SOA Research Institute

CAS

17th Emerging Risk Survey

JULY | 2024

17th Emerging Risk Survey

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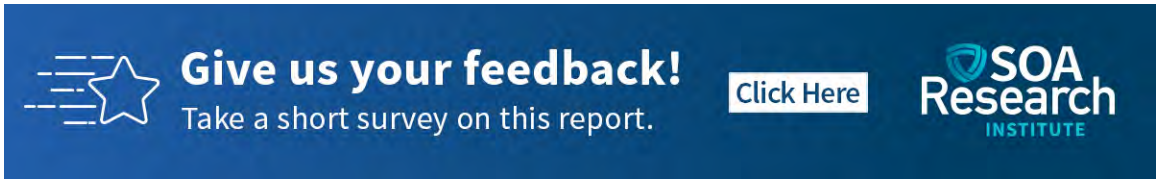

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CONTENTS

17th Emerging Risk Survey

This survey tracks the relative rankings of emerging risks across time according to risk managers. It is the 17th survey of emerging risks sponsored by the Casualty Actuarial Society (CAS), Society of Actuaries (SOA) Research Institute, and Canadian Institute of Actuaries (CIA), administered by the Joint Risk Management Section. The researcher thanks the Financial Reporting, Reinsurance and Joint Risk Management Sections for their financial support.

Context during the period leading up to and including the survey is important due to recency bias, where respondents are more likely to recall recent events and think they are more likely to occur in the future than is appropriate. The survey was open during November 2023; therefore, the following events may have had undue influence on the survey responses. A major earthquake occurred early in the year in Turkey/Syria and fighting continued between Ukraine and Russia combatants. Severe storms on every continent resulted in flooding and hail events. Hurricanes (Atlantic Ocean) were numerous but produced limited damage; typhoons (Pacific Ocean) were light; and cyclones (Indian Ocean) tied previous severity records from 1999 and 2019. Record heat and widespread heat waves also occurred in many places. The pandemic continued to ramp down and ChatGPT was released early in the year, highlighting the promise and fear of many about artificial intelligence.

Trends are as important as absolute responses in helping risk managers contemplate individual risks, threat multipliers and how to plan for future scenarios. The survey responses, especially the comments, give risk managers a way to share innovative ways they think about and deal with risk.

There are several ways to read this paper. The Executive Summary contains a high-level overview, and the Results section provides detailed commentary. Appendix A includes the current definitions for all 23 individual risks. Complete survey results can be found in appendix B, allowing the reader to scan specific sections or questions, and includes every comment received for the open-ended questions. Everyone has a different level of expertise and experience, and the reader can draw their own conclusions and pick out ideas that are useful to them. Appendix C provides a link for those interested in reviewing material from previous surveys in the series. A separate source of information has been provided in a Tableau program[1] that allows the reader to look at some of the results by year or by risk. A companion document, referred to as the Guide for Use report, was released with the 15th survey (data is updated through 2021) and walks the reader through ways to make the document useful to practitioners. Sections discuss each risk and historical data associated with it, as well as providing a guide to how the reader might approach interpreting the report.

[1] The Tableau data can be accessed here:

https://tableau.soa.org/t/soa-public/views/EmergingRisks17thReport/1_HeatMapTimeSeries

Section 1: Executive Summary

The decade of the 2020s has been risk-dominated and 2023 was no exception. On the one hand, the pandemic continued to wind down, with only periodic surges. At the same time, extreme weather, armed conflicts, and new technologies all created disruptions to communities and markets. Water is an evolving crisis, with some areas getting too much with severe storms and cyclones leading to heavy flooding and other areas facing drought. Some alternate, as California partially rebounded from drought with a series of atmospheric rivers, causing major flooding and the re-emergence of Tulare Lake after 130 years. At the same time, the Colorado River remains low as warm temperatures led to relatively less snow causing early runoff. High winds quickly spread a wildfire in Hawaii. Similar situations occurred on every continent.

A surge of interest rate increases revealed banks that had asset-liability management (ALM) mismatches threatened a run-on-the-bank regionally with systemic potential that slowed the U.S. Federal Reserve Bank's tightening of monetary policy. Crypto markets rebounded in the fall as the FTX bankruptcy came closer to its conclusion. ChatGPT was released publicly just after the 2022 survey and spent much of 2023 on the front page of media everywhere, but the additional electricity use necessary interacted with climate risks. Ukraine continued to defend its territory against Russia in the second year of conflict impacting global food supplies. In the month before the survey opened, on October 7, Hamas launched incursions into Israel and responses continue today with the possibility of an expansion into at least a regional conflict. Since the survey closed in November, severe weather, conflicts, influenza, infrastructure, technology, markets and climate change have all been prominent in an election year for many countries.

This evolution of risks is captured in the *17th Emerging Risk Survey*, completed in November of 2023. Risk managers can add value by looking at threat multipliers, where a risk amplifies other risks and creates problems (or opportunities). Regularly taking time to consider emerging risks can aid proactive scenario planning and provide a competitive advantage without overwhelming a firm in detailed models.

Survey respondents reported that global economic expectations had rebounded from their lows. They focused on threat multipliers like war, climate and technology. Strong thunderstorms are an increasing concern. Next year will we be talking about influenza, a regional conflict in Asia, technological attacks against infrastructure or a large earthquake? There are many emerging risks to worry about. By putting them on your radar, a practical response can be developed in advance. It won't work out as expected, but the act of planning allows the risk manager to consider options when time is not the critical path.

The responses across all questions continue a reduced perceived risk from pandemics. Several open-ended questions solicited the respondent's experience with the recent rise in interest rates and how the risk team's scenarios have evolved.

1.1 SURVEY FRAMEWORK

This survey is completed annually (except in 2008, which included two iterations, spring and fall), generally in November. In addition to the top emerging and top five emerging risks, the survey also looks at the top current risk and risk combinations. Combinations of risks often follow the patterns shown when looking at groups of emerging risks, but sometimes also reflect surprises. Some risks are more common when viewed with others than by themselves. This paper will review these quantitative responses, looking for material changes and trends, in addition to considering qualitative risk assessments and current topics. First, we will review the questions about emerging risks that headline the survey.

Respondents selected from 23 risks in five categories as follows. When a chart shows 24 risks, the last one is *Other*, and the survey asks specifically which risks are missing so they can be considered in the future. Some risks that will be considered for increased exposure are disinformation, social media and long-term remote work environments. Appendix A includes definitions used in the survey for each risk and is a key output item of the survey.

Economic Risks

1. *Energy price shock*
2. *Currency shock*
3. *Emergent nation destabilization*
4. *Asset price shock*
5. *Financial volatility*

Environmental Risks

6. *Climate change*
7. *Loss of freshwater services*
8. *Natural catastrophe: tropical storms*
9. *Natural catastrophe: earthquakes*
10. *Natural catastrophe: severe weather*

Geopolitical Risks

11. *Terrorism*
12. *Weapons of mass destruction*
13. *Wars (including civil wars)*
14. *Failed and failing states*
15. *Transnational crime and corruption*
16. *Globalization shift*
17. *Regional instability*

Societal Risks

18. *Pandemics/infectious diseases*
19. *Chronic diseases/medical delivery*
20. *Demographic shift*
21. *Liability regimes/regulatory framework*

Technological Risks

22. *Cyber/networks*
23. *Disruptive technology*

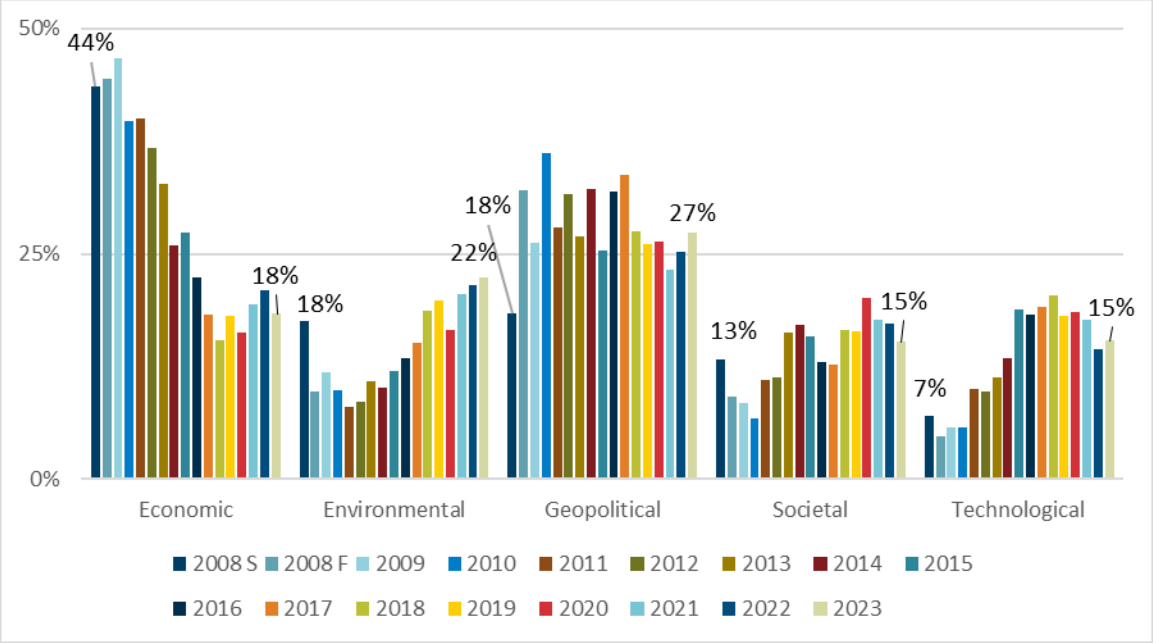
1.2 TOP FIVE EMERGING RISKS

Category trends continued to evolve in this 17th survey. Figure 1 shows the pattern of responses when respondents were asked to choose their top five emerging risks from among 23 individual risks (and *Other*). The risks roll up into five categories (Economic, Environmental, Geopolitical, Societal and Technological). The Geopolitical category of risks increased 2% from the prior survey (27% of the total chosen when up to five emerging risks were selected) and remained the most popular category. Two of the five categories were over 20% and Environmental retained second place (22%), followed by Economic (18%). Technological (15%) and Societal (15%) had the lowest response rates, but each had at least one individual risk inside the top five overall. The uppermost choice, and jumping to second place overall, from the Geopolitical category was *Wars (including civil wars)* where 53% of respondents chose it in their top five, an increase of 10% from the prior survey.

Figure 1

EMERGING RISKS BY CATEGORY (UP TO FIVE RISKS CHOSEN PER SURVEY)

% of Responses in Given Year



New highs were posted for *Climate change*, *Natural catastrophe: severe weather*, *Wars (including civil wars)* and *Demographic shift*. New lows were achieved by *Asset price shock*, *Failed and failing states*, *Liability regimes/regulatory framework and Cyber/networks*. From the prior iteration of the survey, three of the five Economic risks were lower, but *Emergent nation destabilization* was materially higher (20%, up from 9%).

Climate change remains the top response to this question, focused on the top five emerging risks for respondents, followed by *Wars (including civil wars)* and *Disruptive technology*.

The evolution of the top five risks chosen supports general continuity between survey iterations. As shown in Table 1, several risks have remained consistently at the top over the past four years of the pandemic era.

Table 1

TOP FIVE EMERGING RISKS, 2020–2023

	2023	2022	2021	2020
1	Climate change	Climate change	Climate change	Climate change
2	Wars (including civil wars)	Wars (including civil wars)	Cyber/networks	Cyber/networks
3	Disruptive technology	Cyber/networks	Pandemics/infectious diseases	Pandemics/infectious diseases
4	Demographic shift	Financial volatility	Disruptive technology	Disruptive technology
5	Cyber/networks	Demographic shift	Financial volatility	Financial volatility

Six risks increased materially from the previous survey when respondents were asked to choose their top five emerging risks. *Emergent nation destabilization* increased by 11%, *Natural catastrophe: severe weather (except tropical storms)* (+9%), *Terrorism* (+5%), *Wars (including civil wars)* (+10%), *Demographic shift* (+7%) and *Disruptive technology* (+13%).

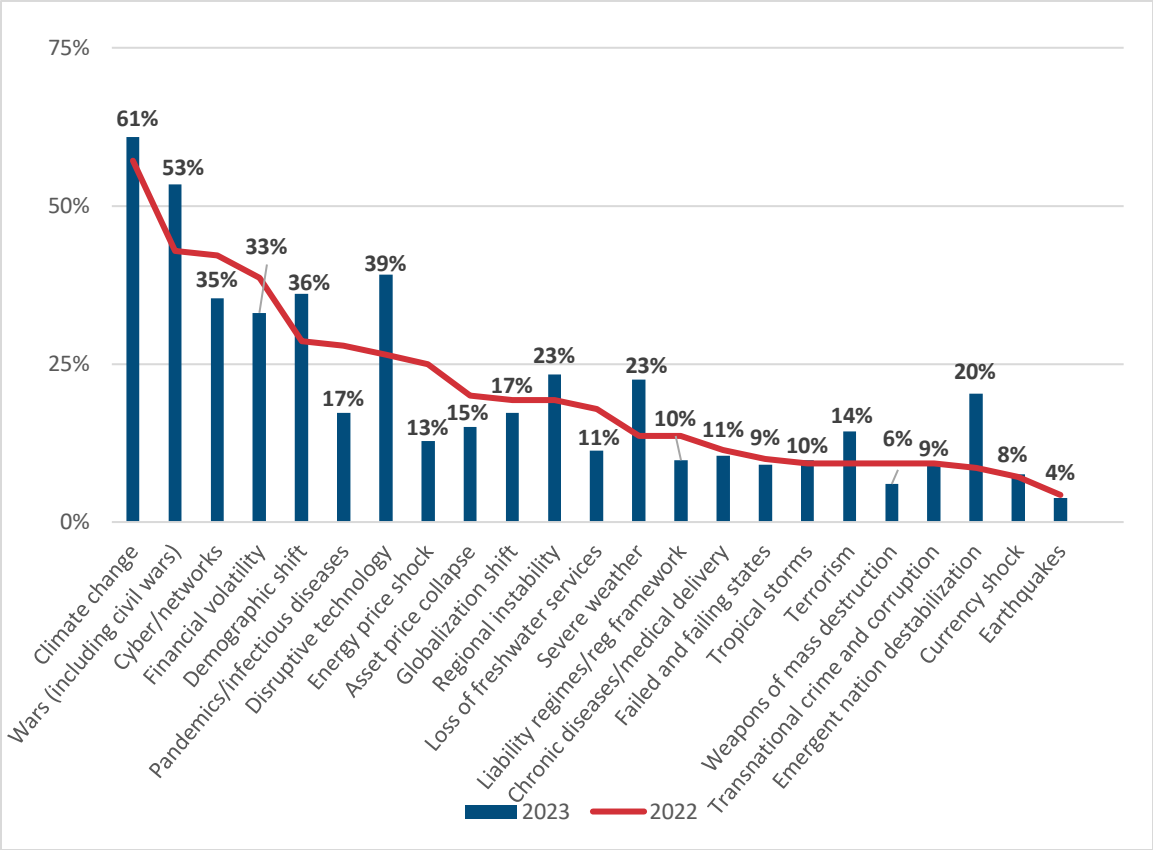
Six risks were down materially (5% or more), including *Energy price shock* (down 12%), *Asset price shock* (-5%), *Financial volatility* (-6%), *Loss of freshwater services* (-7%), *Pandemics/infectious diseases* (-11%, down from 45% in 2020 to 17% in 2023) and *Cyber/networks* (-7%).

Figure 2 shows the results for the top five emerging risks from the most recent two surveys, listed in order of the rankings from 2022. A few risks experienced large changes from the previous survey. The increase in *Emergent nation destabilization* is intriguing, especially given its low ranking in the prior survey.

Figure 2

YEAR-OVER-YEAR EMERGING RISKS (UP TO FIVE RISKS CHOSEN PER SURVEY)

% of Responses in Given Year



1.3 TOP EMERGING RISK

When asked for a single emerging risk from the respondents' top five, the results saw some repositioning, with *Climate change* more than doubling the response rate for Disruptive technology. The top two risks represent 40% of the total responses. This question generates the most concentrated responses.

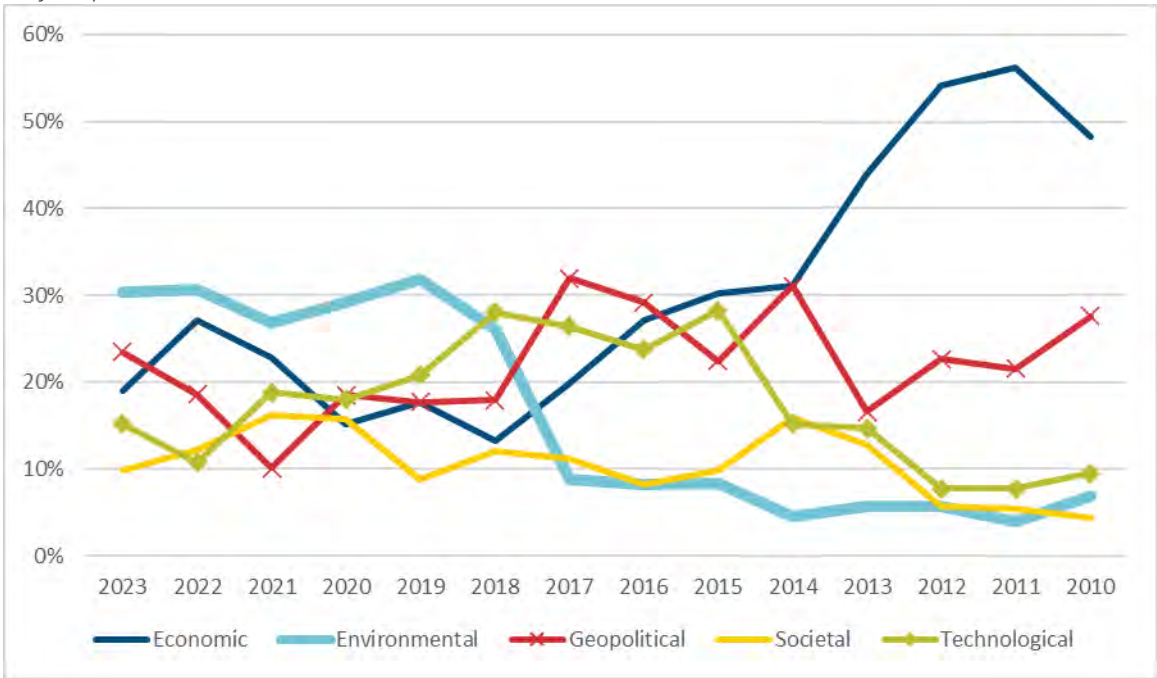
The results for the top emerging risk question were as follows (71% of respondents selected one of the top five, up 10% from the previous survey):

1. *Climate change* (27%, down from 28%)
2. *Disruptive technology* (13%, up from 4%)
3. *Wars (including civil wars)* (12%, up from 6%)
4. *Financial volatility* (11%, down from 15%)
5. *Demographic shift* (steady at 8%)

Two Environmental risks, and four overall, were the only ones not chosen as the top emerging risk. *Natural catastrophe: tropical storms*, *Natural catastrophe: earthquakes*, *Weapons of mass destruction* and *Liability regimes/regulatory framework* were not chosen. *Climate change* responses kept the Environmental category (30%, down from the previous year's 31%) ahead of the Geopolitical category (23%, up from 19%, and at its highest level since 2017).

Figure 3 shows how the categories have evolved over the history of the survey, with recent increases in the Environmental category offset by reductions in the Technological and Economic categories.

Figure 3
TOP EMERGING RISKS BY CATEGORY—SINGLE GREATEST IMPACT
% of Responses in Given Year



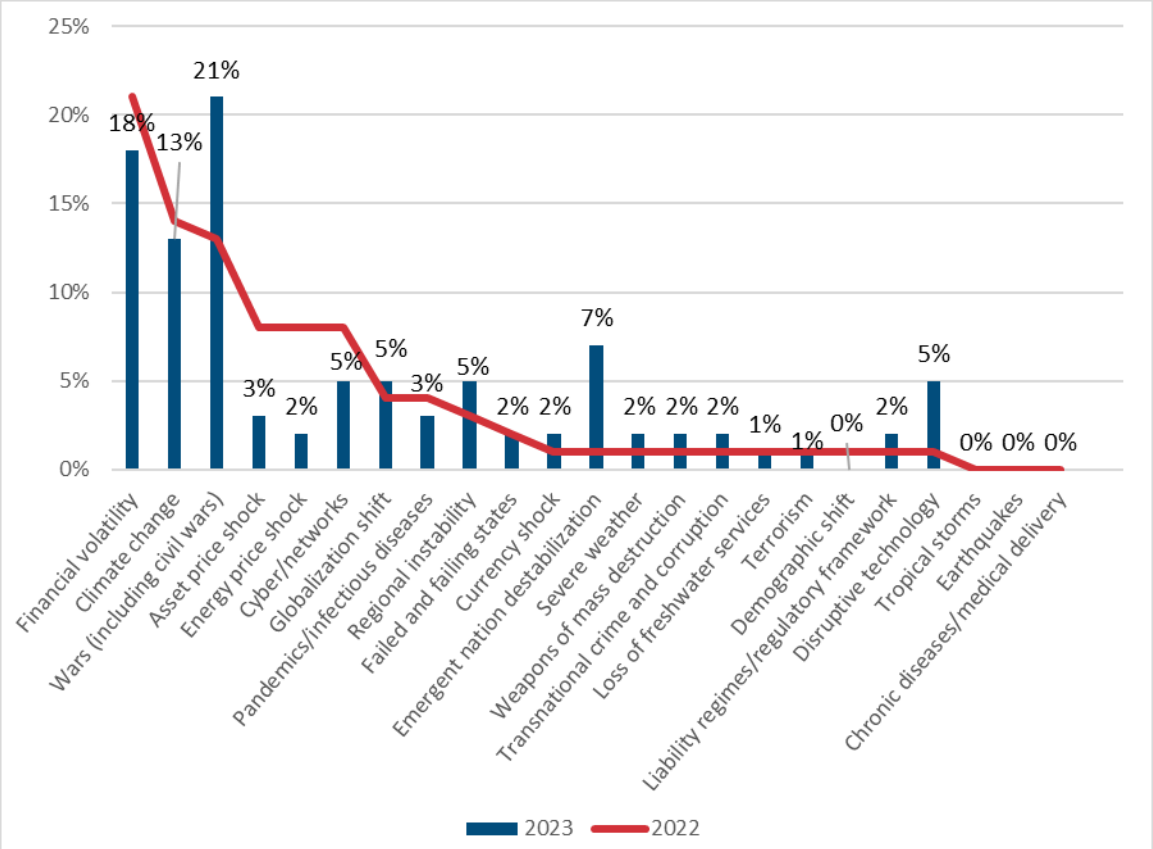
1.4 TOP CURRENT RISK

Current risk results tend to be volatile due to behavioral bias favoring recently occurring events and, as indicated in figure 4, several Economic category risks dropped, replaced by *Wars (including civil wars)*, up from third to first, *Emergent nation destabilization* and *Disruptive technologies*. Each made it into the top three rankings. Four risks received no support: *Natural catastrophe: tropical storms*, *Natural catastrophes:* earthquakes, *Chronic diseases/medical delivery* and *Demographic shift*.

Figure 4

TOP CURRENT RISK, YEAR OVER YEAR

% of Responses in Given Year

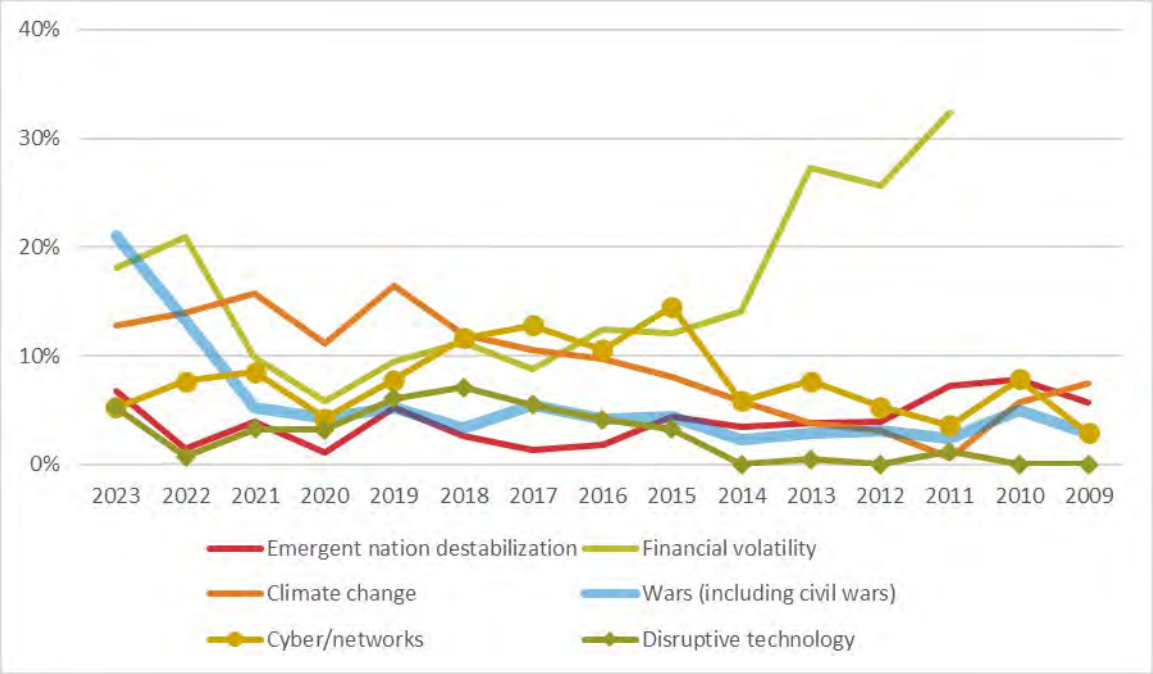


When looking at the 2023 list of top current risks historically in figure 5, one can see stories unfold: a steady buildup in the realization that climate change will impact traditional actuarial practice areas, slow increases followed by a spike in the concern about wars, a volatile technology concern that seems to ebb and flow as pandemics and other risks surge and fall back, and the growing distance and recent resurgence of some economic risks. A single-year change is a lagging indicator, but a trend can be more meaningful to the risk manager as they develop responses and potential scenarios.

Figure 5

TOP CURRENT RISK, HISTORICAL TREND FOR TOP FIVE RESPONSES

% of Responses in Given Year Based on all Responses (multiple allowed)



1.5 RISK COMBINATIONS

There are several ways to think of risk combinations. Compound risks are correlated risks that impact a specific result. An example of this would be the interaction between climate change, energy cost and conflicts that cascade across geographical regions and financial sectors. Risk clusters do not require correlation, looking at multiple risks that an organization, like an insurer or reinsurer, could incur either in parallel or sequentially. These could be independent, but do not have to be, with examples like financial volatility and earthquakes. Risk combination results can be insightful, as readers can review which risks other risk managers think work together in material ways. The top overall results seem to predict threat multipliers that broaden the impact of other risks. The top three risks chosen in combination were *Climate change*, *Wars (including civil wars)* and *Financial volatility*. Interestingly, no combination of these three risks appears in the top eight. The top combinations combine two risks from the same category that are correlated. This is surprising since table 6 that compares categories then seems inconsistent with the risk-by-risk comparisons, probably because there are different numbers of risks in each category. Overall, the Economic and Societal categories moved down and the Environmental and Geopolitical categories moved up.

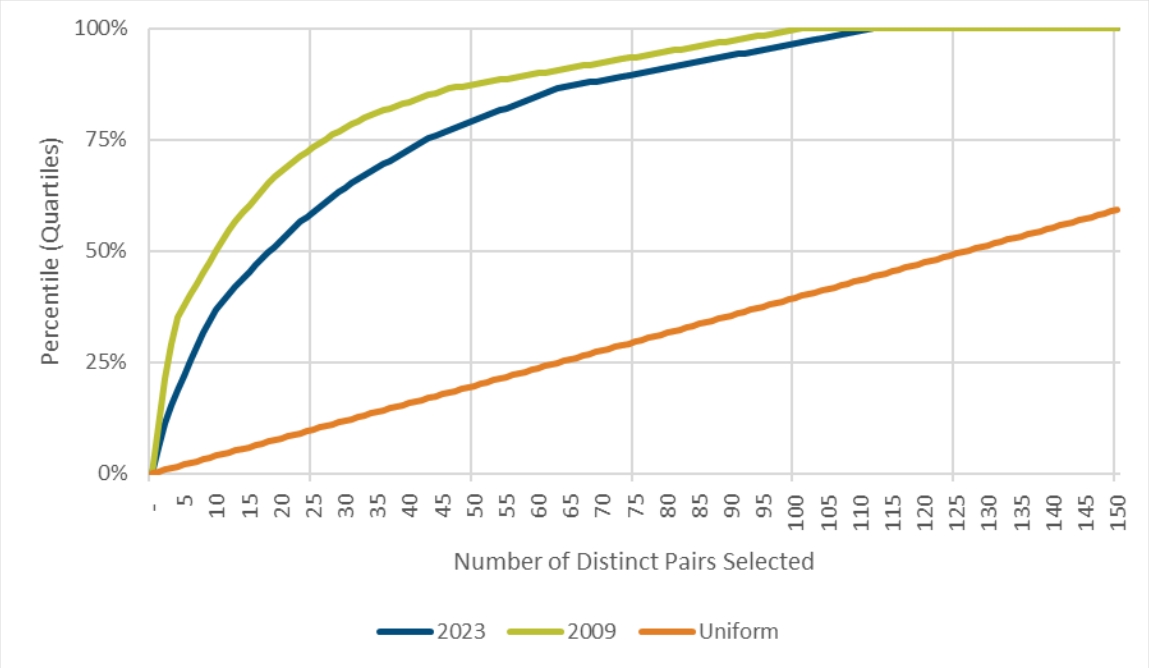
These are the top five combinations that were selected:

1. *Climate change* and *Natural disasters: severe weather*—6%
2. *Cyber/networks* and *Disruptive technology*—5%
3. *Asset price shock* and *Financial volatility*—4%
4. *Climate change* and *Loss of freshwater services*—3%
5. *Terrorism* and *Wars (including civil wars)* – 3%

Results this year for the top five combinations were more concentrated, with their total adding up to 22% after last year's comparable total of 20%.

There are 253 possible two-risk combinations, with many of them not chosen as one of the three possible responses. The first year the risk combination question was added, 2009, turned out to be the most extreme results recorded so far, so the most recent survey result is compared against it. A curve closer to 2009 is more concentrated, with the top risk combinations more likely to be chosen. As shown in figure 6, and discussed in subsection 4.5.3, the distribution of results was more concentrated than the prior survey and fewer risk pairs are being chosen from the pandemic era. To demonstrate the cumulative distribution, a "Uniform" line shows what the result would be if each of the 253 options was equally likely. This less concentrated distribution would counter a more concentrated result that grew quickly to 100% in the upper left portion of the chart.

Figure 6
CUMULATIVE DISTRIBUTION OF COMBINATIONS



1.6 TRENDS

Figure 7 shows results for this survey by category as a percentage of the total, for the top current risk, the top five emerging risks, the top emerging risk and risk combinations. Risk managers are given an option (*Other*), except for risk combinations, if they feel a risk is not already represented. The survey question with the highest response rate among the four questions includes a data label for each category. Often, the top five emerging risks and combination questions generate similar results, reflecting longer time horizon thinking. Historically, recency bias has driven results for both the top current risks and the top emerging risk categories, but there is more divergence this year. These results can be upended by an anomaly driven by the presence of a dominant risk. *Climate change* has driven the Environmental category higher for the top emerging risk. *Financial volatility* as the top current risk has rebounded over the past two surveys and pulled up the Economic category. *Pandemics/infectious diseases* had driven the Societal category higher for the top current risk in 2020 and 2021, but has fallen back since then.

Figure 7

CATEGORY COMPARISON ACROSS FOUR QUESTIONS

% of Responses to Given Question

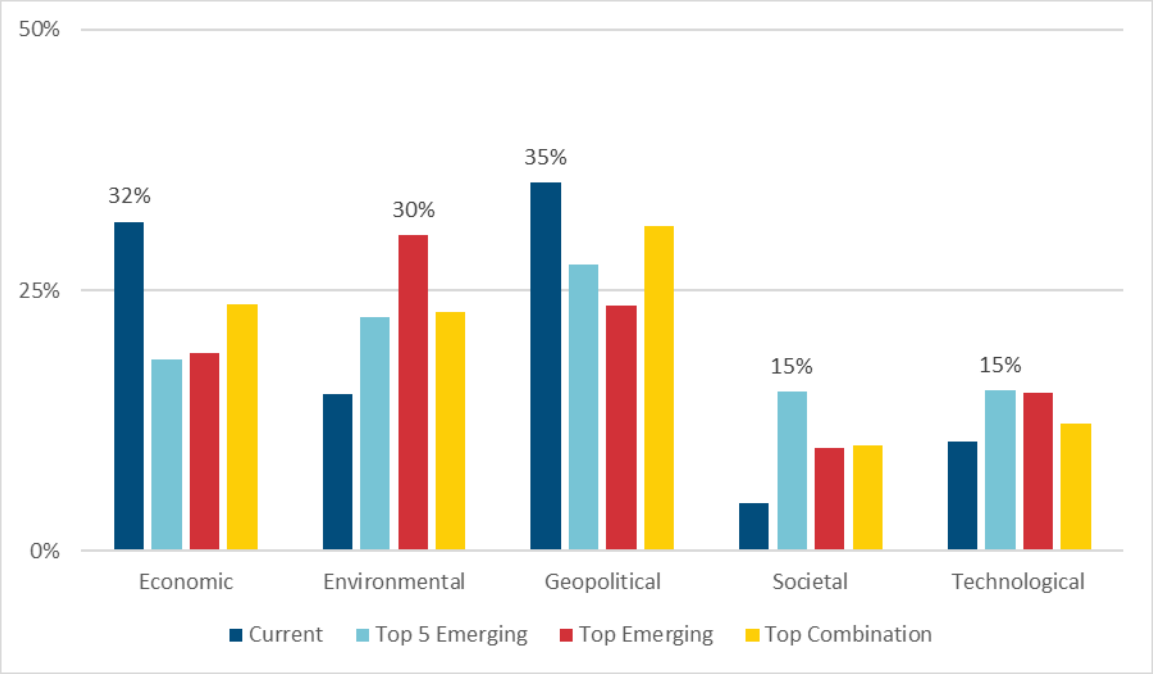
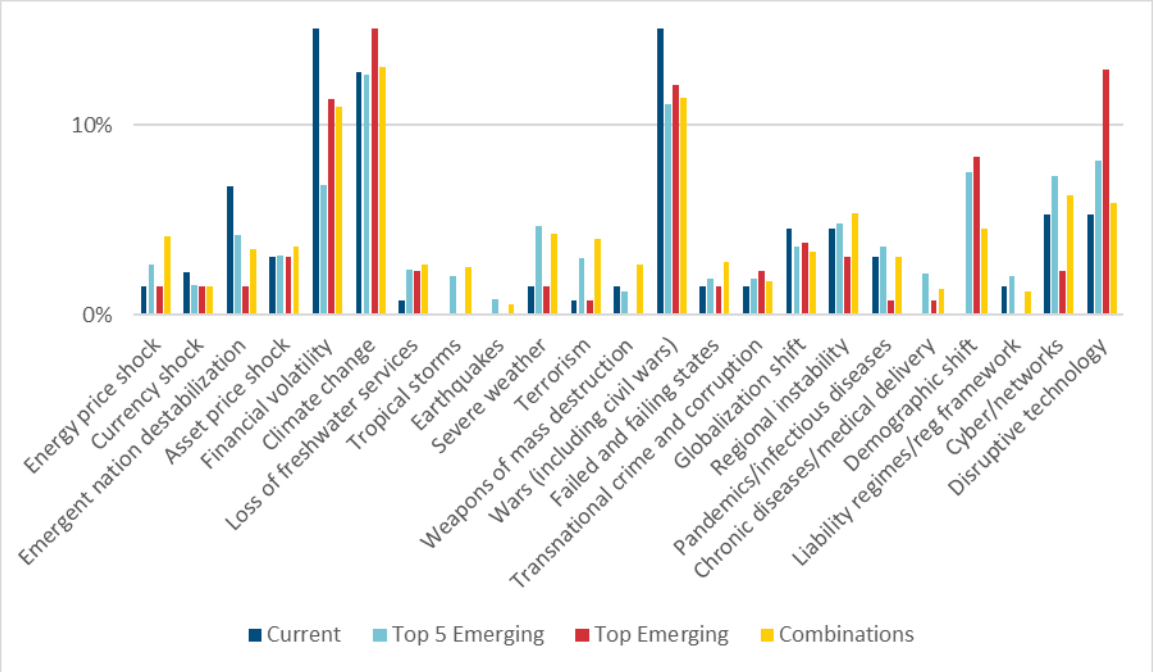


Figure 8 compares the current risk results with the top five emerging risks, top emerging risk and risk combinations at the individual risk level. Hypothesizing why there are discrepancies is useful, and readers may come to different conclusions. (Ed. note: This chart includes information that is located elsewhere, but visually highlights the top risks and those that vary, like *Demographic shift* or *Disruptive technologies*, between questions.)

Figure 8

RISK COMPARISON ACROSS FOUR QUESTIONS

% of Responses to Given Question (Ed. Note: the maximum value for a response has been truncated at 15% to better display differences among the risks—a chart showing an uncapped maximum is available in appendix B)



The survey credibility, with more detail found in specific sections of the survey, can be inferred by the difference among the results for the four questions. The results are mostly consistent for both the leading risks and the differentials between questions. The comments below reflect the researcher's interpretation; that of the reader may differ.

- The risk with the greatest disparity favoring the current risk over the top emerging risk is *Wars (including civil wars)* (8.9%). With the continuing war in Ukraine, ongoing conflict in Gaza and concerns in Asia a daily news item, this is not surprising.
- The risk with the greatest disparity favoring the top emerging risk over the current risk is *Climate change* (13.7%). This represents the risk of greatest concern over longer time horizons.
- The risk with the greatest disparity favoring the top five emerging risks over the top emerging risk is *Cyber/networks* (5.0%). This represents a risk that is likely to grow in importance over time.
- The risk with the greatest disparity favoring the top emerging risk over the top five emerging risks is *Climate change* (13.9%). This risk stands out in importance for survey respondents.
- The risk with the greatest disparity favoring the top current risk over the top five emerging risks is *Financial volatility* (11.2%). This risk has strong support as a current risk relative to longer time horizons and may be expected to mean revert over longer time horizons.
- The risk with the greatest disparity favoring the top five emerging risks over the top current risk is *Demographic shift* (7.5%). This risk is important over longer time horizons, but moves slowly so the concern is not immediate.

1.7 RISK MANAGER GROUPING OF RESULTS

In an initial question, respondents were asked how they define greatest strategic impact. Six options were provided, with three focused on financial impact and three on disruption. This analysis was first completed in 2022.

Greatest strategic impact related to risk can have various meanings. The survey provides these options:

- Financial impact on the world economy
- Disruption to the world economy
- Financial impact on me personally or my firm/industry
- Disruption to me personally or my firm/industry
- Financial impact on lives, habitat and safety
- Disruption to lives, habitat and safety

The survey looked at results for three primary questions split between impact and disruption. With two years of data to compare, breakdowns are available between years and between the financial impact/disruption split, with the difference between the two surveys being especially interesting. Provided here (with complete results presented in appendix B), as seen in figures 9-11, is the split for top emerging risk. The results highlight the unsurprising outcome that people don't think alike and groups with similar responses may act consistently. If your strategic focus is on financial impact, you are more likely to choose economic risks as the top emerging risk, and if disruption, then environmental risks are more likely. Even the differences between years varies based on this choice of greatest strategic impact. Diversity of thought on a risk team is beneficial. (Note that the *Other* category is not shown, resulting in the sum of total results being less than 100%.)

Figure 9

TOP EMERGING RISKS SEGREGATED BY THOSE CHOOSING FINANCIAL IMPACT AS GREATEST STRATEGIC IMPACT

% of Responses

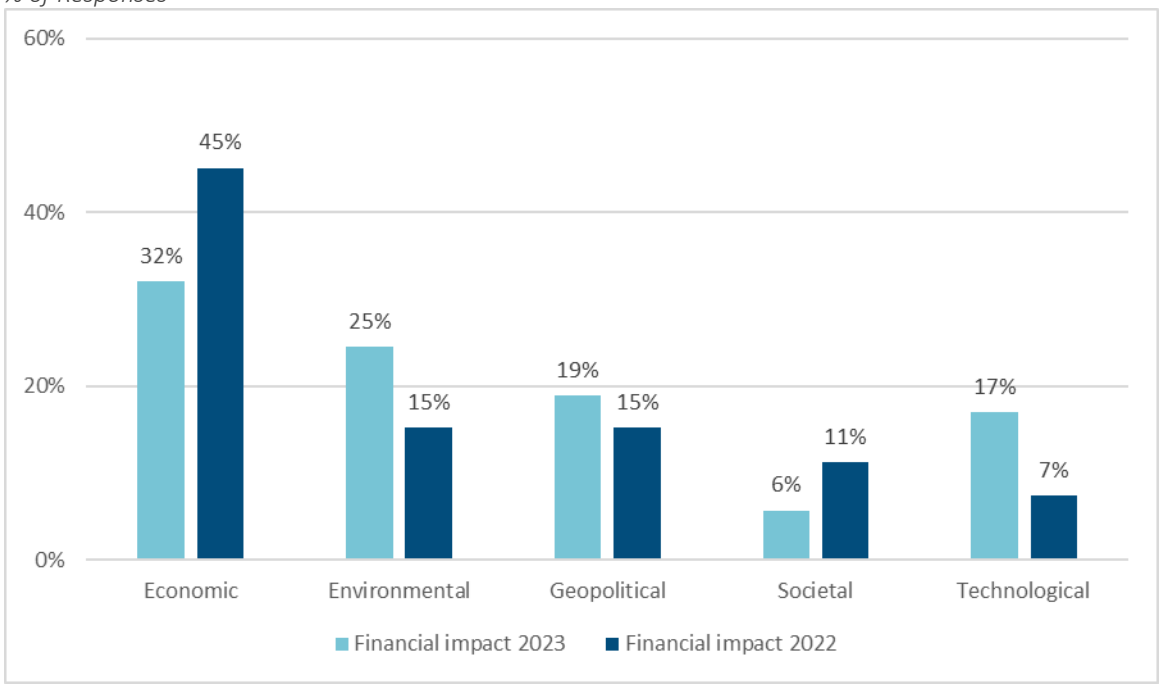


Figure 10

TOP EMERGING RISKS SEGREGATED BY THOSE CHOOSING DISRUPTION AS GREATEST STRATEGIC IMPACT

% of Responses

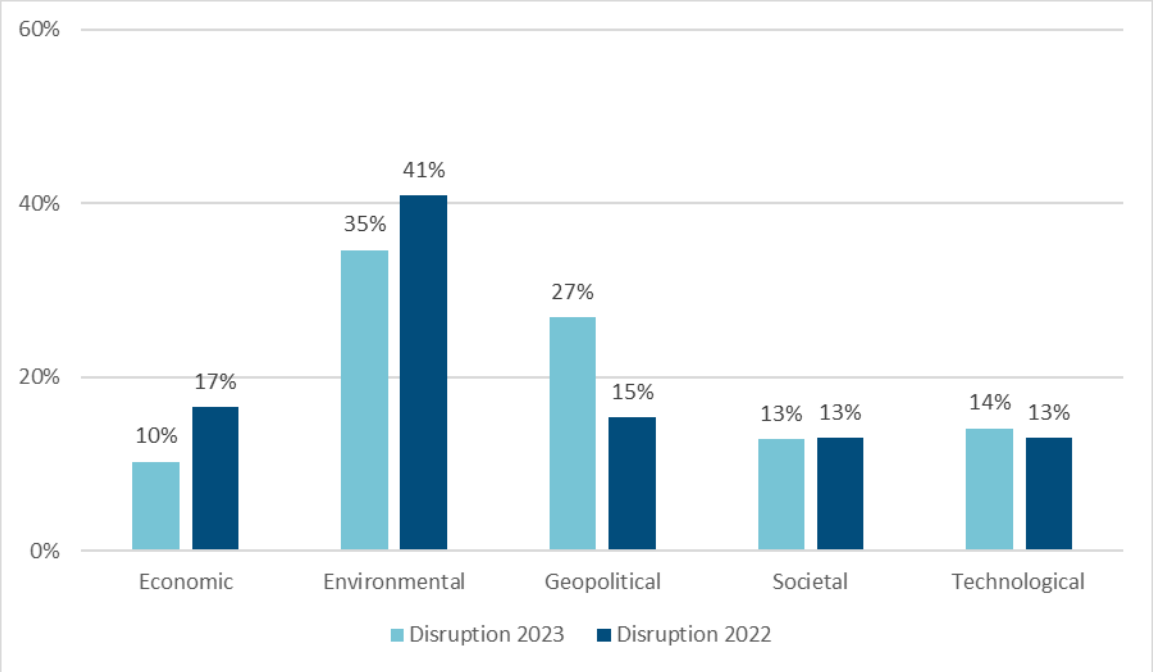
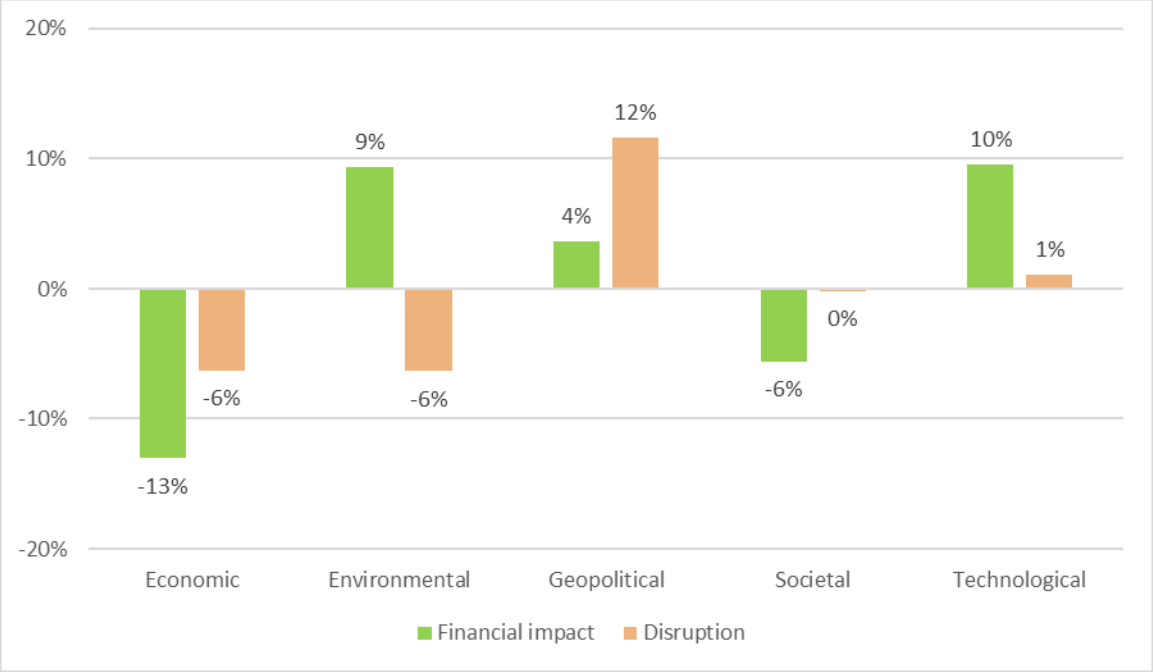


Figure 11

CHANGE IN TOP EMERGING RISK SEGREGATED BY GREATEST STRATEGIC IMPACT

% of Responses



In a polarized world, these results make clear that encouraging views that differ from our own when evaluating risks can lead to better decision-making.

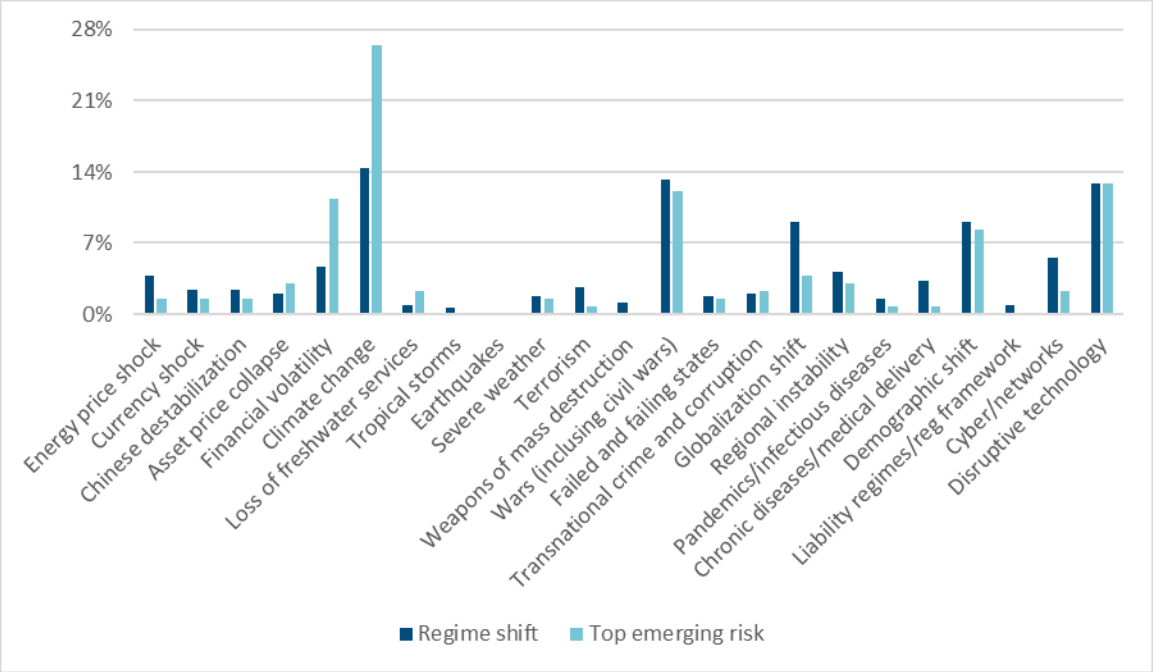
1.8 REGIME CHANGE

Respondents were asked to share up to three risks most likely to play a material role in causing a regime change in the next 5-10 years. Additional information about regime change was provided and can be viewed in subsection 4.5.5 and appendix B. The top three responses were *Climate change* (42% of respondents named it as one of their top three), *Wars (including civil wars)* (38%), and *Disruptive technology* (37%). Only the Economic category is not represented in the top five. Figure 12 shows how risks that lead to a regime change compared to the top emerging risk.

Figure 12

RISKS LIKELY TO LEAD TO REGIME SHIFT COMPARED TO TOP EMERGING RISK

% of Responses



Risks that respondents reported as more likely to create a regime shift than to be the top emerging risk were led by *Globalization shift*, *Cyber/networks*, *Chronic diseases/medical delivery*, *Energy price shock* and *Terrorism*. *Climate change* and *Financial volatility* each had much larger results as the top emerging risk than were likely to cause a regime shift, likely due to the short time horizon and mean reversion nature, respectively.

Many of the respondents suggested that certain risks are threat multipliers, creating outsized results when viewed together, with loss of stability and feedback loops. Concerns included wealth inequality and longevity leading to health care supply problems.

1.9 RISK VERSUS RETURN

Consistent with the prior survey, nearly two-thirds of respondents (65%) said ERM had a positive effect on their company/industry, and 56% noted that ERM improved returns relative to risk (with only 4% saying it did not). Respondents from various practice areas noted that the rise in interest rates was an event that could have been avoided by proactive ERM planning.

For those reporting that ERM improves returns relative to risk, some pointed to a consistent approach being cost effective, especially when looking at the marginal impact. The best analogy was *The same reason having brakes on a car allows for a higher average speed.*

One respondent who stated that ERM does not improve returns relative to risk thinks companies are too cautious.

The respondents who answered *Not sure* about the effects of ERM at their company noted that some use it defensively or that it slows innovation. Avoiding the use of ERM as a check-box exercise or using ERM strictly to assign blame makes it hard to be sure.

1.10 SCENARIO EVOLUTION

Recent risk events have included an interest rate rise, extreme weather events and heightened geopolitical tensions. Scenarios, both deterministic and stochastic, have evolved to quickly capture these types of risks, although many found the timeframe too short to adjust or did not feel that these risks impacted them.

Some expressed concern that weather events were indeed extreme, but news stories in 2024 about increasing premiums for policies in U.S. states show that insurers with capital at risk are updating their models. One noted that *A lot of the things that seemed extremely unlikely are now closer to the realm of possibility in the minds of stakeholders.*

The regional bank asset-liability management (ALM) crisis due to increasing interest rates also changed the risk team's scenarios, although many said they already accounted for that particular event. Some said they were testing farther into the tail of the distribution, looking at behavioral variations and expanding their liquidity scenarios based on recent events.

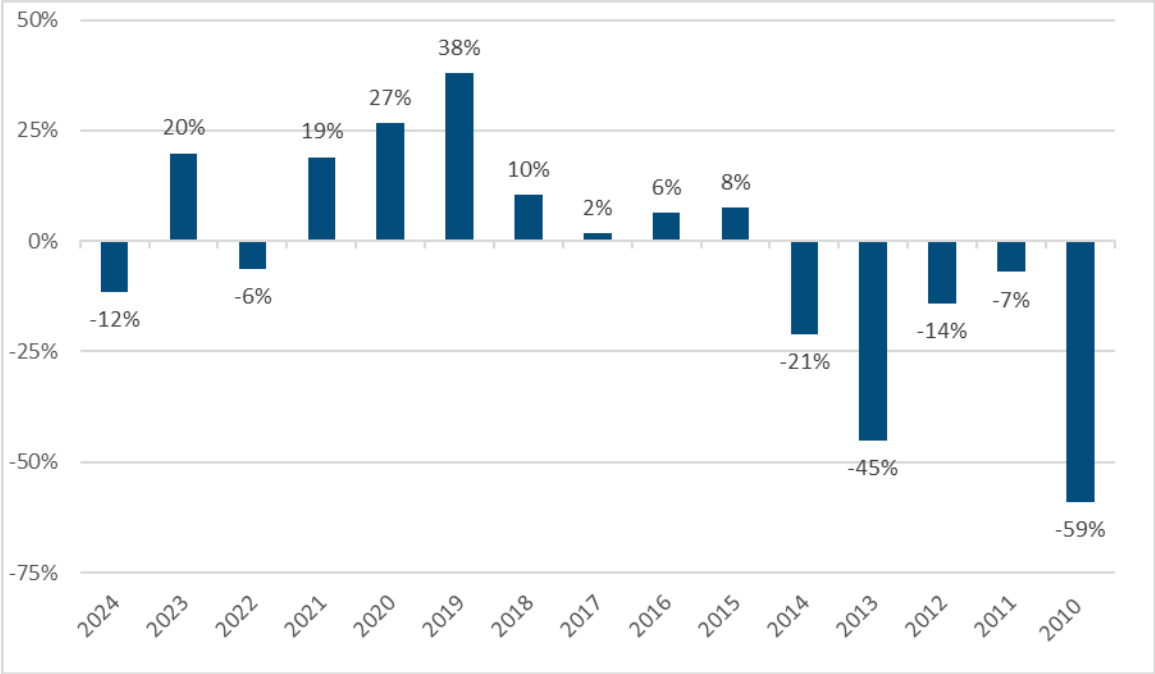
1.11 ECONOMIC EXPECTATIONS

Respondents were more upbeat about global economic expectations for 2024, with a net (Good plus Strong minus Poor) of 4%, up from -12%, as shown in figure 13.

Figure 13

COMBINED GOOD + STRONG - POOR ECONOMIC EXPECTATIONS

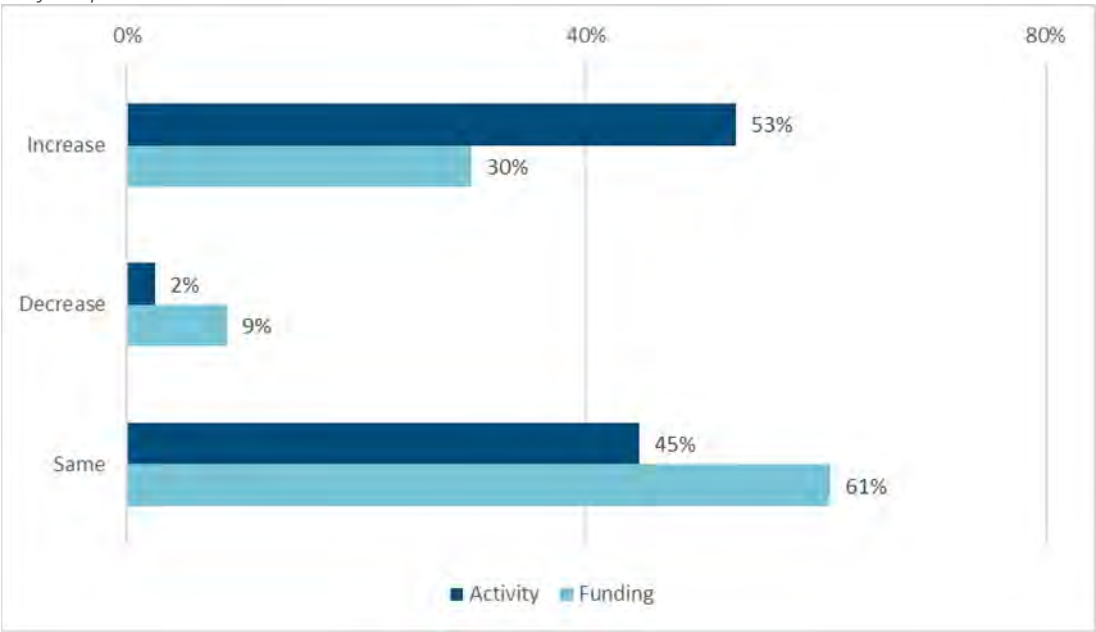
% of Responses



1.12 RISK ACTIVITIES AND FUNDING

Nearly half of respondents reported that activities related to ERM continued to grow in 2023 (but only 22% of respondents reported experiencing staff growth), with 53% expecting activity growth in 2024. As seen in figure 14, only 30% of respondents anticipate an increase in 2024 funding. After several years where the value of risk management was clearly demonstrated and recognized, the trend has improved in the current survey.

Figure 14
ANTICIPATED ERM LEVELS IN 2024
% of Responses to Given Question



1.13 SCENARIOS SUPPORTING THE DEMOGRAPHIC SHIFT RISK

Many risk managers report holding an actuarial credential so others can learn from their efforts building scenarios focused on demographic shifts. Topics considered include migration due to housing affordability, workplace paradigms, assimilation of migrants, mortality and fertility variations, and risk to the financial industry as populations age.

1.14 STRATEGIC OPPORTUNITIES

Nearly all (86%) risk managers reported that they have input (a seat at the table) during strategic opportunities and nearly half (47%, up from 39%) report having both input and a vote.

1.15 PERSONAL FINANCE RESILIENCY

While respondents are not investment professionals and this is not investment advice, risk managers are likely to have valuable perspectives about how to build financial resiliency at a personal level. Many have reduced debt, implemented diversification tactics that spread risk, and hold additional cash as an emergency fund or a short maturity treasury bond ladder. Diversification efforts included asset classes as well as using multiple banks.

1.16 OPPORTUNITIES AND BUBBLES

Strategic risk management involves looking at longer time horizons and seeking out opportunities. Respondents were asked which emerging opportunities, either priced to add value or provide diversification, they were monitoring. Comments noted artificial intelligence, various mitigation tools like reinsurance, and opportunities that were mispriced. One respondent noted that their organization reacted to events and was not proactive, and another noted that climate change is creating opportunities for those who identify where future climate migration would be expected to locate population.

Bubbles reflect mispricing and can often be managed. Respondents in this year's survey were concerned about housing, equities, consumer loans, crypto, green energy, alternative assets and water as aquifers run low.

1.17 UNKNOWN KNOWNS

Unknown knowns, where the analyst is ignorant of the probability distribution of a future event, despite possessing historical data (the results are not predictive of the future), have become a great challenge for today's risk managers. Responses improved from the prior survey, including more examples of how the risk was managed. Recent events led to concerns about policyholder behavior, interest rates and severe weather events. Other concerns included opioid impact, a possible recession and cyber events. One respondent said *None of our historical data is predictive.*

1.18 GREAT RESIGNATION

In the "pandemic era," the labor market has endured several shifts that created buzz words. The Great Resignation occurred in 2020 when employees preferred to work remotely or with greater work/life balance or to stay at home. As the world is well into its fourth year, the labor market continues to evolve with some firms requiring a return to the office. The job market for professionals is not as difficult as it was during the height of the pandemic. For the third time, the survey asked employees at insurance companies how staffing issues impacted their ERM team. The survey found that difficulties were less likely in categories asking about resignation/hiring and staff. Interactions between the stressed commercial real estate market and possibility of a recession or stagflation and extreme weather events makes this an interesting ongoing topic.

Challenges following the COVID-19 lockdowns for individuals and employers include concerns about maintaining fairness between new and existing employees, impact on office space, inter-generational value conflicts and remote work.

Section 2: Top Takeaways

While this report provides many additional nuggets of information to those who read it in its entirety, those who scan the Executive Summary will find the primary trends and conclusions. The following lists provide interesting tidbits intended to prompt you to read or scan additional sections of the report. Reviewers with different backgrounds and experience from the researcher may highlight different comments. For those interested, the entire dataset is reproduced in appendix B.

2.1 WHAT RISK MANAGERS ARE THINKING

- The *Climate change* risk is the first-ranked risk across both emerging risk questions and for combination risks and is second for current risk behind *Financial risk*. It is especially dominant as the top emerging risk.
- *Natural catastrophes: severe weather (except tropical storms)* is increasing across all questions, but especially multiple emerging risks and combinations as extreme weather events become a regular occurrence.
- The Geopolitical category maintained its top ranking for top five emerging risks and the Environmental category reached a new high for the second consecutive survey.
- Risk managers tend to segregate between those who define the strategic impact of risks through financial impact and disruption lenses. Their responses varied based on this focus in expected ways. Building a risk team with representatives from each may provide benefits through diversity of thought.

2.2 LEADING-EDGE ACTIONABLE PRACTICES

- Risk management teams continue to be asked to complete additional activities with the same or a slight increase of staff. Hiring and retention issues post-pandemic have lessened.
- Risk teams were involved with implementing additional scenarios as interest rates rose and extreme weather events occurred in 2023.
- Respondents reported stronger results when asked if ERM has a positive effect on their company or industry, as well as if ERM improves returns relative to risk. The nuances provided in the comments about these questions show the increasing level of practice maturity.

2.3 CONCLUSIONS

The year 2023 was an active year for risks and opportunities, with artificial intelligence, armed conflicts and extreme weather topics active throughout. Financial risks put a spotlight on those who had bet interest rates would not rise and those owning commercial properties. The U.S. Fed continues to fight inflation and the U.S. economy is strong relative to others globally. The *17th Emerging Risk Survey*, compiled in November 2023, provides a snapshot of risk concerns during this period. Risk teams continue to develop scenarios based on newly identified events and potential regime changes (the greatest number and length of comments discussed regimes we should be planning for). The risk team increasingly has a seat at the table with input prior to decisions being made. Risk managers shared their personal financial resilience approach, displaying well thought out strategies tied to conservatism and diversification. The risk managers were upbeat about their economic expectations for 2024 and about their hiring and retention prospects for the ERM team.

Risk managers are not expected to have perfect foresight. Their job is not to predict but to provide a range of possibilities for future outcomes, seeking out emerging risks and strategic opportunities. Comments shared by respondents provide an excellent means of sharing information for those who look beyond the charts of this report, and this is supported by including every question and response in appendix B.

Risks like climate change and deglobalization are challenging the stability necessary for long-term assumptions to be used when pricing risk. Risk managers are increasingly aware of this concern and the

direct and indirect impact as these risks form higher order interactions in complex systems. Modeling becomes much harder when conditions change quickly and regimes are changing. Current high levels of debt, geopolitical uncertainty and a changing climate make scenario planning beyond interest rate changes essential. Success will come to those who anticipate surprises and scan the changing environment for useful information.

Section 3: Background

3.1 SURVEY SPONSORS AND PAST EDITIONS

This research project was sponsored by the Casualty Actuarial Society, Society of Actuaries Research Institute, Joint Risk Management Section (JRMS) of the CIA, CAS and SOA, SOA Financial Reporting and SOA Reinsurance Sections.[2] Thanks to all for their support. A survey was developed and made available through websites and an email link to members of the JRMS, membership distribution lists of several other SOA sections, the CAS, social media such as X (formerly Twitter), and LinkedIn groups related to risk management. A total of 133 responses were received. This represents a material percentage relative to the number distributed (more than 1,200 to the JRMS) in this, the 17th survey in the research series.

Emerging risks can be something new, not seen before, like the Haiti earthquake in 2010 (later research showed such events had happened in the past). They can also be evolving risks, like climate change, where a risk event tomorrow may be similar to past events, but historical data are ineffective in modeling it due to changes in frequency and/or severity assumptions.

Many questions generate consistent trends that suggest stability, but the results continue to evolve and cycle with the risks. In recent years, concerns over artificial intelligence and climate change increased and, of course, the COVID-19 pandemic and several conflicts were great concerns. The previous surveys were distributed in April 2008, November 2008, December 2009, October 2010, October 2011, October 2012, October 2013, October 2014, November 2015, November 2016, November 2017, November 2018, November 2019, November 2020, November 2021 and November 2022. A flash survey was completed in May 2023 with a shortened set of questions. The current-year survey was conducted in November 2023, just after the start of the conflict in Gaza and closed just after the U.S. Thanksgiving holiday. Articles, podcasts and previous research reports can be found at:

www.soa.org/resources/research-reports/2015/research-emerging-risks-survey-reports/

April 2008—First survey

- Max J. Rudolph, International Survey of Emerging Risks, International News (SOA), August 2008, pages 18–21: http://soa.org/library/newsletters/international-section-news/2008/august/isn-2008-iss45.pdf
- Article (reprint): pages 17–20 of *Risk Management*, March 2009 issue: http://soa.org/library/newsletters/risk-management-newsletter/2009/march/jrm-2009-iss15.pdf

November 2008—Second survey

- Research report: www.soa.org/research-reports/2009/research-2009-emerging-risks-survey/

December 2009—Third survey

- Research report: www.soa.org/research-reports/2010/research-2009-emerging-risks-survey/
- Article: pages 12–14 of *The Actuary*, August/September 2010 issue: www.soa.org/library/newsletters/the-actuary-magazine/2010/august/act-2010-vol7-iss4.pdf

October 2010—Fourth survey

- Research report: www.soa.org/research-reports/2011/research-2010-emerging-risks-survey/

[2] This section has been updated with new information, but is otherwise consistent with prior surveys.

- Article: pages 6–9 of *Risk Management*, August 2011 issue: www.soa.org/library/newsletters/risk-management-newsletter/2011/august/jrm-2011-iss22-rudolph.pdf

October 2011—Fifth survey

- Research report: www.soa.org/research-reports/2012/research-2011-emerging-risks-survey/

October 2012—Sixth survey

- Research report: www.soa.org/research-reports/2013/research-2012-emerging-risks-survey/
- Risky Business Bulletin, June 2013: https://www.soa.org/globalassets/assets/files/newsroom/erb-2013-06.pdf
- Article: pages 12–17 of *Risk Management*, August 2013 issue: https://soa.org/Library/Newsletters/Risk-Management-Newsletter/2013/august/jrm-2013-iss27.pdf

October 2013—Seventh survey

- Research report and Key Findings: www.soa.org/research-reports/2014/2013-emerging-risks-survey/
- Article: pages 34–35 of *Risk Management*, August 2014 issue: www.soa.org/globalassets/assets/library/newsletters/risk-management-newsletter/2014/august/jrm-2014-iss30.pdf

October 2014—Eighth survey

- Research report: www.soa.org/research-reports/2015/2014-emerging-risks-survey/
- Article: pages 5–6 of *Risk Management*, April 2016 issue: www.soa.org/globalassets/assets/library/newsletters/risk-management-newsletter/2016/april/rm-2016-iss-35.pdf

November 2015—Ninth survey

- Research report: www.soa.org/research-reports/2016/2015-emerging-risks-survey/

November 2016—10th survey

- Research report: www.soa.org/research-reports/2017/10th-emerging-risks-survey/
- SOA News Canada blog, *Lessons from the* Masters, September 2017: www.soa.org/Files/Research/Projects/erm-lessons-master.pdf
- Summary of findings: www.soa.org/Files/Research/Projects/10th-emerging-risks-survey-summary.pdf

November 2017—11th survey

- Research report, Key Findings report and Research Insights podcast: www.soa.org/resources/research-reports/2018/11th-emerging-risk-survey/
- SOA News Canada blog, February 2019

November 2018—12th survey

- Research report and Key Findings: www.soa.org/resources/research-reports/2019/12th-emerging-risks-survey/

November 2019—13th survey

- Research report and Key Findings: https://www.soa.org/resources/research-reports/2020/13th-emerging-risk-survey/

November 2020—14th survey

- Research report, Key Findings, Video and Data Visualizations: https://www.soa.org/resources/research-reports/2021/14th-annual-survey/

November 2021—15th survey

- Research report, Key Findings, Video, Podcast and Data Visualizations, Guide for Use: https://www.soa.org/resources/research-reports/2022/15th-survey-emerging-risks/

November 2022—16th survey

- Key Findings, Podcast: https://www.soa.org/resources/research-reports/2023/16th-survey-emerging-risks/

November 2023 – 17th survey

- Key Findings, Podcast: https://www.soa.org/resources/research-reports/2024/17th-survey-emerging-risks/

The 23 emerging risks used in this survey have slightly evolved and the definitions developed more fully with each iteration. Each risk is described in detail in appendix A. The name of one risk was updated to be consistent with others in the survey. The definitions for over half the risks differ slightly from previous years. The current survey questions have also evolved over the years, with base questions stable and open-ended questions replaced once responses had stabilized.

Each risk has been categorized as either Economic (five risks), Environmental (five), Geopolitical (seven), Societal (four) or Technological (two). The current survey continues this evolution, adding and subtracting questions, while leaving the core of the survey intact to allow trends to develop. Responses to open-ended questions have been minimally edited.

Note that individual results have generally been rounded to the nearest 1%, so stated totals may not add up to exactly 100% (charts reflect the actual splits).

Research reports do not create themselves in isolation, and the researcher thanks the Project Oversight Group and SOA staff for their help designing and implementing the questionnaire, along with gleaning information from the results. Of course, all errors and omissions remain the responsibility of the researcher.

3.2 RESEARCHER

The researcher for this project is Max Rudolph. Additional related articles and presentations can be found at his LinkedIn profile. His contact information is:

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Section 4: Results

The *17th Emerging Risk Survey* includes sections covering emerging risks, ERM and current topics. Highlights of each section are presented here, with complete results found in appendix B. The survey is anonymous and requests individual rather than formal company responses. It uses an anonymous electronic survey format that encourages individual opinions. Many multiple-choice-format questions are followed up with questions asking "why" or "provide examples," allowing expansion of the concept, comparison from prior surveys, and additional learning for readers. In some cases, the written responses have been sorted based on the answer to the corresponding multiple-choice question. Readers are encouraged to review all comments, compiled in appendix B, and compare their own conclusions with those of the researcher.

The analysis includes partially completed surveys, with percentages based on the number completing each question. Answers of *Not sure* and *Not applicable* were typically excluded from percentages, except when these responses were considered meaningful. The responses were thought-provoking for the researcher, as occurs each year, and respondents are thanked for their efforts.

