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Emerging Risks Survey

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Prepared By
Max J. Rudolph, FSA CERA CFA MAAA

Rudolph
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Seventh Risk Manager Survey of Emerging Risks

Some risks have been managed for many years, evolving slowly with useful historical data. This includes risks for coverage like auto collision, mortality, earthquakes and sickness. This does not mean the distributions are completely stable, but the changes are manageable and common sense analysis generally leads the risk manager to a reasonable response. Emerging risks are longer term in nature, and in the tail of the distribution, so more thought needs to go into the analysis. It is hard to quantify many of these risks, yet an insurer writing a liability that extends over 20 years must consider both positive and negative events that could develop over that time span.

Risks generating historical data that remain stable over time can be represented by a statistical distribution. Other risks are evolving in uncertain ways, have been forgotten in their dormancy, or are new. These latter types are termed emerging risks and typically do not have a well-defined distribution. They require more thought when modeling their impact.

Outliers that are potential solvency events should be addressed both when the relationship is initiated and on an ongoing basis as exposures build up. This makes them a core part of enterprise risk management (ERM), although it also means that the events do not happen frequently. In today's fast moving world this is a problem. We have short memories, so even events that happened less than five years prior are ignored by capital allocators. We see that following the global financial crisis of 2008 where already in 2013 margin debt was again high and debt covenants again loose. Some are predicting another crisis in the near future based on currency wars and high sovereign debt.

For this reason it is important for industries and professions to address emerging risks, otherwise a single entity could force everyone else down a path of improper pricing and following the greater fool. An example that ties directly to this survey is pandemic risk. Over the past 15 years the industry has incorporated extreme events like the 1918 pandemic into capital requirements, where previously this exposure was essentially provided for free.

The role of prediction in ERM is a topic for debate in this survey, with some respondents disliking any attempt to predict but most arguing that predicting a range of outcomes is useful.

A list of emerging risks, if truly thinking with a time horizon of 10 years or more, should not radically change from year to year. There will be some variation, mainly as specific risks cycle back to prominence after long periods of dormancy. A good case study revolves around social networks, which were mentioned most several years ago as emerging risks not included in the survey, and now not mentioned at all.

This survey attempts to track the thoughts of risk managers about emerging risks across time. It is the seventh survey of Emerging Risks conducted by the Joint Risk Management Section, a collaboration of the Casualty Actuarial Society, Canadian

Institute of Actuaries, and Society of Actuaries. Trends are as important as absolute responses, helping risk managers contemplate individual risks, combinations of risks, and unintended consequences of actions. The survey responses and summarized results also provide a tool for risk managers to network with peers and share new ways to think about risk. To further clarify the responses, numerous opportunities were provided within the survey to comment beyond the specific questions posed.

Note that detailed survey results can be found in Appendix II and that Appendix III includes the complete 2012 survey details for comparison.

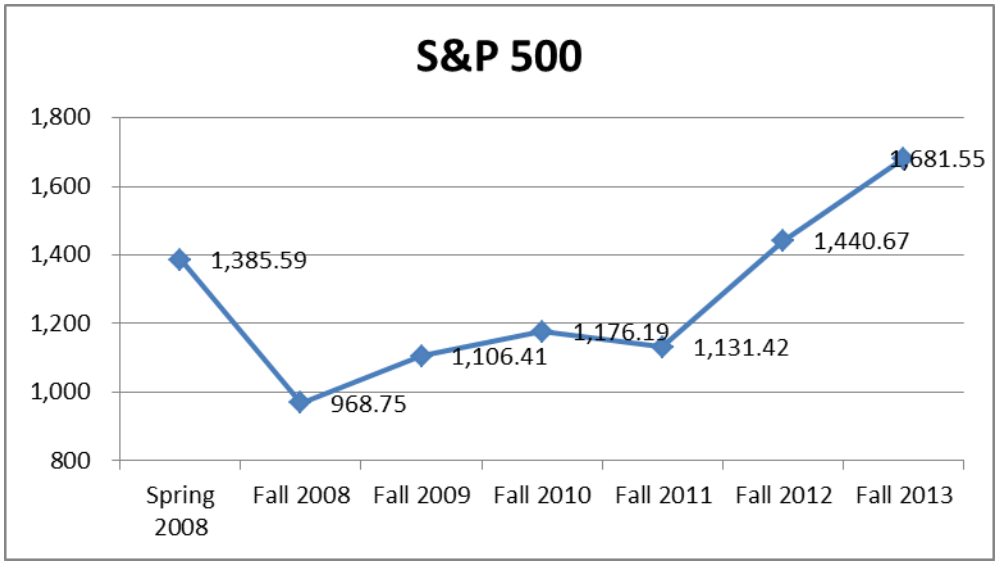
Executive Summary

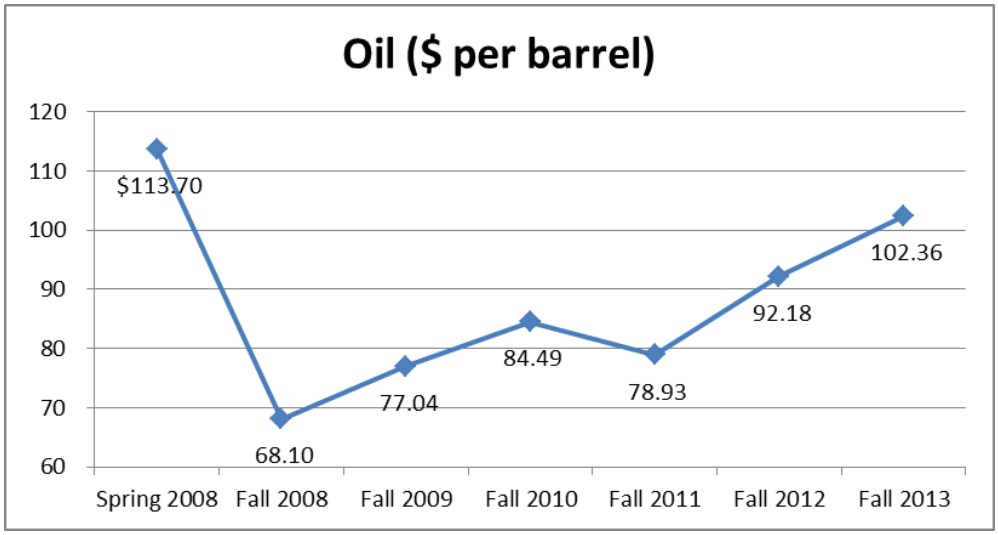
The world of risk management is at a crossroads. Five years have passed since Lehman Brothers and AIG forced the federal government to choose who was "too big to fail." This led to a flurry of risk management activity and regulations. Today enough time has passed that entities can look beyond risks that are fire alarms today to consider risks that could evolve and become material over longer time horizons. This year's survey of emerging risks, the seventh, captures this shift. While financial volatility and other economic risks remain atop the list, other changes are being seen. Risk managers are looking at cyber risk, both as a current risk but especially as an evolving and emerging risk. The pace of regulatory change is increasing, causing great concern for those with budgets to manage while meeting external requirements. On the other end of the spectrum, *Oil price shock* has retreated from the top risk overall in the first survey to one far out of the top five list.

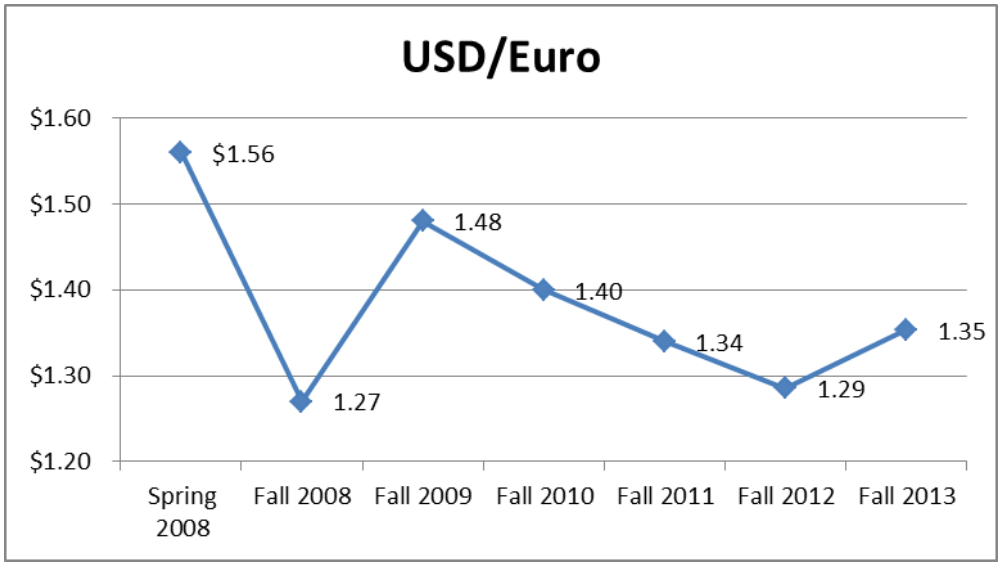
History

As in past reports, the survey results show that current values of the S&P 500, a barrel of oil, and the U.S. dollar relative to the Euro seem to anchor perceptions of risk. Results have evolved over time, generally led by current news topics. Only economic factors are shown here, and the researcher would be interested in suggestions of other metrics that might be drivers of emerging risks.

	S&P 500	Oil (per barrel)	USD/Euro
Spring 2008	1,385.59	$ 113.70	$ 1.56
Fall 2008	968.75	68.10	1.27
Fall 2009	1,106.41	77.04	1.48
Fall 2010	1,176.19	84.49	1.40
Fall 2011	1,131.42	78.93	1.34
Fall 2012	1,440.67	92.18	1.29
Fall 2013	1,681.55	102.36	1.35







The initial survey was released to the INARM group (International Network of Actuarial Risk Managers) in April 2008, soon after Bear Stearns ceased its independence. When that survey was completed, the S&P 500 stood at 1,385.59 (according to Yahoo Finance), the price of a barrel of oil was $113.70 (Energy Information Administration at http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D) and one Euro cost $1.56 (http://www.federalreserve.gov/releases/h10/Hist/dat00_eu.htm). Oil was priced relatively high, the stock markets were at record levels, and the dollar had trended down. At that time the top four emerging risks chosen (where respondents were asked to choose up to five) were

Survey 1 (April 2008)

1. *Oil shock* (57% of respondents)
2T. *Climate change* (40%)
2T. *Blow up in asset prices* (40%)
4. *Fall in value of US $* (38%)

With oil at historic highs, it was the predominant emerging risk chosen. The second survey was completed in early November 2008. Rates are compared at the end of October. Using consistent sources, by then 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

Survey 2 (November 2008)

1. *Blow up in asset prices* (64%)
2. *Fall in value of US $* (48%)
3. *Oil price shock* (39%)
4. *Regional instability* (34%)

Systemic risk was perceived to be very high at this time with asset values in free fall. Oil prices had fallen quite a bit, U.S. currency was considered a safe harbor and Barack Obama had just been elected to his first term as President. The next survey was in early December 2009, and metrics were collected at November month end. The S&P 500 had increased 14%, the price of a barrel of oil had increased 13%, and the U.S. dollar had weakened 17%. The economy had begun its slow recovery. The top four emerging risks from the third iteration of the survey were

Survey 3 (December 2009)

1. *Fall in value of US $* (66%)
2. *Blow up in asset prices* (49%)
3. *Oil price shock* (45%)
4. *Chinese economic hard landing* (33%)

In 2010, data was compiled in October and the indicators had not changed materially. The stock market was up 6%, oil was up 10% and the dollar had further strengthened by 6%. Most of the top 5 results continue to come from the Economic category.

Survey 4 (October 2010)

1. *Fall in value of US $ (49%)*
2. *International terrorism (43%)*
3. *Chinese economic hard landing (41%)*
4. *Oil price shock (40%)*
5. *Failed and failing states (38%)*

In the 2011 survey, data was compiled at the end of September. The U.S. stock market was down 4% overall and very volatile during the year, oil was down 7% and the dollar had further strengthened against the Euro by 4%.

The original list of risks was developed by the World Economic Forum for their annual Global Risks survey. There is a balance required between keeping the list current and being able to show trends. The WEF has aggressively updated their risks, which is somewhat surprising since their stated time horizon is 10 years, but this research has tried to maintain stability for trending purposes. For the 2011 survey the risks were updated. One risk was moved to a different category, two combined and one added. The changes are described in Appendix I. Comparisons have been adjusted for trending. Most of the top six results continue to come from the Economic category. The new risk, *Financial volatility*, resonated with risk managers as they made it their top selection.

Survey 5 (October 2011)

1. *Financial volatility (68%)*
2. *Failed and failing states (42%)*
3. *Cyber security/interconnectedness of infrastructure (38%)*
4. *Chinese economic hard landing (32%)*
4. *Oil price shock (32%)*
4. *Regional instability (32%)*

In 2012 equity markets surpassed the levels of spring 2008 for the first time, while oil prices rebounded and the dollar strengthened. Results were less concentrated.

Survey 6 (October 2012)

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

Equity markets and oil prices continued their trend upward in 2013, while the dollar reversed course and strengthened versus the Euro.

Survey 7 (October 2013)

1. *Financial volatility (59%)*
2. *Cyber security/interconnectedness of infrastructure (47%)*

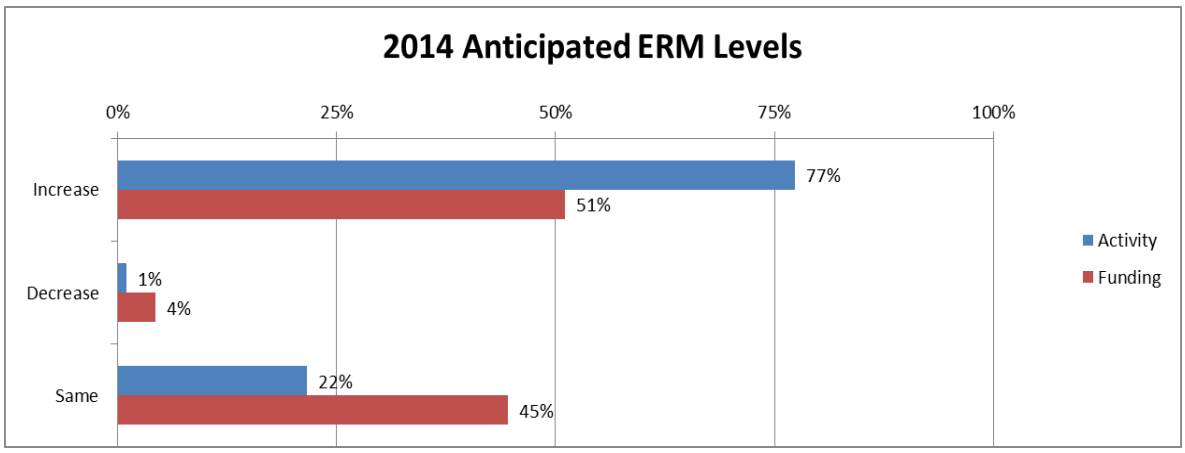
3. *Blow up in asset prices (30%)*
4. *Demographic shift (30%)*
5. *Failed and failing states (29%)*
5. *Regional instability (29%)*

There are numerous emerging risk surveys being published. Many are sponsored by consulting firms and academic institutions, focusing a very short time horizon. The WEF survey states a 10 year time horizon but provides no review of current risk sentiment. Unfortunately the media interprets any emerging risk survey as a review of current risks. This survey attempts to interpret emerging risks over a longer time horizon in the context of current risk concerns. Each year another data point is added. In addition, the evolving role of emerging risks in an enterprise risk management environment is explored (often based on responses from prior surveys). This survey will explore the perceived usefulness of emerging risks and ERM, with some surprising discoveries shared by expert practitioners.

Activity

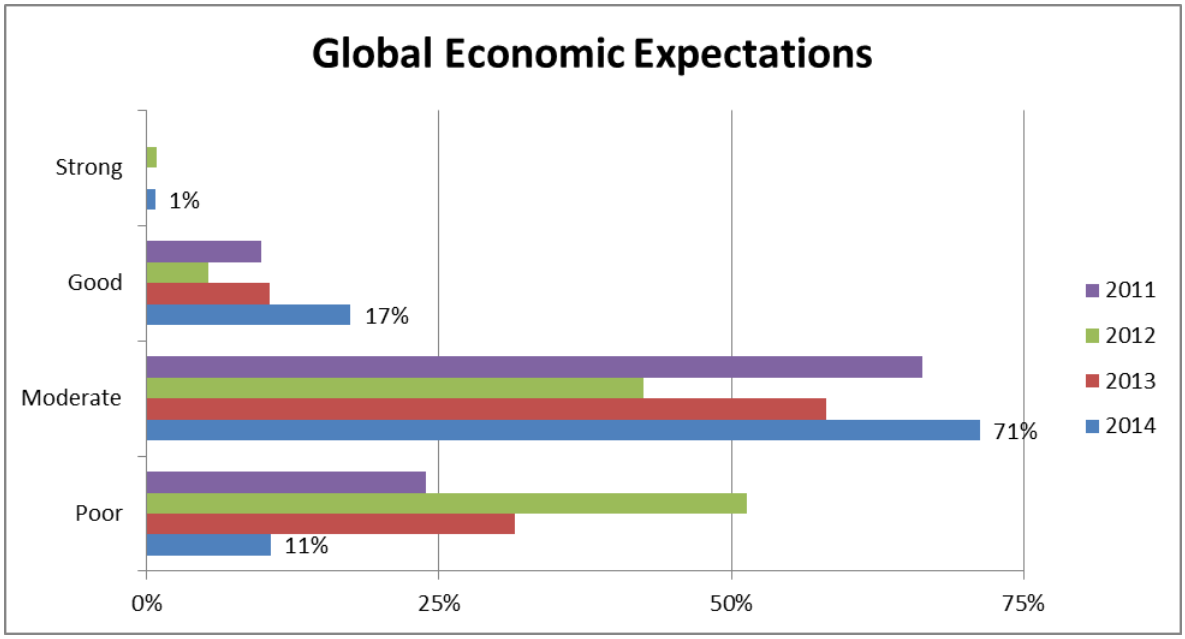
Risk managers report that risk tools are being used more frequently to add value. These incorporate quantitative, qualitative and combination methods. A balance is needed between sophisticated models and simplified techniques based on experience that can be used to identify emerging risks and other outlier events. Once qualitative methods are utilized to identify and prioritize emerging risks, quantification can help management get their arms around the magnitude of the risk.

Many activities related to ERM continued to grow in 2013, with 70% reporting increases and 77% expecting activity growth in 2014. Only half anticipate an increase in funding for ERM activities in 2014. Tied to other survey results, increased regulatory requirements are expected to lead to higher activity levels for several years.



Global economic expectations by survey respondents continued to improve for 2014. Over 85% anticipate a Good (17%) or Moderate (71%) economy. In late 2013 the markets were anticipating a reversal of the quantitative easing program and were completing a strong year for equity markets. This improving prognosis is consistent with

other data collected in the survey pointing toward a risk management community extending its time horizon as it fights through regulatory pressures and cyber security issues.



Emerging Risks

Researchers like Daniel Kahneman and Nassim Taleb discuss extreme events and the human biases surrounding them. Risks interact, leading to higher order effects and unintended consequences. These results are difficult to anticipate and even more difficult to avoid. Emerging risks may be identified by some individuals, but they often do not have decision making duties.

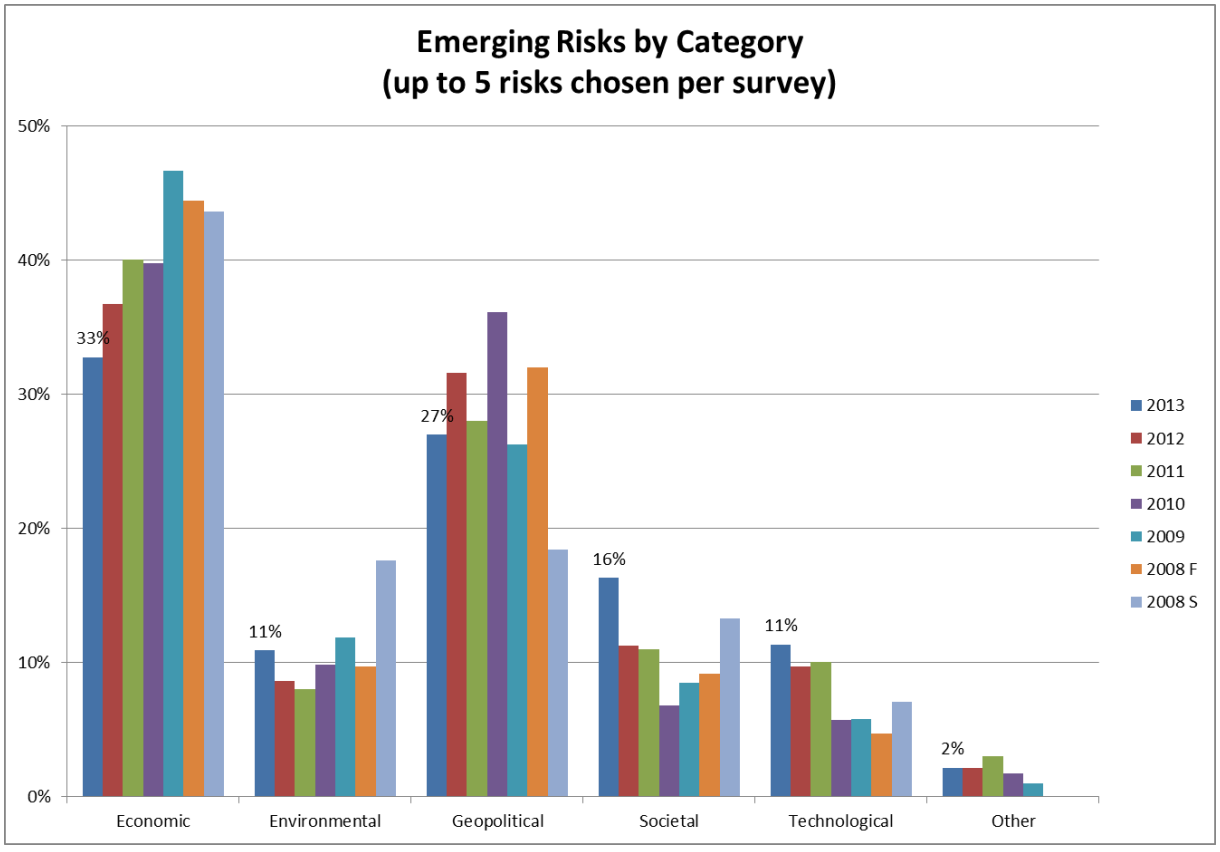
Since the previous iteration of this survey, a number of events have influenced the thinking of risk managers. Reverberations still echo from the 2008 financial crisis, but less so from the 2011 Japanese earthquake/tsunami and Arab Spring and 2012s Hurricane Sandy. Events in 2013 did not have as many immediate and severe worldwide implications for the financial community. Natural disasters, like Typhoon Haiyan, were material but occurred in areas that are generally not fully insured.

Top Five

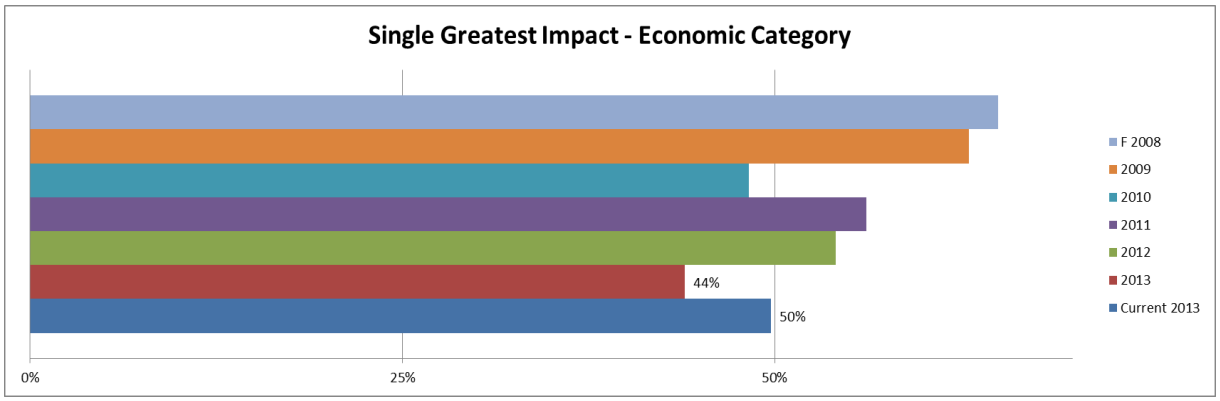
There were some interesting shifts in the 2013 emerging risk results. While the Economic category of risks continues to be the top choice (when up to five emerging risks were selected) ahead of the Geopolitical, Societal, Technological and Environmental categories, its relative importance continues to drop (33% after a peak of 47% in 2009). The risk *Oil price shock* has fallen consistently in this survey (lower for four consecutive years, down from 31% in 2012 to 7% this year) as oil supply improved due to reduced Middle East tensions and new sources coming on-line in North America. Finishing second (with 27%, down from 32%), Geopolitical risks were mostly down. *Transnational crime and* corruption (8% up from 5%) increased but three risks, *Proliferation of*

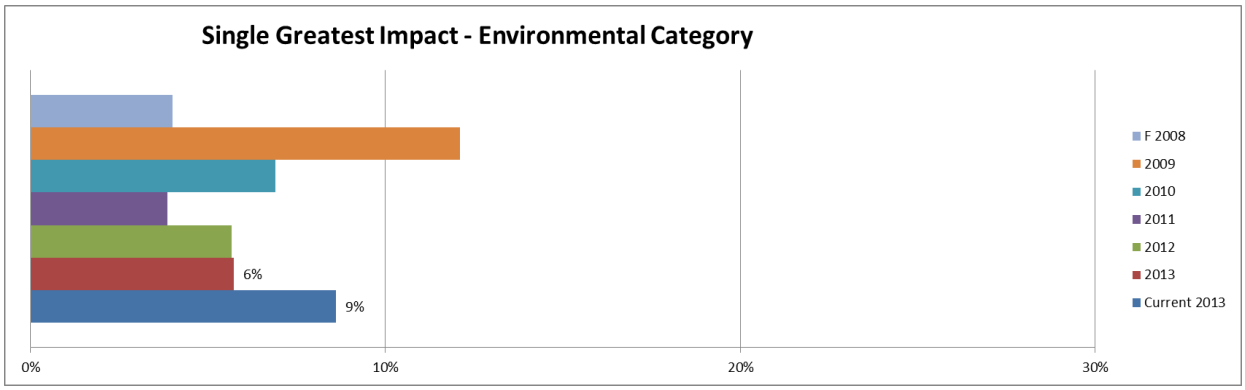
weapons of mass destruction (WMD) (5% down from 14%), *Failed and failing states* (29% down from 33%) and *Regional stability* (29% down from 42%) all decreased at least 4%. The last two listed remain in the top five choices overall. Other risks with new highs across the survey history were *Natural catastrophes: Severe weather* (11%), *Liability regimes/regulatory frameworks* (23% up from 8%) and *Cyber security/interconnectedness of infrastructure* (47%, second overall). New lows were recorded by risks *Oil price shock* (7%), *Chinese economic hard landing* (28%), *Financial volatility* (59%) and *Proliferation of weapons of mass destruction* (5%).

