have made disclosures can be a source of insight for others considering or implementing TCFD for the first time. Starting with observed approaches, actuaries can customize assumption setting in the assessment process, and can learn more about how common exposures can impact their own organization and help to explain these insights.

Similarities to Own Risk and Solvency Assessment (ORSA)

For practitioners in the insurance space, complying with the TCFD recommendations is similar to a general ORSA process, where climate change may already be a risk that is considered. Like ORSA, the TCFD recommendations include categories related to governance, strategy and metrics. It focuses on what a company does, rather than developing a consistent reporting regimen, allowing companies to share information regarding their unique culture and risk tolerance with stakeholders.

Similarly, the TCFD process is all about making risk transparent, building scenarios that show how the particular risk exposures of the company are affected by climate and communicating the results to its stakeholders. This is expected to provide a competitive advantage for companies who complete these tasks successfully. The process will continue to evolve and improve over time as experience is gained and peer pressure incents additional disclosures.

Who Has Adopted TCFD

The TCFD recommendations have been well received by all stakeholders, as evident from the growing list of [Supporters](#)⁸. As of February 2020, TCFD Supporters included 480 financial firms responsible for assets of US\$138tn⁹. With implementation timelines ranging from three to five years, there is a measurable gap between the number of supporters and the extent of disclosures.

Per the TCFD Status Report in 2019, participation does not exceed 50% for any of its recommended disclosures, including Strategy and Governance, which TCFD recommends all companies disclose. This is also the case with insurers. Those who have developed TCFD-aligned reports began focusing on the qualitative aspects of the

⁸ TCFD (2020) *TCFD Supporters*. Available at <https://www.fsb-tcf.org/supporters-landing/>

⁹ TCFD (2020) *TCFD Overview Booklet*. Available at https://www.fsb-tcf.org/wp-content/uploads/2020/03/TCFD_Booklet_FNL_Digital_March-2020.pdf

Recommendations – specifically, Governance and Strategy. Insurers indicate the necessity of an established governance processes relating to climate risks and TCFD implementation, before taking steps towards more complex climate risk assessment and disclosure efforts (e.g., pertaining to risk management, metrics, targets and scenario analysis), for which methodologies are still under development¹⁰.

Disclosures tend to be made in multiple reports, more likely found in supplementary Sustainability Reports, rather than annual reports and financial filings.

The likelihood of disclosures generally increases with company size, as conducting robust analysis is resource intensive and smaller companies have cited capacity constraints in their inability to comply. Multiline, multinational insurers have tended to be early adopters, followed by medium-sized insurers. Property & casualty insurers have generally had higher adoption rates than life and health insurers, where climate risk has been viewed as having a lower potential impact.

Geographic differences in adoption are significant. In emerging markets, there is lower level of awareness as compared to developed countries. Also, regulator/supervisor engagement tends to drive adoption of disclosures, as has been the case in Japan, UK and Europe. Even here, many adopters are early in their journeys. For example, a UK study¹¹ found only limited alignment of insurance firm and pension scheme annual reports with TCFD.

In the **U.S.**, the California Department of Insurance, the Washington State Office of the Insurance Commissioner and the New Mexico Office of Superintendent of Insurance are TCFD Supporters, and have been working with other state regulators to reference TCFD disclosure within the [NAIC Climate Risk Disclosure Survey](#), which is applied as a mandatory instrument in several states. Starting in 2020, NAIC has agreed to accept TCFD reports in lieu of submitting to a survey¹².

Canada's Ministry of Finance has encouraged investors and state-owned entities to adopt the TCFD recommendations to help direct capital towards sustainable businesses. In May 2020, Canada announced that for large businesses (excluding the financial sector) to receive COVID-19 economic aid, they will be required to disclose their climate impact and commit to making environmentally sustainable decisions.

There are three major impediments to speedy execution cited by the Supporters:

- Climate risk mitigation embedded in processes are challenging to discuss separately as part of corporate disclosures.
- Disclosing assumptions used in scenario analysis can include confidential business information they do not wish to disclose.
- In certain instances, there is a lack of industry-specific standardized metrics.

¹⁰ IAIS (2020) *Issues Paper on the Implementation of the TCFD Recommendations*, International Association of Insurance Supervisors (IAIS) and Sustainable Insurance Forum (SIF). Available at <https://www.iaisweb.org/page/supervisory-material/issues-papers>

¹¹ Klumpes, P., Acharyya, M., Kakar, G., & Sturgess, E. (2019) Climate risk reporting practices by UK insurance companies and pension schemes, *British Actuarial Journal*, 24, E30. Available at <https://www.cambridge.org/core/journals/british-actuarial-journal/article/climate-risk-reporting-practices-by-uk-insurance-companies-and-pension-schemes/39E7ABBB63EDE840FC848D90635EC821#>

¹² NAIC (2020) Climate Risk Disclosure Survey Guidance Reporting year 2019. Available at http://www.insurance.ca.gov/0250-insurers/0300-insurers/0100-applications/ClimateSurvey/upload/QUESTIONS-AND-GUIDELINES-CLIMATE-RISK-SURVEY-REPORTING-YEAR-2019_MPrevis-.pdf

Conclusions and Sources to Learn More

Organizations can transparently report their climate impacts under TCFD disclosures, ideally as part of their primary financial filings. There are international trends towards organizations voluntarily adopting TCFD disclosures and regulators strongly recommending or expecting adoption (“comply or explain”).