4.1 WHAT CHANGES IN RESPONSES MEAN

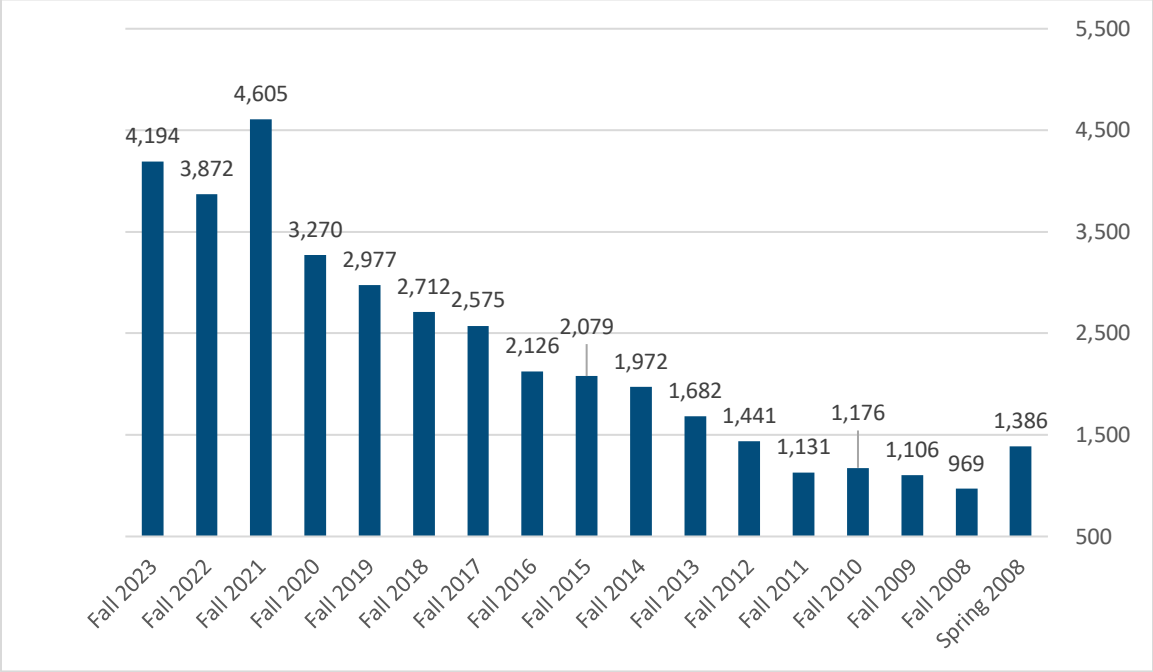
Note that each survey is taken at a different point in history, so the same risk managers do not necessarily respond. This year, 70% of respondents reported that they also participated in the past and 54% have been a risk manager for at least 10 years. Repeat respondents, especially those with great familiarity of the topic, might be more likely to change their responses based on new or recent experiences. While the actual results are provided, the survey should be interpreted based on directional and relative changes between iterations. Increases and decreases in response rates reflect the respondents' relative perception of the risk, not actual changes in assessment of the risk itself. A risk may not have changed at all, but another risk may be perceived as higher or lower, and that affects the relative importance of other risks. For example, in 2022, the war in Ukraine generated discontinuities in the survey.

It can be confusing to talk about percentage changes when survey results are reported in percentages, so changes are always reported as absolute percentage-point changes. For example, if the previous survey reported a 10% response rate and this year's response rate is 15%, this is a 5% increase (not 50%).

4.2 HISTORY

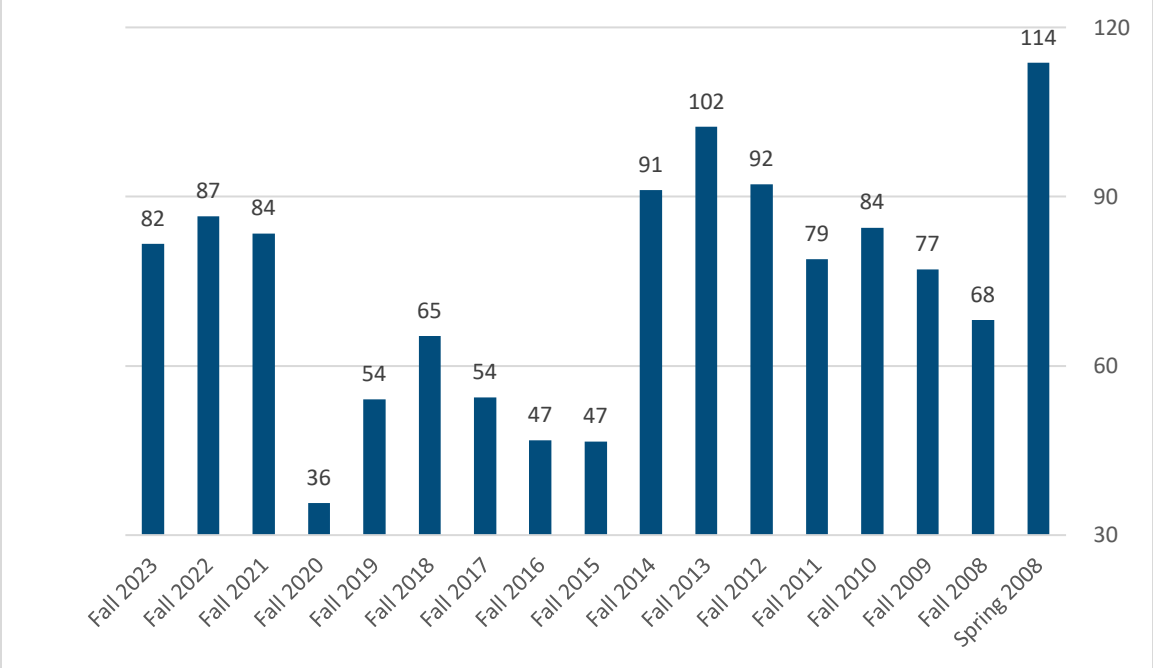
As in previous reports, the survey results show that current values of the Standard & Poor's 500 (S&P 500) equity index (figure 15), the price of a barrel of oil (figure 16), and the exchange rate of the Euro relative to the U.S. dollar (figure 17) seem to anchor perceptions of risk. Results have evolved over time, often led by recent news topics. For example, the 2022 value of the S&P 500 fell after ten consecutive years of increases and the dollar recorded its strongest result. As described below, the first survey was conducted in April 2008 (spring) and all subsequent surveys have been in the fall.

Figure 15
S&P 500, 2008–2023



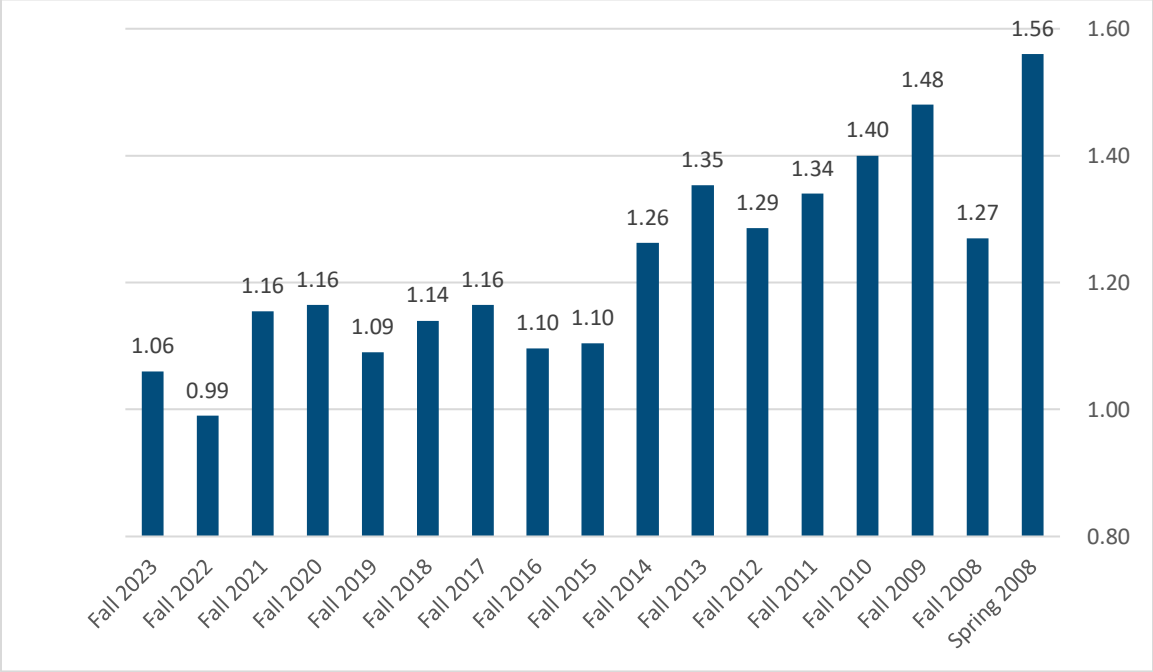
Source: S&P Dow Jones Indices LLC, S&P 500 [SP500], retrieved from FRED, Federal Reserve Bank of St. Louis, https://fred.stlouisfed.org/series/SP500, April 5, 2024.

Figure 16
PRICE OF OIL, 2008–2023
US$ per barrel



Source: U.S. Energy Information Administration, Cushing, OK WTI Spot Price FOB, www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D

Figure 17
EXCHANGE RATE, U.S. DOLLARS PER EURO, 2008–2023



Source: Board of Governors of the Federal Reserve System, Foreign Exchange Rates (H.10): Historical Rates for the EU Euro, www.federalreserve.gov/releases/h10/Hist/dat00_eu.htm

Recency bias influences the results of any survey. The year 2023 left people ready to move on from the pandemic, both worried and excited about artificial intelligence and with geopolitical tensions high due to ongoing conflicts and a series of elections. Convective storms, including tornados and hail, impacted the United States South and Midwest. Since the survey closed, heatwaves have struck Europe and South America, global temperatures continue to set record highs as an el Nino formed, and a series of atmospheric rivers have pummeled the Pacific coast of North America.

The following information provides context to previous surveys. Note that these responses are to a question asking for respondents' top five emerging risks. For example, in Survey 1, listed immediately below, *Oil shock* was listed by 57% of respondents as one of their five. (Ed. Note: Some risk names have evolved over time, e.g., *Oil shock* is now *Energy price shock*.)

Survey 1 (April 2008)

1. *Oil shock* (57% of respondents)
2T. *Climate change* (40%)
2T. *Asset price collapse* (40%)
3. *Currency trend* (38%)

With oil at historic highs, it was the predominant emerging risk in the initial survey. The second survey was completed in early November 2008, shortly after troubles surfaced at Lehman Brothers, AIG and the mortgage giants, Fannie Mae and Freddie Mac. By the end of October 2008, relative to the previous survey, the S&P 500 had dropped 30%, the price of a barrel of oil had decreased 40%, and the U.S. dollar had strengthened 23%. The top four emerging risks from this second iteration of the survey were as follows:

Survey 2 (November 2008)

1. *Asset price collapse* (64%)
2. *Currency trend* (48%)
3. *Oil price shock* (39%)
4. *Regional instability* (34%)

Systemic risk was perceived to be very high at the time, with asset values in free fall. Oil prices had fallen, U.S. currency was considered a safe harbor, and Barack Obama had just been elected to his first term as U.S. president.

The third survey was in December 2009, by which time the S&P 500 had increased 14%, the price of a barrel of oil was up 13%, and the U.S. dollar had weakened by 17%. The economy had begun to recover. For the first time, the top four emerging risks included *Chinese economic hard landing*.

Survey 3 (December 2009)

1. *Currency trend* (66%)
2. *Asset price collapse* (49%)
3. *Oil price shock* (45%)
4. *Chinese economic hard landing* (33%)

The indicators had not changed materially by late 2010 as the European debt crisis ramped up. The stock market was up 6%, the price of oil was up 10%, and the dollar had further strengthened by 6%. Most of the top five results continued to come from the Economic category. *International terrorism* and *Failed and failing states* made their first appearance among the top five.

Survey 4 (October 2010)

1. *Currency trend* (49%)
2. *International terrorism* (43%)
3. *Chinese economic hard landing* (41%)
4. *Oil price shock* (40%)
5. *Failed and failing states* (38%)

In late 2011, the U.S. stock market was down 4% overall and volatile during the year, the price of oil was down 7%, and the dollar had further strengthened against the euro by 4%. Several major events occurred, including the Japanese earthquake/tsunami and the Arab Spring.

Some of the risks were updated for the 2011 survey. One risk was moved to a different category, two were combined and one was added. (These changes, along with others since then, are described in appendix A. Comparisons were adjusted for trending purposes.) Most of the top six results continued to come from the Economic category. A new risk, *Financial volatility*, resonated with risk managers, as they made it their top selection. This was the first time that *Cybersecurity/interconnectedness of infrastructure* appeared in the top five and the last time (to date) that *Oil price shock* (now *Energy price shock*) has appeared.

Survey 5 (October 2011)

1. *Financial volatility* (68%)
2. *Failed and failing states* (42%)
3. *Cybersecurity/interconnectedness of infrastructure* (38%)
4. *Chinese economic hard landing* (32%)

5T. *Oil price shock* (32%)

5T. *Regional instability* (32%)

In 2012, equity markets surpassed the levels of spring 2008 for the first time (up 27% since the previous survey), while oil prices rebounded (17%) and the dollar strengthened (4%).

Survey 6 (October 2012)

1. *Financial volatility* (62%)
2. *Regional instability* (42%)
3. *Cybersecurity/interconnectedness of infrastructure* (40%)
4. *Failed and failing states* (33%)
5. *Chinese economic hard landing* (31%)

Equity markets (17%) and oil prices (11%) continued their upward trend in 2013, while the U.S. dollar reversed course and weakened (5%) versus the euro. Natural disasters were prominent, including Hurricane Sandy in the U.S. and Typhoon Haiyan in Asia.

Survey 7 (October 2013)

1. *Financial volatility* (59%)
2. *Cybersecurity/interconnectedness of infrastructure* (47%)
3. *Asset price collapse* (30%)
4. *Demographic shift* (30%)
5. *Failed and failing states* (29%)
6. *Regional instability* (29%)

By the fall of 2014, the dollar had started to strengthen against the euro (7%), the stock market was up (17%), and the price of oil had started to go down (12%). Much stronger moves in oil and the dollar occurred after the survey closed, leaving the geopolitical crisis in Eurasia as a top concern. An Ebola outbreak in Africa raised concerns of a pandemic.

Survey 8 (October 2014)

1. *Cybersecurity/interconnectedness of infrastructure* (58%)
2. *Financial volatility* (44%)
3. *International terrorism* (41%)
4. *Regional instability* (37%)
5. *Asset price collapse* (31%)

Fall 2015 saw the dollar strengthen relative to the euro (up 14%), which also drove the price of oil down (by 49%), since it is primarily transacted in U.S. dollars. The U.S. stock market increased by 5%, and cyber risk seemed to be constantly in the news.

Survey 9 (November 2015)

1. *Cybersecurity/interconnectedness of infrastructure* (65%)
2. *Financial volatility* (45%)
3. *Terrorism* (37%)
4. *Asset price collapse* (31%)
5. *Regional instability* (26%)

The fall 2016 survey occurred during a period of transition, with the survey completed immediately following the election of Donald Trump as U.S. president, and the metrics were stable. The top three risks remained the same. *Retrenchment from globalization* made the largest move, as voters around the world

considered populist candidates and causes. The top catastrophic events in 2016 were earthquakes, wildfires and flooding due to tropical storms (e.g., Hurricane Matthew) and thunderstorms.[3]

Survey 10 (November 2016)

1. *Cyber/interconnectedness of infrastructure* (53%)
2. *Financial volatility* (44%)
3. *Terrorism* (39%)
4. *Technology* (34%)
5. *Retrenchment from globalization* (30%)

The fall 2017 survey continued a period of calm following the global financial crisis nearly 10 years prior, while geopolitical tensions continued to be high. Natural disasters, some driven by record warming, included Hurricanes Harvey, Irma and Maria, along with atmospheric rivers on the West Coast of the U.S. and wildfires. Earthquakes in Mexico, Cyclone Debbie in Australia, European temperature extremes and Asian flooding all contributed to worldwide risk events.

Survey 11 (November 2017)

1. *Cyber/interconnectedness of infrastructure* (53%)
2. *Terrorism* (41%)
3. *Technology* (38%)
4. *Regional instability* (31%)
5. *Asset price collapse* (30%)

The personal impact of climate change was highlighted in 2018 by wildfires, flooding, heat waves and storm concentrations felt by Hurricane Michael, heavy winter storms and nor'easters. Geopolitical tensions remained high, although events in North Korea and Syria received less attention in the press.

Survey 12 (November 2018)

1. *Cyber/network infrastructure* (56%)
2. *Climate change* (49%)
3. *Technology* (40%)
4. *Demographic shift* (32%)
5. *Financial volatility* (27%)

Climate events were recognized around the world as many people seemed to better understand the ramifications of a warming planet as it impacted their daily lives. The geopolitical situation remained tense.

Survey 13 (November 2019)

1. *Climate change* (54%)
2. *Cyber/networks* (51%)
3. *Disruptive technology* (35%)
4. *Demographic shift* (33%)
5. *Financial volatility* (29%)

[3] Swiss Re, "Preliminary Sigma Estimates for 2017: Global Insured Losses of USD 136 Billion Are Third Highest on Sigma Records," news release, December 20, 2017, www.swissre.com/media/news-releases/2017/nr20171220_sigma_estimates.html.

The COVID-19 pandemic emerged into a worldwide event as global supply chain and geopolitical tensions were interwoven with the health impacts. Wildfires in Australia and the western United States kept climate change in the discussion, and Black Lives Matter protests were held globally.

Survey 14 (November 2020)

1. *Climate change* (50%)
2. *Cyber/networks* (47%)
3. *Pandemics/infectious diseases* (45%)
4. *Disruptive technology* (40%)
5. *Financial volatility* (31%)

The COVID-19 pandemic evolved with new variants in 2021. Vaccines worked, especially against hospitalization and death, for those with access who chose to receive it. A polar vortex reached to the Mexican border, record heat waves hit France and western North America and major flooding occurred in many places, including India, China, Afghanistan and Europe. Drought and wildfire events occurred around the Mediterranean and Colorado suffered large economic impact from a wildfire.

Survey 15 (November 2021)

1. *Climate change* (58%)
2. *Cyber/networks* (52%)
3. *Pandemics/infectious diseases* (38%)
4. *Disruptive technology* (32%)
5. *Financial volatility* (30%)

Since the survey closed in late November, weather events continued, with tornados and a derecho in the U.S., multiple cyclones in southeastern Africa, and flooding in South Africa, Asia and South America.

Survey 16 (November 2022)

1. *Climate change* (57%)
2. *Wars (including civil wars)* (43%)
3. *Cyber/networks* (42%)
4. *Financial volatility* (39%)
5. *Demographic shift* (29%)

The year 2023 set many global temperature records, saw concerns about artificial intelligence, and tensions rise and conflict erupt in Gaza in the month prior to the survey. Extreme weather occurred everywhere, highlighted by convective storms in Europe, flooding in New Zealand and wildfires in Hawaii.

Survey 17 (November 2023)

1. *Climate change* (61%)
2. *Wars (including civil wars)* (53%)
3. *Disruptive technology* (39%)
4. *Demographic shift* (36%)
5. *Cyber/networks* (35%)

4.3 INTRODUCTORY QUESTIONS

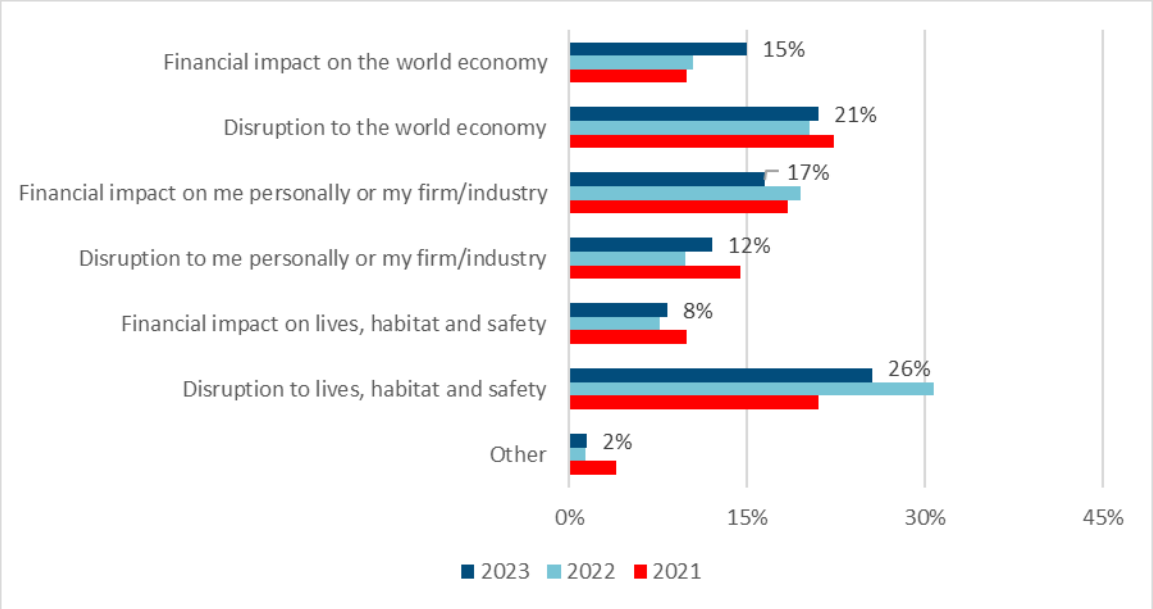
Respondents have varying definitions of the greatest “strategic impact related to risk.” Possible responses follow combinations of three groups (world economy; me personally or my firm/industry; lives, habitat and

safety) and two types of impact (financial, disruption). Figure 18 shows that, in the current survey, disruption to lives, habitat and safety, down 5% to 26% and the top overall response, was offset by a similar gain of 5% (to 15%) for financial impact on the world economy.

Figure 18

GREATEST STRATEGIC IMPACT

% of Responses



Respondents also were asked to consider 23 risks. Complete definitions of the risks are provided in appendix A, but the risk names are also listed here for the reader's convenience.

Economic Risks

1. *Energy price shock*
2. *Currency shock*
3. *Emergent nation destabilization*
4. *Asset price shock*
5. *Financial volatility*

Environmental Risks

6. *Climate change*
7. *Loss of freshwater services*
8. *Natural catastrophe: tropical storms*
9. *Natural catastrophe: earthquakes*
10. *Natural catastrophe: severe weather*

Geopolitical Risks

11. *Terrorism*
12. *Weapons of mass destruction*
13. *Wars (including civil wars)*
14. *Failed and failing states*
15. *Transnational crime and corruption*
16. *Globalization shift*
17. *Regional instability*

Societal Risks

18. *Pandemics/infectious diseases*
19. *Chronic diseases/medical delivery*
20. *Demographic shift*
21. *Liability regimes/regulatory framework*

Technological Risks

22. *Cyber/networks*
23. *Disruptive technology*

Changes to risk names and definitions during the survey's history are documented in appendix A. The 23 emerging risks used in this iteration of the survey were reviewed. Names were changed for one risk (from *Asset price collapse* to *Asset price shock*), and 14 risks had their definitions updated or clarified. The definitional changes, described in more detail in appendix A, included adding de-dollarization to *Currency shock;* referring to instability and extremes (*Asset price shock*); specifically referring to ocean currents, pollution and greenhouse gases (*Climate change*); referencing heatwaves (*Natural catastrophe: severe weather*); referencing misinformation (*Globalization shift*); referring to the fertility rate (Demographic shift); and referencing systemic liabilities (*Liability regimes/regulatory framework*). Each reflects updated thinking about the risk. Some were recommended in the previous survey.

4.4 CURRENT RISK

Each year, a benchmarking question is asked about the top current risk. Before the respondents answer this question, they are reminded of recency cognitive bias, an anchoring effect identified in prior surveys. In the field of behavioral finance, it is thought that recognizing our shortcomings will help us to overcome them.

The distribution of results by category follows, along with prior-year results. The 2023 survey was impacted by the conflict between Hamas and Israel in Gaza, the Ukraine war, extreme weather events and record high global temperatures. The cognitive impact of the pandemic seems to have reverted back to levels seen in 2019.[4]

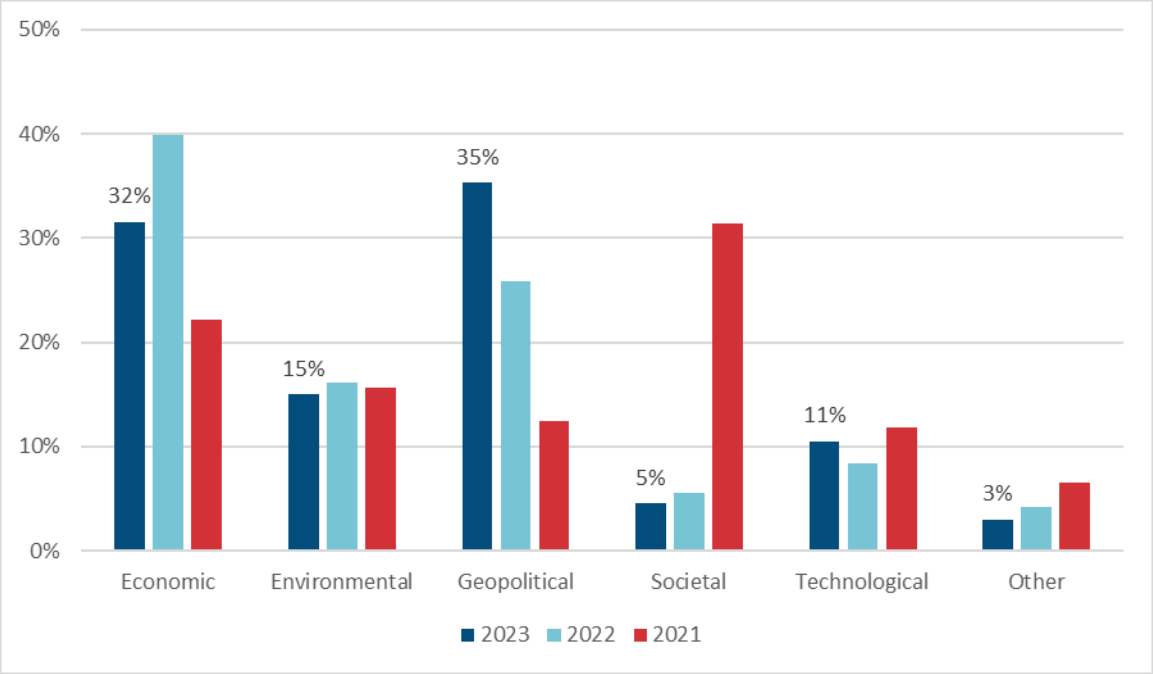
As shown in figure 19, the Geopolitical category had the most responses with 35% (up 9%), offset by a drop of 9% (to 32%) for the Economic category.[5]

[4] All tables include the most recent results, starting with the current survey and working backward, as shown here.
[5] Throughout this report, a percentage-point change means an absolute increase or decrease (e.g., a two-percentage-point increase from 22% is 24%) and does not reflect a percent change (e.g., a 2% increase from 22% is 22.4%).

Figure 19

CURRENT RISK WITH GREATEST IMPACT

% of Responses in Given Year



From an individual risk perspective, *Wars (including civil wars)* jumped from 13% to 21% to be the leading response for this question. *Energy price shock* decreased from 8% in the previous survey to 2% of respondents selecting it as having the greatest current impact, following a 2022 spike.

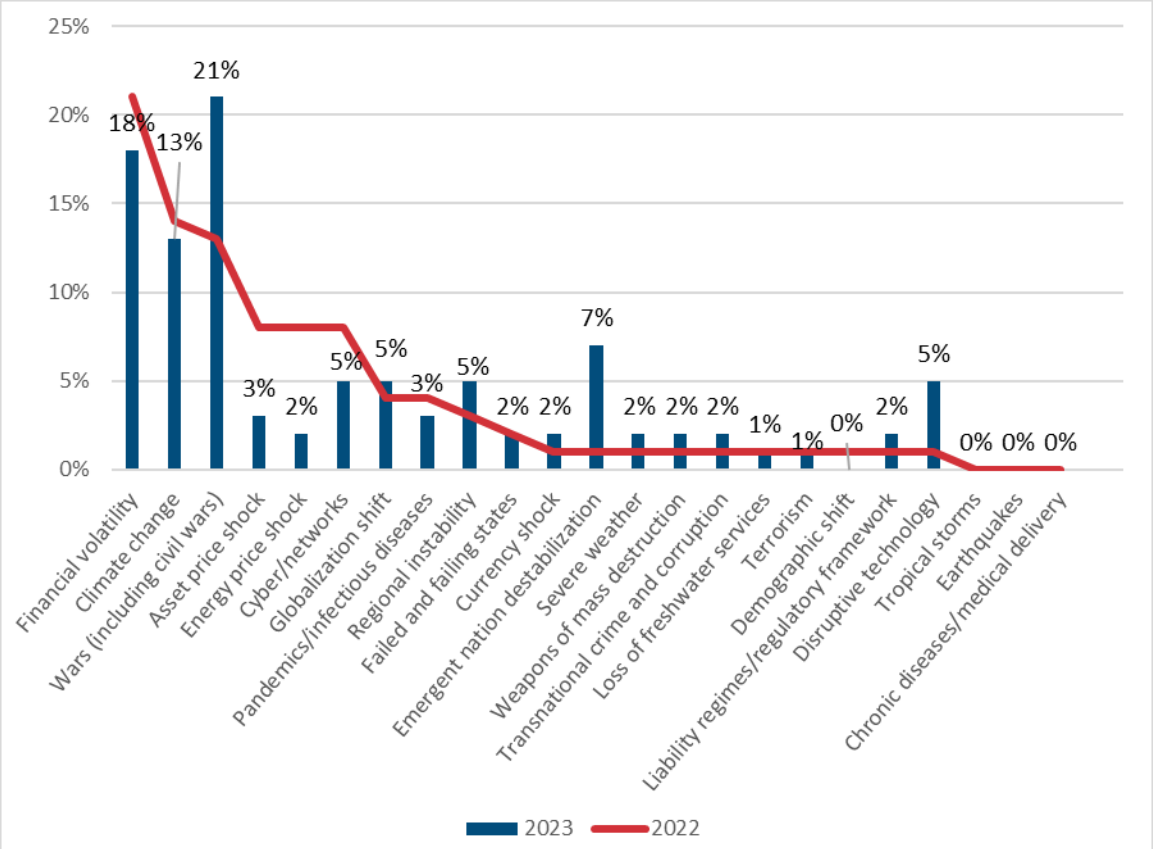
All but four risks were chosen as the top current risk by at least one respondent. *Natural catastrophe: tropical storms*, *Natural catastrophe: earthquakes*, *Chronic diseases/medical delivery* and *Demographic shift* were not chosen.

Figure 20 shows how current risks can change between surveys. Data labels reflect 2023 results. Results for top current risk often reflect recency bias, but previously popular risks that have reduced results may be temporary, reflecting a contrarian indicator. This year's survey saw *Disruptive technology* spike after low response rates in the last several surveys after ChatGPT and other artificial intelligence models were introduced broadly early in 2023.

Figure 20

TOP CURRENT RISK, YEAR OVER YEAR

% of Responses in Given Year



The top choice differentiated itself from the other options. These were the top five current risks chosen, including ties, with *Emergent nation destabilization* and *Disruptive technologies* new to this list:

Table 2

TOP RANKED CURRENT RISKS

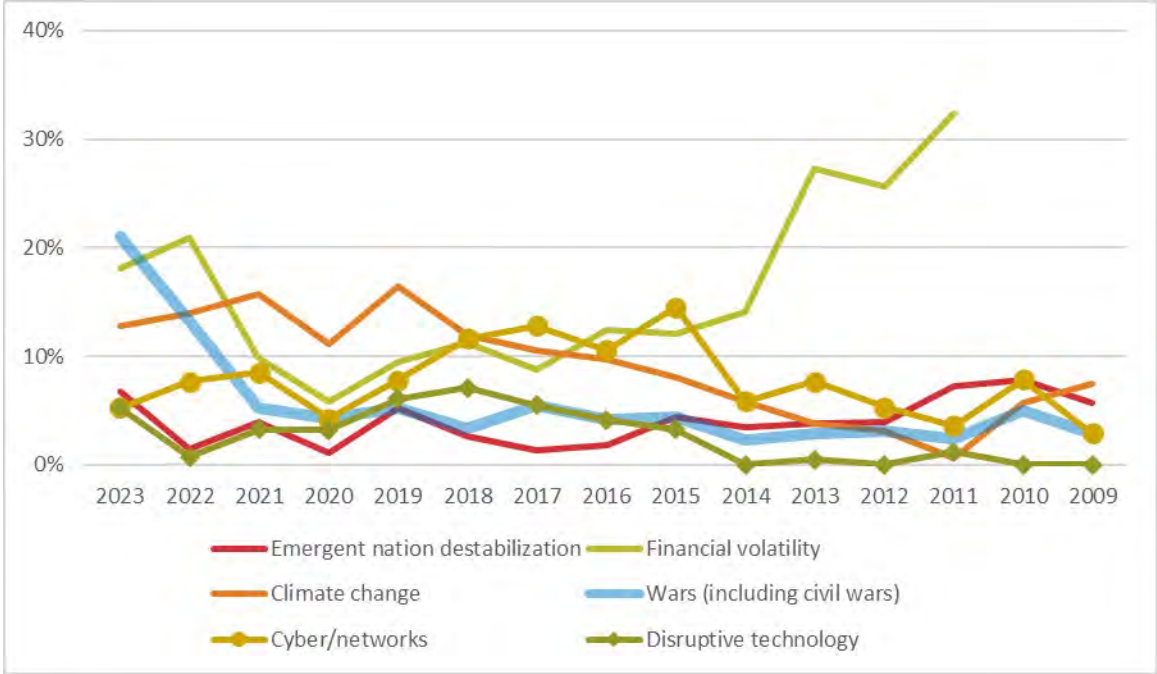
1	*Wars (including civil wars)*	21%
2	*Financial volatility*	18%
3	*Climate change*	13%
4	*Emergent nation destabilization*	7%
5T	*Cyber/networks*	5%
5T	*Disruptive technologies*	5%

When looking at trends, it is interesting to see how the top five current risks have performed across each survey iteration. As seen in figure 21, *Financial volatility* fell (along with other economic risks) as time increased since the great financial crisis but has now rebounded. *Wars (including civil wars)* had been stable before spiking in 2022 and is now the top response. *Emergent nation destabilization* and *Disruptive technology* each increased from the prior survey. (Ed. Note: *Financial volatility* was added in 2011)

Figure 21

TOP CURRENT RISK, HISTORICAL RESULTS FOR TOP FIVE RESPONSES

% of Responses in Given Year



4.5 SECTION A: EMERGING RISKS

Questions about emerging risks are asked from several perspectives in this survey: top five emerging risks, top emerging risk and risk combinations.

4.5.1 TOP FIVE EMERGING RISKS: ENVIRONMENTAL AND GEOPOLITICAL RISKS INCREASE

After choosing which risk has the greatest current impact, respondents chose up to five emerging risks that "you feel will have the greatest impact over the next few years." Respondents select a time horizon of their choosing. The data is compared across surveys and considers recent events as part of the analysis.

Each survey comes at a unique time in history. Environmental and geopolitical concerns overwhelmed societal (as the pandemic risk mean reverted) and economic issues. Climate change retained the top position with 61% of respondents choosing it in their top five emerging risks. Prior to viewing the results, the researcher has a view of what to expect based on recency bias. The pullback for *Pandemics/infectious diseases* and increase for *Wars (including civil wars)* were not surprising, but other risks that were in the news did not see the expected gains. These included *Natural catastrophe: earthquakes*, which given the major Turkey/Syria event early in 2023 seemed likely to increase.

While 86% of respondents chose a full complement of five emerging risks, not everyone did. The average was 4.83 selected per respondent. Percentages reported for this survey for individual risks are based on the number of respondents who answered the specific survey question so sum greater than 100%, in this

case, 483% (for comparison to other results, this question is later recalculated as a percentage of total responses so individual risks total 100%).

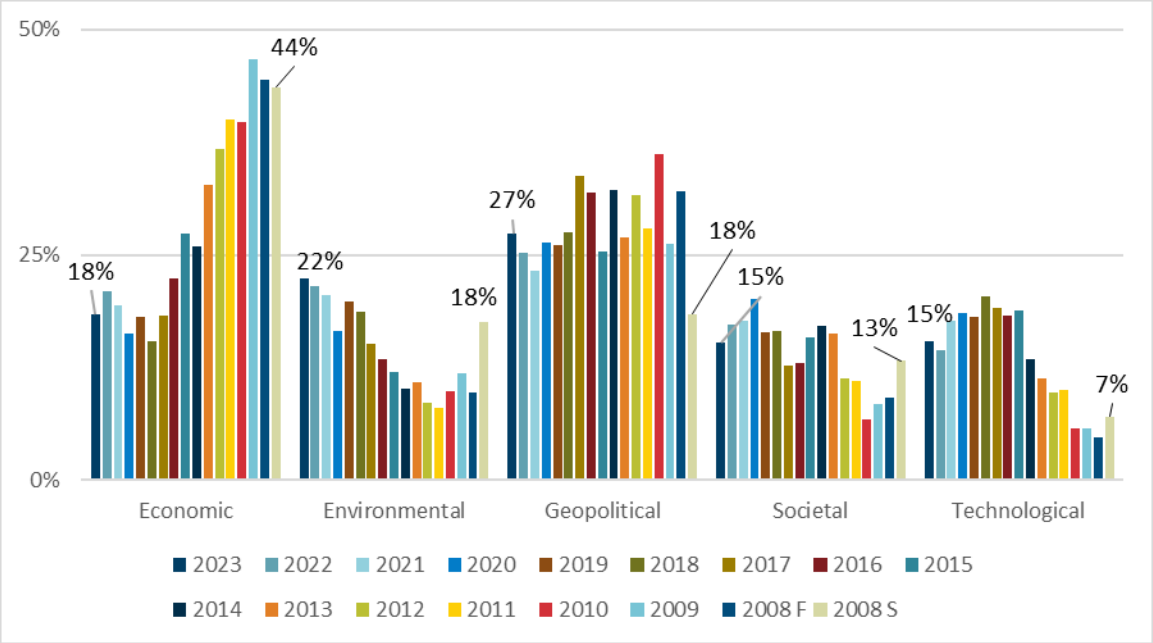
Geopolitical maintained its lead (27% of the total selections came from this category), with the Environmental category (22%) in second place, followed by the Economic category (18%, down from 21%). The Technological and Societal categories complete the rankings, each at 15%. The results distributed by category (using percentages of total responses) are shown below.

As figure 22 shows, each category has its own story across the history of the survey. A continued recovery by Economic risks continues to reflect heightened concerns.

Figure 22

EMERGING RISKS, BY CATEGORY (UP TO FIVE RISKS CHOSEN PER SURVEY)

% of Total Responses in Given Year



The reader will note that some graphs show 2008 S and 2008 F. In the survey's first year, two iterations were completed, with versions in both spring and fall. *Financial volatility* was added as a risk in 2011, maintaining 23 risks by combining *Pandemics* and *Infectious diseases* into a single risk. Since then, the survey has been completed each fall with the same set of risks (although risk names and definitions have evolved).

In 2022, there was material movement in a few individual risks (eight up and eight down). Risks up at least 3% included *Emergent nation destabilization* (20%, up from 9% last year), *Climate change* (61%, up from 57%), *Natural catastrophe: severe weather* (23%, up from 14%), *Terrorism* (14%, up from 9%), *Wars (including civil wars)* (53%, up from 43% and 24% in the last two surveys), *Regional instability* (23%, up from 19%), *Demographic shift* (36%, up from 29% and 23% previously) and *Disruptive technology* (39%, up from 26%). Risks down at least 3% included most of the Economic risks, *Energy price shock (*13%, down from 25%), *Asset price shock* (15%, down from 20%), *Financial volatility* (33%, down from 39%), *Loss of freshwater services* (11%, down from 18%), *Weapons of mass destruction* (6%, down from 9%), *Pandemics/infectious diseases* (17%, down from a peak of 45% in 2020) and *Cyber/networks* (35%, down from 42% and 52% previously).

New highs were posted for *Climate change*, *Natural catastrophe: severe weather*, *Wars (including civil wars)* and *Demographic shift*. New lows were achieved by *Asset price shock*, *Failed and failing states*, *Liability regimes/regulatory framework and Cyber/networks*.

The top five specific responses were spread across four of the five categories. Multiple responses—up to five—were encouraged. The percentages shown here use the number of respondents in the divisor, so totals are much greater than 100%. The top five total 225%, slightly less concentrated than last year's 209%.

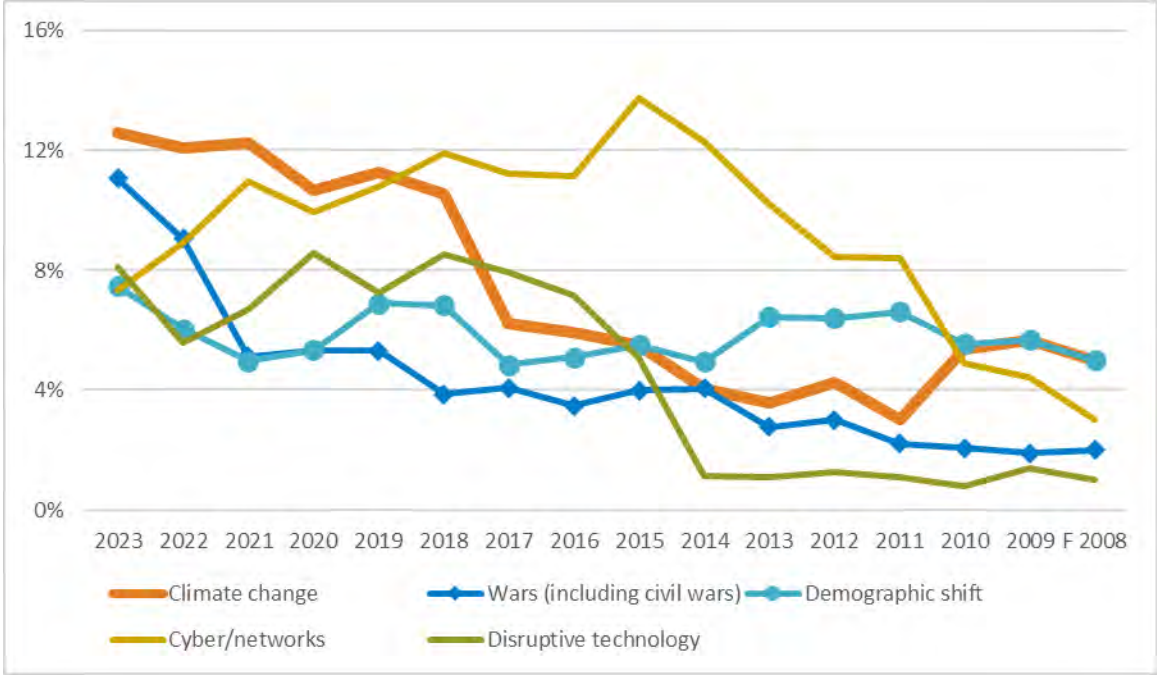
Table 3
TOP RANKED EMERGING RISKS (5)

1	*Climate change*	61%
2	*Wars (including civil wars)*	53%
3	*Disruptive technology*	39%
4	*Demographic shift*	36%
5	*Cyber/networks*	35%

Calculating the mean and standard deviation covering the history of each risk, then comparing the ratio of standard deviation to mean, results in a broad range (see appendix B, section A). *Currency shock*, with a range from 1% to 14%, has the largest ratio at 0.85 (next highest is *Energy price shock* at 0.75). The most stable risk is *Demographic shift*, with a range of 5% to 7% and ratio of 0.13 (next lowest is *Loss of freshwater services* at 0.28).

The trends over the past decade for the top five risks, shown in figure 23, are interesting to interpret. All but one of the five rose in 2023. *Climate change* continues to steadily increase, while *Financial volatility* has cycled off its low. *Wars (including civil wars)* rose in 2022 at a faster pace. *Cyber/networks* is slowly decreasing from its peak in 2015.

Figure 23
TOP FIVE EMERGING RISKS, HISTORICAL RESULTS FOR TOP FIVE RESPONSES
% of Responses in Given Year Based on all Responses (up to five allowed)



Trends of at least two consecutive years may act as a leading indicator. Only four met this criterion in 2023. Two-year increasing trends were observed for *Natural catastrophes: severe storms*, *Wars (including civil wars)* at three years, *Regional instability* and *Demographic shift*. The longest decreasing trend is a five-year streak for *Failed and failing states*, with a two-year streak for *Cyber/networks*. A three-year decreasing streak is current for *Pandemics/infectious diseases*.

One method for analyzing this data over time is to highlight those risks reported in the current survey that are above long-term averages. For this purpose, the data was analyzed as a percentage of all responses (so totals are 100%). Three of the five categories were higher than their average over the 17 survey cycles. Environmental (22% vs 14% average), Societal (15% vs 14% average) and Technological (15% vs 13% average) each satisfied this criterion, while Economic (18% vs 30% average) and Geopolitical (27% vs 28% average) were lower. Among individual risks, five of the 23 had above-average results. The greatest positive differential was 7% for *Wars (including civil wars)*. Eleven trended below average, including all of the Economic risks. Several risks were 3% below average, led by *Currency shock*.

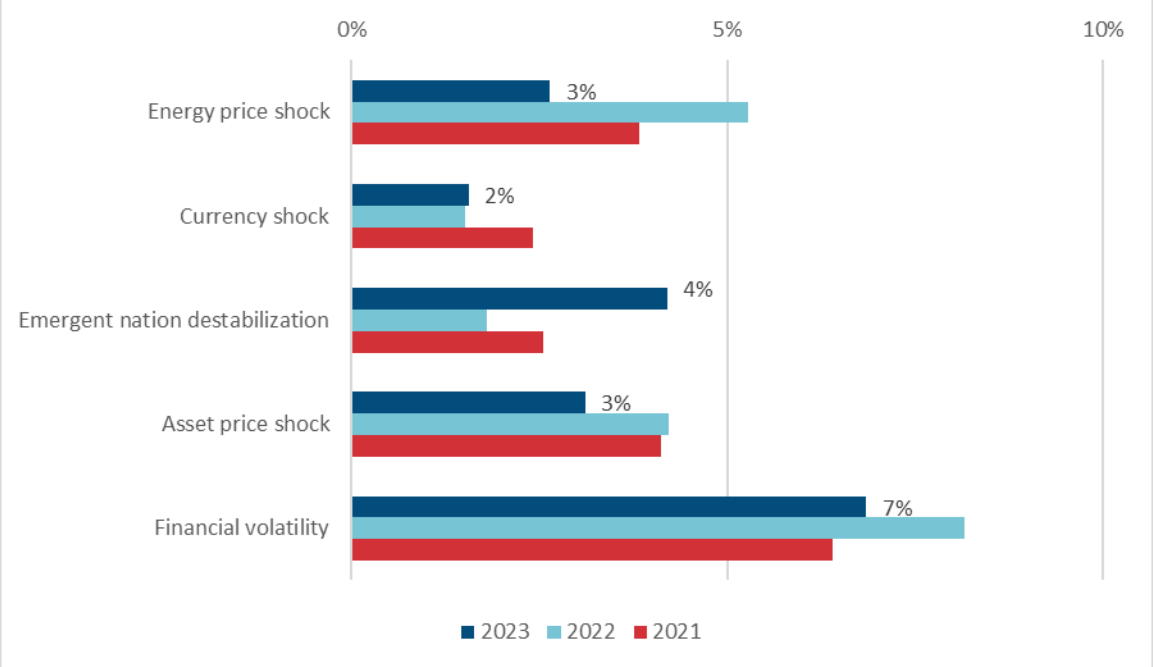
Figures 24 through 28 show recent trends for each category when respondents chose (up to) five emerging risks. The denominator in the percentages is the total number of responses received, rather than the number of respondents. This allows a comparison to other questions.

Economic risks were selected less often in total than in the previous survey, led by *Financial volatility* and *Emergent nation destabilization*, as shown in figure 24.

Figure 24

EMERGING RISK TRENDS: ECONOMIC RISKS

% of Total Responses

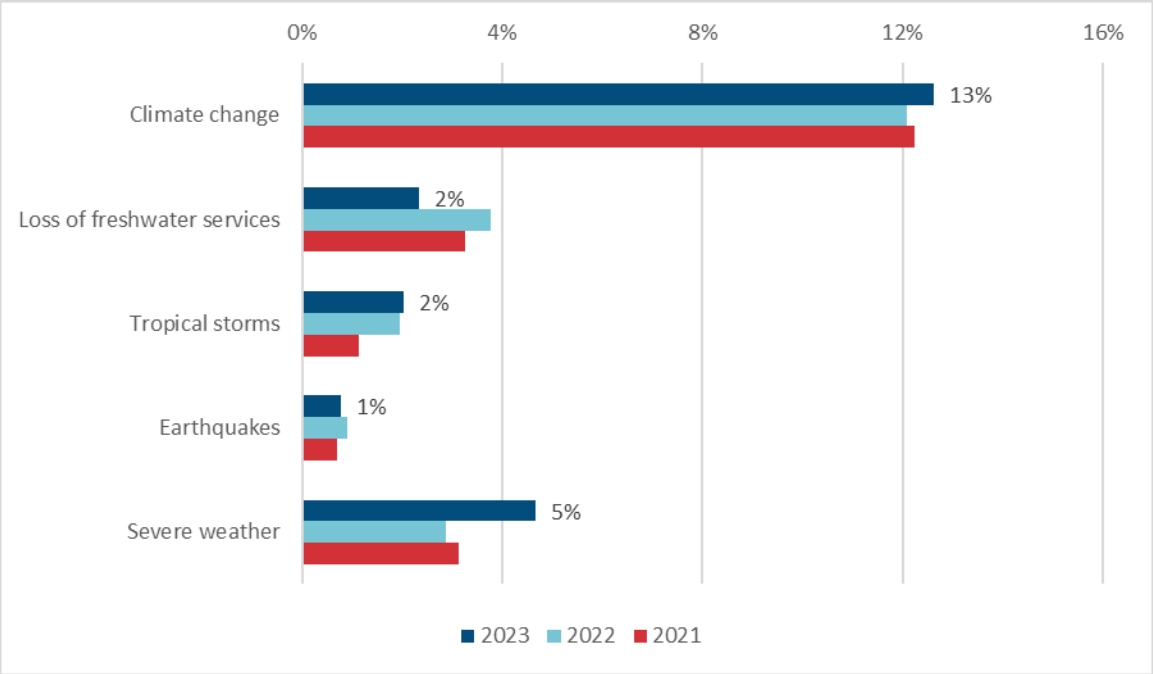


As shown in figure 25, three of the five Environmental risks were selected more often in the current survey. The increase in responses for *Natural catastrophes: severe weather* is consistent with increases elsewhere in the survey.

Figure 25

EMERGING RISK TRENDS: ENVIRONMENTAL RISKS

% of Total Responses

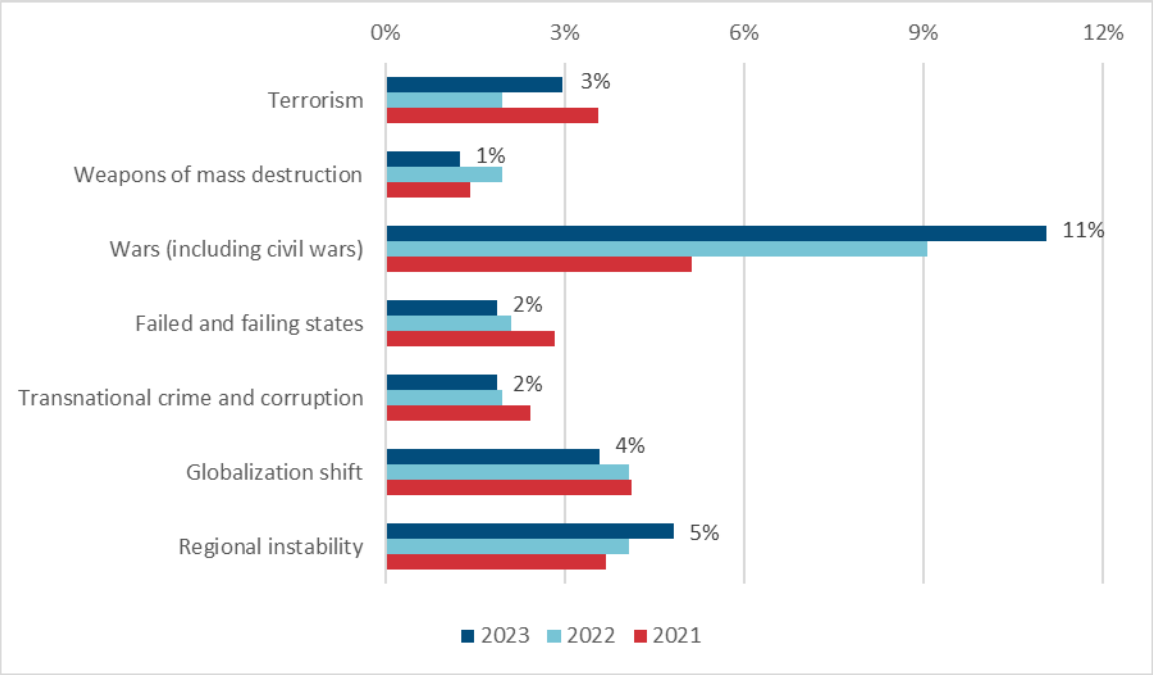


In the Geopolitical category, *Wars (including civil wars)* spiked for the second consecutive year, as shown in figure 26, reflecting conflicts including Ukraine and Gaza.

Figure 26

EMERGING RISK TRENDS: GEOPOLITICAL RISKS

% of Total Responses

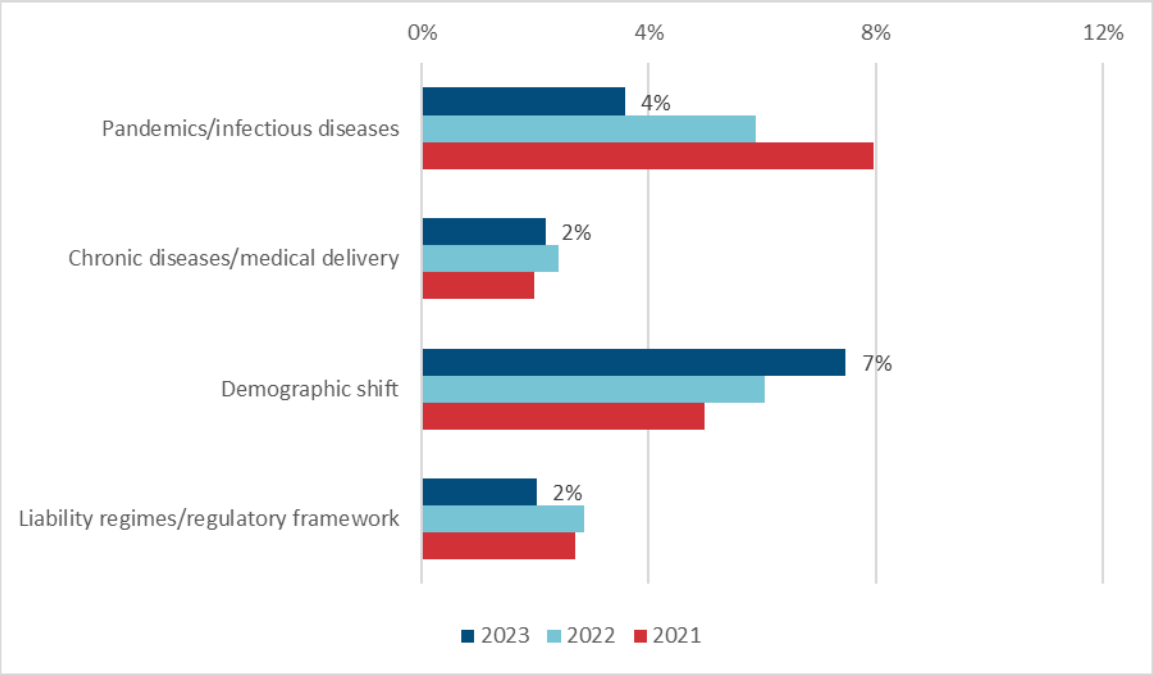


Demographic shift rose for the second consecutive year, offsetting the continued mean reversion of *Pandemics/infectious diseases*, as can be seen in figure 27.

Figure 27

EMERGING RISK TRENDS: SOCIETAL RISKS

% of Total Responses

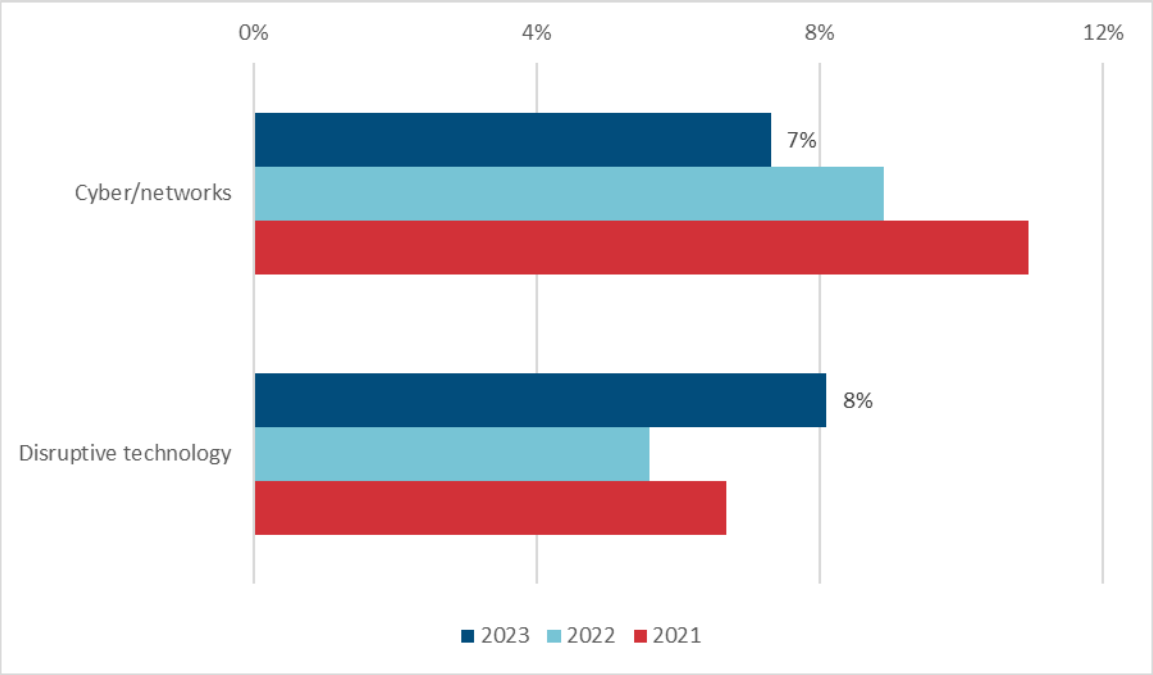


Cyber/networks fell but *Disruptive technology* recovered based on a surge in artificial intelligence applications, as seen in figure 28. Both are among the top five risks chosen.

Figure 28

EMERGING RISK TRENDS: TECHNOLOGICAL RISKS

% of Total Responses

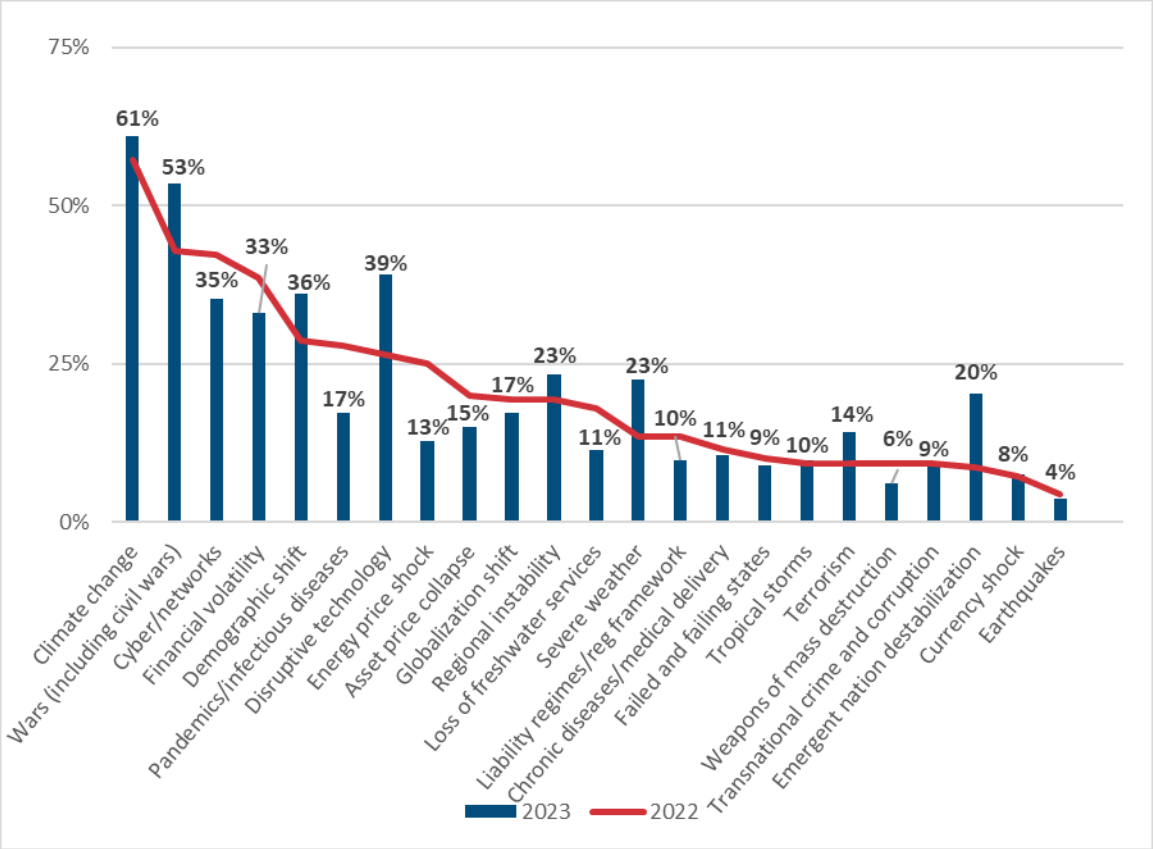


Some of the recent differences are highlighted in figure 29. It is interesting to see how the responses for some risks change between years. The data labels presented are from 2023, with risks sorted based on 2022 results. While pandemics and some economic risks fell off risk managers' radars, the current survey reflects increases in several risks.

Figure 29

YEAR-OVER-YEAR EMERGING RISKS (UP TO FIVE RISKS CHOSEN)

% of Responses in Given Year

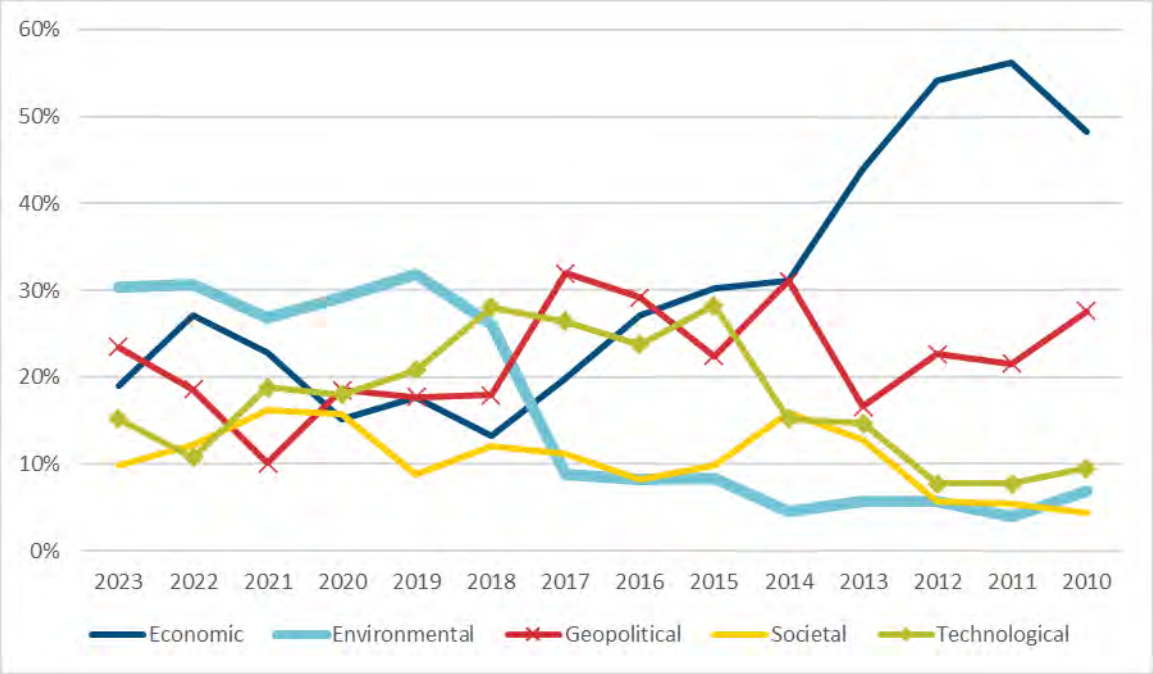


4.5.2 TOP EMERGING RISK: CLIMATE CHANGE

Respondents were asked to state the single emerging risk, from the group of (up to) five they selected in the previous question, they expected to have the greatest impact. The responses to this question have traditionally been volatile based on recent events. The Environmental category maintained the top ranking, with the Economic category maintaining second place. *Climate change*, at 27%, would be the leading category by itself and is well ahead of second place, *Disruptive technology*. The largest drop was *Cyber/networks*, from 7% to 2% (13% in 2021). The largest increase was *Disruptive technology*, increasing from 4% to 13%.

Figure 30 compares the top emerging risks at the category level for the fall 2008, 2015 and 2023 surveys to show variation in results over the period of the survey. The chart shows how risk categories have trended, although there has been a lot of volatility along the way, both in total and within specific risks (see appendix B). Risk perceptions in the Economic category have fallen dramatically, although now off minimums, feeding increases over time for the Environmental, Societal and Technological categories. The Geopolitical category has been stable most of the time in total.

Figure 30
HISTORICAL TOP EMERGING RISK BY CATEGORY
% of Responses in Given Year



The top emerging risk in this iteration of the survey remained *Climate change*, which dominates each of the survey questions asking about emerging risks. *Disruptive technology* is second. Here are the top five leading responses:

Table 4
TOP RANKED EMERGING RISK

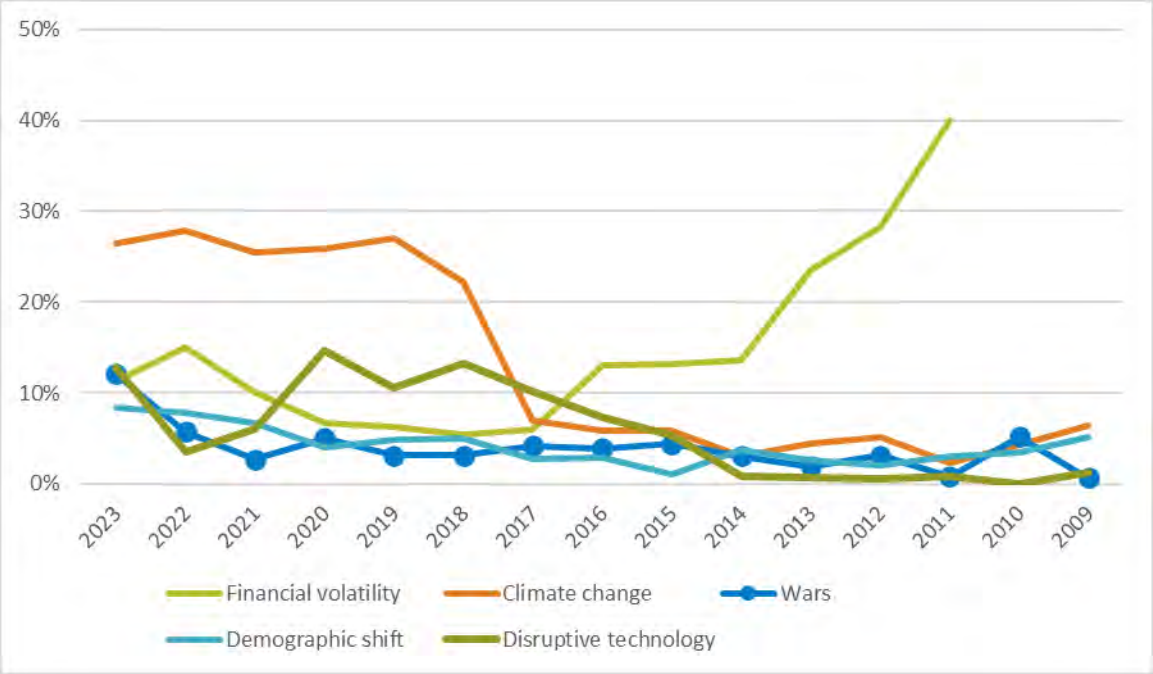
1	*Climate change*	27%
2	*Disruptive technology*	13%
3	*Wars (including civil wars)*	12%
4	*Financial volatility*	11%
5	*Demographic shift*	8%

Among the top emerging risks, *Climate change* spiked in 2018, as seen in figure 31, and has been relatively stable since. *Financial volatility* (added to the survey in 2011) rebounded after dropping from earlier high levels following the financial crisis that was just starting when the survey began. *Wars (including civil wars)* spiked starting in 2022.

Figure 31

TOP EMERGING RISK, HISTORICAL RESULTS FOR TOP FIVE RESPONSES

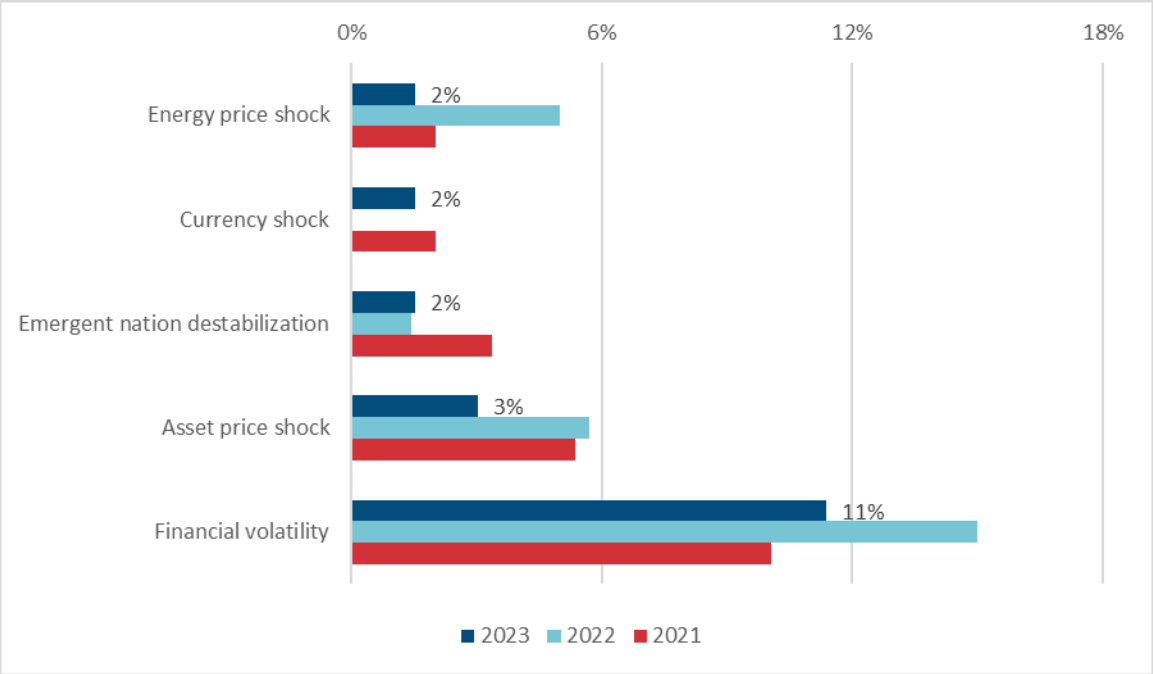
% of Responses in Given Year



For each risk category, figures 32 through 36 show how respondents answered the top emerging risk question within the category for the most recent three surveys. Note that the horizontal axis for each chart is chosen to highlight the data and is not consistent among categories. Data labels are rounded to the nearest percentage point and are shown for the most recent survey. The length of the individual bar has not been rounded.

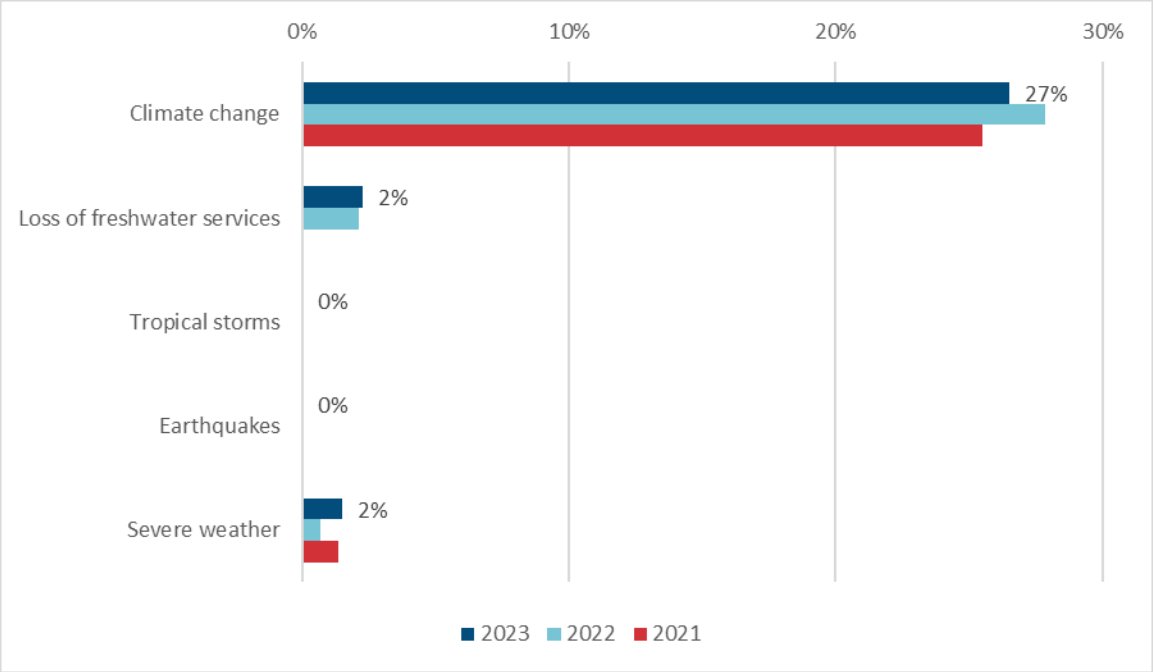
As shown in figure 32, the Economic category showed three of the five risks fall by at least 3%, led by *Financial volatility*.