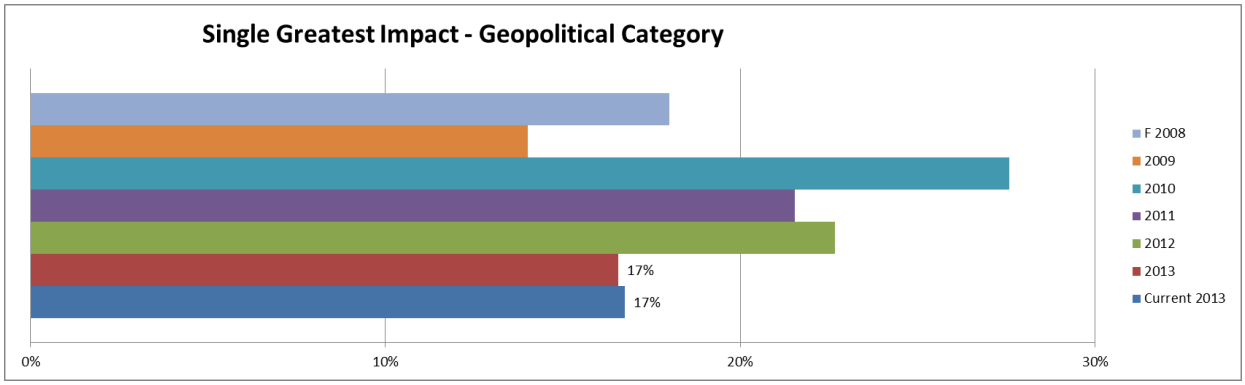
Cyber security has been a risk of growing importance, trending up from 21% in 2009 to this year's survey where 47% listed it among their top five emerging risks. With the revelations of the National Security Agency (NSA) surveillance program and retail store Target's breach of confidential credit card information, this heightened awareness has been justified and provided warning of the need for awareness and mitigation of this risk. Prior survey analysis has focused on anchoring, where respondents get pulled toward recent events. This year results do not confirm these tendencies, and the cyber security results point toward a predictive quality of the survey.

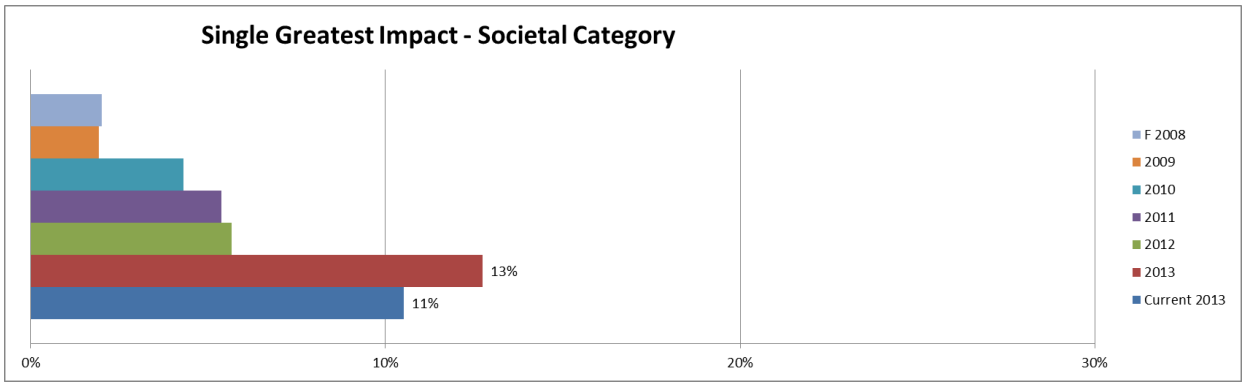


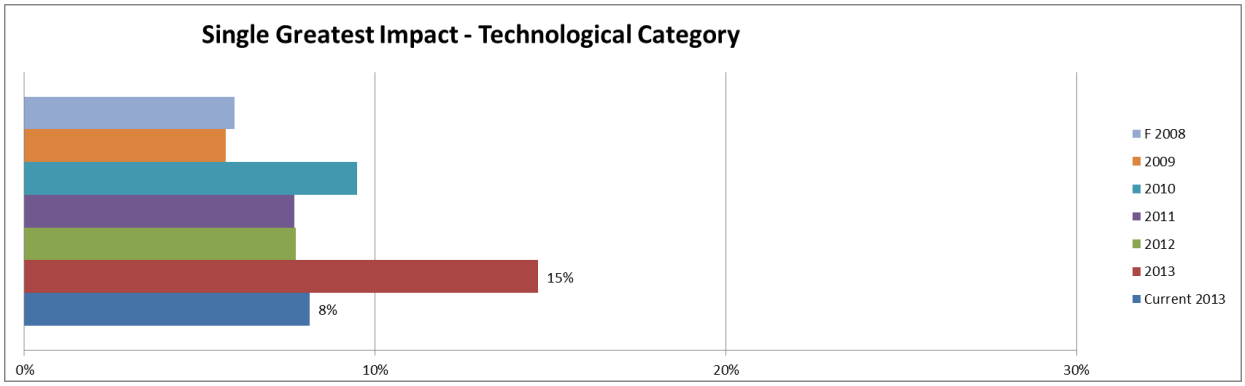
Note that, for ease of viewing, labels are included on graphs for only the most recent data point and only recent data points are included. (This next set of graphs has two data labels since it also includes the top current risk). All data points can be found in Appendix II.





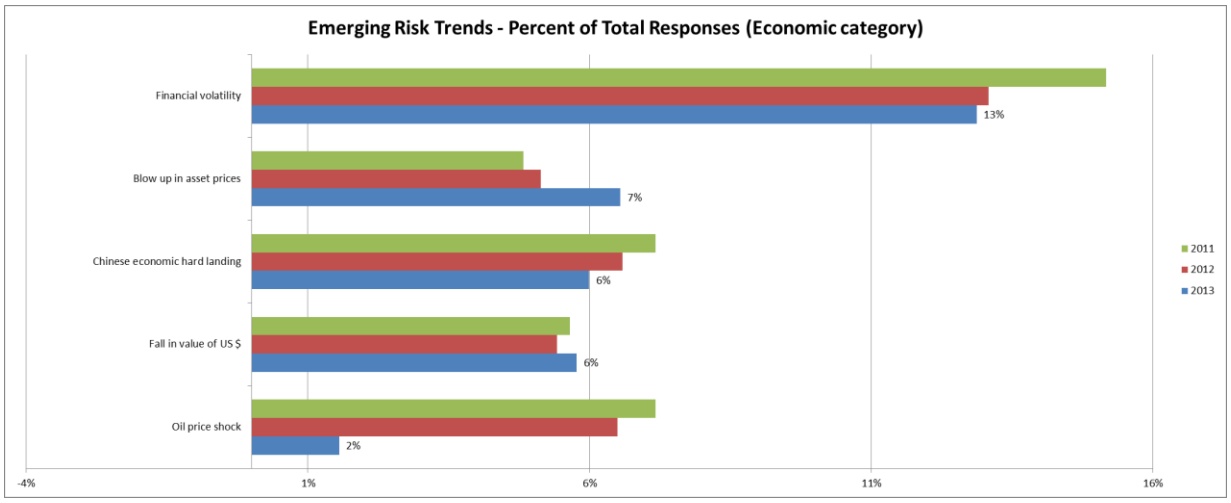


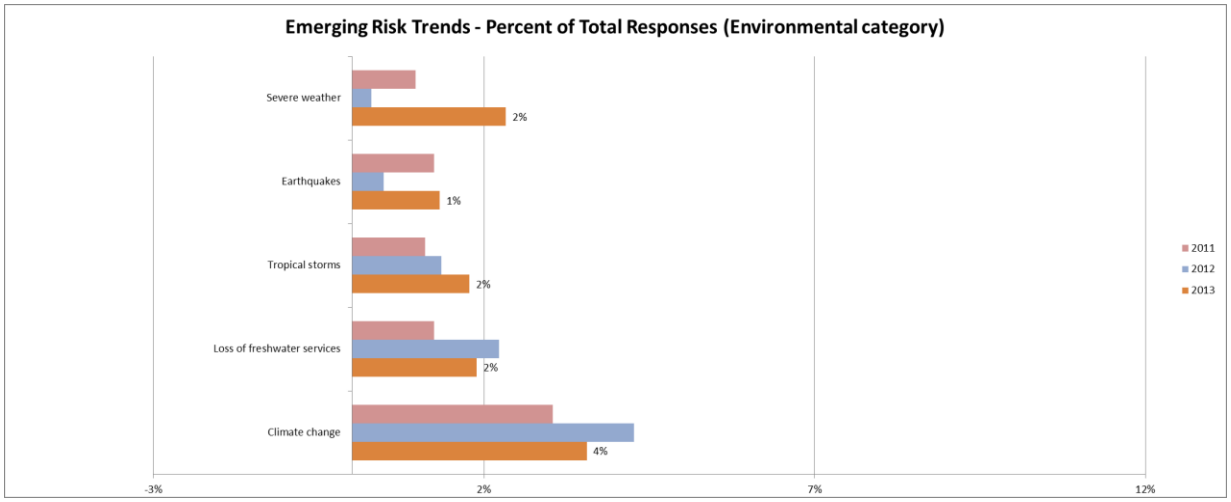


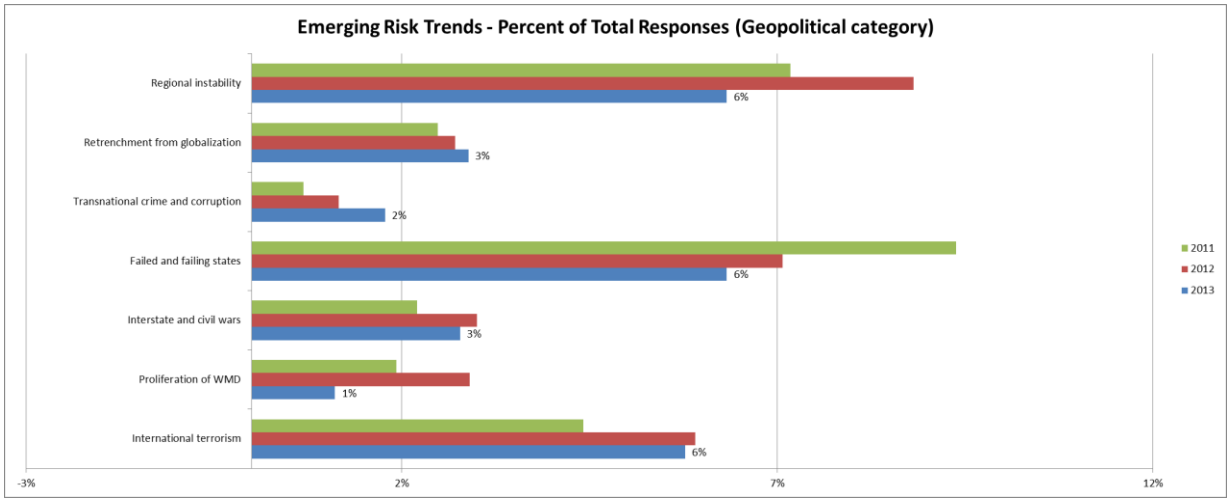


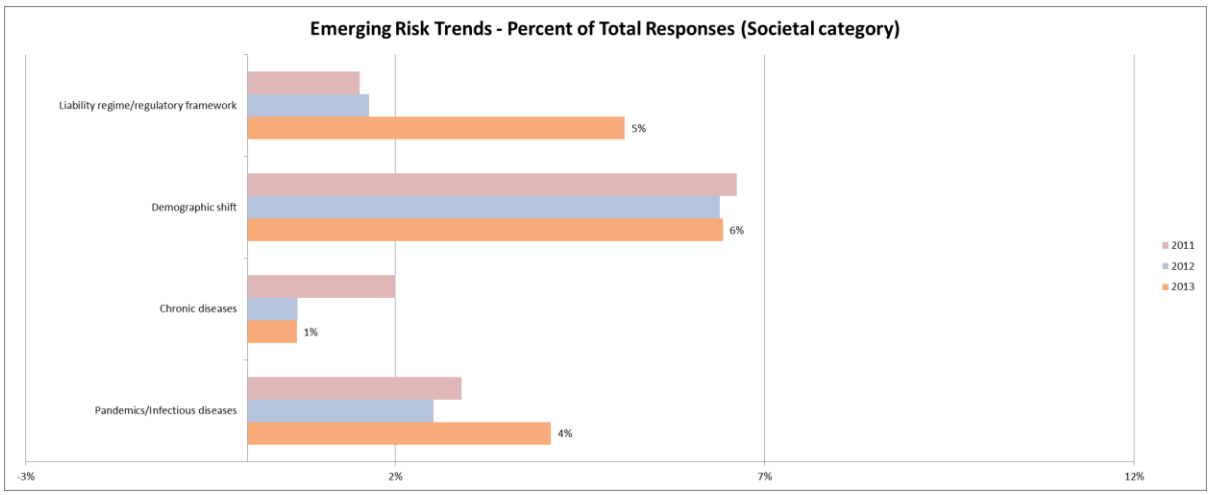
Trending

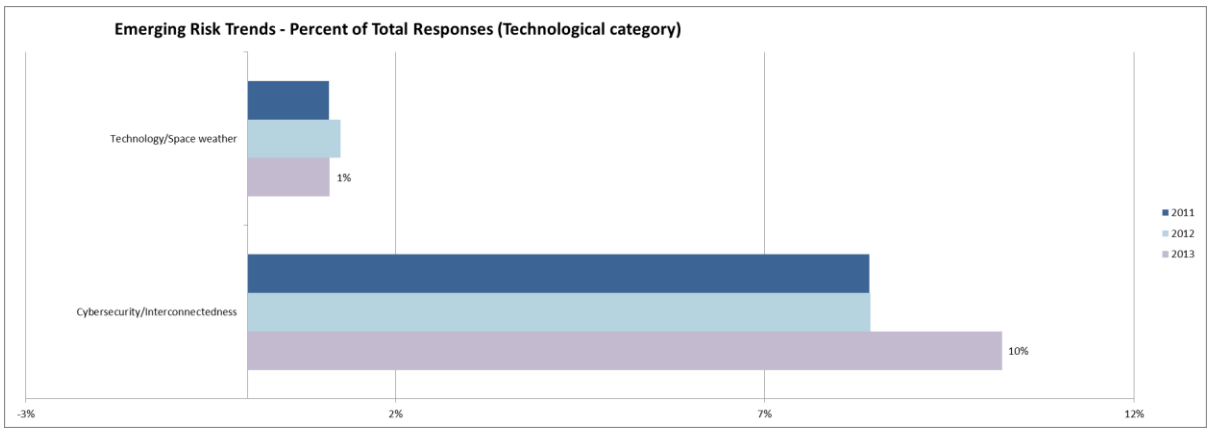
The following set of charts show historically the results by category and risk.



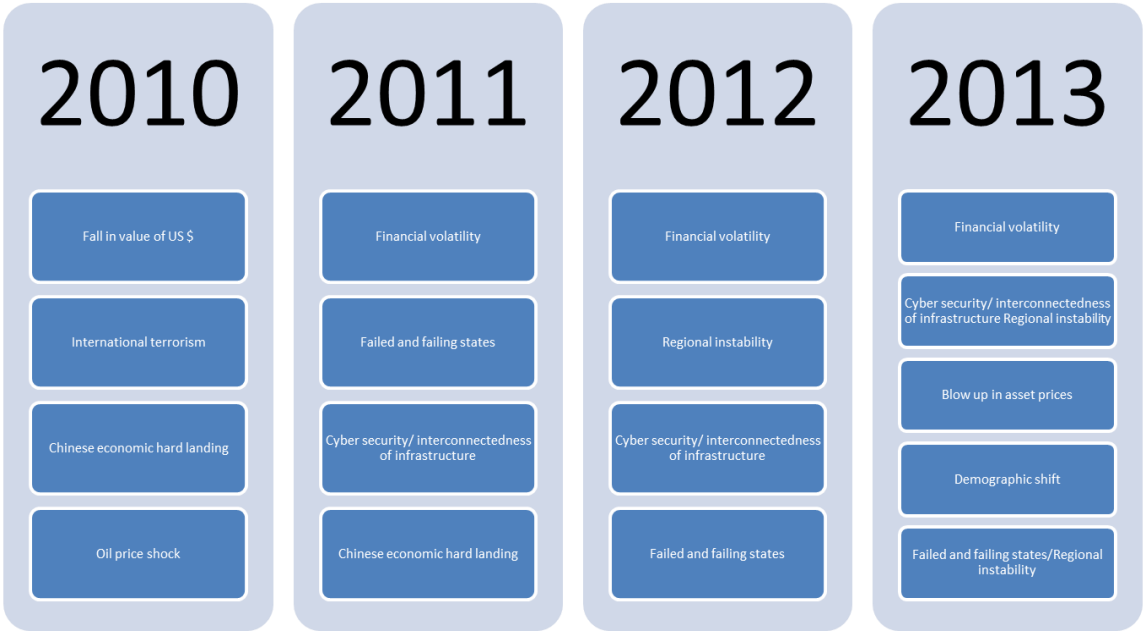








The evolution of the top four risks chosen provides evidence that trends can be relied on in this survey. The general continuity between surveys is very reassuring. The emergence of risks like *Cyber security/interconnectedness of infrastructure* shows how concerns are evolving away from the Economic category.



Oil price shock was a major surprise in this year's survey as it accelerated its downward trend. It has dropped every year in the survey, from a high of 45% to 31% in the prior survey, but this year the bottom fell out as it was named a top five emerging risk by only 7% of the respondents.

Interestingly, when asked for a single emerging risk the respondents' top choices nearly overlap the earlier result. With cyber security issues and increased regulatory burdens in Fall 2013, the top risks listed overlap with three of the risks listed when the top five are selected.

Top emerging risk October 2013 (top five named by 62% of respondents)

1. *Financial volatility (24%)*
2. *Cyber security/interconnectedness of infrastructure (14%)*
3. *Liability regimes/regulatory framework (10%)*
4. *Blow up in asset prices (8%)*
5. *Chinese economic hard landing (6%)*

Each survey has been conducted in periods with unique characteristics that drove results. The perceived risks of environmental, societal and technological risks are rising, while risk managers are moving away from a focus on economic and geopolitical risks as conditions stabilize (at least for now). The real scenario, of course, remains to play out.

Emerging Opportunities

Risk can be viewed in a number of ways. Risk managers tend to focus on volatility, downside risk, or solvency events. Initial risk management efforts focus on mitigation, and some respondents view emerging risk efforts primarily as risk avoidance. Some are evolving toward incorporating strategic risks in their analysis and look at upside

opportunities. When asked for examples, responses focused on instances where volatility and mean reversion led to opportunistic trading.

Leading Indicators

Best practice approaches to incorporate leading indicators in action plans improved this year. These efforts, sometimes labeled key performance indicators (KPI) or key risk indicators (KRI), are attempting to provide information earlier in the decision making process. A lagging indicator uses information collected after a decision is made, such as quarterly revenue or income. A leading indicator provides information earlier in the process. Examples would include instances of long lines on the first day of the Christmas shopping season reflecting retailer success or a spike in the credit default spread for a supplier reflecting vendor risk. Over half, 54%, reported formally identifying emerging risks, with 94% of those respondents stating that they have a process to measure, monitor and mitigate them.

Over half select at least some leading indicators around emerging risks, and over half of those have criteria for actionable items. Many of the indicators collected continue to be trailing in nature, although some attempt to manage rolling 4 week data trends of sales and lapses. Some have built what-if scenarios with action plans that become active when certain thresholds are met.

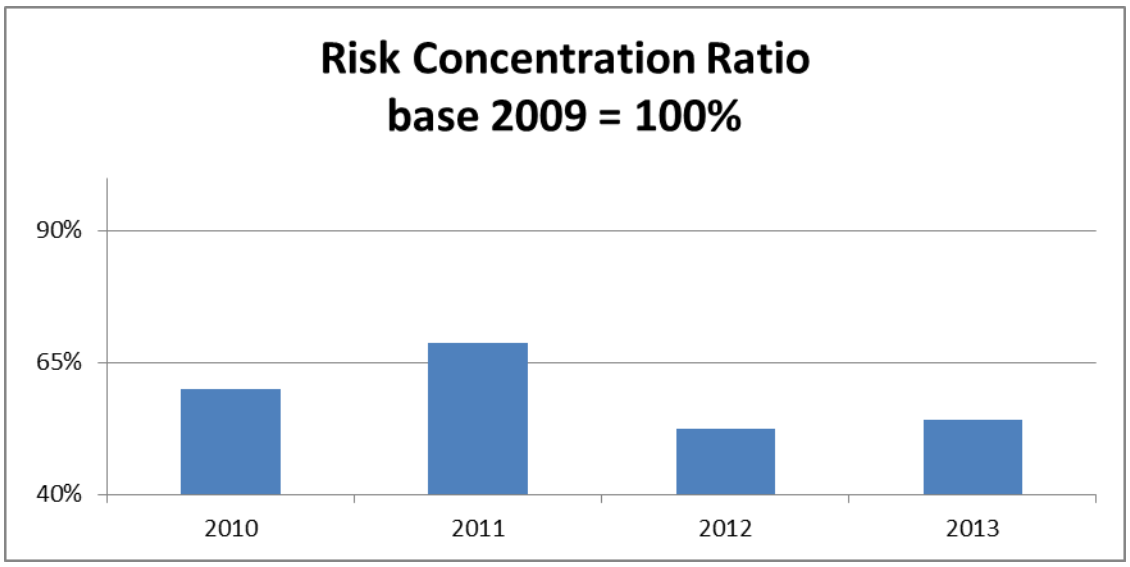
While improvements were reported in peer review, communication, transparency and sophistication, a proper blend of quantitative sophistication and qualitative analysis is necessary. Many of the responses can be represented by *eye-ball and SWAG* or by organized techniques like the *Delphi method.*

Risk Combinations

The survey again asked about concerns due to combinations of risks. Four of the top five combinations included *Financial volatility,* selected with *Blow up in asset prices (7%), Chinese economic hard landing* (4%), *Liability regimes/regulatory framework* (4% after not being rated previously), *and Fall in value of US $* (3%). The top combinations not including *Financial volatility* consisted of *International terrorism and Cyber security/interconnectedness of infrastructure* with 4%, fourth overall. Those combinations including *Oil price shock* decreased by two-thirds (from 9% to 3%), consistent with its large drops elsewhere in the survey. Two risks increased from 1% to 4% in the current survey, *Transnational crime and corruption and Liability regimes/regulatory framework.* The top three category combinations again consisted of Economic and Geopolitical risks, with Economic-Economic (24%) followed by Economic-Geopolitical (18%) and Geopolitical-Geopolitical (15%), although each decreased from prior surveys. The next highest category was Geopolitical-Technological with 9%, and also represented the largest increase (from 4%).

There are 253 possible two-risk combinations among the 23 risks. The distribution of results was the least concentrated so far, especially as results extend beyond the median, as can be seen in the accompanying chart. The period immediately following the financial crisis might be the most extreme we will see, so 2009 is used as the base year of 100%

for the Risk concentration ratio. Comparisons are made by ranking the risks and summing them, looking at the 25th percentile, median (50th percentile), 75th percentile and total. A higher number reflects greater concerns.



As a relative measure, the Risk Concentration Ratio represents the current feeling among the risk management community. They are less focused on a potential crisis this year so other results present more broadly.

Conclusions

New risks are gaining a foothold in the consciousness of risk managers. Rapidly changing regulations and cyber risk are replacing the risk of an oil price shock and other economic risks as they prioritize their efforts. Geopolitical risks decreased in importance but still remain among those risks most often considered. As risk managers think about longer time horizons and risk combinations, demographics and corruption are being considered more. The Chinese economy remains a concern, but seems to have moved to a back burner for now. The survey shows predictive qualities surrounding trends, as risks move up and down in relative importance.

Enterprise Risk Management continues to be a conflicted subject. Some best practice entities feel that their management team is making better decisions based on the information they receive from the ERM team. Others who might also claim to be among the top practitioners prefer to focus solely on the downside risk aspects of ERM. These differences are based on culture and personnel. A senior team that includes skeptics is more likely to use a risk staff to define process and consistency, while a CRO involved in strategic planning will probably bring risk tools to that table.

Risk teams continue to be asked to do more, and need to be more efficient to accomplish this goal. A risk becomes that so much is asked to complete new regulations that inexperienced and overworked staff become overwhelmed and focuses more on getting the project done than on the process of ERM. A risk team with occasional downtime will

come up with new ideas as they attend seminars and network with peers or just sit and think. A risk manager who has their nose to the grindstone might accomplish the immediate task but be woefully unprepared for longer time horizon risks that emerge over time. Those who strike a healthy balance between improving existing practices, improving transparency, and becoming a lifelong learner will better understand their risks and make better decisions.

As this report is being written in early 2014 extreme weather has impacted the U.S. and the United Kingdom has experienced torrential rains. China has been damaged by an earthquake and Australia by wildfires. The financial world is deleveraging and unwinding the central bank taper. Regional tensions are relatively tame as Russia hosts the Winter Olympics and cyber hacking has become routine. What will come next? What emerging risks will we deal with next year, 5 years from now, or 20 years from now? How will they interact with other risks and events? How can you prepare? The answers will lead to opportunities for some. Will it be you?