TCFD compliance is an evolving area in which preparers face challenges. Although good practices are emerging, there is no consensus yet around what constitutes best practice in this area. Reporting from this perspective enables stakeholders to question the activities that drive an organization’s climate impacts. The dialogue on an organization’s TCFD journey may over time prompt it to change its strategy or practices.

Actuaries may get involved in identifying, assessing and managing climate risk. Scenario analysis is a helpful tool for explaining physical, transition and liability risks that many actuaries have used in other contexts. Actuaries may become involved in preparing parts of climate-related reporting, as well as being users of this information. These disclosures may ultimately challenge conventional investment and underwriting practices.

Any actuary interested in getting involved in this area could start by looking at the March 2020 (or subsequent) TCFD overview booklet¹³ that summarizes its current state of progress. In September 2020, the updated TCFD Status Report, is expected to be available. The [TCFD Knowledge Hub](https://www.tcfdhub.org)¹⁴ is provided by the Climate Disclosure Standards Board (CDSB) which is part of CDP (formerly the Carbon Disclosure Project) Worldwide. Information for specific industries, for general issues such as investment mandates and for TCFD’s four themes of Governance, Strategy, Risk management and Metrics & Targets can be found there. In conjunction with the Sustainability Accounting Standards Board (SASB), the CDSB has produced the TCFD Implementation Guide¹⁵ and the TCFD Good Practice Handbook¹⁶ which highlight examples of current good practice.

The [Climate Financial Risk Forum \(CFRF\) Guide](https://www.fca.org.uk/publication/corporate/climate-financial-risk-forum-guide-2020-summary.pdf)¹⁷ published in June 2020 is another helpful resource. CFRF is co-chaired by the UK’s Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA). The guide contains four industry-produced chapters (Disclosures, Innovation, Scenario Analysis and Risk Management) and is designed to be as practical and as widely accessible as possible.

Examples of initial TCFD efforts of financial firms can be found in ‘TCFD Pilot Projects’¹⁸ from the United Nations Environment Programme Finance Initiative (UNEP FI). Pointers to discussions among regulators can be found in recently produced Issues Papers¹⁹ from the International Association of Insurance Supervisors (IAIS) on the Implementation of the Recommendations of the TCFD. It concludes with a next step to develop an Application Paper on Climate Risk in the Insurance Sector that will include a section on disclosures.

¹³ TCFD (2020) *TCFD Overview Booklet*. Available at https://www.fsb-tcf.org/wp-content/uploads/2020/03/TCFD_Booklet_FNL_Digital_March-2020.pdf

¹⁴ CDSB (2020) *TCFD Knowledge Hub*. Available at <https://www.tcfdhub.org>

¹⁵ CDSB (2019) *TCFD Implementation Guide*. London, UK: Climate Disclosure Standards Board. Available at <https://www.cdsb.net/tcfid-implementation-guide>

¹⁶ CDSB (2019) *TCFD Good Practice Handbook*. London, UK: Climate Disclosure Standards Board. Available at <https://www.cdsb.net/tcfid-good-practice-handbook>

¹⁷ CFRF (2020) *Climate Financial Risk Forum Guide 2020 Summary*. Available at <https://www.fca.org.uk/publication/corporate/climate-financial-risk-forum-guide-2020-summary.pdf>

¹⁸ UNEP FI (2020) *TCFD Pilot Projects*. Geneva, Switzerland: United Nations Environment Programme Finance Initiative Secretariat. Available at <https://www.unepfi.org/climate-change/tcfid/>

¹⁹ IAIS (2020) *Issues Paper on the Implementation of the TCFD Recommendations*, International Association of Insurance Supervisors (IAIS) and Sustainable Insurance Forum (SIF). Available at <https://www.iaisweb.org/page/supervisory-material/issues-papers>

About The Society of Actuaries

The Society of Actuaries (SOA), formed in 1949, is one of the largest actuarial professional organizations in the world dedicated to serving more than 31,000 actuarial members and the public in the United States, Canada and worldwide. In line with the SOA Vision Statement, actuaries act as business leaders who develop and use mathematical models to measure and manage risk in support of financial security for individuals, organizations and the public.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policymakers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public policymakers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement and other topics. The SOA's research is intended to aid the work of policymakers and regulators and follow certain core principles:

Objectivity: The SOA's research informs and provides analysis that can be relied upon by other individuals or organizations involved in public policy discussions. The SOA does not take advocacy positions or lobby specific policy proposals.

Quality: The SOA aspires to the highest ethical and quality standards in all of its research and analysis. Our research process is overseen by experienced actuaries and nonactuaries from a range of industry sectors and organizations. A rigorous peer-review process ensures the quality and integrity of our work.

Relevance: The SOA provides timely research on public policy issues. Our research advances actuarial knowledge while providing critical insights on key policy issues, and thereby provides value to stakeholders and decision makers.

Quantification: The SOA leverages the diverse skill sets of actuaries to provide research and findings that are driven by the best available data and methods. Actuaries use detailed modeling to analyze financial risk and provide distinct insight and quantification. Further, actuarial standards require transparency and the disclosure of the assumptions and analytic approach underlying the work.

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