Figure 32
TOP EMERGING RISKS—ECONOMIC
% of Total Responses



Environmental category risks, shown in figure 33, remain small as top emerging risk, except for *Climate change*, which remains the top overall risk for the sixth consecutive year.

Figure 33
TOP EMERGING RISKS—ENVIRONMENTAL
% of Total Responses

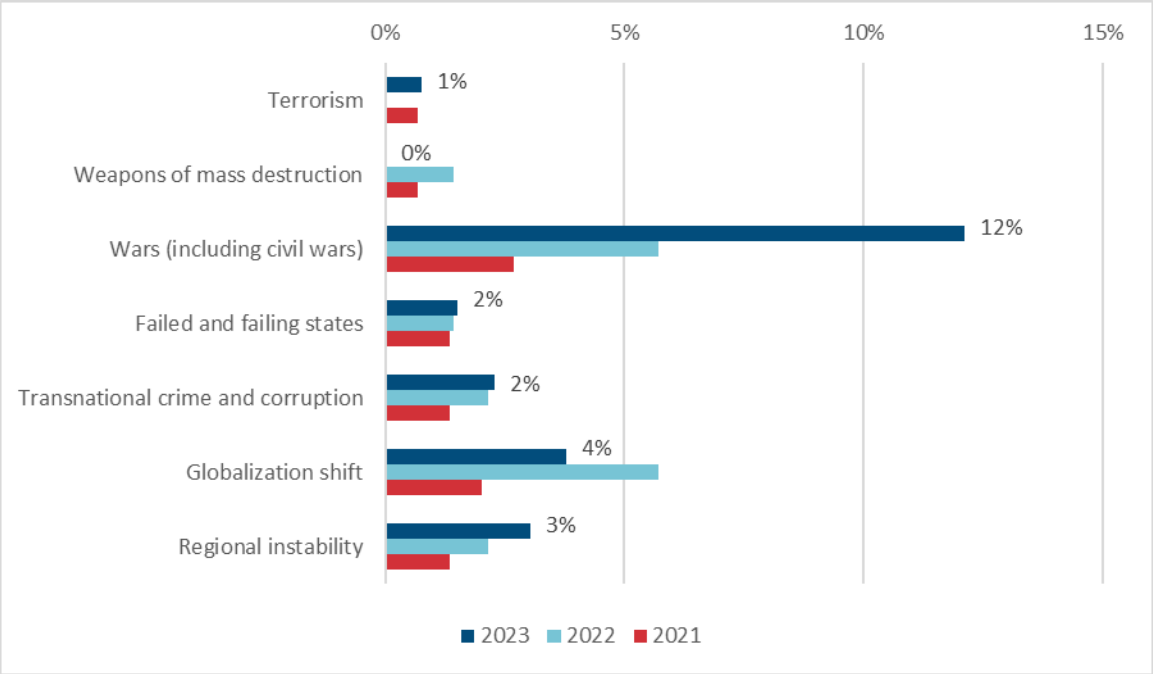


Geopolitical risks tended to be the most volatile in the survey, so it is not surprising to see in figure 34 that many of these risks whipsaw, with 2023 an up year overall. *Wars (including civil wars)* had its highest result for the second straight year and *Regional instability* is inching up.

Figure 34

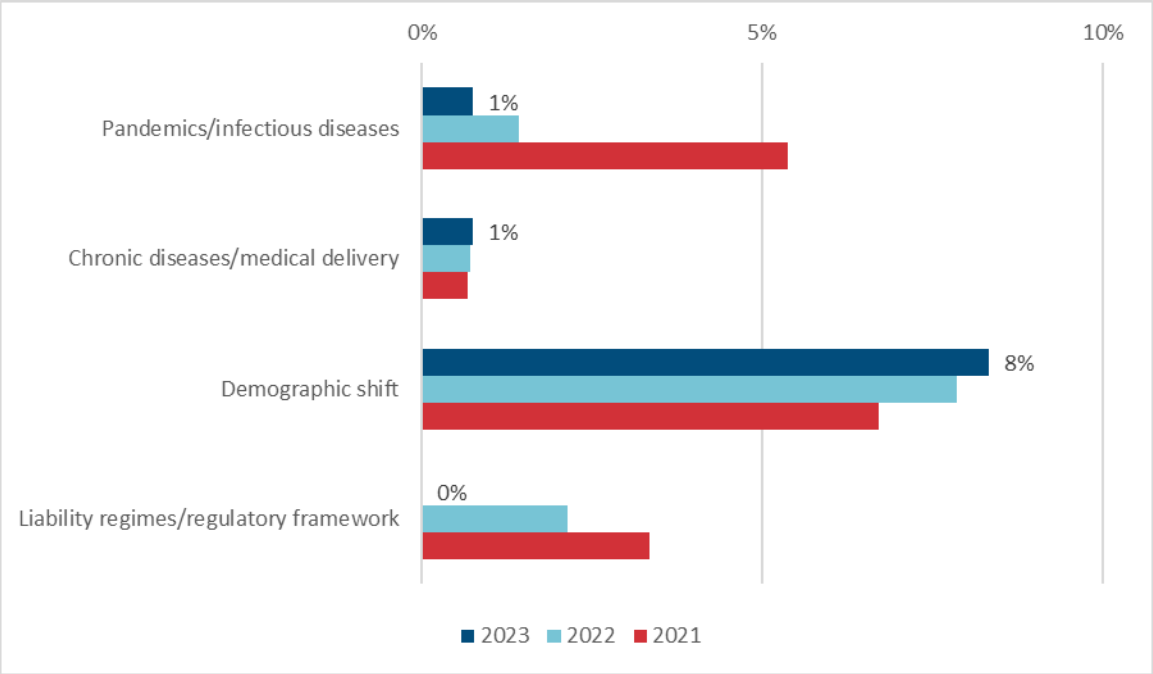
TOP EMERGING RISKS—GEOPOLITICAL

% of Total Responses



As shown in figure 35, the Societal category saw an increase in the *Demographic shift* risk to its highest level for the third consecutive year, offsetting a drop from 2% to 0% in the *Liability regimes/regulatory framework* risk.

Figure 35
TOP EMERGING RISKS—SOCIETAL
% of Total Responses



In the Technological category, shown in figure 36, *Disruptive technology* rose to its highest level since 2020.

Figure 36

TOP EMERGING RISKS—TECHNOLOGICAL

% of Total Responses

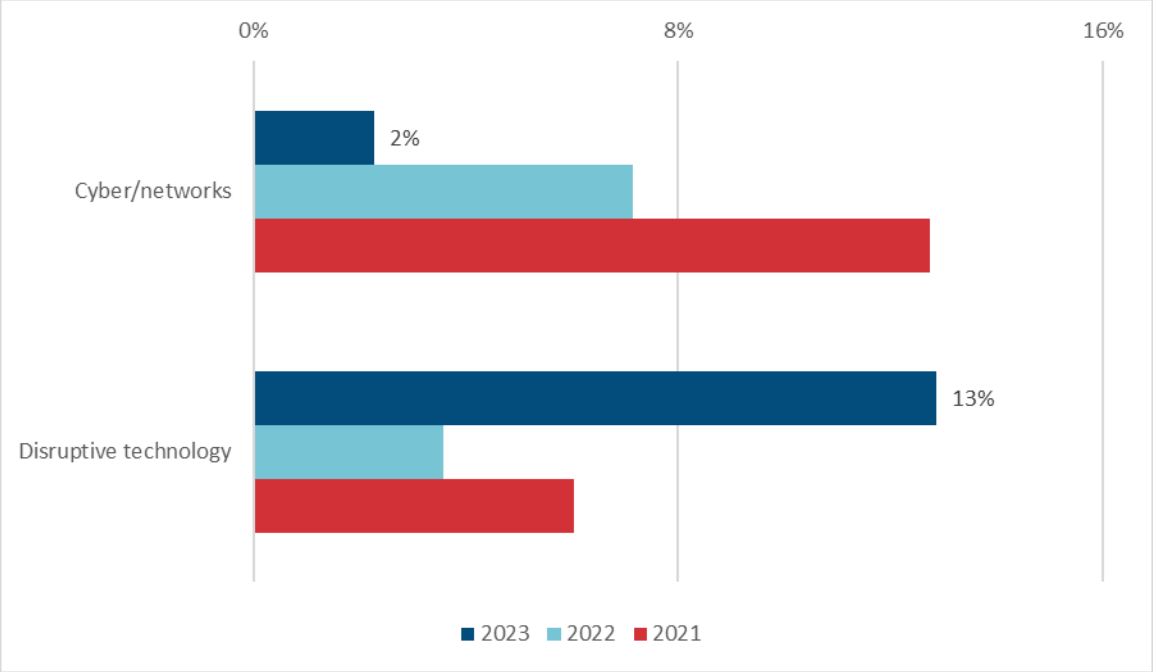
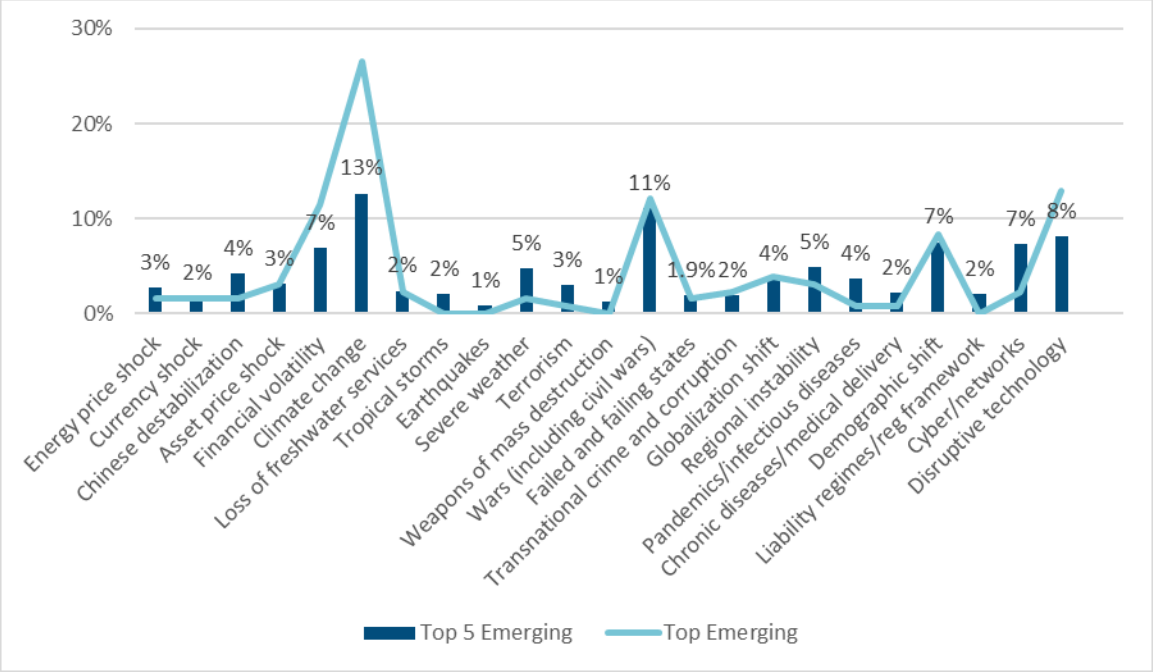


Figure 37 compares the percentages selecting each risk as the top emerging risk with the percentages selecting each risk as one of the five top emerging risks. For several risks, these two measures of perceived importance vary. If we use the highest absolute positive differential to mark the importance of being the top overall risk relative to inclusion in the top five list, that risk is again *Climate change*, at 14%. The greatest negative differential is *Cyber/networks* at −5%.

Figure 37

EMERGING RISKS SELECTED FOR TOP FIVE AND TOP RISK

% of Responses to Given Question



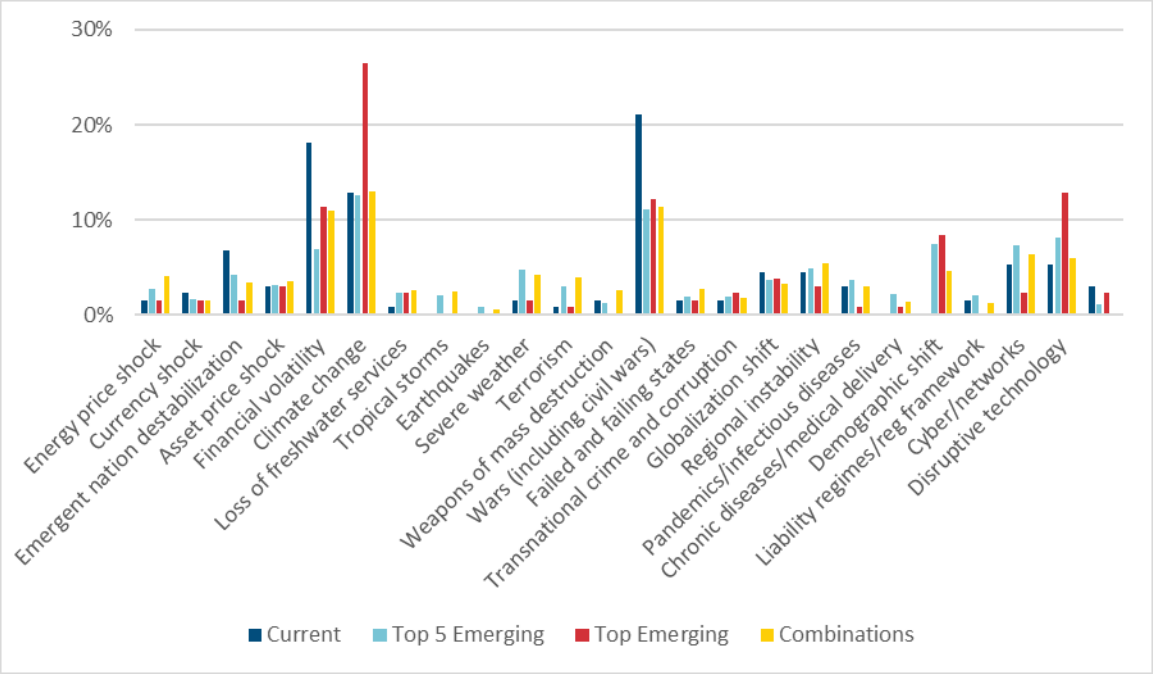
A comparison of the top current risk and top emerging risk suggests which risks are expected to be relatively more important in the future. The largest absolute negative differential (current less than top emerging risk) is *Climate change*, at 14%. The largest absolute positive differentials, suggesting an expectation of lower risk in the future, are *Wars (including civil wars)* at 9% and *Financial volatility* at 7%.

Another interesting characteristic of a particular risk is to have the top five response be the highest of the three measures of its perceived risk. This could reflect a risk that respondents are worried about, but they cannot quite get their heads around being the most important risk. As shown in figure 38, this characteristic is seen with 13 of the 23 risks. More interesting is which risks have their maximum score outside the top five emerging risk question. For current risk, there are four risks where it is the top score across the three questions. The risks where the top emerging risk is the top score include four risks: *Climate change*, *Transnational crime and corruption*, *Demographic shift* and *Disruptive technology*.

Figure 38

RISK PERCEPTION, BY RISK AND QUESTION

% of Responses to Given Question



4.5.3 RISK COMBINATIONS

Risks interact with each other. Higher-order interactions can result in tipping points that generate a regime shift to a new distribution. The risk combination question allows practitioners to share their perceptions with peers. What is included, and what is not, is interesting and can then be qualitatively monitored over time.

The outcomes of risk interactions are hard to plan for. When multiple risks are correlated, or randomly occur at about the same time, companies are at risk if they haven't proactively planned for a liquidity event and managed leverage. Surprising and unintended consequences abound.

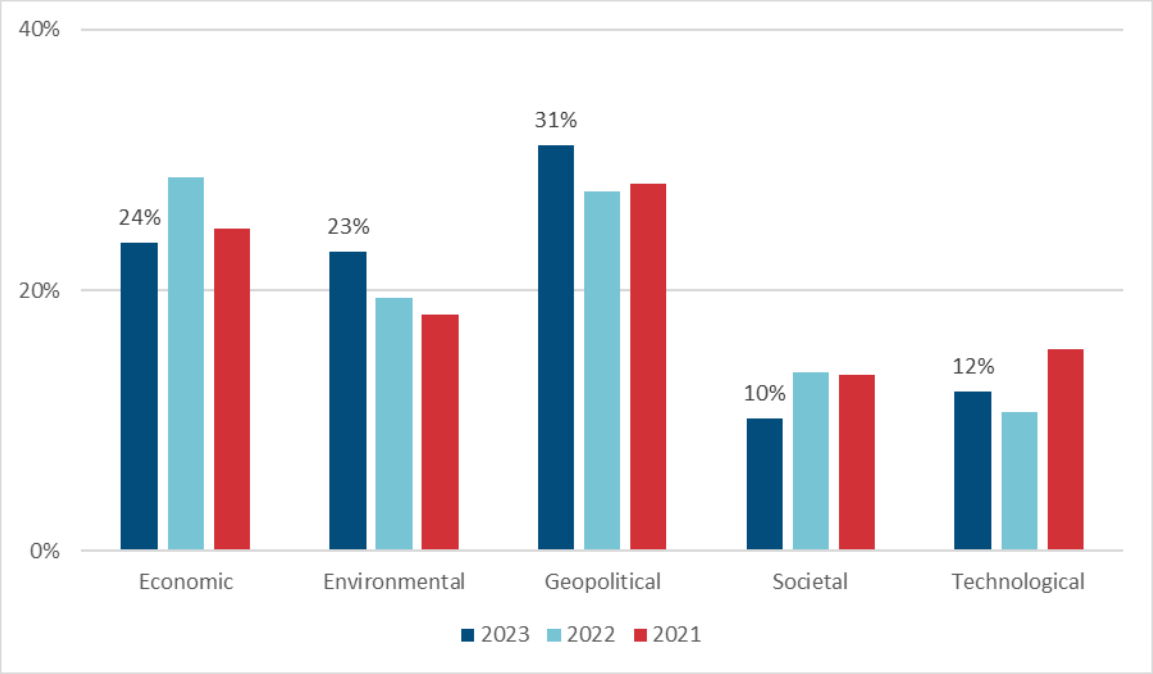
To explore this issue, the survey asked each respondent to choose up to three combinations of two risks they believe will have a large impact over the next few years, either concurrently or sequentially. Appendix B includes a grid showing how many of each combination were chosen.

Even though the question is about combinations of risks, it is helpful to look first at the distribution of categories from which the risks were chosen. These are threat multipliers that cause other risks to have outsized consequences. The Geopolitical, Economic and Environmental categories are the most frequent response categories, with an increase in the Environmental, Geopolitical and Technological categories offsetting a decrease in Economic and Societal. Figure 39 provides a graphical representation of the results that follow.

Figure 39

MOST IMPACTFUL RISK COMBINATIONS, BY RISK CATEGORY

% of Responses Selected from Category in Given Year



The term, threat multiplier, was coined by the U.S. military to describe a risk that interacts with other risks and amplifies the impact. Climate change is often the example cited, but it seems reasonable to apply the term here to risks that are concerns when thought of in combination with other risks. The individual risks most often selected for combinations were *Climate change*, *Wars (including civil wars)* and *Financial volatility*, the same risks but in a different order than the previous survey.

Table 5

TOP RANKED EMERGING RISKS IN COMBINATION

1	*Climate change*	13%
2	*Wars (including civil wars)*	11%
3	*Financial volatility*	11%
4	*Cyber/networks*	6%
5	*Disruptive technology*	6%

The highest result covering the history of the survey was recorded for *Climate change*, *Natural catastrophe: severe weather* and *Wars (including civil wars)*. *Asset price shock* and *Failed and failing states* (for the second consecutive year) recorded new lows, making them worth monitoring for mean reversion in future surveys.

Figure 40

TOP RISK COMBINATIONS, YEAR-OVER-YEAR RESULTS 2022-2023

% of Responses in Given Year

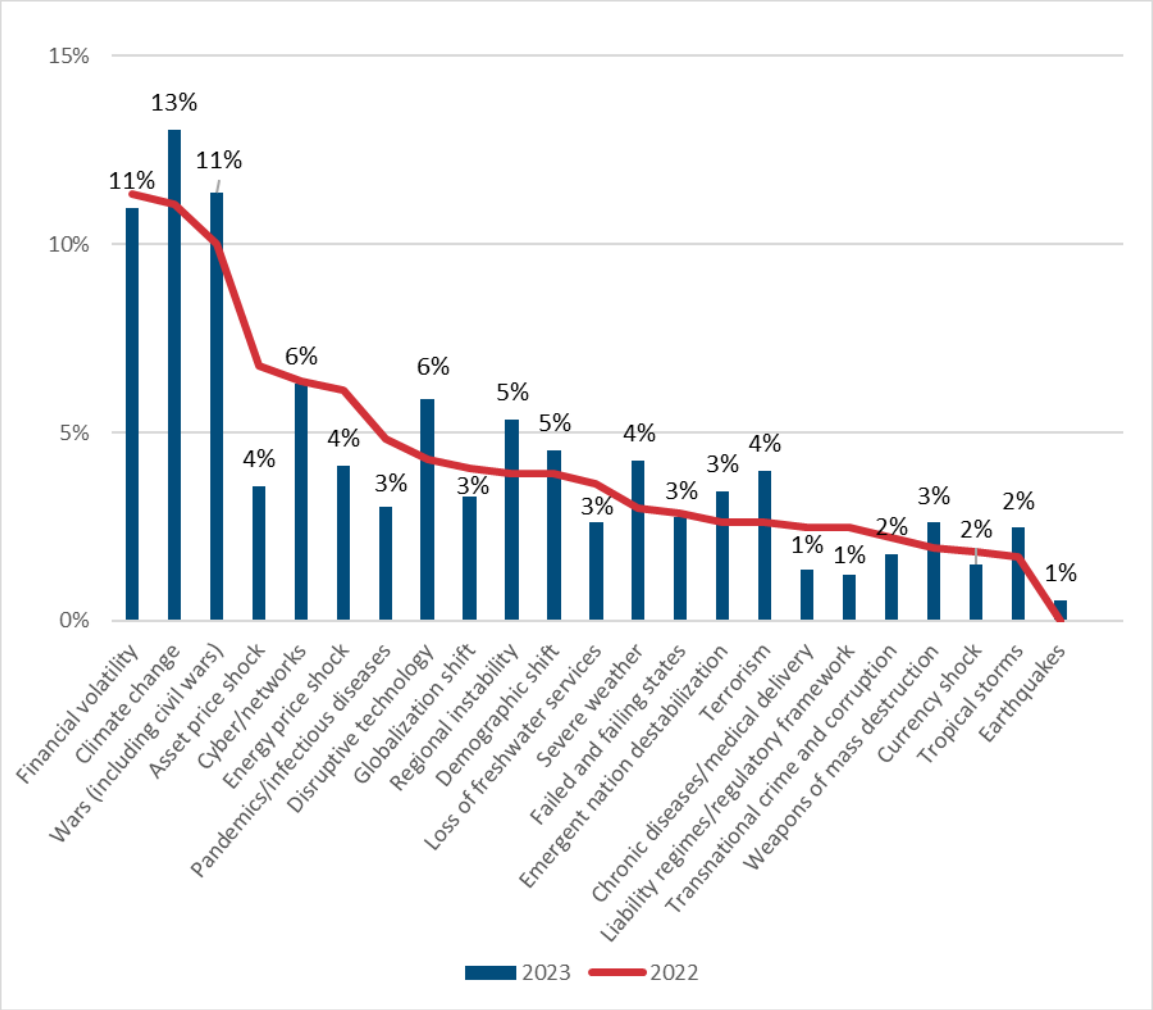
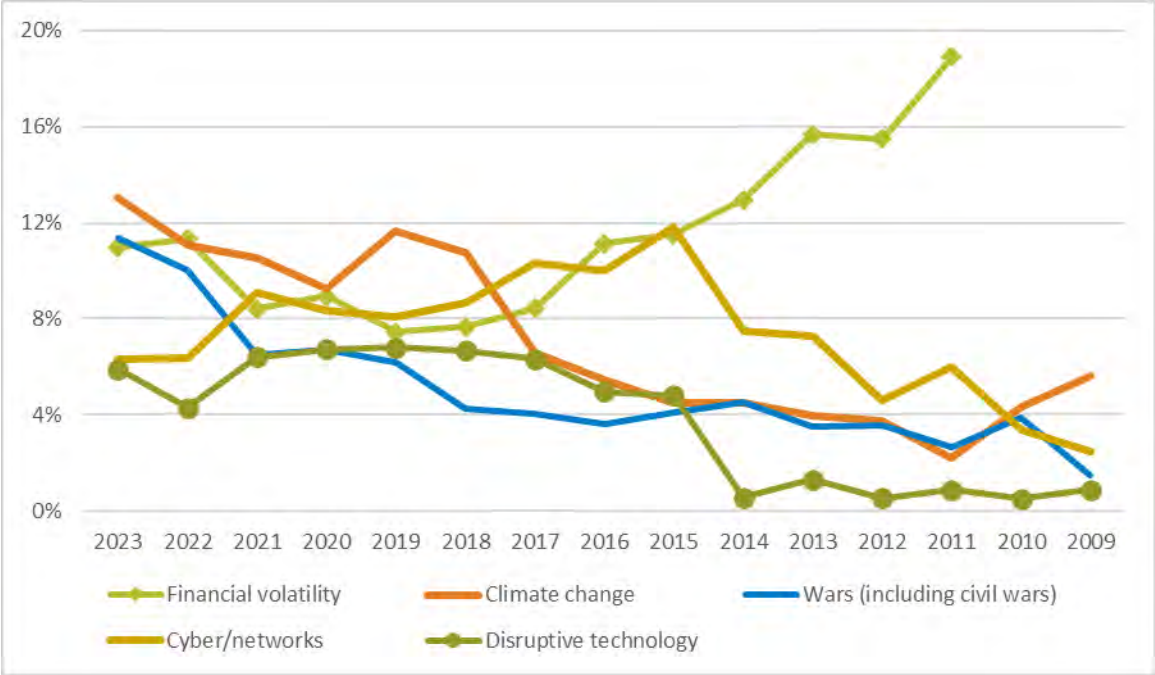


Figure 41 shows that the top five responses for risk combinations have each been at or above 4% for the last six surveys (Ed. Note: the *Financial volatility* risk was added in 2011).

Figure 41
HISTORICAL COMBINATIONS, TOP FIVE RISKS
% of Responses in Given Year



The top combinations of two risks chosen continue to show a broad dispersion. The difference drops off quickly when combinations are ranked based on the percentage choosing them. The top five combinations among the 364 responses were as follows:

21 responses 6%, no. 3 in previous survey

Climate change

Natural catastrophe: severe weather

20 responses 5%, no. 2 in previous survey

Cyber/networks

Disruptive technology

15 responses 4%, no. 5

Asset price shock

Financial volatility

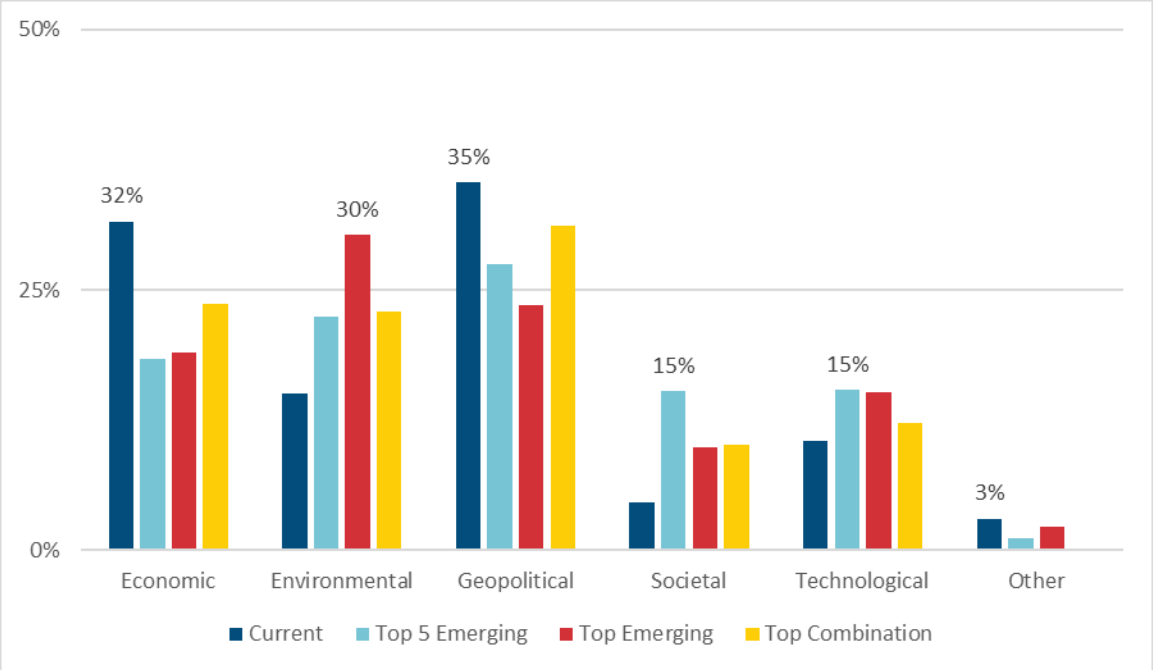
The major category combinations were as follows (with percentages from the current and most recent surveys):

Table 6
RISK COMBINATION PAIRS BY CATEGORY

		2023	2022	2021	2020
Geopolitical	Geopolitical	**17%**	11%	15%	14%
Environmental	Environmental	**14%**	12%	9%	8%
Economic	Geopolitical	**12%**	17%	11%	11%
Economic	Economic	**10%**	12%	11%	8%
Economic	Environmental	**7%**	5%	5%	3%
Geopolitical	Technological	**6%**	7%	8%	9%
Technological	Technological	**5%**	4%	8%	6%
Environmental	Geopolitical	**5%**	5%	5%	6%
Geopolitical	Societal	**5%**	3%	3%	7%
Economic	Societal	**4%**	6%	6%	9%
Environmental	Societal	**4%**	5%	6%	5%
Economic	Technological	**3%**	3%	4%	4%
Societal	Societal	**3%**	6%	5%	4%
Societal	Technological	**2%**	2%	3%	4%
Environmental	Technological	**2%**	2%	1%	1%

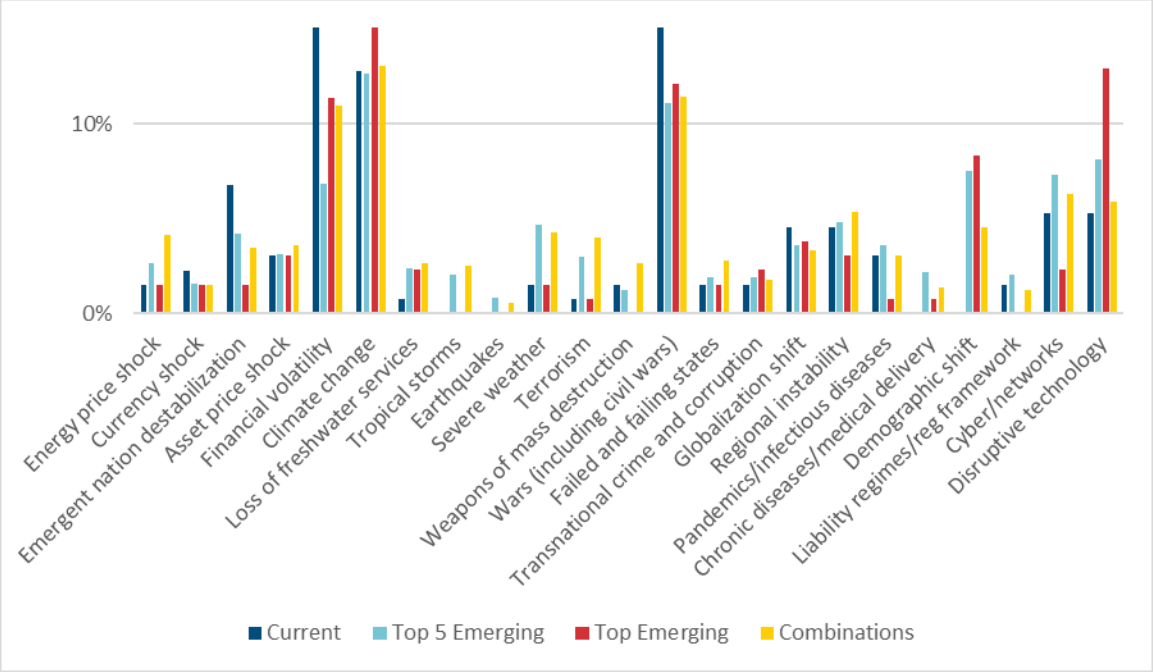
By category, except for Economic and Geopolitical current risks and Societal top five emerging risks, responses don't generally vary by a large amount when viewed across the four major questions as shown in Figure 42. The top current risks are especially volatile between surveys.

Figure 42
SELECTION OF RISKS IN CATEGORY, BY QUESTION
% of Responses Selected from Category for Given Question



The highest results vary among the Societal (three of the four risks peak with top five emerging risks), Geopolitical (four of seven peak with combinations), Technological (two risks peak with top five emerging risks and top emerging risk), Economic (three of five risks peak with current risk), and Environmental (selection of top emerging risk is high due to the *Climate change* risk) categories. Risk by risk, there is much more variation, as shown in figure 43, but results for many risks remain in a range across all four questions.

Figure 43
SELECTION OF RISK, BY QUESTION
% of Responses to Given Question



The following risks were most often selected as the top current risk (relative to the other questions):

- *Currency shock*
- *Emergent nation destabilization*
- *Financial volatility*
- *Wars (including civil wars)*
- *Globalization shift*

The following risks were most often selected as one of the top five emerging risks:

- *Natural catastrophe: earthquakes*
- *Natural catastrophe: severe weather*
- *Pandemics/infectious diseases*
- *Chronic diseases/medical delivery*
- *Liability regimes/regulatory framework*
- *Cyber/networks*

The following risks were most often selected as the top emerging risk:

- *Climate change*
- *Transnational crime and corruption*
- *Demographic shift*
- *Disruptive technology*

The following risks were most often selected as part of a combination:

- *Energy price shock*
- *Asset price shock*
- *Loss of freshwater services*
- *Natural catastrophe: tropical storms*
- *Terrorism*
- *Weapons of mass destruction*
- *Failed and failing states*
- *Regional instability*

There are 253 possible risk combinations. If the results in figure 44, a cumulative distribution function, were in the upper left section of the graph and reached 100% very quickly, this would recognize the similarities between responses and be very concentrated. The "Uniform" line shown represents the extreme for less concentrated responses, where each combination was listed at the same level. Respondents are asked to choose three risk combinations (from the 23) that will have the largest strategic impact in the future. Since the financial crisis in 2008–2009, results have trended toward reduced concentrations (greater variation among these choices). The 2009 result lies further from the diagonal baseline, showing a heavily concentrated result, than does the 2023 line. The current year's results were slightly more concentrated in the top choices represented in the top quartile.

Figure 44
CUMULATIVE DISTRIBUTION OF RISK COMBINATIONS SELECTED

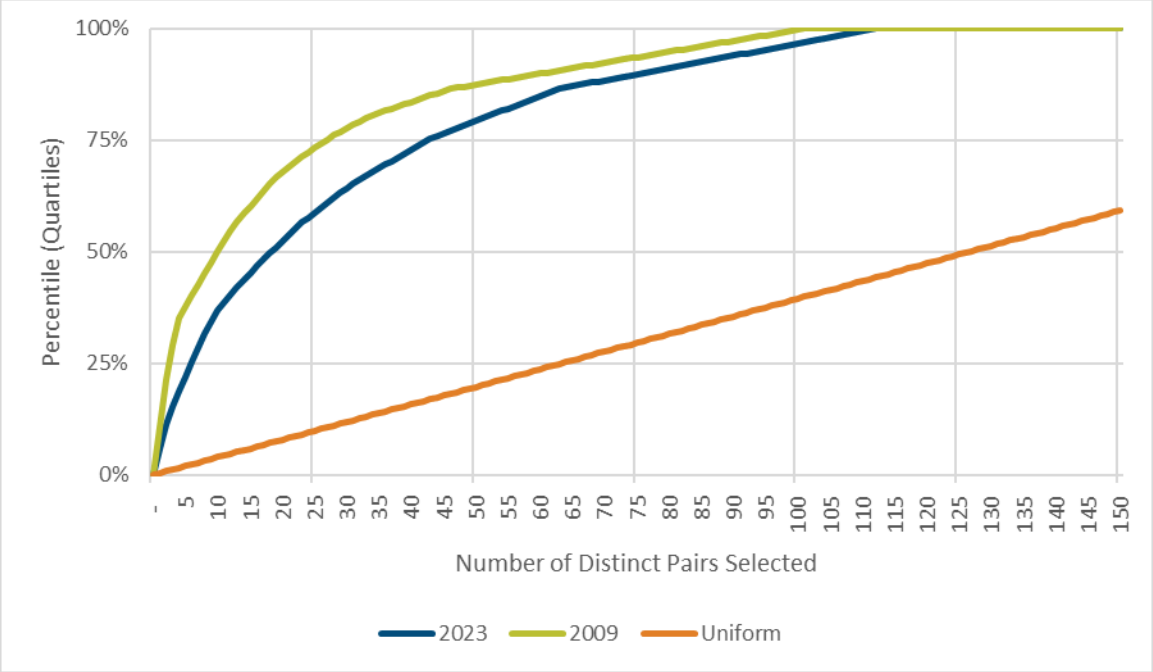
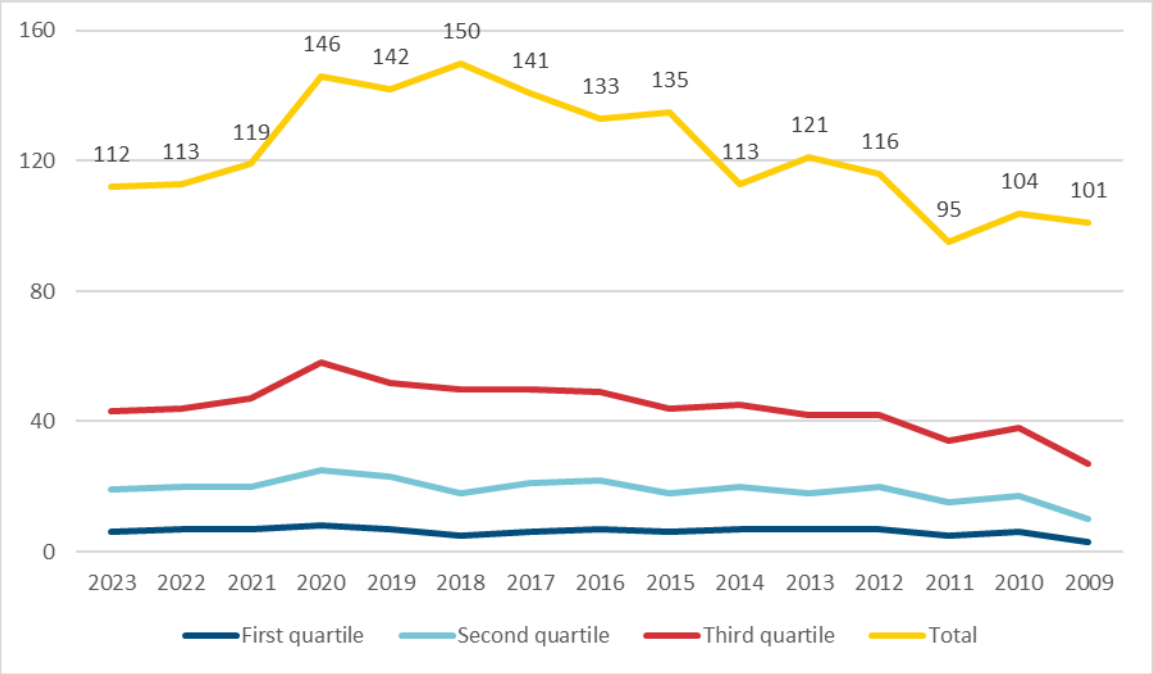


Figure 45 shows the number of combinations selected each year, with data listed cumulatively and the first quartile representing the most frequent responses. The current survey suggests a continued shift toward more concentrated risks. Fewer than half of the possible two-risk combinations were selected (112 of 253 possible pairs of combinations). With so many large risk events during the year, respondents had lots to think about, yet seemed to be focusing in on the risks that matter to them, creating a narrowing view of critical risk combinations as compared to prior years. For example, in the 2018 survey, 150 risk combinations were selected versus 112 in the 2023 survey.

Since the pandemic year of 2020, the number of risk combinations chosen has fallen, from 146 to 112 in the current survey. The chart shows a similar result in the 75th percentile and median metrics. One hypothesis could be that there are multiple risk combinations where previously one had dominated each year. Future surveys may provide additional clues.

Figure 45

NUMBER OF RISK COMBINATIONS SELECTED, BY YEAR

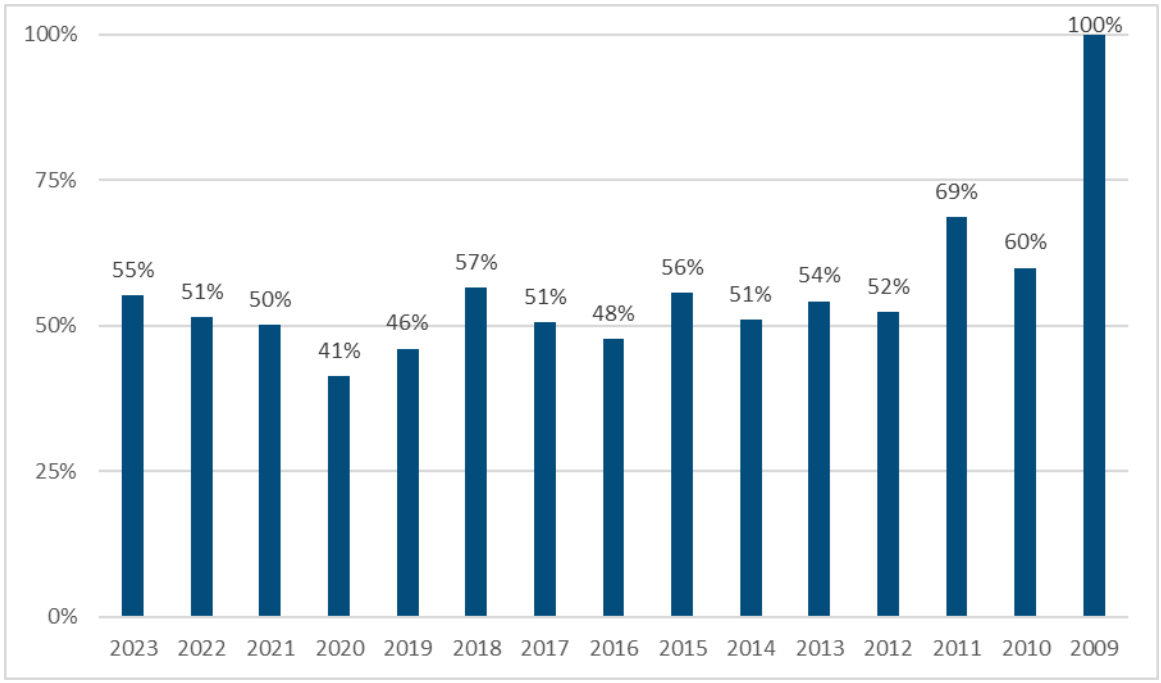


The level of concentration can be considered an indicator of the current risk environment. The risk combination concentration ratio is calculated by comparing the ratio at each of the three quartiles (2009 result divided by current year result) and averaging them. A lower number shows broader results, while 100% would recreate the 2009 survey. This generates a relative risk combination concentration ratio. As an example, for the 25th percentile result in 2023, the sum of six risk combinations cumulatively added to a grand total of 25% while, in 2009, it was three (3/6 = 50%). The metrics from each of the three quartiles are then used to calculate an average. Shown in figure 46, this year's risk combination concentration ratio of 55% is in the top third of results.

Figure 46

RISK COMBINATION CONCENTRATION RATIO

Base 2009 = 100%



4.5.4 SEGMENTED RESULTS BASED ON GREATEST STRATEGIC RISK

One of the great learnings that comes with experience is that not everyone thinks the same. If we want to be understood by everyone, this needs to be considered. One way this survey does that is by presenting all the data in an appendix. Getting credible data requires a lot of respondents, so take these results as the example that they are. This is the second survey where the results of what is the greatest strategic impact are used to analyze the current, top five emerging and top emerging risk results. By continuing to perform this dissection, we will see if trends hold up or change in interesting ways.

The first question in the survey asked respondents for their definition of greatest strategic impact. By segregating the responses between the 40% who chose financial impact versus the 60% who chose disruption, similar to the prior survey, we can see the result of multiple opinions. (Ed. note: Results shown do not add to 100% since the Other category was not included.)

Figures 47, 48 and 49 show, for top current risk, the differentials by risk category. Not surprisingly, those who focused on the financial impact of strategic risks were more likely to choose economic risks and those who focused on disruption chose geopolitical and environmental risks. The current results see the Economic category down and the Geopolitical category up, with mixed results for the other categories.

Figure 47

TOP CURRENT RISK SEGREGATED BY THOSE CHOOSING FINANCIAL IMPACT AS GREATEST STRATEGIC IMPACT

% of Responses

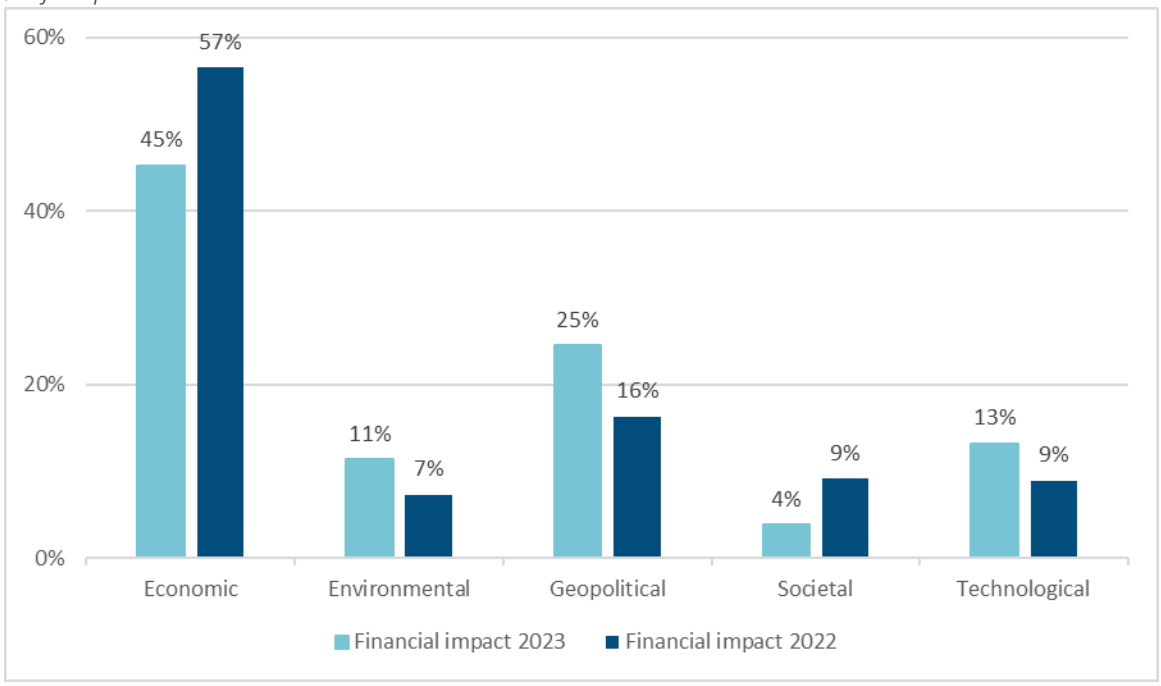


Figure 48

TOP CURRENT RISK SEGREGATED BY THOSE CHOOSING DISRUPTION AS GREATEST STRATEGIC IMPACT

% of Responses

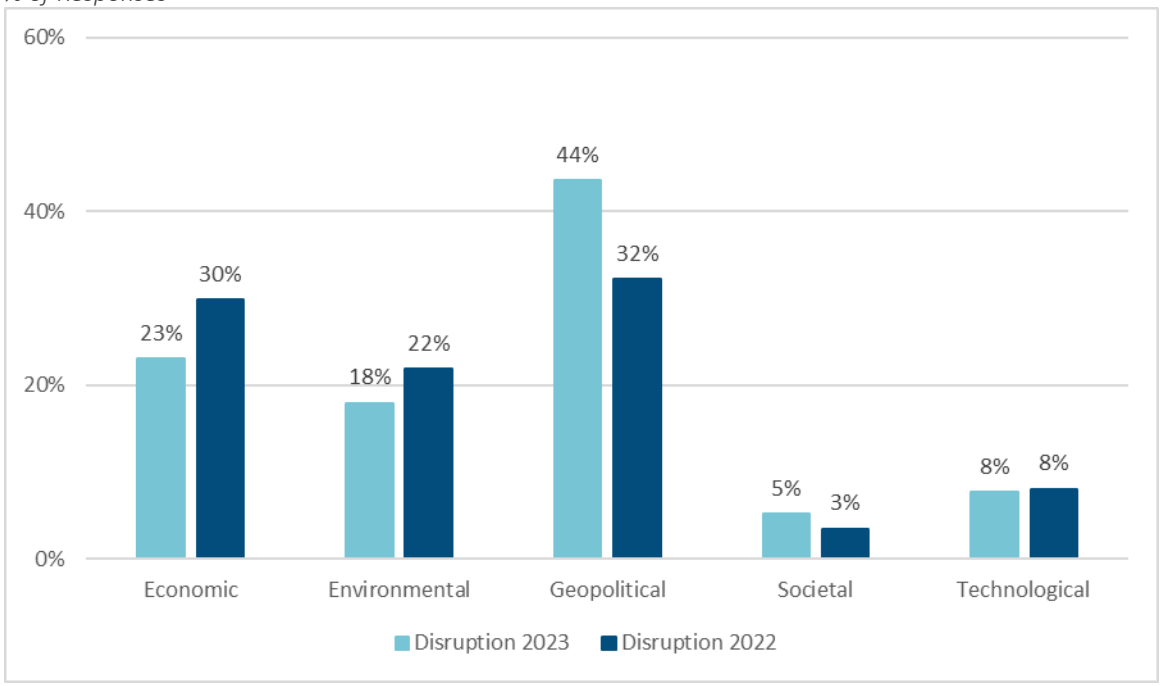
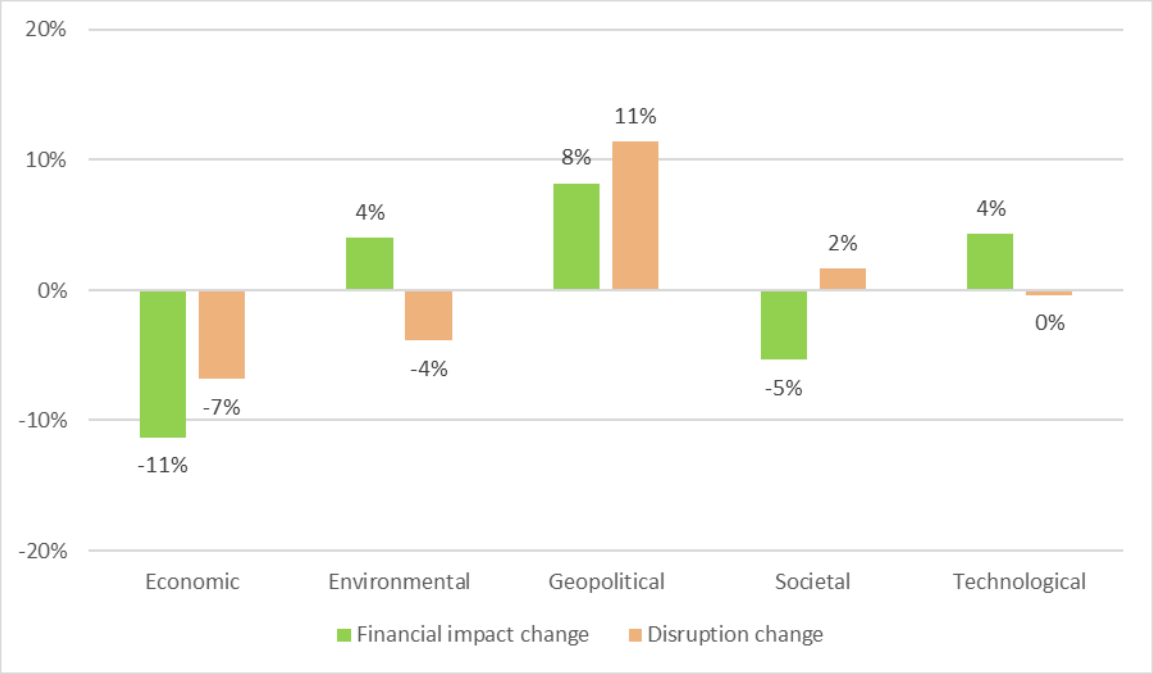


Figure 49

CHANGE IN TOP CURRENT RISK SEGREGATED BY GREATEST STRATEGIC IMPACT

% of Responses



Figures 50, 51 and 52 show, for the top five emerging risks, the differentials by risk category. Similar to what is seen with the combined results, there is more stability between years for the top five emerging risks than for other questions. While most of the changes between years were minor, for those who answered Financial Impact, the Economic category fell and the Environmental category grew by nearly as much.

Figure 50

TOP FIVE EMERGING RISKS SEGREGATED BY THOSE CHOOSING FINANCIAL IMPACT AS GREATEST STRATEGIC IMPACT

% of Responses

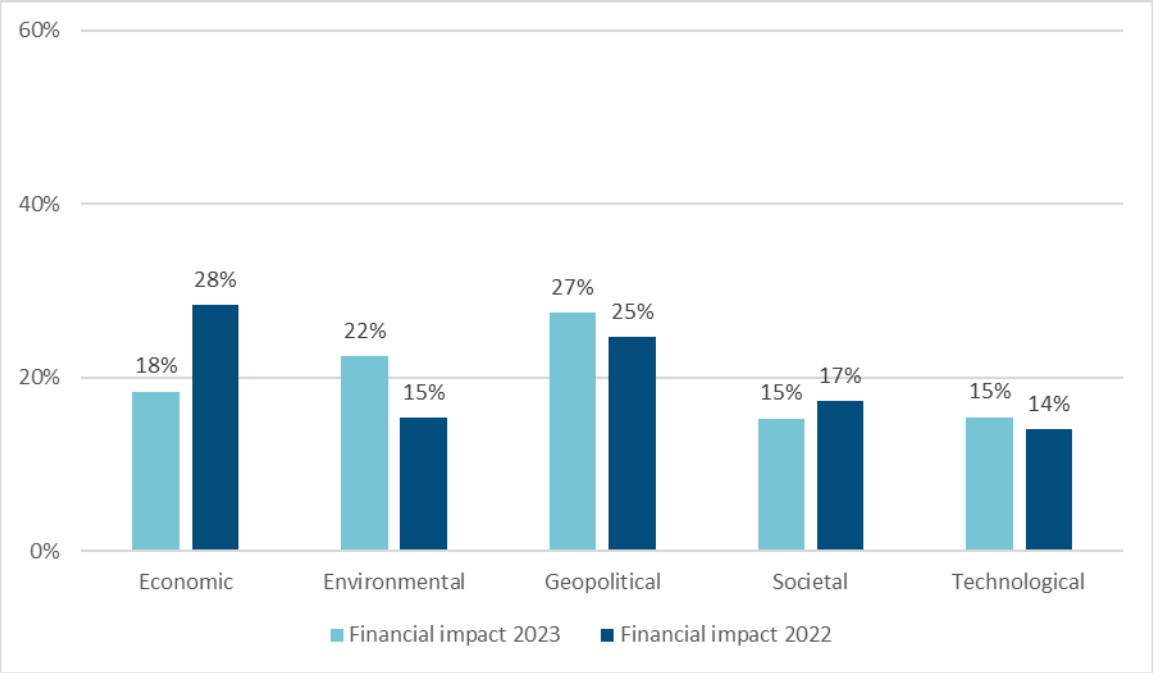


Figure 51

TOP FIVE EMERGING RISKS SEGREGATED BY THOSE CHOOSING DISRUPTION AS GREATEST STRATEGIC IMPACT

% of Responses

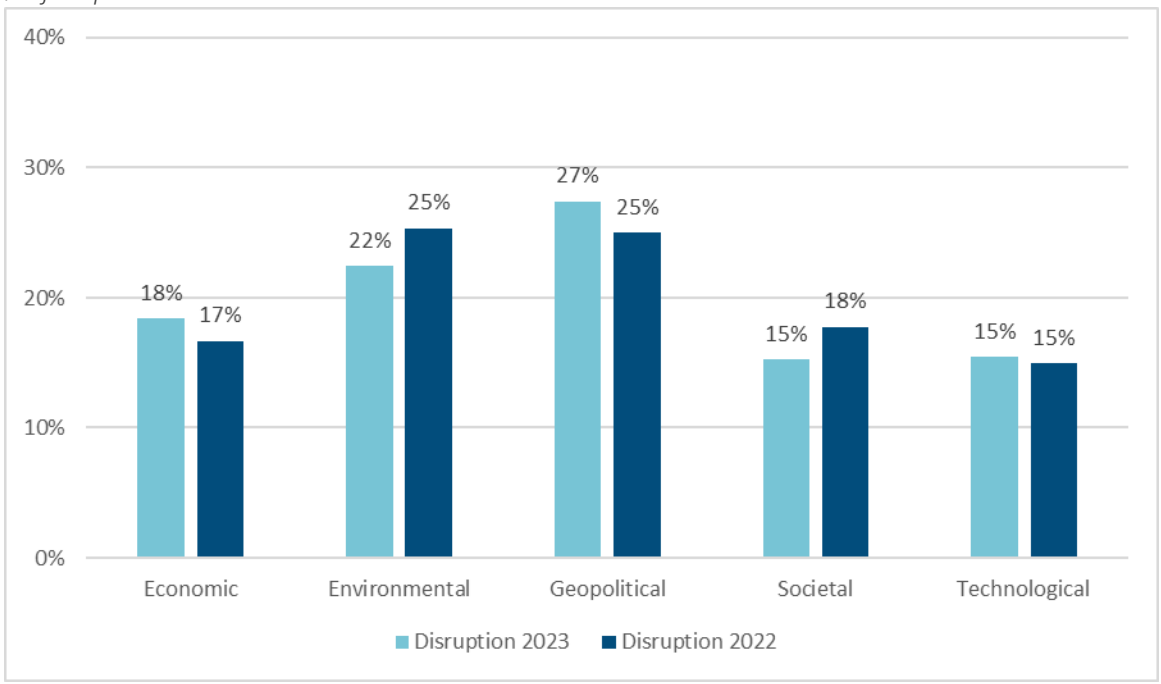
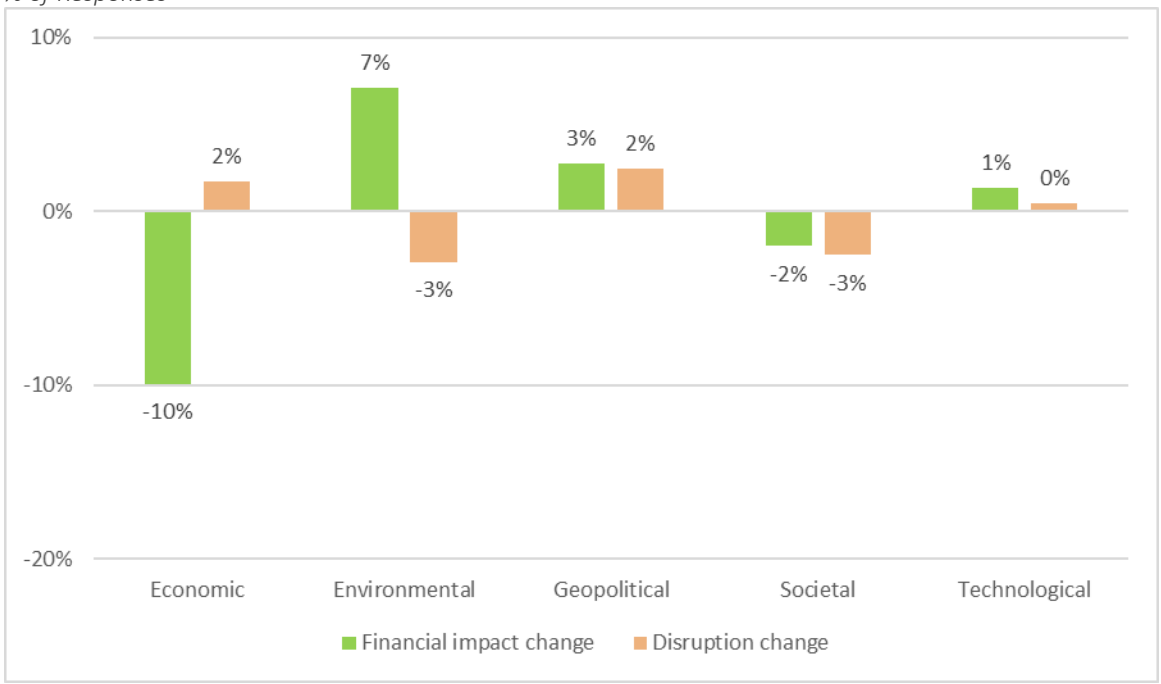


Figure 52

CHANGE IN TOP FIVE EMERGING RISKS SEGREGATED BY GREATEST STRATEGIC IMPACT

% of Responses



Figures 53, 54 and 55 show, for the top emerging risk, the categories chosen by year. Those who focused on the financial impact of strategic risks in 2023 were more likely to choose the Environmental (+9%) and Technological (+10%) categories and less likely to choose the Economic (-13%) category. Those who focused on disruption in 2023 were more likely to choose Geopolitical risks (+12%) as their top emerging risk and less likely to choose Economic (-6%) or Environmental (-6%).

Figure 53

TOP EMERGING RISKS SEGREGATED BY THOSE CHOOSING FINANCIAL IMPACT AS GREATEST STRATEGIC IMPACT

% of Responses

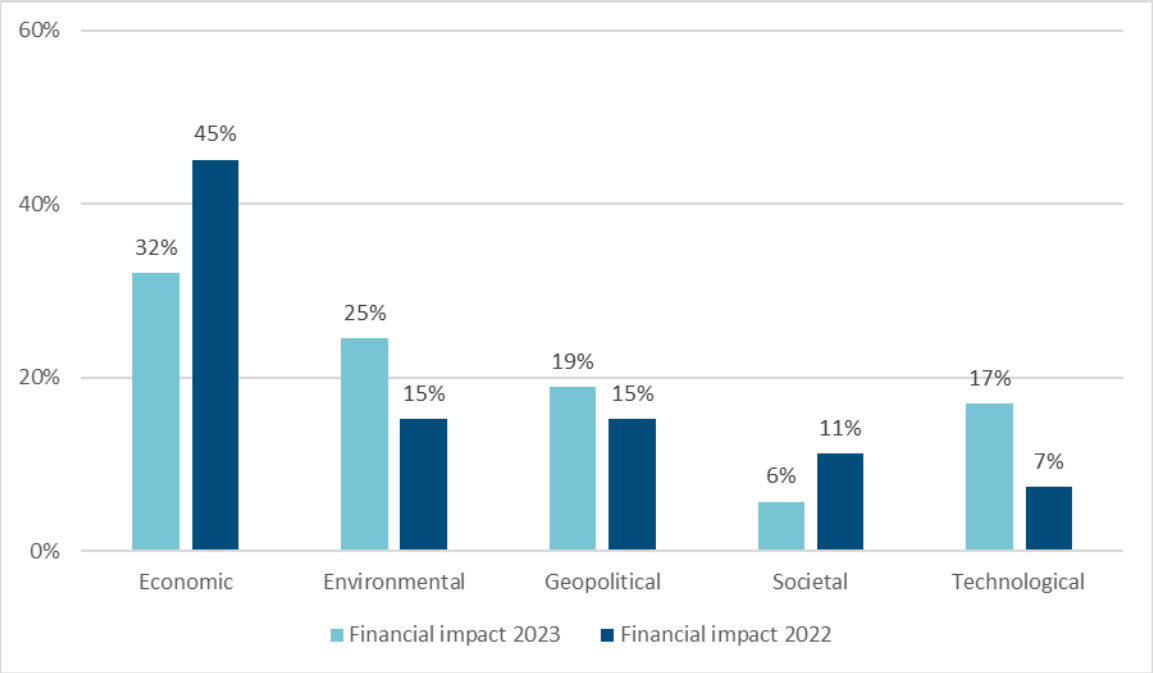


Figure 54

TOP EMERGING RISKS SEGREGATED BY THOSE CHOOSING DISRUPTION AS GREATEST STRATEGIC IMPACT

% of Responses

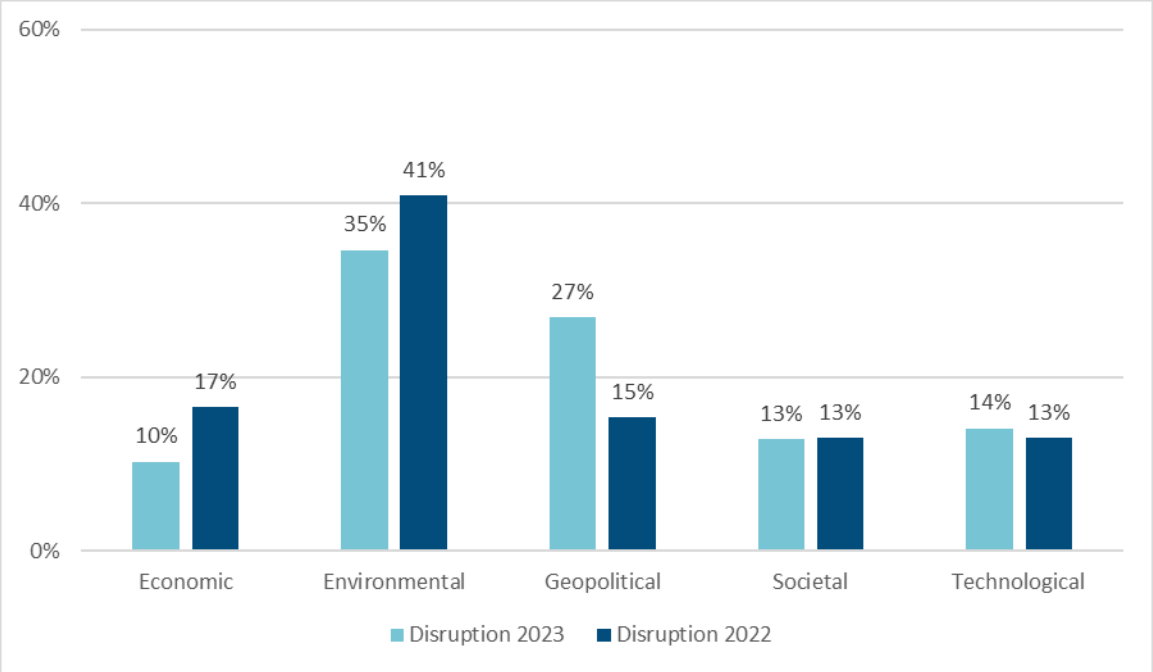
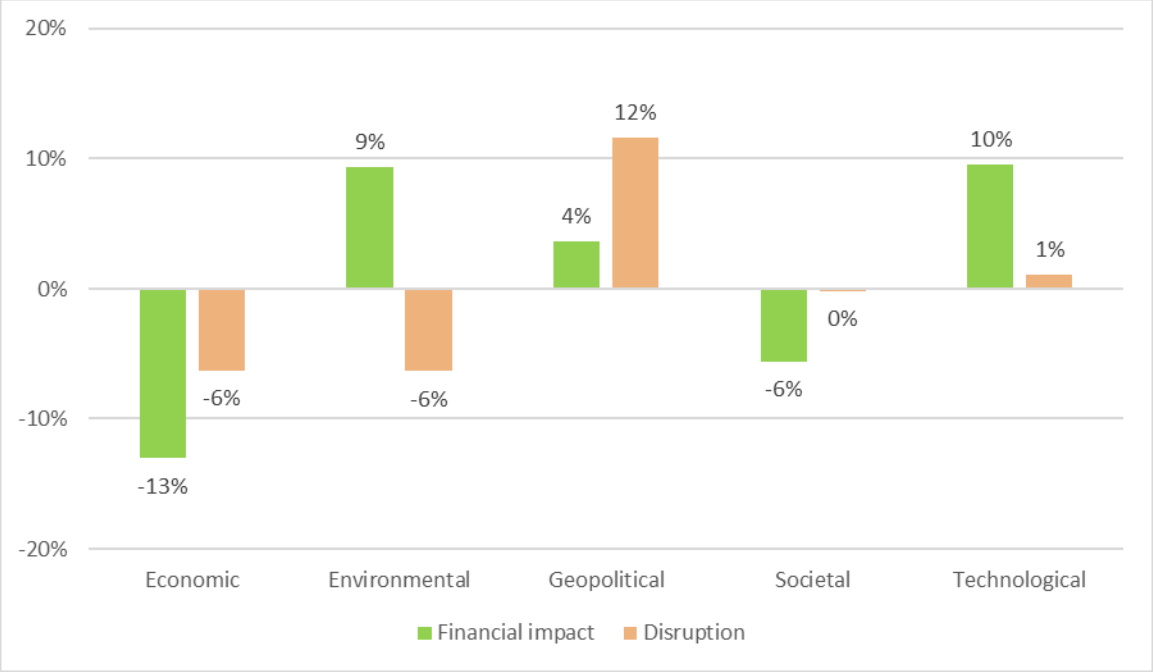


Figure 55

CHANGE IN TOP EMERGING RISK SEGREGATED BY GREATEST STRATEGIC IMPACT

% of Responses



4.5.5 EMERGING RISK ROLE IN REGIME SHIFT

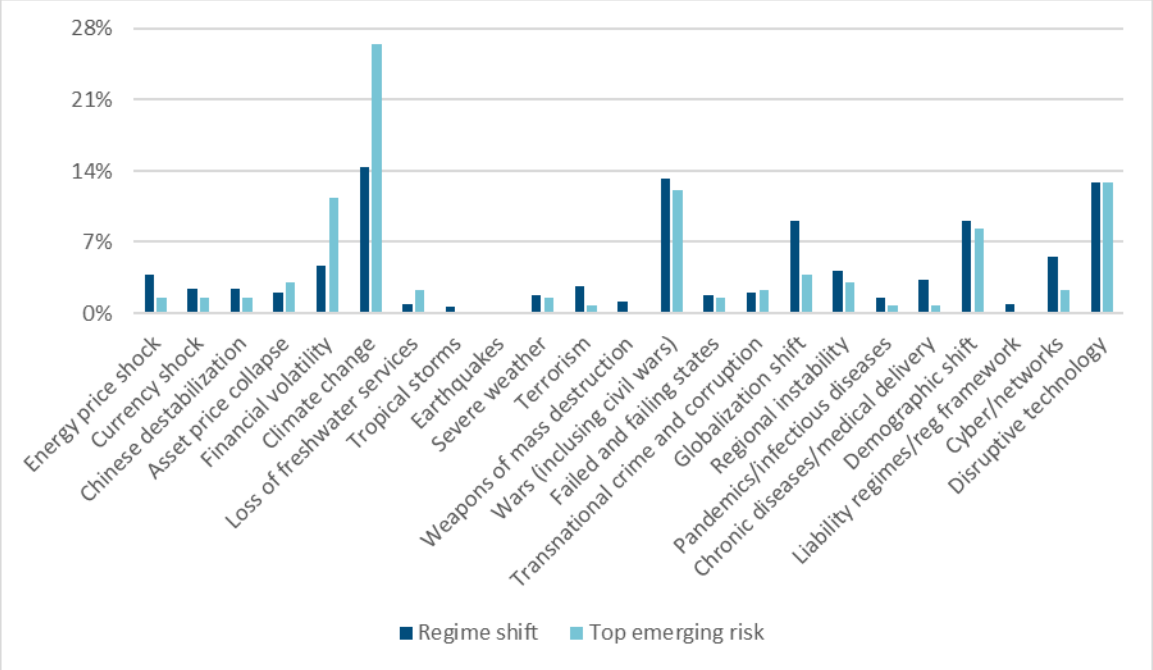
Respondents were asked to share up to three risks most likely to play a material role in causing a regime change in the next 5-10 years. Additional information about regime change was provided and can be

viewed in appendix B. The top responses were *Climate change* (42% of respondents named it as one of their top three), *Wars (including civil wars)* (38%) and *Disruptive technology* (37%). Only the Economic category is not represented in the top five, and Geopolitical dominated the categories (34%). Figure 56 shows how risks that lead to a regime change compared to the top emerging risk.