Background

This research project was funded by the Joint Risk Management Section of the Society of Actuaries, Canadian Institute of Actuaries, and Casualty Actuarial Society. A survey was developed and made available through an email link to members of the Joint Risk Management Section. Others were invited to participate utilizing the INARM list serve and Linked-in groups related to risk management. The North American based CRO Council was also invited to participate. A total of 219 responses were received. This represents greater than 5% of completed surveys relative to the number distributed (over 2,500 to JRMS) and represents an increase over previous research. This is the sixth survey completed. Many questions are starting to generate sustained trends that suggest conclusions. The previous surveys were distributed in April 2008, November 2008, December 2009, November 2010 and October 2011. This year's survey was conducted in October 2012. For background purposes, articles and previous research reports can be found at:

All surveys and articles
http://www.soa.org/Research/Research-Projects/Risk-Management/research-emerging-risks-survey-reports.aspx

April 2008

- Article: pages 18-21 of the International News August 2008 issue http://soa.org/library/newsletters/international-section-news/2008/august/isn-2008-iss45.pdf
- Article (reprint): pages 17-20 of the Joint Risk Management Section March 2009 newsletter http://soa.org/library/newsletters/risk-management-newsletter/2009/march/jrm-2009-iss15.pdf

November 2008

- Research report http://www.soa.org/research/research-projects/risk-management/research-2009-emerging-risks-survey.aspx

December 2009

- Research report http://www.soa.org/research/research-projects/risk-management/research-2009-emerg-risks-survey.aspx
- Article pages 12-14 Aug/Sep 2010 The Actuary http://www.soa.org/library/newsletters/the-actuary-magazine/2010/august/act-2010-vol7-iss4.pdf

November 2010

- Research report http://www.soa.org/research/research-projects/risk-management/research-2010-emerging-risks-survey.aspx
- Article http://www.soa.org/library/newsletters/risk-management-newsletter/2011/august/jrm-2011-iss22-rudolph.pdf

November 2011

- Research report http://www.soa.org/research/research-projects/risk-management/research-2011-emerging-risks-survey.aspx

November 2012

- Research report http://www.soa.org/research/research-projects/risk-management/research-2012-emerging-risks-survey.aspx
- Article http://www.soa.org/Library/Newsletters/Risk-Management-Newsletter/2013/december/jrm-2013-iss28.pdf

Rather than developing a unique set of emerging risks to consider, one originally developed by the World Economic Forum (WEF) was chosen for the initial survey. The World Economic Forum reports, starting in 2007, can be found at www.weforum.org . The 23 risks utilized in this survey are described in detail in Appendix I. They differ slightly from some previous years as Infectious disease was combined with Pandemics, and Financial volatility was added. Demographics was moved from the Economics category to Societal to better reflect its impact. There were no changes in the current year. Each risk has been categorized as either Economic (5 risks), Environmental (5), Geopolitical (7), Societal (4) or Technological (2). The current survey continues its evolution, adding and subtracting a few questions while leaving the core of the survey intact. Responses to open ended questions are edited only for obvious spelling corrections.

Research reports do not create themselves in isolation, and the researcher thanks Dave Ingram, Barbara Scott and Steve Siegel 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.

Researcher

The researcher for this project is Max J. Rudolph, FSA CFA CERA MAAA. Additional related articles and presentations can be found at his web site. His contact information is

Max J. Rudolph, FSA CFA CERA MAAA
5002 S. 237th Circle
Elkhorn, NE 68022
(402) 895-0829
Max.rudolph@rudolph-financial.com
www.rudolph-financial.com
twitter @maxrudolph

Results

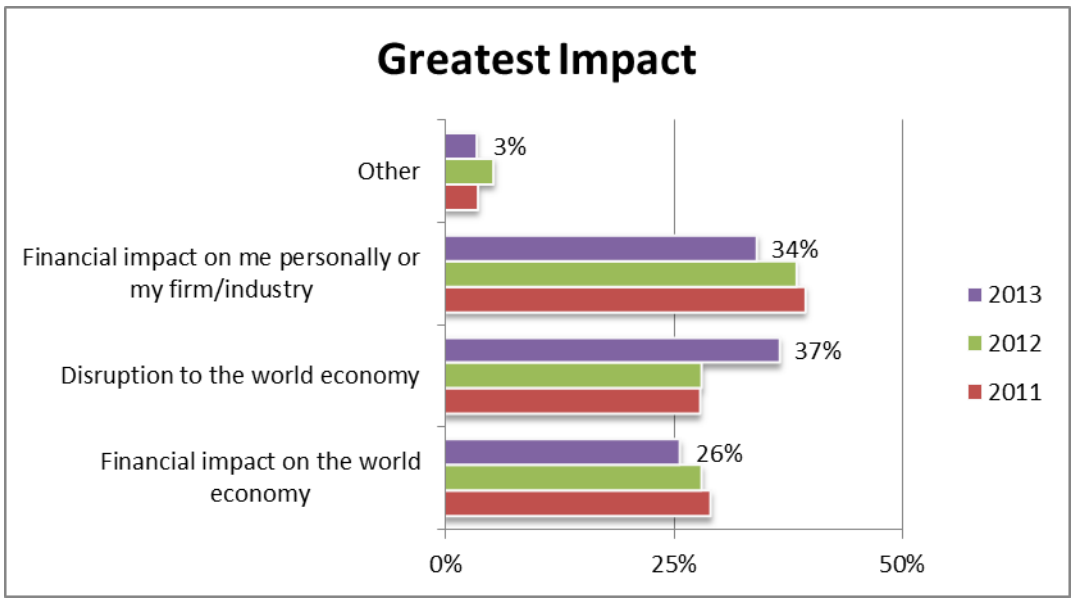
The seventh survey of Emerging Risks, sponsored by the Joint Risk Management Section, covers Current Risks, Emerging Risks, Leading Indicators, Methodology, Predictions, Current Topics, and Demographics. Highlights of each section are presented here while complete results can be found in Appendix II. A total of 223 anonymous surveys were completed (electronically). Some respondents did not answer all the questions, but partially completed surveys have been included with percentages adjusted for the number completing each question. Answers of Not Sure and Not Applicable were generally (but not always) excluded from percentages. In addition, many questions allowed or sought out comments and examples. As always, this was the most thought provoking part of the survey.

Introductory Questions

While previous emerging risk surveys found that recent events have an anchoring effect on responses, this year's survey was not as supportive of this concept. Anchoring was first described by Daniel Kahneman and Amos Tversky as part of their prospect theory work, and Kahneman was awarded the 2002 Nobel Prize in Economics. A recent event, real or random, anchors the respondent's thoughts and makes similar events seem more likely in the future. For example, the 2008 survey results had a high concentration within the Economic risk category that seemed to scale back as time passed from the financial crisis. The Mumbai terrorist attack in November 2008 provides a striking example. It occurred toward the end of the survey's open period and impacted the remaining surveys. A much higher percentage chose International Terrorism as a primary emerging risk after the event. Oil prices have been another leading indicator, and in 2011 the Arab Spring events seem to have impacted the results. Risk managers who keep this bias in mind are better able to overcome it through awareness. A major benefit of an annual survey is the ability to look at averages and trends across multiple years. The survey continues to reach out to risk managers with open ended questions about how emerging risks are being managed. The researcher thanks those who filled out the survey, and especially those who contributed to the open ended questions. As with any research project, the researcher ends up learning quite a bit from the respondents.

Respondents have varying definitions of emerging risk. The answer most commonly reported in the survey this year relates to disruption (37%) to the world economy, with financial impact on me personally or my firm/industry (34%) and financial impact (26%) on the world economy receiving material support. This was a change from prior years as Financial impact on me personally or my firm/industry has previously been the top choice.

- 26% (28%/29% in 2012/11 survey) Financial impact on the world economy
- 37% (28%/28%) Disruption to the world economy
- 34% (38%/39%) Financial impact on me personally or my firm/ industry
- 3% (5%/4%) Other



Each year a benchmarking question is asked about the top current risk. When the respondent answers this question they are reminded of the anchoring affect identified in prior surveys. In the field of behavioral finance it is thought that recognizing our shortcomings will help us to overcome them.

Definitions of the 23 risks are provided in Appendix I but they are also listed here for convenience.

Economic Risks

- Oil price shock
- Fall in value of US dollar
- Chinese economic hard landing
- Blow up in asset prices
- Financial volatility

Environmental Risks

- Climate change
- Loss of freshwater services
- Natural Catastrophe: Tropical Storms
- Natural Catastrophe: Earthquakes
- Natural Catastrophe: Severe Weather (except Tropical Storms)

Geopolitical Risks

- International Terrorism
- Proliferation of Weapons of Mass Destruction
- Interstate and civil wars
- Failed and failing states
- Trans-national crime and corruption

- Retrenchment from globalization
- Regional instability

Societal Risks
- Pandemics/Infectious disease
- Chronic diseases
- Demographic shift
- Liability regimes/regulatory framework

Technological Risks
- Cyber security/Interconnectedness of infrastructure
- Technology/Space weather

The 23 emerging risks used in this iteration of the survey were reviewed and two were defined more clearly. *Natural Catastrophe: Inland Flooding* was changed to *Natural Catastrophe: Severe Weather (except Tropical Storms)* to make clearer that convection storms, droughts, wildfires and other such events were covered by this risk. *Liability regimes* risk was renamed to *Liability Regimes and regulatory framework*, a clarification as respondents showed concern for rapidly changing rules in past surveys. The risks were originally developed for the 2007 World Economic Forum (WEF) report on Emerging Risks. Since then the WEF has evolved its list in ways that are more consistent with a shorter time horizon than used here. All changes to risk classifications have been documented in Appendix I.

The categories of risks chosen as those having the current greatest impact were

- Economic 50% (50% in 2012)
- Environmental 9% (7%)
- Geopolitical 17% (25%)
- Societal 11% (5%)
- Technological 8% (5%)
- Other 6% (7%)

The Economic category continued as the top choice, receiving half of the support as *Financial volatility* risk once again dominated the other choices. Societal (11%), Technological (8%) and Environmental (9%) risks saw increases, while Geopolitical (17%) dropped off.

Many of the "other" responses could have been mapped to the existing risk options, dealing with volatility, regional instability and climate change. All but one of the risks (*Chronic diseases*) was chosen by at least one survey respondent.

The top choices were

- *27% Financial volatility*
- *12% Blow up in asset prices*
- *8% Cyber security/Interconnectedness of infrastructure*
- *6% Fall in value of US$*
- *5% Liability regimes/regulatory framework*

Of the Economic risks, only *Oil price shock and Chinese economic hard landing* fell outside the top 5. A major result of the survey is the reduction in concern about *Oil price shock*, both for current and longer time horizons. This could be due to increasing supply due to hydraulic fracturing (fracking) or potentially reduced tensions in the Middle East led by a negotiating Iranian government.

Only two categories increased materially (over 5% or doubled) from the prior survey.

- *Demographic shift (from 3% to 1%)*
- *Liability regimes/regulatory framework (from 1% to 5%)*

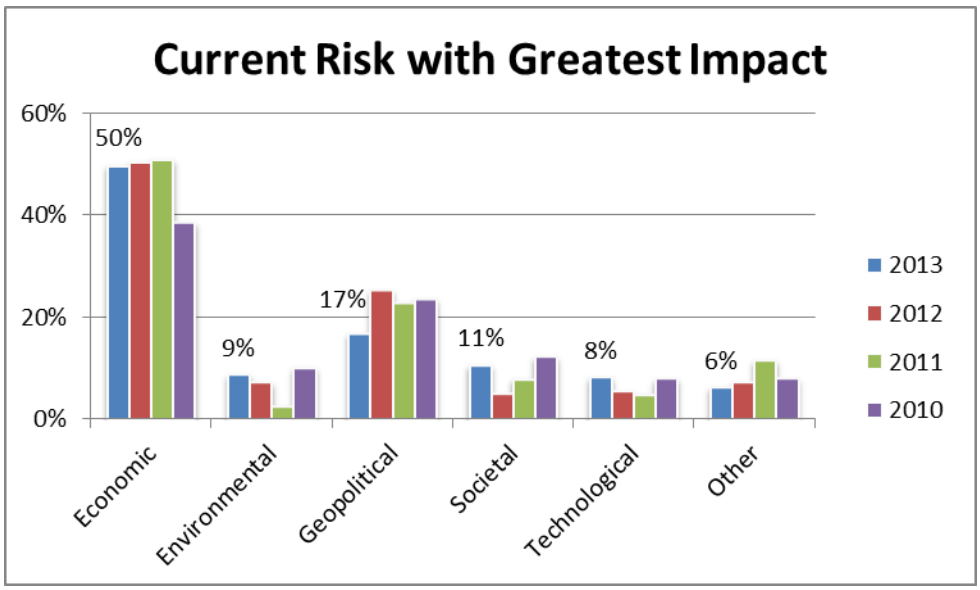
The categories that decreased materially (over 5% or reduced by half)

- *Oil price shock (from 5% to 1%)*
- *Proliferation of weapons of mass destruction (from 3% to 1%)*
- *Regional instability (from 7% to 3%)*

Demographic shift is an interesting category to make a major move as a current risk as demographic trends tend to appear over many years. It regained ground lost in the prior survey and returns to levels seen in 2011. *Proliferations of weapons of mass destruction* also reverted to 2011 levels after spiking last year.

The Geopolitical category results are very interesting again this year. It seems to be more volatile than the other categories. None remain in the top five current risks. *Regional instability* (down from 7% to 3%), *Failed and failing states* (down from 8% to 4%), and *Proliferation of weapons of mass destruction (WMD)* (down from 3% to 1%) all fell materially (5% or by 50%). This category especially seems to be anchored by current events, and in late 2013 the news was mild.

The Societal category also saw an overall increase from 5% to 11%, led by Liability regimes/regulatory framework (up 4%) and Demographic shift (up from 1% to 3%). Technological category Cyber security/Interconnectedness of infrastructure was the other big mover, up 3% and now ranked 5th overall.



Section 1: Emerging Risks

Top 5: Societal increases but Economic category leads

After asking which risk has the current greatest impact, 196 survey respondents chose up to five emerging risks that "you feel will have the greatest impact over the next few years." The World Economic Forum had a time horizon of 10 years in mind when it developed their 23 risks, but that is not required here. The data is also compared across surveys, and considers current events as part of the analysis. At the time of the first survey, in May 2008, the market was showing signs of weakness, but the real concern was the price of oil. By late 2008 the stock markets had fallen precipitously and the price of oil had dropped from record highs. This was the height of the global financial crisis. In December 2009 the global financial crisis and systemic risk were beyond the worst point, but unemployment was high. The Copenhagen climate conference had just been held and earlier in the year dealt with the H1N1 mild pandemic. The large deficits incurred by fiscal stimulus packages were front and center on risk manager's minds. In late 2010 political tensions on the Korean peninsula and the European debt crisis were hot topics. 2011 was a busy year, with events including the Japanese tsunami and nuclear disaster, the Arab Spring, and the evolving European debt crisis. The 2012 survey continued to move further away from the financial crisis, but tensions in the Middle East (Syria, Iran) were front and center. During the current cycle, Hurricanes Sandy and Haiyan led a torrent of natural disasters around the world. Economies are getting back on track while many leading indicators regarding debt levels remain elevated. There is never a dull moment, and a crisis is really not that unusual.

Not all respondents chose to list five risks. While 69% shared the maximum five risks, the average was 4.53, down from 4.71 a year earlier. Percentages in this survey are based on the number of respondents who answered the specific survey question. This allows consistent comparison with previous and subsequent survey iterations. For example, 196 respondents answered Question 1 and 59 included *Blow up in asset prices* as one of their

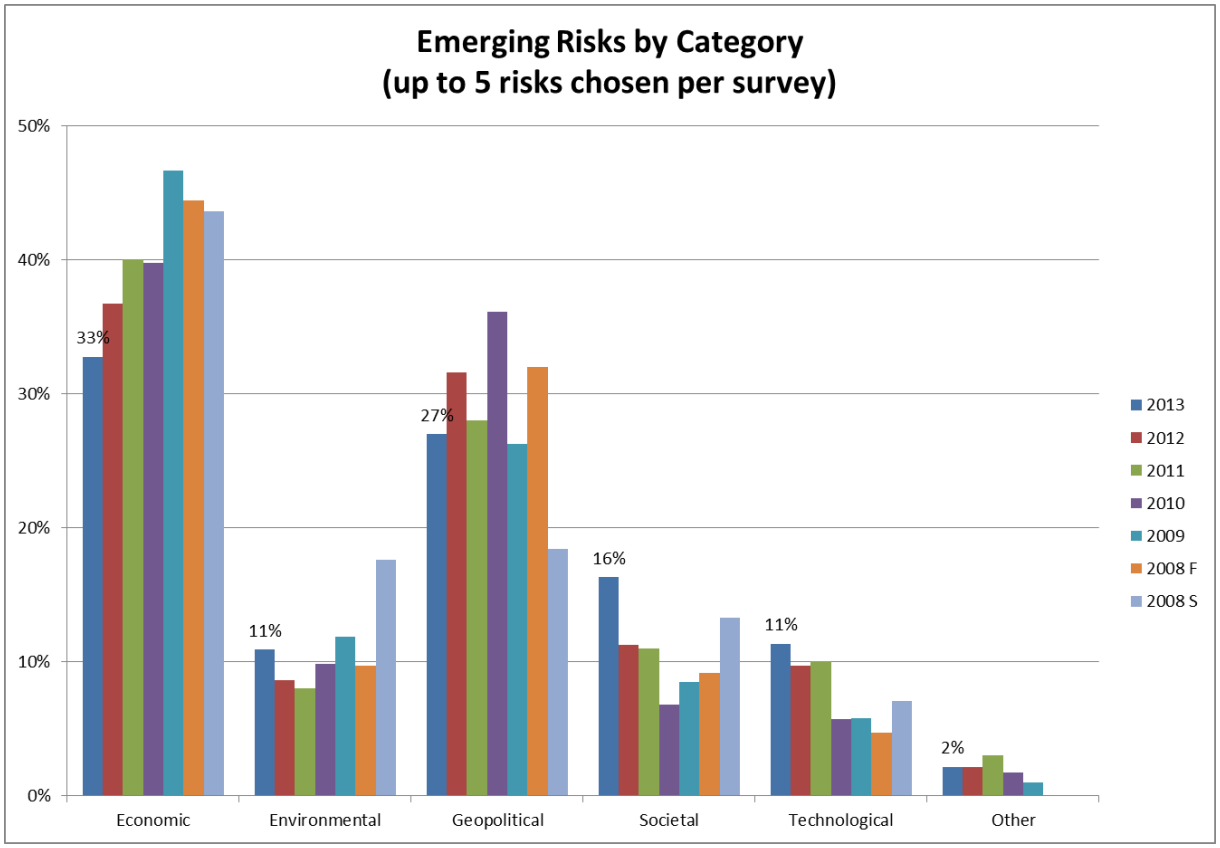
(up to 5) responses. Thus 30% (59/196 = 0.30) chose this emerging risk. These percentages will be higher than those that are based on all of the responses rather than the number of respondents.

Given the current economic stresses worldwide and the group being surveyed (risk managers), it is not surprising that the Economic category again received the most responses, followed again this year by Geopolitical. The other categories trailed.

A total of 901 responses were received, including 16 (2%) in the Other category. The results distributed by category (using percentages of total responses) are:

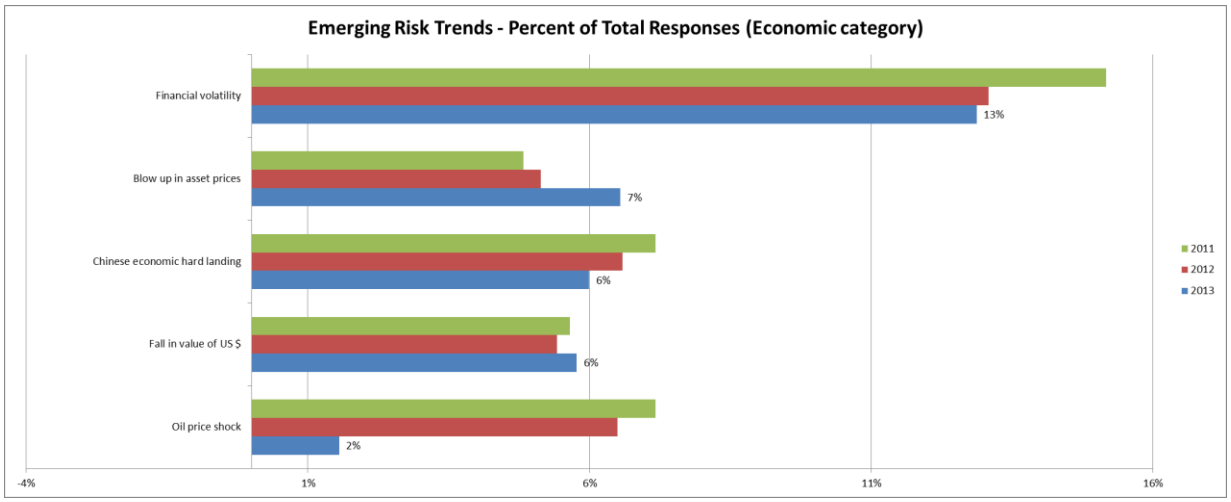
1. Economic 33% (37%/40%/40%/47%/44%/44% in past surveys with most recent listed first)
2. Geopolitical 27% (32%/28%/36%/26%/32%/18%)
3. Societal 16% (11%/11%/7%/8%/9%/13%)
4. Technological 11% (10%/10%/6%/6%/5%/7%)
5. Environmental 11% (9%/8%/10%/12%/10%/18%)

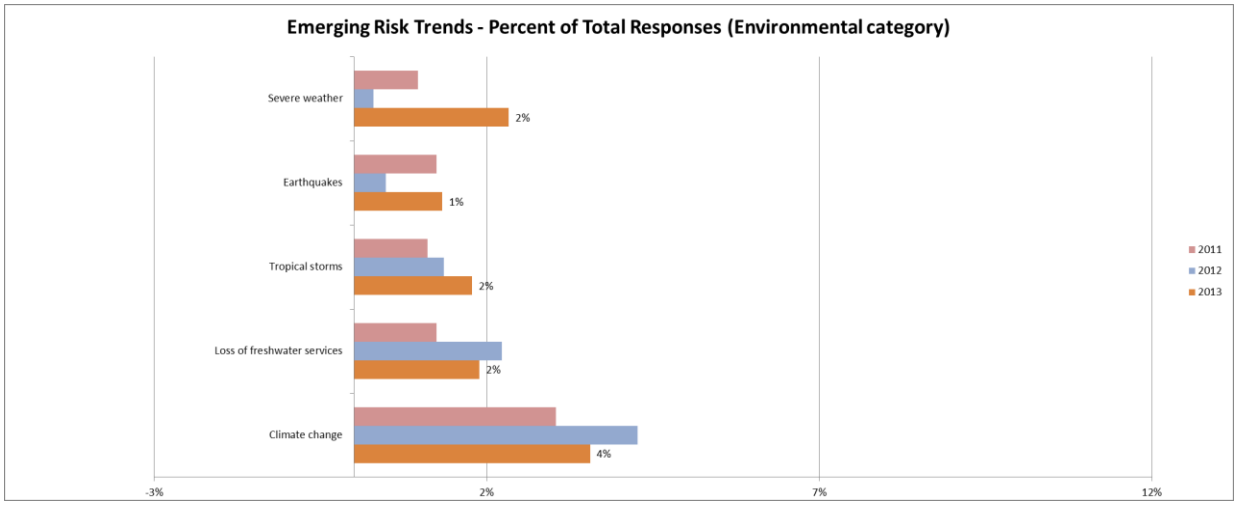
As we move further away from the financial crisis the Economic category continues to trend down from its highs in 2009. The Societal and Technological recorded new highs. Geopolitical saw a 5% reduction and Environmental rose 2% for its highest response rate since 2009.

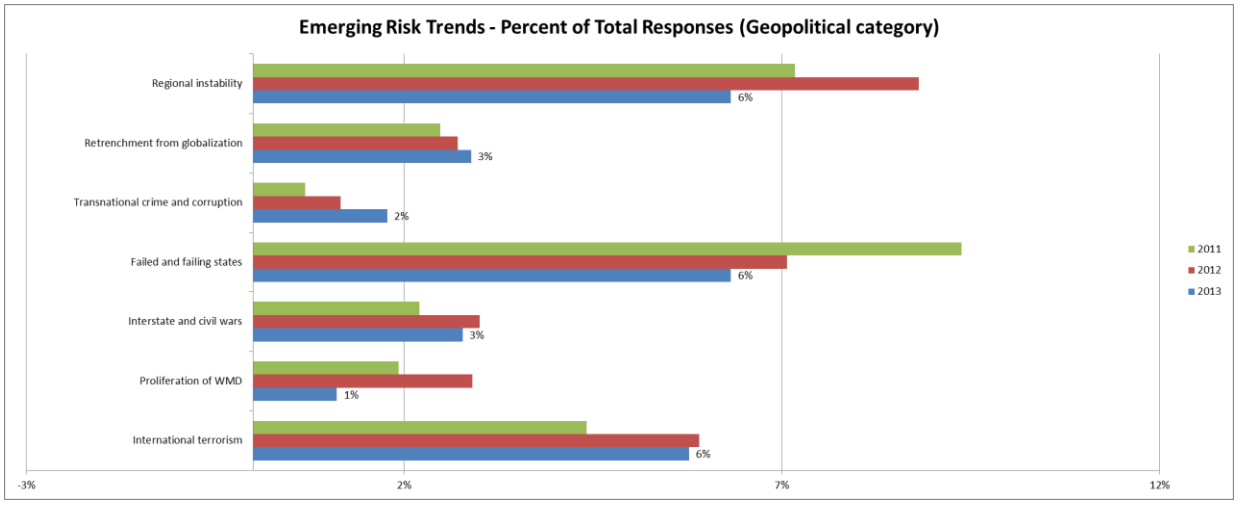


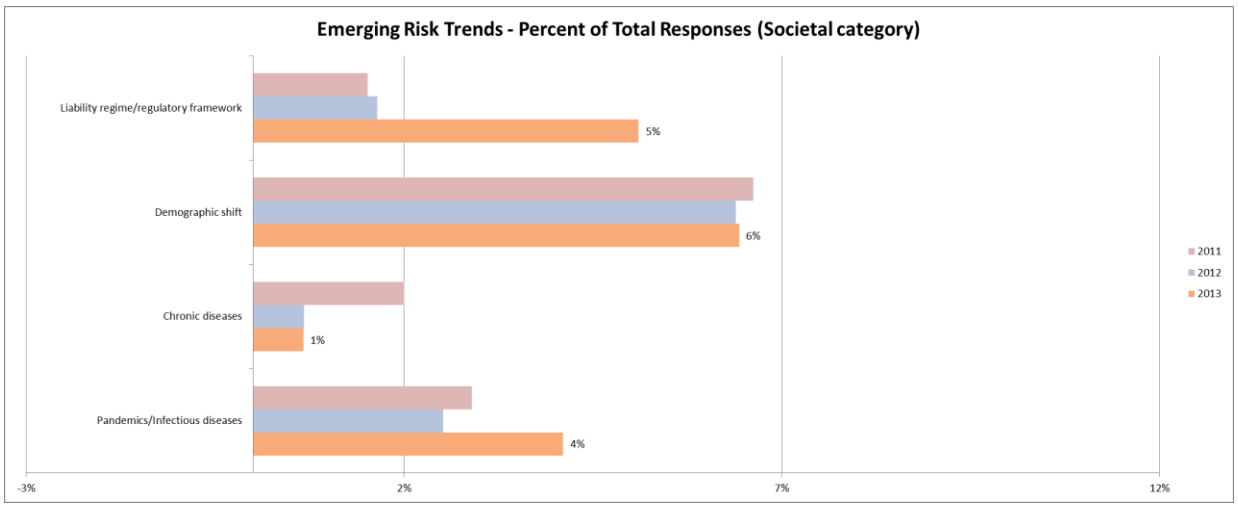
There were material increases in most of the major categories. In the Economic group *Blow up in asset prices* increased from 24% to 30% to rank third overall. Both *Natural catastrophe: Earthquakes* (from 2% to 6%) and *Natural catastrophe: Severe Weather* (from 1% to a high of 11%) contributed to the overall Environmental increase. The Societal category also had two risks that increased materially, with *Pandemics/infectious diseases* rising from 12% to 19% and *Liability regimes/regulatory framework* increasing from 8% to a record high 23%. In the Technological category, *Cyber security/interconnectedness of infrastructure* increased from 40% to a record 47% for second place overall. Three risks materially decreased from the prior survey, with large drops reported by *Oil price shock* (31%, the previous record low, to 7%), *Proliferation of weapons of mass destruction (WMD)* (from 14% to a record low 5%), and *Regional instability* (down from a record high of 42% last year to 29%).