Figure 56

RISKS LIKELY TO LEAD TO REGIME SHIFT COMPARED TO TOP EMERGING RISK

% of Responses

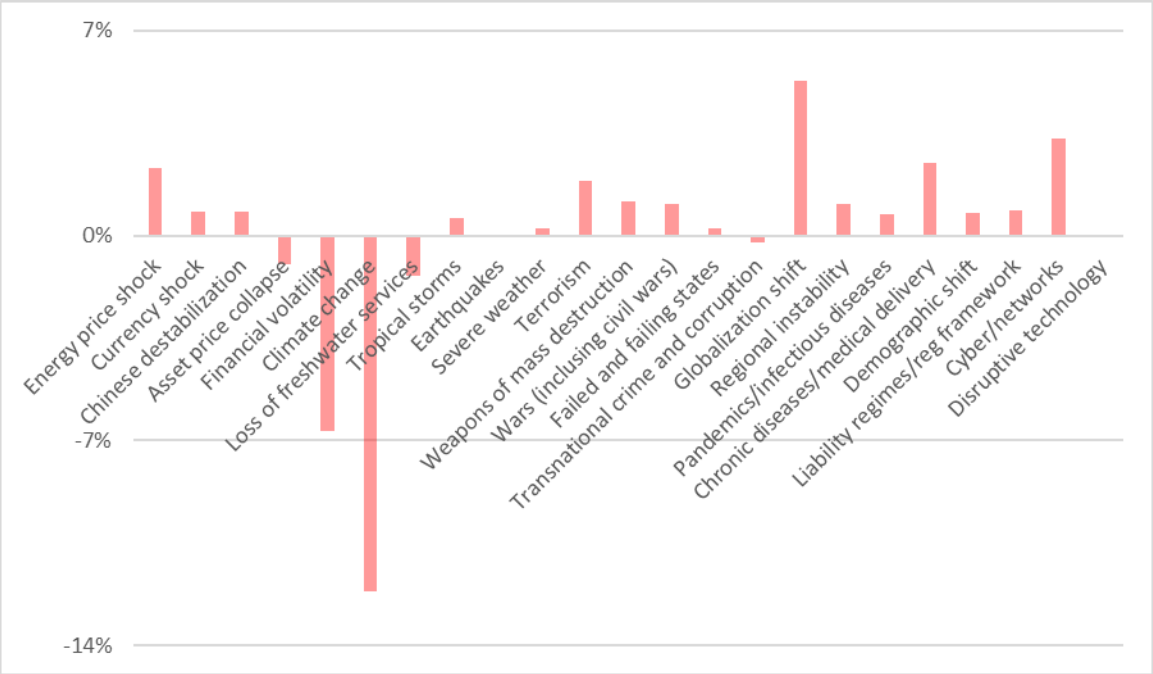


Risks that respondents reported as more likely to create a regime shift than to be the top emerging risk, shown in figure 57, were led by *Globalization shift*, *Cyber/networks*, *Chronic diseases/medical delivery*, *Energy price shock* and *Terrorism*. *Climate change* and *Financial volatility* each had much larger results as the top emerging risk than were likely to cause regime shift, likely due to the short time horizon and mean reversion nature, respectively.

Figure 57

DIFFERENCE BETWEEN RISKS LIKELY TO LEAD TO REGIME SHIFT COMPARED TO TOP EMERGING RISK

% of Responses



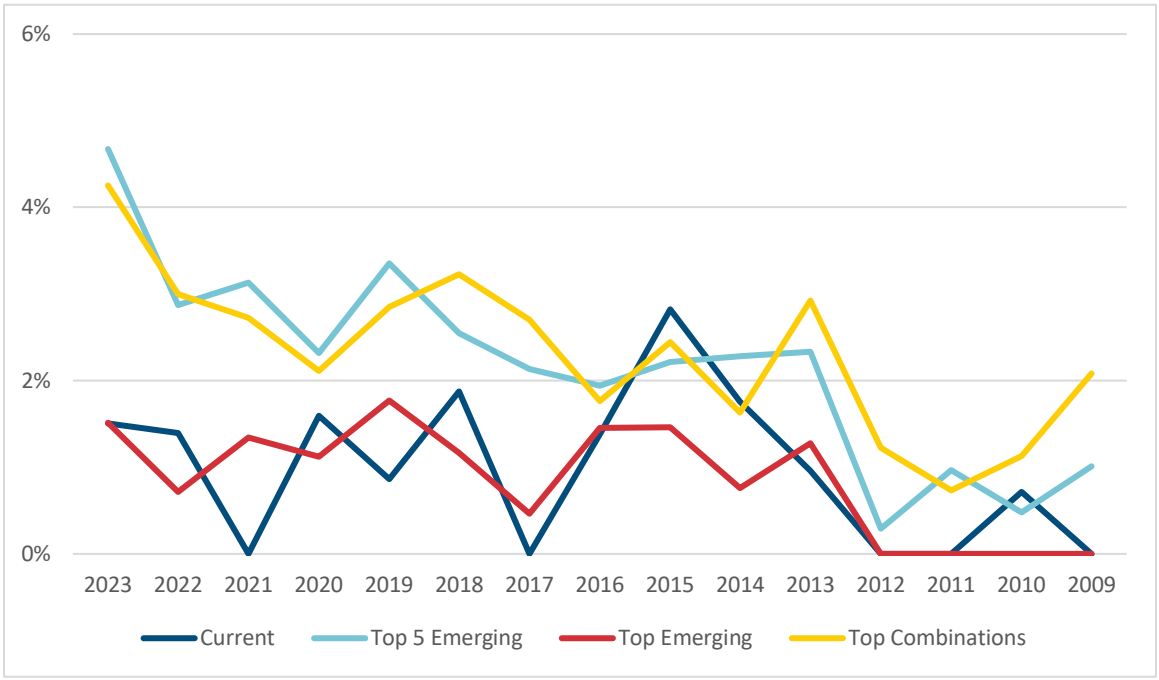
Only six risks were not chosen by at least 5% of the respondents, and that includes some that are cyclical like earthquakes and pandemics. Respondents were asked to elaborate on their responses. A summary of typical and/or interesting responses follows. A lot of the comments suggest certain risks are threat multipliers. Some respondents interpreted regime shift to require war, which it does not.

- *Interaction between Climate change, natural disasters, regional instability, wars*
- *De-Globalization shifts that see power shift among regional players, leading to war.*
- *Climate change impacts food supplies, livability in certain regions, climate migration, conflict, demographic shift in multiple regions of the world.*
- *Longevity leads to health care shortages*
- *Wealth Inequality*
- *Failed/failing states of large countries*
- *Feedback loop between climate change and active wars*
- *US losing its position of leadership, both politically and economically, in the world*
- *Unknown impact of cyber and disruptive technologies, both positive and negative*
- *Need for stability – financial, climate, health, rule of law, energy supplies and cost,*
- *Potential for technology to drive productivity gains*
- *The impacts of climate change are diverse and accelerating in their severity. These are likely to trigger higher order impacts on many other systems, processes, people, and regimes. Wars and instability have already occurred as a result of climate change, and the stresses induced by climate change will create new problems we have not yet fully contemplated.*
- *Regional concerns in the Middle East and China*
- *Disruptive technology, e.g., AI, will lead us into the unknown and will require new strategies and new ways of thinking.*
- *Significantly higher mortality and property and casualty claims caused by to higher temperatures and weather-related natural catastrophes.*

4.5.6 HIGHLIGHTED RISK – NATURAL CATASTROPHE: SEVERE WEATHER (EXCEPT TROPICAL STORMS)

As the climate warms, for a 1°F temperature increase, the atmosphere can hold 3-4% more moisture and extreme weather becomes more common. One risk that is moving higher is tied to severe weather, the extreme weather events tied to inland convective storms, flooding, drought, heat waves, wild fires and sand storms. This is especially true for the top five emerging risks and emerging risk combinations, as seen in Figure 58. Paired with *Climate change*, it is also the top risk combination.

Figure 58
HISTORICAL RESULTS FOR NATURAL CATASTROPHE: SEVERE WEATHER (EXCEPT TROPICAL STORMS)
% of Responses



4.5.7 ADDITIONAL RISKS

The final question in this section asked for suggestions of risks that are not included in the current set of 23 (defined in appendix A). The best of these responses will be used to modify the risk definitions (see appendix A for examples) in future survey iterations to incorporate risk nuances. Here are some typical suggestions:[6]

- *Access to health care*
- *Mental health*
- *Cultural shift/turmoil – with Geopolitical globalization shift – include antisemitism, racism, misogyny and similar acts too*
- *Border security/immigration*
- *Specify religious conflicts under War*
- *Include illiquidity in definition of asset price shock or financial volatility*
- *Concentration risk of assets and other?*

[6] Direct comments from respondents have been slightly edited throughout the report.

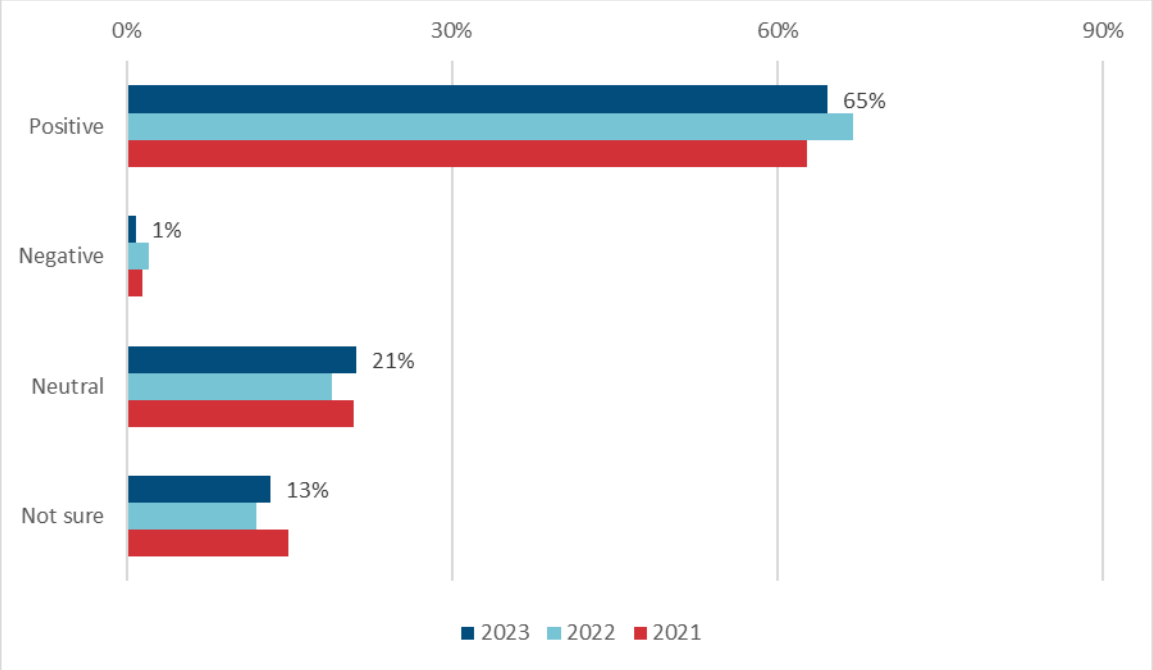
The complete list in appendix B is very thought provoking. Several definitions should be updated in future surveys. These suggestions also help to drive future qualitative questions.

4.6 SECTION B: ENTERPRISE RISK MANAGEMENT (ERM)

This section solicits input from practitioners on the overall health of their ERM practice. Open-ended questions complement the emerging risk trends asked about in section A. Each risk management program is unique. The reader's experience will differ from that of the researcher, so you are encouraged to pick out and interpret the comments made in appendix B. Based on the practitioner's personal ERM journey, they will suggest possible future development paths of an ERM process at various levels of maturity.

The first question in this section asked respondents whether enterprise risk management has had a positive, negative or neutral effect in your company/industry. As figure 59 shows, a majority (65%, down from 67%) responded that the effect has been positive. This result has been above 60% in each year since 2020. ERM continues to evolve toward company-specific levels consistent with unique governance goals and company risk culture, but results for this survey question seem to be stabilizing.

Figure 59
EFFECT OF ERM IN RESPONDENT'S COMPANY/INDUSTRY
% of responses in Given Year



An open-ended question asked respondents to share an example from the past year where an event occurred that could have been avoided if proactive ERM planning had been in place. Typical comments referenced the impact of higher interest rates that forced regulatory responses and stressed financial firms' balance sheets with unrealized fixed income losses. Better ALM and stress testing could have helped. The comments included the following:

- *Proactive ERM has in some ways hindered innovation by limiting targeted risk taking*
- *Silicon Valley Bank insolvency*
- *change pension asset investment policy to better immunize from discount rate shifts*
- *The problem of negative IMR. Rapid increases to interest rates are not without precedent. Regulators and ERM teams should not have been caught flat-footed by this sort of situation.*

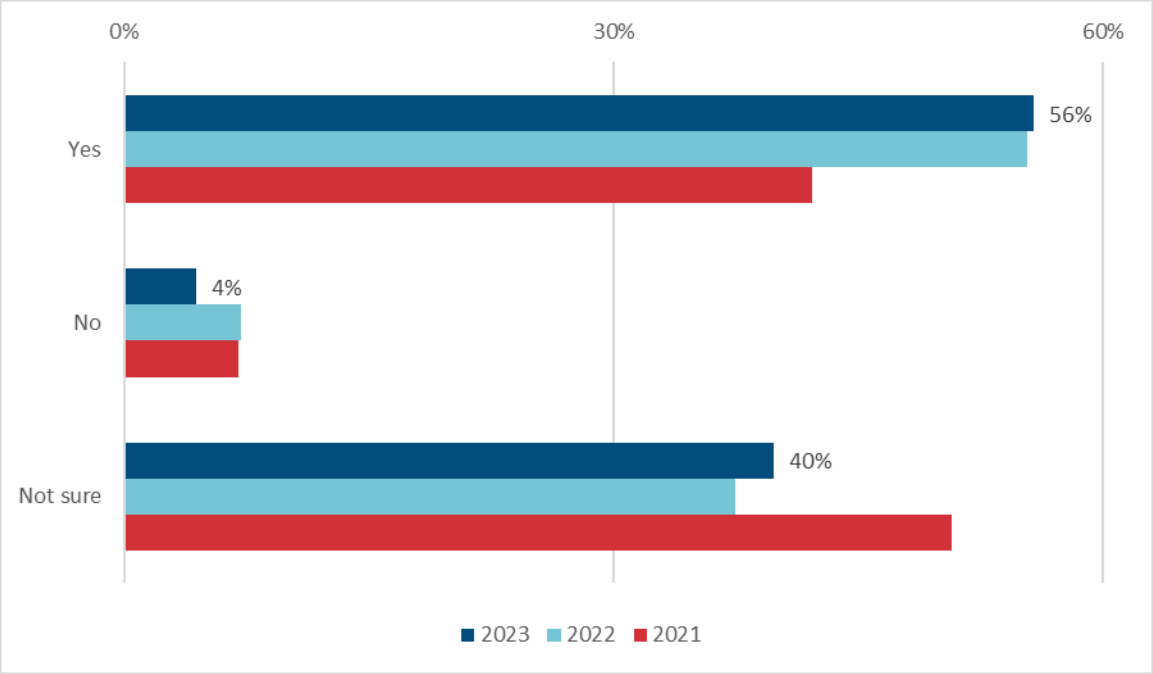
- *It has taken way too long to recognize climate change as a major risk; even in the actuarial profession of supposed risk experts. We need to define ""future"" more definitely in the context of time horizon; look for indicators suggesting evolution of particular risks.*
- *There was an attack at our workplace that should have been avoided with better crisis management.*
- *SVB crisis that forced Fed to reverse QT - scenario planning and stress testing of mean reversion scenarios would have made the risk obvious, and the companies with exposed balances (above FDIC limits) should have easily seen this risk.*
- *Losses due to extreme weather can be minimized through aggregate and individual risk concentration studies.*

Balancing risk and return are hard. When times are good, management's risk appetite grows only to be surprised when the cycle turns. The survey asked whether implementing ERM improved company returns relative to the amount of risk. Results as shown in figure 60 indicate similar responses to the prior survey and a lower rate saying no (4% versus prior year 7%). Splitting the comments out by how the question was answered provides additional clarification. This question has many well-thought-out responses. Readers are encouraged to read all of them in appendix B.

Figure 60

WHETHER ERM IMPROVES RETURNS RELATIVE TO RISK

% of Responses in Given Year



Among those stating that ERM does improve returns relative to risk, comments in this year's survey make it clear that ERM has become part of the normal process at many firms:

- *ERM allows companies to make risk-based decisions, and take on additional risk with more comfort, knowing that there are monitoring and mitigation mechanisms in place to reduce the impact of any particular risk, as well as financial modeling capabilities to take advantage of risk diversification.*
- *A consistent approach to reviewing and monitoring of ongoing risks.*
- *A well-functioning ERM organization should be able to spot opportunities as well as avoid disasters*

- *The same reason having brakes on a car allows for a higher average speed.*
- *Helps to keep the focus on possibilities, and less so on the more common known risks. In particular, the known unknown risks can be properly considered.*
- *Usually more cost effective if future risk is eliminated or reduced in impact compared with lack of planning.*
- *ERM is holistic, so looking at marginal impacts on aggregate risk in a consistent framework allows for better decisions to be made.*
- *It helps identify what are the key risks the company faces and helps mitigate that risk exposure*
- *It forces management to think about the risks. It is too common for companies to sell products without properly considering all risks.*
- *ERM can help put a collar on the negative impact of risks, and reduce volatility.*

Only one respondent who said ERM does not improve returns relative to risk shared a comment:

- *Big companies are being too cautious and are being swayed too easily by grifters.*

Some of the most thoughtful comments came from those who were not sure if ERM has added value. Representative comments included:

- *It depends on how it is implemented. Some companies use it less for strategic risk taking and more for defensive purposes. If the ERM area is only focused on loss prevention instead of strategic risk taking, it can be a drain on company resources without providing enough in return to warrant the costs.*
- *I find it difficult to estimate the value of ERM*
- *ERM is an echo chamber.*
- *ERM can prevent risks, but it can also be a hindrance to development and innovation.*
- *Many companies are still viewing ERM as a "check-the-box" exercise, as opposed to a useful tool.*
- *Its hard to disprove a negative- ERM function is blamed when something goes wrong but not credited when bad things happen and company weathers the storm*

Two open-ended questions were asked about scenarios. In the first, respondents were asked how scenarios, both deterministic and stochastic used to manage a company, changed as extreme weather events and geopolitical events have played out in 2023. Many found the timeframe too short to adjust or did not feel that these risks impacted them. The following are a few examples:

- *Additional deterministic scenarios have been added to the risk catalog based on the events in 2023, as well as projections for 2024 (being an election year for the US, for example)*
- *No change. Reporting of weather has become more sensational. Losses from weather have been steadily decreasing. Scenarios should reflect reality rather than sensational reporting.*
- *how are you defining "extreme weather events"? what some categorize as "extreme" aren't necessarily extreme when reviewed in historical context*
- *Not a factor, no impact on this issue. We do not recognize these as significant risks to track*
- *Allowed for review of scenario robustness and completeness.*
- *A lot of the things that seemed extremely unlikely are now closer to the realm of possibility in the minds of stakeholders*

The second question asked how current risks like the regional bank asset liability management (ALM) crisis due to interest rates had changed the risk team's scenarios. Some said they were testing farther into the tail of the distribution based on recent events. Several noted that a rising rate scenario had already been

tested so no need to add scenarios. This makes sense for insurers with little mismatch in the block of business. The following are examples of their responses:

- *It has caused risk teams to look at scenarios that would have been considered more unlikely in the past. It has also spurred companies to be more cognizant of the liquidity risks that they have.*
- *Biggest change has been to recognize counterparty and credit risk in insured, government-backed borrowers - e.g., FDIC-insured regional banks that have been allowed to fail and threatened with failure.*
- *They increased the range of the various risk scenarios. More options became reasonable.*
- *I don't think the bank liquidity issue has changed any practices. Those banks had liquidity guidelines in place, they just ignored them. No ERM practice, or scenario selection, will avoid willful non-compliance.*
- *We used to focus mainly on parallel yield curve shifts but are introducing more scenarios to understand how twists and inverted curves may impact us. We recently moved to a new accounting regime which is also influencing how these movements are reported, requiring us to update our ALM approaches.*
- *More shocks and sensitivities to shocks. Less reliance on stock ESGs.*
- *A heightened sense of the policyholder (or depositor) behavior risk. You need to have scenarios where behavior can vary for any given scenario. Often an underappreciated risk*
- *Considered more sequential risk scenarios.*

4.7 SECTION C: CURRENT TOPICS

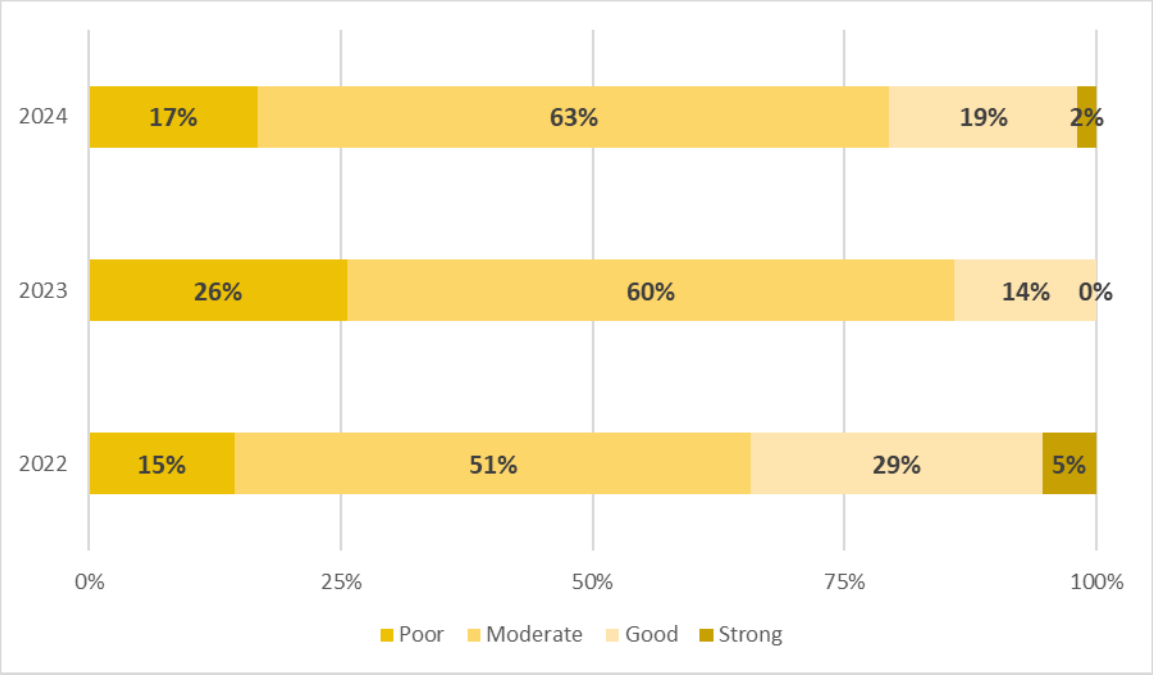
Now, more than 15 years after the global financial crisis, the 17th survey in this series continues to reflect on that period. Now other global events seem to be happening with greater frequency. The world is moving quickly and is no longer as stable as previously. The Current Topics section reflects this, showing some altered assumptions of the future.

Asked their expectations about the global economy, respondents were much more positive than in the previous year, with 63% having a moderate outlook for 2024 and 19% a good outlook (2% had a strong outlook), as shown in figure 61. Poor expectations fell from 26% to 17%. The downside seems similar to 2023 but with more upside.

Figure 61

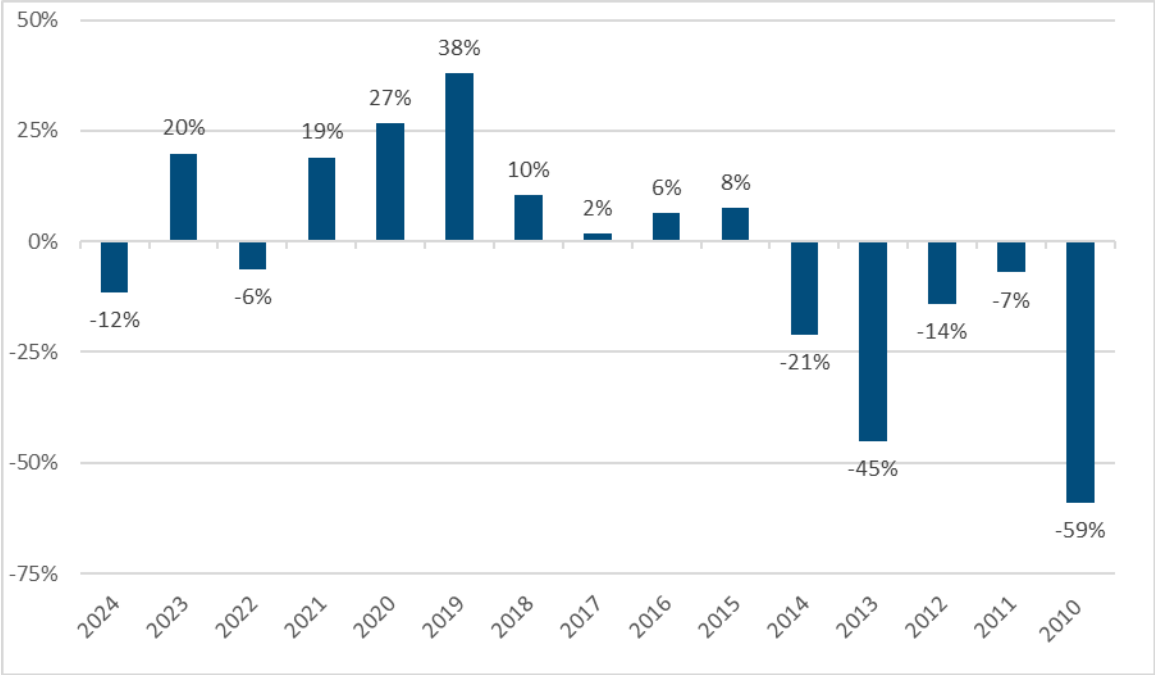
GLOBAL ECONOMIC EXPECTATIONS

% of Responses in Given Year



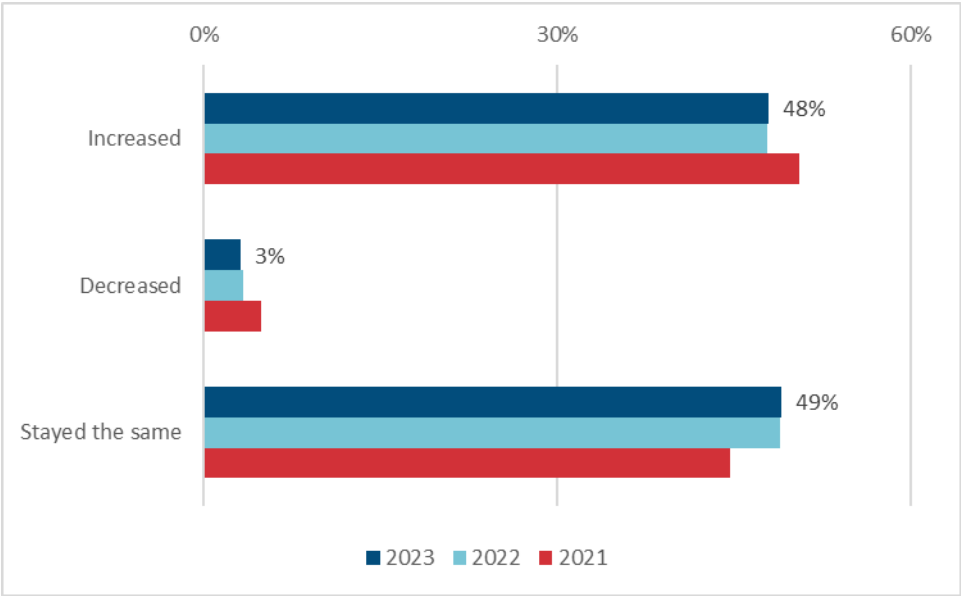
As can be seen in figure 62, the net result, adding good and strong, and subtracting poor, rebounded to a level typical of the last ten years.

Figure 62
NET EXPECTATIONS FOR GLOBAL ECONOMY (GOOD + STRONG – POOR), 2009–2024
% of Responses in Given Year



Nearly half of risk managers (48%) reported increased ERM activity in 2023, nearly identical to the prior survey, as shown in figure 63.

Figure 63
PERCEIVED LEVEL OF ERM ACTIVITY
% of Responses in Given Year

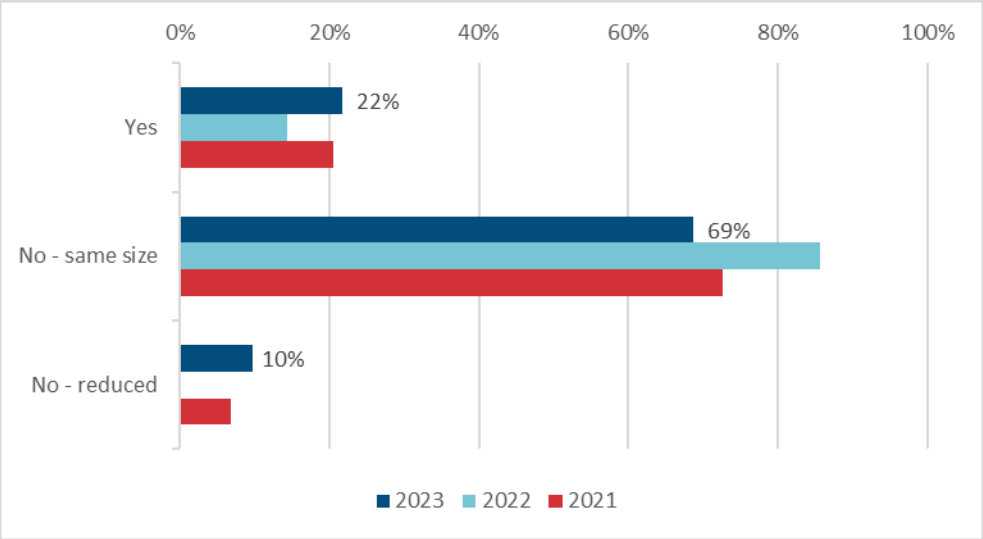


Higher ERM activity led to internal staff growth for 22% (up from 14%) of the respondents in 2023, as shown in figure 64. A material level, 10%, saw their staff decrease in size.

Figure 64

ERM INTERNAL STAFF GROWTH

% of Responses in Given Year

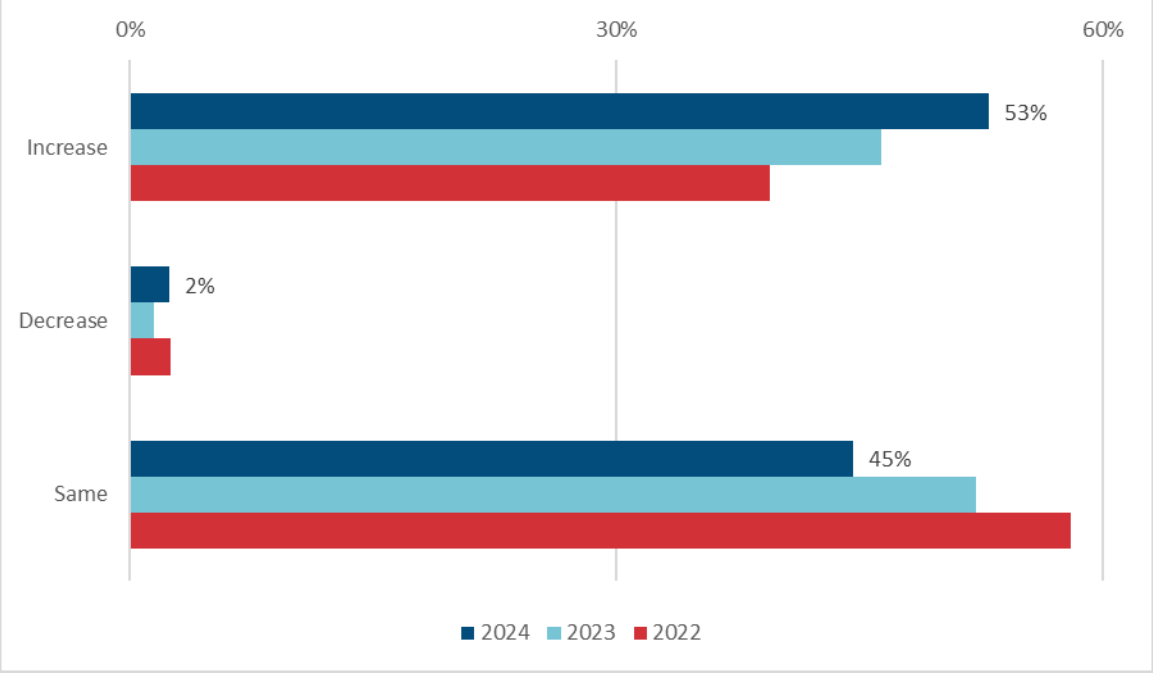


ERM activity is expected to increase for 53% of the respondents in 2024, as shown in figure 65, with only 2% expecting ERM activity to decrease. This is consistent with the responses in the previous section where risk teams were being asked to do more.

Figure 65

ERM ACTIVITY GROWTH

% of Responses in Given Year

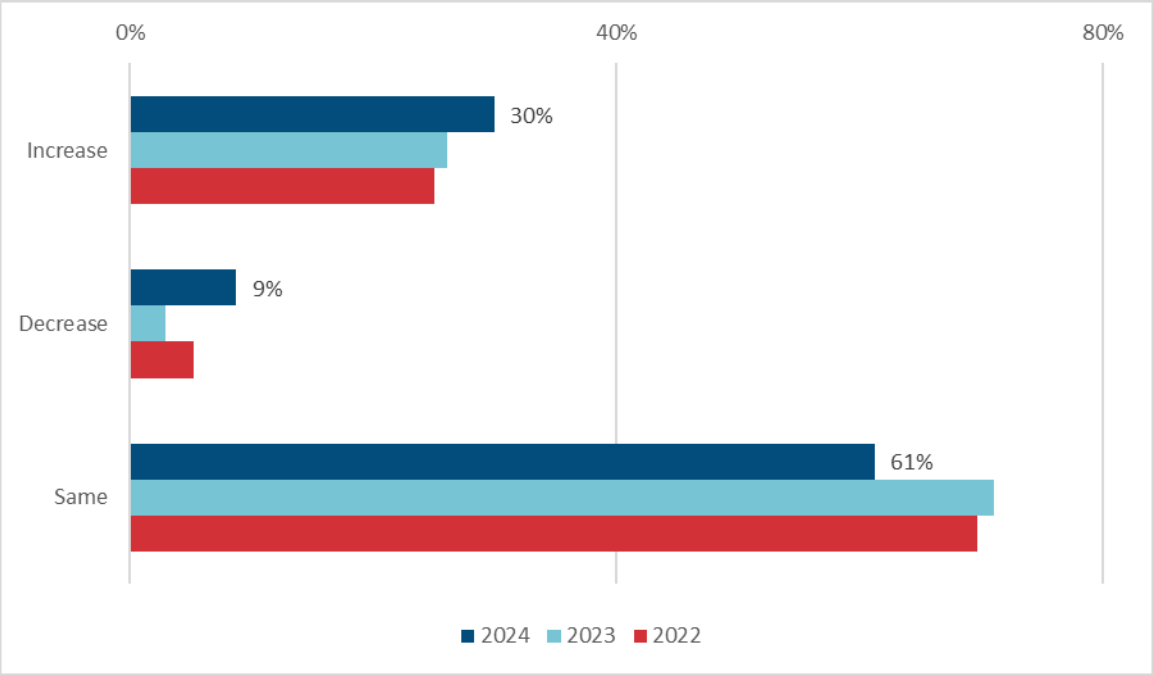


Respondents indicated that levels of funding for ERM are expected to increase by 30% in 2024. Figure 66 shows that 9% expect funding to decrease for the upcoming year.

Figure 66

ANTICIPATED LEVELS OF ERM FUNDING

% of Responses to Given Question

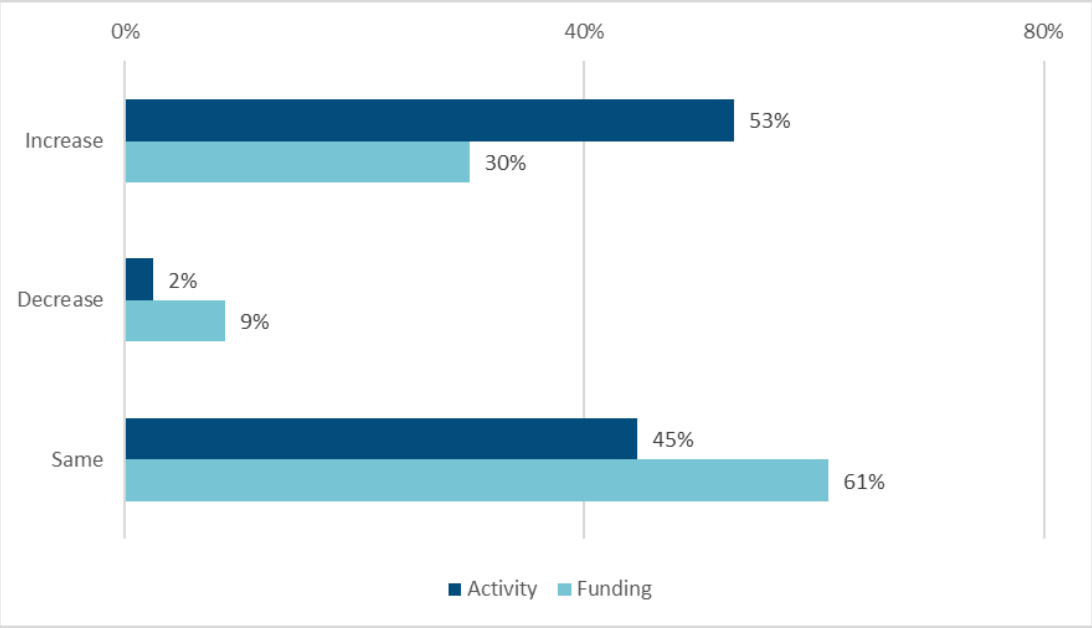


In figure 67, respondents show that activity levels are expected to increase in 2024 more than funding. This is disappointing but consistent with prior surveys.

Figure 67

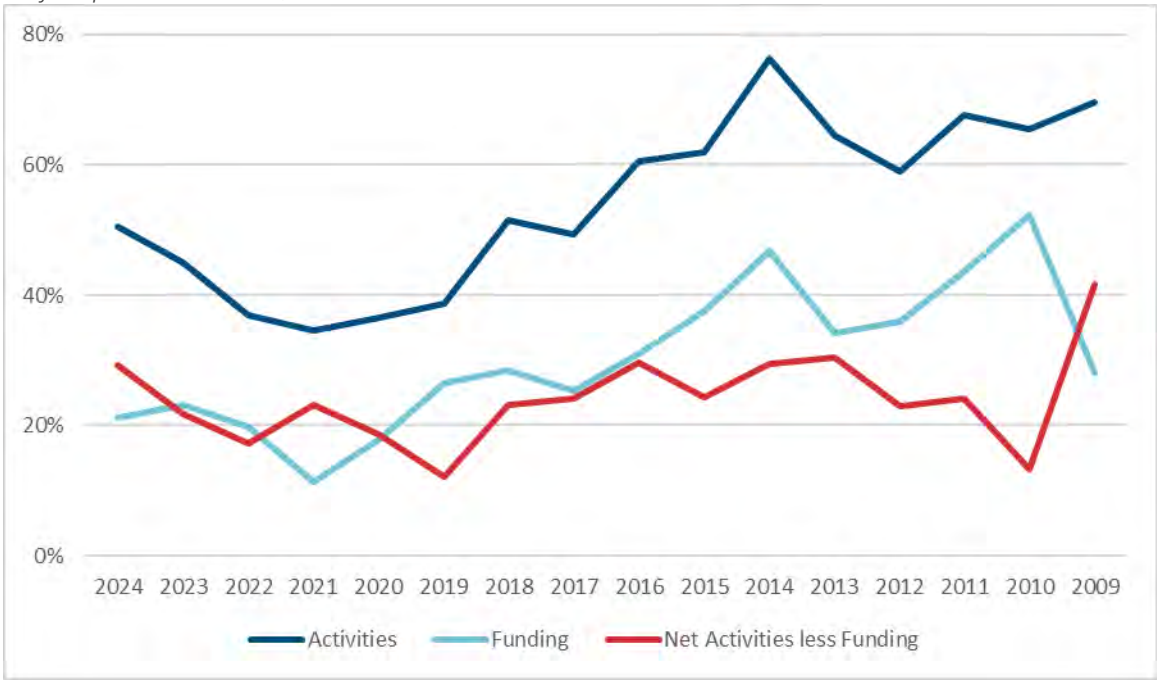
ANTICIPATED LEVELS OF ERM ACTIVITY AND FUNDING IN 2024

% of Responses to Given Question



The net result when the increase in ERM funding is subtracted from the increase in activities, shown across all years in figure 68, was the highest since 2016. Risk practitioners should expect to stay as busy as always.

Figure 68
ANTICIPATED LEVELS OF ERM ACTIVITY AND FUNDING
% of Responses to Given Question



Demographic shift risk seems like a risk that this group of respondents would be comfortable analyzing. When asked about scenarios they look at, if any, to analyze this risk, many seemed aware of the evolving nature of demographics, but not of historical events regarding immigration assimilation. No comments were received about longevity extension scenarios. The comments received include:

- *Parts of the business consider shifts in values, especially expectations focusing on data privacy and security, as well as reputation risk. Most of the demographic shift scenarios we analyze focus on reputation risk.*
- *Large migration in the US from urban areas to more affordable regions as home prices and inflation hit the economy. A new paradigm around workplace and the types of work expected in the labor force will emerge.*
- *influx of illegal aliens into the country coupled with unwillingness to assimilate them*
- *Domestic migration by state...socio-economic population shifts.*
- *Age, Income, Location, Education*
- *Considering different mortality improvement (or degradation) scenarios, as well as varying birth rates.*
- *aging population resulting in $7.8 trillion in global aum that could leave life insurers by 2040 if retention strategies aren't implemented for their beneficiaries soon.*

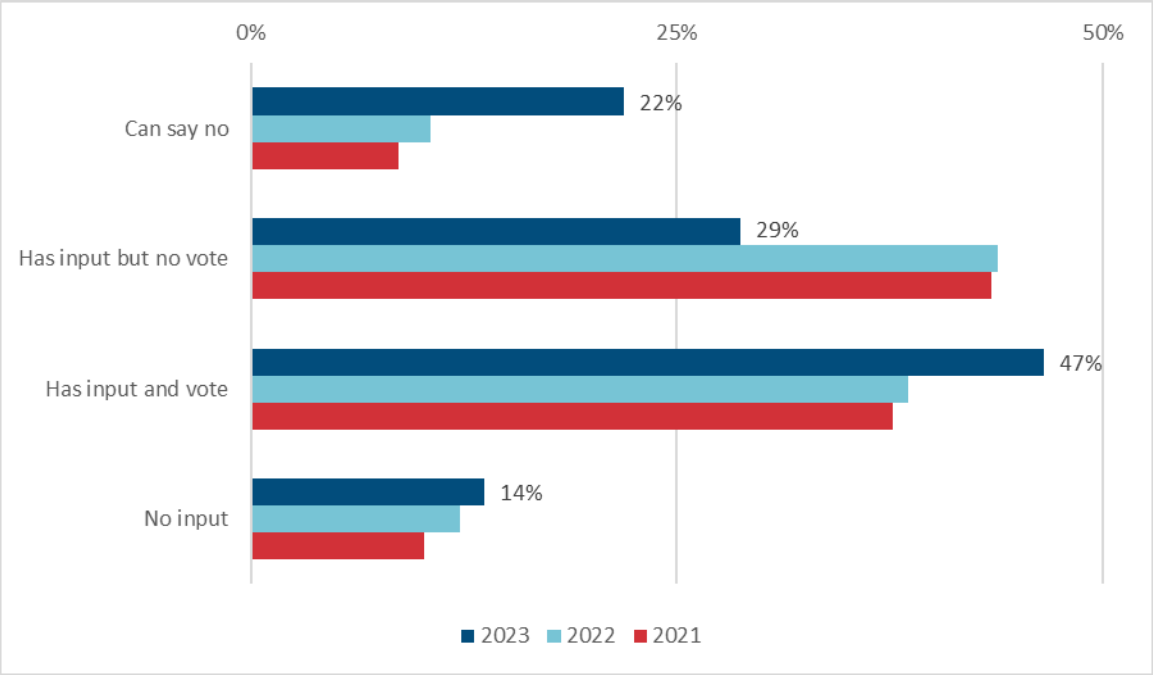
The survey asked how the ERM team is used when a strategic opportunity is presented to a firm. As illustrated in figure 69, 86% of respondents said they provide input to strategic opportunities, down 2% from the prior survey. Within the group that has input was good news, with more (22%, up from 11%) reporting that they can say no to an opportunity, and 47% (up from 39%) having both input and a vote. One person challenged the wording of the question, saying that "*The true measure of an ERM program is a cost/benefit or return on investment.*" This is only true if the board and senior management are open to this

information, but wording could be improved in the future. Other respondents noted the “squishy” nature of the question and that their input is often limited to improving the process going forward.

Figure 69

USE OF ERM TEAM FOR A STRATEGIC OPPORTUNITY

% of Respondents in Given Year



Respondents were asked to describe actions they have taken to build resilience in their personal finances in case an emerging risk event occurs. This question was asked to see if they were implementing tools personally that differed from those used professionally. Respondents had put in place typical actions related to diversification, reduced debt and holding additional cash. The responses included:

- *Diversified across more assets. Holding more cash. Cryptocurrency.*
- *some I know are holding precious metals and guns.*
- *Diversification of investments. Diversification of banks (multiple accounts, including electronic only, like PayPal).*
- *We hold more cash than we would otherwise need. We also chose a home equity line of credit, rather than paying cash, both to give us a buffer line of credit and to not deplete cash. My equity holdings are well diversified, and our retirement funds will be annuitized, not strictly "spent down". I have friends who are hoarding cash and buying gold.*
- *Strong emergency fund*
- *Debt reduction*
- *No loans, pay off credit cards each cycle, more investments in 2-year ladder of fixed income (Treasuries and CDs), equity filter encourages low leverage stocks. Worry is for recession/depression and effects of quantitative tightening while fiscal policy is loose - high likelihood of further stagflation. Ladder will allow dollar cost averaging once conditions worsen.*

Some risk managers seek ways to exploit risk by finding opportunities that are mispriced or provide diversification. Respondents were asked which, if any, emerging “opportunities” they monitor. Comments

noted technology, especially AI, the EV market, product pricing extremes and property in climate resilient locations.

Respondents were asked if they had identified bubbles. A variety of responses were received. Typical responses included housing, equities (whole market of subsets like the EV and AI markets), alternative assets and fresh water. The comments included:

- *housing, healthcare*
- *Real estate and equities*
- *Real Estate is still overpriced (commercial more than residential). There is also more risk in consumer loans than the market currently indicates. While FTX reset the crypto bubble, there is still too much optimism in that market. Green energy revenue expectations are too reliant on government funding.*
- *Alternative assets are at a similar state of unrealistic valuations as they were before the 2008 crisis in terms of undervalued credit risk. Private Equity has NO BUSINESS OWNING life insurance and annuity firms due to the duty of regulators to the public good, They run into industries, pump and dump them and destroy them relying on the privatization of the profit they make if bad things don't happen and socialization of damages if they do.*
- *House prices and cars are two possibilities.*
- *Water is priced too low as aquifers run low - higher prices would encourage desalinization but also lead to higher prices for food*

Respondents were also asked to share an unknown known, where there is historical data, but it is not predictive, along with how it is managed. Responses improved from the prior survey, including more examples of how the risk was managed. Respondents are concerned about many of their primary assumptions related to mortality, morbidity, policyholder behavior, interest rates, cyber and severe weather events. The responses included:

- *Policyholder behavior risk, especially around annuities. I'm unsure if the past experience of lapsation will be predictive of future lapsation as interest rates remain higher or increase from current levels.*
- *medical advancements - impacts on morbidity/mortality*
- *The chance of upcoming recession in the next 12 months. We are advising caution for entry into certain insurance markets at this time.*
- *Opioid deaths - premium increase for specific age groups, additional sales in the age groups most affected (to spread the risk over a wider group of policies), decreased sales at age groups most affected, improved risk selection techniques*
- *None of our historical data is predictive.*
- *Cyber data. Use as much industry breach data as possible.*
- *n/a to my practice area*
- *Interest rate risks - current yield and credit spread movements are not lining up with historical data.*
- *All weather-related risks - I follow Worldweatherattribution.org, led by Dr. Friederike Otto, where they anticipate impact of on/off fossil fuel extraction since 1750. Other option is first differences over last 5 10 or 30 years and extrapolate.*

In the time since the start of the pandemic, many workers have revisited their work goals. Early on, there was unemployment insurance and stimulus benefits that allowed time to absorb the new situation. In what became known as the Great Resignation, many workers resigned even if they did not have another job lined up. Even now, help-wanted ads are plentiful for many jobs. The survey asked employees at insurance companies how this has impacted their ERM function.

With many employees returning to an office setting at least part time, the job market for professionals is not as difficult as it was during the height of the pandemic. The Great Resignation seems to be fading as government stimulus is withdrawn. For the third time, the survey asked employees at insurance companies how staffing issues impacted their ERM team. The survey found that 63% of respondents were impacted by the issue in some way, and some by more than one.

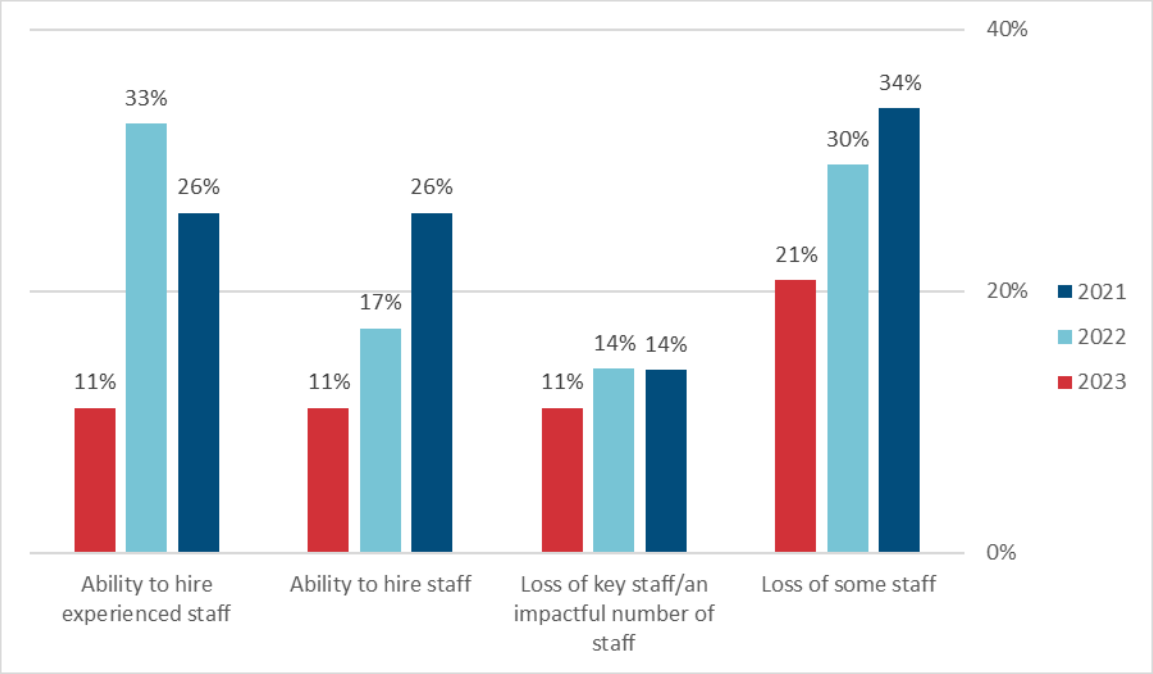
It's not clear what these responses would have been prior to the pandemic, but the situation for insurers seems to be improving. Only 21% (down from a peak of 34%) reported a loss of some staff, as shown in Figure 70. Respondents noted that it was easier to hire staff this year relative to last (11% versus previous 33%). The interactions between the stressed commercial real estate market and possibility of a recession, job market for risk managers, pandemics, and extreme weather events (among others) makes this an interesting ongoing topic.

With no baseline prior to the pandemic to work from, it's not known what these results would have been in the past. This question could be asked periodically going forward to determine if 2021 was a temporary high point (similar to a concentration of combinations during the great financial crisis), consistently stable level, or something else.

Figure 70

IMPACT OF GREAT RESIGNATION TO ERM FUNCTION

% of Respondents



In a new question tied to those about the Great Resignation, the survey asked an open-ended question: As employees return to the office following the COVID-19 lockdowns, what challenges do you see for individuals and employers (e.g., inflation eroding purchasing power, preference for remote work, or other employer-employee friction points)? There were many responses, including concerns about maintaining fairness between new and existing employees, impact on office space, inter-generational value conflicts and remote work. Some examples are:

- *Salaries are sky rocketing due to demand. How do you bring in talent while also rewarding your current staff for not leaving*
- *change in employee priorities (i.e., work just not as important for many people)*

- *Obvious waste of space for owned or long term leased office space. Still see a clear preference of remote work for experienced hires. Hires out of school preferring in office. Very tough to balance. Training methods need to be improved for helping newer (early in career) professionals.*
- *Inflation on personal spending power. The remote work battle: the desire of employees to be remote, but the employment market has changed again as we come out of the peak of the pandemic. Roles are not going to be treated equally and it is not a matter of pay scale. Customer service and Fellows of the actuarial orgs will have the power to demand remote, but the actuarial analyst less power to do so. The challenge is in maintaining morale and culture when what the market demands is not equal with WFH.*
- *It's hard to manage which days everyone on a team will be in the office. Child care (outside the home) is still not back to pre-pandemic levels, and employees are struggling to overcome the pick-up/drop-off responsibilities. Young employees are feeling a lack of mentoring while working remotely, but those under 30 are most likely to be comfortable pinging managers to discuss work-related issues, questions and concerns. Isolation will be a big concern on a more global scale, as I suspect most employees won't recognize loneliness for what it is, or that it would be mitigated by time in the office with other employees. Hallway conversations are not happening, and the loss of overheard discussions will lead to less understanding of the business outside the individual's purview. Cafeteria staffing levels is a problem - and as the company cuts back on food selections, this becomes one more reason to not come to the office.*
- *Concern on how to develop early career employees and foster a sense of loyalty and engagement that leads to positive retention.*
- *Loss of communication skills among employees and loss of desire to communicate one-on-one.*
- *Inflation and preference for remote work are real issues, Stress induced by staff reductions will erupt in more labor unrest as it already is in the health care delivery (such as Kaiser Permanente), retail services (Amazon) and retail pharmacy (CVS, Walgreens) industries.*
- *High preference for remote work, but difficulty with succession, and finding the right people to move into leadership roles.*
- *Increasing costs are squeezing insurers, which creates frictions with employees and hiring practices. There is a desire to keep head count and costs down at the same time as employees are overworked and need additional resources. Increasing retirements among Baby Boomers and lack of talented candidates to replace them, both internally and externally, exacerbate the problem.*
- *Now with demonstrated "success" of high-cognitive tasks being deliverable at similar efficiencies remotely, an elevated conflict between employees and management is arising. Though, Management is fractured on the topic, as well.....Mandating a return to the office is leading to a "regime shift" on many individuals which adapted in many economic ways toward being remote (particularly with family care & household management). Disrupting employees to change that erodes the employer-employee relationship. In an environment where labor is more available than supply, this leads to the employee (best talent) considering and being triggered to consider alternatives.*
- *Inertia. It is difficult for employees to go back to the office on a regular basis. May put organizations at risk of losing employees if a number of days at the office per week becomes mandatory.*
- *For employees, increased travel time and cost, increased cost of child supervision, etc. For employers, increased rent and other infrastructure cost, inability to retain key staff, a disgruntled workforce.*
- *Travel budgets are becoming inflated because we are hiring remote employees in other parts of the country but still requiring that they come in to the home office 2-4 times per year.*

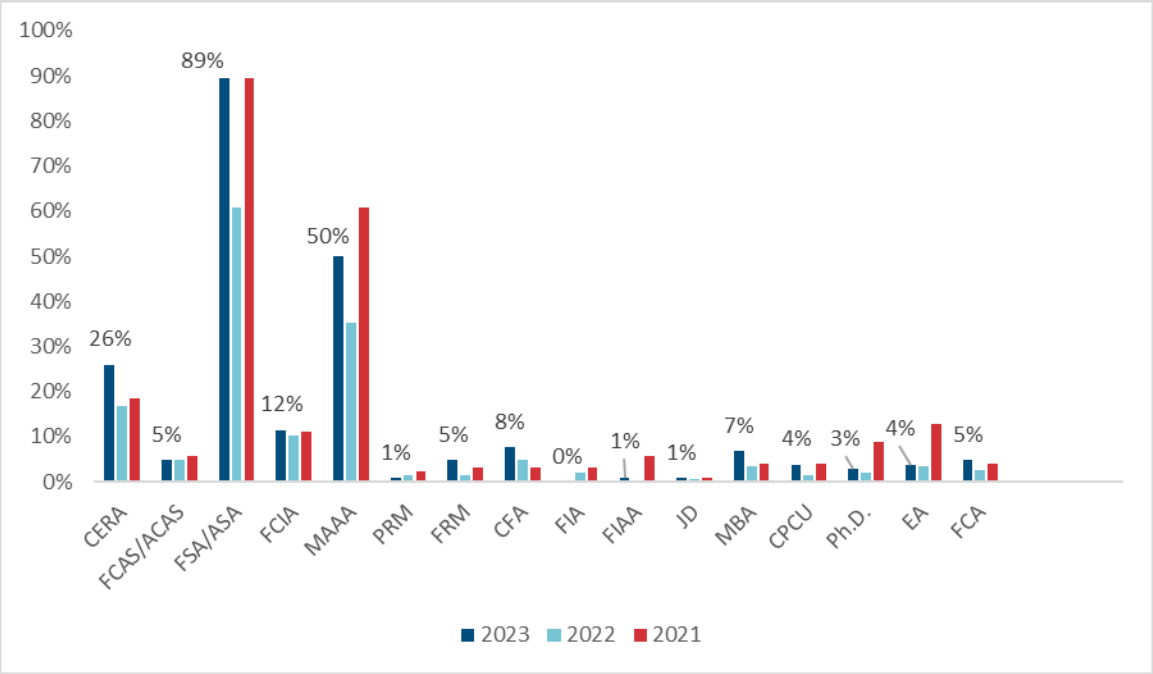
4.8 SECTION D: DEMOGRAPHICS

Each year, the *Emerging Risk Survey* is distributed using targeted emails and social media. For this survey, 70% reported filling out the survey in the past, the highest level in the survey's history. Those holding the CERA credential from an actuarial organization represented 26% (highest since 2015) of the total. One of the sponsors, the Joint Risk Management Section (JRMS), was well represented in the survey, with 89% of respondents holding a credential from the SOA, 5% from the CAS, and 12% from the CIA (see figure 71). Other groups strongly represented were CFA charter holders (8%) and those with an MBA (7%). Many respondents held multiple credentials. Two areas of practice had changes in participation rate. Health practitioners were 12% of respondents, versus 20% last year, and Property/Casualty was up from 7% to 12%.

Figure 71

CREDENTIALS HELD BY RESPONDENTS

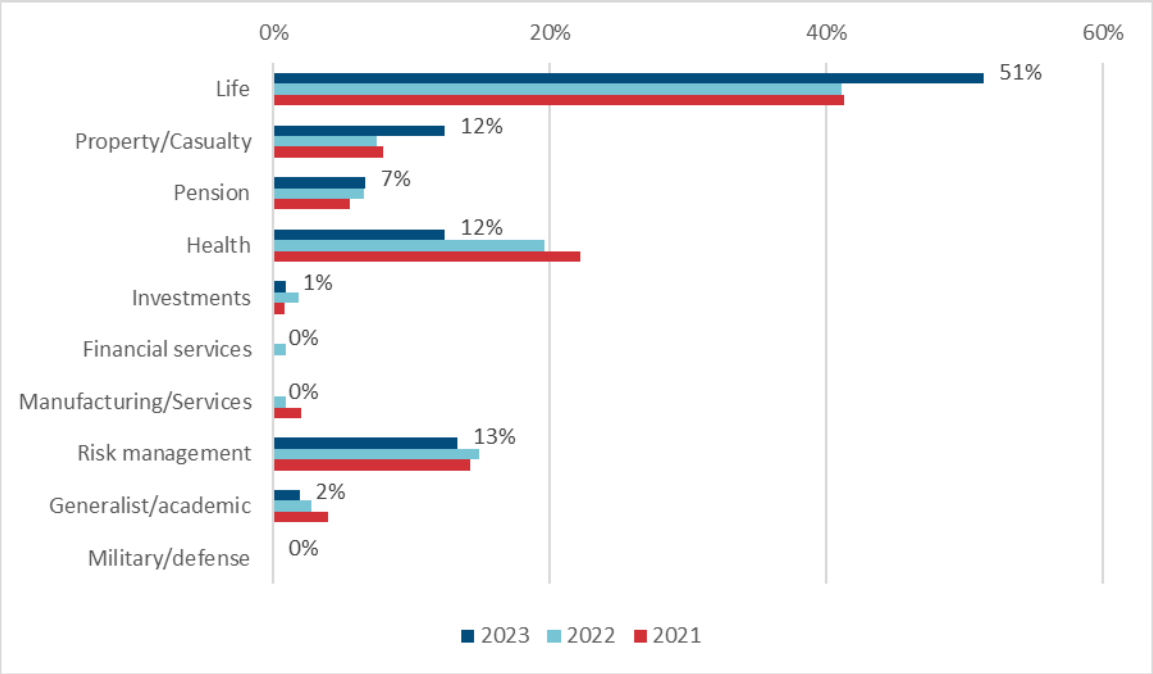
% of Responses in Given Year



This year's survey was completed by experienced practitioners (54% have more than ten years of experience). The researcher is indebted to respondents who share their experiences. Most respondents work at an insurer/reinsurer (69%) or as a consultant (24%).

The survey continued to be dominated by North Americans (81%), with a significant minority coming from Asia (11% up from 5%). As illustrated in figure 72, the primary areas of practice were led by life insurance, risk management, property/casualty, health and pensions.

Figure 72
RESPONDENTS' PRACTICE AREAS
% of Responses in Given Year



A final survey question asked for sources respondents use to scan for emerging risks. The ideas are the most valuable part of this report for some. Respondents shared news services, newspapers (e.g., AP, *Wall Street Journal*, Financial Times, NY Times, Washington Post), magazines (e.g., The Economist, National Geographic), reinsurer and consultant publications, rating-agency reports, LOMA, professional actuarial organizations (e.g., IAA, IFOA, CAS, SOA and CIA), GARP, WEF, the CDC, IPCC and WHO and actuarial consulting firms (e.g., ARM, Swiss Re). Others spoke with peers, reviewed academic papers and participated in risk surveys (internal and external). This survey was referenced by several respondents as a good source, meeting the hopes of the researcher.

Section 5: Future Recommendations

This survey should continue to use open-ended questions to learn from practitioners. Using the experience of the Project Oversight Group (POG) has worked well to develop questions and should continue. The survey should seek to expand distribution beyond North America and outside the insurance industry. Here are specific suggestions made by the researcher, POG and respondents:

- Consider:
  - Question - what types of narrative scenarios do you consider?
  - Massive mortality event
  - Add something like consumer sentiment index to Intro section https://www.bls.gov/wsp/ metrics on strike
  - Question about risk metrics
  - Consider adding religious reasons for wars and regional conflict
  - Section D question 7 – one respondent preferred to focus on ROI as the measure – make clear that risk versus return is considered only after the board and senior management accept the value of ERM
  - Review responses to allow retirees to answer not applicable or make it clear they can leave the question blank

Section 6: Acknowledgments

The researchers' deepest gratitude goes to those without whose efforts this project could not have come to fruition: the Project Oversight Group for their diligent work overseeing, reviewing and editing this report for accuracy and relevance. Any errors remain the responsibility of the author.

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Appendix A: Glossary of Risks – Fall 2023

These 23 risks and a description of each form the core of the Emerging Risk Survey.

ECONOMIC RISKS

- Energy price shock—Price instability and extremes of energy prices.
- Currency shock—Material disruptions to currency equilibrium, including central bank devaluations (currency wars), de-dollarization, and digital currencies.
- Emergent nation destabilization—Fast growing country's economic growth slows, potentially as a result of protectionism, demographics, internal politics, and/or economic difficulties.
- Asset price shock—Price instability and extremes of assets such as housing and equities.
- Financial volatility—Price instability and extremes of sectors, including commodities, equities, or interest rates.

ENVIRONMENTAL RISKS

- Climate change—Change in climate patterns generates both extreme events and changes in trend, impacting infrastructure, agricultural yields, soil degradation, ocean currents, ecosystem biodiversity (e.g., insects, shellfish), and human lives. Drivers of physical and transition risks include, but are not limited to, space weather, pollution, and release of greenhouse gases.
- Loss of freshwater services—Water shortages impact agriculture, businesses, and human lives. Drivers include, but are not limited to, climate change and human influence (e.g., pollution, aquifer depletion).
- Natural catastrophe: tropical storms—Hurricanes, typhoons, and cyclones lead to disruption, catastrophic economic losses, and/or high human loss of life.
- Natural catastrophe: earthquakes—Strong seismic/volcanic activity leads to disruption, catastrophic economic losses, and/or high human loss of life.
- Natural catastrophe: severe weather—Meteorological phenomena lead to disruption, catastrophic economic losses, and/or high human loss of life. Includes inland flooding, tornados, thunderstorms, heatwaves, drought, wildfires, high winds, snowstorms, and dust storms.

GEOPOLITICAL RISKS

- Terrorism—Attacks lead to disruption, catastrophic economic losses, and/or high human loss of life.
- Weapons of mass destruction—Nuclear, biological, radiological, or chemical technologies lead to disruption, catastrophic economic losses, and/or high human loss of life.
- Wars (including civil wars)—Wars erupt between or within countries, leading to disruption, catastrophic economic losses, and/or high human loss of life.
- Failed and failing states—The trend of a widening gap between order and disorder or widening social rifts.
- Transnational crime and corruption—Corruption is endemic. Non-government entities successfully penetrate the global economy.
- Globalization shift—Preference changes to imports and immigration. Changes include populism, democracy, socialism, communism, religiosity, and political uncertainty. Changes in use of technological platforms allow misinformation and disinformation to spread. Countries retrench

and become more nationalistic and protectionist or open up their economies to outsiders. Inequality, privacy, and food insecurity challenge the concepts of fairness and egalitarianism.
- Regional instability—Unstable regions cause widespread political and other crises.

SOCIETAL RISKS

- Pandemics/infectious diseases—A pandemic emerges with high mortality/incidence of diseases such as HIV/AIDS, Ebola, coronavirus, or influenza. Antimicrobial resistance becomes common.
- Chronic diseases/medical delivery—Diseases such as obesity, diabetes, cardiovascular, and substance abuse become widespread or treatments appear. Material changes to medical delivery or financing.
- Demographic shift—Evolving populations size and mix (e.g., age, size, race, fertility rate, mortality rate, migration, skills, workplace environment) drive changes in economic growth and levels of government intervention.
- Liability regimes/regulatory framework—Costs increase faster than GDP, with increases in the spread and size of litigiousness (e.g., social inflation, climate litigation, systemic liabilities due to chemicals, microplastics or hazardous waste) and speed of regulatory revisions. Material changes in tax policy.

TECHNOLOGICAL RISKS

- Cyber/networks—A major disruption in the availability, reliability and resilience of critical information infrastructure caused by cyber risks, terrorist attacks, or technical failure. Results are felt in supply chains, major infrastructure: power distribution, water supply, transportation, telecommunication, emergency services, and/or finance.
- Disruptive technology—Unintended consequences of technology lead to abrupt change (e.g., artificial intelligence, drones, self-driving cars, additive manufacturing, internet of things, nanoparticles). Models become more complex but less descriptive over long time horizons.

EVOLUTION OF RISKS

The survey has attempted to maintain consistent risk definitions as much as possible. Many changes have been made based on suggestions from respondents and POG members, along with the researcher.

Spring 2008—23 risks generated by the WEF's *Global Risks 2007*

Fall 2008—No change to risks, minor changes to definition wording.

2009—No changes

2010—Some definitional changes:

- Changed *Oil price shock/energy supply interruptions* to *Oil price shock.*
- Changed *U.S. current account deficit/fall in U.S. dollar* to *Fall in value of US$.*
- Changed *Blow up in asset prices/excessive indebtedness* to *Blow up in asset prices.*
- Changed *Middle East instability—The Israel–Palestine conflict and Iraqi civil war continue* to *Regional instability* (a variety of hot spots are prevalent around the world. These include the Middle East and the Korean Peninsula).
- Changed *Infectious diseases in the developing world* to *Infectious diseases.*
- Changed *Chronic disease in the developed world* to *Chronic disease.*
- Changed *Emergence of risks associated with nanotechnology* to *Nanotechnology.*

2011—More substantive changes, but with an attempt to maintain trends and simplify:

- Moved *Fiscal crises caused by demographic shift* from the Economic to Societal category and renamed it *Demographic shift*; updated trend data to make it consistent going forward.
- Added *Financial volatility—price instability of core products such as commodities, energy or currency* to the Economic category.
- Combined *Pandemic* and *Infectious diseases* to make *Pandemics/infectious diseases* (A pandemic emerges with high mortality/incidence of diseases such as HIV/AIDS spreads geographically.)
- Changed *Breakdown of critical information infrastructure (CII)* to *Cybersecurity/interconnectedness of infrastructure.*
- Changed *Nanotechnology* (Studies indicate health impairment due to unregulated exposure to a class of commonly used nanoparticles—used in paint, nanocoated clothing, cosmetics or health care—exhibiting unexpected, novel properties and easily entering the human body.) to *Technology/space weather* (Health is impaired due to exposure to nanoparticles, unintended consequences of technology or disruptions caused by geomagnetic storms, meteorites and other phenomena originating from beyond the earth.)
- Changed definition of *International terrorism* from "Attacks disrupt economic activity, causing major human and economic losses. Indirectly, attacks aid retrenchment from globalization" to "Attacks disrupt economic activity, causing major human and economic losses."
- Changed the definition of *Regional instability* from "A variety of hot spots are prevalent around the world. These include the Middle East and the Korean peninsula" to "Certain unstable areas may cause widespread political and other crises. These include, but are not limited to, the Middle East and the Korean peninsula."
- Changed definition of *Liability regimes* from "U.S. liability costs rise by multiples of GDP growth, with litigiousness spreading to Europe and Asia" to "Liability costs rise by multiples of GDP growth, with the spread of litigiousness."

2012—No changes

2013—Changes to two definitions:

- Changed *Natural catastrophe: inland flooding* to *Natural catastrophe: severe weather (except tropical storms)* and the definition to "Meteorological phenomena with the potential to cause significant economic losses, fatalities and disruption. Includes inland flooding from all causes, tornados, thunderstorms, drought, wildfires, high winds, snowstorms and dust storms."
- Changed *Liability regimes* to *Liability regime and regulatory framework*, and the definition to "Costs rise by multiples of GDP growth, with the spread of litigiousness and regulatory revisions."

2014—Changes to the names of two risks:

- Changed *Fall in value of US$* to *Currency trend.*
- Changed *Blow up in asset prices* to *Asset price collapse.*

2015—Changes to the names of four risks:

- Changed *Currency trend* to *Currency shock.*
- Changed *Climate change* to *Climate change (includes space weather).*
- Changed *International terrorism* to *Terrorism.*
- Changed *Technology/space weather* to *Technology* to reflect that space weather is a cause of cyclical climatic variations.

2016—Changes to the names of two risks and updates to the definitions of eight risks, mainly to adopt a consistent method of describing the negative results of a risk. Definition changes were meant to add clarity. Specifically, *Demographic shift* added migration as a specific factor:

- Changed definition of *Natural catastrophe: tropical storms* from "A hurricane or typhoon passes over heavily populated areas, leading to catastrophic economic losses and/or high human death tolls" to "A hurricane or typhoon leads to disruption, catastrophic economic losses, and/or high human loss of life."
- Changed *Natural catastrophe: earthquakes* from "Strong earthquake(s) occurs in heavily populated areas" to "Strong earthquake(s)/volcanic eruptions lead to disruption, catastrophic economic losses and/or high human loss of life."
- Changed *Natural catastrophe: severe weather (except tropical storms)* from "Meteorological phenomena with the potential to cause significant economic losses, fatalities and disruption. Includes inland flooding from all causes, tornados, thunderstorms, drought, wildfires, high winds, snowstorms and dust storms" to "Meteorological phenomena lead to disruption, catastrophic economic losses, and/or high human loss of life. Includes inland flooding, tornados, thunderstorms, drought, wildfires, high winds, snowstorms and dust storms."
- Changed *Terrorism* from "Attacks disrupt economic activity, causing major human and economic losses" to "Attacks lead to disruption, catastrophic economic losses, and/or high human loss of life."
- Changed both name and definition from *Proliferation of weapons of mass destruction (WMD)*—"Treaty on the non-proliferation of Nuclear Weapons is no longer effective, leading to the spread of nuclear technologies" to *Weapons of mass destruction*—"Nuclear, biological, radiological and chemical technologies are held by unstable groups, leading to disruption, catastrophic economic losses, and/or high human loss of life."
- Changed *Demographic shift* from "Aging populations in developed economies drive economic stagnation by forcing governments to raise taxes or borrow" to "Evolving populations (e.g., age, size, migration trends) drive economic stagnation and governmental interventions."
- Changed both name and definition from *Cybersecurity/interconnectedness of infrastructure*—"A major disruption of the availability, reliability and resilience of a critical information infrastructure caused by cybercrime, terrorist attack or technical failure. Results are felt in the major infrastructure: power distribution, water supply, transportation, telecommunication, emergency services and finance" to *Cyber/interconnectedness of infrastructure*—"A major disruption of the availability, reliability and resilience of critical information infrastructure caused by cyber risks, terrorist attack or technical failure. Results are felt in major infrastructure: power distribution, water supply, transportation, telecommunication, emergency services, and finance." Comments in previous surveys had noted that cybersecurity did not cover all cyber risks.
- Changed *Technology* from "Health is impaired due to exposure to nanoparticles or unintended consequences of technology" to "Includes drones, self-driving cars, additive manufacturing (3-D printing), the internet of things, exposure to nanoparticles, or other unintended consequences of technology that lead to disruption and/or catastrophic economic losses."

2017—Changes to the names of two risks and update to the definitions of seven risks, partly to show risk as two-sided:

- Changed both name and definition from *Climate change (includes space weather)*—"Climate change generates both extreme events and gradual changes, impacting infrastructure, agricultural yields and human lives. (Drivers are unspecified; examples include space weather and human influence.)" to *Climate change*—"Change in climate patterns generates both extreme events and gradual changes, impacting infrastructure, agricultural yields and human lives. (Drivers include, but are not limited to, space weather and human influence.)"

- Changed the definition of *Natural catastrophe: tropical storms* from "A hurricane or typhoon leads to disruption, catastrophic economic losses, and/or high human loss of life" to "Hurricanes and typhoons lead to disruption, catastrophic economic losses, and/or high human loss of life."
- Changed the definition of *Natural catastrophe: earthquakes* from "Strong earthquake(s)/volcanic eruptions lead to disruption, catastrophic economic losses, and/or high human loss of life" to "Strong earthquake(s)/seismic activity lead to disruption, catastrophic economic losses, and/or high human loss of life."
- Changed the definition of *Weapons of mass destruction* from "Nuclear, biological, radiological and chemical technologies are held by unstable groups, leading to disruption, catastrophic economic losses, and/or high human loss of life" to "Nuclear, biological, radiological or chemical technologies are held by unstable groups, leading to disruption, catastrophic economic losses, and/or high human loss of life."
- Changed both the name and definition from "*Retrenchment from globalization*—Rising concerns about cheap imports and immigration sharpen protectionism in developed countries. Countries become more nationalistic and state-oriented" to "*Globalization shift*—Preference changes to imports and immigration. Countries retrench and become more nationalistic and protectionist or open up their economies to outsiders."
- Changed the definition of *Demographic shift* from "Evolving populations (e.g., age, size, migration trends) drive economic stagnation and government interventions" to "Evolving populations (e.g., age, size, migration trends) drive changes in economic growth and levels of government intervention."
- Changed the definition of *Technology* from "Includes drones, self-driving cars, additive manufacturing (3-D printing), the internet of things, exposure to nanoparticles, or other unintended consequences of technology that lead to disruption and/or catastrophic economic losses" to "Unintended consequences of technology leads to disruption and/or catastrophic economic losses (e.g., drones, self-driving cars, additive manufacturing, the internet of things, exposure to nanoparticles)."

2018—Changes to the names of two risks and update to the definitions of six risks:

- Changed definition for *Natural catastrophe: earthquakes* to reflect seismic/volcanic activity rather than earthquake/seismic to clarify that volcanic activity should be included with this risk.
- Changed name from *Chinese economic hard landing* to *Chinese destabilization.*
- Changed definition of *Transnational crime and corruption* to refer to non-state entities rather than organized crime.
- Definition of *Globalization shift* adds "Inequality challenges the concept of fairness and egalitarianism."
- Definition of *Pandemics/infectious diseases* expanded to include "Antimicrobial resistance becomes common."
- Definition of *Demographic shift* adds race as an example of an evolving population.
- Changed name of *Cyber/interconnectedness of infrastructure* to *Cyber/network infrastructure.*
- Changed definition of *Technology* to list nanoparticles rather than exposure to nanoparticles.

2019—Changes to the names of five risks and update to the definitions of six risks:

- Changed definition of *Chinese destabilization* to include demographics.
- Changed definition of *Climate change* to include ecosystem biodiversity (e.g., insects, shellfish).
- Changed name of *Natural catastrophe: severe weather (except tropical storms)* to *Natural catastrophe: severe weather.*
- Changed name and definition of *Interstate and civil wars* to clarify that all wars were included. The risk is now called *Wars (including civil wars).*

- Definition of *Globalization shift* adds "Political uncertainty."
- Updated name and definition of *Chronic diseases* to incorporate medical delivery (e.g., change to single-payer system).
- Changed definition of *Liability regimes/regulatory framework* to include increases in the spread and size of litigiousness.
- Changed name of *Cyber/network infrastructure* to *Cyber/networks*, but definition is unchanged.
- Changed name of *Technology* to *Disruptive technology* due to suggestions in prior survey.

2020—No changes to the names of any risks but updates to the definitions of seven risks:

- Definition of *Currency shock* added "Central banks may engage in currency wars."
- Definition of *Loss of freshwater services* added "(Drivers include climate change and human influence.)"
- Definition of *Wars (including civil wars)* added wording to be consistent with *Weapons of mass destruction*…"leading to disruption, catastrophic economic losses, and/or high human loss of life."
- Definition of *Failed and failing states* added "or widening social rifts."
- Definition of *Globalization shift* specifically added references to populism, trade wars and food insecurity.
- Definition of *Pandemics/infectious diseases* added reference to coronavirus.
- Definition of *Liability regimes/regulatory framework* added example of social inflation under litigiousness.

2021—Change to the name of one risk and updates to definitions of four risks:

- Definition of *Currency shock* added reference to digital currencies.
- Name of *Chinese destabilization* modified to *Emergent nation destabilization* to reflect other potentially disruptive nations.
- Definition of *Climate change* expanded to specifically list TCFD (Task force on Climate-related Financial Disclosures) categories of physical and transition risks.
- Definition of *Chronic diseases/medical delivery* expanded to include substance abuse.
- Definition of *Demographic shift* list of examples expanded to include skills shortages.

2022—Change to the name of no risks and updates to definitions of 12 risks:

- Definition of *Energy price shock* changed from "Energy prices change abruptly" to "Price instability and extremes of energy prices."
- Definition of *Climate change* updated to include soil degradation and incorporate physical and transition risks directly.
- Definition of *Loss of freshwater services* updated to reference pollution.
- Definition of *Weapons of mass destruction* updated so possession is not limited to unstable groups.
- Definition of *Transnational crime and corruption* simplified from "continues to be endemic" to "is endemic."
- Definition of *Globalization shift* increased examples to include democracy, socialism, communism and religiosity. Privacy was added to inequality and food insecurity as a concept of fairness and egalitarianism.
- Definition of *Regional instability* updated from "unstable areas" to "unstable regions."
- Definition of *Chronic diseases/medical delivery* updated to include treatments. The term "material trends" was updated to "material changes."

- Definition of *Demographic shift* was clarified by adding size and mix prior to the examples, and "skill shortages" was shortened to "skills."
- Definition of *Liability regimes/regulatory framework* was expanded to add climate litigation and tax policy.
- Definition of *Cyber/networks* was expanded to include supply chains.
- Definition of *Disruptive technology* was clarified by changing "the internet of things" to "internet of things."

2023—Change to the name of one risk and updates to definitions of 15 risks:

- Definition of *Currency shock* expanded to include de-dollarization.
- Definition of *Emergent nation destabilization* updated to reflect that more than one of the listed concerns could happen at the same time.
- Name of *Asset price collapse* modified to *Asset price shock* to enhance consistency with other Economic risks and reflect the two-sided nature of the risk. Definition now notes price instability and extremes to be consistent with other risks.
- Definition of *Financial volatility* deletes specific reference to inflation/deflation since other examples are not shown.
- Definition of *Climate change* made several changes. "Gradual changes" is now "changes in trend." Ocean currents are added as an example. "Human influence" is replaced with "pollution, and release of greenhouse gases."
- Definition of *Loss of freshwater services* added aquifer depletion.
- Minor grammatical change made to definition of *Natural catastrophe: earthquakes*.
- Definition of *Natural catastrophe: severe weather* expanded to include heatwaves.
- Minor grammatical change made to definition of *Weapons of mass destruction*.
- Definition of *Transnational crime and corruption* updated from "Non=state entities" to "Non-government entities."
- Definition of *Globalization shift* updated to include "Changes in use of technological platforms allow misinformation and disinformation to spread."
- Definition of *Demographic shift* - add examples of fertility rate, mortality rate, workplace environment.
- Definition of *Liability regimes/regulatory framework* updated to include systemic liabilities due to chemicals, microplastics or hazardous waste.
- Minor grammatical change made to definition of *Cyber/networks*.
- Definition of *Disruptive technology* examples updated to include artificial intelligence.

Appendix B: 17th Survey Results (Compiled Fall 2023)

This appendix includes the survey as well as the responses. There were 133 respondents. Not all the respondents answered every question. The percentages reflect the number of responses received, divided by the number who answered that specific question. Totals shown may not add to 100% due to rounding. All tables of response percentages for recurring questions include the most recent results, starting with the current survey and working backward through the given number of surveys.

Responses to open-ended questions have been lightly edited, but original intent is unchanged. Comments are identified using *italics*. Occasionally, a comment is highlighted using boldface type to reflect those the researcher found particularly thought-provoking.

Many of the charts and tables contain only the most recent data. The accompanying Tableau data includes all 17 data points.

****

The following text introduced the survey to recipients via email.

> ## Participate in the 17th Survey of Emerging Risks
>
> The Joint Risk Management Section of the Canadian Institute of Actuaries, the Casualty Actuarial Society, and the Society of Actuaries (SOA) will oversee an online survey to help understand individual risk managers' perspectives on emerging risks. We value insights from all levels of experience and backgrounds and invite you to participate in this annual survey. This is an email invitation for you to participate in the 17th Annual Survey of Emerging Risks.
>
> **Please complete this survey by Nov. 20**. The survey should take about 15 minutes to complete. Please share your thoughts and experiences in the comment boxes. **Responses from more than one risk manager within the same company are encouraged.** All responses are anonymous.
>
> Our thanks to the CAS and the SOA Investment, Reinsurance, Joint Risk Management, and Financial Reporting sections for supporting this research. If you have questions about the survey, please contact Korrel Crawford at the SOA Research Institute.
>
> Thank you for your participation.

Once inside the survey, the respondent is greeted with the following.

> **2023 Emerging Risks Survey**
> Emerging risks have either not previously occurred or have not occurred for so long that they are not considered possible. The lack of credible historical data creates a formidable challenge for risk managers. While completing the survey, please consider a time horizon that extends beyond a business plan time frame (often 3–5 years).
>
> This survey is sponsored by Joint Risk Management Section of the Canadian Institute of Actuaries, Casualty Actuarial Society and the Society of Actuaries. The complete results will be available at https://www.casact.org/ and www.soa.org.
>
> Responses are anonymous and multiple responses from an organization are encouraged. Please distribute this survey to other risk managers or persons who think about risk, especially those from other than traditional actuarial careers.

Upon completion of the survey, you will be offered a printable report of your survey responses.

Please respond no later than **Monday, November 20, 2023**. A glossary of terms is available for reference: Glossary of risks 2023. [Ed. Note: this is appendix A.]

Thanks for participating!

****

The following data is not presented to the respondents but is useful in the analysis since recency bias has been identified as a contributing factor to the results.

Macroeconomic Trends

Date	Survey Date	S&P 500	Oil Price	Currency
End of April	Spring 2008	1,385.59	113.70	1.56
End of October	Fall 2008	968.75	68.10	1.27
December 11	Fall 2009	1,106.41	77.04	1.48
October 15	Fall 2010	1,176.19	84.49	1.40
End of September	Fall 2011	1,131.42	78.93	1.34
End of September	Fall 2012	1,440.67	92.18	1.29
End of September	Fall 2013	1,681.55	102.36	1.35
End of September	Fall 2014	1,972.29	91.17	1.26
End of October	Fall 2015	2,079.36	46.60	1.10
End of October	Fall 2016	2,126.15	46.83	1.10
End of October	Fall 2017	2,575.26	54.36	1.16
End of October	Fall 2018	2,711.74	65.31	1.14
End of October	Fall 2019	2,976.74	54.09	1.09
End of October	Fall 2020	3,269.96	35.64	1.16
End of October	Fall 2021	4,605.38	83.50	1.16
End of October	Fall 2022	3,871.98	86.54	0.99
End of October	Fall 2023	4,193.80	81.64	1.06

Sources:
S&P 500 https://fred.stlouisfed.org/series/SP500
Oil price ($ per barrel) www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D
EUR/USD http://www.federalreserve.gov/releases/h10/Hist/dat00_eu.htm

The initial survey was completed in April 2008, soon after Bear Stearns lost its independence. At that time, the S&P 500 stood at 1,385.59, the price of a barrel of oil was US$113.70 and one euro cost US$1.56. The price of oil was high, the stock markets were at then record levels and the dollar was cheap relative to the euro. The table had been set for the financial crisis that soon followed. Today's survey reflects a near tripling of the S&P 500, much lower prices for oil and the strongest U.S. dollar since before the survey began.

DEFAULT QUESTION BLOCK

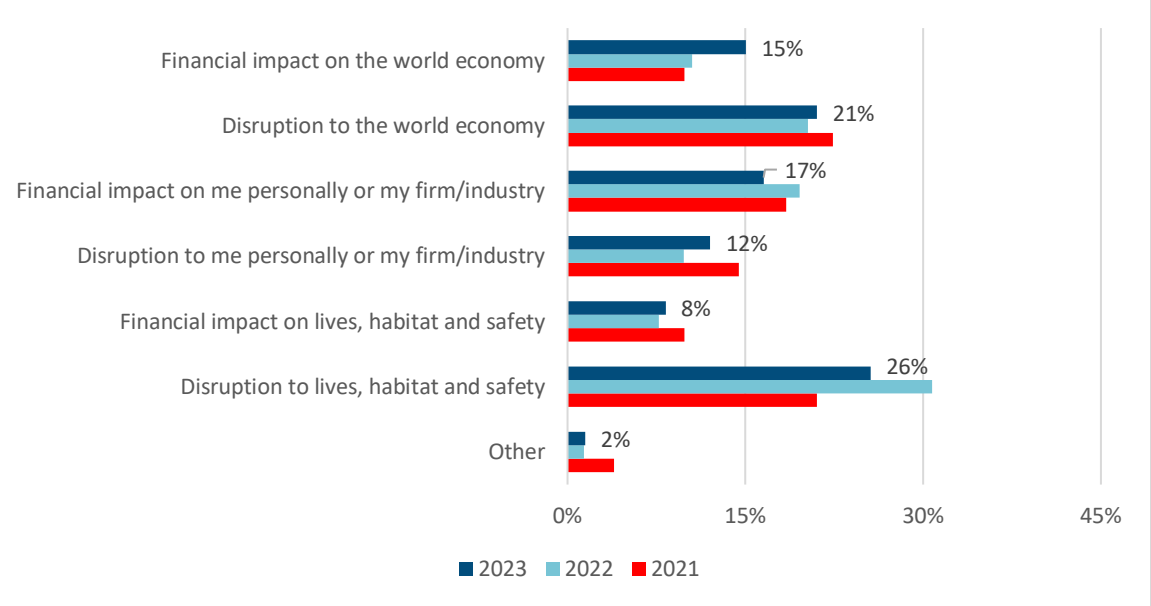
Strategic impact can be thought of using time horizon. There are current risks that require immediate action, tactical risks that are accounted for in a 3–5-year plan, and strategic risks that are not expected to occur until after that time horizon but remain important.

Previous surveys have found that respondents tend to be anchored in the present with their responses. It is thought that knowledge of this cognitive bias will help to understand and compensate for it, so we will start by asking you about today's current risks. The following questions will ask you to identify current and emerging risks that you expect to have the greatest strategic impact currently and in the future.

There is a balance required between keeping the list of risks current and being able to show trends. The *Survey of Emerging Risks* has tried to maintain stability for trending purposes, although the list has evolved over time, as described in appendix A.

Question 1. Greatest strategic impact related to risk can have various meanings. How do you define it?

Greatest Strategic Impact



133 total responses

	Responses	2023	2022	2021
Financial impact on the world economy	20	15%	10%	10%
Disruption to the world economy	28	21%	20%	22%
Financial impact on me personally or my firm/industry	22	17%	20%	18%
Disruption to me personally or my firm/industry	16	12%	10%	14%
Financial impact on lives, habitat and safety	11	8%	8%	10%
Disruption to lives, habitat and safety	34	26%	31%	21%
Other	2	2%	1%	4%

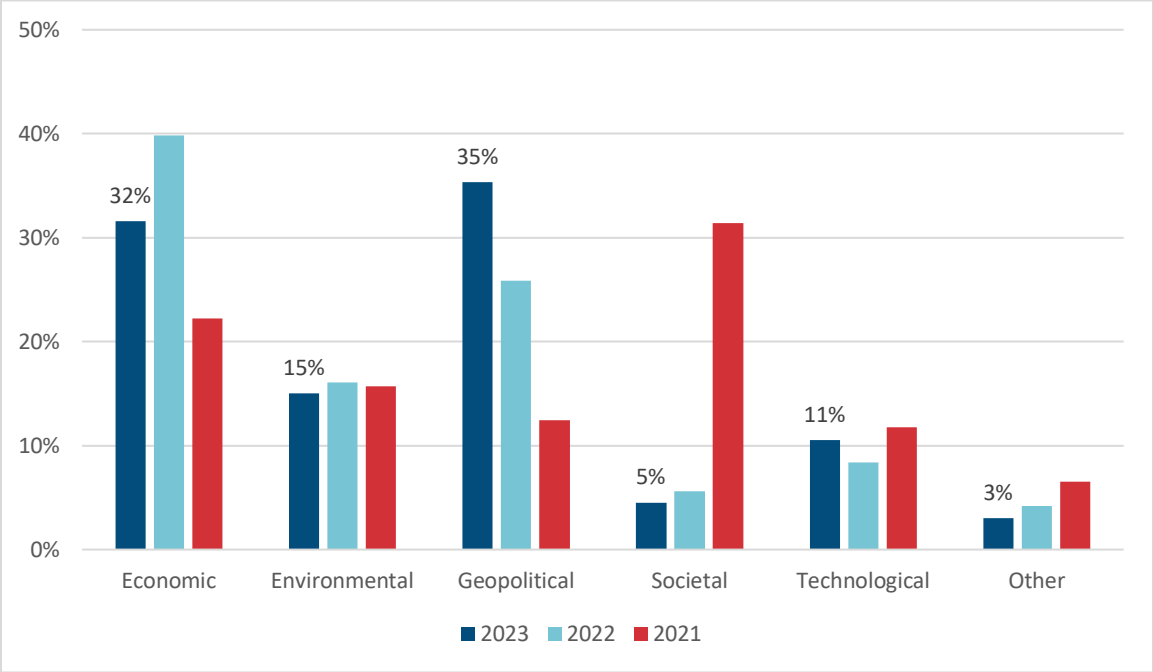
Other

- *Disruption to individuals, their health, finances, or quality of life*
- *Increasing in poverty. Elimination of Middle Class.*

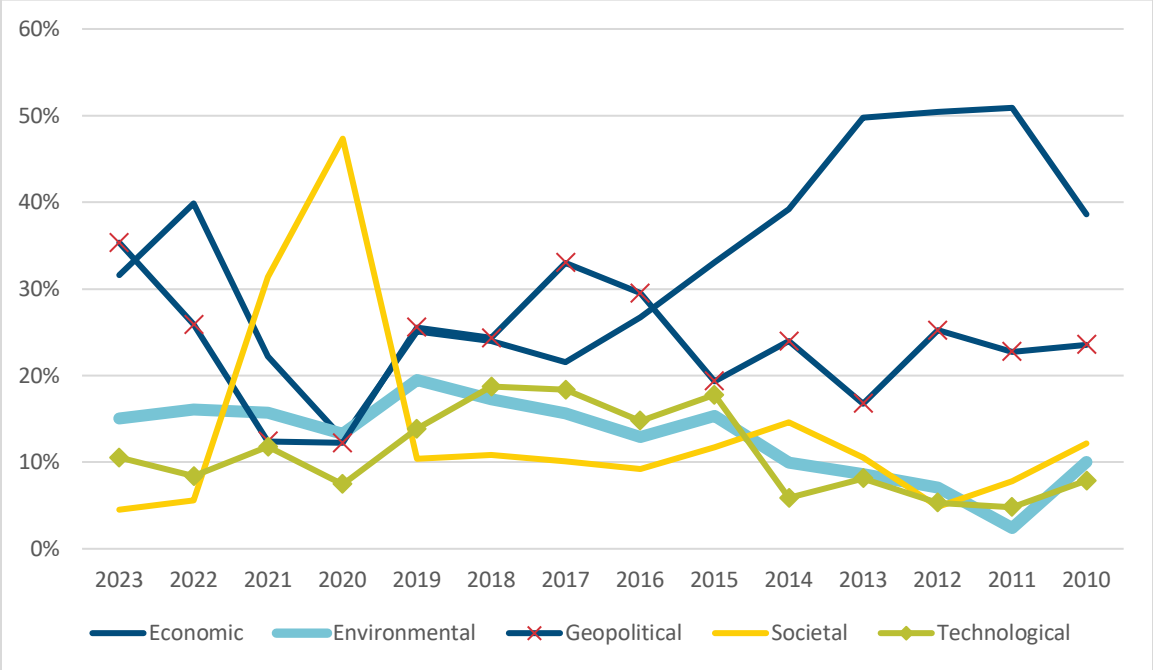
Later in this analysis, some of the survey results will be segregated between how respondents answered this question.

Question 2. What is the risk that currently has the greatest impact? (Please select one.)

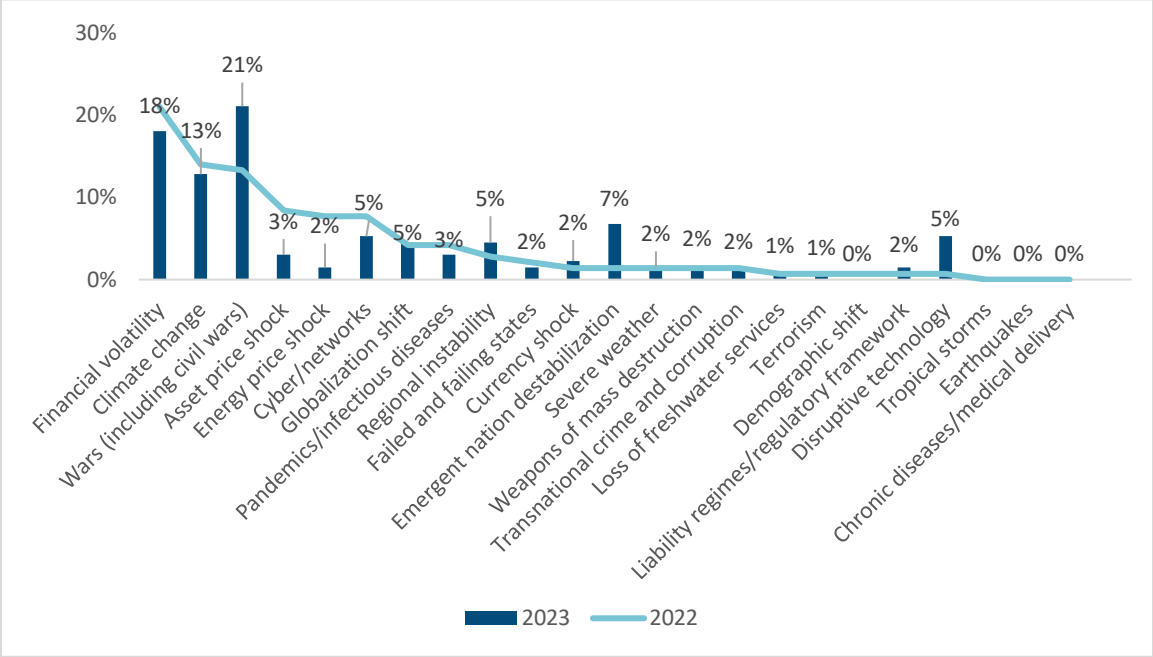
Current Risk with Greatest Impact



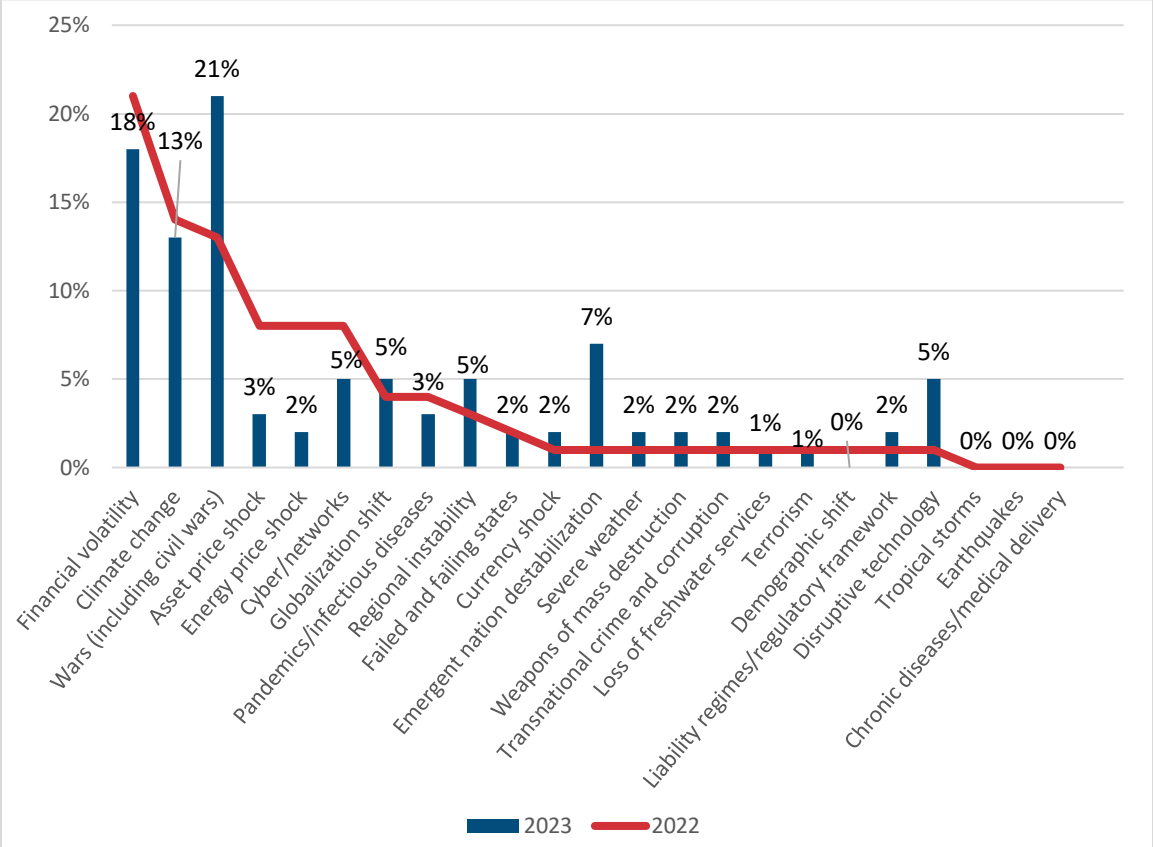
Historical Current Risk by Category



Year-Over-Year Current Risk



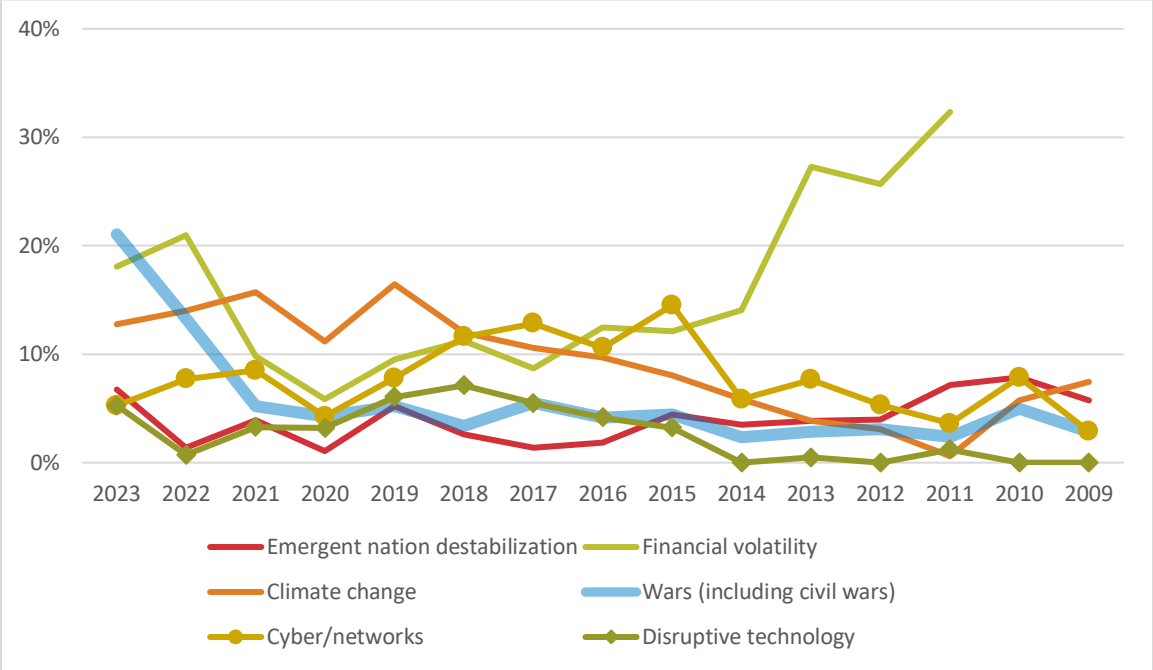
Year-Over-Year Current Risk



133 total responses
The rankings for the top current risks are:

1. Wars (including civil wars) - 21%
2. Financial volatility - 18%
3. Climate change - 13%
4. Emergent nation destabilization – 7%
5. Disruptive technologies - 5%
5. Cyber/networks - 5%

Historical Current Risk for Top Five Risks



In the following tables of responses, for the current year's results, yellow highlight is used to indicate a three-percentage-point increase or doubling (when above 2% in previous year), and green highlight indicates a three-percentage-point decrease or halving (when above 2% in previous year).

	2023	2022	2021	2020	2019	2018
Economic	32%	40%	22%	13%	25%	24%
Energy price shock	2%	8%	1%	1%	0%	0%
Currency shock	2%	1%	1%	2%	1%	2%
Emergent nation destabilization	7%	1%	4%	1%	5%	3%
Asset price shock	3%	8%	7%	4%	9%	8%
Financial volatility	18%	21%	10%	6%	10%	11%

	2023	2022	2021	2020	2019	2018
Environmental	15%	16%	16%	13%	19%	17%
Climate change	13%	14%	16%	11%	16%	12%
Loss of freshwater services	1%	1%	0%	1%	0%	1%
Natural catastrophe: tropical storms	0%	0%	0%	0%	1%	3%
Natural catastrophe: earthquakes	0%	0%	0%	0%	1%	0%
Natural catastrophe: severe weather (except tropical storms)	2%	1%	0%	2%	1%	2%

	2023	2022	2021	2020	2019	2018
Geopolitical	35%	26%	12%	12%	26%	24%
Terrorism	1%	1%	1%	1%	2%	4%
Weapons of mass destruction	2%	1%	1%	1%	2%	3%
Wars (including civil wars)	21%	13%	5%	4%	5%	3%
Failed and failing states	2%	2%	1%	3%	4%	5%
Transnational crime and corruption	2%	1%	1%	1%	3%	2%
Globalization shift	5%	4%	2%	3%	5%	5%
Regional instability	5%	3%	1%	0%	3%	3%

	2023	2022	2021	2020	2019	2018
Societal	5%	6%	31%	47%	10%	11%
Pandemics/infectious diseases	3%	4%	27%	45%	2%	2%
Chronic diseases/medical delivery	0%	0%	0%	1%	3%	2%
Demographic shift	0%	1%	3%	0%	3%	4%
Liability regimes/regulatory framework	2%	1%	1%	2%	2%	3%

	2023	2022	2021	2020	2019	2018
Technological	11%	8%	12%	7%	14%	19%
Cyber/networks	5%	8%	8%	4%	8%	12%
Disruptive technology	5%	1%	3%	3%	6%	7%

Other (3%/4%/7%/7%/6%/5%)

- *Unintended consequences of political decisions*
- *The Republican Party*
- *National and Border Security*
- *US political polarization*

SECTION A: EMERGING RISKS

Question 1. Please choose up to five (5) emerging risks that you feel will have the greatest strategic impact in the future. (please select no more than five)

642 total responses from 133 surveys

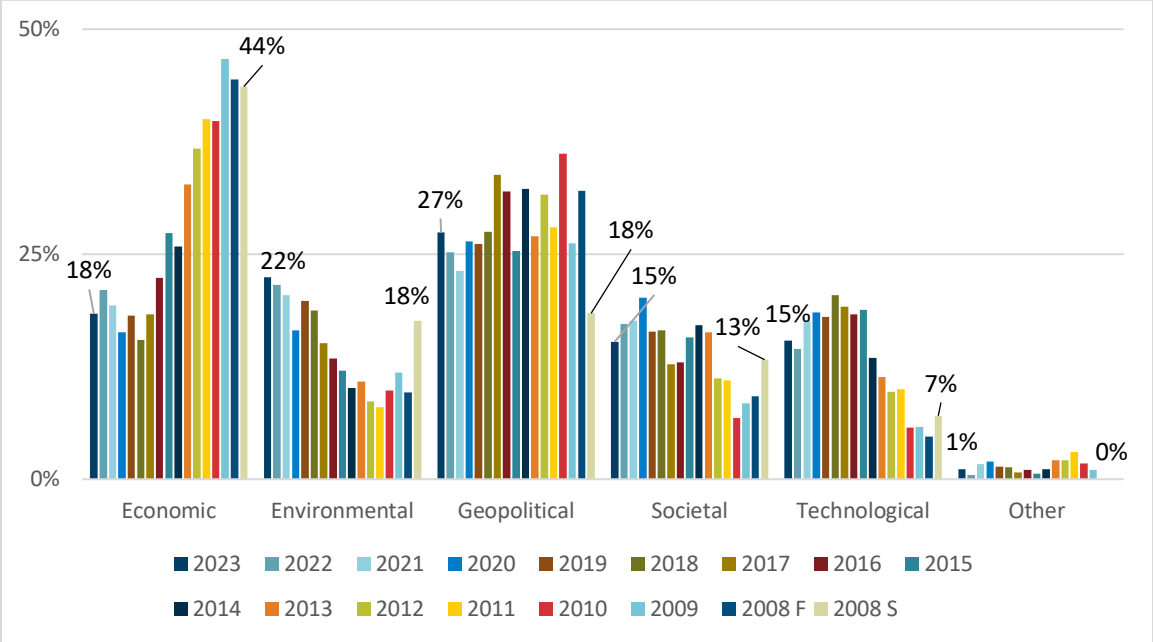
Average of 4.83 risks selected per survey (4.73 in prior survey)

Divisor in percentages for major categories is 642; for individual risks, it is 133. Note that, due to multiple responses, the sum of all percentages is materially greater than 100%.

Number of responses selected (maximum of 5):

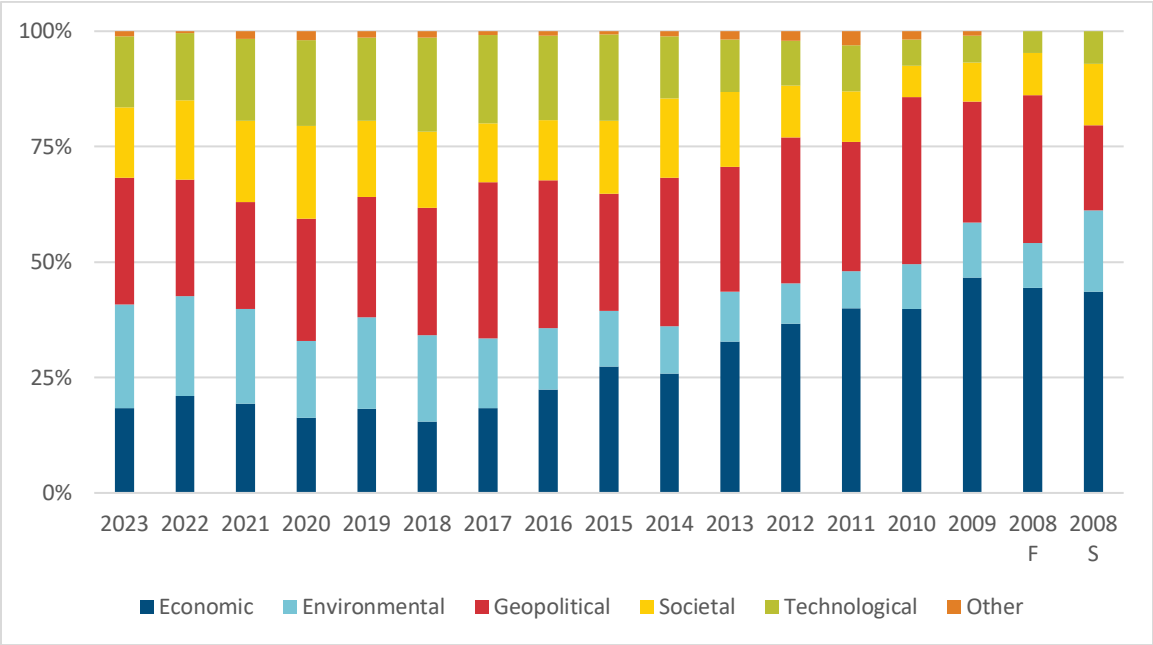
- 1: 1 survey (1%)
- 2: 0 surveys (0%)
- 3: 2 surveys (2%)
- 4: 15 surveys (11%)
- 5: 115 surveys (86%)

Emerging Risks by Category (Up to Five Risks Chosen per Survey)

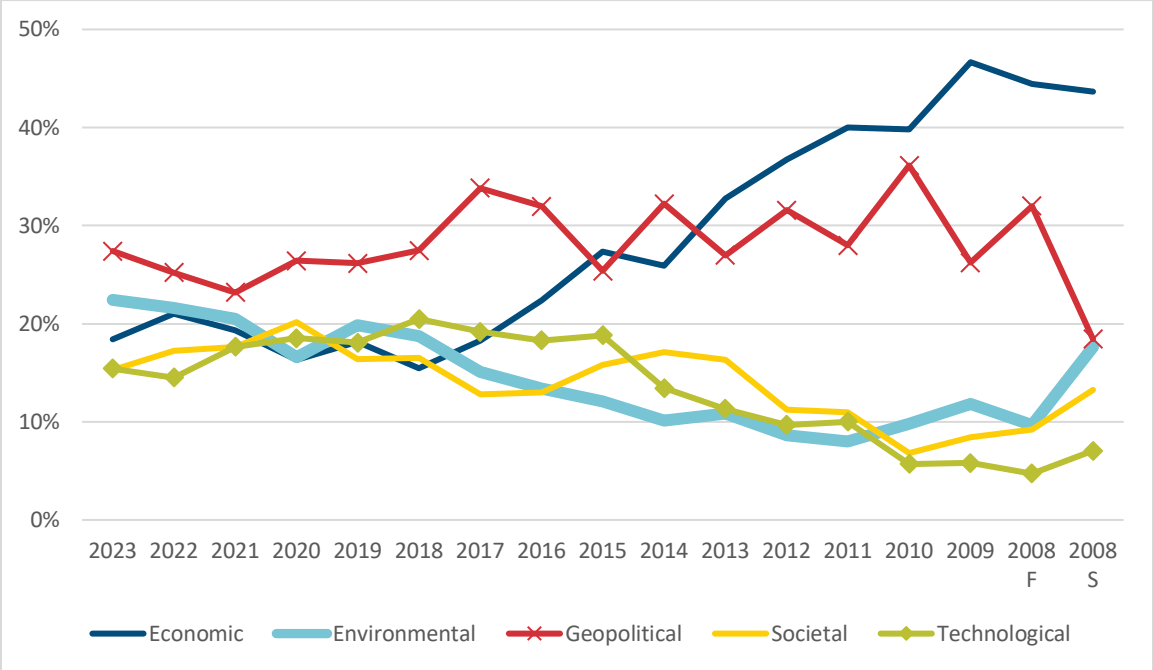


Ed. Note: In 2008, the survey was collected in both the spring (S) and fall (F).

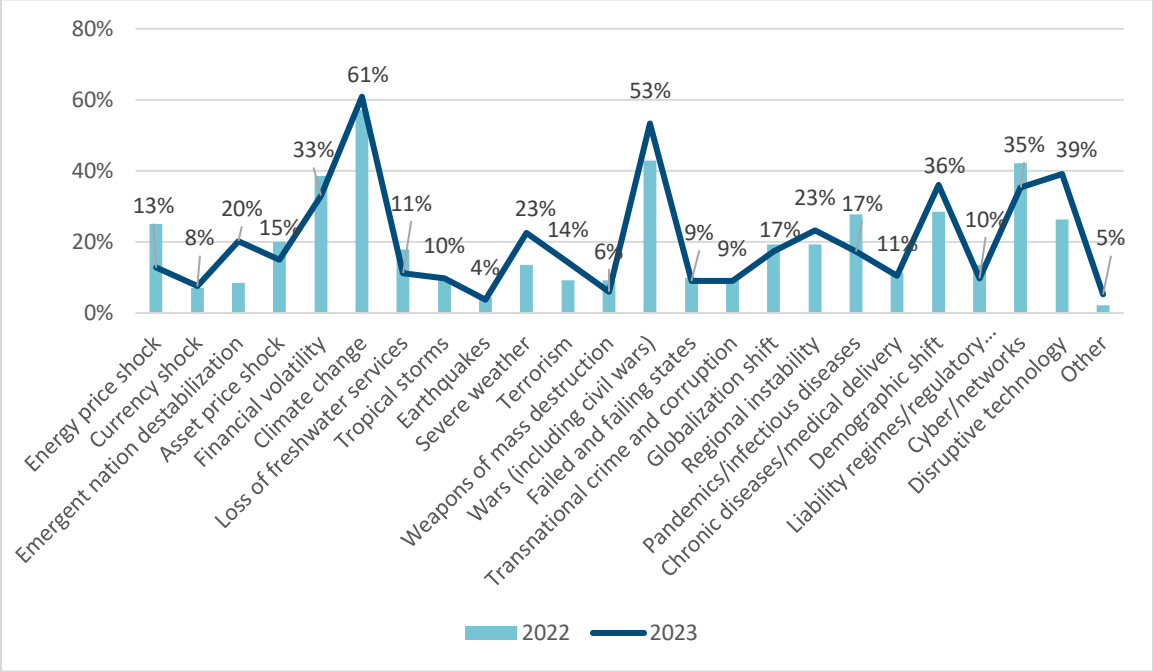
Emerging Risks by Category (Up to Five Risks Chosen per Survey)



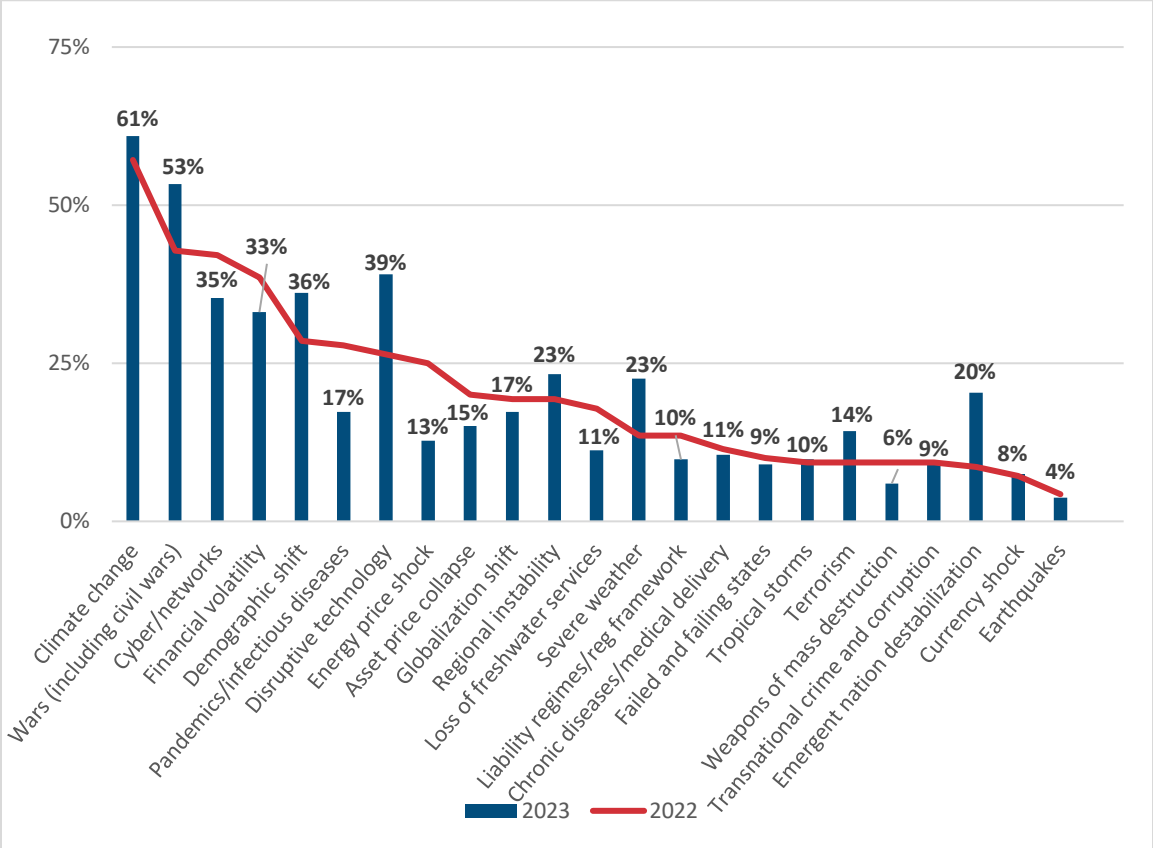
Historical Emerging Risks (Up to Five Risks Chosen per Survey) by Category



Year-Over-Year Emerging Risks (Up to Five Risks Chosen per Survey)



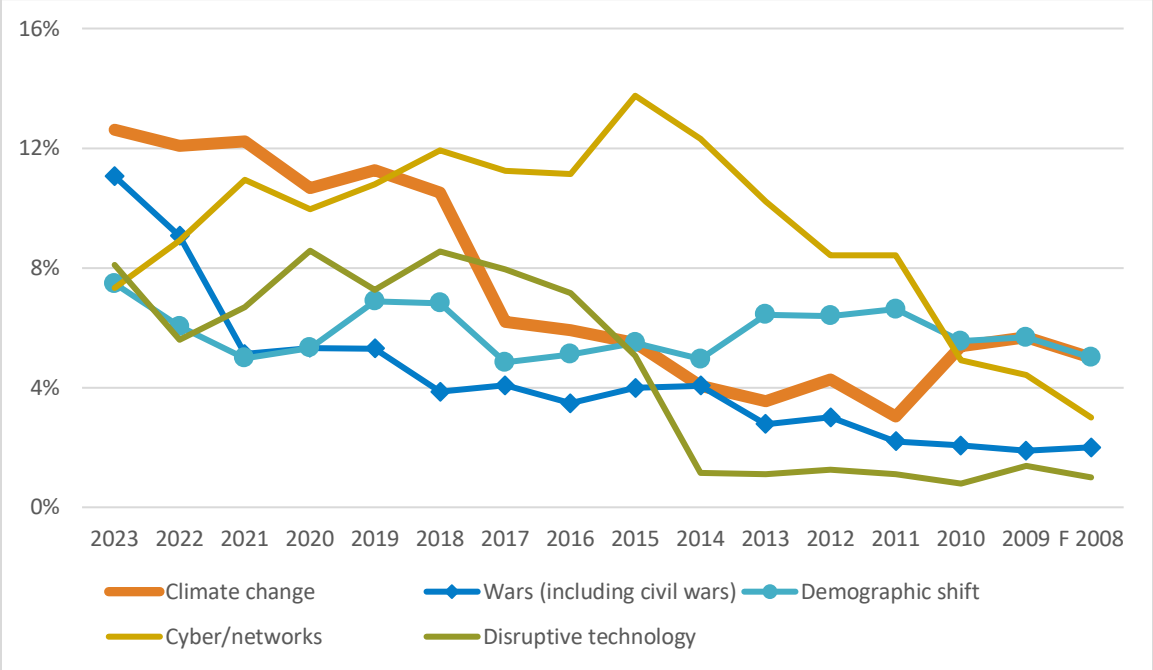
Year-Over-Year Emerging Risks (Up to Five Risks Chosen per Survey)



The rankings for the top five emerging risks as a percentage of respondents are:

1. *Climate change* - 61%
2. *Wars (including civil wars)* - 53%
3. *Disruptive technology* – 39%
4. *Demographic shift* - 36%
5. *Cyber/networks* - 35%

Historical Emerging Risks (Up to Five Risks Chosen per Survey) for Top Five Risks



	2023	2022	2021	2020	2019	2018
Economic	**18%**	21%	19%	16%	18%	15%
Energy price shock	13%	25%	18%	4%	7%	6%
Currency shock	**8%**	7%	11%	7%	7%	7%
Emergent nation destabilization	20%	9%	12%	15%	23%	15%
Asset price shock	15%	20%	19%	20%	21%	19%
Financial volatility	33%	39%	30%	31%	29%	27%

	2023	2022	2021	2020	2019	2018
Environmental	**22%**	22%	20%	17%	20%	19%
Climate change	61%	57%	58%	50%	54%	49%
Loss of freshwater services	11%	18%	15%	8%	12%	13%
Natural catastrophe: tropical storms	**10%**	9%	5%	7%	8%	8%
Natural catastrophe: earthquakes	**4%**	4%	3%	2%	4%	6%
Natural catastrophe: severe weather (except tropical storms)	23%	14%	15%	11%	16%	12%

	2023	2022	2021	2020	2019	2018
Geopolitical	27%	25%	23%	26%	26%	27%
Terrorism	14%	9%	17%	19%	17%	23%
Weapons of mass destruction	6%	9%	7%	8%	9%	13%
Wars (including civil wars)	53%	43%	24%	25%	25%	18%
Failed and failing states	9%	10%	13%	18%	19%	25%
Transnational crime and corruption	9%	9%	11%	11%	12%	12%
Globalization shift	17%	19%	19%	20%	20%	20%
Regional instability	23%	19%	17%	17%	22%	18%

	2023	2022	2021	2020	2019	2018
Societal	15%	17%	18%	20%	16%	17%
Pandemics/infectious diseases	17%	28%	38%	45%	22%	25%
Chronic diseases/medical delivery	11%	11%	9%	12%	12%	8%
Demographic shift	36%	29%	23%	25%	33%	32%
Liability regimes/regulatory framework	10%	14%	13%	13%	11%	12%

	2023	2022	2021	2020	2019	2018
Technological	15%	15%	18%	19%	18%	20%
Cyber/networks	35%	42%	52%	47%	51%	56%
Disruptive technology	39%	26%	32%	40%	35%	40%

Other (1%/0%/2%/2%/1%/1%)

- *Financial impacts of failed US economic policies*
- *Inflation*
- *Elimination of Middle class - leaving only 20%-30% in very wealthy and 80% - 70% in (extreme) poverty or higher.*
- *AI*
- *Cyber/networks if it includes AI misuses.*
- *Mass migration from climate change*
- *US political discord*

Another way to review this data is as a percentage of the total responses. For example, *Climate change* had 81 responses in this survey. In the previous analysis just shared, 81/133 = 61%. In the following tables, we will look at 81/642 = 13% and compare the results with the average across previous surveys. This will allow consistent analysis against other questions in the current survey. Yellow highlight signifies higher than the average in the current survey, and green highlight signifies lower than the average.[7]

[7] Note that charts show actual results, while labels are rounded to the nearest percentage point. In some instances, the bar in the graph has positive length but the label says 0%.

Results are presented with the average across all 17 surveys first, then listing each result starting with the most recent survey.

	Avg	2023	2022	2021	2020	2019	2018
Economic	**30%**	**18%**	21%	19%	16%	18%	15%
Energy price shock	**5%**	**3%**	5%	4%	1%	1%	1%
Currency shock	**5%**	**2%**	2%	2%	2%	1%	1%
Emergent nation destabilization	**5%**	**4%**	2%	3%	3%	5%	3%
Asset price shock	**6%**	**3%**	4%	4%	4%	4%	4%
Financial volatility	**9%**	**7%**	8%	6%	6%	6%	6%

	Avg	2023	2022	2021	2020	2019	2018
Environmental	**14%**	**22%**	22%	20%	17%	20%	19%
Climate change	**7%**	**13%**	12%	12%	11%	11%	11%
Loss of freshwater services	**2%**	**2%**	4%	3%	2%	3%	3%
Natural catastrophe: tropical storms	**2%**	**2%**	2%	1%	2%	2%	2%
Natural catastrophe: earthquakes	**1%**	**1%**	1%	1%	0%	1%	1%
Natural catastrophe: severe weather (except tropical storms)	**2%**	**5%**	3%	3%	2%	3%	3%

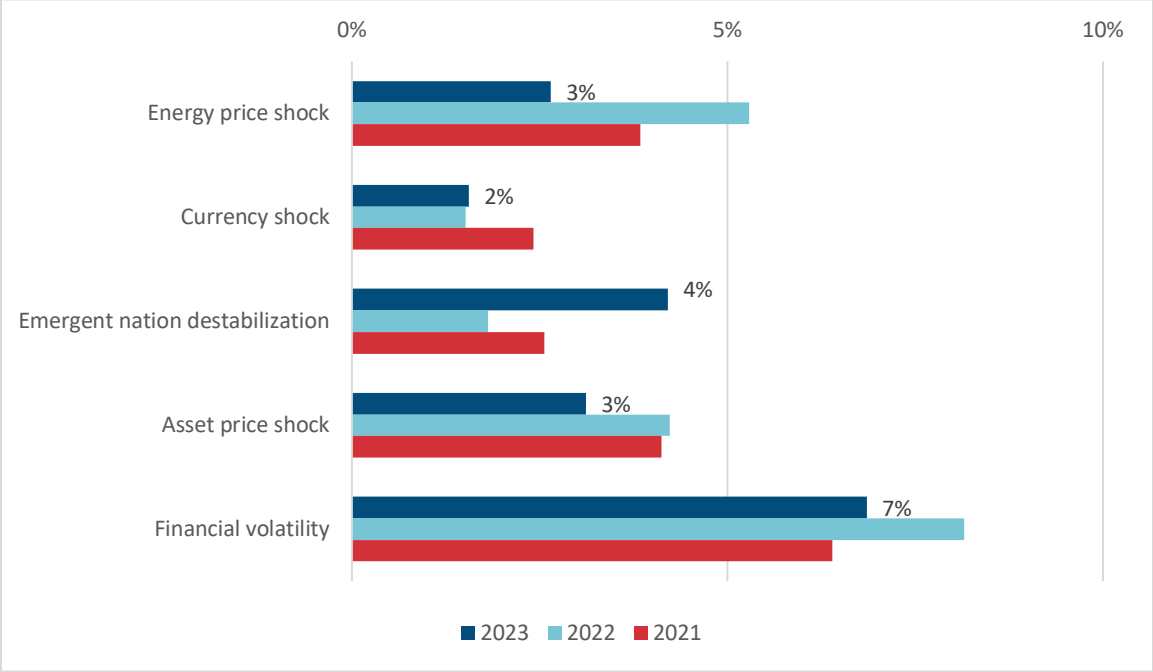
	Avg	2023	2022	2021	2020	2019	2018
Geopolitical	**28%**	**27%**	25%	23%	26%	26%	27%
Terrorism	**6%**	**3%**	2%	4%	4%	4%	5%
Weapons of mass destruction	**2%**	**1%**	2%	1%	2%	2%	3%
Wars (including civil wars)	**4%**	**11%**	9%	5%	5%	5%	4%
Failed and failing states	**5%**	**2%**	2%	3%	4%	4%	5%
Transnational crime and corruption	**2%**	**2%**	2%	2%	2%	3%	2%
Globalization shift	**4%**	**4%**	4%	4%	5%	4%	4%
Regional instability	**5%**	**5%**	4%	4%	4%	5%	4%

	Avg	2023	2022	2021	2020	2019	2018
Societal	**14%**	**15%**	17%	18%	20%	16%	17%
Pandemics/infectious diseases	**5%**	**4%**	6%	8%	10%	5%	5%
Chronic diseases/medical delivery	**2%**	**2%**	2%	2%	3%	3%	2%
Demographic shift	**6%**	**7%**	6%	5%	5%	7%	7%
Liability regimes/regulatory framework	**3%**	**2%**	3%	3%	3%	2%	3%

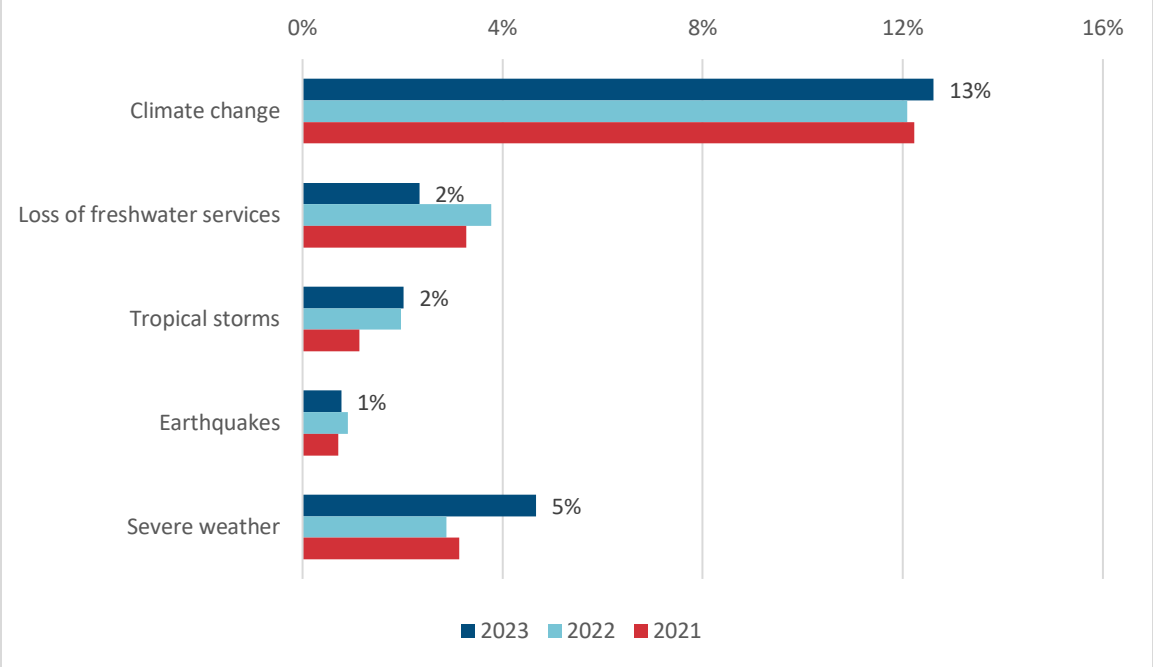
	Avg	2023	2022	2021	2020	2019	2018
Technological	**13%**	**15%**	15%	18%	19%	18%	20%
Cyber/networks	**9%**	**7%**	9%	11%	10%	11%	12%
Disruptive technology	**4%**	**8%**	6%	7%	9%	7%	9%

Other—Avg 2% (1%/0%/2%/2%/1%/1%)

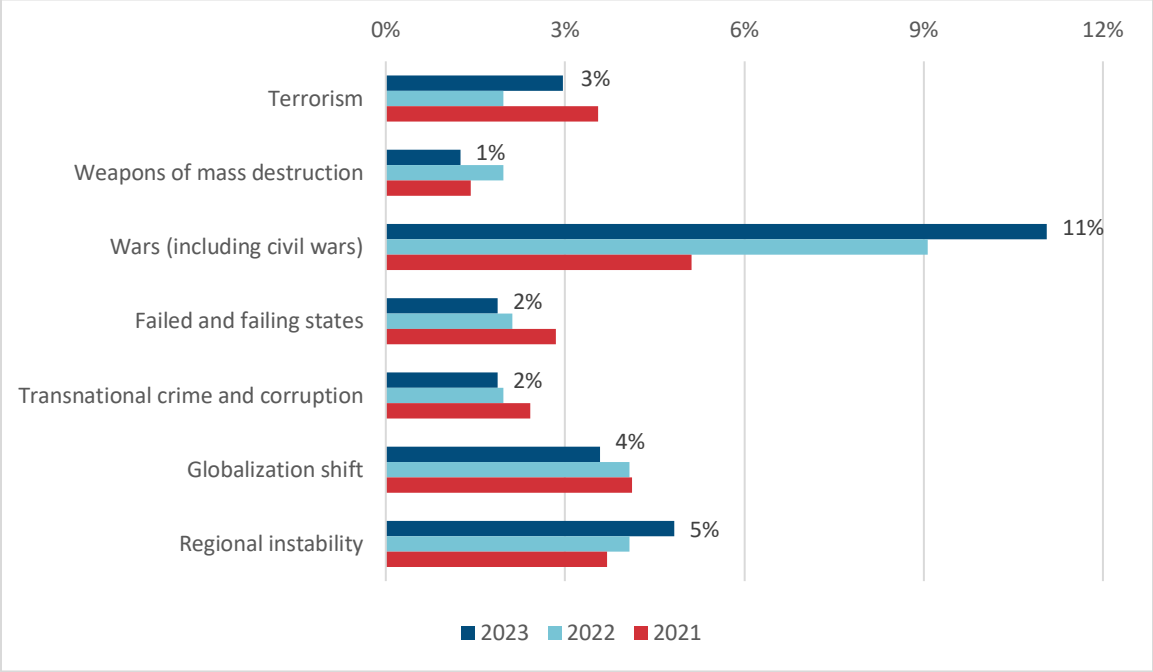
Emerging Risk (up to five) Trends—Economic (% of Total)



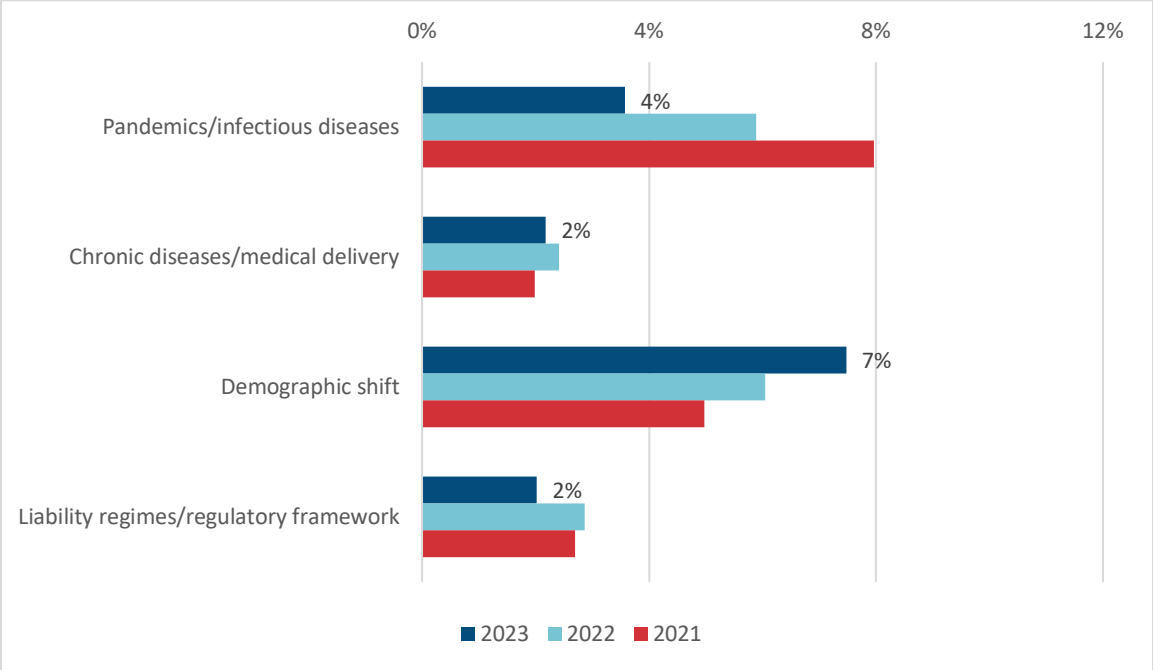
Emerging Risk (up to five) Trends—Environmental (% of Total)



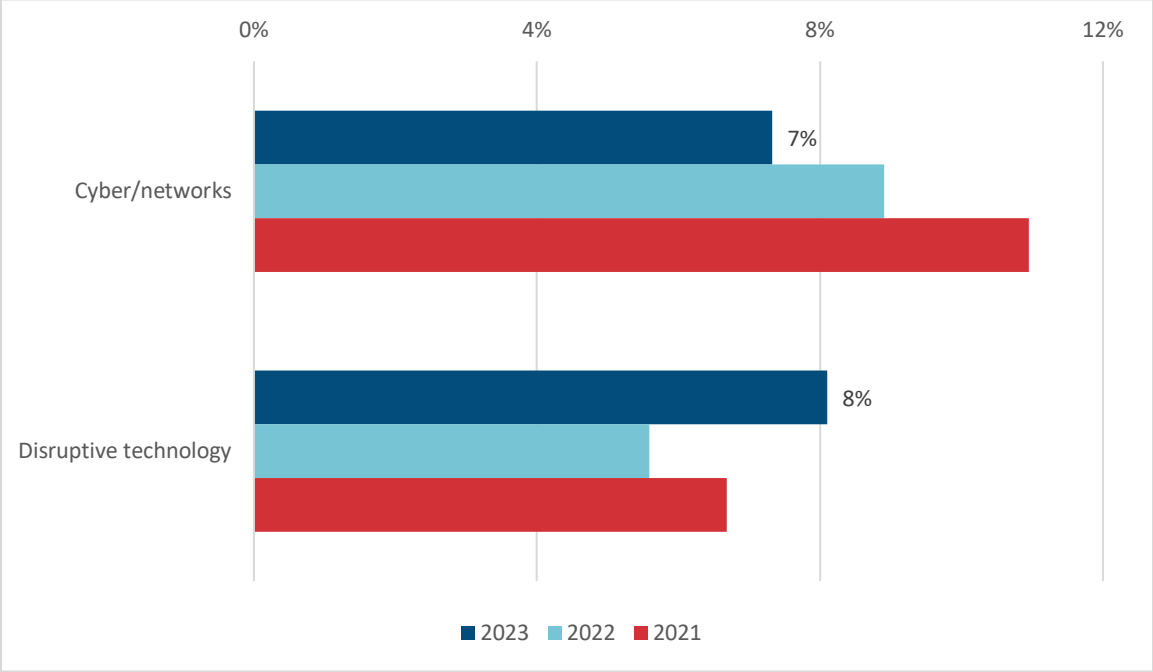
Emerging Risk (up to five) Trends—Geopolitical (% of Total)



Emerging Risk (up to five) Trends—Societal (% of Total)



Emerging Risk (up to five) Trends—Technological (% of Total)



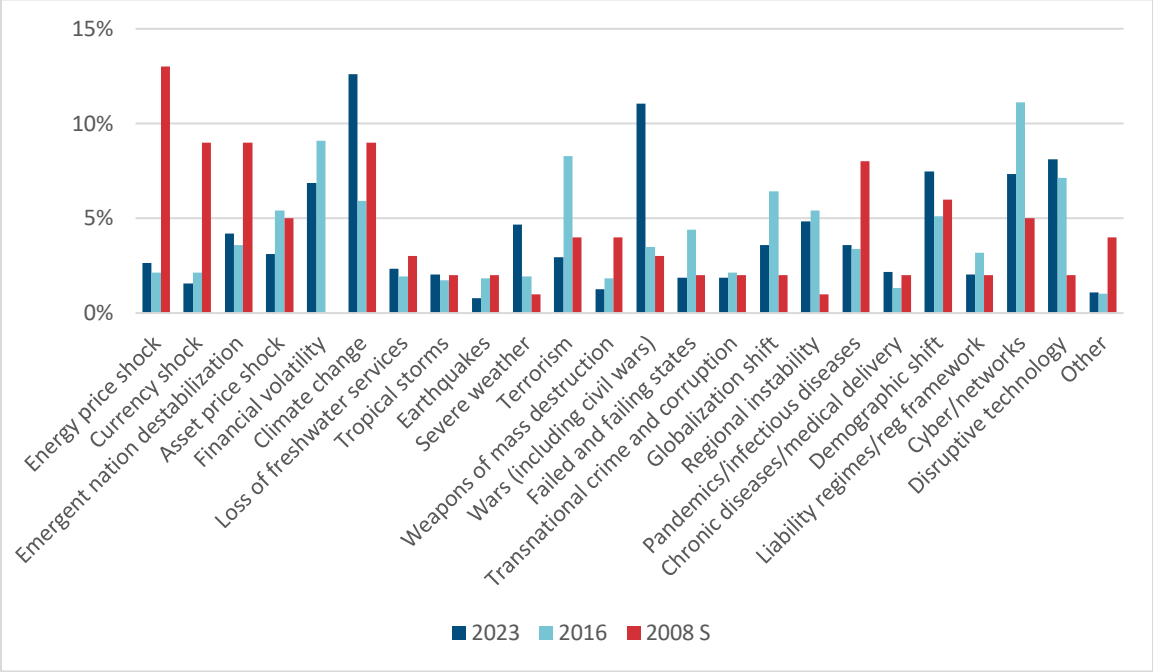
Top Five Emerging Risks as Percentage of Total

Risk	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	F 2008	S 2008	Average
Energy price shock	3%	5%	4%	1%	1%	1%	1%	2%	*3%*	3%	2%	6%	7%	9%	10%	8%	13%	5%
Currency shock	2%	2%	2%	2%	1%	1%	1%	2%	*3%*	1%	6%	5%	6%	10%	14%	10%	9%	5%
Emergent nation destabilization	4%	2%	3%	3%	5%	3%	3%	4%	*5%*	6%	6%	7%	7%	9%	7%	6%	9%	5%
Asset price shock	3%	4%	4%	4%	4%	4%	6%	5%	*6%*	7%	7%	5%	5%	6%	10%	14%	5%	6%
Financial volatility	7%	8%	6%	6%	6%	6%	6%	9%	*9%*	9%	13%	13%	15%					9%
Climate change	13%	12%	12%	11%	11%	11%	6%	6%	6%	4%	4%	4%	3%	5%	6%	5%	9%	7%
Loss of freshwater services	2%	4%	3%	2%	3%	3%	2%	2%	2%	2%	2%	2%	1%	2%	2%	2%	3%	2%
Tropical storms	2%	2%	1%	2%	2%	2%	3%	2%	1%	1%	2%	1%	1%	1%	2%	1%	2%	2%
Earthquakes	1%	1%	1%	0%	1%	1%	1%	2%	1%	1%	1%	0%	1%	1%	1%	1%	2%	1%
Severe weather	5%	3%	3%	2%	3%	3%	2%	2%	2%	2%	2%	0%	1%	0%	1%	0%	1%	2%
Terrorism	3%	2%	4%	4%	4%	5%	9%	8%	8%	9%	6%	6%	4%	9%	6%	6%	4%	6%
Weapons of mass destruction	1%	2%	1%	2%	2%	3%	4%	2%	*2%*	2%	1%	3%	2%	4%	3%	3%	4%	2%
Wars (including civil wars)	11%	9%	5%	5%	5%	4%	4%	3%	4%	4%	3%	3%	2%	2%	2%	2%	3%	4%
Failed and failing states	2%	2%	3%	4%	4%	5%	3%	4%	*4%*	6%	6%	7%	9%	8%	4%	6%	2%	5%
Transnational crime and corruption	2%	2%	2%	2%	3%	2%	3%	2%	*1%*	2%	2%	1%	1%	3%	2%	2%	2%	2%
Globalization shift	4%	4%	4%	5%	4%	4%	4%	6%	*1%*	2%	3%	3%	2%	5%	4%	5%	2%	4%
Regional instability	5%	4%	4%	4%	5%	4%	7%	5%	6%	8%	6%	9%	7%	5%	6%	7%	1%	5%
Pandemics/infectious diseases	4%	6%	8%	10%	5%	5%	3%	3%	*4%*	6%	4%	3%	3%	5%	6%	7%	8%	5%
Chronic diseases/medical delivery	2%	2%	2%	3%	3%	2%	2%	1%	2%	1%	1%	1%	2%	1%	1%	1%	2%	2%
Demographic shift	7%	6%	5%	5%	7%	7%	5%	5%	6%	5%	6%	6%	7%	6%	6%	5%	6%	6%
Liability regimes/regulatory framework	2%	3%	3%	3%	2%	3%	3%	3%	5%	5%	5%	2%	2%	1%	1%	1%	2%	3%
Cyber/networks	7%	9%	11%	10%	11%	12%	11%	11%	14%	12%	10%	8%	8%	5%	4%	3%	5%	9%
Disruptive technology	8%	6%	7%	9%	7%	9%	8%	7%	5%	1%	1%	1%	1%	1%	1%	1%	2%	4%
Other	1%	0%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	3%	2%	1%	4%	4%	2%

Top Emerging Risks (Choose Up to Five) historical ratio of standard deviation to mean

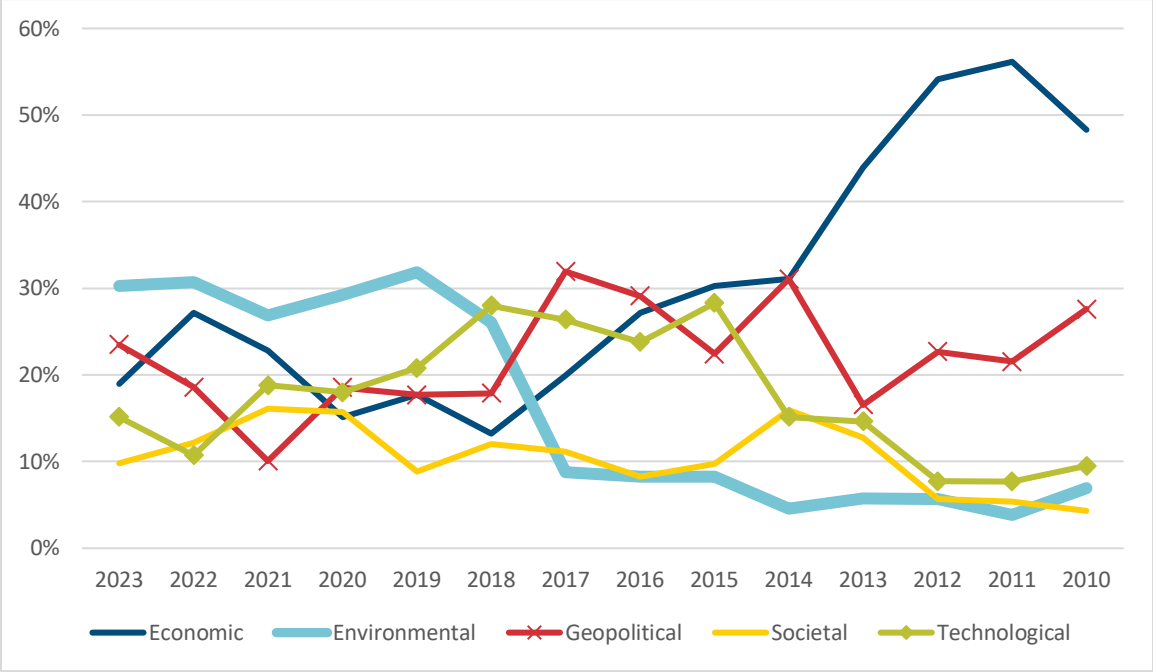
Risk	Ratio
Energy price shock	75%
Currency shock	85%
Emergent nation destabilization	40%
Asset price shock	43%
Financial volatility	34%
Climate change	44%
Loss of freshwater services	28%
Tropical storms	35%
Earthquakes	36%
Severe weather	60%
Terrorism	38%
Weapons of mass destruction	41%
Wars (including civil wars)	57%
Failed and failing states	45%
Transnational crime and corruption	29%
Globalization shift	36%
Regional instability	33%
Pandemics/infectious diseases	38%
Chronic diseases/medical delivery	38%
Demographic shift	13%
Liability regimes/regulatory framework	47%
Cyber/networks	34%
Disruptive technology	71%
Other	61%

Top Emerging Risks (Choose Up to Five)

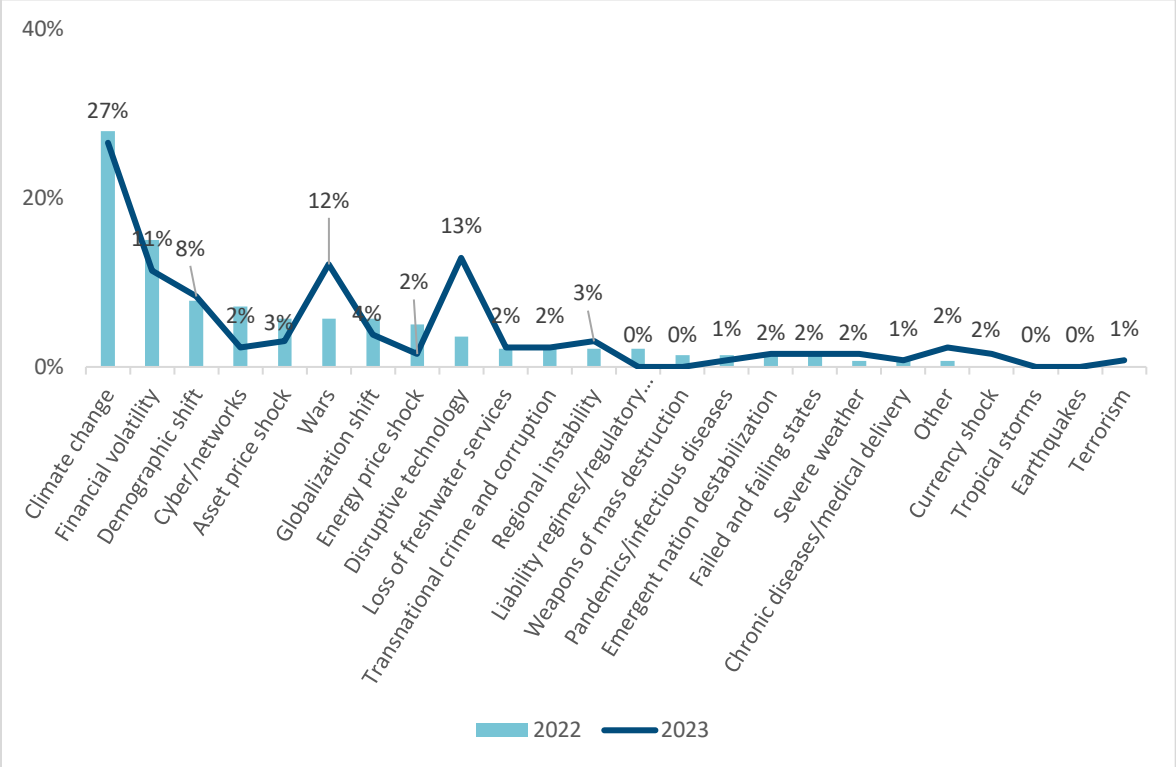


Question 2. Of the emerging risks selected in the previous question, what one (1) would you rank number one as having the greatest strategic impact in the future? (Please select one.)