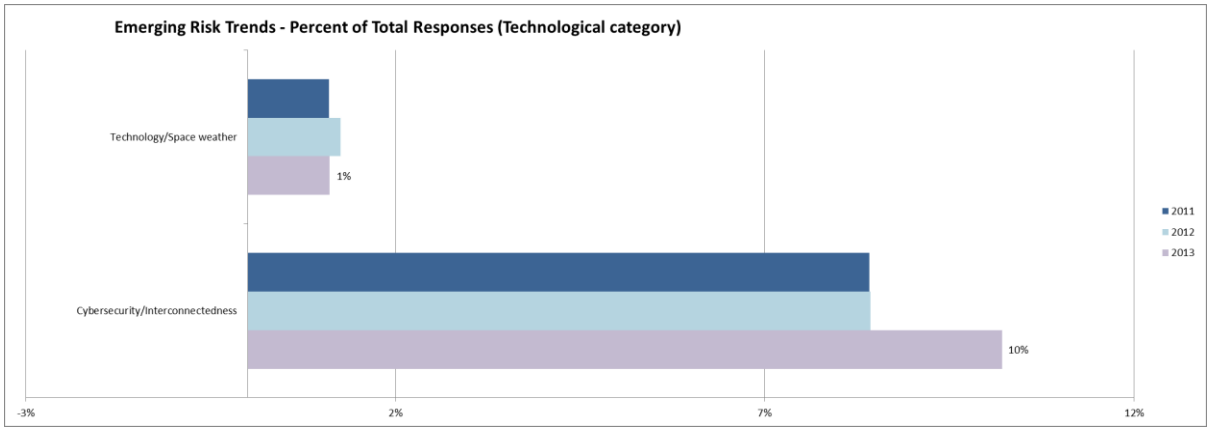
The chart shows that Economic and Geopolitical risks remain the highest, although both had lower results this year and the other three categories cut into their lead. Within the Economic category, *Financial volatility* risk remained the top choice overall and Blow up in asset prices was third. The other category with two of the top five emerging risks in 2013 was Geopolitical, with *Regional instability* and *Failed and failing states* in a tie for #5. Societal, Technological and Environmental risks all increased their totals. Increasing trends (at least 2 consecutive years) include *Fall in value of US $, Blow up in asset prices, Natural catastrophe: Tropical storms (3 years), Transnational crime and corruption, Liability regimes/regulatory framework (3 years), and Cyber security/interconnectedness of infrastructure (4 years).* Decreasing trends included *Oil price shock (4 years), Chinese economic hard landing (3 years), Financial volatility, and Failed and failing states.* Some categories rebounded materially after falling in the previous survey. These included *Natural catastrophe: Earthquakes and Natural catastrophe: Severe weather.* Dropping after a strong increase in the last survey were *Climate change, Loss of freshwater services, Proliferation of weapons of mass destruction (WMD), and Regional instability.* The long lasting repercussions of the earthquake/tsunami in Japan and strong tornadic season in 2013 may have impacted the results.











The top five specific responses to Question 1, *What are the emerging risks that you feel will have the greatest impact over the next few years?* were spread across the Economic, Geopolitical, Societal and Technological categories. Multiple responses, up to 5, were encouraged. The percentages shown here use the number of respondents in the divisor, so 62% shows how many included that risk as one of the five chosen.

1. 59% (62% in 2012) *Financial volatility*
2. 47% (40%) *Cyber security/interconnectedness of infrastructure*
3. 30% (24%) *Blow up in asset prices*
4. 30% (30%) *Demographic shift*
5. 29% (42%) *Regional instability*
5. 29% (33%) *Failed and failing states*

What follows are the overall results.

Economic – 33% (previous survey 37%)

• 7% (31%) Oil price shock
• 27% (26%) Fall in value of US $
• 28% (31%) Chinese economic hard landing
• 30% (24%) 3 Blow up in asset prices
• 59% (62%) 1 Financial volatility

Environmental – 11% (9%)

• 16% (20%) Climate change
• 9% (11%) Loss of freshwater services
• 8% (6%) Natural catastrophe: Tropical storms
• 6% (2%) Natural catastrophe: Earthquakes
• 11% (1%) Natural catastrophe: Severe Weather

Geopolitical – 27% (32%)

• 27% (28%) International terrorism
• 5% (14%) Proliferation of weapons of mass destruction (WMD)
• 13% (14%) Interstate and civil wars
• 29% (33%) 5 Failed and failing states
• 8% (5%) Transnational crime and corruption
• 13% (13%) Retrenchment from globalization

• 29% (42%) 5 Regional instability

Societal – 16% (11%)

• 19% (12%) Pandemics/Infectious diseases
• 3% (3%) Chronic diseases
• 30% (30%) 4 Demographic shift
• 23% (8%) Liability regimes/regulatory framework

Technological – 11% (10%)

• 47% (40%) 2 Cyber security/interconnectedness of infrastructure
• 5% (6%) Technology/space weather

Other – 2% (2%)

One of the most interesting results of this year's survey relative to previous years is the continued falloff of anything associated with global warming. Both Climate change and Loss of freshwater services were down this year after increasing in the prior survey, although the Environmental category increased in total.

The *Cyber security/interconnectedness of infrastructure* (40% to 47%) response continues its march upwards, and moves into a solid second place overall.

Interestingly, despite low support in the current risk category, *Pandemics/infectious diseases* spiked from 12% to 19%. *Liability regimes/regulatory framework* also spiked from 8% to 23% as a clarified definition aligned with a steady change in regulations across the financial sector.

Most of the Other responses to Question 1 in this Section referenced in some way the public debt crisis, either specifically mentioning public debt or political instability in developed countries. Most, if not all, of the risks listed were subsets of the risks offered as choices.

One method to analyze this data over time is to highlight those risks reported in the current survey above their long-term averages. For this purpose the data were analyzed with responses as a percentage of all responses, rather than as a percentage of surveys collected. Of the five primary categories, two were higher than their average over the seven survey cycles. Societal (16% vs. 11% average) and Technological (11% vs. 8% average) both satisfied this criterion, while Economic at 33% was below its 41% average. Among individual risks, five of the 23 beat their average. The greatest differential was 4% for *Cyber security/interconnectedness of infrastructure.* Seven are trending below the average, led by a 6% below average result for *Oil price shock.* For the second consecutive year, four of the five risks are below their long-term average for the Economic category, while the Environmental category has two out of five above their longer term average.

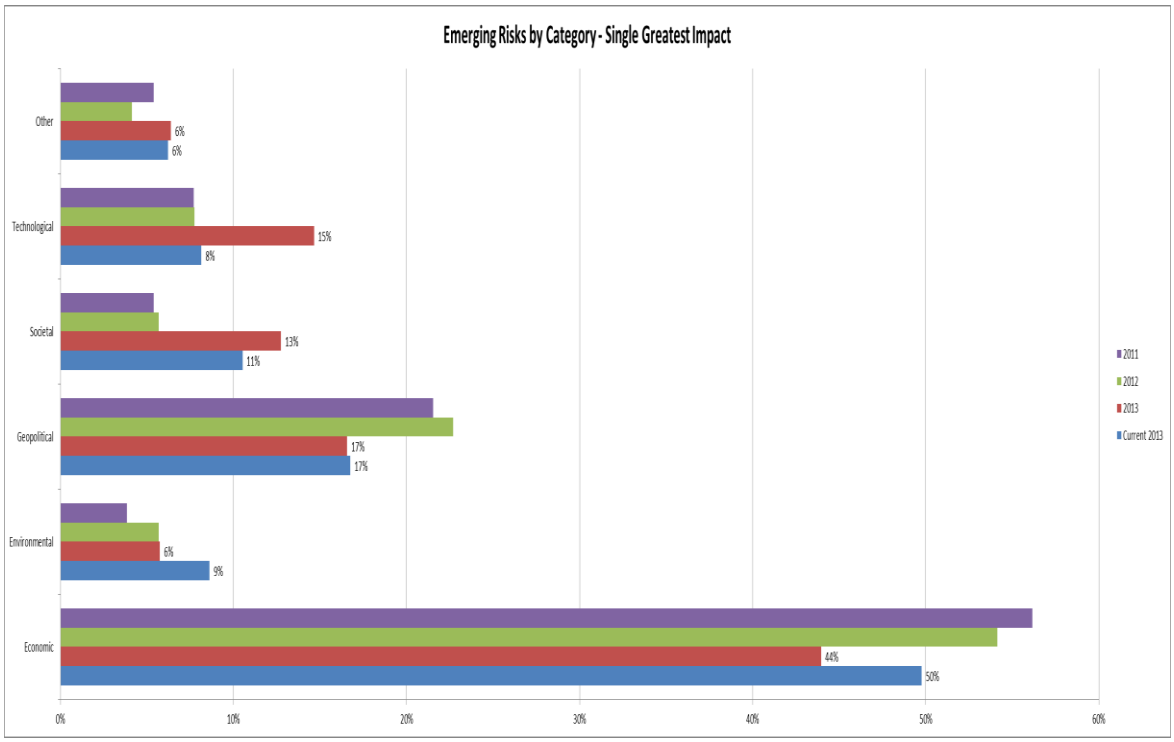
Top Emerging Risk: *Financial volatility*

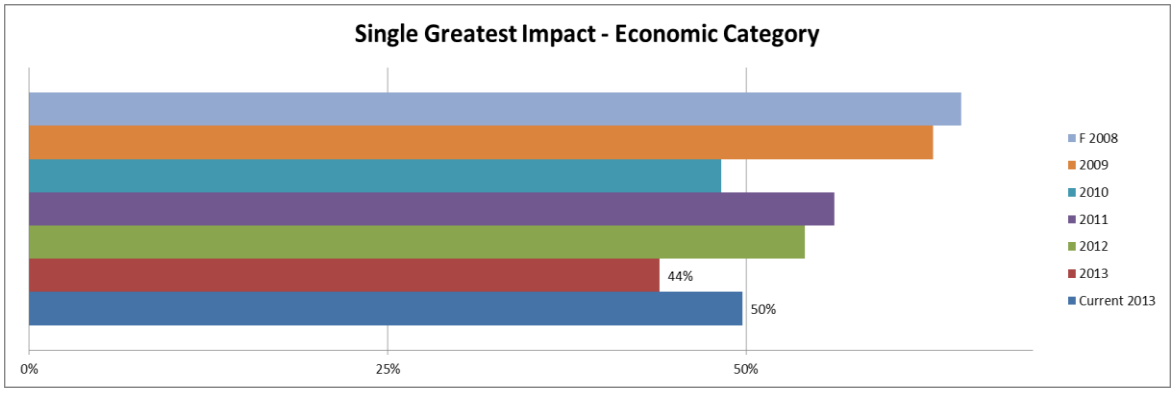
In Question 2, respondents were asked to state what one emerging risk they expected to have the greatest impact. Not surprisingly, the Economic category continues to dominate this question with nearly half the responses, with an increasingly tight battle for the

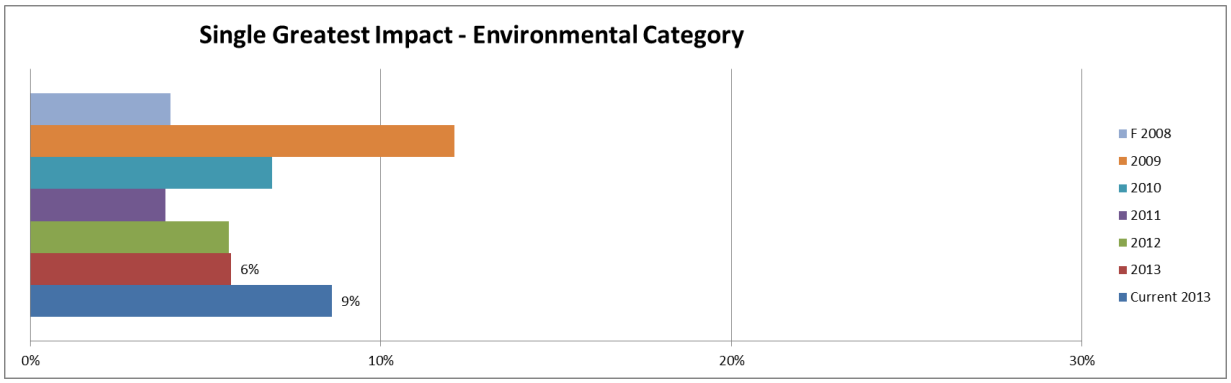
second spot. Geopolitical risks held on this year, but Technological and Societal both gained ground. The Environmental category held steady in response rate but fell behind the others.

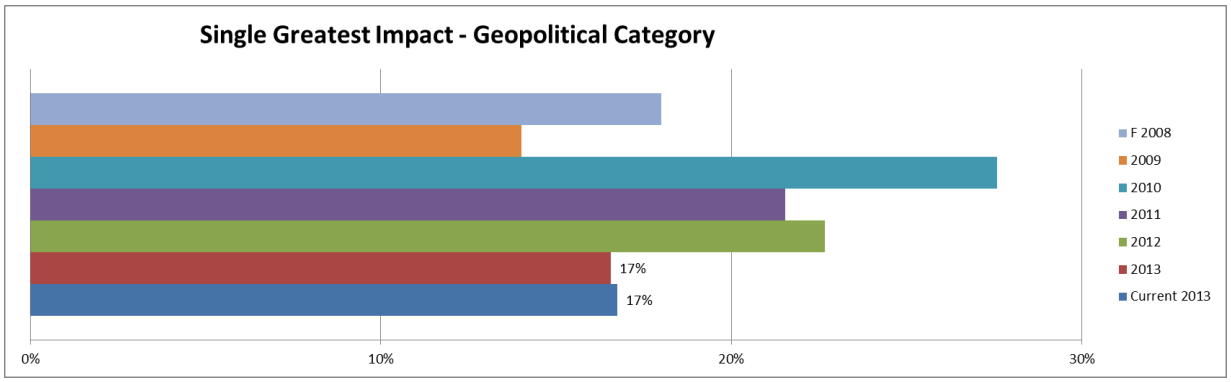
1. 44% (54%) Economic
2. 17% (23%) Geopolitical
3. 15% (8%) Technological
4. 13% (6%) Societal
5. 6% (6%) Environmental

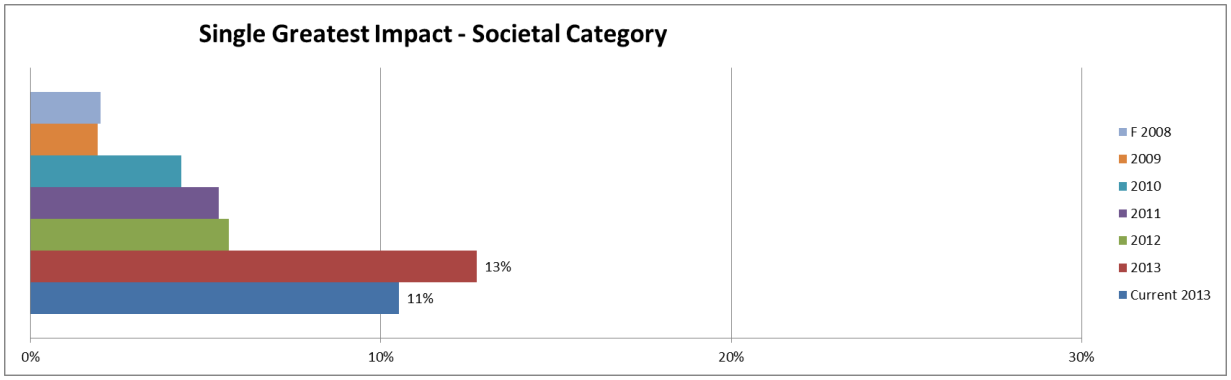
In the accompanying charts, the current risk with greatest impact has been included with the emerging risk choices from the past three years for the major categories and for all years when each category is listed separately. The results do not seem to be following past patterns of the current risk preferences pulling up/down the emerging risk results.

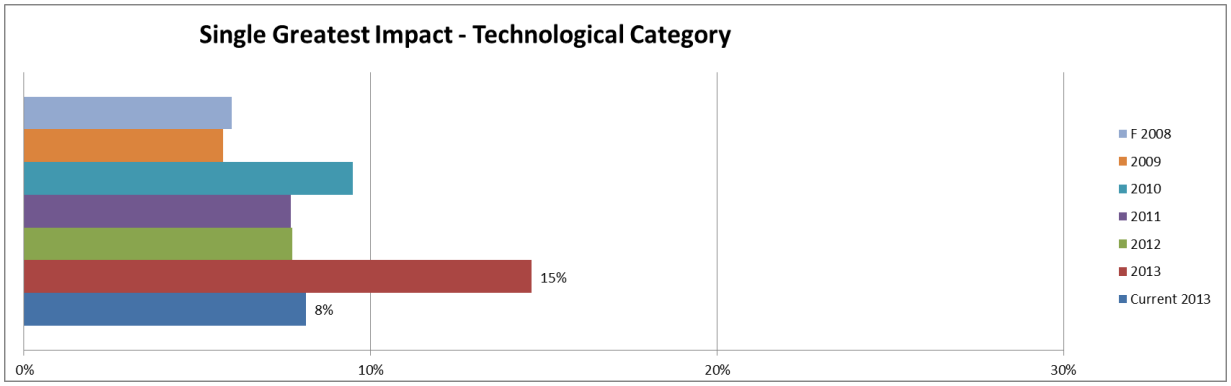












The Economic category had three of the top five specific responses, along with *Cyber security/interconnectedness of infrastructure* in second and *Liability regimes/regulatory framework* in third. Results were similarly concentrated to last year's survey, with 38% explained by the top two responses and 62% by the top 5. Respondents seem more worried about less financially oriented risks than they were last year. While there is still great risk uncertainty, the broader results seem to signal that risk managers are becoming more concerned about technological and societal risks. The major risk increases fell to three risks, *International terrorism* (1% to 4%), *Liability regimes/regulatory framework* (2% to 10%), and *Cyber security/interconnectedness of infrastructure* (7% to 14%). The only material drop was *Oil price shock*, falling from 5% to 1%. The drop in this risk is consistent throughout the report.

1.	24% (28% in 2012)	*Financial volatility*
2.	14% (7%)	*Cyber security/interconnectedness of infrastructure*
3.	10% (2%)	*Liability regimes/regulatory framework*
4.	8% (9%)	*Blow up in asset prices*
5.	6% (5%)	*Chinese economic hard landing*

Dropping out of the top five were *Failed and failing states and Regional instability,* both from the Geopolitical category.

Risk Combinations

As we saw in the period leading up to the financial crisis, and ongoing regional tensions throughout the world, interactions between risks lead to unintended consequences. Examples might be interactions between the sovereign debt crisis in Europe and a natural disaster stressing freshwater availability, driving the world into recession or conflict.

Combinations of emerging risks interact in ways that are often not fully understood. Risk combinations can happen simultaneously or sequentially. For example, the Geopolitical risk *Loss of freshwater services* could lead to *Interstate and civil wars*. Concurrent emerging risks could exacerbate a scenario. In 2011 the Japanese earthquake and tsunami led to supply chain stress scenarios that had not previously been considered.

In Question 3 of Section 1, risk combinations are considered. These results can be looked at from several perspectives. Each respondent could choose up to three combinations of two risks. Respondents were asked to list their top combination first for a follow-up question. Appendix II includes a grid showing all combinations.

Even though the question is about combinations of risks, it is helpful to look first at the risks in isolation. Consistent with earlier questions, Economic (40%) and Geopolitical (32%) are the most frequent response categories when identified in isolation. There was movement toward the Environmental, Technological and Societal categories.

1. 40% (46%) Economic
2. 32% (32%) Geopolitical
3. 11% (9%) Environmental
4. 9% (7%) Societal
5. 9% (5%) Technological

Individual risks were led by the same major categories. *Financial volatility* as the top response was included 16% of the time. Dropping out of the top five were *Oil price shock, Chinese economic hard landing and Regional instability.*

1. 16% (15% in 2012) *Financial volatility*
2. 8% (6%) *Fall in value of US $*
3. 7% (5%) *Cyber security/interconnectedness of infrastructure*
4. 7% (8%) *Blow up in asset prices*
5. 6% (6%) *International terrorism*

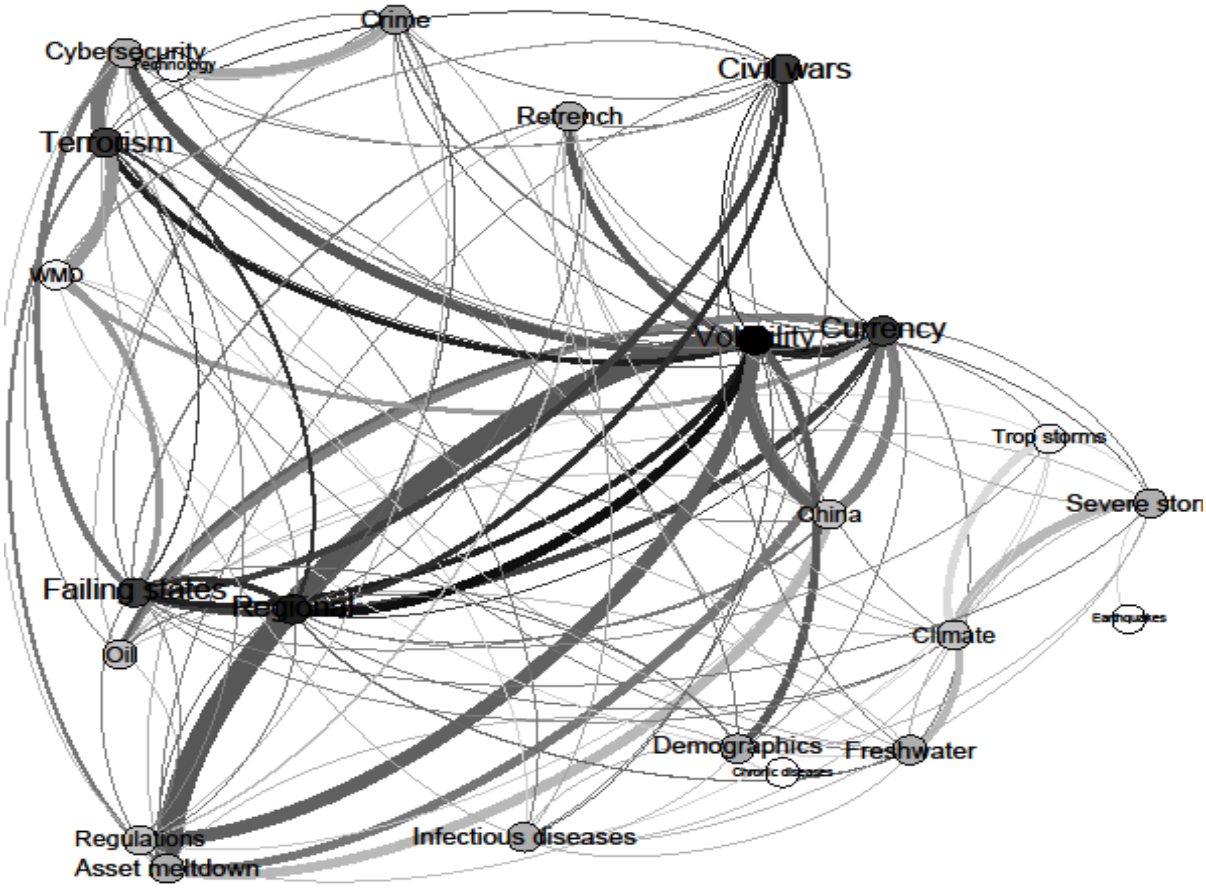
While *Financial volatility* continues to dominate the combination category as it does when considering individual risks, several other risks had material increases. *Natural catastrophes: Severe weather, Transnational crime and corruption, and Liability regimes/regulatory framework* each at least doubled. *Oil price shock* was the only risk that dropped by a lot, with a 6% decrease from a number two ranking to 3%. The top risk combinations chosen continue to show a broad dispersion, so a risk like *Chinese economic hard landing* that dropped from 7% to 6% is no longer ranked in the top five but continues to show strength. *Financial volatility* is one of the risks chosen in four out of the top five combinations. In order, its five companion risks are *Blow up in asset prices, Chinese economic hard landing, Liability regimes and regulatory framework.* The top two combinations not to include *Financial volatility* were *International terrorism/Cyber security /interconnectedness of infrastructure* in a tie for 2nd and *International terrorism and Proliferation of weapons of mass destruction (WMD)* (tie for 5th). Interestingly, the top 2012 combination of *Oil price shock and Financial volatility* was not highly ranked this year.