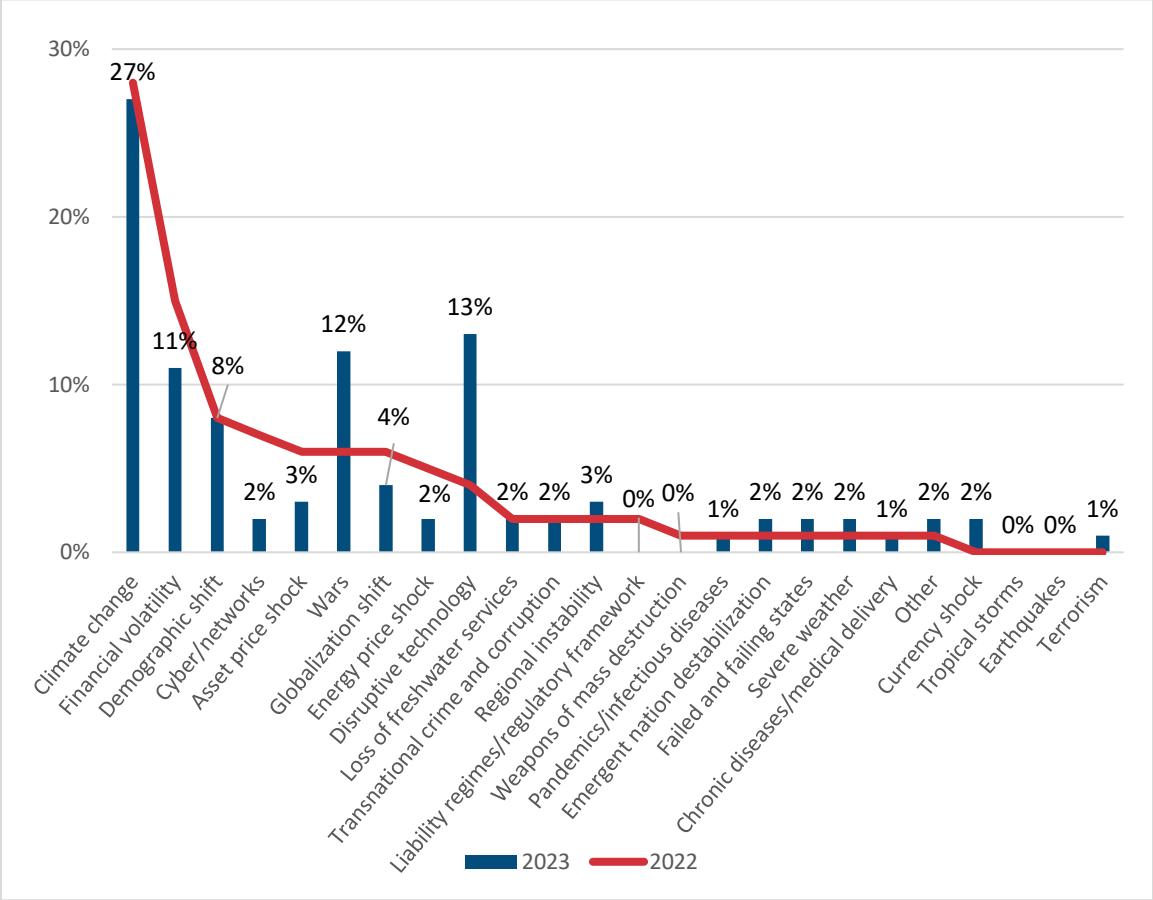
Historical Top Emerging Risk by Category



Year-Over-Year Emerging Risk



Year-Over-Year Emerging Risk



132 total responses

Answers in yellow highlight are up at least three percentage points; those in green highlight are down at least three percentage points.

The rankings for the top emerging risk are:

1. *Climate change* - 27%
2. *Disruptive technology - 13%*
3. *Wars (including civil wars)* - 12%
4. *Financial volatility* - 11%
5. *Demographic shift* - 8%

	2023	2022	2021	2020	2019	2018
Economic	**19%**	27%	23%	15%	18%	13%
Energy price shock	**2%**	5%	2%	1%	1%	0%
Currency shock	**2%**	0%	2%	2%	0%	1%
Emergent nation destabilization	**2%**	1%	3%	4%	4%	2%
Asset price shock	**3%**	6%	5%	2%	6%	5%
Financial volatility	**11%**	15%	10%	7%	6%	5%

	2023	2022	2021	2020	2019	2018
Environmental	30%	31%	27%	29%	32%	26%
Climate change	27%	28%	26%	26%	27%	22%
Loss of freshwater services	2%	2%	0%	2%	3%	2%
Natural catastrophe: tropical storms	0%	0%	0%	1%	0%	1%
Natural catastrophe: earthquakes	0%	0%	0%	0%	0%	0%
Natural catastrophe: severe weather (except tropical storms)	2%	1%	1%	1%	2%	1%

	2023	2022	2021	2020	2019	2018
Geopolitical	23%	19%	10%	19%	18%	18%
Terrorism	1%	0%	1%	1%	2%	2%
Weapons of mass destruction	0%	1%	1%	1%	1%	1%
Wars (including civil wars)	12%	6%	3%	5%	3%	3%
Failed and failing states	2%	1%	1%	3%	5%	3%
Transnational crime and corruption	2%	2%	1%	1%	2%	2%
Globalization shift	4%	6%	2%	5%	3%	4%
Regional instability	3%	2%	1%	2%	2%	3%

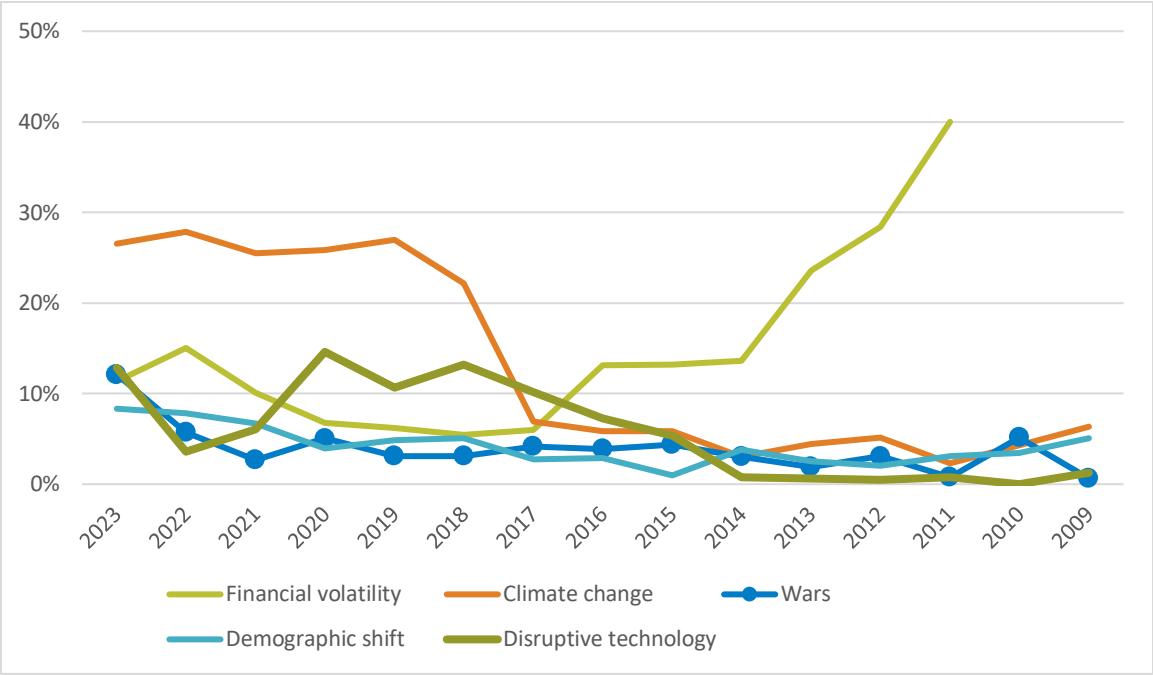
	2023	2022	2021	2020	2019	2018
Societal	10%	12%	16%	16%	9%	12%
Pandemics/infectious diseases	1%	1%	5%	8%	2%	4%
Chronic diseases/medical delivery	1%	1%	1%	1%	0%	2%
Demographic shift	8%	8%	7%	4%	5%	5%
Liability regimes/regulatory framework	0%	2%	3%	2%	2%	2%

	2023	2022	2021	2020	2019	2018
Technological	15%	11%	19%	18%	21%	28%
Cyber/networks	2%	7%	13%	3%	10%	15%
Disruptive technology	13%	4%	6%	15%	11%	13%

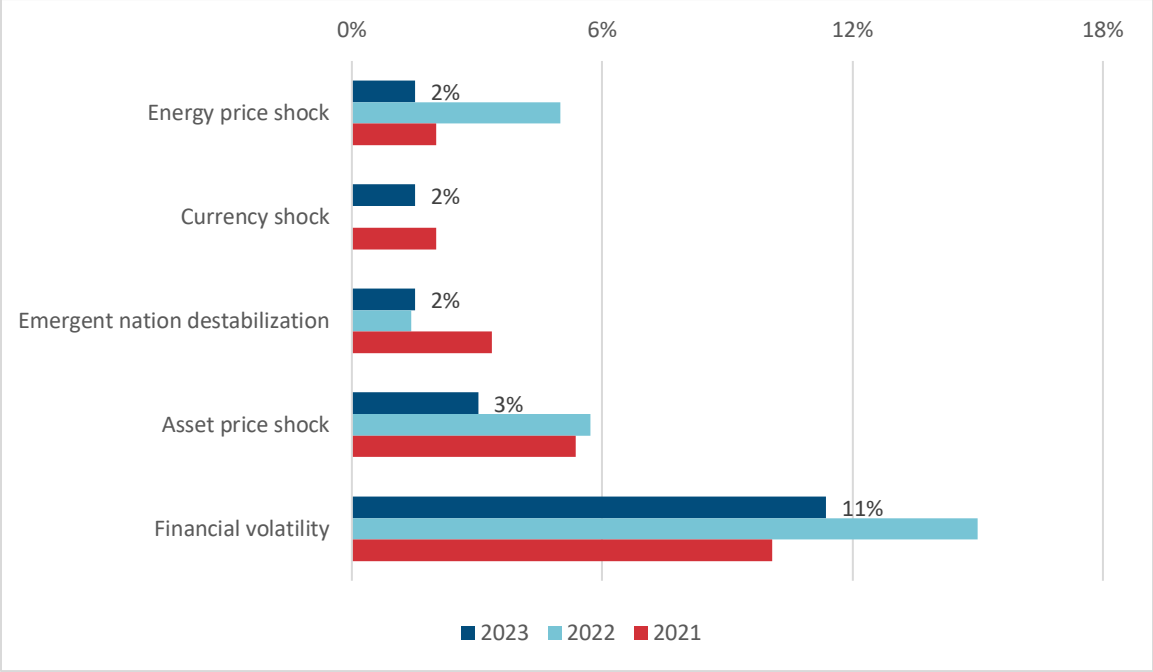
Other (2%/0%/5%/3%/3%/3%)

- *Financial impacts of open borders*
- *Question is unclear. What is future? Next 5, 10, 20 years?*
- *US political discord*

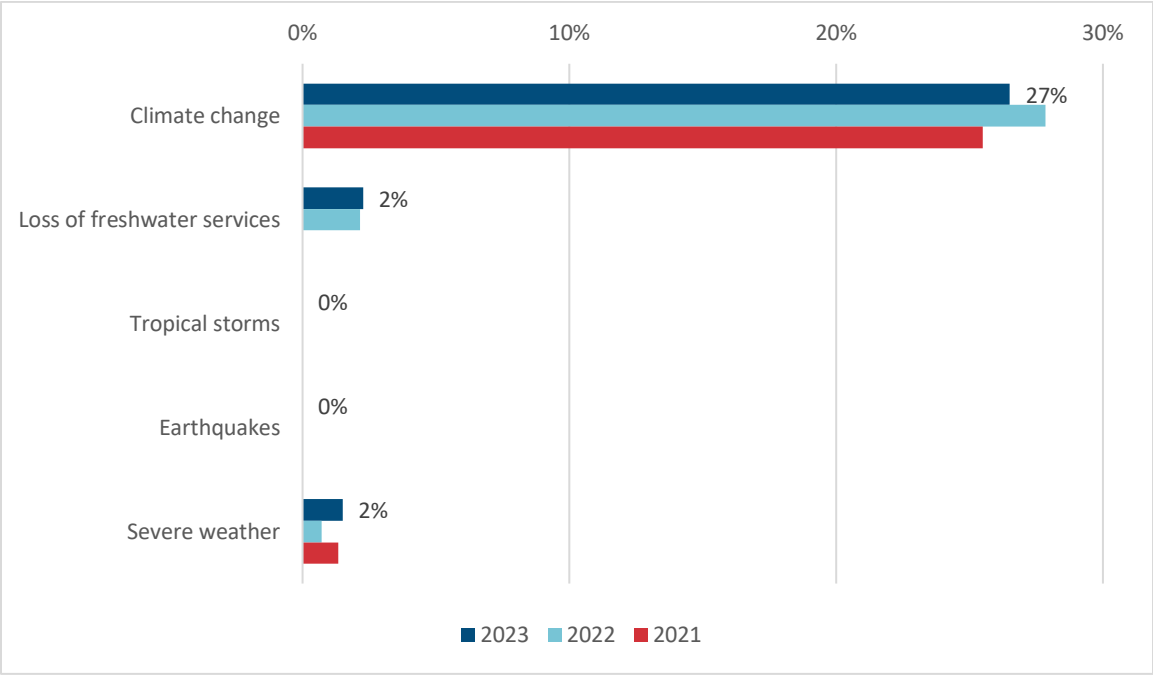
Historical Emerging Risk for Top Five Risks



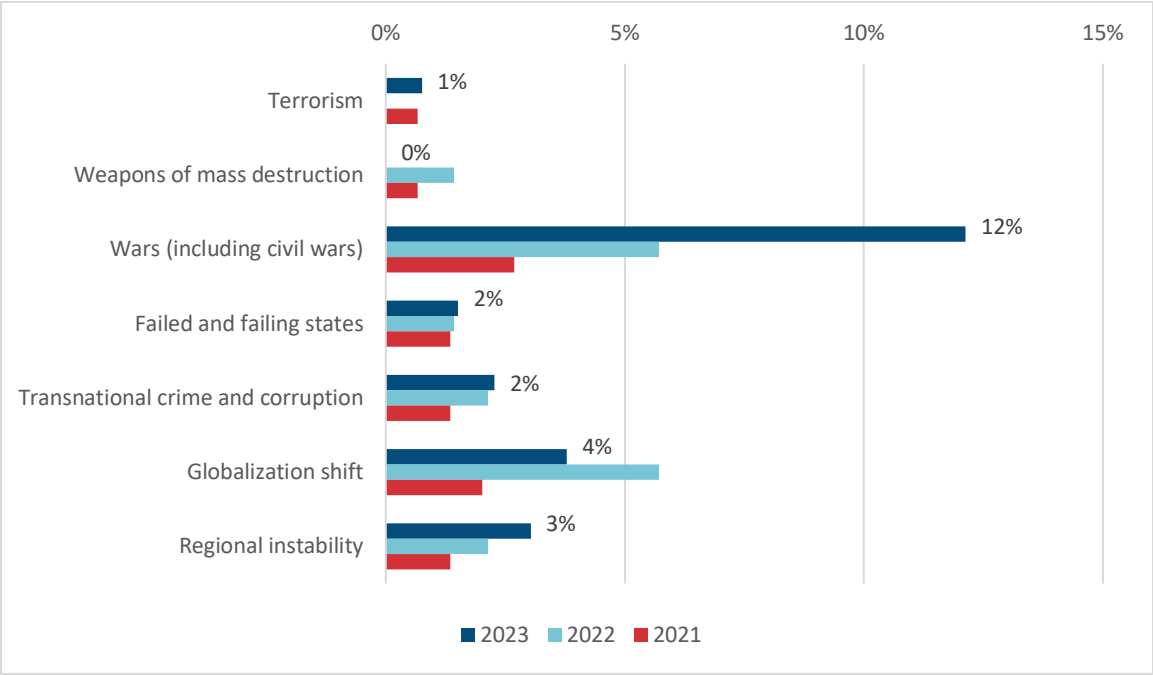
Top Emerging Risks—Economic (% of Total)



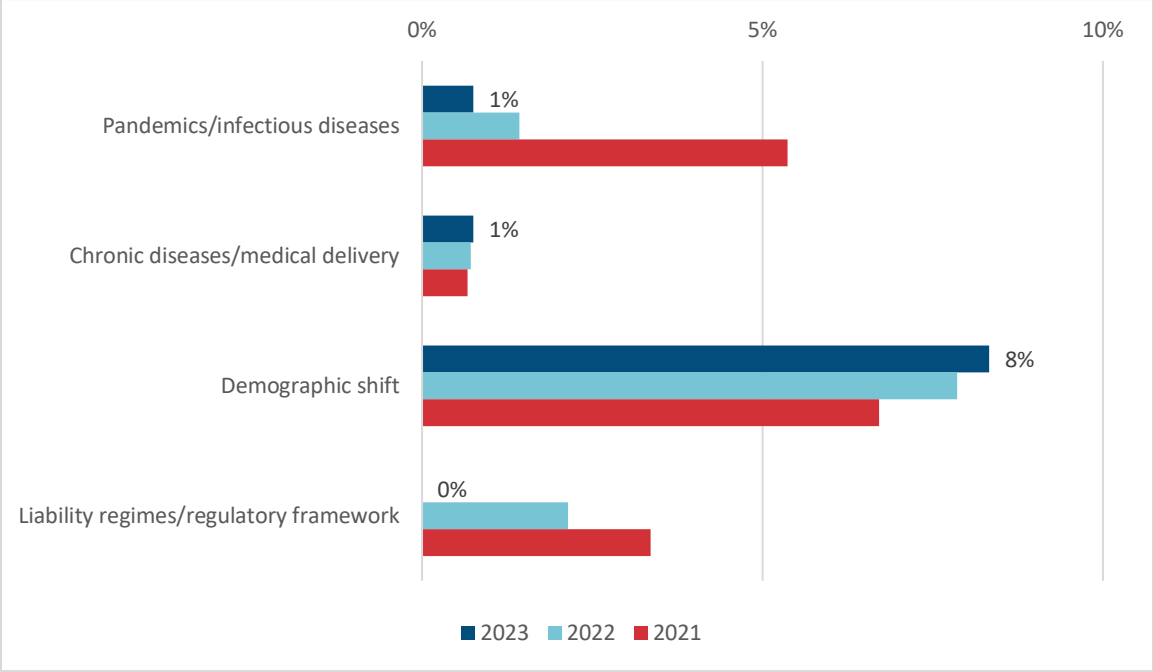
Top Emerging Risks—Environmental (% of Total)



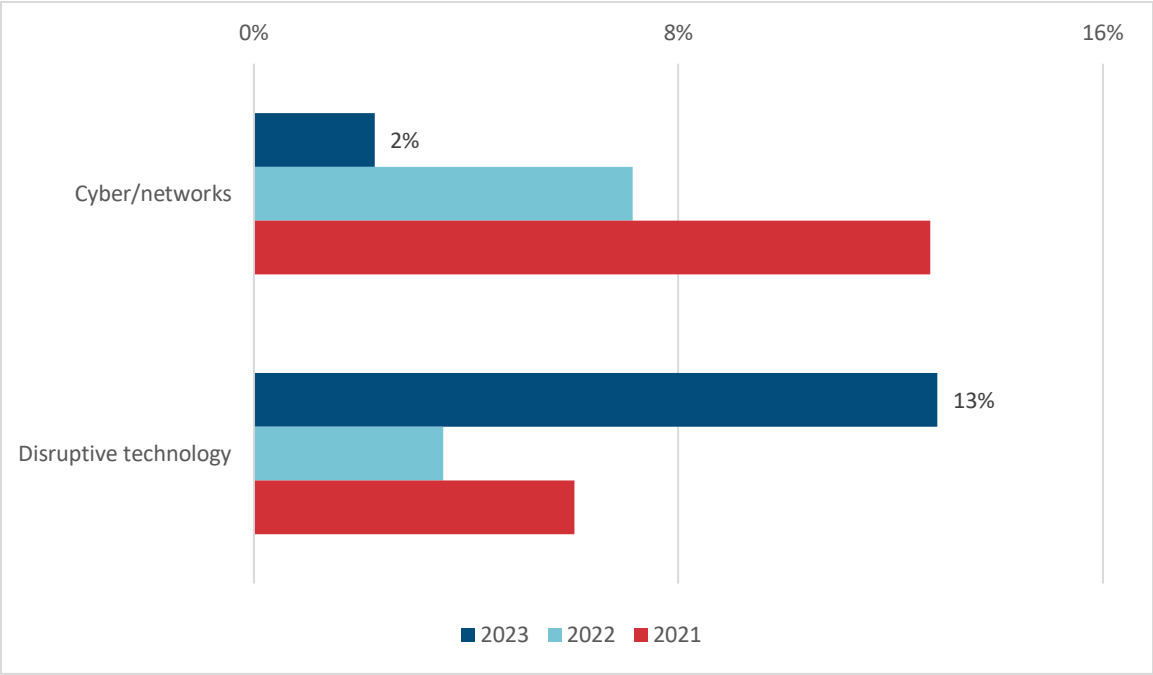
Top Emerging Risks—Geopolitical (% of Total)



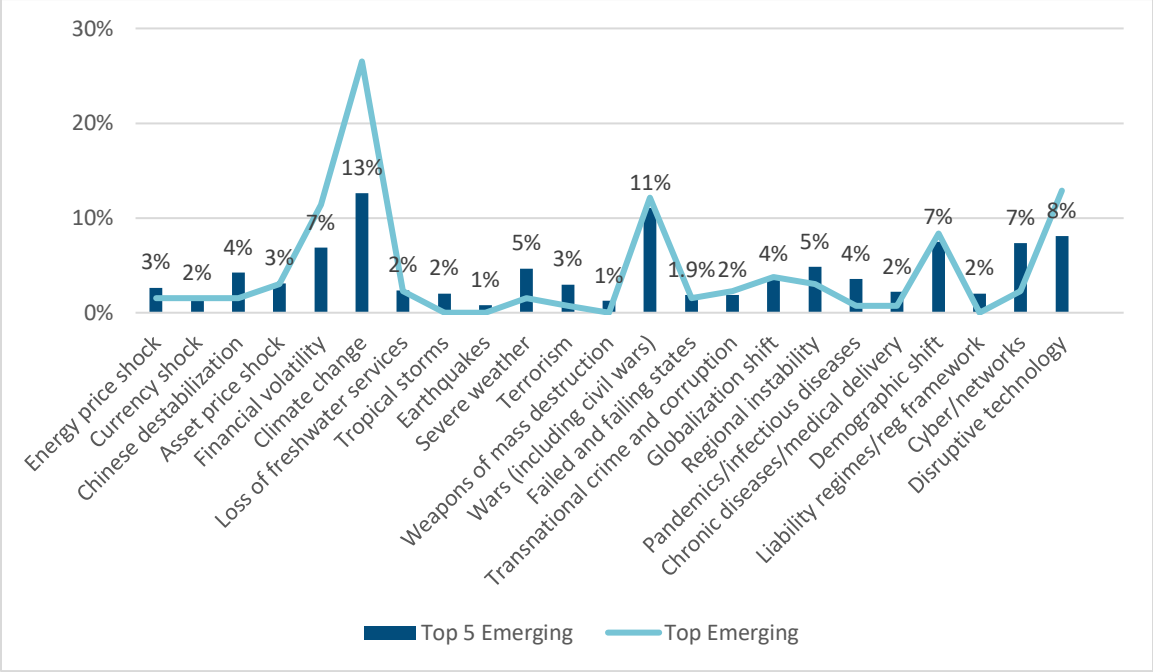
Top Emerging Risks—Societal (% of Total)



Top Emerging Risks—Technological (% of Total)

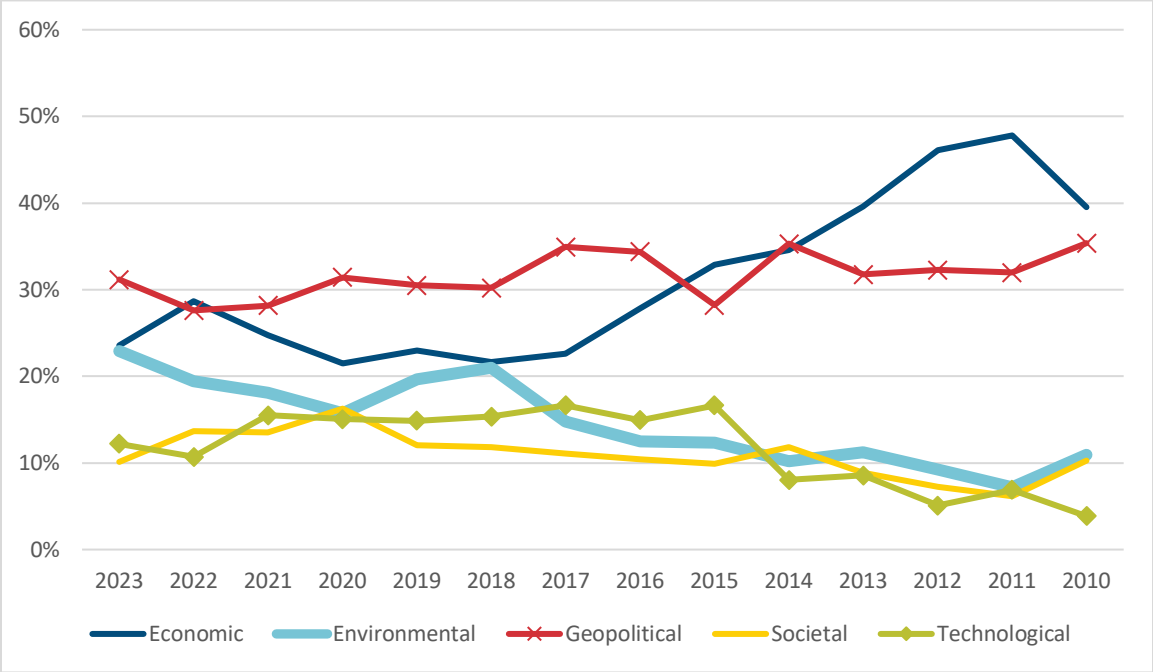


Emerging Risks (Top Five Emerging Vs. Overall Top Emerging)

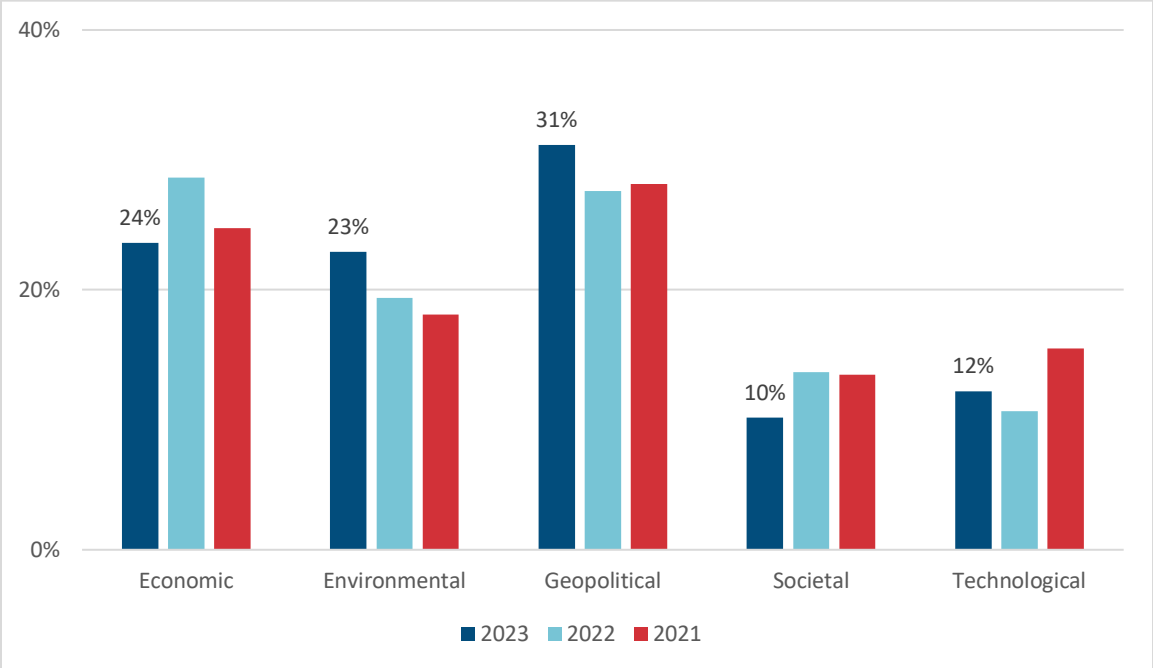


Questions 3, 4 and 5. Questions 3, 4 and 5 should be considered at the same time. Of the 23 emerging risks, are there combinations that you believe will have a large strategic impact in the future? These could occur at the same time (concurrent) or follow each other (sequential). Please select a combination of TWO risks for each response.

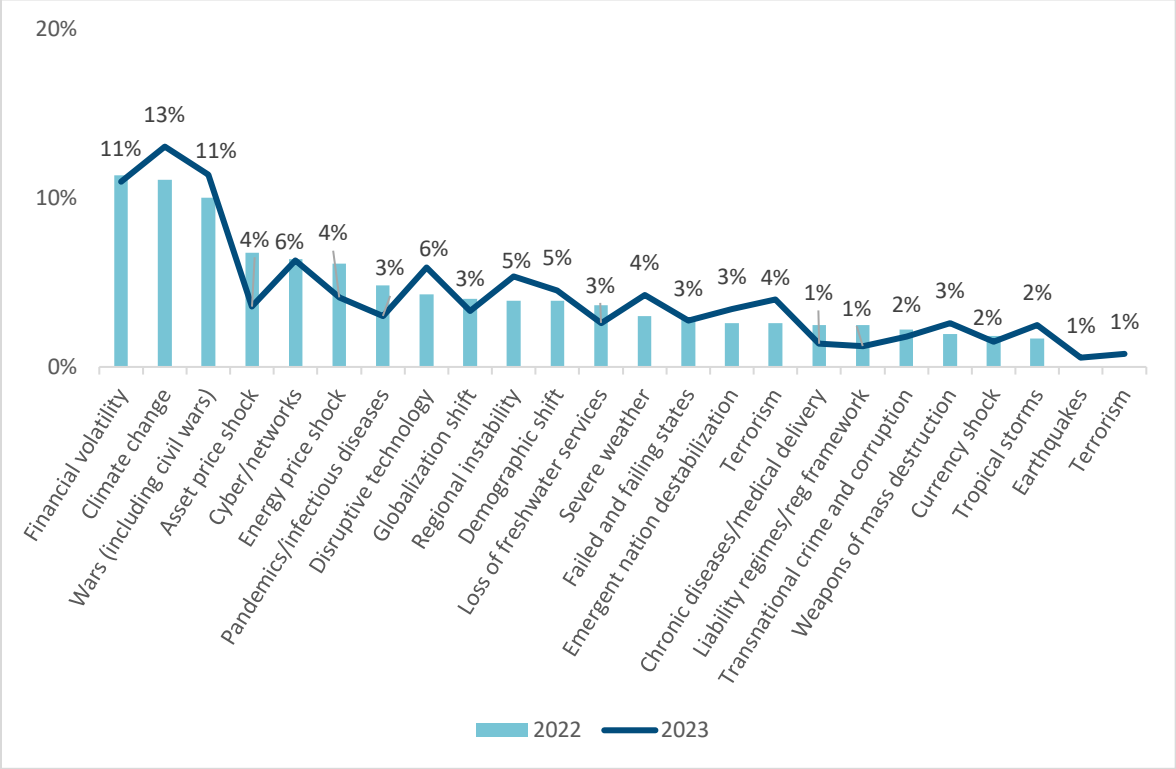
Historical Combination Risks by Category



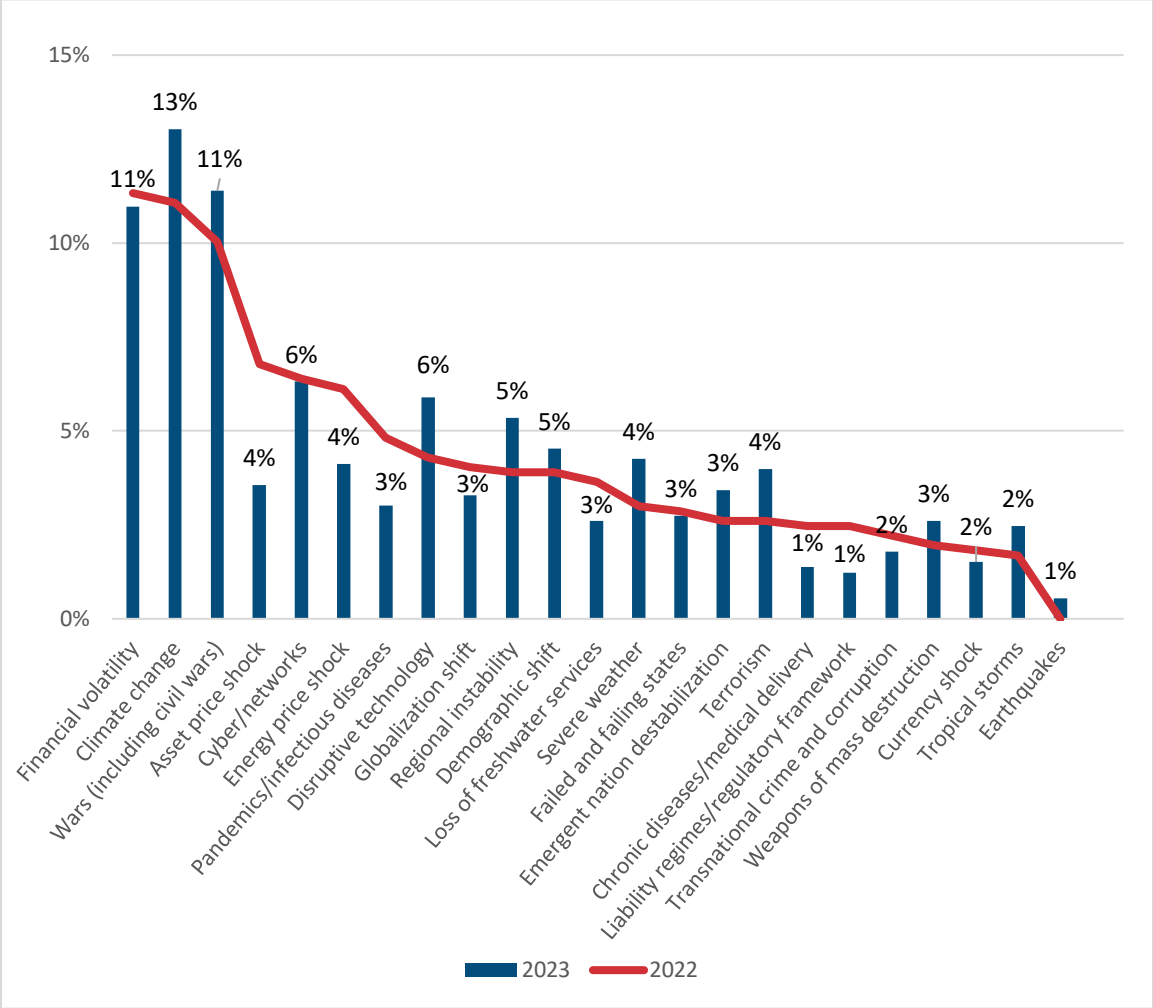
Emerging Risk Combinations by Category



Year-Over-Year Emerging Risk Combinations



Year-Over-Year Emerging Risk Combinations

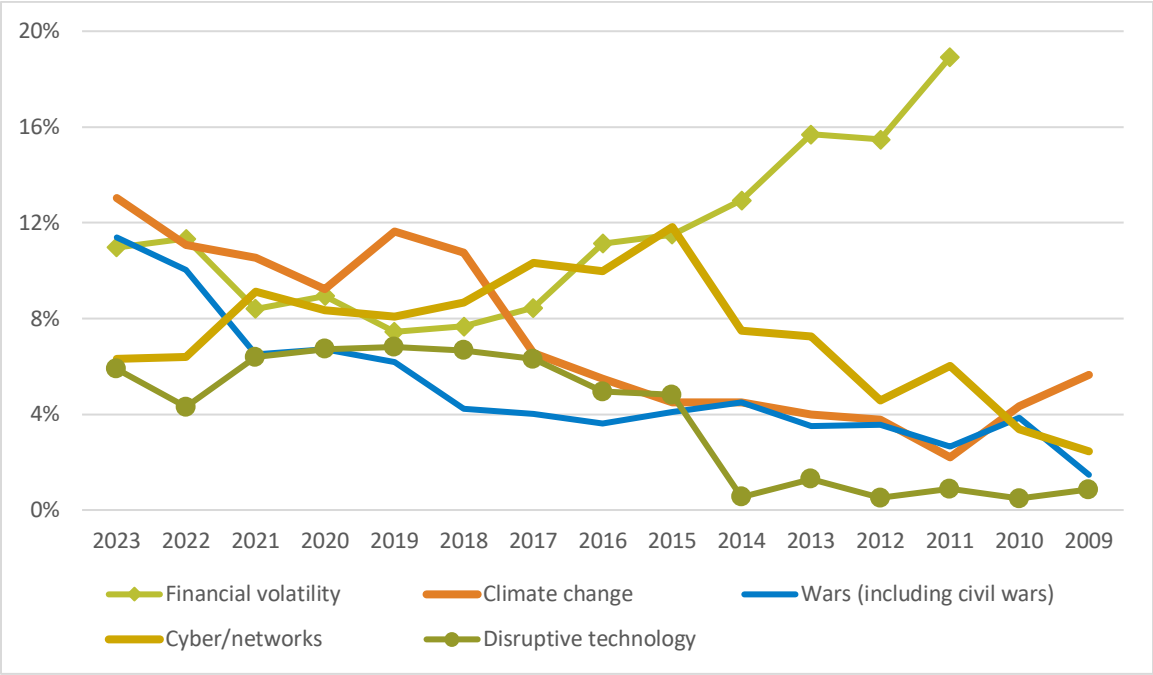


Two-risk combinations—**364 total responses (mean across all surveys is listed first)**

The rankings for combination risks are:

1. *Climate change* - 13%
2. *Wars (including civil wars)* - 11%
3. *Financial volatility* - 11% (risk was added in 2011)
4. *Cyber/networks* - 6%
5. *Disruptive technology* - 6%

Historical Combinations for Top Five Risks



	Avg	2023	2022	2021	2020	2019	2018
Economic	**33%**	24%	29%	25%	21%	23%	22%
Energy price shock	**5%**	4%	6%	5%	2%	2%	2%
Currency shock	**5%**	2%	2%	3%	1%	2%	2%
Emergent nation destabilization	**5%**	3%	3%	2%	3%	5%	3%
Asset price shock	**7%**	4%	7%	6%	6%	6%	7%
Financial volatility	**11%**	**11%**	11%	8%	9%	7%	8%

	Avg	2023	2022	2021	2020	2019	2018
Environmental	**14%**	23%	19%	18%	16%	20%	21%
Climate change	**7%**	13%	11%	11%	9%	12%	11%
Loss of freshwater services	**2%**	3%	4%	3%	2%	3%	3%
Natural catastrophe: tropical storms	**2%**	**2%**	2%	2%	2%	2%	3%
Natural catastrophe: earthquakes	**1%**	**1%**	0%	0%	0%	0%	1%
Natural catastrophe: severe weather (except tropical storms)	**2%**	4%	3%	3%	2%	3%	3%

	Avg	2023	2022	2021	2020	2019	2018
Geopolitical	31%	31%	28%	28%	31%	30%	30%
Terrorism	6%	4%	3%	4%	4%	5%	5%
Weapons of mass destruction	3%	3%	2%	2%	2%	2%	3%
Wars (including civil wars)	5%	11%	10%	7%	7%	6%	4%
Failed and failing states	6%	3%	3%	4%	6%	5%	6%
Transnational crime and corruption	2%	2%	2%	3%	3%	2%	3%
Globalization shift	4%	3%	4%	3%	5%	4%	4%
Regional instability	6%	5%	4%	5%	4%	6%	5%

	Avg	2023	2022	2021	2020	2019	2018
Societal	11%	10%	14%	13%	16%	12%	12%
Pandemics/infectious diseases	4%	3%	5%	6%	7%	3%	4%
Chronic diseases/medical delivery	1%	1%	2%	3%	3%	2%	2%
Demographic shift	4%	5%	4%	3%	4%	5%	4%
Liability regimes/regulatory framework	2%	1%	2%	2%	2%	2%	1%

	Avg	2023	2022	2021	2020	2019	2018
Technological	11%	12%	11%	16%	15%	15%	15%
Cyber/networks	7%	6%	6%	9%	8%	8%	9%
Disruptive technology	4%	6%	4%	6%	7%	7%	7%

Combinations

2023 chart (top 10 are highlighted) – respondents could choose three sets of two-risk combinations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		3	2	2	9	6	0	0	0	0	1	0	2	1	0	0	2	0	0	0	1	0	1
2			0	0	3	0	1	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0
3				1	3	4	1	0	0	0	2	0	6	2	0	1	1	0	0	2	0	0	0
4					15	1	0	0	0	0	1	0	2	0	1	0	1	0	0	0	0	1	1
5						10	0	0	0	1	1	1	5	1	2	4	4	5	0	3	3	7	2
6							12	11	0	21	1	0	6	1	0	1	5	5	0	4	2	2	3
7								0	0	1	0	1	1	0	0	0	1	1	0	0	0	0	0
8									3	4	0	0	0	0	0	0	0	0	0	0	0	0	0
9										0	0	0	0	0	0	0	0	1	0	0	0	0	0
10											0	0	2	0	0	0	0	0	0	1	0	0	1
11												3	12	1	1	1	0	1	0	0	0	4	0
12													12	1	0	0	0	0	1	0	0	0	0
13														6	1	4	12	2	1	3	0	3	1
14															2	0	3	0	0	2	0	0	0
15																0	0	0	0	0	0	6	0
16																	3	0	0	4	0	0	5
17																		1	0	1	1	1	3
18																			2	2	0	1	0
19																				5	1	0	0
20																					0	1	5
21																						0	1
22																							20
23																							

Leading combinations were as follows:

21 responses 6%, no. 3

Climate change

Natural catastrophe: severe weather

20 responses 5%, no. 2

Cyber/networks

Disruptive technology

15 responses 4%, no. 5

Asset price shock

Financial volatility

12 responses 3%, not in previous top 10

Climate change

Loss of freshwater services

12 responses 3%, not in previous top 10

Terrorism

Wars (including civil wars)

12 responses 3%, not in previous top 10

Weapons of mass destruction

Wars (including civil wars)

12 responses 3%, not in previous top 10

Wars (including civil wars)

Regional instability

11 responses 3%, no. 8

Climate change

Natural catastrophe: tropical storms

10 responses 3%, no. 9

Financial volatility

Climate change

15 responses 2%, not in previous top 10

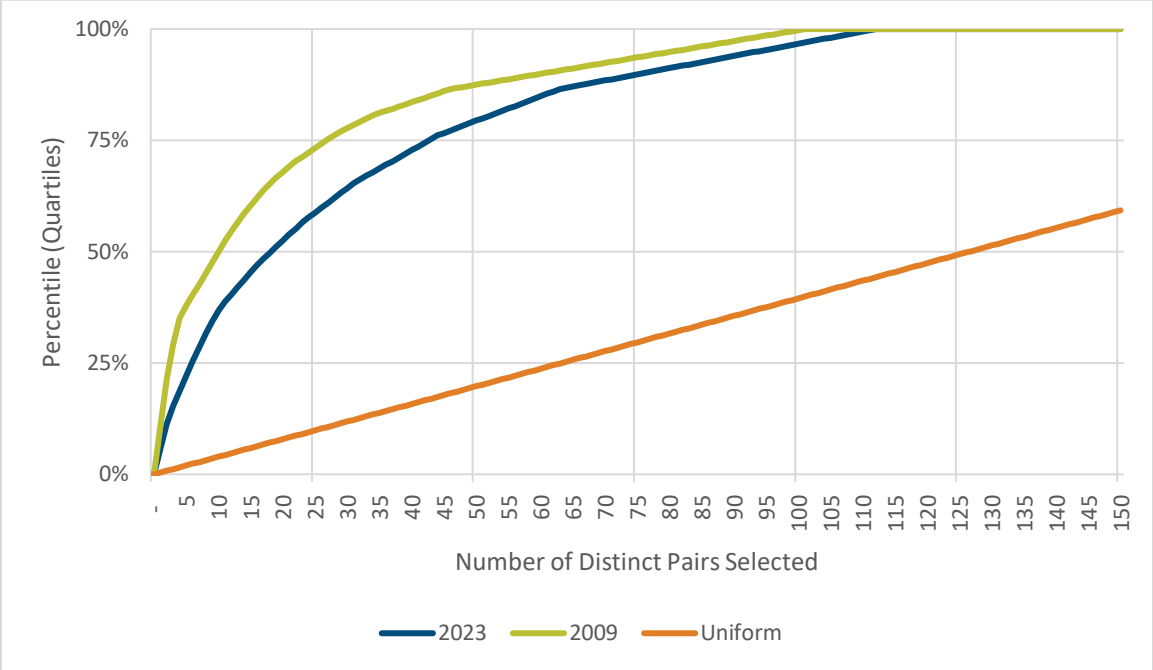
Energy price shock

Financial volatility

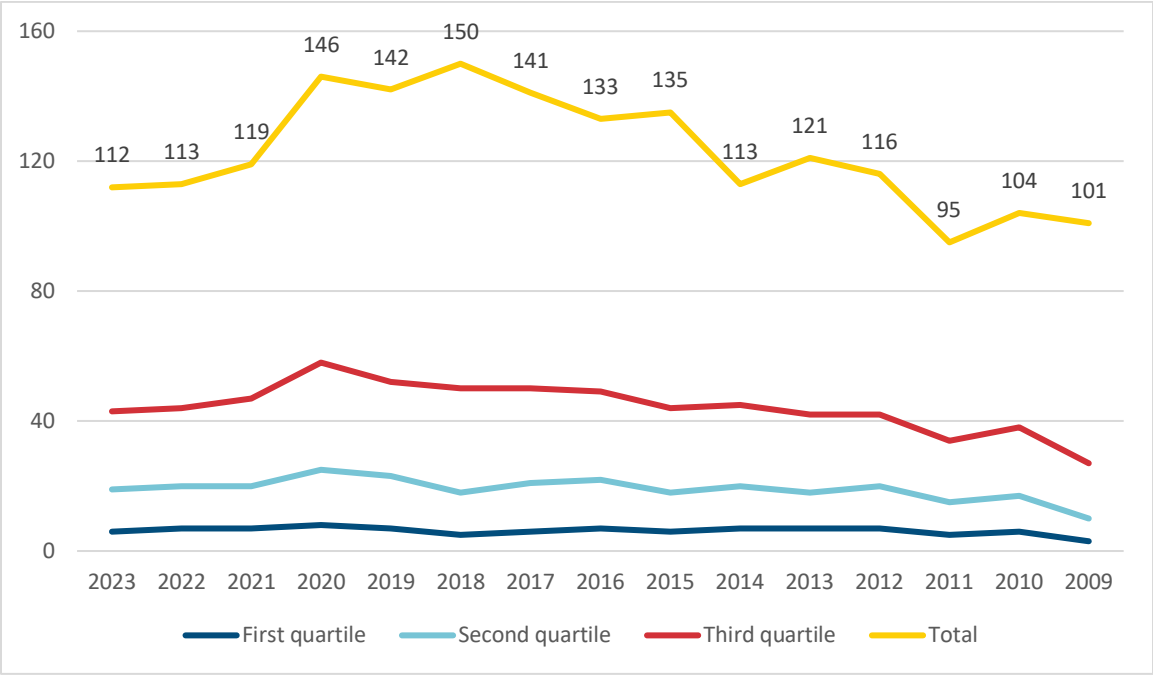
Ed. note: The combinations question was added in the second iteration of the survey in fall 2008.

There are 253 possible risk combinations when two risks are chosen from 23 options. If the results in the cumulative distribution function were in the upper left section of the graph and reached 100% very quickly this would recognize the similarities between responses and be very concentrated. The “Uniform” line shown represents the extreme for less concentrated responses, where each combination was listed at the same level. Respondents are asked to chose three risk combinations (from the 23) that have the largest strategic impact in the future. Since the financial crisis in 2008–2009, results have trended toward reduced concentrations (greater variation among these choices). The 2009 result lies further from the diagonal baseline, showing a heavily concentrated result, than does the 2023 line. The current year’s results were slightly more concentrated in the top choices represented in the top quartile.

Cumulative Distribution of Combinations (253 total possible)

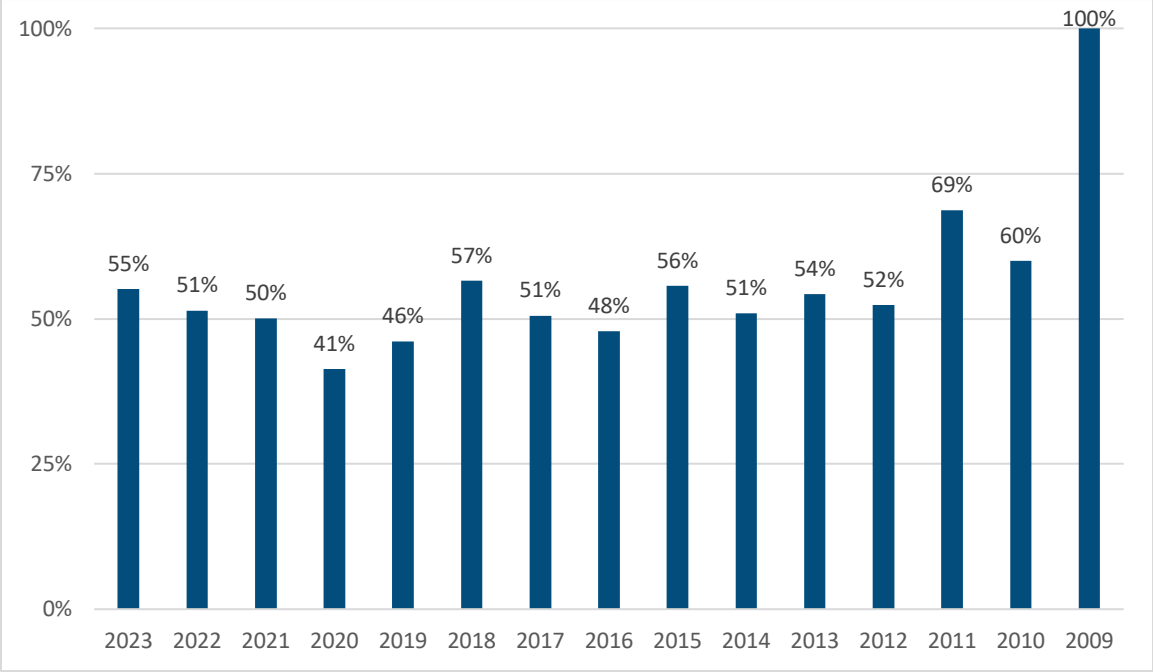


Risk Combinations



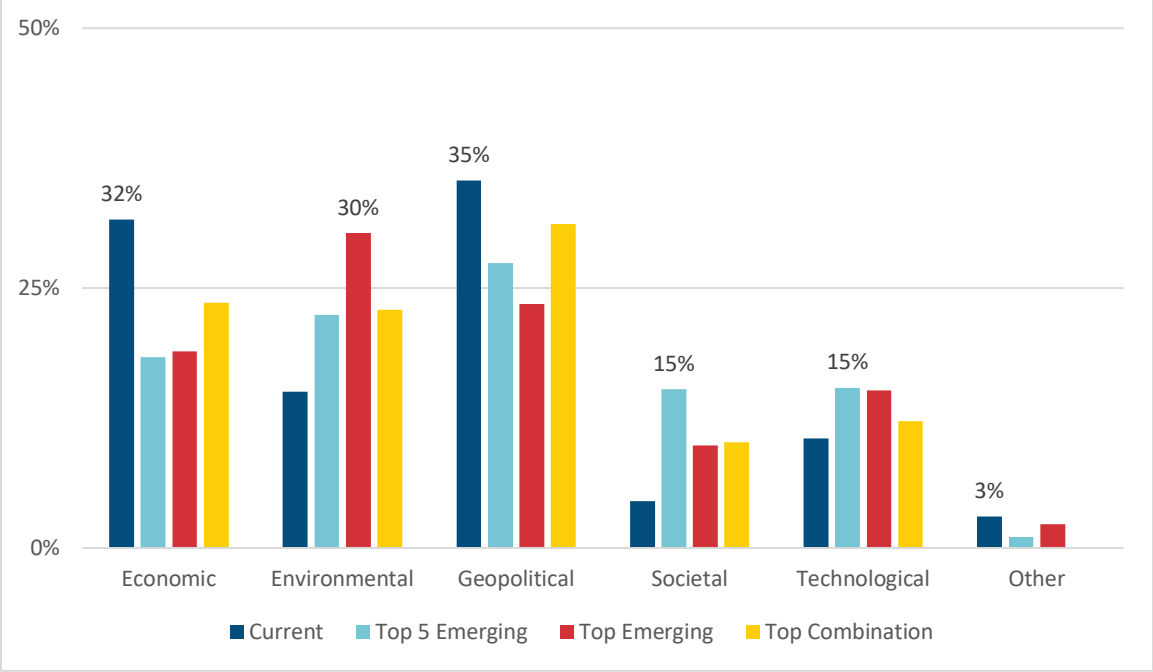
These results show how any risk combinations it takes for each quartile. A more concentrated result would have fewer than a less concentrated result.

Risk Concentration Ratio (Base 2009 = 100%)

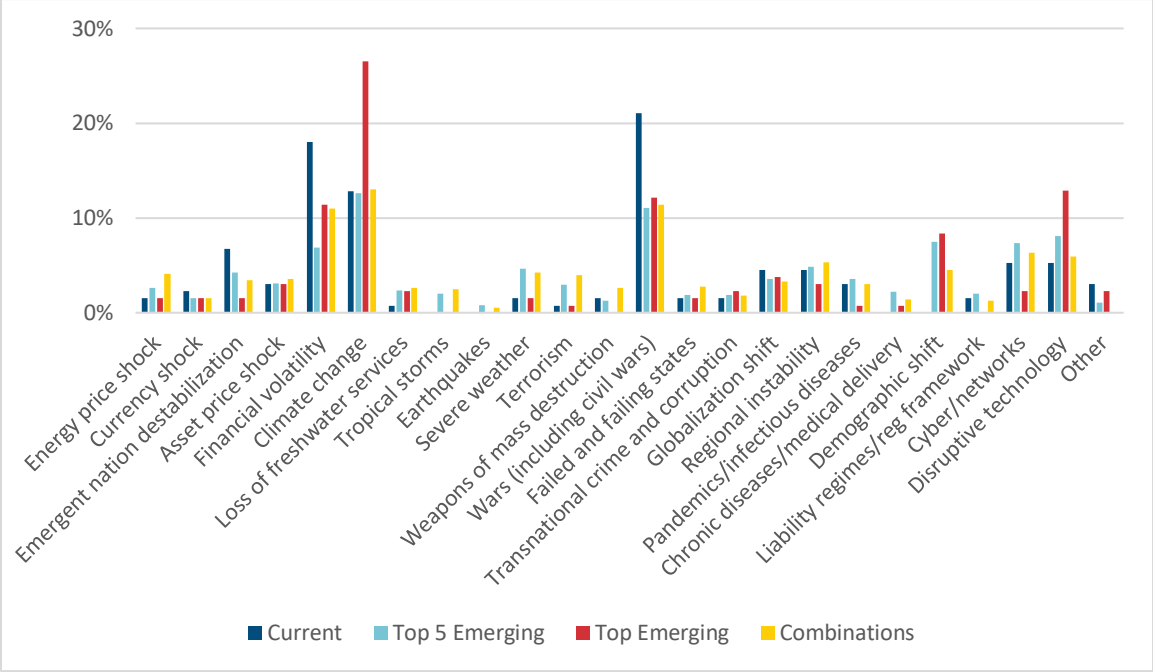


The Risk Concentration Ratio metric compares the average result across the four quartiles when compared to the 2009 extremely concentrated results. A low number means the results were less concentrated.

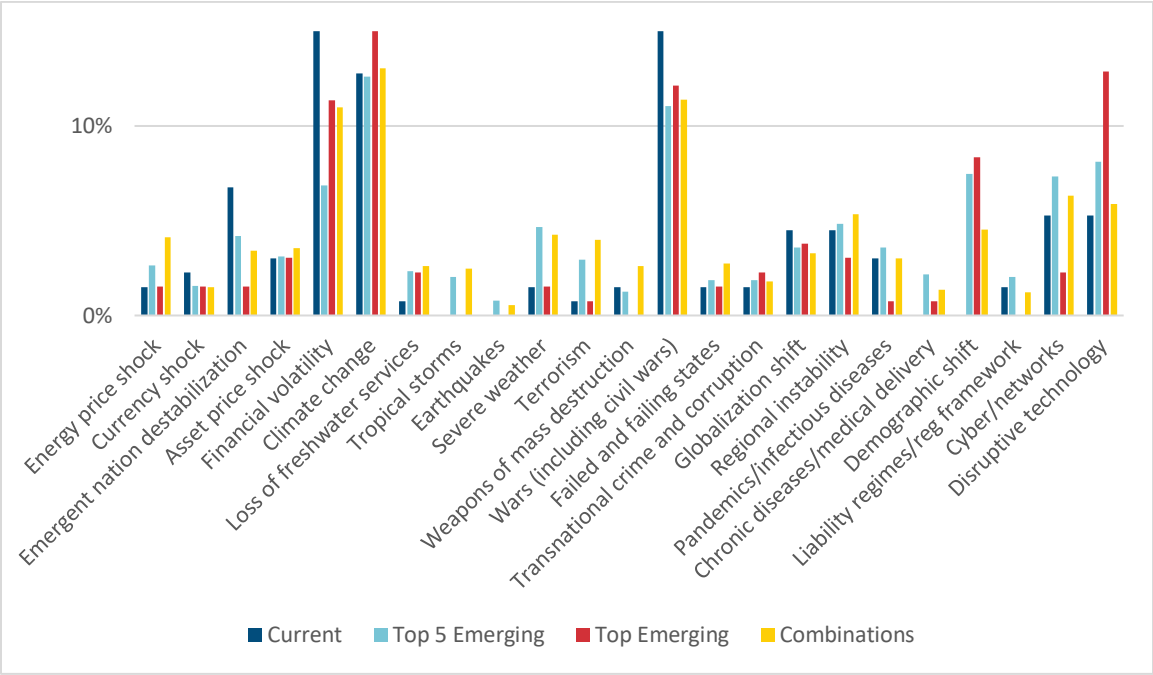
Category Comparison Across Four Questions



Risk Comparison Across Four Questions



Risk Comparison Across Four Questions (restricted y-axis)



In the next table, a yellow highlight shows the highest result among the first three questions, and the red highlight shows where risk combination is the highest result.

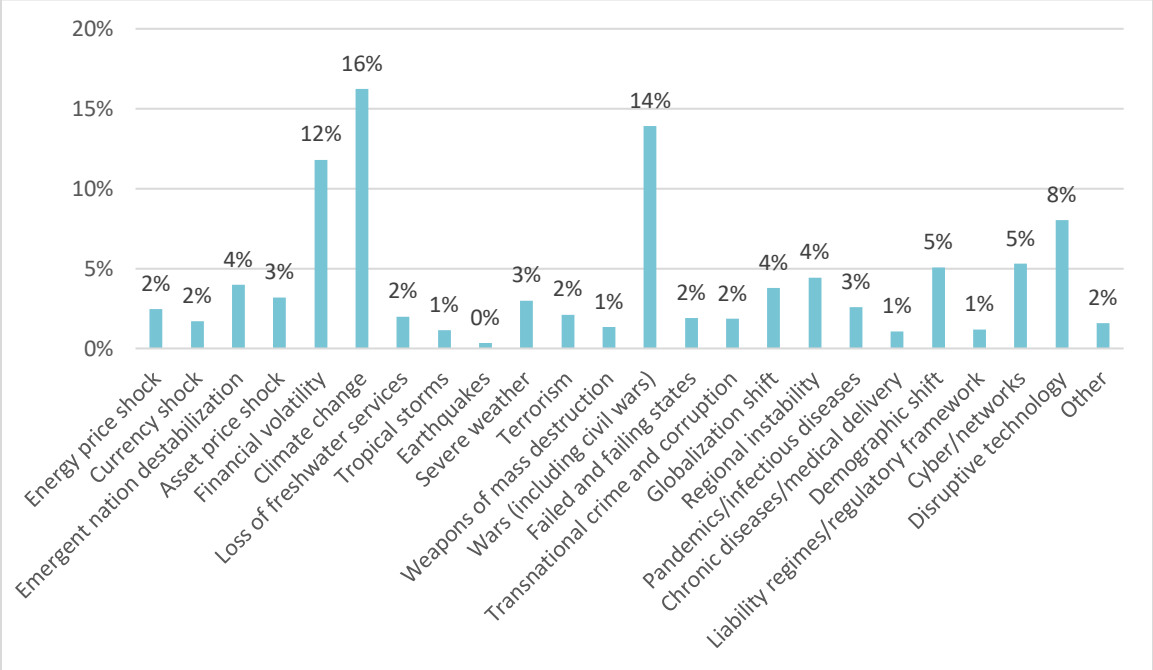
Comparison Across Four Questions

Comparison Across Four Questions	Current 2023	Top 5 2023	Top 2023	Combos 2023
Energy price shock	1.5%	2.6%	1.5%	4.1%
Currency shock	2.3%	1.6%	1.5%	1.5%
Emergent nation destabilization	6.8%	4.2%	1.5%	3.4%
Asset price shock	3.0%	3.1%	3.0%	3.6%
Financial volatility	18.0%	6.9%	11.4%	11.0%
Climate change	12.8%	12.6%	26.5%	13.0%
Loss of freshwater services	0.8%	2.3%	2.3%	2.6%
Tropical storms	0.0%	2.0%	0.0%	2.5%
Earthquakes	0.0%	0.8%	0.0%	0.5%
Severe weather	1.5%	4.7%	1.5%	4.3%
Terrorism	0.8%	3.0%	0.8%	4.0%
Weapons of mass destruction	1.5%	1.2%	0.0%	2.6%
Wars (including civil wars)	21.1%	11.1%	12.1%	11.4%
Failed and failing states	1.5%	1.9%	1.5%	2.7%
Transnational crime and corruption	1.5%	1.9%	2.3%	1.8%
Globalization shift	4.5%	3.6%	3.8%	3.3%
Regional instability	4.5%	4.8%	3.0%	5.3%
Pandemics/infectious diseases	3.0%	3.6%	0.8%	3.0%
Chronic diseases/medical delivery	0.0%	2.2%	0.8%	1.4%
Demographic shift	0.0%	7.5%	8.3%	4.5%
Liability regimes/regulatory framework	1.5%	2.0%	0.0%	1.2%
Cyber/networks	5.3%	7.3%	2.3%	6.3%
Disruptive technology	5.3%	8.1%	12.9%	5.9%
Other	3.0%	1.1%	2.3%	

Comparison Across Four Questions showing differentiation between questions

Comparison Across Four Questions	Current 2023	Top 5 2023	Top 2023	Combos 2023	C-top5	C-top	C-combo	Top5-top	Top 5-combos	Top-combos
Energy price shock	1.5%	2.6%	1.5%	4.1%	-1.1%	0.0%	-2.6%	1.1%	-1.5%	-2.6%
Currency shock	2.3%	1.6%	1.5%	1.5%	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%
Emergent nation destabilization	6.8%	4.2%	1.5%	3.4%	2.6%	5.3%	3.3%	2.7%	0.8%	-1.9%
Asset price shock	3.0%	3.1%	3.0%	3.6%	-0.1%	**0.0%**	-0.6%	0.1%	-0.5%	-0.5%
Financial volatility	18.0%	6.9%	11.4%	11.0%	11.2%	**6.7%**	7.1%	-4.5%	-4.1%	0.4%
Climate change	12.8%	12.6%	26.5%	13.0%	0.2%	**-13.7%**	-0.2%	**-13.9%**	-0.4%	13.5%
Loss of freshwater services	0.8%	2.3%	2.3%	2.6%	-1.6%	-1.5%	-1.9%	0.1%	-0.3%	-0.3%
Tropical storms	0.0%	2.0%	0.0%	2.5%	-2.0%	0.0%	-2.5%	2.0%	-0.4%	-2.5%
Earthquakes	0.0%	0.8%	0.0%	0.5%	-0.8%	0.0%	-0.5%	0.8%	0.2%	-0.5%
Severe weather	1.5%	4.7%	1.5%	4.3%	-3.2%	0.0%	-2.7%	3.2%	0.4%	-2.7%
Terrorism	0.8%	3.0%	0.8%	4.0%	-2.2%	0.0%	-3.2%	2.2%	-1.0%	-3.2%
Weapons of mass destruction	1.5%	1.2%	0.0%	2.6%	0.3%	1.5%	-1.1%	1.2%	-1.4%	-2.6%
Wars (including civil wars)	21.1%	11.1%	12.1%	11.4%	10.0%	8.9%	9.7%	-1.1%	-0.3%	0.7%
Failed and failing states	1.5%	1.9%	1.5%	2.7%	-0.4%	0.0%	-1.2%	0.4%	-0.9%	-1.2%
Transnational crime and corruption	1.5%	1.9%	2.3%	1.8%	-0.4%	-0.8%	-0.3%	-0.4%	0.1%	0.5%
Globalization shift	4.5%	3.6%	3.8%	3.3%	0.9%	0.7%	1.2%	-0.2%	0.3%	0.5%
Regional instability	4.5%	4.8%	3.0%	5.3%	-0.3%	1.5%	-0.8%	1.8%	-0.5%	-2.3%
Pandemics/infectious diseases	3.0%	3.6%	0.8%	3.0%	-0.6%	2.2%	0.0%	2.8%	0.6%	-2.3%
Chronic diseases/medical delivery	0.0%	2.2%	0.8%	1.4%	-2.2%	-0.8%	-1.4%	1.4%	0.8%	-0.6%
Demographic shift	0.0%	7.5%	8.3%	4.5%	-7.5%	-8.3%	-4.5%	-0.9%	2.9%	3.8%
Liability regimes/regulatory framework	1.5%	2.0%	0.0%	1.2%	-0.5%	1.5%	0.3%	2.0%	0.8%	-1.2%
Cyber/networks	5.3%	7.3%	2.3%	6.3%	-2.1%	**3.0%**	-1.0%	5.0%	1.0%	-4.0%
Disruptive technology	5.3%	8.1%	12.9%	5.9%	-2.8%	**-7.6%**	-0.6%	**-4.8%**	2.2%	7.0%
Other	3.0%	1.1%	2.3%		1.9%	0.7%		-1.2%		

Average Across Four Questions (Current, Top Five, Top and Combinations)

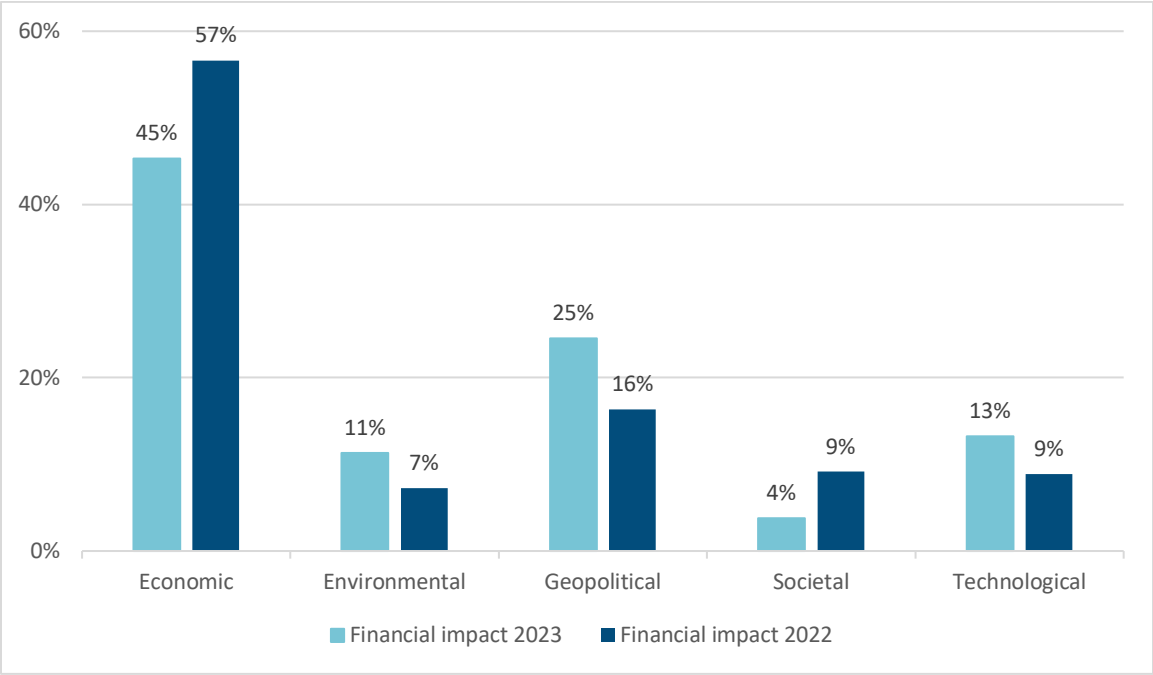


Questions have been segregated by their response to *Greatest strategic impact related to risk can have various meanings. How do you define it?* A grid of six responses were split two ways between financial impact and disruption and split three ways as follows:

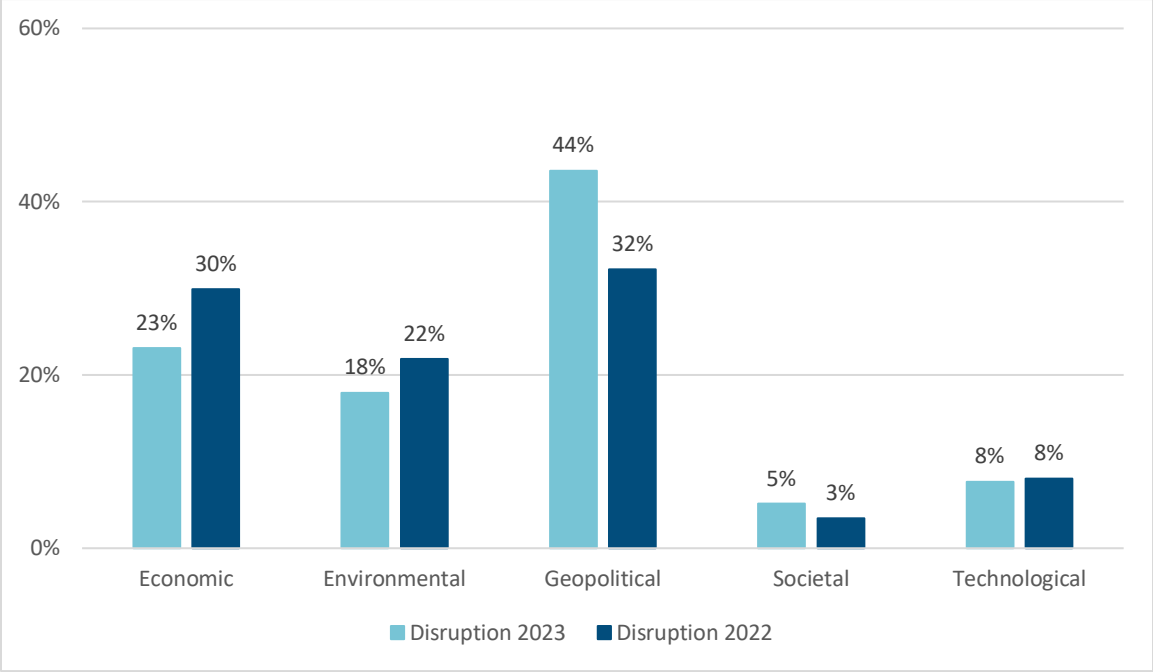
- World economy
- Me personally or my firm/industry
- Lives, habitat and safety

While the numbers are too small to be statistically significant, some interesting differentiation is apparent when separating results between financial impact and disruption.

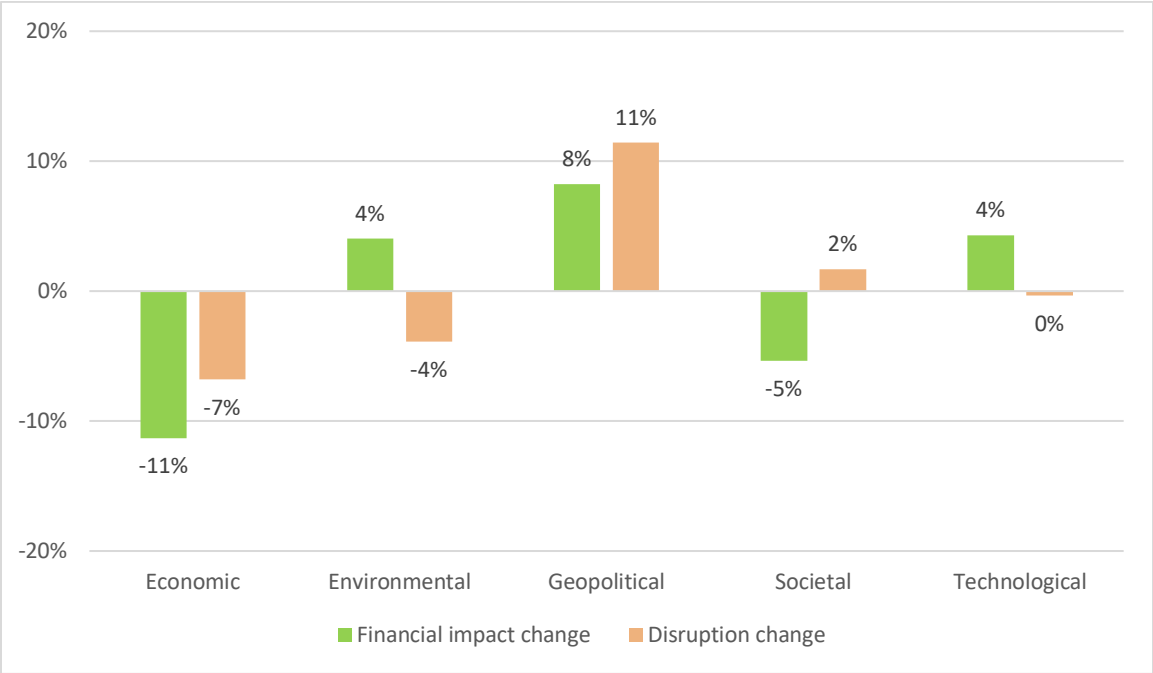
Top Current Risk for those answering Financial Impact as Greatest Strategic Impact



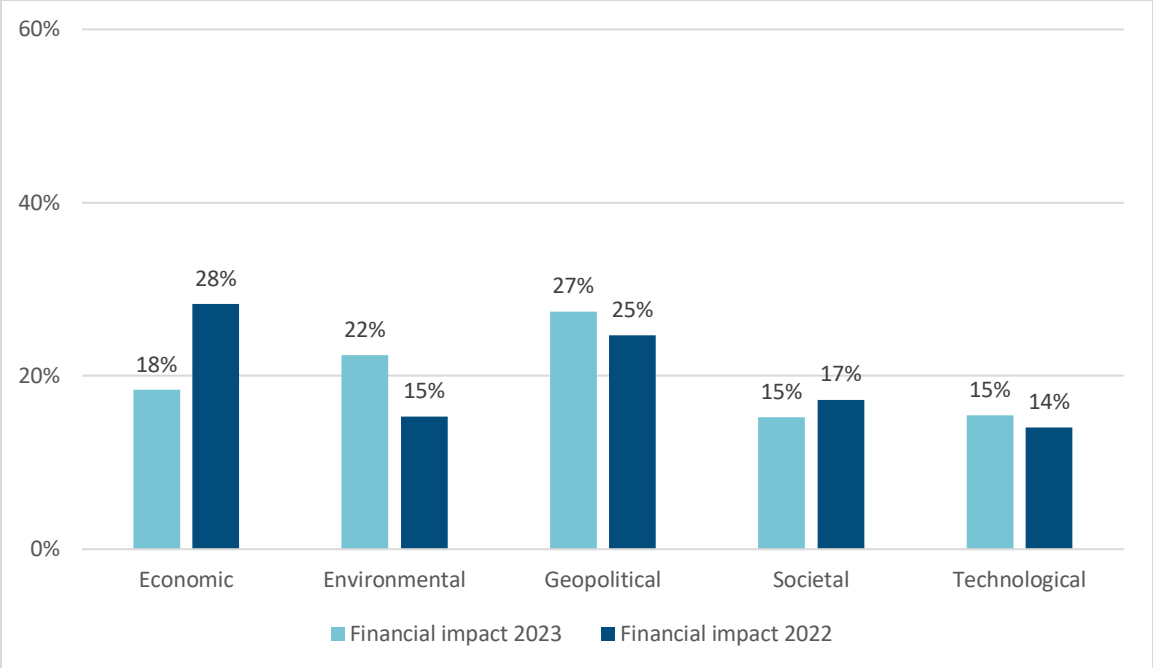
Top Current Risk for those answering Disruption as Greatest Strategic Impact



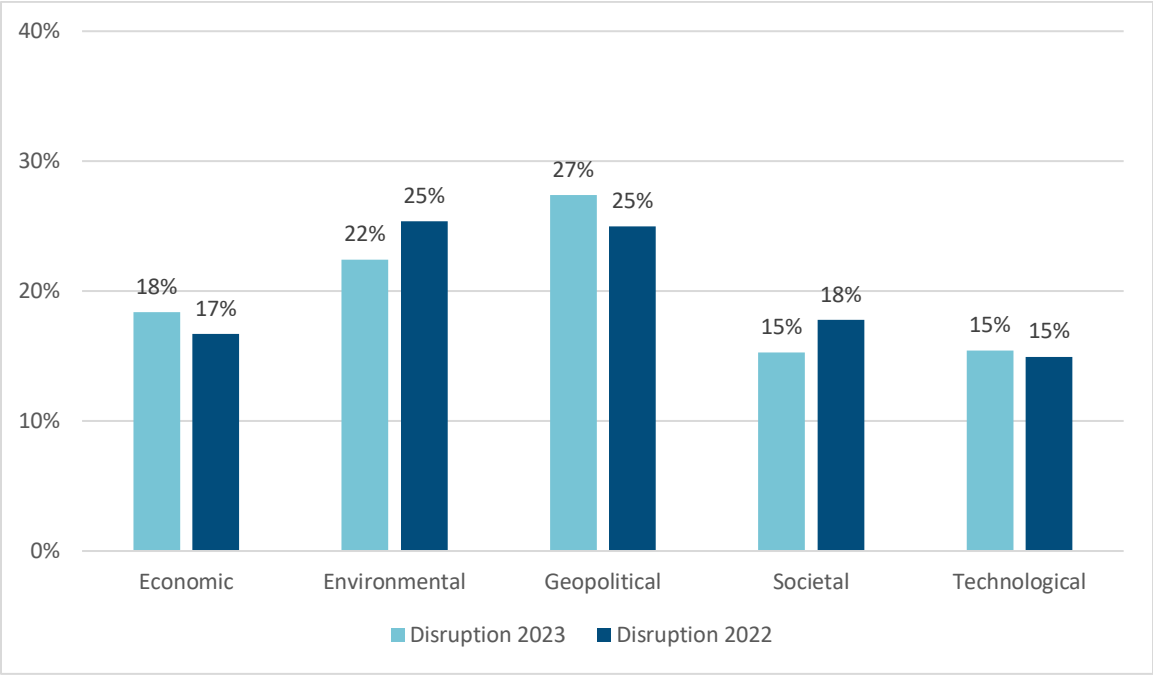
Change in Top Current Risk based on answer to Greatest Strategic Impact



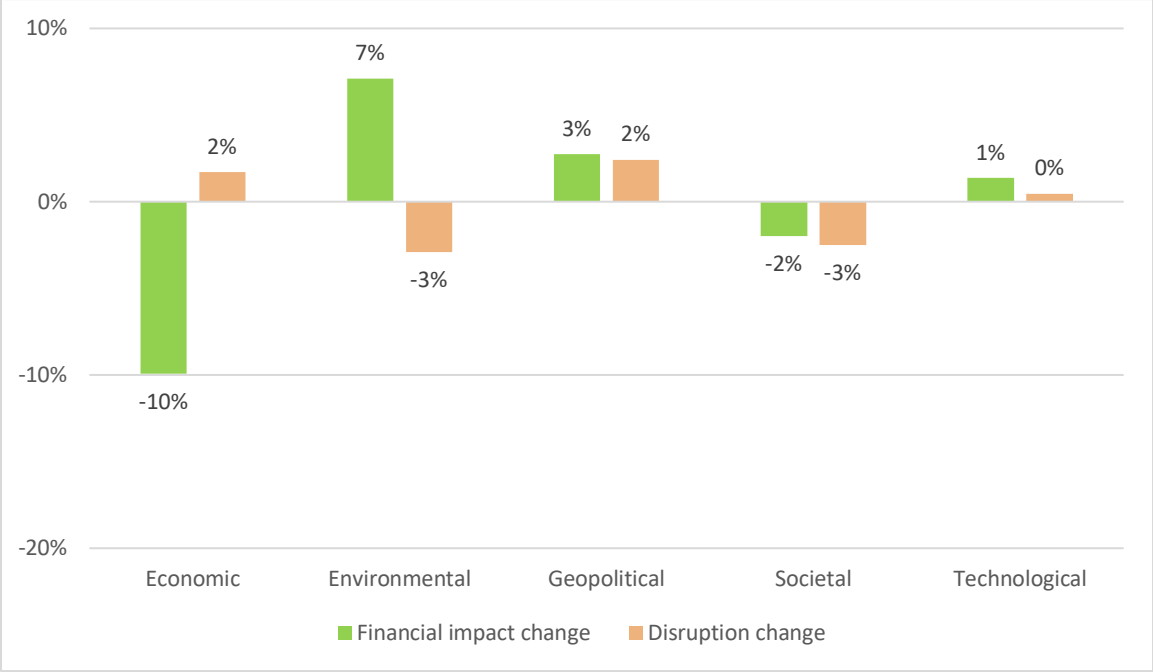
Top Five Emerging Risks for those answering Financial Impact as Greatest Strategic Impact



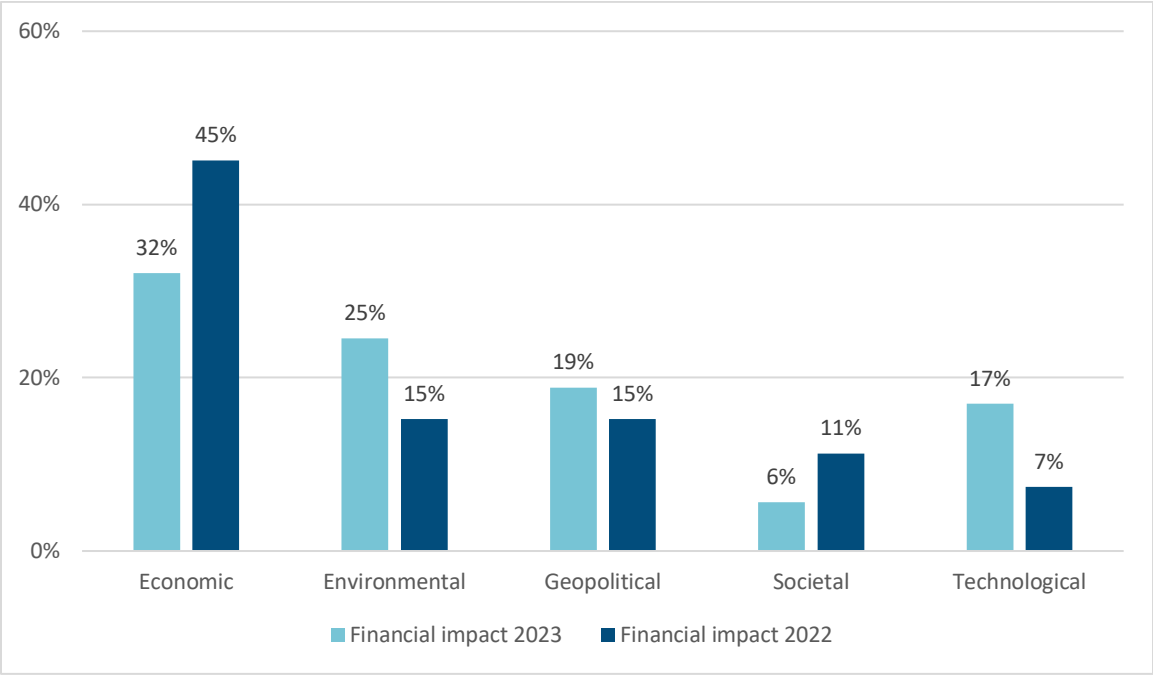
Top Five Emerging Risks for those answering Disruption as Greatest Strategic Impact



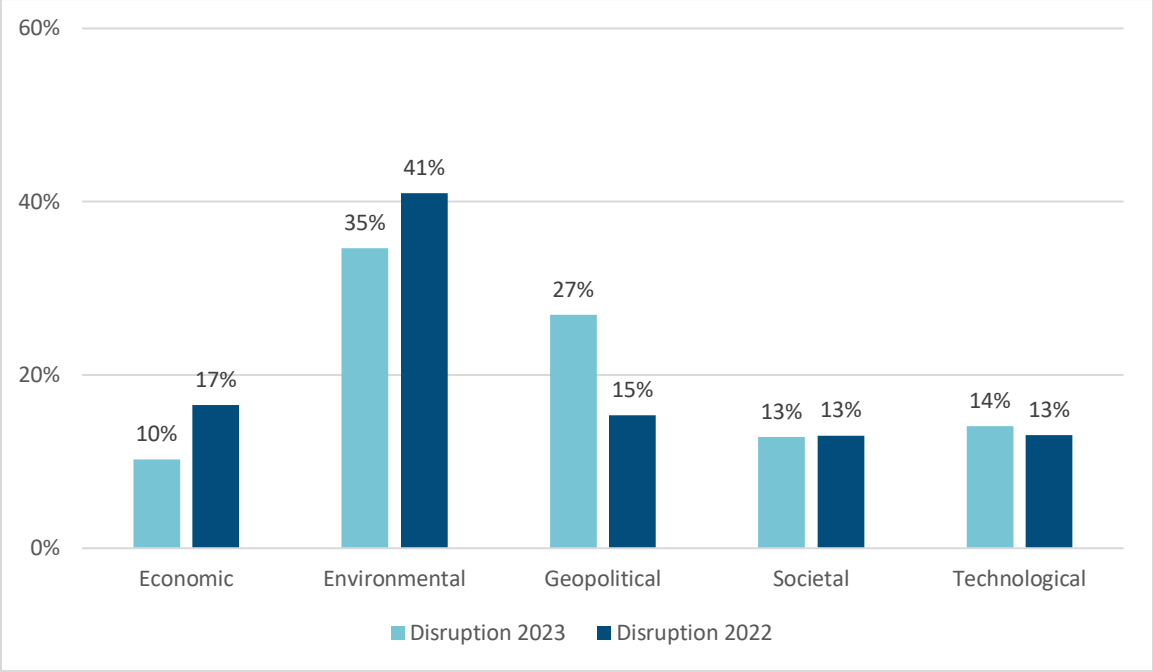
Change in Top Five Emerging Risks based on answer to Greatest Strategic Impact



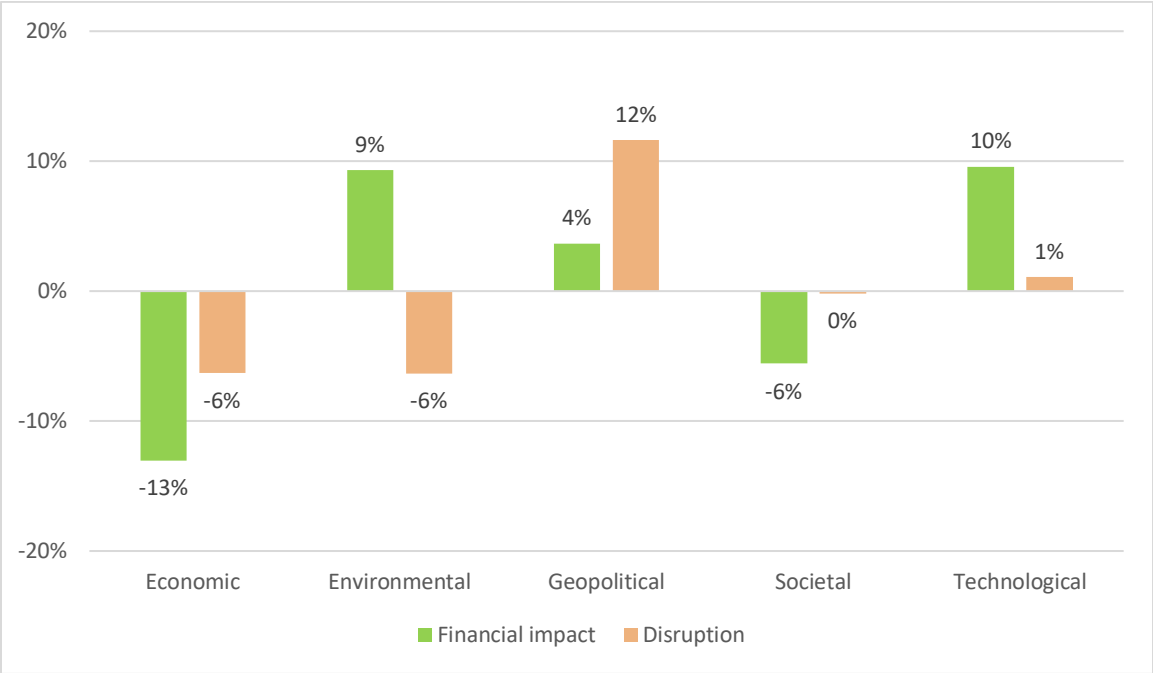
Top Emerging Risk for those answering Financial Impact as Greatest Strategic Impact



Top Emerging Risk for those answering Disruption as Greatest Strategic Impact



Change in Top Emerging Risk based on answer to Greatest Strategic Impact



Each year, a specialty question is asked. Traditionally the question has not been repeated in subsequent surveys, but some may cycle through periodically.

Question 6. Many commentators are suggesting that today's world is changing quickly and that we are entering a new regime, i.e., a period where previous methods of analyzing risks and returns need to be rebuilt from first principles. Rules of thumb would no longer be effective and historical data is not predictive of future experience (unknown knowns) with sufficient accuracy to maintain the integrity and stability of pricing and projections.

Following WW2, a new regime started that was defined in part by the baby boom, antibiotic driven health improvements, reducing debt-to-GDP ratios, the Cold War, a naïve understanding of greenhouse gases, and improving technology (e.g., TV, early computers, medical advances). There have been several regime shifts since then, each impacting society broadly as well as methods and assumptions used by actuaries and other financial analysts. Alternative names for recent regime shifts include the new normal or megatrend.

If there is a regime change in the next 5-10 years, which 3 emerging risks are most likely to play a material role in causing it? (please select no more than three)

A total of 118 respondents chose at least one risk, for a total of 341 responses (average of 2.89 risks selected per survey that selected at least one).

The top rankings for risks likely to emerge before 2025 are (percentages reflect number of respondents answering)

1. *Climate change* - 42%
2. *Wars (including civil wars)* - 38%
3. *Disruptive technology* - 37%

4T. Globalization shift - 26%

4T. Demographic shift - 26%

Category (percentages reflect total responses)

Economic	15%
Environmental	18%
Geopolitical	34%
Societal	15%
Technological	18%

Risks Likely to Play a Role in Regime Change in the next 5-10 years (percentages are per respondent)

Economic	
Energy price shock	11%
Currency shock	7%
Emergent nation destabilization	7%
Asset price shock	6%
Financial volatility	14%

Environmental	
Climate change	42%
Loss of freshwater services	3%
Natural catastrophe: tropical storms	2%
Natural catastrophe: earthquakes	0%
Natural catastrophe: severe weather (except tropical storms)	5%

Geopolitical	
Terrorism	8%
Weapons of mass destruction	3%
Wars (including civil wars)	38%
Failed and failing states	5%
Transnational crime and corruption	6%
Globalization shift	26%
Regional instability	12%

Societal	
Pandemics/infectious diseases	4%
Chronic diseases/medical delivery	9%
Demographic shift	26%
Liability regimes/regulatory framework	3%

Technological	
Cyber/networks	16%
Disruptive technology	37%

Question 7. Please elaborate on your response(s) to the previous question.

- *The rise of the BRIC countries will knock the petrodollar from its place of dominance and cause significant global tension*
- ***Climate change is leading to more frequent and strong natural disasters. As climate impacts regions disproportionately, it can destabilize parts of the world leading to wars. Another impact that could lead to war are globalization shifts that see power shift among regional players. That could also lead to war.***
- ***Climate change will greatly impact food supplies, livability in certain regions which will then lead to increased migration, conflict and a demographic shift in multiple regions of the world.*** *This will place financial strain on several governments. Tack onto that the uncertainty of alternative energy sources and the ability of OPEC to change prices (i.e., increase output to reduce oil prices to delay the move to alternative energy sources) will only serve to increase instability.*
- *A regime change implies a significant shift in the world established order, with war being a common triggering point for reestablishing this order. Together with another pandemic in a post-COVID world and loss of asset value will cause the most significant disruptions to the world over the next 5-10 year time frame.*
- *Baby boom with increase health problems and disparity in regional service (country) for health care providers or resources available (scarce or not enough humans).*
- *I am including the impact of technology driven regime changes and influence in multinational relationships, e.g. Russia and China, with transnational crime and corruption. Continued climate impacts will continue to influence life, property and well-being on a broad scale and with it insurability, or at least affordable insurance. Much of the influence of the actors such as Russia and China are done w/o concern for climate impact (not saying the U.S. is exemplary here) and as faith in institutions weakens along with climate and these actors' valuations will likely fall or consolidate.*
- *Shifts in geopolitical power and generational values will continue to impact globalization trends. Existing long-term trade, economic, and political partnerships are under strain, and fairly sensitive to large shock events in "other categories of risk". E.g. Qatar's threat to cut natural gas due to the US support of Israel.*
- ***Risk of going back to the future. De-globalization, which would result in disconnecting and isolation of country/state and regional economies and consequent loss of specialization, hindrance to the division of labor, and reduced pressure to deregulate economies is a large and growing risk. De-globalization is a far greater disruptive macro risk than globalization.***
- *There is potential for a loss of US as the dominant and largely unchallenged world power in the near term. This could be coupled with war or not. Also, there is a significant risk (positive or negative) of major technological upheaval through AI-driven technologies.*
- ***Inequality will persist among nations with migration and unbalanced wealth being the main result. This will drive destabilization and wars. Change in demographics and shortage of resources will push inflation and generate asset shock across all markets***
- *Like prior to WWI/WWII, it seems like the current global position is primed for a massive war. This war is driven largely by the desire for multiple types of power including economic. Many states have lost or gained economic power during the past regime, and these power shifts were (and are) driven materially by both globalization and demographic shifts.*
- *Failed/failing states have traditionally been considered to be isolated to small countries with little impact on the world economy. The possibility of a major country within the world/region could have a much broader impact. (Venezuelan issues significantly impact much of South America.) As more sophisticated players (often state sponsored) are involved in cyber crime (or simply monitoring), the possibility of a failing state to use the global networks to keep "control" or move money or take down other states becomes much more possible, if still unlikely. We are becoming more and more globally interconnected and regional instability will quickly become worldwide.* ***Climate change is "manageable" for those with sufficient funds. It can lead to doom for those without, and so financial stability becomes a significant risk - the risks are all intertwined.***

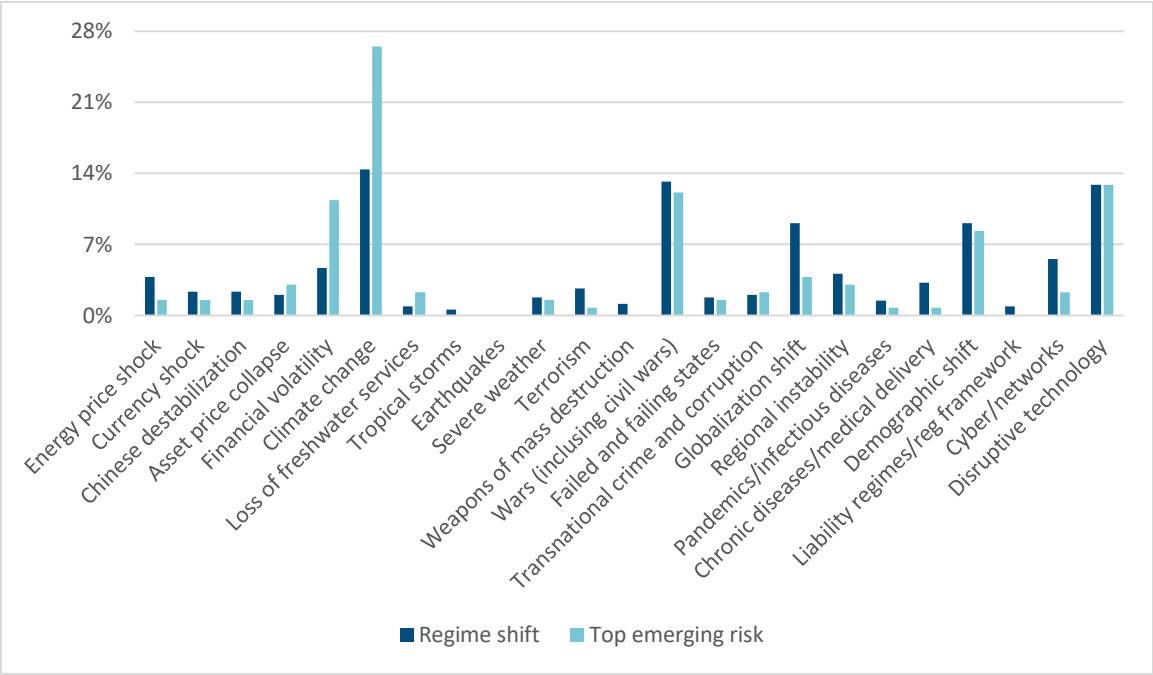
- *The number of active wars is noticeably increasing. On the other hand the focus of world governments is shifting from climate change to mitigating the impacts of the active wars which is leading to quicker deterioration of the climate change problem. This will lead to a new reality in world economy. In my view, this transitional period will quickly change once a new technology developed by one of the world superpowers clearly shifts the advantage and balance of power to that superpower. At that point we will understand the boundaries and the rules of the new regime.*
- *US losing its position of leadership, both politically and economically, in the world*
- *The narrative is written by the winning part, failed nations put at risk the credibility of Central Banks, i.e. the value of the currencies and leads to financial instability. This political uncertainty, restricts access to scarce resources as fresh water and food, to the more vulnerable people, many persons could be left behind*
- *New AI such as Chat GPT that will further advance is a disruptive technology that will change the way risks are analyzed. Regional instability is likely to increase driven by what is happening with Ukraine-Russia relations, Israel-Hamas with potential further escalating tensions in the middle east, China-Taiwan, with increased potential isolationism by the US government and alienation from their European counterparts will likely result in a globalization shift that could significantly impact future assumptions.*
- *What is going on in Middle East currently looks more and more as if it could escalate into WW3. Some are already saying we are in WW3. If nuclear weapons are used, millions and even billions could be killed. Terrorism is infiltrating into most every part of the civilized world. A coordinated attack which could include cyber attacks could destabilize economies most everywhere.*
- *How bad will Cyber get? Is it mitigatable? Wars change everything. How far will these latest triggers go?*
- ***Financial risks to me are the most important as they have the possibility to affect every person. If you add crime and corruption as causing some of this financial instability including cyber crimes, then you may have a truly unstable financial future. If your financial holdings aren't secure, do you really have a strong financial outcome? If the regimes and regulations don't support prosecution and limiting the financial vulnerability, especially of the elderly, then no one has any financial stability especially in retirement.***
- *I see technology, climate and demographics as having some degree of influence on each other. Our understanding of climate change continues to evolve and "new" technologies are not necessarily providing answers but will continue to emerge. Demographic shifts will impact labour markets and technology is impacting the skill sets needed - are we investing enough in training? How does immigration play a role? Climate also impacts demographics as it is linked to events that impact the health and wellbeing of individuals which then links back to the labour market. Interesting times indeed.*
- *There will be great advances for the internet (web3), AI technology, and greater use of blockchain technology to improve our systems. There was a great improvement in the economy due to the invention of PCs. I think the improvements will be on a similar scale. With all of this, comes risk and reward.*
- *If allowed, I would have added a fourth, demographic shift.*
- ***The world indeed changes. Seemingly forgotten are the lessons learned of past; thus, doomed to repeat them.***
- *The rise of AI as a business tool will disrupt entire industries and displace countless workers. The same is true for climate change. Extreme weather events and shifting climate will displace a portion of the population. Both of these risks will contribute to financial instability, and major shifts in goods moving around the world and scarcity mindset will lead to rise in populism and political instability.*
- *These are risks that have emerged in the last 25 years and each have had a significant impact*
- *I see this being demographically driven mixed with new technology that creates new capabilities for disruptive groups.*

- *This is intended to capture the possibility that these three items happen in concert: 1. Dropping birth rates continue to increase the burden of a smaller working age population supporting a growing older age population 2. Energy prices are shocked after countries convert to an electricity dependent society 3. Disruptive technology like AI leads to less demand for workers. The combination results in an increased burden on those working while also leading to high energy prices and high inflation.*
- *Given the recent escalation of the war between Israel and Hamas in the East Mediterranean region, and the (maybe potential, maybe already happening) involvement of the US and Iran military forces, it is apparent that there are similar risks arising on the horizon in other regions as well.*
- *Concerns of old aged and climate changes may increase the regional instability.*
- *Desperate nations will be fighting over energy resources with some of those nations losing relevancy due to poor demographics. Peter Zeihan is an expert in this area.*
- *Cyber Security can be changed through the enhancements and risks of A.I. Information and data is just as valuable as gold. How can we protect ourselves from bad actors that can threaten to shut down our day-to-day systems? Passwords are old school, and we may need to look at upgrading to passkeys for internal and external uses.*
- ***The impacts of climate change are diverse and accelerating in their severity. These are likely to trigger higher order impacts on many other systems, processes, people, and regimes. Wars and instability have already occurred as a result of climate change, and the stresses induced by climate change will create new problems we have not yet fully contemplated.***
- *Transnational crime and corruption has the ability to totally disrupt life as we know it, to potentially bring lifestyles back to the Middle Ages.*
- *We can see wars around the world in Ukraine and Palestinian area. There are also terrorism around. The pandemic has just ended the first 3-year periods which might mean another round of mutation, which might spread around through wars.*
- *Each of the risks selected hit a different impact of the world, and as such create a holistic shift. Nation destabilization creates greater chaos and national movements. Tropical storms threaten the environment and ways of life. Chronic diseases and medical delivery will either show a breakthrough that improves lives or fail to keep up with changing health concerns.*
- *Demographics -- western societies have been under pressure for some time with an increasingly large (proportional) and extended (longer duration) aging population. This continues and the stress on the financial structure of western societies continues leading to a potential for a regime shift in taxation, social policy, regulatory, etc. that may influence financial services, products, pricing, etc. Currencies, many fiat currencies, are also being stressed for continued viability -- potentially leading to a broad shock, particularly with (a.) the USD so prevalent (& reserve currency) and (b.) geo-political shifts toward Asia RE: currency pressures. Globalization has continued and incurred an interesting pivot(?) point during the COVID pandemic -- where some trends may be reversing. Supply chains, resource alignment, etc. may further any momentum shift into a new regime.*
- ***Climate change may very fundamentally impact where different human activities can happen, driving all manner of tensions with unpredictable but possibly fundamental consequences.*** *This could interact with shifting attitudes toward globalization, which could also independently be a driver of paradigm shifts. New technology could help mitigate impacts of climate change, and could fundamentally change work and economies and in unpredictable ways.*
- *Climate change is about to really kick in and bite the world. It will soon cause mass migration away from affected areas (due to flood, storm, drought, loss of fresh water, loss of arable land), which will destabilize affected countries, and possibly lead to wars, regime changes, changes in norms in international relations/globalization.*
- ***It is all about China! China is a dictatorial nation state that sponsors terrorism and fraud worldwide. China will continue to cause global instability to suit its own purposes. This includes intimidation of other nations, through such actions as trade embargoes (e.g. won't accept***

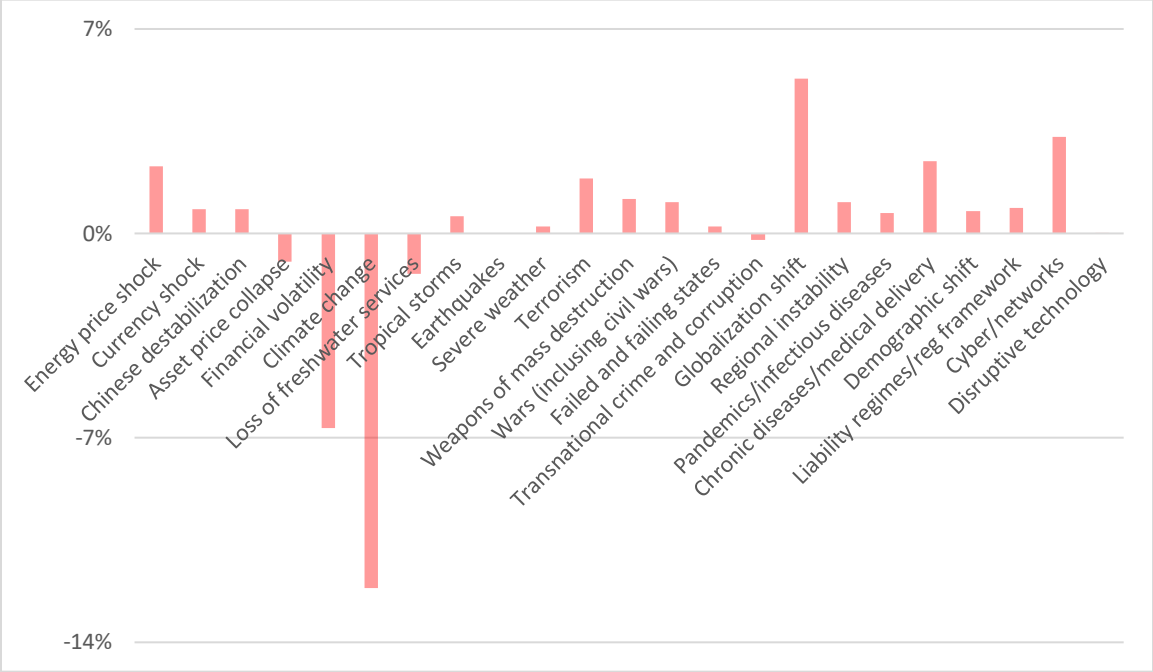
Canadian Wheat), interference in foreign elections (e.g. Canada - last election it promoted a Liberal Minority Government), and potential expansion (e.g. Taiwan, the China Sea, the Belt and Road Initiative, etc.).

- *War, cyber attacks could be larger drivers of regime change.*
- *The likelihood of war (or a sum of) is increasing around the globe. This will bring regional instability and population movements*
- *If regime change results in ruling by very rich, with tax cuts for wealthy, resulting in wealth transfer and hence degrading environment.*
- *Many baby boomers retiring, with low recent fertility will result in increased migration, although some people will fight this trend.*
- *It depends on the scope of change. If it is limited to only a small region, the impact should be manageable.*
- *Climate change leading to severe weather will require a rethink of product development, communication and distribution, as well as reinsurance. Disruptive technology, e.g., AI, will lead us into the unknown and will require new strategies and new ways of thinking. Wars and terrorism, fuelled by ideology as well as poverty, overcrowding and overpopulation, and of course intolerance of others when life is a constant struggle for survival, can lead to a rethink of actuarial methods and assumptions.*
- *A pandemic would cause panic among people (e.g. COVID). This would create opportunities for corrupt regimes to try to control the population through unnecessary regulations that stifle individual liberty and potentially violate human rights.*
- *The most powerful source of future regime change is something related to the fundamental structures. Demographic or Geographical, or Deglobalization are the fundamental things.*
- *Fundamental changes such as Demographic, Geographic, and political issues will be the most important things.*
- *As the younger generation replaces the older generation they will rely even more on new technologies, often without regard for the potential implications of the new technology. Also, companies will need to rely on new technology to help understand risks, which can lead to everyone looking at risks the same way and everyone having the same blind spots.*
- *We are already in a shift, characterized by a move away from globalization, increasing energy costs and extreme weather events. All of this is impacting supply channels, massively impacting refugee migration, and leading to protectionist government policy that adversely impacts inflation overall.*
- *Significantly higher mortality and property and casualty claims caused by to higher temperatures and weather-related natural catastrophes.*
- *AI is going to be a global game-changer*
- *Short term risk is fourth turning, either intra or interstate wars with new tools of destruction led by technology. we're in a poor place financially to enter a war, with fiscal dominance showing too much debt both individually and for governments (especially when considering pension plans and other off balance sheet items)*
- *Climate change and energy shocks are deeply linked and they will drive disruptive technologies which may define the next regime change*
- *AI and the use of data will likely lead to a regime change*
- *GenAI sabotage of democracy. Climate change will have its epiphany (for example people will suddenly stop buying properties in Florida, and the combination of these abrupt readjustments will cause a regime shift)*

Risks Likely to Lead to a Regime Change in the Next 5-10 Years Compared to Top Emerging Risk



Difference in Results Between Risks Likely to Lead to a Regime Change in the Next 5-10 Years and Top Emerging Risk



Question 8. No list of risks is ever complete. Are there additional emerging risks you feel are significant that should be considered for future surveys? For reference, here is the current glossary: Glossary of risks 2023 (appendix A).

As noted in the introductory paragraphs of this appendix, some responses are in boldface to signify that they are particularly thought-provoking to the researcher.

- *Excess mortality continues or even accelerates.*
- ***Emotional risk not well managed or understand between community in the world.***
- ***Access to healthcare*** *I guess falls under medical delivery in the glossary and is tied to chronic disease, which makes some sense but with many nations now aging, e.g. U.S., China, Japan, human resources for health care delivery are becoming constrained. Additionally with the influence of online information/misinformation Globalization Shift, Cyber and Transnational influence are all coming together.*
- *Political polarization, disinformation, social media, deep fakes (AI), and informational warfare will continue to divide us here in the US, and across the world.*
- *De-globalization.*
- ***I'm not sure if "Demographic shift" accurately captures cultural shift/turmoil. It also seems that dramatic shifts in culture appear to be captured under Globalization risks - I'm not sure if the classification should be geopolitical instead of societal.***
- *Pandemic Risk*
- *No. I think regime change will be upon us soon, and I think the material risks are included.*
- *None*
- *Demographic shift is tied to cultural preferences, that is of course hard to measure*
- *the risk of overstating the impact of climate change*
- *A seemingly ever more increasingly God-less world.*
- *Nothing comes to mind*
- ***Medical delivery is only part of the picture regarding public health. Mental health has become a global crisis and can only be partially addressed by medical delivery systems. Suggest refining the glossary to separate public health from medical delivery. A good resource for that exercise might be "Mirage of Health" by Rene Dubos, a microbiologist who published in 1959.***
- *Retirement Security in the US -- the 401k generation is entering retirement years. That could lead to a massive change in the underlying retirement structure if there isn't enough saved for the golden years.*
- ***Under societal risks: a rise in financial inequality can exacerbate many of the other risks on the list.***
- *no*
- *Technological risk: AI, VR and human-like machines will boom very soon in China and in the US. What if those are faulty and go wrong? Would that cause another kind of civil wars given the boundaries between human and non-human are getting blurred?*
- ***Border Security. Financial Impacts of Illegal Immigration. Social Unrest & Instability - Indirect Financial Impacts***
- ***Religious conflicts are possible captured by other categories, but I see as having huge potential risk.***
- *N/A*
- *Inflation. National Debt*
- *Disruptive technology: we just see the tip of the iceberg of AI capabilities. When quantum computers will be fully operational, it will bring AI to levels that we may not even anticipate as of now. For the good and unfortunately the bad probably.*
- *If regime change results in ruling by very rich, with tax cuts for wealthy, resulting in wealth transfer and hence degrading environment.*
- *Low fertility rate - although this is implicitly included in demographic shifts.*

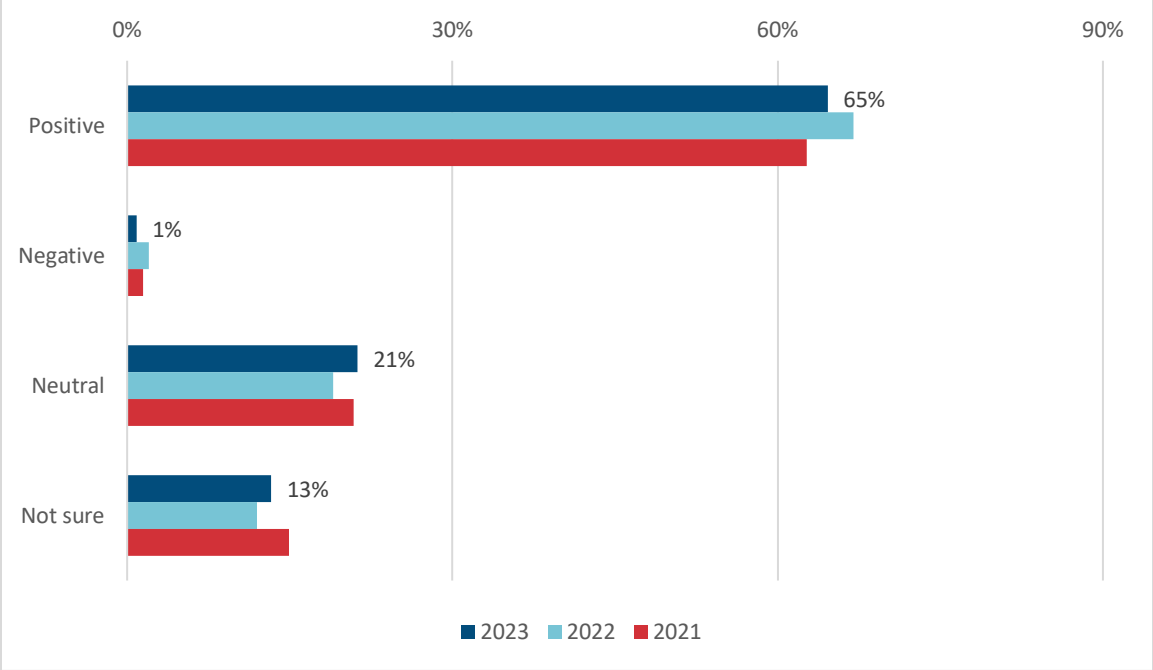
- *Yes, I believe a growing societal risk is the increasing inability and/or unwillingness of communities/groups to solve their common problems, and conflict resolution skills are becoming increasingly valuable. We need to move from "me vs you" to "us against the problem".*
- *Political nationalism and other general political instability in national governments*
- *This probably falls under "societal risks": The lack of innovation and critical thinking among the population could cause a "brain drain" and make society unsustainable. For example, the population is aging, and, eventually, there will not be enough young, able people to support the economy & labor demands. Without innovation (e.g. automation), things and people would get neglected, and society would regress.*
- *Cultural change related to the people's behavior can also make a new risk.*
- *AI / Machine Learning*
- ***Risk of obsolescence of life insurance due to a persistent trend of lower percentages of US households that own of life insurance policies 2. Risk that lower-rated, illiquid structured financial assets (often sold by private equity firms) will become worthless in a contagion, reducing insurers' capital to below minimum levels required to remain in business.***
- *Impact of food insecurity/climate change on population migration and stability*
- *Societal polarization and social unrest driven by governments and bad actors, fueled by social media and AI.*
- *Artificial Intelligence and an abundance of data will push for great change*
- *US political discord*
- *Disruptive technologies could be further broken down. For example, there is AI along with a multitude of potential related regulatory changes globally.*
- ***Freshwater could be a subset of climate change (see Arizona). Unsure if Disruptive technology correctly captures in people's minds the rise of antisemitism/racism/misogyny which are old evils facilitated by technology.***

SECTION B: ENTERPRISE RISK MANAGEMENT

Question 1. Has enterprise risk management had a positive, negative or neutral effect in your company/industry?

	2023	2022	2021	2020
Positive	**65%**	67%	63%	59%
Negative	**1%**	2%	1%	0%
Neutral	**21%**	19%	21%	28%
Not sure	**13%**	12%	15%	13%

ERM Effect



Question 2. Please share an example from the past year, if applicable, where an event occurred that could have been avoided if proactive ERM planning had been in place.

- *My company had an operational event that caused us to have some billing issues that required correction. Better controls would have helped.*
- *Catastrophic loss with help of technology.*
- *Volatility in the job market could have been lower, if companies took at longer-term risk management approach (looking over the 3-5 yr horizon, rather than focusing on short-term stock market gains).*
- *N/A*
- *NA*
- *N/A - **proactive ERM has in some ways hindered innovation by limiting targeted risk taking***
- *Digitalization of the product offering*
- *Large Companies have business units that have their own risk management practices that's not consistent across the enterprise. This causes different departments to do things differently. This causes double counting when you look at financials from an enterprise view. This can be avoided by having an enterprise view of risks.*

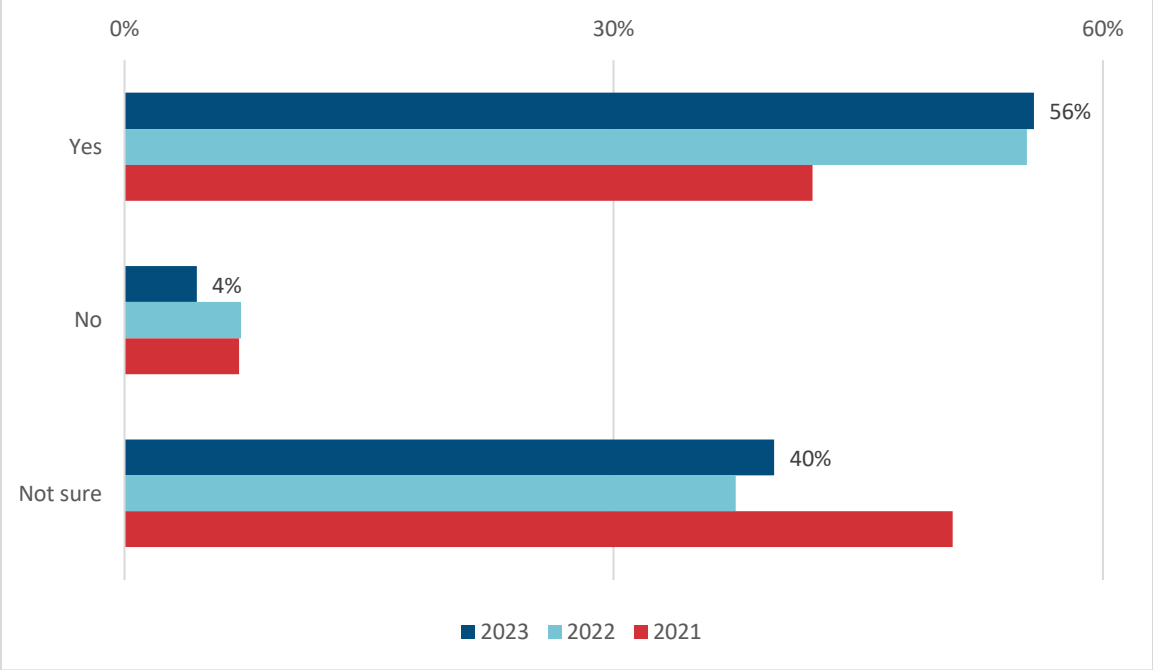
- *Having a clear framework (and therefore risk appetite) around country risk would make sure companies are comfortable with the exposure being taken in specific countries when conflicts arise*
- *Silicon Valley Bank insolvency*
- *over compensation toward the need for electric vehicles*
- ***change pension asset investment policy to better immunize from discount rate shifts***
- *NA*
- *Risk is an area of education. With more employees able to understand various aspects of risk, then more may be able to identify at risk issues early in the process helping others to mitigate effects.*
- ***The nature of cyber risk is such that it can be difficult to fully avoid but I believe the impact would be greatly reduced with proactive ERM planning.***
- *Hamas attack on Israel*
- ***The problem of negative IMR. Rapid increases to interest rates are not without precedent. Regulators and ERM teams should not have been caught flat-footed by this sort of situation.***
- *There are ERM in place.*
- ***1-AI...everything is AI these days. Though not suddenly on the scene, this topic has become societal in months. Organizations are pivoting.....devoting resources to follow the momentum. This leads to various disruption and FOMO activities. Yet, is it possible that if we examine various new technologies, etc. that the road toward successful, constructive adoption is a bit longer than every organization pivoting with resource dispersion and distraction. Or, is that part of the evolution and a need to be on the leading edge? I did not observe ERM frameworks intervening to a point to lead to conscious, controlled, targeted resource deployment. 2-Rising interest rates may be the more prominent example -- leading to bank failures, etc. Was the scenario not telegraphed? Was it not in the likely realm of things? Sure it was. But, many institutions made decisions for years that were not unwindable in months. And, many of those decisions were made 'to compete.' Note that one key bank failure exposed the Management team for not really prioritizing ERM -- which is probably more of a canary in a mine than many want to accept.***
- *Several S&L failures in US.*
- *Don't know*
- *N/A*
- ***ERM has helped prevent the placement of ineffective reinsurance.***
- ***It has taken way too long to recognize climate change as a major risk; even in the actuarial profession of supposed risk experts. We need to define ""future"" more definitely in the context of time horizon; look for indicators suggesting evolution of particular risks.***
- *loss due to high energy pricing and higher general inflation.*
- *One example is model risk. We found some significant errors in the actuarial models due to lack of controls and model validation.*
- *Asset risk, Foreign exchange rate risk*
- *N/A*
- *None that were material*
- *n/a*
- ***There was an attack at our workplace that should have been avoided with better crisis management.***
- *Silicon Valley Bank - ALM mismatch*
- ***SVB crisis that forced Fed to reverse QT - scenario planning and stress testing of mean reversion scenarios would have made the risk obvious, and the companies with exposed balances (above FDIC limits) should have easily seen this risk.***

- *Pandemic put a real-world test on everyone's ERM*
- ***Losses due to extreme weather can be minimized through aggregate and individual risk concentration studies.***
- *Hiring spree followed by layoffs*

Question 3. Does implementing ERM improve company returns relative to the amount of risk? (Please select one.)

	2023	2022	2021	2020
Yes	56%	55%	42%	47%
No	4%	7%	7%	8%
Not sure	40%	38%	51%	44%

Does ERM Improve Returns Relative to Risk?



Question 4. Why or why not?

For those who answered *Yes*:

- *Avoid major losses or maintain operations.*
- ***ERM allows companies to make risk-based decisions, and take on additional risk with more comfort, knowing that there are monitoring and mitigation mechanisms in place to reduce the impact of any particular risk, as well as financial modeling capabilities to take advantage of risk diversification.***
- ***A consistent approach to reviewing and monitoring of ongoing risks.***
- *True risk-return discussions take place*
- ***A well-functioning ERM organization should be able to spot opportunities as well as avoid disasters***
- *At least, it is an awareness of what could happen, it is a good framework to be prepared.*
- *We are able to clearly demonstrate that we are operating within our risk appetite supported with appropriate and relevant KRIs and KPIs*

- *Yes, to a certain extent.*
- *aids prudent management*
- *An ERM program should be risk-based and should include efficient and effective response versus unplanned costs when events happen which tend to be much more significant than upfront proactive planning costs. There is a balance though and spending on risk management without considering risk-reward trade-off can lead to significant expenses.*
- *It makes an entity more risk-aware and leads to agile thinking.*
- ***The same reason having brakes on a car allows for a higher average speed.***
- *Improved understanding and management of the risks which a company faces is arguably always better than not. However, knowledge of risks does not always lead to intelligent risk management.*
- *That's controlled risk appetite which leads to more predictable results.*
- *Holistic view better captures a view of enterprise risk as a whole to prioritize competing priorities within the enterprise. Without ERM, each of those projects may seek to optimize in silo, but in aggregate, relative risk and return may not be as well balanced.*
- *Reduces risk (avoids losses). Can help focus on activities with highest risk-adjusted returns.*
- *Helps to keep the focus on possibilities, and less so on the more common known risks. In particular, the* ***known unknown risks*** *can be properly considered.*
- *ERM reduces negative financial surprises and thereby increases profits and reduces income volatility over the longer run.*
- *Better preparation if risk materializes. Even if it is not a risk that has been identified, the fact that some planning is done will help to face it.*
- ***Usually more cost effective if future risk is eliminated or reduced in impact compared with lack of planning.***
- *Forces forward consideration of risks*
- *Change in investment philosophy*
- *helps avoid losses and increase profits.*
- *Encourages asking difficult questions that may otherwise go unaddressed.*
- ***ERM is holistic, so looking at marginal impacts on aggregate risk in a consistent framework allows for better decisions to be made.***
- *It helps identify what are the key risks the company faces and helps mitigate that risk exposure*
- *It forces management to think about the risks. It is too common for companies to sell products without properly considering all risks.*
- *ERM can help put a collar on the negative impact of risks, and reduce volatility.*

For those who answered *No*:

- ***Big companies are being too cautious and are being swayed too easily by grifters.***

For those who answered *Not sure*:

- ***It depends on how it is implemented. Some companies use it less for strategic risk taking and more for defensive purposes. If the ERM area is only focused on loss prevention instead of strategic risk taking, it can be a drain on company resources without providing enough in return to warrant the costs.***
- *Unclear to me that the cost of mitigation is well factored in. I have encountered many risk professionals who seem to have lost sight of the fact that risk is ok if you are compensated for taking it. I have also seen it slow decision making to the point of missing opportunities.*
- ***I find it difficult to estimate the value of ERM***
- *It's too difficult to measure might-have-been losses that may have been averted. ERM professionals (regulators, consultants, company employees) are measuring themselves and making their own benchmarks.* ***ERM is an echo chamber.***

- *I'm not in an active role. The way this question is worded has me answering "not sure". It may not actually increase returns, though it could. It should be critical for avoiding and limiting downside risk, but it may not always be successful at that.*
- *NA*
- ***ERM can prevent risks, but it can also be a hindrance to development and innovation.***
- *How do you measure the cost of a risk that might have been prevented through an ERM program? Until a risk event occurs, it is quite difficult to estimate the cost of that. Unless events were occurring prior to an ERM program being put in place, and they are no longer occurring, this is not directly measurable. Once ERM becomes embedded within an organization, the cost of an ERM program is also hard to quantify.*
- *ERM implementation in my region is still in its initial phase. Most companies are still trying to understand how it should be implemented. Most ERM departments are new and their activities are usually just a formality to comply with the regulation.*
- *I haven't seen any formal measurement of this so I answered Not sure. However, I think this is a need to have area of most organizations. Without ERM, an organization is greatly at risk.*
- ***Many companies are still viewing ERM as a "check-the-box" exercise, as opposed to a useful tool.***
- *ERM, as deployed, has been more form than substance. In many cases, ERM is a "check the box" function. Sure, even in advanced organizations, ERM may have a significant input into decision-making -- but does not lead decision-making. Even as a significant input, the content delivered isn't necessarily much beyond solid practice of product owners, financial officers, etc. and the analysis/sensitivities they should explore under basic standards. Some orgs. embed the execution of hedging or other actions within ERM, which are actions that are presumably inherent in product development and execution....if the argument is that those hedging actions are applying Management's risk tolerance, does that imply that Management had no risk tolerance assessment without an ERM team executing the hedging? I don't subscribe to that.*
- *If role of ERM and CRO is diminished or disregarded, the impacts are muted*
- *Depends on the time frame measured, and the phrasing relative to the amount of risk makes assessment hard. I do think good risk management will over time prevent more losses than its cost, while inefficient risk management would not!*
- ***Its hard to disprove a negative- ERM function is blamed when something goes wrong but not credited when bad things happen and company weathers the storm***
- *difficult to prove*
- *Risk management tends to mean "risk avoidance" and companies and their boards are becoming more risk averse. There is little or no emphasis on looking for opportunities with a positive risk-adjusted outcome.*
- *a lot of energy and resource put to it; often times it "only" quantifies what we inherently know. However, it does create a way to surface and highlight potential risk to force the conversation and address it.*
- *Too early to tell.*
- *Well developed ERM is hard to be implemented because of some political issues.*
- *You can't measure the value or return to risks that were avoided since the outcome was never experienced.*
- *Difficult to measure*
- *Depends on industry and severity of risk exposure*
- *Erm buried into risk committee duties. Risk appetite develops but never used*

Question 5. How have scenarios, both deterministic and stochastic used to manage a company, changed as extreme weather events and geopolitical events have played out in 2023?

- *Hurricane and wildfire forecasting*
- *They haven't*

- *more tail event testing*
- *In Life Insurance, probably not much. I would assume it is different in other industries, but I am not familiar with those industries.*
- *I haven't seen much change in 2023 with respect to scenarios, other than calibrating to a new starting point.*
- *For life insurance very limited at this time except for travel insurance.*
- ***Additional deterministic scenarios have been added to the risk catalog based on the events in 2023, as well as projections for 2024 (being an election year for the US, for example)***
- ***No change. Reporting of weather has become more sensational. Losses from weather have been steadily decreasing. Scenarios should reflect reality rather than sensational reporting.***
- *These scenarios need to be updated because they may not reflect the universe of possibilities as things change. There are problems that deterministic or stochastic scenarios do not reflect the range of possibilities, or do not reflect them with a reasonable enough distribution, or produce results that are implausible or incomplete for various reasons.*
- *It helps predict large swings in the market and capture asset shocks and changes in interest rates*
- *The range of reasonable scenarios has grown wider.*
- *On the life side, more volatility in financial markets is expected. Otherwise, very little has changed.*
- *NA*
- *Not much*
- *High impact. Risk frameworks have definitely been extended to address those kind of perils*
- *The distribution simulated by stochastic scenarios includes the impacts of such events. For deterministic scenarios, current events help inform the possible scenarios and impacts.*
- *Not much has changed for us due to the limited impact on our business from such scenarios*
- ***how are you defining "extreme weather events"? what some categorize as "extreme" aren't necessarily extreme when reviewed in historical context***
- *Little. Little impact on our business.*
- *There are more events that are considered unusual. It is almost that a risk modifier is needed to assume there is no normal year anymore. Of course, this depends on the type of business. For insurance companies, I would assume this is already occurring.*
- *To date, these events have not had a significant impact on us (we operate in a single country) but we continue to closely monitor and learn.*
- *They haven't. Extreme weather events are not new and attempts to associate them with the presence of carbon in the atmosphere are closer to religious beliefs or political propaganda than scientific findings.*
- *for the health industry, not at all*
- *I have not seen any meaningful incorporation of climate risk externalities in ERM.*
- *Not sure as that's more on the non life side while my role is on life and health*
- *Generally focus on views within a handful of potential market environments to understand the range of potential impacts, even within deterministic and stochastic scenarios.*
- *Scenarios modeled generally provide interesting reference points, but not actionable decisions. Until a given risk manifests, Management tends to avoid over-committing to tempered activities employed in advance of something that might not occur. "We shall temper sales WHEN the event emerges, not in anticipation of it." Though having advance insight on intended decisions reads constructively, Management generally employs a bit of amnesia or rationalization that the previous insight is not necessarily applicable....and then the decision changes, is deferred, or is simply not implemented as "decided upon" in advance.*
- *Not a factor, no impact on this issue. We do not recognize these as significant risks to track*
- *No opinion*
- *A wider range of possibilities needs to be considered.*
- *Extreme weather events have increased damage losses in catastrophe models and are influencing property underwriting and reinsurance decisions.*

- *n/a to my practice area*
- *They haven't in my view-but SHOULD- especially the USA become a failed state under Republican rule and the deterioration of respect from the rule of law*
- *climate risks have become more explicit*
- *None. We are not impacted by those events.*
- *Scenarios cannot catch the real-world Catastrophic event. It is not enough.*
- *Economic scenarios haven't changed as much, since they are an outcome from other events. Interest rates, and equity markets will do similar things, regardless of the underlying triggers that produce the result. I would expect catastrophe scenarios would change quite a bit, but that is not my area of expertise.*
- *Allowed for review of scenario robustness and completeness.*
- *None - due to fact that we are basically a life insurance company.*
- *Added climate risk scenario*
- *There is a reliance on scenarios that sometimes outweighs more practical approaches.*
- *geopolitical events impact new legislation and therefore impact the insurance industry and financial markets*
- *We only use deterministic. We are unaffected by weather, but geopolitical events drive economic volatility.*
- *we need to learn from extreme events elsewhere and add new stresses to our tool kit - having a plan is not the same as predicting but makes it easier to adjust*
- ***A lot of the things that seemed extremely unlikely are now closer to the realm of possibility in the minds of stakeholders***
- *The scenarios need to consider more frequency of larger events, along with less reinsurance capacity in working layers.*
- *I don't believe my organization does that (they should)*

Question 6. How have current risks, like the regional bank asset liability management (ALM) crisis due to interest rates, changed a risk team's scenarios?