The major category combinations were

- 24% (29%) Economic – Economic
- 18% (21%) Economic – Geopolitical
- 15% (18%) Geopolitical – Geopolitical
- 9% (4%) Geopolitical – Technological
- 7% (6%) Economic – Societal
- 7% (6%) Environmental – Environmental
- 4% (2%) Geopolitical – Societal
- 4% (2%) Environmental – Geopolitical
- 4% (3%) Economic – Technological
- 2% (1%) Environmental – Societal
- 2% (3%) Economic – Environmental
- 2% (2%) Societal – Societal
- 2% (1%) Technological – Technological
- 1% (1%) Societal – Technological
- 0% (0%) Environmental – Technological

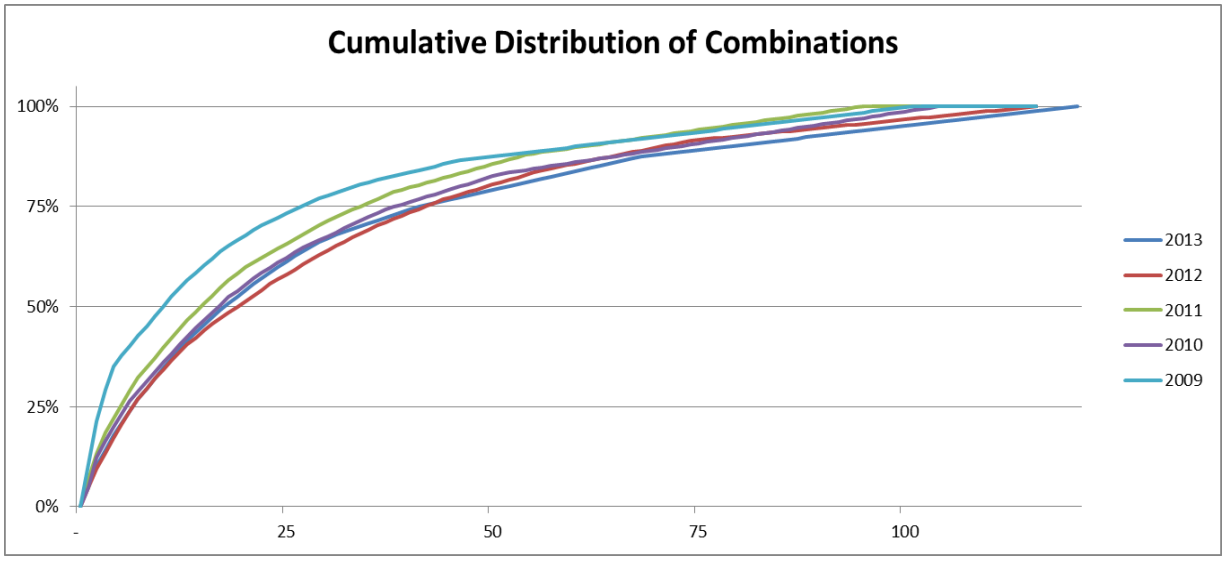
The combinations of the Economic and Geopolitical categories retained the top three positions, although each reduced its previous value. Increasing this year were several Geopolitical positions, with Geopolitical-Technological moving from 4% to 9%. Reductions were seen for the top three selections, including all the Economic/Geopolitical combinations. Every potential combination of categories received at least one vote in this year's survey.

Risk combinations can be viewed graphically using the open source Gephi software package. This shows the strength of an individual risk (node) and between risks (edge). For those who think visually this can be an easier analytical process than reviewing the data itself.



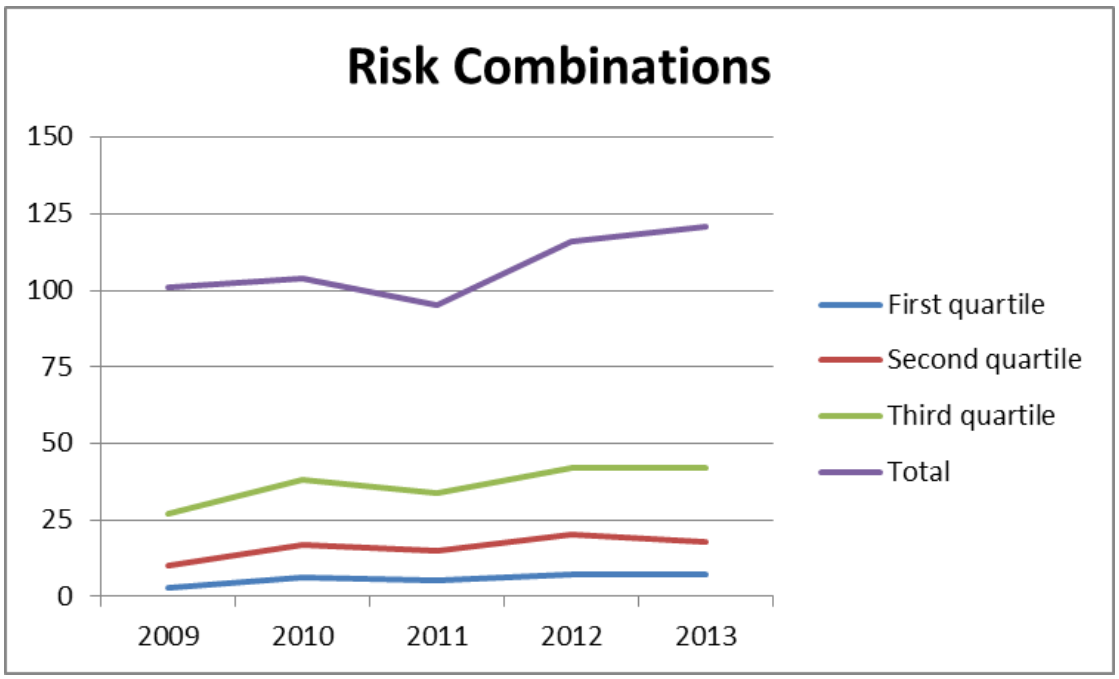
Leading combinations among the 474 responses were (top 7 are listed)

28 responses (7%) 5% in prior survey, ranked #2
Blow up in asset prices
Financial volatility
16 responses (4%) 4%, #4
Chinese economic hard landing
Financial volatility
16 responses (4%) 1%, NR
Financial volatility
Liability regimes and regulatory framework
16 responses (4%) 2%, #9
International terrorism
Cyber security/interconnectedness of infrastructure
13 responses (3%) 3%, #6
Fall in value of US $
Financial volatility
13 responses (3%) 4%, #3
International terrorism
Proliferation of weapons of mass destruction (WMD)
13 responses (3%) 0%, NR
Transnational crime and corruption
Cyber security/interconnectedness of infrastructure

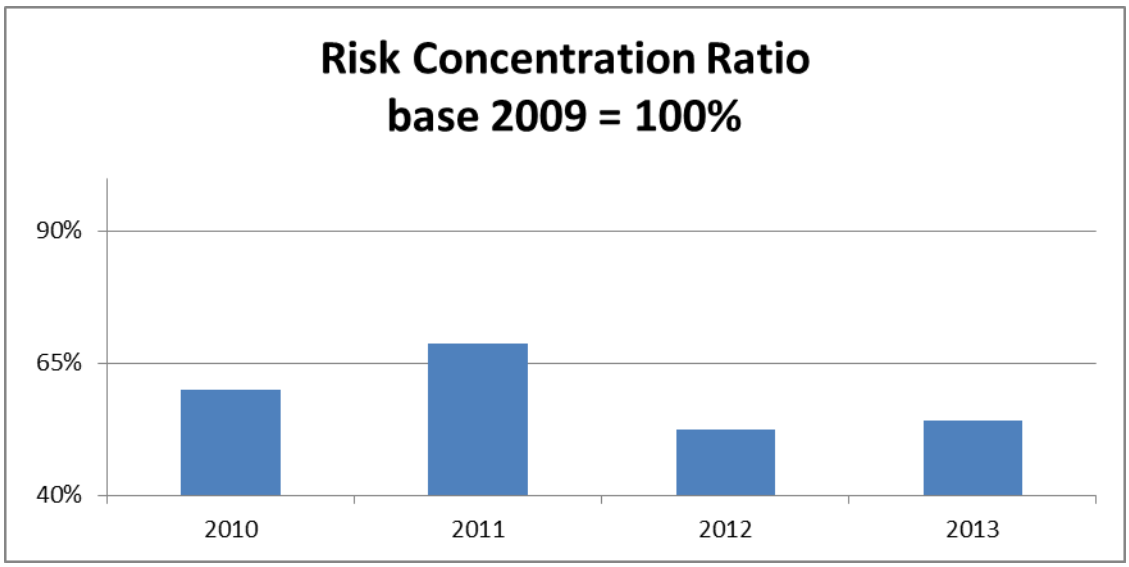


There are 253 possible risk combinations. Except for 2011, the trend has been toward a reduced concentration, although this year results were more concentrated in the early years while still being more disperse across all options. The outlier in 2011 seems to be a result of the major events that occurred in that year; sovereign debt crisis, Japanese earthquake/tsunami, and Arab Spring. By quartile, with data listed cumulatively and first quartile representing the most frequent responses, results were presented in the following

graph. This presents a trend that will continue to be monitored and analyzed. Responses continue to be less concentrated than in surveys taken during the financial crisis. This year provided the broadest range seen for this question, with more risk combinations chosen (121 versus 116/95/104/101/75 in previous surveys).



This may be an indicator of the current risk environment, with each quartile being considered against the extreme example of 2009. This year's Risk Concentration Ratio of 54% is comparable to last year.

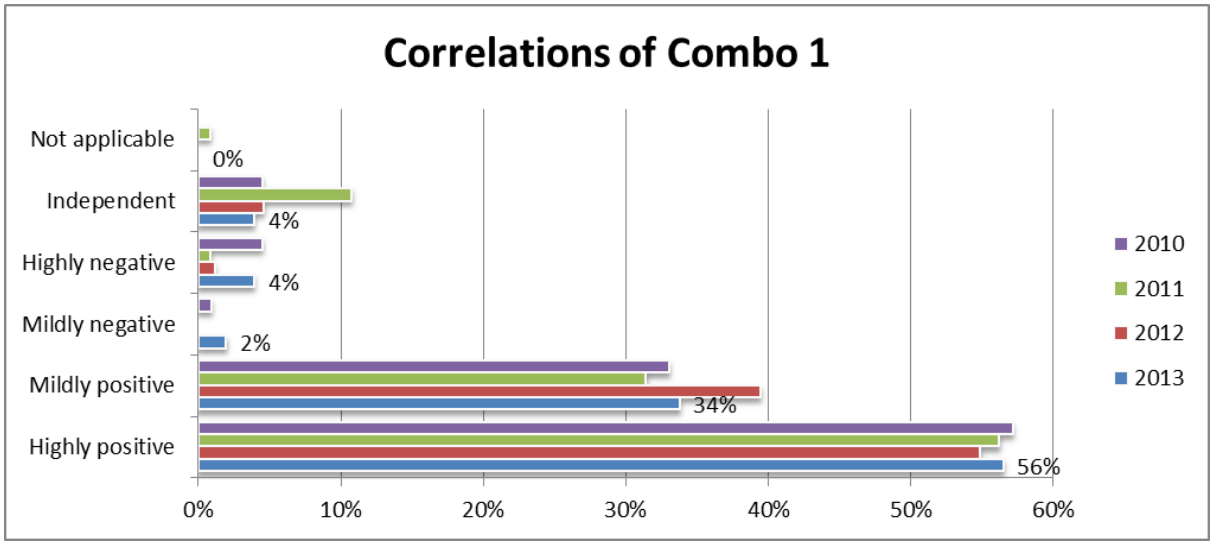


The next chart shows the responses in the order they were chosen. A follow up question referred to Combination 1 so it is reasonable to assume that it is the risk manager's first choice. We generally observe that the Economics category is more commonly included in the first option while the other categories become relatively more prevalent in later choices. It may be that risk managers are anchored in current events for the first choice and Combos 2 and 3 might provide more forecasting credibility.

		2013	
		Combo 1	Combo 2/3
Economics	Economics	39%	16%
Economics	Environmental	1%	2%
Economics	Geopolitical	18%	17%
Economics	Societal	7%	8%
Economics	Technological	2%	4%
Environmental	Environmental	6%	7%
Environmental	Geopolitical	3%	4%
Environmental	Societal	3%	2%
Environmental	Technological	1%	0%
Geopolitical	Geopolitical	9%	18%
Geopolitical	Societal	3%	4%
Geopolitical	Technological	6%	11%
Societal	Societal	0%	3%
Societal	Technological	0%	1%
Technological	Technological	1%	2%
		100%	100%

Respondents were asked the level of correlation for the two risks in Combo 1. Along with 90% of responses that reported either highly or mildly positively correlated (down from 94% in 2012), the negative correlation responses (highly 4% mildly 2%) increased so the total correlated responses are 96%. Respondents are considering the potential interactions between risks and how that impacts events. These results continue to be intriguing as the risk community thinks through this issue each year. A highly positive correlation does not infer causality, but the risk manager might consider if correlated risks are sequential that one might be a leading indicator for the other.

Sometimes it is not clear if there is causality or not. For example, in 1923 the Kanto earthquake in Japan was accompanied by a simultaneous typhoon that fanned flames and created one of the most deadly events of all time. Some have theorized that the low atmospheric pressure generated by the typhoon created conditions favorable for an earthquake.

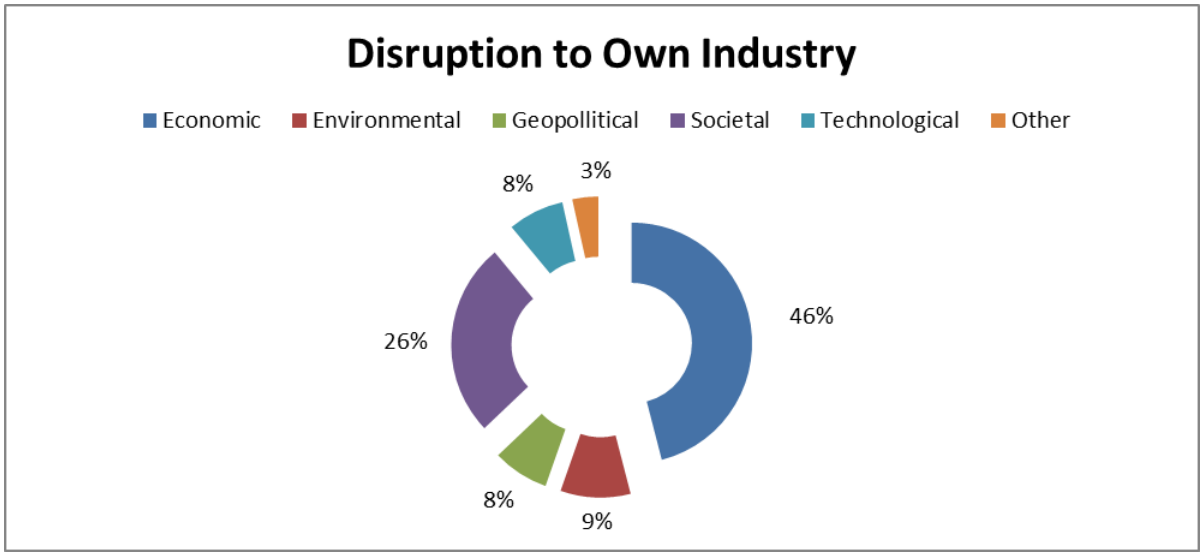


It is very hard to anticipate all of the unintended consequences when multiple risks are stressed at the same time or in rapid succession. This survey generally includes a question allowing up to three risks to be chosen that fit the criteria. In this survey respondents are asked *What risks in the next year do you expect (including interactions) to create the greatest disruption in your firm or industry?* Not surprisingly, most of the results align closely with the top current risk distribution. Only one risk has a greater than 3% differential from that ranking. In this ranking, *Liability regimes/regulatory framework* is much more common, 14% versus 5% in the current risk question and 5% in the greatest emerging risk question. This seems to reflect the new reality of rapidly changing regulations as the Affordable Care Act, Dodd-Frank, ORSA and other regulations are rolled out.

Respondents included up to three risks, and 158 respondents chose 376 responses (2.4 per). Results focused on the Economic and Societal categories, with the leading response 46% from the Economic category.

1. 46% Economic
2. 26% Societal
3. 9% Environmental
4. 8% Geopolitical
4. 8% Technological

The top two specific risks chosen were *Financial volatility (26%) and Liability regimes/regulatory framework* (14%). Rounding out the top 5 were *Blow up in asset prices* (10%), *Fall in value of US $* (8%), *Demographic shifts and Cyber security/interconnectedness of infrastructure (both at 6%).*



There were 13 write-in responses, and most focused on regulatory reforms and financial volatility.

Risk as Opportunity

Many risk managers view risk as two sided, with opportunities drawn out of the same tools and datasets used for risk mitigation. The survey asked which emerging "opportunities" are being monitored. Some representative responses included

- Arbitrage created by evolving experience (ex. Mortality) compared to static assumption scenario for pricing of insurance coverages.
- Demographic shift. U.S. is completely unprepared for it, and U.S. public finance is a disaster.
- Climate change, demographic changes, regional instability
- Volatility is opportunity
- I look for investment opportunities due to climate change such as warmer climates in Canada more receptive to farming and wetter climates near the Sahara allowing recapture of cropland.
- Increased use of solar. It is both an opportunity and risk.

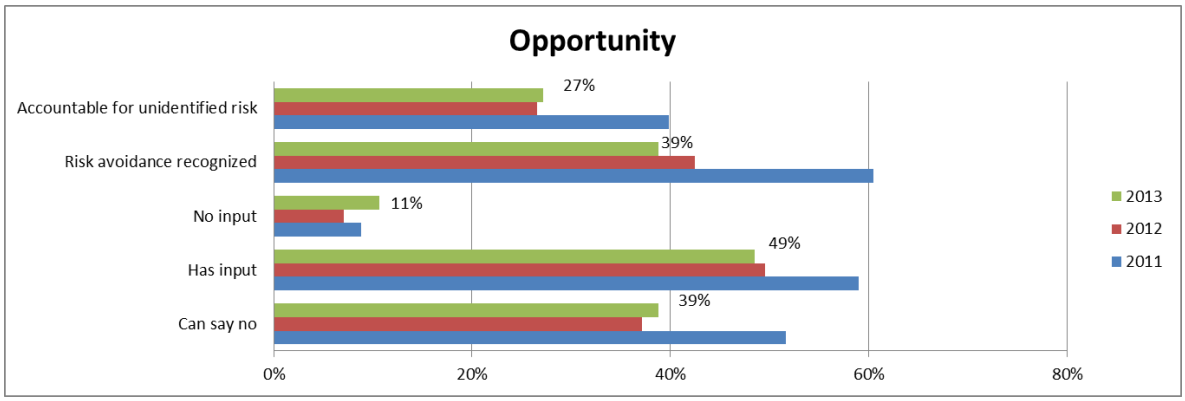
In general, opportunities are being sought out by looking for volatility and assuming reversion to the mean. As we have seen previously, not all agree with the premise of "risk as opportunity." One respondent shared

- The real risks are not predictable

And similar comments have been received in years past challenging the use of risk management as a source for other than risk mitigation techniques.

This is a developing area in risk management, and some firms are starting to take advantage of it. If a risk manager can identify trends or information leading to opportunities or mispriced products, this moves into the strategic aspects of risk management. Highlighting a few of the comments made, it seems that places to look include product pricing, technology, interest rate specifics, demographics, climate change, and seeking out opportunities to optimize the risk profile. These could be early indicators of success that risk managers are especially qualified to identify.

The survey asked how the ERM team is utilized when a strategic opportunity is presented to a firm. The results stabilized in this survey. Most (84%) can say "no" to a strategic opportunity and/or have input but no vote. Only 39% expect to be recognized for avoiding a risk while almost a third (27%) say they would be held accountable if they failed to identify a risk. Asked to comment, several respondents expressed concerns about ERM as value-driven, with comments such as *Totally disagree with premise and ERM function lacks practical relevance.* These are separate arguments, but each is important. Some feel that risk mitigation is the only role for risk managers, while others feel that ERM is a theoretical exercise devoid of practical value. Both reflect internal culture and are not generic comments.



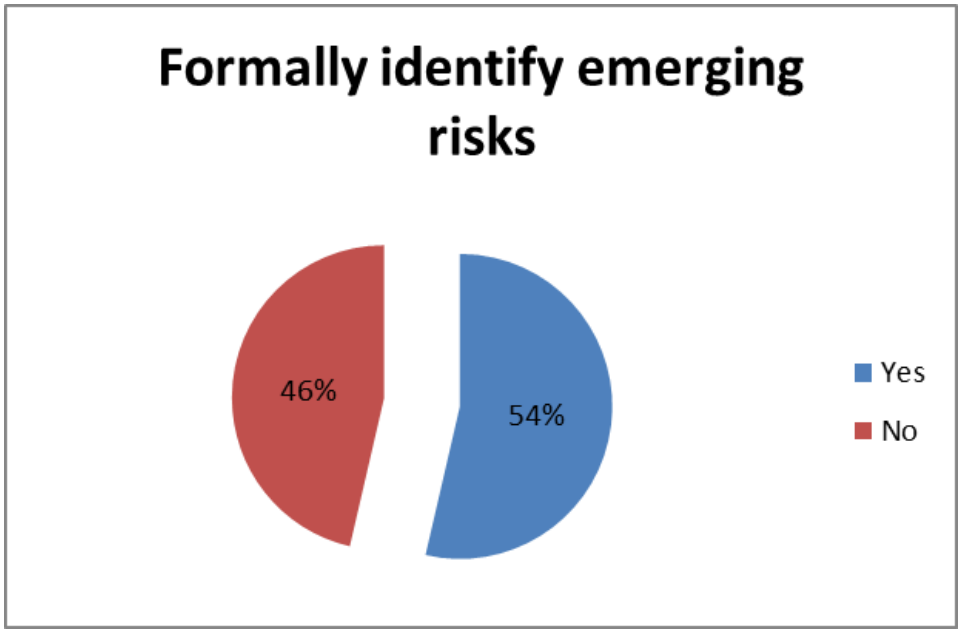
A final question for this section asked for suggestions of risks that could be added to our current 23, described in detail in Appendix I. Each respondent could suggest up to three additional risks. Here are some of the suggestions that don't seem to be included in the current options (unedited).

- Impact of social networking on company reputation
- Social Contract Risk – Pension Risk transfer to employees
- Proliferation of Cheap Underwriting Tools and Genetic Testing leading to anti-selection
- Reduced value of education and hard work in the US
- Medical breakthroughs affecting longevity risk
- Elimination of manufacturing jobs as technology, 3-D printing, etc. replace manual labor
- Overregulation of industries
- Global food shortage
- Further separation of the haves and the have nots – declining middle class
- Replacement of local retail outlets by on-line shopping and distribution outlets
- Religious risk
- Just in time delivery in many industries thwarted by climate/hacking/terror interruption to infrastructure

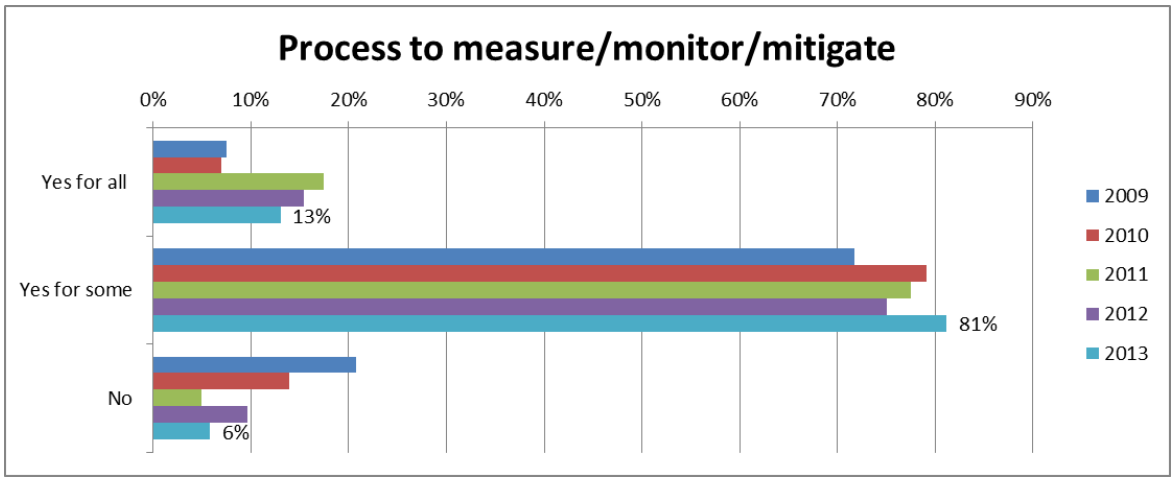
Section 2: Leading Indicators

Leading indicators of emerging risks are metrics, or events, that indicate higher likelihood that an emerging risk may be materializing. This also provides information used to make better decisions earlier than might be the case otherwise. Key risk indicators (KRIs) provide information about a specific risk. They do not replace metrics that measure value in hindsight, but attempt to identify drivers of future performance. Trending GDP or CPI can provide macroeconomic KRIs, as can revenue and liabilities for a firm. These are examples of lagging indicators and measure historic results. Leading indicators, in contrast, provide information earlier in the process. For example, a leading indicator such as a lower unemployment rate would drive expectations of higher collected taxes. A leading indicator could also be the occurrence of an event that becomes a Boolean indicator, acting as a light switch or on/off indicator. An example might be the signing of a star athlete who would drive higher attendance at games and revenues for the athletic department. The survey asked about the use of leading indicators that would provide a firm with actionable information about a risk.

Due to some apparent confusion in past surveys regarding this section, this year's survey asked an initial clarification question, *Do you formally identify emerging risks?* Only 54% responded that they did, which positions a formal process as something not yet common at firms.

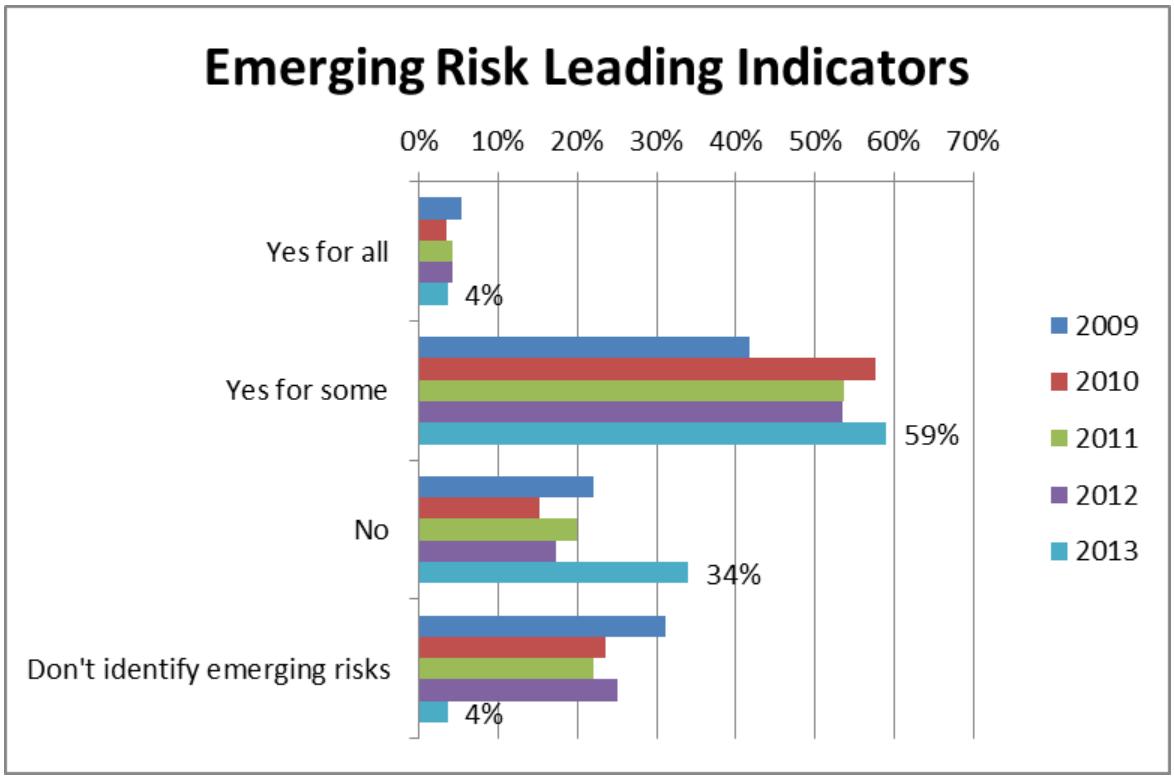


For those with a formal process, the next question asked about measuring, monitoring, and mitigating an emerging risk once it has been identified. 94% responded that they did this for some or all of their identified emerging risks (up from 90% in 2012). 6% reported having no process in place.



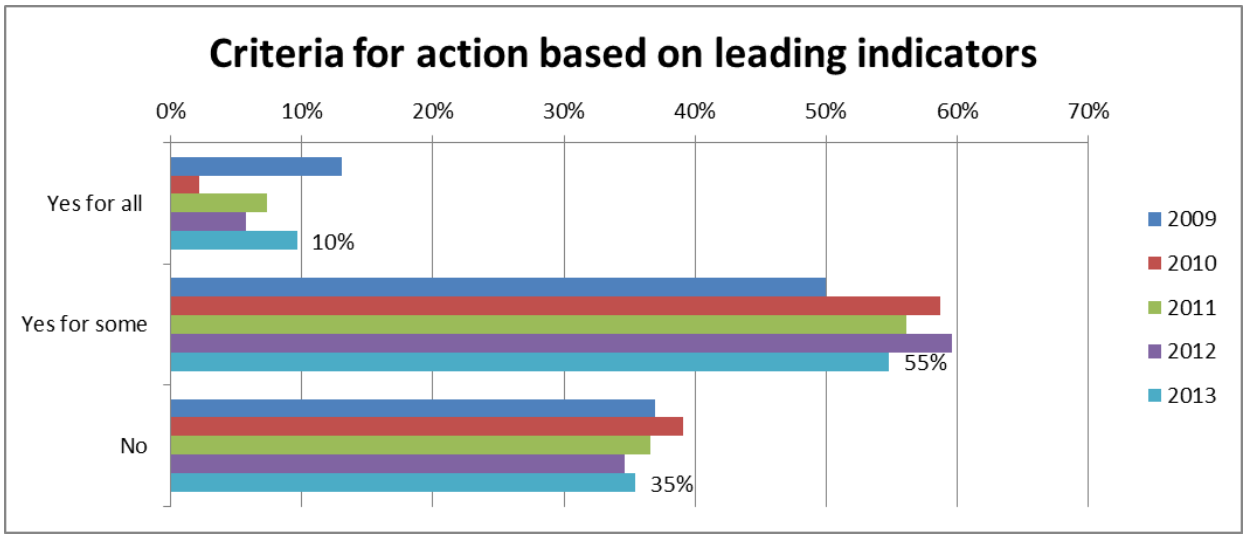
Examples are moving toward specific concerns, with cyber risk, demographics, climate change and obesity providing advance information tied to specific exposures. Some are focused on regulatory updates and staying abreast of them.

Next up was the question, *Once an emerging risk is identified, do you select leading indicators to measure changing likelihoods?* Four percent of the respondents noted that they had leading indicators for all identified emerging risks and 59% had them for some. This question was impacted by Question 1, which asked if the respondent had a formal process for identifying emerging risks and forwarded them to the next section if they said no.



More interesting are the examples shared about specific leading indicators collected and monitored (found in their entirety in Appendix II). Many are standard byproducts of the financial reporting process or economic metrics. These include stock indices, commodities, credit spreads, volatility, and weather markers. Some are specific to an industry, like monitoring mortality improvements or regulatory changes. Some risk managers have the ability to monitor web traffic and others focus on supplier risk. One interesting result was to track rolling 4 week trends of sales and lapses, along with regrettable turnover.

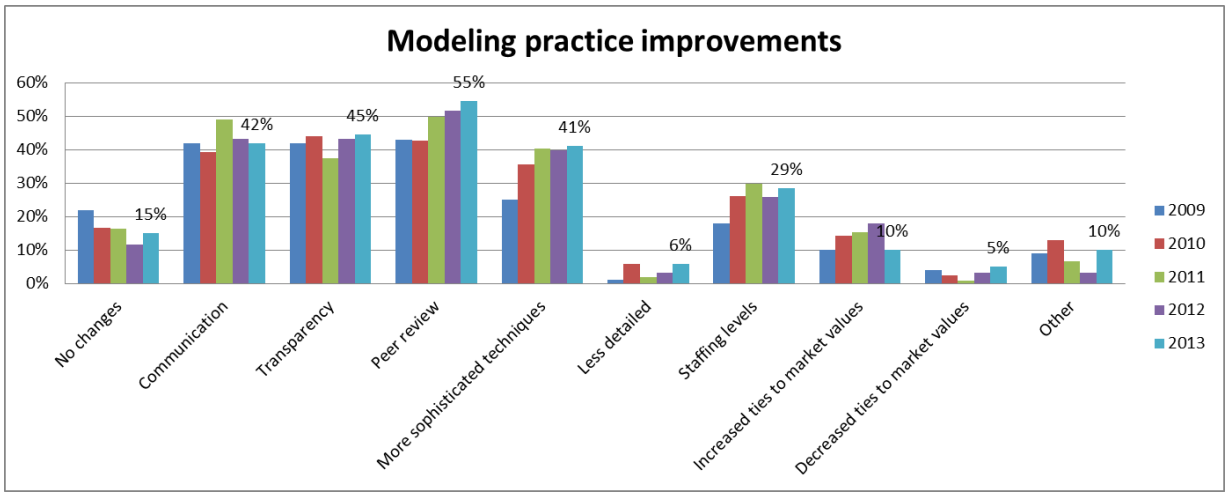
The survey asked whether these leading indicators included criteria that would lead to an action to mitigate or accept the risk. Over half (65%) stated that criteria exist for at least some of their emerging risks.



When asked for examples, respondents are starting to share more specific actions, making adjustments to either take advantage or mitigate a risk. Some groups meet monthly and have developed tactical plans built around what-if scenarios such as a government default.

Section 3: Methodology

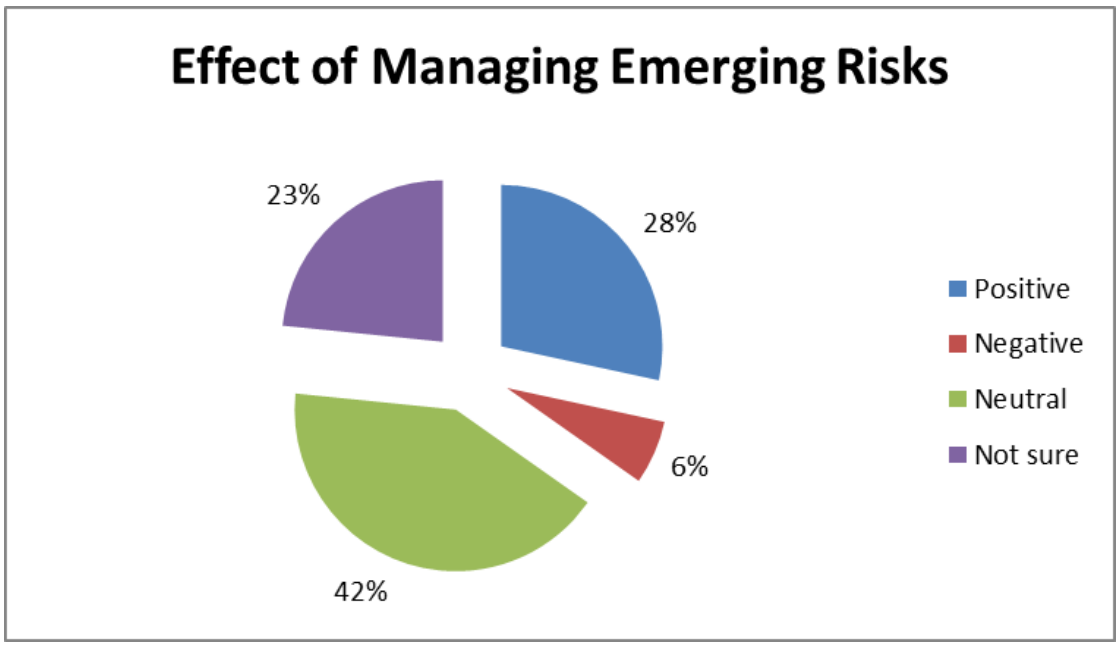
Models continue to be heavily scrutinized as various regulatory developments move forward. How are risk managers adapting? Staffing is visited later in the survey, but peer review, transparency, communication and increasingly sophisticated techniques all continue to evolve. Trends are noticeable among some of the other options as well, with more reporting *No changes* (15%), and more (5% versus 3%) citing *Decreased ties to market values* and fewer choosing (10% versus 18%) *Increasing ties to market value*. While not one of the top responses, *Less detailed* doubled its response rate from 3% to 6%. Other responses focused on controls and "less blind reliance" on models.



When asked to share methods for developing assumptions applicable to emerging risks, the focus was on expert opinions, performing sensitivities and focusing on exposures and risk concentrations.

With over 70 comments, it's clear that this is a topic being discussed by risk managers and evolving over time. Comments like "eye-ball method", "Delphi method" and "SWAG" seem to sum up the current state of affairs. While most seem to be trying to get their hands around the issues, there is not a clear cut logical methodology.

The survey asked respondents if managing emerging risks was worthwhile. Given the qualitative responses in the previous question that showed an evolving and improving process, it's not surprising that the most popular response was Neutral (42%), with another 23% Not sure.



When asked to explain their answer, many respondents referred to such things as a heightened sense of awareness, a more nimble management response and proactive scenario planning.

While a majority of comments reflected positive experiences, the culture at some firms has led to less than full support for analysis of emerging risks. Of course each entity must balance the cost against knowing that only some of the emerging risks will become material threats or opportunities. These types of comments can be learned from, and are a primary reason why individual respondents are sought out rather than a company response.

- Relevance not appreciated
- Management is not yet convinced they need attention
- I don't believe risk management programs have really focused on "hitting the ball". Instead they spend too much time worrying about measuring how much the ball will hurt when it hits. Risk measurement is a priority over risk management.
- Not as effective as can be. For each time where the management has been a positive, there has been an overreaction or poor response which actually made things worse.
- The tendency is to ignore emerging risks, or trust that they will revert to historical norms, until they are imminent by which time the cost of mitigation (e.g., hedging out the risk) is prohibitive.

In possibly the most interesting part of the survey to analyze, respondents were asked to share instances where quantitative, qualitative, and combination efforts have enabled better decision making.

The quantitative responses included some common themes. Many reflected modeling improvements to incorporate correlations and provide a prioritization plan. Some reflected actual mitigation plans that had been implemented. One respondent stated that they had changed products, exited distribution channels and adjusted capital levels due to model improvements.

Not all risk managers have found harmony with their quantification efforts. *Too much time is being spent arguing about how to quantify the risk and not enough time spent on managing the risk.*

A representative qualitative example of improved decision making was *Our qualitative analysis has ensured that our senior managers are better informed about the full range of exposures, specifically including those for which our internal quantification efforts are inadequate*. Others referenced the usefulness of qualitative analysis for correlations and operational risk. *Understanding what can happen and how to address the risk is more important than specifying the exact impact of a potential event.*

When respondents share instances where a combination of qualitative and quantitative analysis has enabled better decision making, true expertise shows through. The few detailed responses talk about using qualitative guidance to provide a reality check on models. *Especially with emerging risks, often the qualitative scanning, assessment, and monitoring are more important, with quantification to follow, influencing decision making. Knowing when and how to balance speed and precision is key to quantification. Clear communication and appropriate governance are key to qualitative assessments.*

The section can be summarized with this comment. *I truly believe a quantitative approach driven by qualitative guidance is a superior approach to risk management!*

Section 4: Predictions

The capabilities of the risk manager, at least as they characterize them, focus on identifying risk exposures and ranges of scenarios. While they can't predict every crisis, at least some bubbles driven by human bias may be identified in advance. When asked if it is possible to anticipate/predict a crisis, most (81%) stated that it was possible sometimes, with 1% saying they could always do so. Comments reflected recognition of mean reverting data, and the difficulty of identifying the timing and severity. *Boards and senior management are very susceptible to group think.*

Aligning incentives is also a problem for risk managers, as being early even if correct is hard to distinguish from being wrong. *Financial crises are predictable, issue is that many don't want to exit first and therefore wait too long, making the crisis worse.* Another respondent said *Better to stick with the herd and not stick one's neck out if you want to keep your job.*

The process is hard. *You need to be lucky to look in the right direction, and intelligent enough not to brush it aside.*

Nearly two-thirds (65%) felt it was part of their job to predict a range of outcomes. This question was rewritten this year to bifurcate the Yes responses between Yes range of outcomes and Yes specific outcomes. Only 3% chose the latter option. This is a good example where the way a question is asked matters to the results. The comments shared were very interesting, and may lead to changes in the survey next year

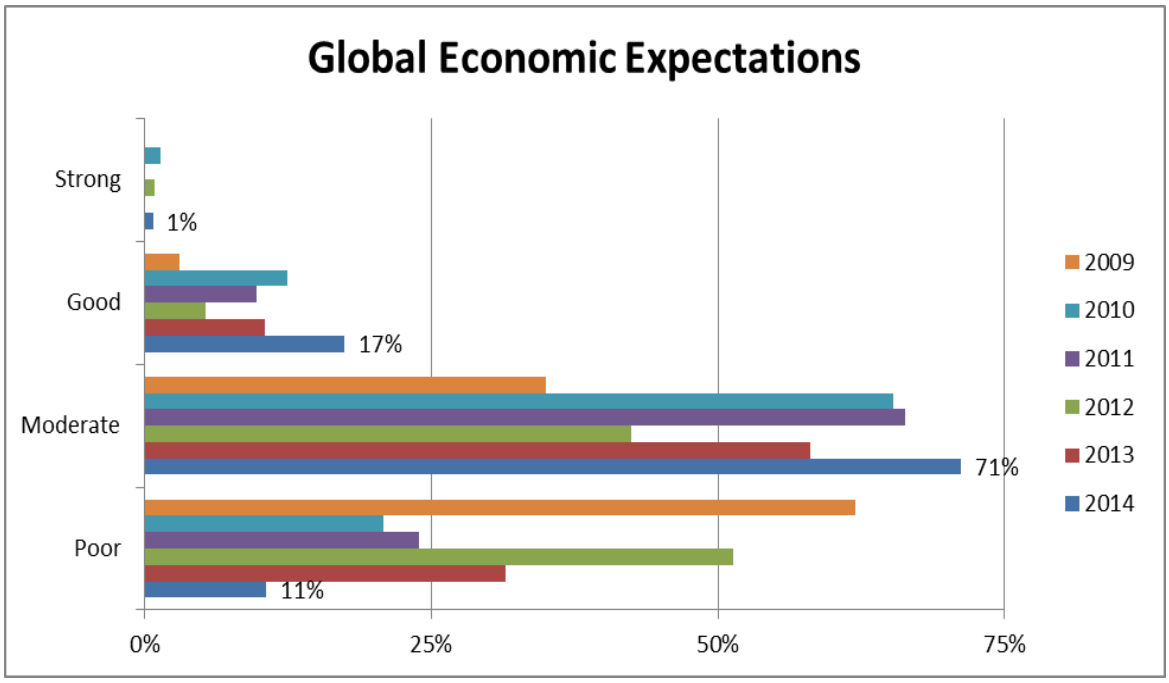
.

- *Risk management is not predictive, it is defensive.*
- *Predictions will be wrong. Risk management is preparing for whatever scenario unfolds, regardless of how expected it is.*
- *Is there any leader or manager who does not have to predict the future in some way?*
- *The WORST thing a risk manager can do is try to predict the future. Good risk management requires an assumption that anything can happen AND that we can't know what is going to happen (or not happen).*

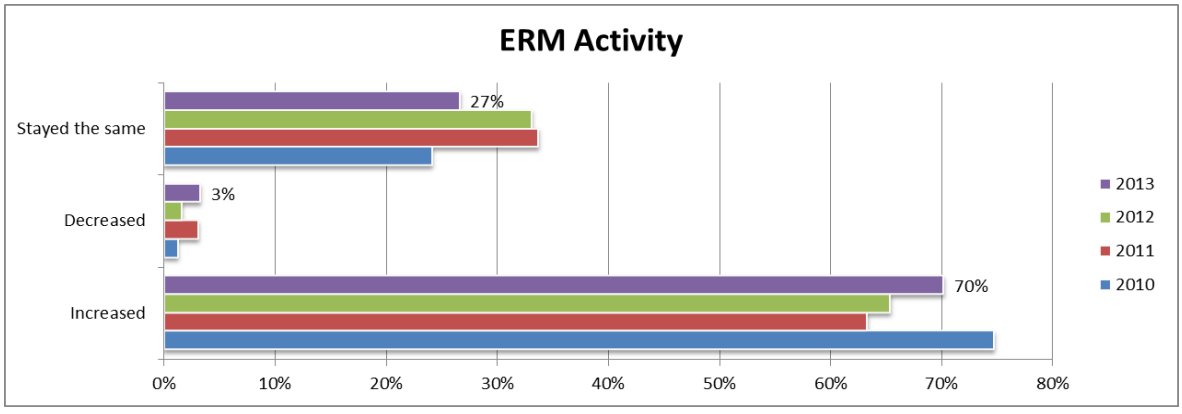
Section 5: Current topics

Since the first iteration of this survey in April 2008 much has transpired. With this in mind, some questions were posed for trending purposes and to determine if the responses can be used as leading indicators and thus be predictive.

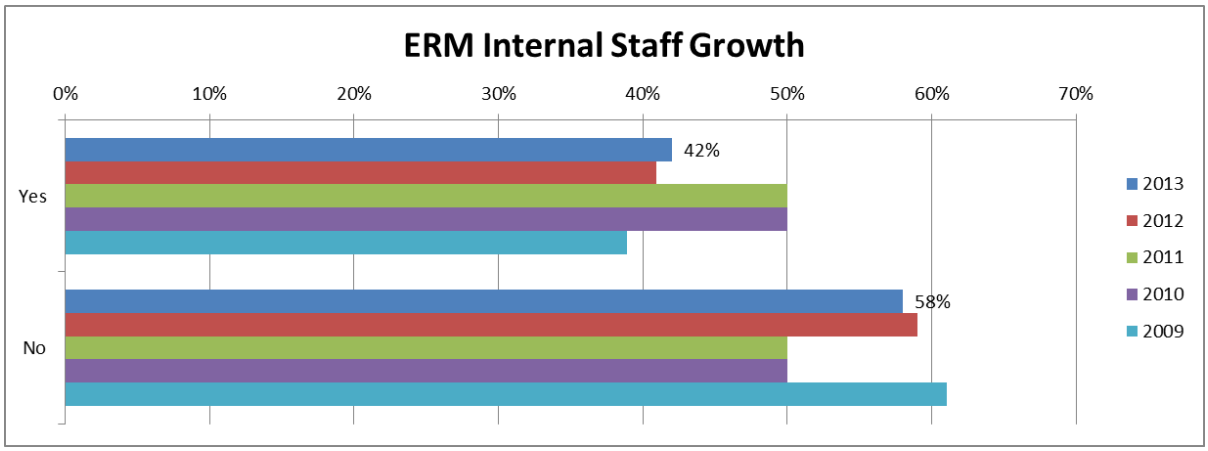
Global economic expectations have been volatile during past surveys, and this year is no different. Respondents have an improved outlook for 2014, with 71% (a new high) having a moderate outlook and 17% (also a new high) a good outlook. Only 11%, a new low, have poor expectations.



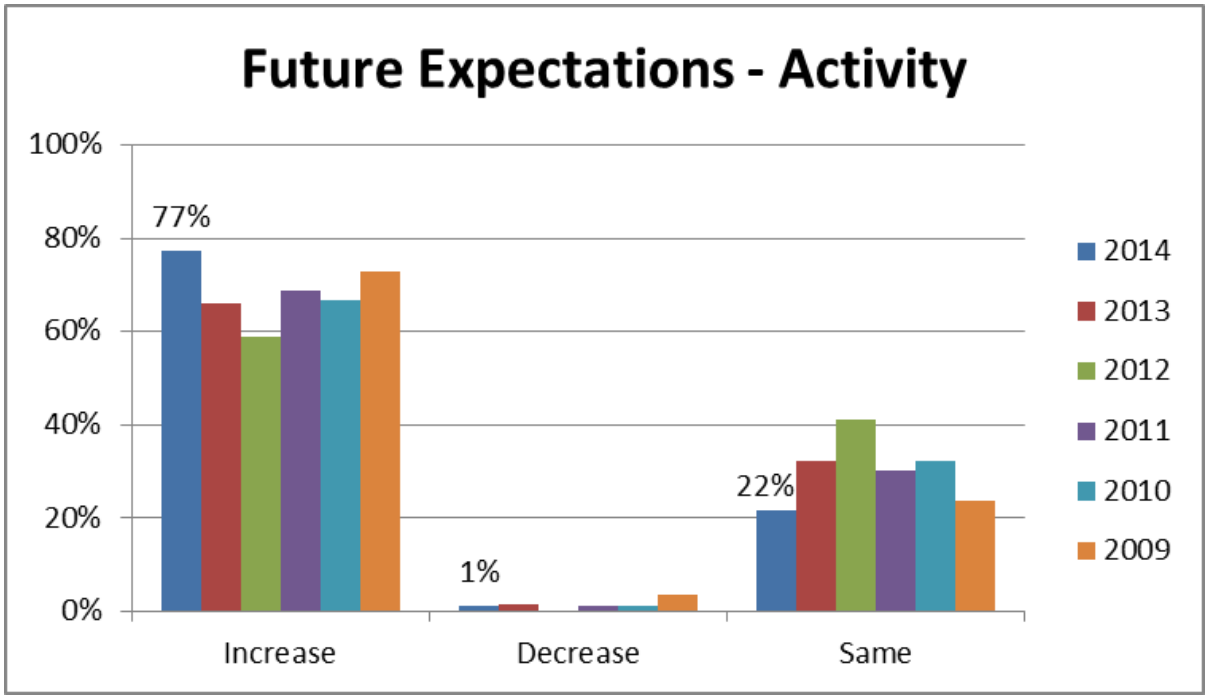
Risk managers continued to see increased ERM activity (70%) in 2013, increasing for the second consecutive year.

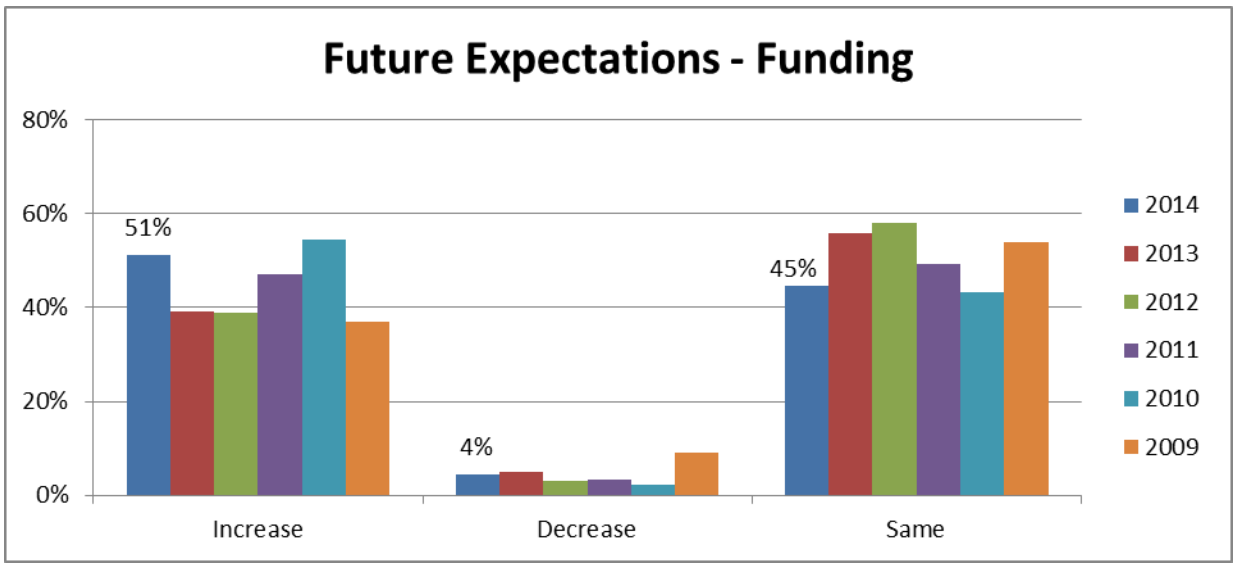


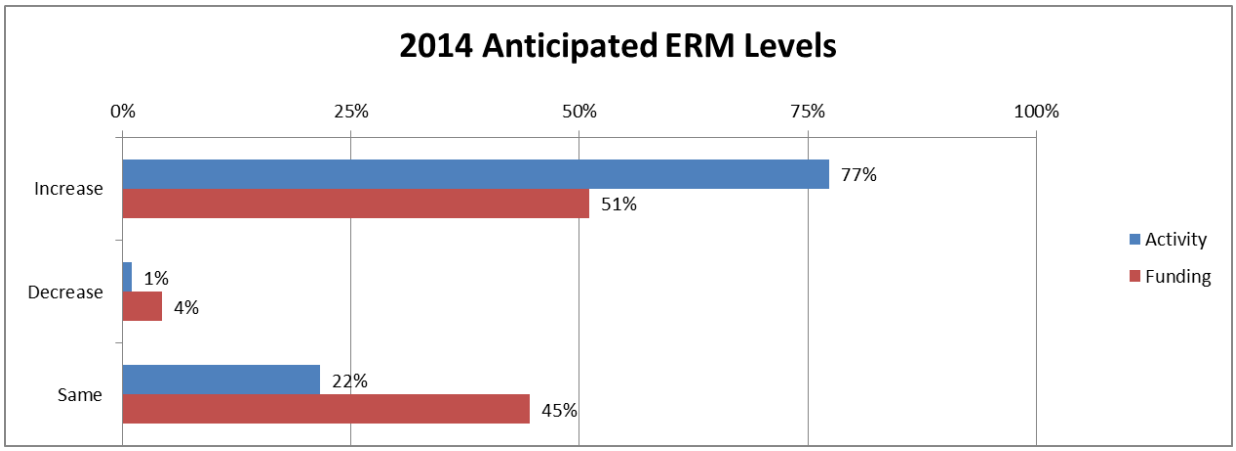
Despite the higher ERM activity, 58% of respondent's internal staff did not grow in 2013.