- *Significant review of where investments are currently and revisiting risks there*
- ***It has caused risk teams to look at scenarios that would have been considered more unlikely in the past. It has also spurred companies to be more cognizant of the liquidity risks that they have.***
- *Some debate on rate regime (higher for longer vs back down) but both scenarios considered.*
- *added scenarios*
- *Reduce concentration and managed climate risk*
- *attempt to account for greater volatility and more due diligence on counter party risk. access to liquidity (or lack thereof) and/or the perception thereof is key in most of the banks that fell.*
- *Broader outlooks, casting a wider net for potential outcomes and analyzing more scenarios in general.*
- ***Biggest change has been to recognize counterparty and credit risk in insured, government-backed borrowers - e.g., FDIC-insured regional banks that have been allowed to fail and threatened with failure.***
- *I'm not involved with this to say firsthand.*
- *It has pushed companies to be more proactive in the product offering under high interest rate environment and has shown that strong guardrails around hedging and reserve and capital provisions are fundamental to long term success*
- *They increased the range of the various risk scenarios. More options became reasonable.*
- ***I don't think the bank liquidity issue has changed any practices. Those banks had liquidity guidelines in place, they just ignored them. No ERM practice, or scenario selection, will avoid willful non-compliance.***
- *NA*

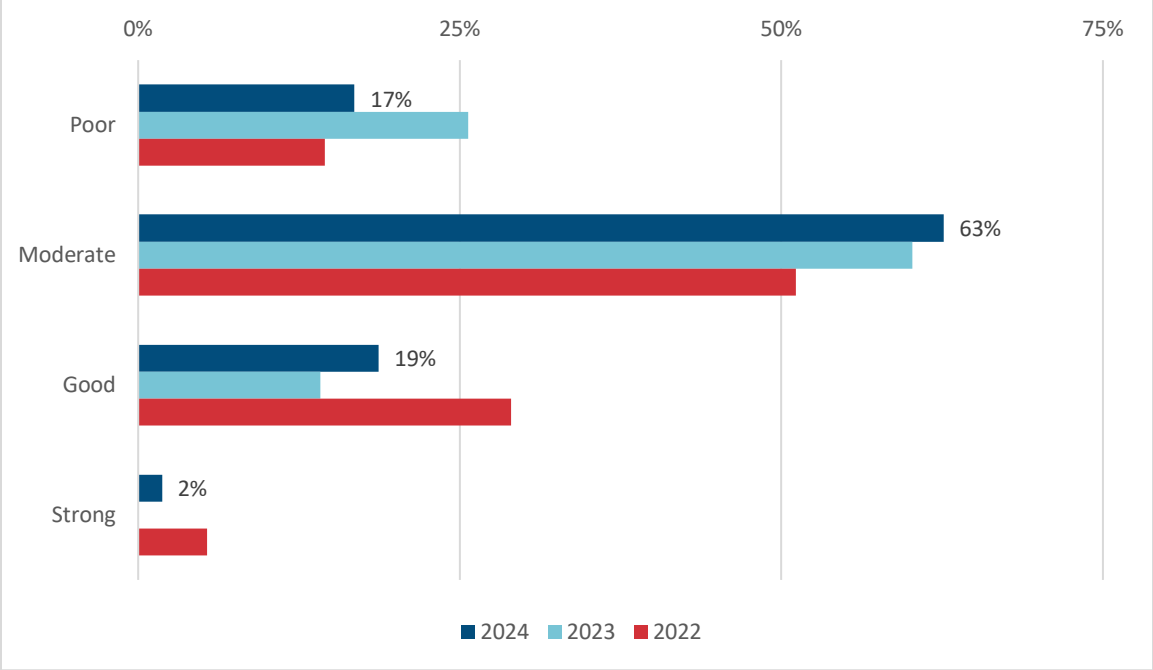
- *Medium-to-low impact. I would expect most companies to already have had scenarios around ALM and liquidity risk*
- *These should not need to change as such scenarios should have already been contemplated.*
- *Our risk scenarios were quite robust to support our ALM and liquidity profile.*
- *not sure how best to answer*
- *Little. Little impact on our business.*
- *So much depends upon the type of organization. I think this is a hard question as interest rate increases can help some parts of the company and hurt others.*
- ***We used to focus mainly on parallel yield curve shifts but are introducing more scenarios to understand how twists and inverted curves may impact us. We recently moved to a new accounting regime which is also influencing how these movements are reported, requiring us to update our ALM approaches.***
- ***More shocks and sensitivities to shocks. Less reliance on stock ESGs.***
- *The shock scenarios are of higher magnitudes as they were used to be.*
- *Additional focus on any potential weak spots in ALM that could be exacerbated under such unexpected scenarios.*
- *I'm not well-informed enough to opine. I suspect that there has been some "reaction" to these events, but I suspect that fundamental changes to frameworks, models, testing, risk tolerance reviews, etc. have been broadly adopted. Yet, I do submit that many organizations are reacting to the climate and circumstances -- much of which an ERM framework would have informed management about in advance and required decisions years ago to be implemented to "immunize" the institution through these events.....though, had it done so, it may have not competed to the extent management desired (and is compensated to achieve).*
- *No impacts*
- *Starting point for scenarios is very different than a few years ago, so risk of negative rates has receded while folks are realizing a more balanced view of the future is needed.*
- *Cross-industry risks are real - e.g. a failure in the reinsurance market will impact the life insurance market indirectly, particularly when substitutes don't readily exist.*
- *Increased interest rates are reflected in economic scenario generators and have increased risk capital estimates coming from stochastic economic capital models.*
- *n/a to my practice area*
- *unsure*
- *We pay close attention to our asset portfolios and liquidity positions.*
- *More focus on ALM, which is not considered as important these days.*
- ***A heightened sense of the policyholder (or depositor) behavior risk. You need to have scenarios where behavior can vary for any given scenario. Often an underappreciated risk***
- ***Considered more sequential risk scenarios.***
- *We have increased our stress testing.*
- *No change*
- *It hasn't changed much; there is still a gap that is imperfectly hedged*
- *Companies should have already been looking at these.*
- *A lot of the things that seemed extremely unlikely are now closer to the realm of possibility in the minds of stakeholders*
- *Regional banks ALM crisis is not due to interest rates. It is due to bad management and specifically bad risk management. Proper risk management would have avoided the situation. In other words, the scenarios should only change if you weren't considering an interest rate up shock scenario. This risk exposure is not new and was considered in the NY7.*
- *There is a need to add/run more scenarios with multiple risk occurrences.*

SECTION C: CURRENT TOPICS

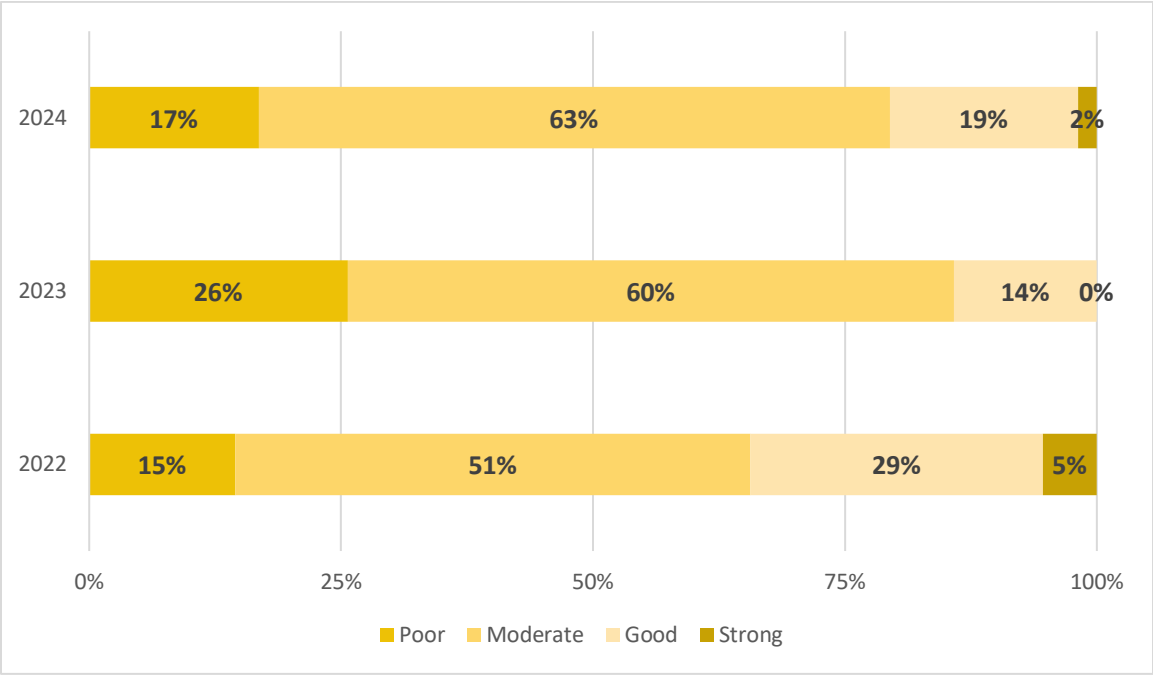
Question 1. Your expectation for the 2024 global economy is:

	2024	2023	2022	2021
Poor	**17%**	26%	15%	25%
Moderate	**63%**	60%	51%	56%
Good	**19%**	14%	29%	16%
Strong	**2%**	0%	5%	3%

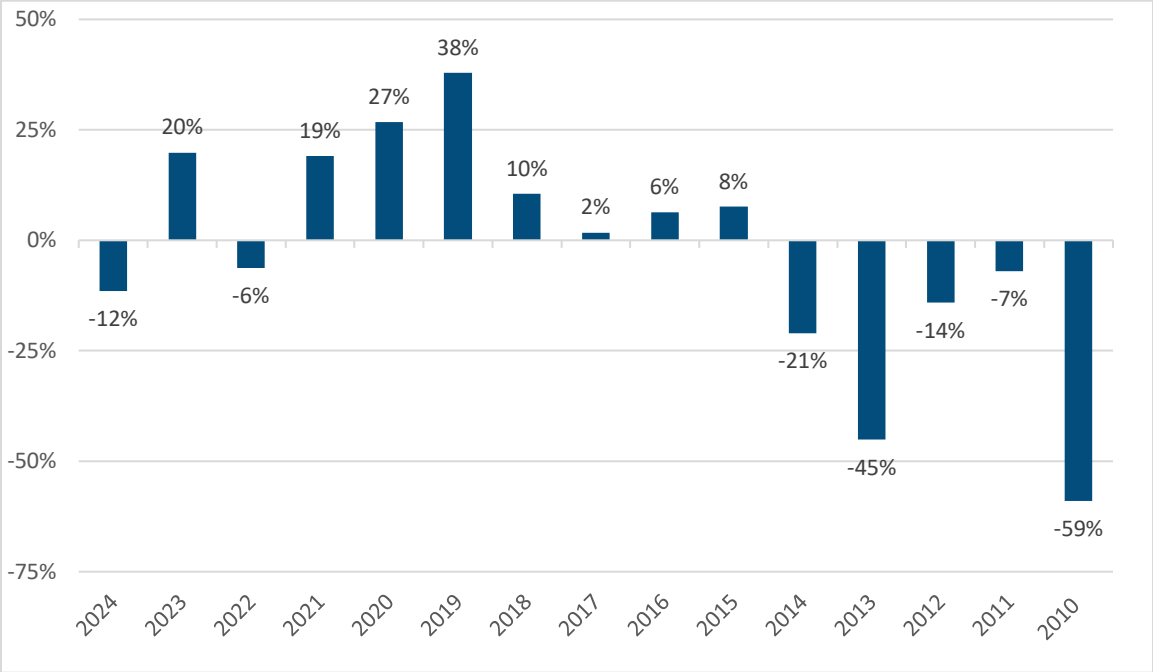
Global Economic Expectations



Global Economic Expectations



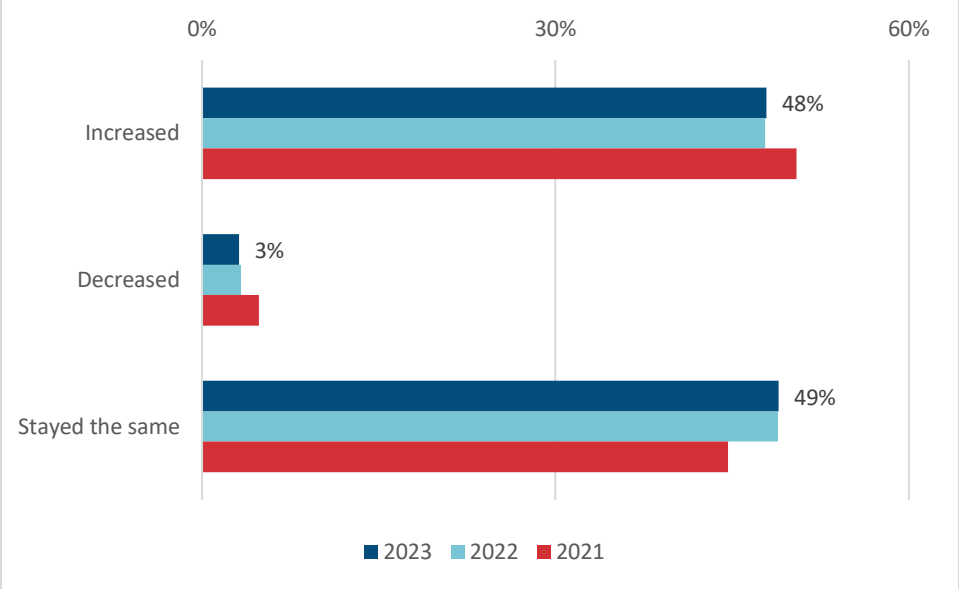
Combined Net (Good + Strong – Poor) Economic Expectations



Question 2. Did you experience a change in the level of ERM-focused activities for your organization or clients in 2023?

	2023	2022	2021	2020
Increased	**48%**	48%	50%	53%
Decreased	**3%**	3%	5%	5%
Stayed the same	**49%**	49%	45%	42%

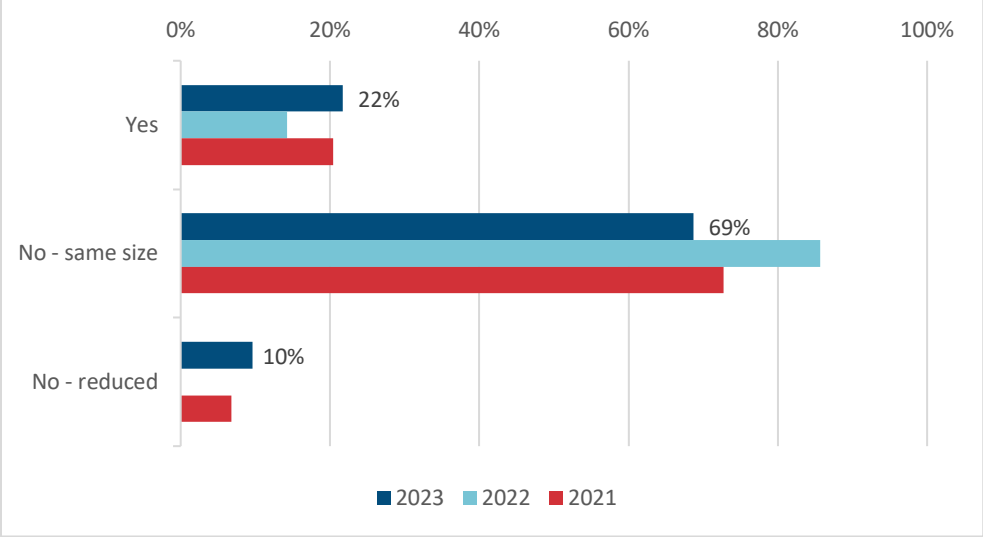
ERM Activity



Question 3. Did your internal ERM staff increase in 2023?

	2023	2022	2021	2020
Yes	**22%**	14%	20%	15%
No—same size	**69%**	86%	73%	76%
No—reduced	**10%**	0%	7%	9%

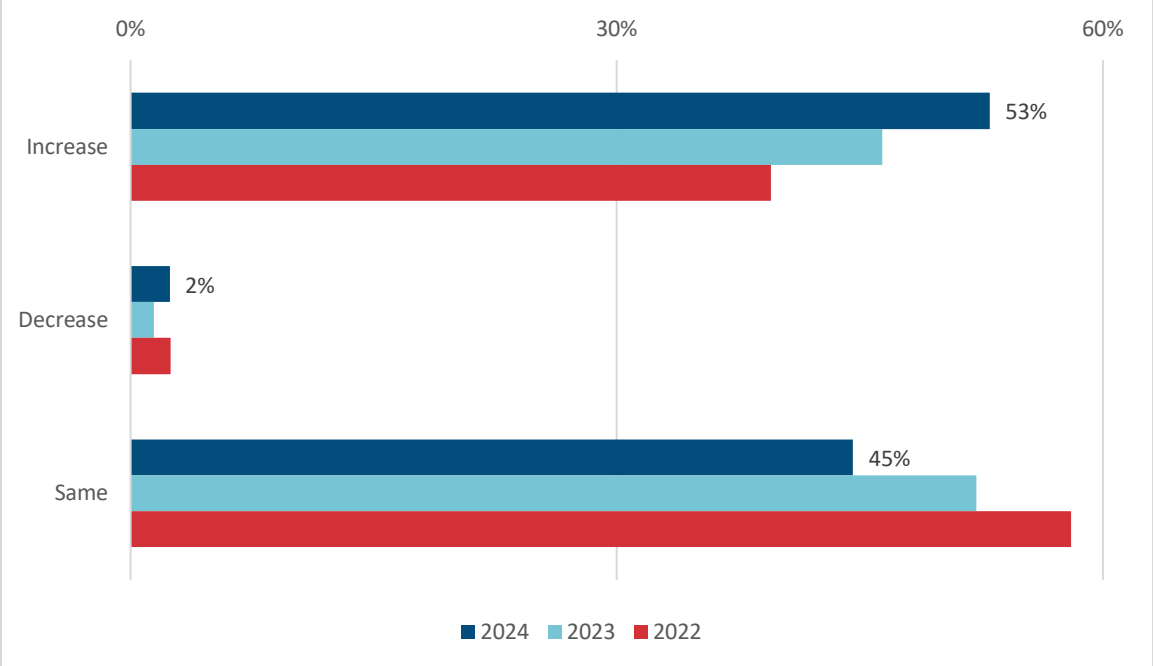
ERM Internal Staff Growth



Question 4. Do you anticipate a change in the level of ERM-focused activities for your organization or clients in 2024 relative to 2023?

	2024	2023	2022	2021
Increase	**53%**	**46%**	40%	38%
Decrease	**2%**	**1%**	2%	3%
Stay the same	**45%**	**52%**	58%	59%

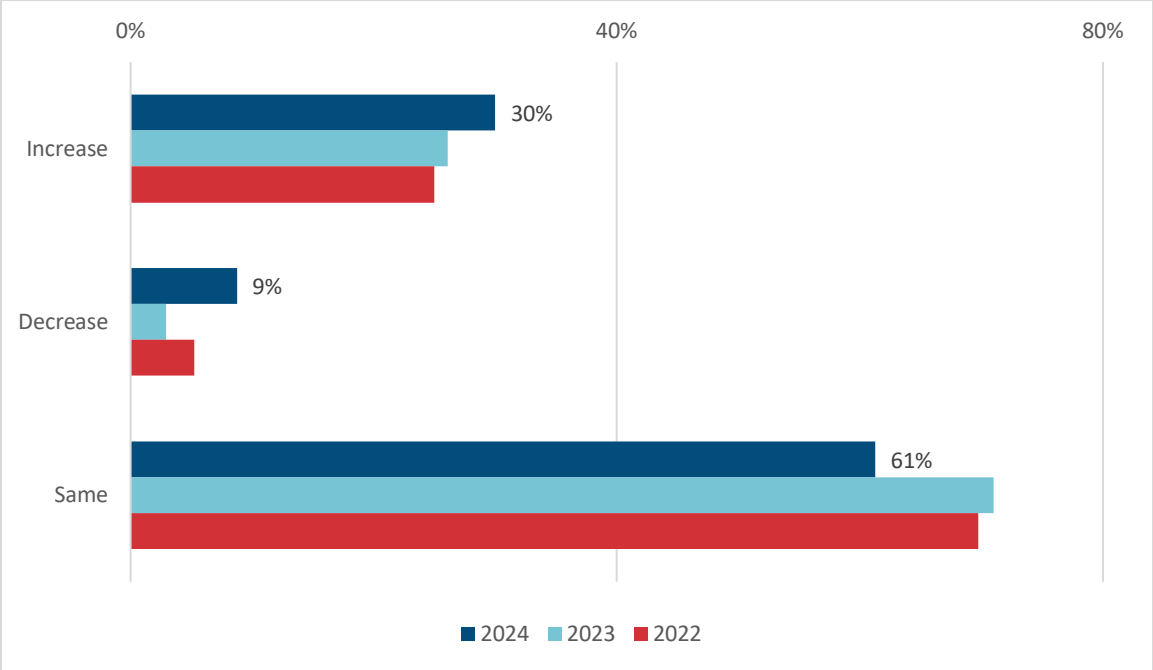
Future Expectations—Activity



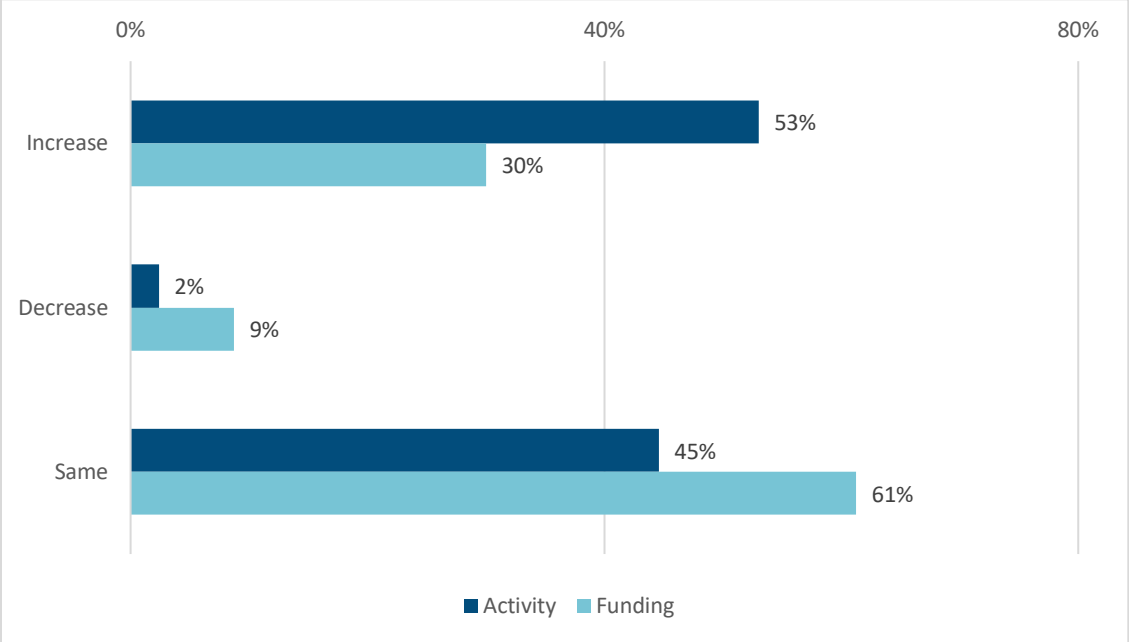
Question 5. Do you anticipate a change in the level of funding dedicated to ERM-focused activities for your organization or clients in 2024 relative to 2023?

	2024	2023	2022	2021
Increase	**30%**	26%	25%	22%
Decrease	**9%**	3%	5%	10%
Stay the same	**61%**	71%	70%	68%

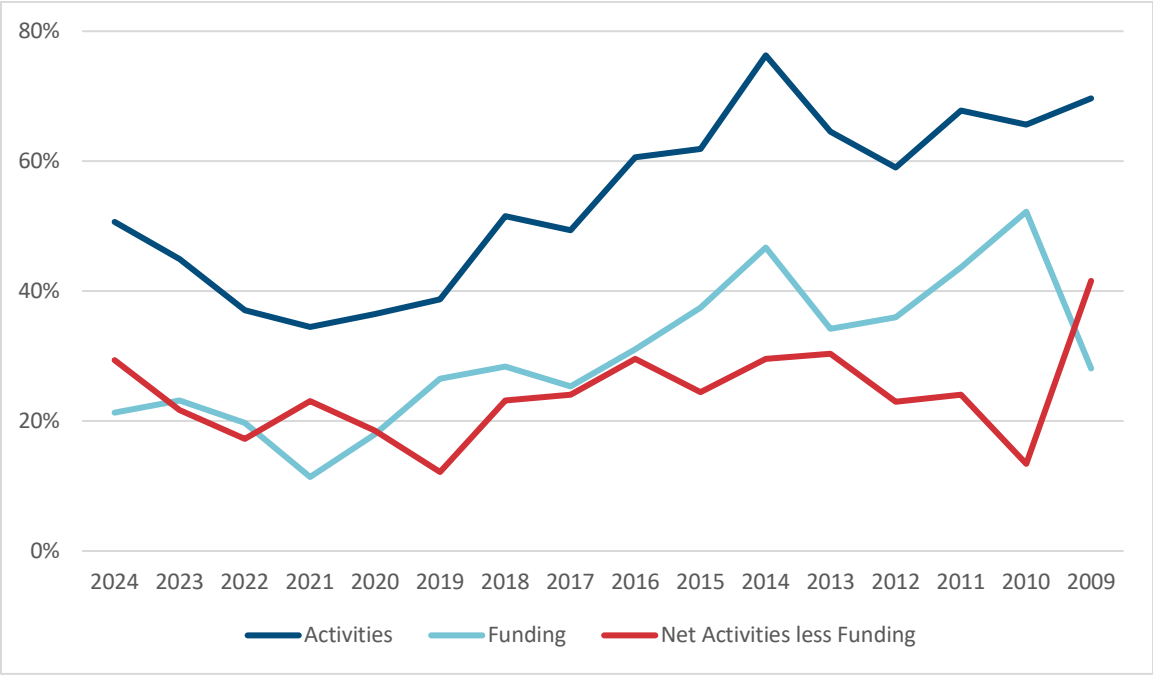
Future Expectations—Funding



Anticipated ERM Levels



Anticipated ERM Activity and Funding Levels, Historical



Question 6. What types of Demographic shift scenarios do you analyze?

- *Continued wealth gap*
- *aging of the population and knowledge gaps in the emerging workforce*
- *None currently.*
- *changes to mortality/longevity over time; mix of business across countries*
- *Impact of migration of population from other countries.*
- *aging of the population*
- ***Parts of the business consider shifts in values, especially expectations focusing on data privacy and security, as well as reputation risk. Most of the demographic shift scenarios we analyze focus on reputation risk.***
- *None.*
- *N/A*
- *aging of population*
- ***Large migration in the US from urban areas to more affordable regions as home prices and inflation hit the economy. Anew paradigm around workplace and the type work expected in the labor force will emerge.***
- *Not sure.*
- *We are a global reinsurer - we analyze increased movement between risks from differing countries, demographic changes due to shifts in economic status of potential customers, shifts caused by migration, medical improvements, and many more. (I have not seen results of this analysis change any sales goals…)*
- *NA*
- *n/a*
- *None*
- *More women in the workforce, it changes perspectives in outcomes and way of how business do their core work.*
- *Larger than expected increase in higher age policyholders*
- ***influx of illegal aliens into the country coupled with unwillingness to assimilate them***

- *Demographic shift has limited impact on our core business.*
- *Not sure*
- *We currently look at this mainly through experience analysis but need to reconsider.*
- *In addition to an ongoing wave of retirees, a less-well educated younger generation will be entering the labor force. Much of this will run afoul of the disruptive technologies mentioned earlier.*
- *Increase reliance on 401k plans instead of more traditional pension plans.*
- *aging population has an impact on healthcare, but that analysis usually occurs in pricing, outside of ERM.*
- *Socioeconomic changes in middle market and changes in target market composition.*
- *I am not involved in this part at work.*
- ***Domestic migration by state…socio-economic population shifts.***
- ***Age, Income, Location, Education***
- ***Considering different mortality improvement (or degradation) scenarios, as well as varying birth rates.***
- *Don't know*
- *N/A*
- *none*
- *n/a to my practice area*
- *None*
- *low fertility shifted mortality*
- *Decrease and aging in Developed country, Increase in Developing country. So that huge movement will be possible.*
- *None*
- *None at the current time.*
- *Nothing specific*
- ***aging population resulting in $7.8 trillion in global aum that could leave life insurers by 2040 if retention strategies aren't implemented for their beneficiaries soon.***
- *Mortality and morbidity increase due to pandemics, infectious disease, etc.*
- *For longer time horizons, looking out to 2050 or longer, immigration becomes the issue driving geopolitics due to climate change. Thinking more about GDP growth impact if immigration is restricted or welcomed.*
- *Continued process of de-risking property exposures.*
- *US demography as it changes the customer base*

Question 7. The true measure of an ERM program is how it is received by the board and senior management. Which of these is true in your situation? (Please select all that apply.)

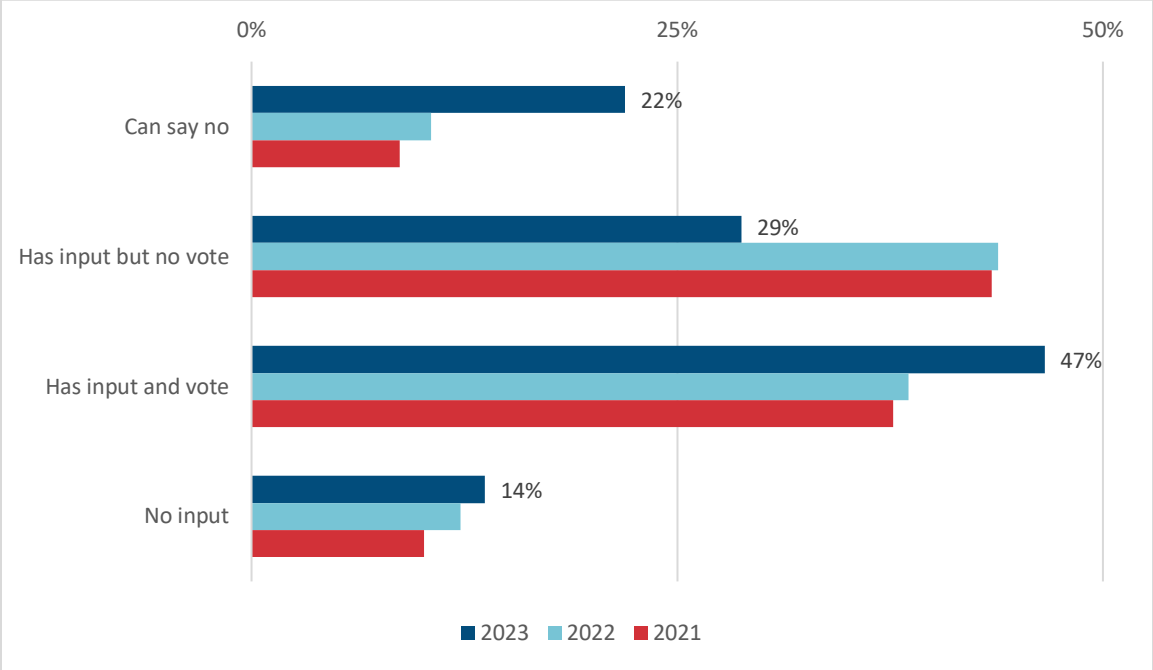
Percentages back out respondents who stated that the question is not applicable to them.

	2023	2022	2021	2020
Our ERM function can say no to a strategic opportunity	22%	11%	9%	17%
Our ERM function has input but not a vote when a strategic opportunity is being considered	29%	44%	43%	38%
Our ERM function has input and a vote when a strategic opportunity is being considered	47%	39%	38%	35%
Our ERM function has no input when a strategic opportunity is being considered	14%	12%	10%	11%

Comments/Examples:

- *Not sure*
- *Some parts of risk management have more authority to say no than others. E.g. Information Security, Regulatory Compliance, and Legal has more say and are able to reject certain decisions.*
- ***"The true measure of an ERM program is how it is received by the board and senior management." That is wrong. The true measure of an ERM program is a cost/benefit or return on investment metric.***
- *Assessment of Capital Management Strategies such Reinsurance Agreements*
- ***This is a bit "squishy" - ERM is consulted, but I am not sure they can override sales decisions. On the other hand, our ERM function was instrumental in moving us into a complementary line of business where the new risks will offset current risks.***
- ***usually get brought in at the end of the analysis, provide input on the risk assessment and going-forward ways to measure value realized.***
- *No (real) erm function*

Strategic Opportunity



Question 8. What actions have you taken to build resilience in your personal finances in case an emerging risk event occurs? (leave blank if none or not applicable)

- ***Diversified across more assets. Holding more cash. Cryptocurrency.***
- *Taking advantage of higher CD rates*
- *Looking at alternative sources of funding*
- ***some I know holding precious metals and guns.***
- ***Diversification of investments. Diversification of banks (multiple accounts, including electronic only, like PayPal).***
- *Diversification, more insurance/reinsurance, additional contingencies*
- *NA*
- *Just saving in reasonably diversified assets. I haven't made changes from what is generally accepted good practice.*

- *We hold more cash than we would otherwise need. We also chose a home equity line of credit, rather than paying cash, both to give us a buffer line of credit and to not deplete cash. My equity holdings are well diversified, and our retirement funds will be annuitized, not strictly "spent down". I have friends who are hoarding cash and buying gold.*
- *Strong emergency fund*
- *More cash on hand, and in holdings*
- *reducing debt*
- *Debt reduction*
- *Diversifying my portfolio with a good mix of short and long-term investments, high and low risk investments.*
- *Increased savings, reduction in overhead*
- *Seeking high yield savings accounts in additional banks to improve interest income and also lower concentration of savings in a single bank. Considering increasing benefit coverage through work in case of unexpected expenses.*
- *Established reserves; higher cash position -- though worry about currency exposure; some additional exposure to real assets.*
- *Saving, cut back on spending*
- *Diversification of holdings across asset classes and geography.*
- *Am focussing on building larger liquid reserves (cash, equities) in the next 12-24 months.*
- *Reduced equity exposures, higher bond exposures.*
- *I have ZERO exposure or equities because I believe the U.S. is on a risky political path. My stance on my OWN personal finances could change, depending on the Nov. 2024 election outcome.*
- *Stack more cash and inflation related asset.*
- *Higher allocation to cash, given recent high rates of return.*
- *No loans, pay off credit cards each cycle, more investments in 2 year ladder of fixed income (Treasuries and CDs), equity filter encourages low leverage stocks. Worry is for recession/depression and effects of quantitative tightening while fiscal policy is loose - high likelihood of further stagflation. Ladder will allow dollar cost averaging once conditions worsen.*
- *Cash cushion*

Question 9. Some risk managers seek ways to exploit risk by finding opportunities that are mispriced or provide diversification. Which, if any, emerging "opportunities" do you monitor?

- *None*
- *AI*
- *Mispriced*
- *blockchain, over dependence on AI, EV market*
- *N/A*
- *Reinsurance Transactions*
- *None*
- *critical illness coverage, pet insurance, longevity offsets, group insurance*
- *diversification*
- *None*
- *technologies*
- *disruptive technology, demographic changes*
- *AI/Brain wave reading*
- *Pricing of new business relative to competitors*
- *Asset pricing; interest rate yield curve abnormalities (reversion to mean considerations)*
- *health care*

- *None, our organization is only reactive*
- *Mortality and longevity pricing.*
- *N/S*
- *Equity Prices.*
- *Growth opportunities. Talent opportunities.*
- *n/a to my practice area*
- *None right now since it hard to tell the directional bias of market, political and other risks currently*
- *Competitors in the market, horizontal integration with suppliers/service providers*
- *Change in currency exchange rate.*
- *Product competition*
- *semiconductor manufacturing in US*
- *Watching financial markets*
- ***financial assets, housing, currencies***
- ***Property in climate resilient locations***

Question 10. Bubbles occur when asset prices increase to an unsustainable level, eventually reverting to a lower price. Are there bubbles that you have identified in today's market?

- ***housing, healthcare***
- ***Real estate and equities***
- *None so far.*
- *housing*
- *Stock market, especially growth stocks overvalued. US public debt costs will squeze private debt / drive rates up and demographics may drive lower demand for stocks (US anyway).*
- *No*
- *EV manufacturer valuations*
- *Yes.*
- *Well, we recently have had some AI-driven bubbles in certain equities, but I have not been following closely.*
- *not clear signs yet, price correction and long term high interest rates is a possibility*
- ***Real Estate is still overpriced (commercial more than residential). There is also more risk in consumer loans than the market currently indicates. While FTX reset the crypto bubble, there is still too much optimism in that market. Green energy revenue expectations are too reliant on government funding.***
- *Real estate market in the GCC.*
- *Inflation (goods and services prices) are currently in a bubble.*
- *No*
- *no*
- *Not sure I would classify them as bubbles but we are constantly monitoring with a view to take advantage of an opportunities to lengthen our portfolio*
- *Housing*
- *Housing*
- *AI valuations*
- *Property markets in Hong Kong.*
- *Asset prices; personal debt; housing prices; related outcomes to qualitative easing?*
- *basics...groceries, energy, etc.*
- *If I had them I'd be considerably wealthier*
- *Bitcoin/crypto currency. All blockchain/defi/crypto related companies. Tesla*
- *Equity prices - don't consider future actions by China.*

- *National debt.*
- *n/a to my practice area*
- *Alternative assets are at a similar state of unrealistic valuations as they were before the 2008 crisis in terms of undervalued credit risk. Private Equity has NO BUSINESS OWNING life insurance and annuity firms due to the duty of regulators to the public good, They run into industries, pump and dump them and destroy them relying on the privatization of the profit they make if bad things don't happen and socialization of damages if they do.*
- *Everywhere.*
- *No*
- *Real estate*
- *House prices and cars are two possibilities.*
- *Water is priced too low as aquifers run low - higher prices would encourage desalinization but also lead to higher prices for food*
- *GenAI*

Question 11. List an unknown known (where you have historical data, but it is not predictive) and how you adjust to manage the risk.

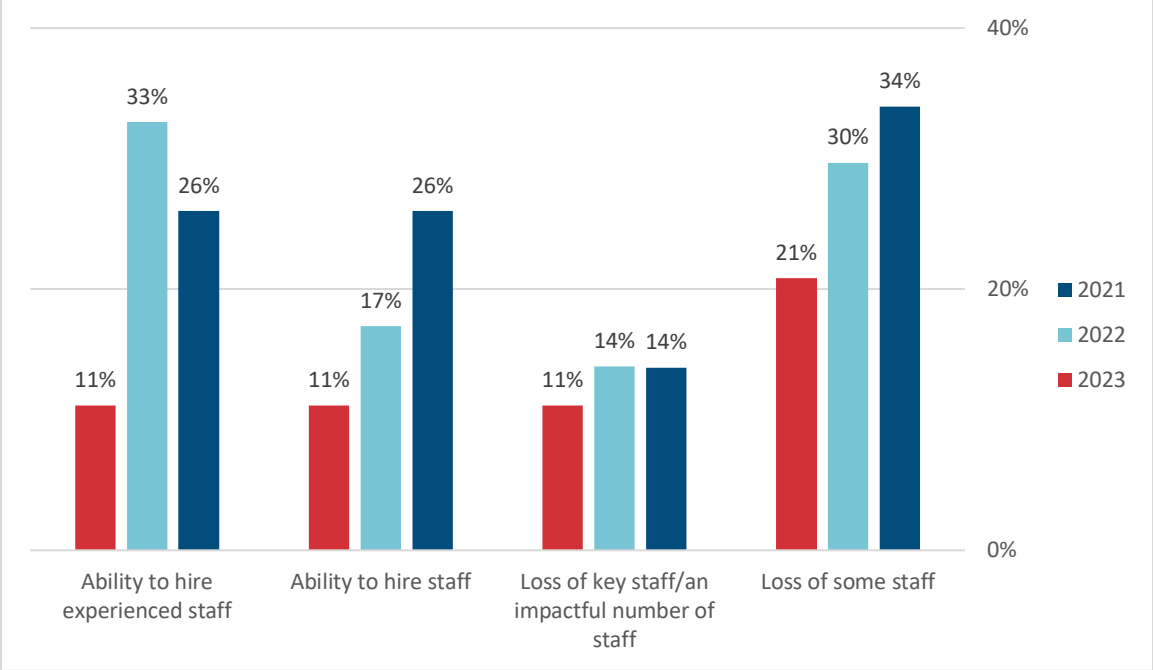
- *Policyholder behavior risk, especially around annuities. I'm unsure if the past experience of lapsation will be predictive of future lapsation as interest rates remain higher or increase from current levels.*
- *medical advancements - impacts on morbidity/mortality*
- *Greatest concurrency from web*
- *The chance of upcoming recession in the next 12 months. We are advising caution for entry into certain insurance markets at this time.*
- *long term risk in asset valuation, we manage with long term asset strategies*
- *We don't know when (or technically if) the world's next major global conflict will occur. We also obviously don't know how that will play out given that wars and global conflict are inherently unpredictable regardless of past experience.*
- *Opioid deaths - premium increase for specific age groups, additional sales in the age groups most affected (to spread the risk over a wider group of policies), decreased sales at age groups most affected, improved risk selection techniques*
- *Impact of the events in the middle east.*
- *None of our historical data is predictive.*
- *Cyber. Do our best with the budget allocated.*
- *Interest rates is an example as well as mortality. We have future predictions, but they may not be accurate. Again, a risk modifier is necessary to manage the unknown risk of not accurately predicting the future effects.*
- *vulnerability management within the IT space. Historical data does not provide meaningful insights so we are trying to dig deeper to understand other parameters that will help identify vulnerabilities that create the most risk so we can focus on those*
- *Impact of strategies to combat climate change, many of which are promising on paper but have difficult or impossible quantifications*
- *Not sure about this question is driving to.*
- *N/A*
- *Cyber data. Use as much industry breach data as possible.*
- *n/a to my practice area*
- *Drivers of mortality.*
- *There is a periodical debt crisis.*
- *Mortality, scenario analysis.*
- *Cyber - increase in our multi-authentication procedures.*

- *Interest rate risks - current yield and credit spread movements are not lining up with historical data.*
- *All weather related risks - I follow Worldweatherattribution.org, led by Dr. Friederike Otto, where they anticipate impact of on/off fossil fuel extraction since 1750. Other option is first differences over last 5 10 or 30 years and extrapolate.*
- *Cyber exposure - managed through operational procedures and insurance.*

Question 12. How is the great resignation currently impacting the ERM function in your firm? (Please select all that apply)

	2023	2022	2021
No impact	**60%**	44%	37%
Loss of some staff	**21%**	30%	34%
Loss of key/impactful number of staff	**11%**	14%	14%
Ability to hire staff	**11%**	17%	26%
Ability to hire experienced staff	**11%**	33%	26%

Great Resignation



Comments

- *N/A*
- *staff looking for salaries adjusted for inflation and current markets*
- *The great resignation has impacted the entire company, not specifically the ERM function. Our ERM team is led by a well-respected actuary, and retention is not much of a problem. If someone leaves, internal replacement is easily managed.*
- *Minimal impact today - we had some turnover but were able to fill the vacancy within a reasonable time frame*
- ***Seems to be lessening.***
- *Organizations would rather struggle short-staffed than make a hiring decision. The result is under-employment.*

- *n/a to my practice area*
- ***Most of jobs added in last few years were due to immigrants - role of low level actuaries may become less relevant. Profession will need to figure out how to train so credentialed members have experience and foresight to justify high salaries.***

Question 13. As employees return to the office following the COVID-19 lockdowns, what challenges do you see for individuals and employers (e.g., inflation eroding purchasing power, preference for remote work, or other employer-employee friction points)?

- *lack of experienced younger employees.*
- ***Salaries are sky rocketing due to demand. How do you bring in talent while also rewarding your current staff for not leaving***
- *Inflation for employees. Company cultures not being able to adapt to hybrid or remote work preferences of employees.*
- ***change in employee priorities (i.e., work just not as important for many people)***
- ***Obvious waste of space for owned or long term leased office space. Still see a clear preference of remote work for experienced hires. Hires out of school preferring in office. Very tough to balance. Training methods need to be improved for helping newer (early in career) professionals.***
- *preference for remote work, childcare concerns*
- *inflation*
- *Balance between preference for remote work for employes and productivity for employer*
- ***Inflation on personal spending power. The remote work battle: the desire of employees to be remote, but the employment market has changed again as we come out of the peak of the pandemic. Roles are not going to be treated equally and it is not a matter of pay scale. Customer service and Fellows of the actuarial orgs will have the power to demand remote, but the actuarial analyst less power to do so. The challenge is in maintaining morale and culture when what the market demands is not equal with WFH.***
- *Effects of uneven inflation.*
- *Our particular company is continuing to allow remote work. However, I do expect to see varying degrees of friction from information I have read between employers and employees regarding the necessity of on-site work. There has been an increase in suggesting a 4-day work week even. I'm unsure of what may develop here and have not studied it.*
- *preference for remote work*
- *preference of remote work and certain areas of practice, the new paradigm in the labor force*
- *Not everyone will be returning to the office because some positions were hired remotely or have shifted to permanent remote. This could cause friction among employees as different employees and/or departments have different expectations regarding coming to the office.*
- ***It's hard to manage which days everyone on a team will be in the office. Child care (outside the home) is still not back to pre-pandemic levels, and employees are struggling to overcome the pick-up/drop-off responsibilities. Young employees are feeling a lack of mentoring while working remotely, but those under 30 are most likely to be comfortable pinging managers to discuss work-related issues, questions and concerns. Isolation will be a big concern on a more global scale, as I suspect most employees won't recognize loneliness for what it is, or that it would be mitigated by time in the office with other employees. Hallway conversations are not happening, and the loss of overheard discussions will lead to less understanding of the business outside the individual's purview. Cafeteria staffing levels is a problem - and as the company cuts back on food selections, this becomes one more reason to not come to the office.***
- *inflation eroding*
- *Preference for remote work. Skilled employees leaving the company because of less flexibility of working from home.*
- *Culture, training of new grads*

- *Concern on how to develop early career employees and foster a sense of loyalty and engagement that leads to positive retention.*
- *Younger generations value the fact of being at home, they are able to not take a job offer if commuting is long, but this also allows to have teams from different places working together. This is an spectacular challenge to employers and teams to "be together"*
- *More employees prefer remote work. Difficult to bond and communicate effectively sometimes when some employees are at the office while others are remote for meetings.*
- *Loss of communication skills among employees and loss of desire to communicate one-on-one.*
- *Differences of opinion between employer and employee with regard to productivity in the recent past and the model for success in the future.*
- *Gas prices are an impediment to driving to the office. Additionally all transit costs are higher. When you consider education needs of employees, social education/work etiquette, and the cost of going to work versus working from home, a balanced approach is likely needed to ensure employee progression. I think working from home a few days and in the office a few days is likely a workable solution for many individuals and employers. I think we got used to working at home, and just need to readjust to working in person again.*
- *preference for remote work is the biggest challenge*
- *None.*
- *Inflation and preference for remote work are real issues, Stress induced by staff reductions will erupt in more labor unrest as it already is in the health care delivery (such as Kaiser Permanente), retail services (Amazon) and retail pharmacy (CVS, Walgreens) industries.*
- *Much higher preference for remote work and work condition flexibility.*
- *High preference for remote work, but difficulty with succession, and finding the right people to move into leadership roles.*
- *Increasing costs are squeezing insurers, which creates frictions with employees and hiring practices. There is a desire to keep head count and costs down at the same time as employees are overworked and need additional resources. Increasing retirements among Baby Boomers and lack of talented candidates to replace them, both internally and externally, exacerbate the problem.*
- *Finding talent who are willing to come to the office at a specific location.*
- *Work from home policies become standard benefits in the industry. Colleagues might wear masks at work in meetings.*
- *Inflation limiting purchasing power and companies not stepping up to increase salaries to truly account for changes in cost of living. Hybrid or remote work will further erode bonding/connections with coworkers and ability to really connect on a more personal, yet still professional level. Companies considering options such as unlimited PTO to help inspire employees to stay will lead to more stressed/less healthy workforce, who will fail to return to office as often as companies desire. Some companies may choose to lower real estate footprint, which may then negatively impact those employees who prefer have an office/desk to go to. Alternatively, companies may suffer from a correction to the Great Resignation where employees are staying longer and increasing costs.*
- *Now with demonstrated "success" of high-cognitive tasks being deliverable at similar efficiencies remotely, an elevated conflict between employees and management is arising. Though, Management is fractured on the topic, as well…..Mandating a return to the office is leading to a "regime shift" on many individuals which adapted in many economic ways toward being remote (particularly with family care & household management). Disrupting employees to change that erodes the employer-employee relationship. In an environment where labor is more available than supply, this leads to the employee (best talent) considering and being triggered to consider alternatives.*
- *We never closed during Covid, so we never experienced these challenges*
- *Balancing multiple individual preferences in scheduling office and home time. Right-sizing office space*
- *Preference for remote work*
- *inflation eroding purchasing power, preference for remote work*

- *Inflation isn't going away; Remote work is here to stay.*
- *Remote work has increased efficiency and given a better balance for employee home/ work time.*
- ***Inertia. It is difficult for employees to go back to the office on a regular basis. May put organizations at risk of losing employees if a number of days at the office per week becomes mandatory.***
- *Preference for remote work is VALID, and invalidate the current valuation of commercial real estate. Adults who are professionals who are given tasks with deadlines don't need to be supervised as long as they deliver their projects on time, correctly and within budget. The insurance industry assumes that ALL its workers must be watched. I may be biased but gen Z workers are frankly lazy and self-centered AND MUST be monitored since they WILL do as little as possible to meet goals and demand pay. This is geared from over 30 years of industry experience and watching how different cohorts of workers approach their tasks with different levels of cynicism.*
- ***For employees, increased travel time and cost, increased cost of child supervision, etc. For employers, increased rent and other infrastructure cost, inability to retain key staff, a disgruntled workforce.***
- *Preference for remote work, which can sometimes cause feelings of isolation.*
- *Change of working culture*
- *Desire for remote work and lack of wage inflation.*
- *Preference for remote work, increased transportation costs. challenging work/life balance for younger families with parents commuting.*
- *Preference for remote work, commuting costs for those with long (e.g. 1hr+) commutes.*
- *Remote work*
- ***Travel budgets are becoming inflated because we are hiring remote employees in other parts of the country but still requiring that they come in to the home office 2-4 times per year.***
- *Friction on remote work. As employers gain the upper hand, expect to see continued return to work requests.*
- *for those who are self employed there are not adequate resources to provide basic IT support*
- *Developing connections with new employees and the entire team.*
- *Remote work preference mismatch between employer and employee leads to hiring challenges*

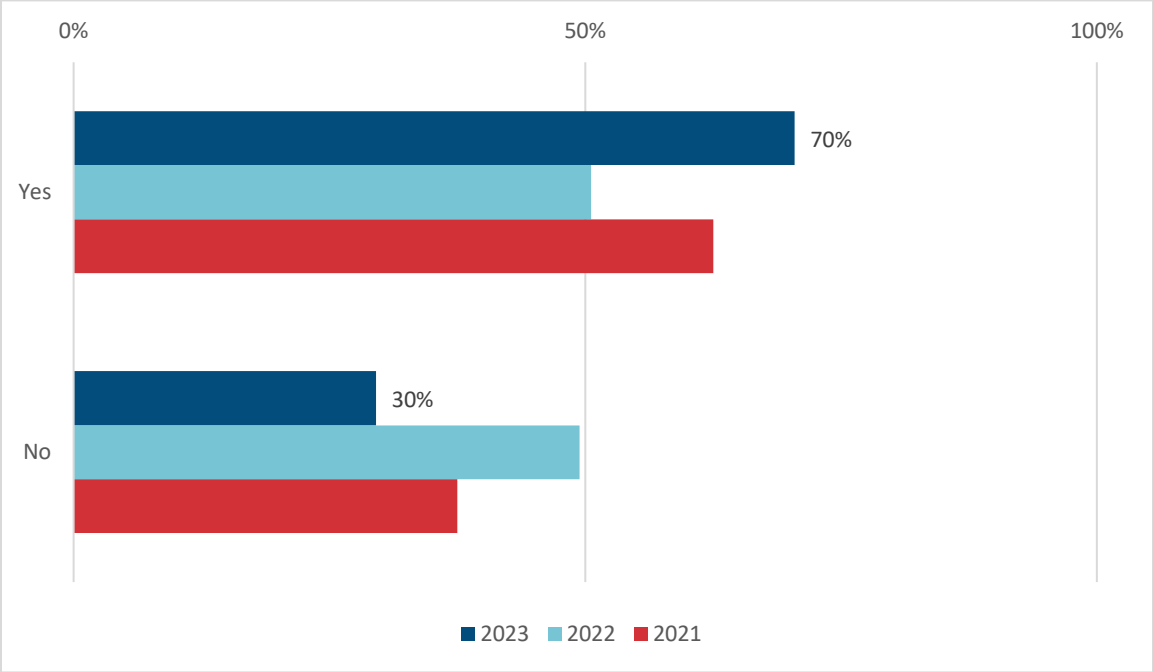
SECTION D: DEMOGRAPHICS

If you are no longer part of a risk team, respond based on your most recent career path.

Question 1. Have you completed this survey in the past?

	2023	2022	2021	2020
Yes	70%	51%	63%	52%
No	30%	49%	38%	48%

Previous Survey Participant



Question 2. What credentials do you currently hold? (Please select all that apply.)

252 responses from 104 surveys (average of 2.4 responses per survey)

Percentages are based on 104 surveys.

	2023	2022	2021	2020
CERA	26%	17%	18%	19%
FCAS/ACAS	5%	5%	6%	15%
FSA/ASA	89%	61%	90%	84%
FCIA	12%	10%	11%	7%
MAAA	50%	35%	61%	59%
PRM	1%	1%	2%	1%
FRM	5%	1%	3%	1%
CFA	8%	5%	3%	10%
FIA	0%	2%	3%	3%
FIAA	1%	0%	6%	1%
JD	1%	1%	1%	1%
MBA	7%	3%	4%	8%
CPCU	4%	1%	4%	1%
Ph.D.	3%	2%	9%	6%
EA	4%	3%	13%	5%
FCA	5%	3%	4%	2%

Other actuarial credentials

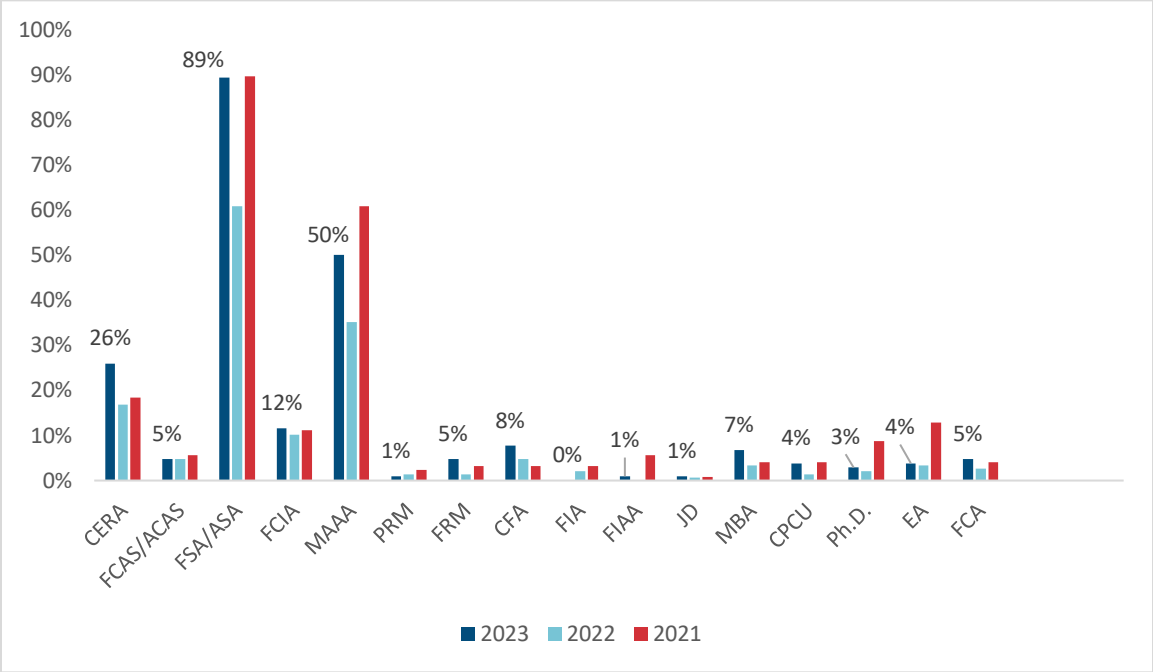
- *NA*
- *FASHK*
- *FASHK*
- *N/A*
- *Member of CAA*
- *Fellow of Institute of Actuaries Korea*
- *FFA*
- *AQ (France)*

Other non-actuarial credentials

- *FLMI*
- *CRISC*
- *FLMI/M*
- *CIPP and CIPT from the International Association of Privacy Professionals*
- *NA*
- *FLMI*
- *FLMI, MS*
- *Certified FALU, FLMI, CLU, Fellow (ALUCA)*
- *MHKSI*
- *M. S.*
- *FLMI, AIRC*
- *CIA, CRMA*
- *FLMI, CLU, ChFC, FLMI*

- *FLMI*
- *FLMI, CLU, LLIF*
- *FLMI RHU*

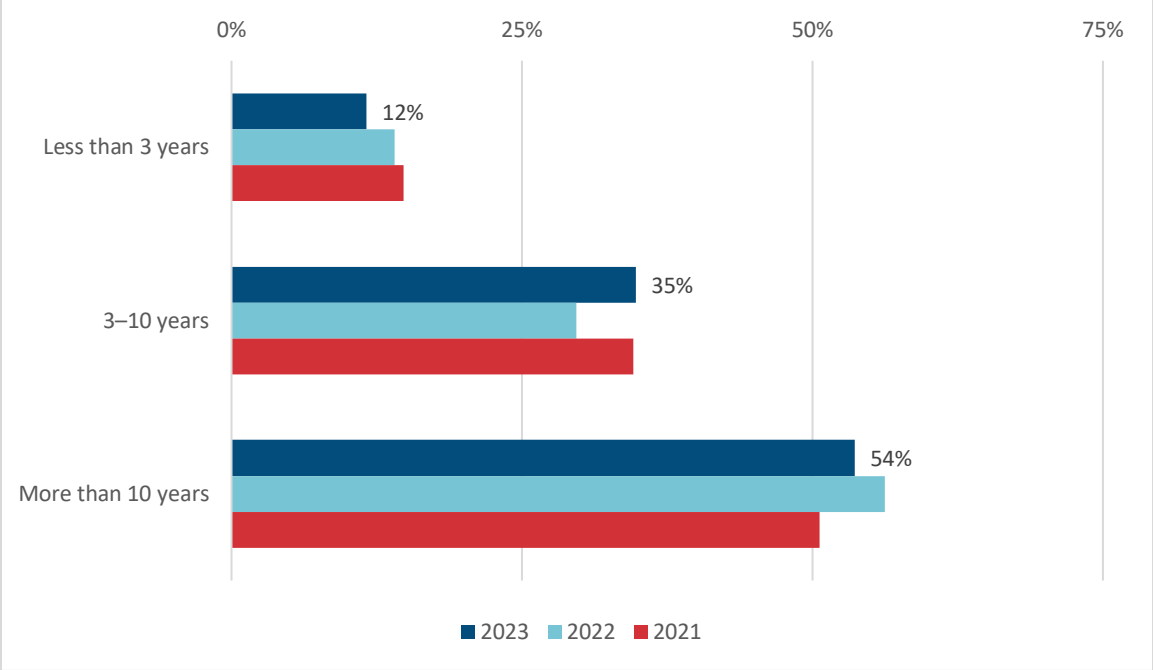
Credentials



Question 3. How long have you been a risk manager?

	2023	2022	2021	2020
Less than 3 years	**12%**	14%	15%	14%
3–10 years	**35%**	30%	35%	41%
More than 10 years	**54%**	56%	51%	45%

Experience



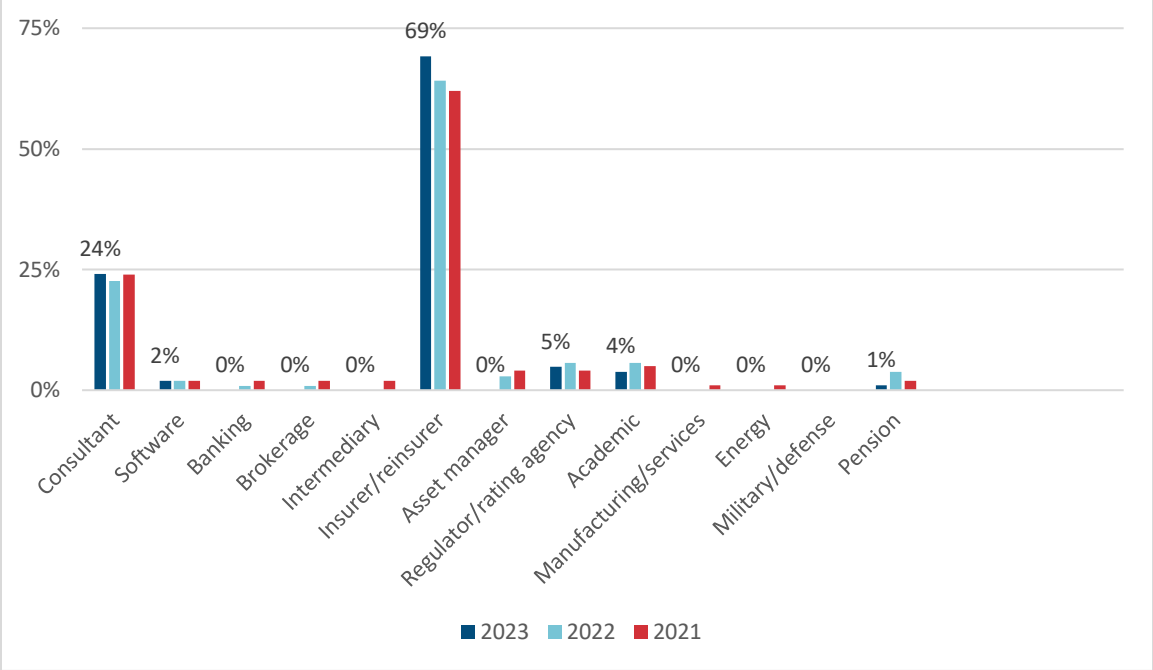
Question 4. Employer type (please select all that apply).

	2023	2022	2021	2020
Consultant	24%	23%	24%	25%
Software	2%	2%	2%	2%
Banking	0%	1%	2%	1%
Brokerage	0%	1%	2%	3%
Intermediary	0%	0%	2%	2%
Insurer/reinsurer	69%	64%	62%	63%
Asset manager	0%	3%	4%	4%
Regulatory/rating agency	5%	6%	4%	4%
Academic	4%	6%	5%	5%
Manufacturing/Services	0%	0%	1%	1%
Energy	0%	0%	1%	1%
Military/Defense	0%	0%	0%	0%
CRO (or acting CRO) at CRO Council firm	0%	0%	2%	2%
CRO (or acting CRO) at CRO Forum firm	0%	0%	0%	0%
Pension fund	1%	4%	2%	2%

Other

- *Currently retired*
- *retired - no employer*
- *Chairman of the Risk Committee of the Board.*

Employer Type



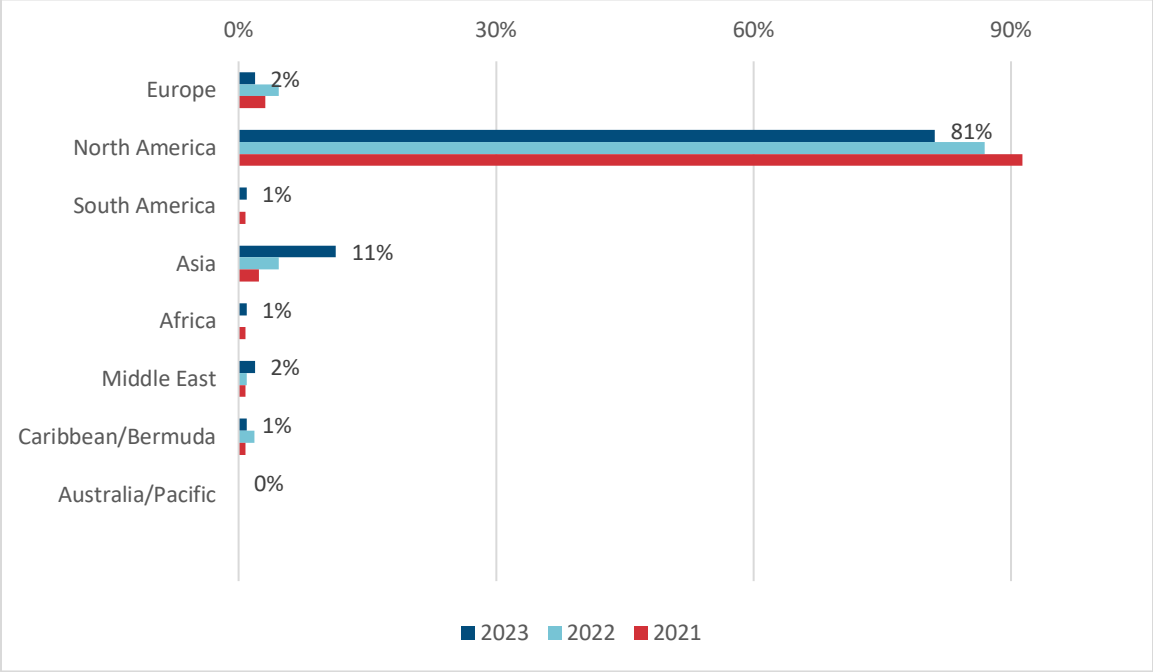
Question 5. Primary region (please select one).

	2023	2022	2021	2020
Europe	2%	5%	3%	4%
North America	81%	87%	91%	89%
South America	1%	0%	1%	1%
Asia	11%	5%	2%	4%
Africa	1%	0%	1%	1%
Middle East	2%	1%	1%	1%
Caribbean/Bermuda	1%	2%	1%	0%
Australia/Pacific	0%	0%	0%	1%

Other

- *Balanced mix of Europe, US, and China*

Region



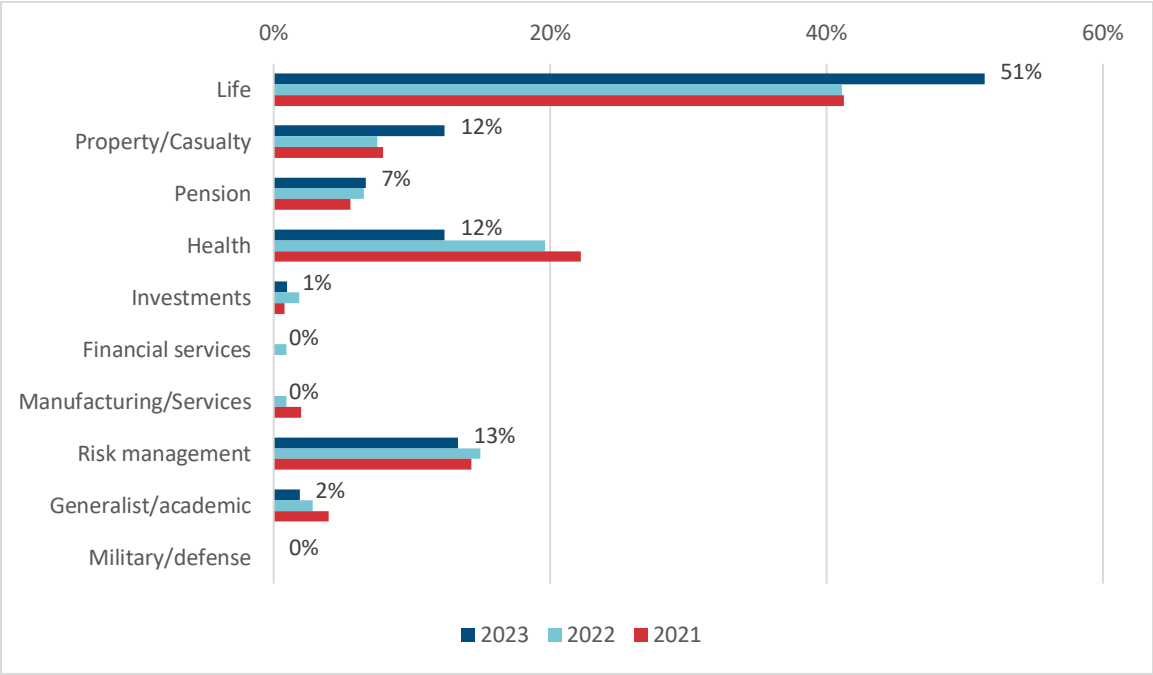
Question 6. Primary area of practice (please select one).

	2023	2022	2021	2020
Life	51%	41%	41%	35%
Property/casualty (general insurance, nonlife)	12%	7%	8%	13%
Pension	7%	7%	6%	8%
Health	12%	20%	22%	21%
Investments	1%	2%	1%	4%
Financial services (noninsurance)	0%	1%	0%	1%
Manufacturing/services	0%	1%	2%	2%
Risk management	13%	15%	14%	10%
Generalist/academic	2%	3%	4%	2%
Military/defense	0%	0%	0%	0%

Other

- *Group Insurance*

Practice Area



Question 7. What sources do you find valuable when scanning for emerging risks (list up to three)?

- *World Economic Forum, SOA, Gartner*
- *SOA meetings, news articles/videos*
- *Government, consultants*
- *SOA website*
- *Actuality news (from SOA, industries), Government forecast and expected changes in regulation,*
- *multiple industry and news sources: SOA, AAA, Medscape, NYT, WP, Barrons, Apple News*
- *N/A*
- *papers from renowned consultants in the field, financial data, company experience*
- *Generic news sources (AP, Reuters, DW, etc.), SOA publications*
- *Wall Street Journal, Wired & Fast Company magazines*
- *Newspapers and journals.*
- *Daily newsletters from key insurance publications, but also just every day news from common news outlets*
- *General news*
- *Credible sources such as WSJ and independent news reports, such as Quartz (https://qz.com)*
- *Risk Publications, Swiss Re's SONAR, Chat GPT*
- *Consultant's emerging risk report. My boss who listens to news sources perpetually.*
- *research, articles, discussions*
- *This survey as well as Gartner emerging risk survey and Swiss Re's sonar.*
- *Actuarial periodicals; fee-based subscriptions; expert analysis*
- *This survey, Trend Reports from various independent organizations, The news*
- *Financial times, google trend*
- *SOA research, NY Times, Washington Post*
- *News; industry publications; academic publications*
- *SOA publications, Widespread public media*
- *The SOA List and journals.*

- *Google search, Daily news from multiple sources, GARP*
- *Reinsurers, global consultants*
- *Market data, political data*
- *Environmental scanning and projecting.*
- *the Economist magazine*
- *Market research and people's news*
- *SOA publications, News gathering services.*
- *AM BEST, LOMA, SOA*
- *The news, global risk surveys, risk association white papers*
- *Periodicals; conferences*
- *SOA Emerging Risk survey, LOMA ERM Committee, ARM Dangerous Risks Survey*
- *Economist, Smithsonian magazine, National Geographic*

Question 8. Do you have any comments or suggestions for future iterations of this survey?

- *None at this time.*
- *I think it's good to keep track of emerging changes as those will increase over time*
- *No. I find this survey to be very valuable in its current format.*
- *I'd like to learn more about risk metrics/measurement techniques*
- *No*
- *It seems answers will be very different if one thinks in terms of 1) mankind, 2) US and Canada inhabitants, 3) the insurance industry in US and Canada, 4) one's company and its products, and 5) oneself. I know the survey gets at this at the beginning, but is hard for me to think what can come from responses that are aggregated across all these perspectives.*
- *Nothing - I find the length of this one about right*
- *Ranking risks, Enumerating potential financial impacts of various risks*
- *Look at which countries have negative replacement and impact on the stability of the economy.*
- *Looks good to me!*
- *No*
- *Look at relevance of Societal Risk in the context of Organizational Risk*
- *for those who are retired, do a better job at including 'not applicable' to more questions*
- *None*

Thanks for your participation!

Researcher's Notes for Future Surveys

Add questions probing:

- What actions do you take between crises to add value?
- Currency shock—include risk of Bretton Woods–type overhaul
- Add student to employer type options

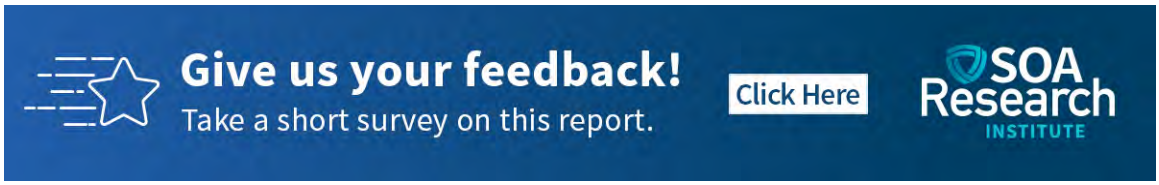
Review definitions:

Consider ranking four primary questions – 23 points for number 1 down to 1 or 10 points for number 1 and no points for numbers 11 and later.

Consider building a "quilt" of rankings across all years of the survey by risk.

Appendix C: Survey Results 2022 and Earlier

Detailed results for prior surveys can be found at www.soa.org/resources/research-reports/2015/research-emerging-risks-survey-reports/



About the Casualty Actuarial Society

The Casualty Actuarial Society (CAS) is a leading international organization for credentialing and professional education. Founded in 1914, the CAS is the world's only actuarial organization focused exclusively on property and casualty risks and serves over 9,100 members worldwide. CAS members are experts in property and casualty insurance, reinsurance, finance, risk management and enterprise risk management. Professionals educated by the CAS empower business and government to make well-informed strategic, financial and operational decisions.

The purposes of the Casualty Actuarial Society are:

- To advance the body of knowledge of actuarial science applied to general insurance, including property, casualty and similar risk exposures
- To expand the application of actuarial science to enterprise risks and systemic risks
- To establish and maintain standards of qualification for membership
- To promote and maintain high standards of conduct and competence
- To increase the awareness of actuarial science
- To contribute to the well-being of society as a whole

In principle and in practice, the CAS values and seeks diverse participation within the property/casualty actuarial profession. In support of those values, the CAS encourages an inclusive community where differences are celebrated and all have the opportunity to participate to their fullest potential in its success. The CAS commits time and resources to accomplish this objective.

Actuaries are required to adhere to the high standards of conduct, practice and qualifications of the actuarial profession, thereby supporting the actuarial profession in fulfilling its responsibility to the public.

The Casualty Actuarial Society
4350 N. Fairfax Drive, Suite 250
Arlington, VA 22203
https://www.casact.org/

About the Society of Actuaries Research Institute

Serving as the research arm of the Society of Actuaries (SOA), the SOA Research Institute provides objective, data-driven research, bringing together tried and true practices and future-focused approaches to address societal challenges and business needs. The institute provides trusted knowledge, extensive experience and new technologies to help effectively identify, predict and manage risks.

Representing the thousands of actuaries who help conduct critical research, the SOA Research Institute provides clarity and solutions on risks and societal challenges. The institute connects actuaries, academics, employers, the insurance industry, regulators, research partners, foundations and research institutions, sponsors and non-governmental organizations, building an effective network which provides support, knowledge and expertise regarding the management of risk to benefit the industry and the public.

Managed by experienced actuaries and research experts from a broad range of industries, the SOA Research Institute creates, funds, develops and distributes research to elevate actuaries as leaders in measuring and managing risk. These efforts include studies, essay collections, webcasts, research papers, survey reports, and original research on topics impacting society.

Harnessing its peer-reviewed research, leading-edge technologies, new data tools and innovative practices, the institute seeks to understand the underlying causes of risk and the possible outcomes. It develops objective research spanning a variety of topics with its strategic research programs: aging and retirement; actuarial innovation and technology; mortality and longevity; diversity, equity and inclusion; healthcare cost trends; and catastrophe and climate risk. The Institute has a large volume of topical research available, including an expanding collection of international and market-specific research, experience studies, models and timely research.

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