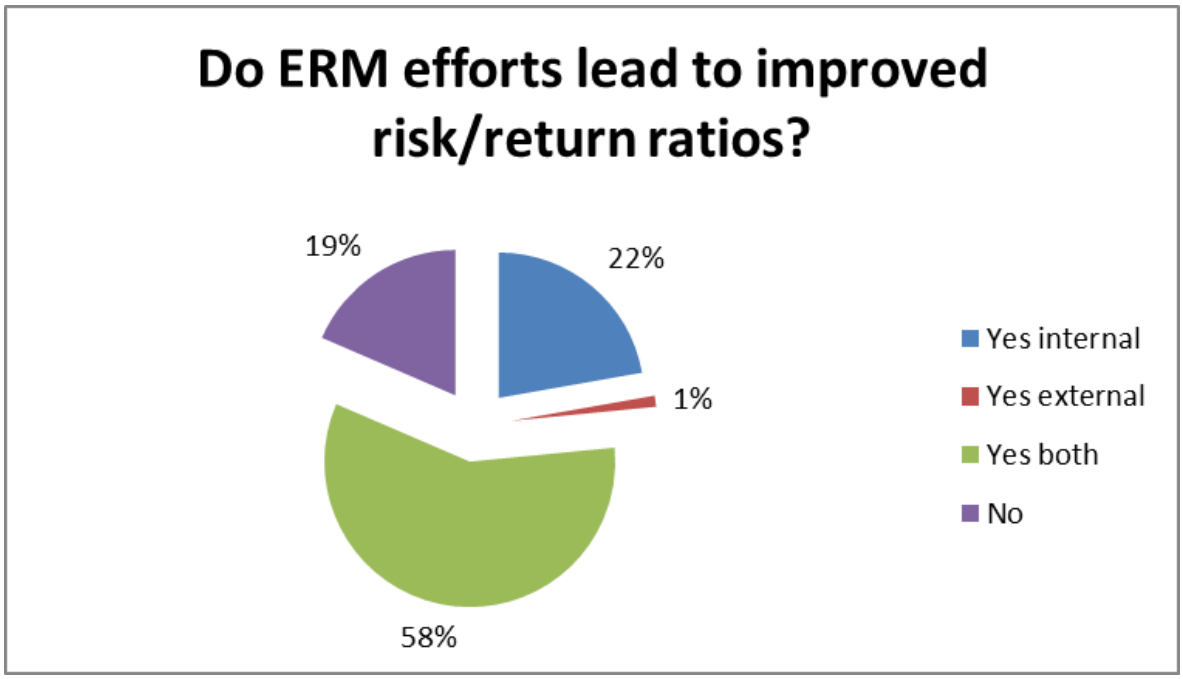
For 2014, survey respondents anticipate continued growth in their activities (77% - highest recorded), but only half (51%) expect to see increased funding to accomplish these heightened expectations. As with other sectors of the economy, risk managers are being asked to do more, often with existing or smaller (4%) staffs. A challenge, especially when there is not an ongoing crisis, is to have management teams perceive ERM as value added rather than a cost center.







A firm's risk profile evolves over time, as does its understanding of those risks. In an attempt to ascertain the level of ERM maturity, respondents were asked *Do ERM efforts lead to improved risk/return ratios?* Both internal and external (e.g., Dodd-Frank and Basel II) were provided as options. While few thought that external efforts were valuable on their own (1%), 81% of those responding thought either internal, external or combined efforts had improved risk relative to return. Those who said *No* had an interesting interpretation of the issue, as seen below.



When asked to expand on the topic, the value of individual versus company responses was shown. While many responses contained positive experiences, it is clear that the culture at some firms views ERM as a cost center and necessary evil. Many comments reflected on the greater transparency and effectiveness of their process. Here are some of the more interesting comments.

- Very little focus on return, or on the cost of risk hedging. Right now, ERM is all on or all off, companies have not achieved a balance.
- I think that ERM at my company is somewhat like auditing on steroids: checking, certifying, and safety procedures. I don't think there is a strong understanding of risk or a belief that understanding risk would actually protect the company.
- ORSA will help accelerate work that would otherwise be done over a longer timeframe.
- It has brought a more consistent view of risk/return across the enterprise.
- Risk/Return ratio is a fallacy deep in the tail. It is all about understanding risk in the tail – not worrying about return.
- There is much greater focus on taking on only risks where there is an acceptable return given the risk. This is being pushed from both internal and external efforts.

Enterprise risk management requires a balancing act between those who don't want to accept any risk and those who look only at returns. It is important to qualitatively look at risk exposures and what-ifs, and develop quantitative metrics to measure returns relative to some type of capital measure. It requires common sense and a healthy skepticism. Involving people with different perspectives is useful as no one person can anticipate every situation and how it will play out.

Not everyone agrees on what the risk team should accomplish. The broadest thinkers consider all of these, but not all cultures embrace them. Some look at risk in all forms as bad, and try to set up controls to eliminate any possibility of a risk. Others focus on risk in only certain sections of a distribution, either trying to optimize the common results around the mean or looking strictly in the tail. Both of these interpretations are important but a focus on one ignores the other.

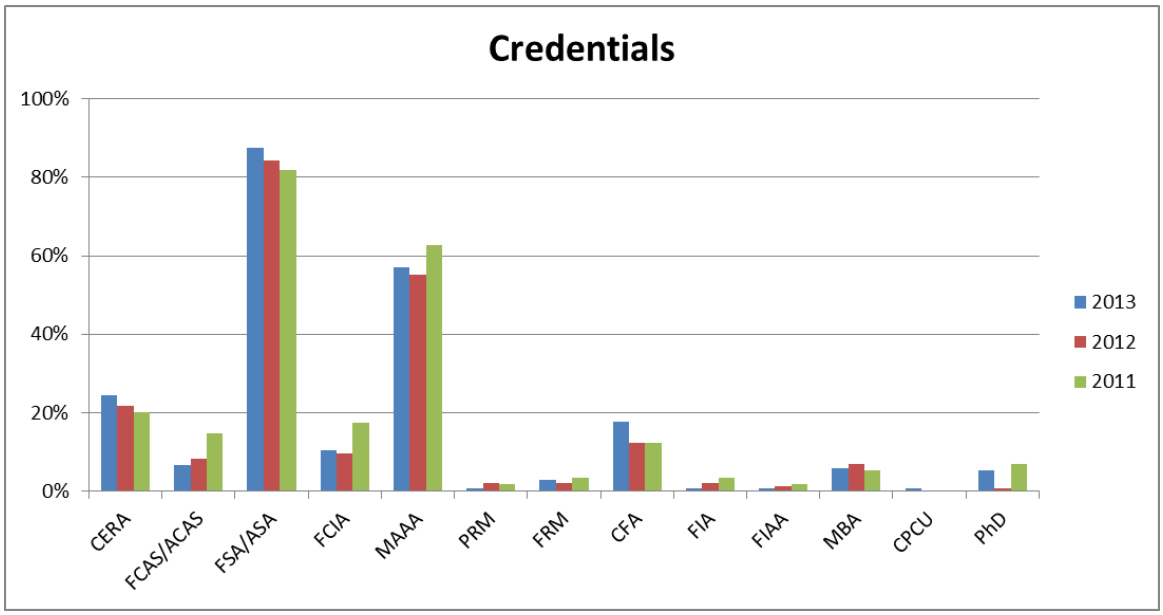
Regulatory efforts like ORSA (Own Risk and Solvency Assessment) in the insurance industry can provide shared practices an individual company may not have thought of as well as providing budget dollars to improve the ERM process overall. Rightly or wrongly, budget is easier to allocate when there is a compliance aspect to it.

A nice summary of thoughts was the comment *Greater awareness of potential risks and various reductions in exposure to some of those risks.*

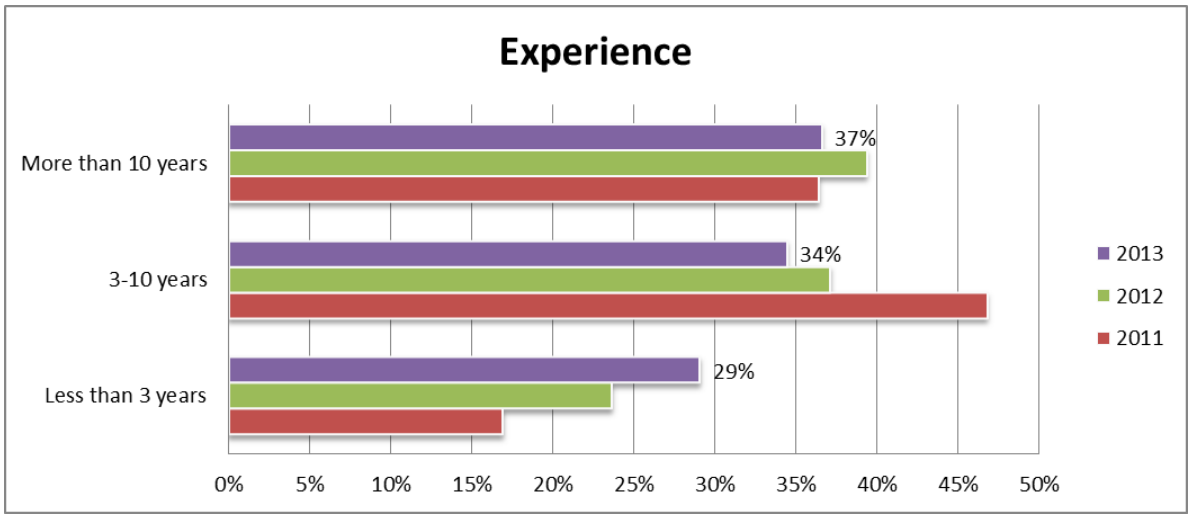
Based on the researcher's experience, there is a continuum of ERM best practice. Some early "adopters" focused on lowering capital requirements tied to their rating. Some were asked to implement an ERM program by their Board with little guidance, often leading to regular reports but little change in the decision making process. Others very quietly continued practices that were not called ERM but effectively managed the risk profile of a firm. These firms continue to improve communication efforts with third party stakeholders. Best practice firms are moving toward incorporating ERM in their strategic planning process, considering the evolving risk profile.

Section 6: Demographics

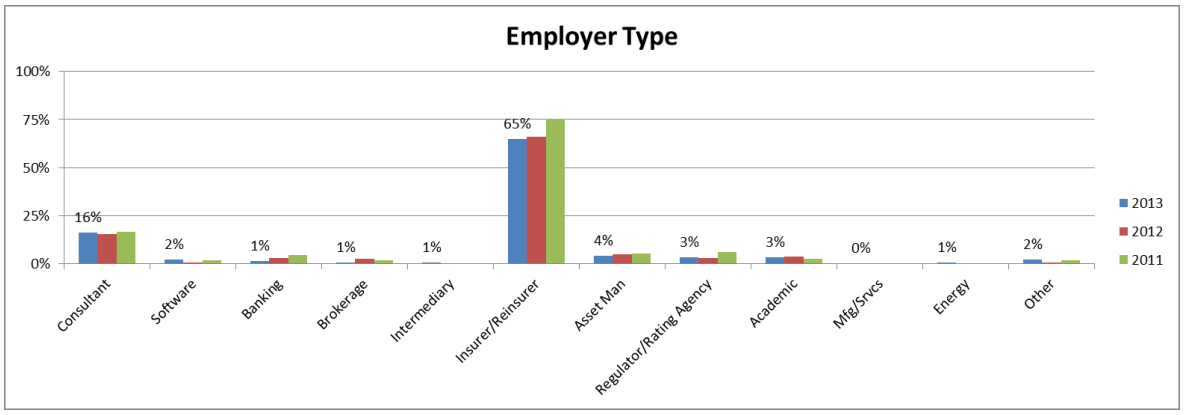
Each year the Emerging Risks survey is distributed in several ways, primarily via targeted emails and social media. Each year attempts are made to expand participation. This year the recently formed CRO Council members were asked to participate. For this survey 35% reported filling out the survey in the past. In another question, 87% responded that the survey respondent held a credential from the Society of Actuaries (ASA/FSA). Other groups representing the research sponsor, the Joint Risk Management Section, were also represented with 10% FCIAs (Canadian Institute of Actuaries) and 7% ACAS/FCAS (Casualty Actuarial Society). Another group strongly represented is CFA charter holders with 18% of the respondents, up from 12% last year.



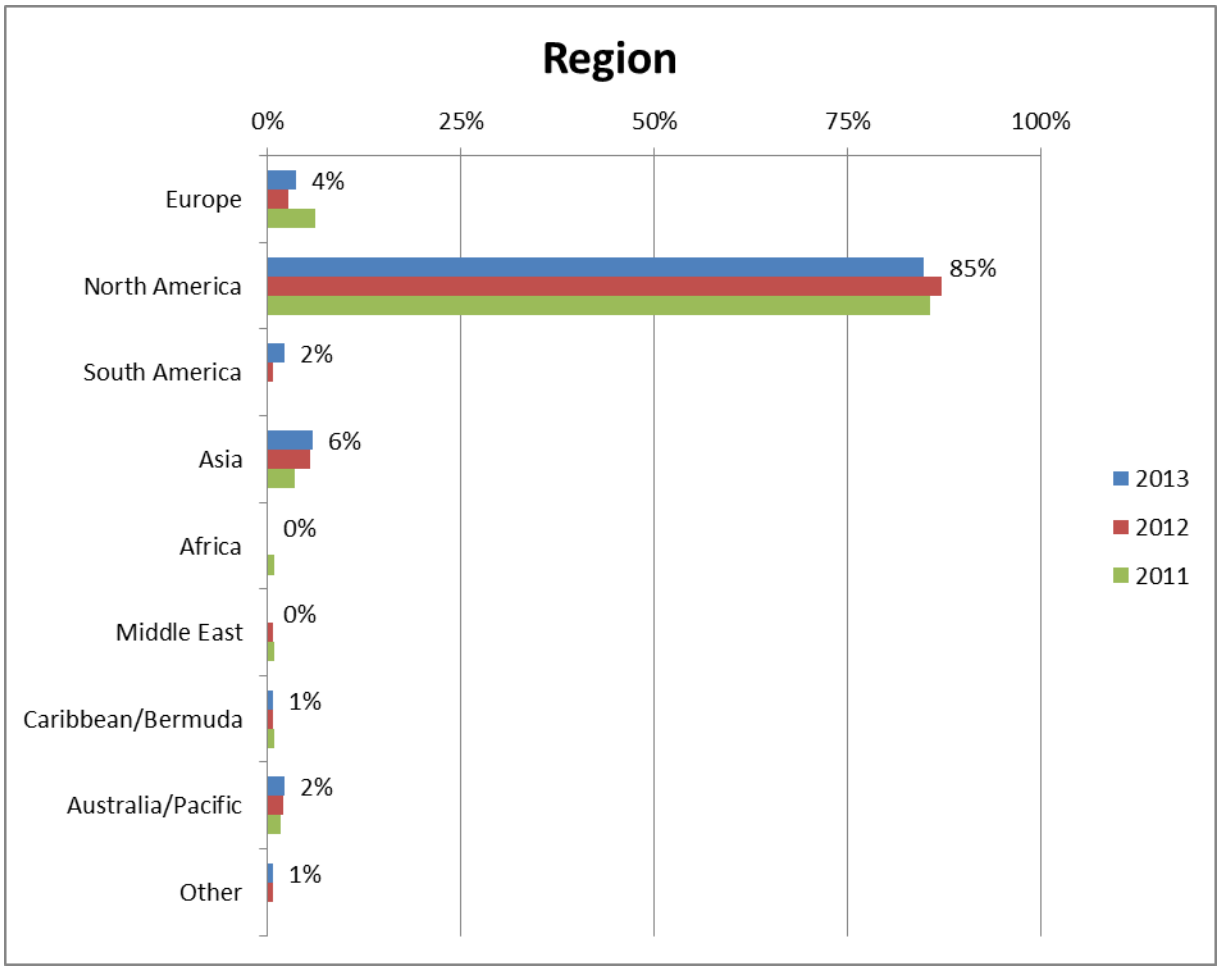
The survey is split among risk managers with different levels of experience, with about one-third (37%) saying they have over 10 years of experience in the role. This group has shown itself able to share many best practices.



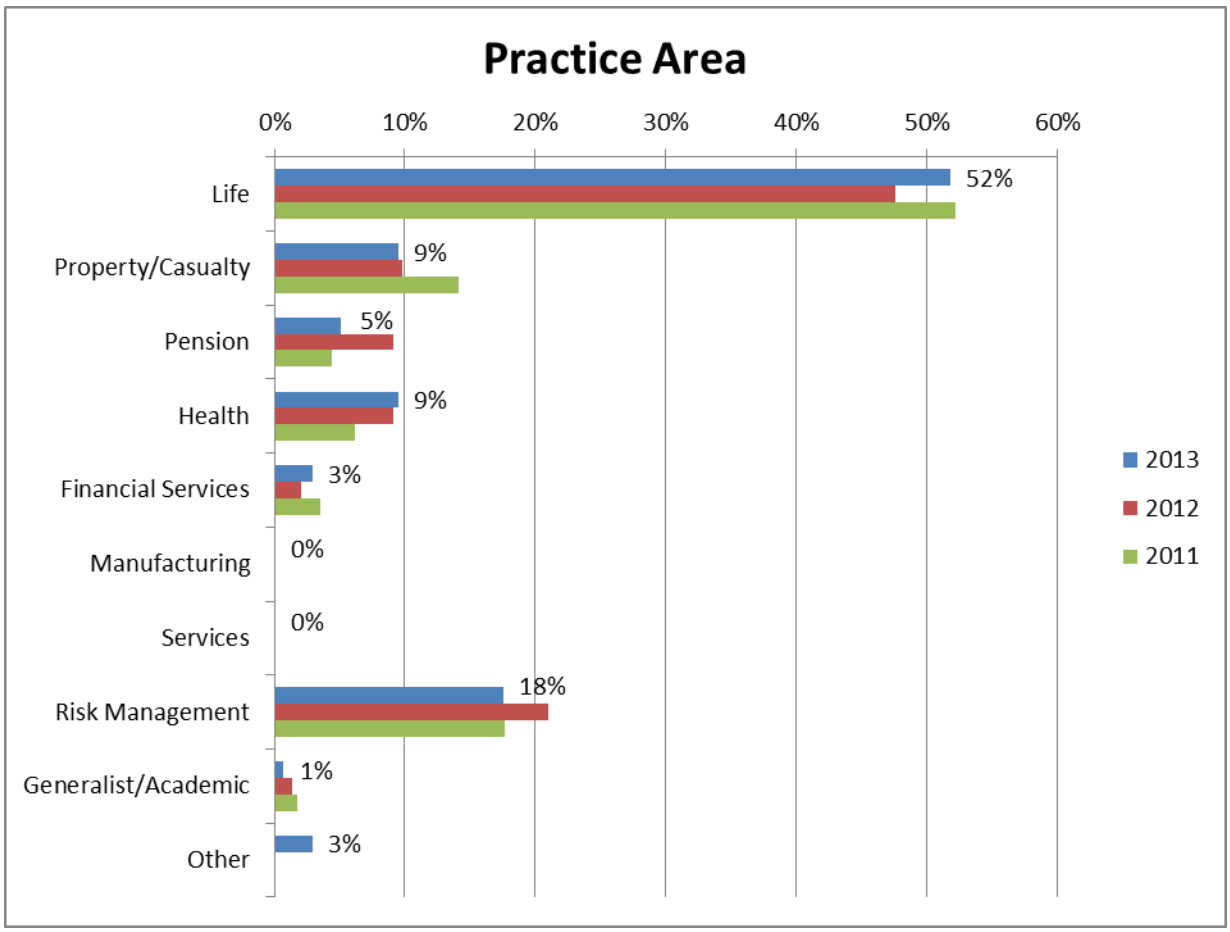
Most survey respondents are employed by either an insurance company/reinsurer (65%) or as a consultant (16%).



The survey continues to be dominated by North Americans (85%), with significant minorities coming from Asia, Europe, Australia and South America. This year surveys were also completed by risk managers in the Caribbean/Bermuda region.



The primary areas of practice continue to be life insurance (52%) and risk management (18%). Property/casualty insurance (9%), health (9%) and pension (5%) practitioners also participated.



The survey found that 55% of the respondents belonged to the Joint Risk Management Section (JRMS, sponsored by the Casualty Actuarial Society, Canadian Institute of Actuaries and SOA). The survey was sent directly to all JRMS and INARM (International Network of Actuarial Risk Managers) members, along with some targeted social media groups on LinkedIn and Twitter.

Future Recommendations

Future surveys should continue to probe the anchoring issue and look for concrete examples where decision making was improved through an emerging risk process. The survey should continue to use open-ended questions to learn from top practitioners. Utilizing the experience of the Project Oversight Group (POG) has worked very well so far in developing questions and should continue. The survey should be distributed more widely in order to gain the perspective of those outside North America and outside the insurance industry. Partnerships with UK and Australian actuarial risk managers, along with the CRO Forum, should be sought out. Additional groups should be encouraged to complete the survey to reduce the reliance on actuarial risk managers.

In each survey the current 23 risks should be reviewed. The World Economic Forum list of emerging risks continues to evolve, and those in this survey should as well.

Suggestions from the researcher

Add questions probing

- Does an emerging risk leading indicator ever get dropped? Why?
- What blogs and other sources do you follow?

Following the Introductory Section question about top current risk, ask which regions they are concerned with (looking for regional instability and also if Eurozone problems are being picked up here).

Investigate ways that rating agencies and the SEC are incorporating emerging risks in their analysis.

2014
Special question – interaction with population growth
Explain correlations in question at end of section 1
Add investments as a practice area
Where does stochastic analysis add value and where does it not

Appendix I - Glossary of Risks

Initially 23 core risks were defined in Global Risks 2007: A Global Risk Network Report. They can be found at www.weforum.org/pdf/CSI/Long_Global_Risk_Report_2007.pdf. What follows is an updated version for the 2013 survey with a description of the risks.

23 risks

Economic Risks

- Oil price shock – Oil prices rise steeply due to major supply disruption.
- Fall in value of US dollar - US current account deficit triggers a major fall in the dollar.
- Chinese economic hard landing – China's economic growth slows, potentially as a result of protectionism, internal political or economic difficulties.
- Blow up in asset prices – The value of personal assets such as housing and equities collapse, fueling a recession.
- Financial volatility – price instability of core products such as commodities, energy or currency

Environmental Risks

- Climate change – Climate change generates both extreme events and gradual changes, impacting infrastructure, agricultural yields and human lives.
- Loss of freshwater services – Water shortages impact agriculture, businesses and human lives.
- Natural Catastrophe: Tropical Storms – Hurricane or typhoon passes over heavily populated areas, leading to catastrophic economic losses and/or high human death tolls.
- Natural Catastrophe: Earthquakes – Strong earthquake(s) occur in heavily populated areas.
- Natural Catastrophe: Severe Weather (except Tropical Storms) Meteorological phenomena with potential to cause significant economic losses, fatalities and disruption. Includes inland flooding from all causes, tornados, thunderstorms, drought, wildfires, high winds, snow storms and dust storms.

Geopolitical Risks

- International Terrorism – Attacks disrupt economic activity, causing major human and economic losses.
- Proliferation of Weapons of Mass Destruction (WMD) –nuclear Non-Proliferation Treaty no longer effective, leading to spread of nuclear technologies.
- Interstate and civil wars – Major interstate or civil wars erupt.
- Failed and failing states – Trend of widening gap between order and disorder.
- Trans-national crime and corruption – Corruption continues to be endemic and organized crime successfully penetrates the global economy.

- Retrenchment from globalization – Rising concerns about cheap imports and immigration sharpen protectionism in developed countries. Emerging economies become more nationalist and state-oriented.
- Regional instability – Certain unstable areas may cause widespread political and other crises. These include, but are not limited to, the Middle East and the Korean peninsula.

Societal Risks

- Pandemics/Infectious disease – A pandemic emerges with high mortality/Incidence of diseases such as HIV/AIDS spreads geographically.
- Chronic diseases – Obesity, diabetes and cardiovascular diseases become widespread.
- Demographic shift – Aging populations in developed economies drive economic stagnation by forcing governments to raise taxes or borrow.
- Liability regime and regulatory framework – Costs rise by multiples of GDP growth, with spread of litigiousness and regulatory revisions.

Technological Risks

- Cyber security/Interconnectedness of infrastructure – A major disruption of the availability, reliability and resilience of critical information infrastructure caused by cyber-crime, terrorist attack or technical failure. Results are felt in major infrastructure: power distribution, water supply, transportation, telecommunication, emergency services and finance.
- Technology/Space weather – health impairment due to exposure to nanoparticles, unintended consequences of technology, or disruptions caused by geomagnetic storms, meteorites and other phenomena originating from beyond the earth.

Evolution of risks

The survey has attempted to maintain consistent risks as much as possible.

Spring 2008 – 23 risks generated by World Economic Forum'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 US current account deficit/fall in US 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 attempt made to maintain trends and simplify

- *Moved Fiscal crises caused by demographic shift from Economic to Societal category and renamed Demographic shift. Updated trend data to make consistent going forward.*
- *Added Financial volatility – price instability of core products such as commodities, energy or currency to Economic category*
- *Combined Pandemic and Infectious diseases to Pandemics/infectious disease – A pandemic emerges with high mortality/Incidence of diseases such as HIV/AIDS spreads geographically.*
- *Changed Breakdown of critical information infrastructure (CII) to Cyber security/Interconnectedness of infrastructure*
- *Changed Nanotechnology Studies indicate health impairment due to unregulated exposure to a class of commonly-used nanoparticles (used in paint, nano-coated clothing, cosmetics or healthcare) exhibiting unexpected, novel properties and easily entering the human body. To Technology/Space weather – health impairment 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 US 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 spread of litigiousness.*

2012 – no changes

2013 – changes to two definitions in reaction to

- *Changed Natural Catastrophe: Inland Flooding to Natural Catastrophe: Severe Weather (except Tropical Storms) and the definition to Meteorological phenomena with potential to cause significant economic losses, fatalities and disruption. Includes inland flooding from all causes, tornados, thunderstorms, drought, wildfires, high winds, snow storms and dust storms.*
- *Changed Liability Regimes to Liability regime and regulatory framework, and the definition to Costs rise by multiples of GDP growth, with spread of litigiousness and regulatory revisions.*

Appendix II - Survey Results 2013

The following includes the survey as well as the responses. There were 223 respondents to the survey. Not all respondents answered every question. The percentages below reflect the number of responses received divided by the number who answered the specific question. Some totals may not add to 100% due to rounding. Note that open ended questions are unedited except for obvious spelling corrections.

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. These risks often seem obvious after they occur but are not considered in advance. Many risk managers are trying to be better prepared by identifying potential emerging risks and prioritizing those that might have the greatest potential impact on society. 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 the Joint Risk Management Section (Canadian Institute of Actuaries, Casualty Actuarial Society and Society of Actuaries). The complete results will be available on the Section webpage at www.soa.org. A summary article is also expected to be published in an upcoming JRMS newsletter.

Keep in mind that you cannot press the "back" button in your browser to review prior answers. Please use the "Previous" button at the bottom of each page to navigate back to already answered questions. If you want to save your responses for later, it is suggested to print each page before pressing the "Continue" button.

Please respond no later than November 12, 2013.

For a glossary of terms, please click here (see Appendix I) and then click on the link in the Related Links box on the right of the page.

Thanks for participating!

Note: Occasionally a comment is **highlighted** to reflect those the researcher found particularly thought provoking.

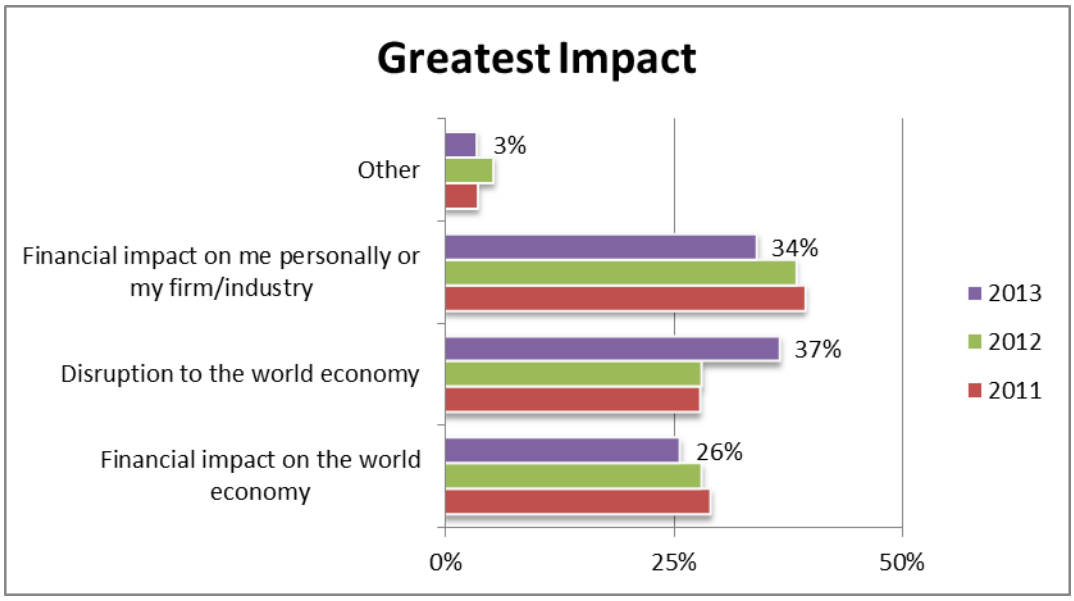
Default Question Block

Previous surveys have found that respondents tend to be anchored in the present with their responses, giving more weight to recent events. It is thought that knowledge of that tendency will help you understand and compensate for it, so we will start by asking you about today's risks. The following questions will ask you to identify current and emerging risks that you expect to have the greatest impact currently and also over the next few years.

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

• 52 responses 26% (28%/29% in 2012/11 survey) Financial impact on the world economy
• 74 responses 37% (28%/28%) Disruption to the world economy
• 69 responses 34% (38%/39%) Financial impact on me personally or my firm/ industry
• 7 responses 3% (5%/4%) Other

- Depends on the context
- Divergence from key targets in Company strategic plans.
- Poor priorities in political debate divert resources needed to confront and hopefully manage risks.
- Financial impact on the current point of reference – usually firm
- Financial impact to my client base
- Financial impact & disruption (it's hard to differentiate these)



Question 2. What is the risk that currently has the greatest impact? (please select one) The 23 risks shown have been adapted from those developed by the World Economic Forum in 2007. (Ed. Note: detailed definitions of these risks can be found in Appendix I, along with how the definitions have evolved over time.)

209 total responses for individual responses (bold corresponds with a 5% increase or doubling, *italics a 5% decrease or halving***)**
Economic – 104 responses 50% (50%/51%/39%)
• *2 responses* *1% (5%/3%/5%)* *Oil price shock*
• 12 responses 6% (4%/2%/11%) 4 Fall in value of US $
• 8 responses 4% (4%/7%/8%) Chinese economic hard landing

• 25 responses 12% (12%/7%/14%) 2 Blow up in asset prices
• 57 responses 27% (26%/32%) 1 Financial volatility (new category in 2011)

Environmental – 18 responses 9% (7%/2%/10%)

• 8 responses 4% (3%/1%/6%) Climate change
• 5 responses 2% (3%/1%/3%) Loss of freshwater services
• 2 response 1% (0%/1%/1%) Natural catastrophe: Tropical storms
• 1 responses 0% (1%/1%/0%) Natural catastrophe: Earthquakes
• 2 responses 1% (0%/0%/1%) Natural catastrophe: Severe Weather

Geopolitical – 35 responses 17% (25%/23%/24%)

• 8 responses 4% (3%/2%/4%) International terrorism
• *3 responses 1% (3%/1%/4%) Proliferation of weapons of mass destruction (WMD)*
• 6 responses 3% (3%/2%/5%) Interstate and civil wars
• *8 responses 4% (8%/11%/4%) Failed and failing states*
• 1 response 0% (0%/0%/1%) Transnational crime and corruption
• 2 responses 1% (1%/2%/4%) Retrenchment from globalization
• *7 responses 3% (7%/4%/1%) Regional instability*

Societal – 22 responses 11% (5%/8%/12%)

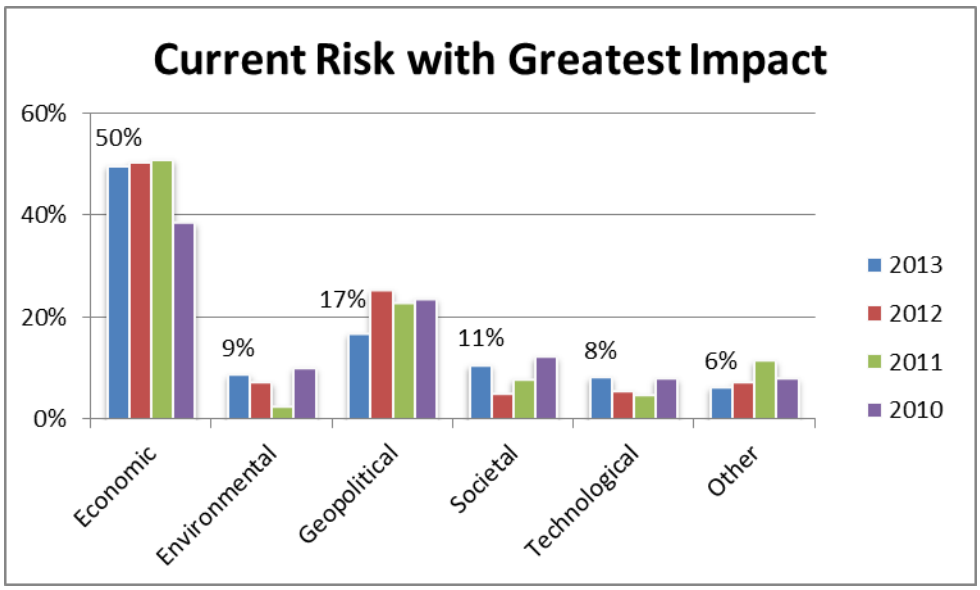
• 5 responses 2% (2%/4%/4%) Pandemics/Infectious diseases
• 0 responses 0% (0%/1%/1%) Chronic diseases
• **6 responses 3% (1%/3%/7%) Demographic shift**
• **11 responses 5% (1%/1%/0%) 5 Liability regimes/regulatory framework**

Technological – 17 responses 8% (5%/5%/8%)

• 16 responses 8% (5%/4%/8%) 3 Cyber security/Interconnectedness of infrastructure
• 1 response 0% (0%/1%/0%) Technology/Space weather

Other – 13 responses 6% (7%/11%/8%)

- Tax regime
- Death of the Ocean
- Fiscal Discipline of US Government
- Political instability
- U.S. public finance
- US dollar loses its reserve currency status
- US self-made default
- US, UK, EU continuing austerity programs
- US Debt Ceiling
- Ineffective priorities, checks and balances in government
- Continuing low interest rates
- Consequences of the socialization of U.S.
- Shift to Governmental Control from personal rights

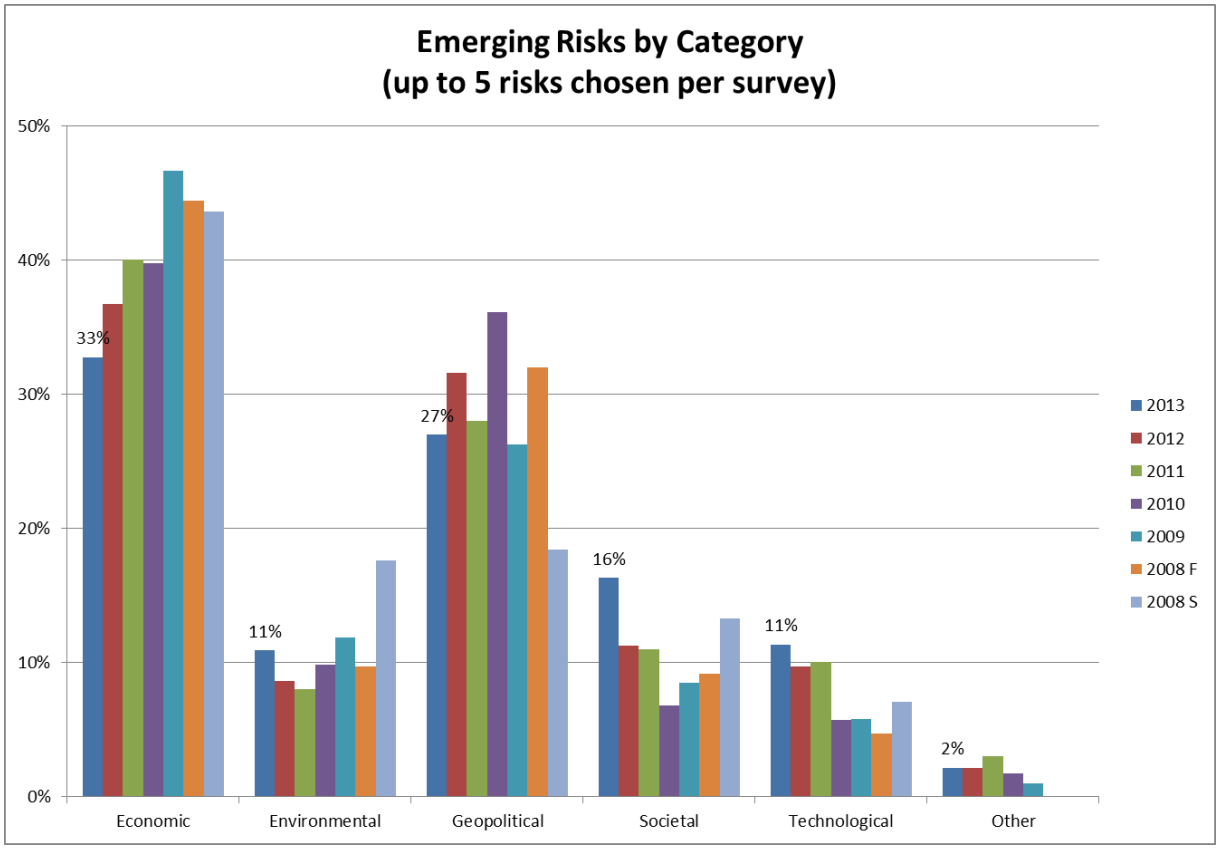


Section 1: Emerging Risks

Question 1. Please choose up to five (5) emerging risks that you feel will have the greatest impact over the next few years.

901 total responses from 196 surveys - average 4.60 (4.53 in 2012)
Divisor in percentages for major categories is 901 – for individual categories it is 196 (223 surveys with 27 who did not respond to this question).

- 0 - 27 surveys 12% (4%/5%)
- 1 - 5 surveys 2% (1%/4%)
- 2 - 3 surveys 1% (0%/1%)
- 3 - 15 surveys 7% (5%/7%)
- 4 - 20 surveys 9% (11%/15%)
- 5 - 153 surveys 69% (78%/68%)



Economic – 295 responses 33% (previous surveys 2012/2011/2010/2009/F2008/S2008 37%/40%/40%/47%/44%/44%)

• 14 responses 7% (31%/32%/40%/45%)		Oil price shock
• 52 responses 27% (26%/25%/49%/66%)		Fall in value of US $
• 54 responses 28% (31%/32%/41%/33%)		Chinese economic hard landing
• 59 responses 30% (24%/22%/31%/49%)	3	Blow up in asset prices
• 116 responses 59% (62%/68%)	1	Financial volatility

Environmental – 98 responses 11% (9%/8%/10%/12%/10%/18%)

• 32 responses 16% (20%/14%/25%/27%)	Climate change
• 17 responses 9% (11%/6%/9%/10%)	Loss of freshwater services
• 16 responses 8% (6%/5%/4%/8%)	Natural catastrophe: Tropical storms
• 12 responses 6% (2%/6%/5%/7%)	Natural catastrophe: Earthquakes
• 21 responses 11% (1%/4%/2%/5%)	Natural catastrophe: Severe Weather

Geopolitical – 243 responses 27% (32%/28%/36%/26%/32%/18%)

• 52 responses 27% (28%/20%/43%/30%)		International terrorism
• 10 responses 5% (14%/9%/18%/14%)		Proliferation of weapons of mass destruction (WMD)
• 25 responses 13% (14%/10%/10%/9%)		Interstate and civil wars
• 57 responses 29% (33%/42%/38%/18%)	5	Failed and failing states
• 16 responses 8% (5%/3%/12%/7%)		Transnational crime and corruption
• 26 responses 13% (13%/11%/25%/18 %)		Retrenchment from globalization
• 57 responses 29% (42%/32%/25%/28%)	5	Regional instability

Societal – 147 responses 16% (11%/11%/7%/8%/9%/13%)

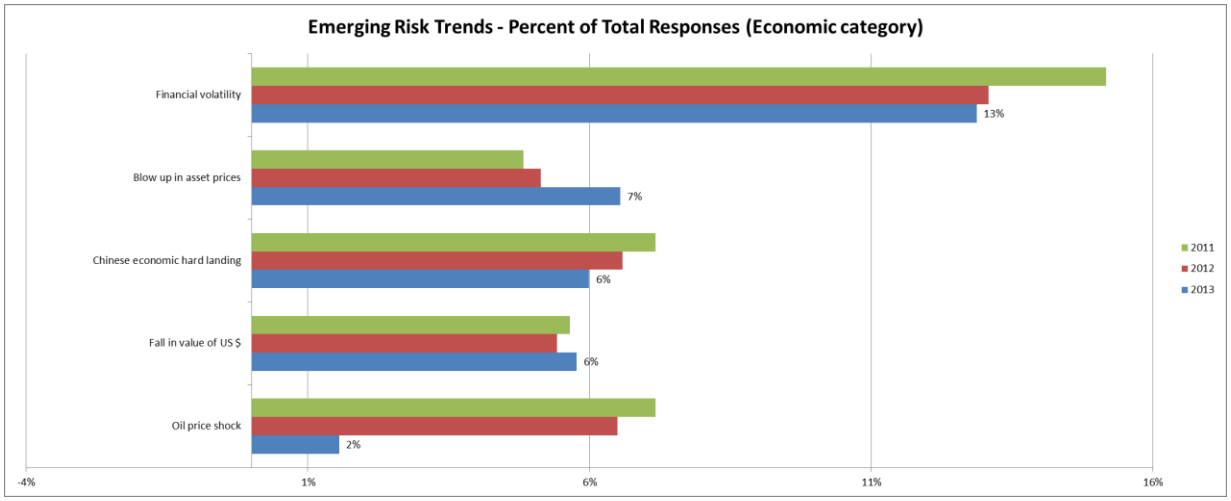
• 37 responses 19% (12%/13%/22%/30%) Pandemics/Infectious diseases
• 6 responses 3% (3%/2%/4%/4%) Chronic diseases
• 58 responses 30% (30%/30%/26%/27%) 4 Demographic shift
• 46 responses 23% (8%/7%/6%/6%) Liability regimes/regulatory framework

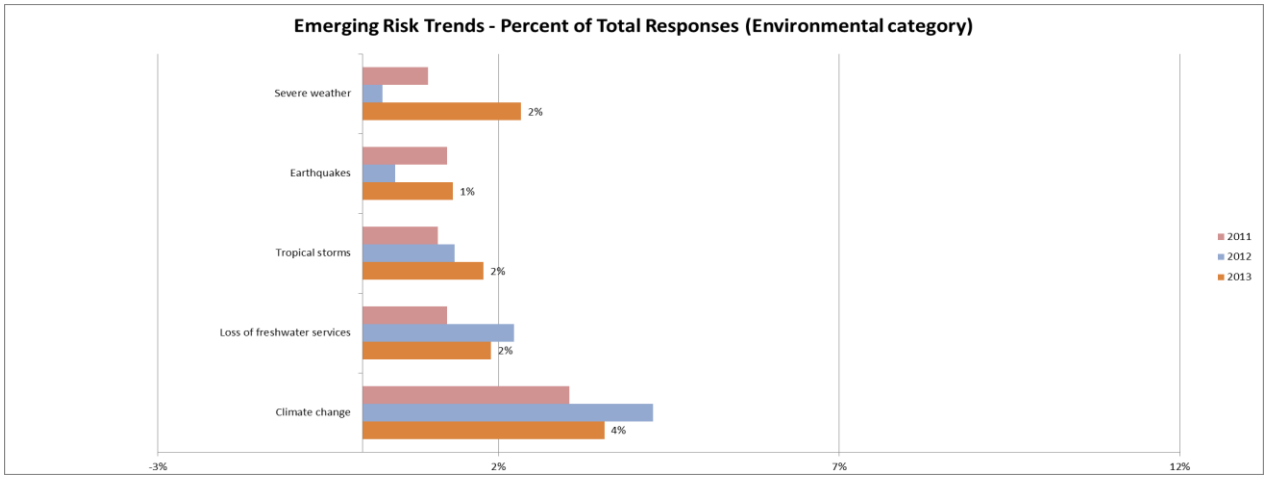
Technological – 102 responses 11% (10%/10%/6%/6%/5%/7%)

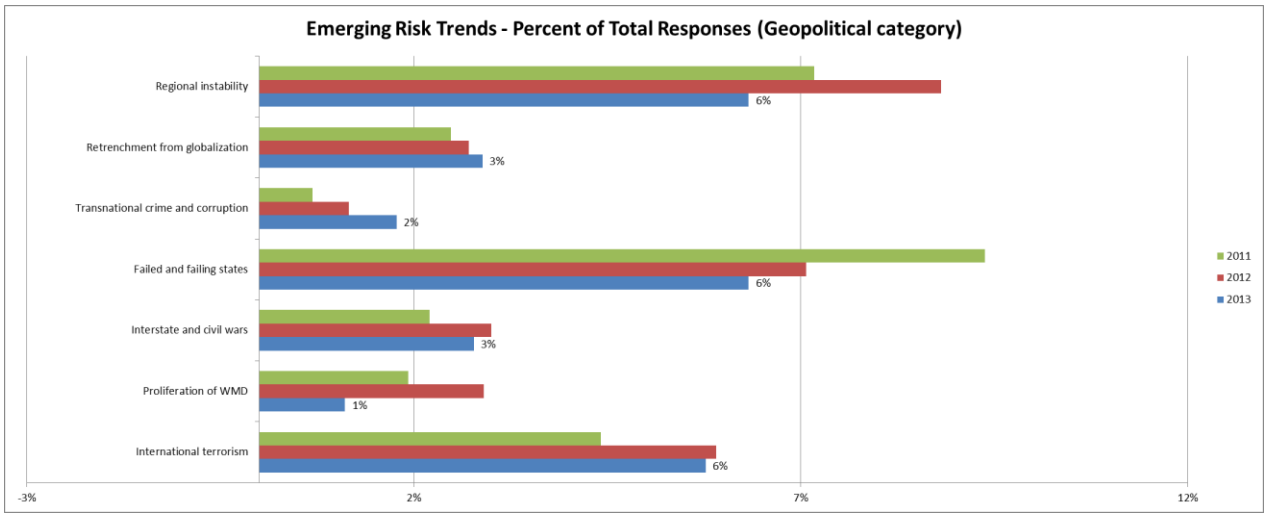
• 92 responses 47% (40%/38%/23%/21%) 2 Cyber security/interconnectedness of infrastructure
• 10 responses 5% (6%/5%/4%/7%) Technology/space weather

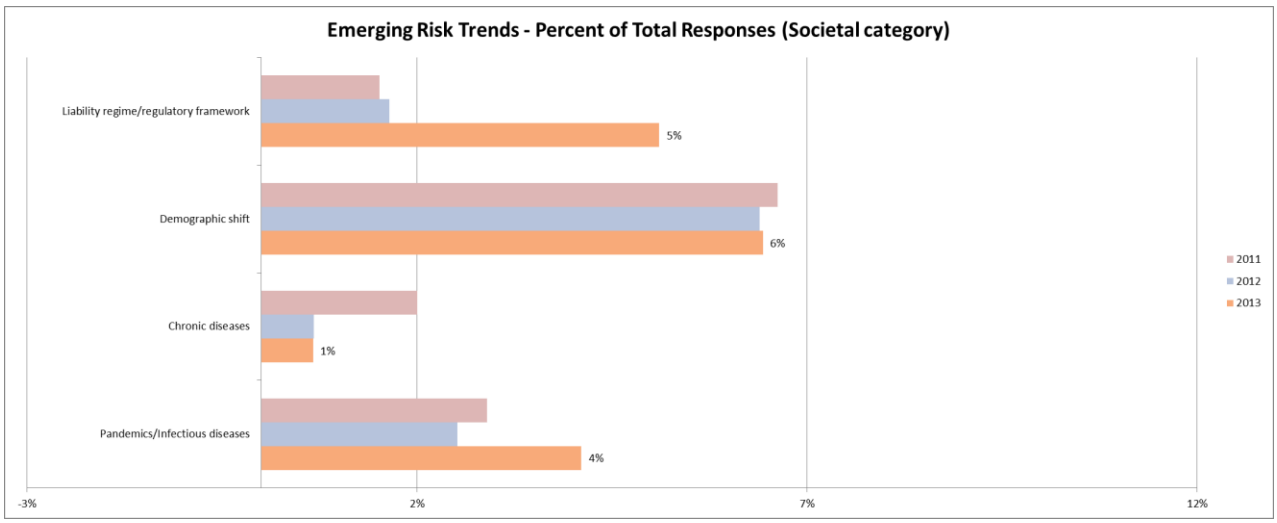
Other – 16 responses 2% (2%/3%/2%/1%/0%/0%)

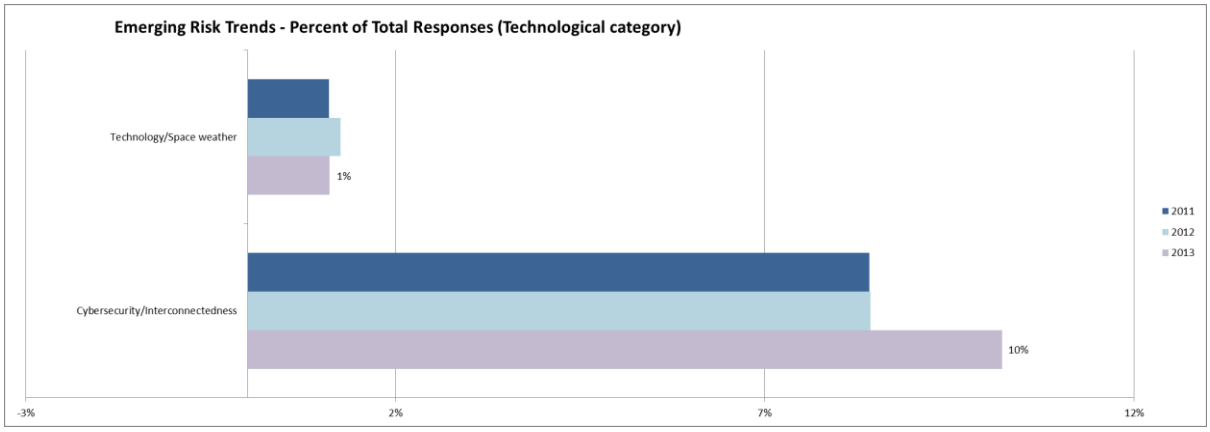
- Political instability
- U.S. public finance
- Government gridlock
- US dollar loses its reserve currency status
- Global and local economic imbalances
- US dollar no longer reserve currency
- Potential Downgrade of US Debt
- Failure to address effects of focus shift from western to Asian economies
- Worldwide income inequality
- Inability to produce enough food to feed people worldwide
- Extreme Interest Rates
- Continuation of negative real interest rates
- Sharp rise in US rates
- Healthcare reform
- Food insecurity/Crop failure/Depletion of fish stocks
- Mobile Technology











Another way to review this data is as a percent of the total responses. For example, Climate change had 32 responses in this survey. In the previous analysis just shared, 32/196 = 16%. In this next section we will look at 32/901 = 4% and compare the results with previous surveys. **Bold** signifies higher than the average in the current survey and *Italics* signifies lower than the average.

Economic (41% average – 33%/37%/40%/40%/47%/43%/42% October 2013, October 2012, October 2011, November 2010, December 2009, November 2008, April 2008)

• *8% - 2%/6%/7%/9%/10%/8%/13%*	*Oil price shock*
• *9% - 6%/5%/6%/10%/14%/10%/9%*	*Fall in value of US $*
• *7% - 6%/7%/7%/9%/7%/6%/9%*	*Chinese economic hard landing*
• 7% - 7%/5%/5%/6%/10%/14%/5%	Blow up in asset prices
• *14% - 13%/13%/15%*	*Financial volatility*

Environmental (11% - 11%/9%/8%/10%/12%/9%/17%)

• *5% - 4%/4%/3%/5%/6%/5%/9%*	*Climate change*
• 2% - 2%/2%/1%/2%/2%/2%/3%	Loss of freshwater services
• **1% - 2%/1%/1%/1%/2%/1%/2%**	**Natural catastrophe: Tropical storms**
• 1% - 1%/0%/1%/1%/1%/1%/2%	Natural catastrophe: Earthquakes
• **1% - 2%/0%/1%/0%/1%/0%/1%**	**Natural catastrophe: Severe Weather**

Geopolitical (28% - 27%/32%/28%/36%/26%/31%/18%)

• 6% - 6%/6%/4%/9%/6%/6%/4%	International terrorism
• *3% - 1%/3%/2%/4%/3%/3%/4%*	*Proliferation of weapons of mass destruction (WMD)*
• **2% - 3%/3%/2%/2%/2%/2%/3%**	**Interstate and civil wars**
• 6% - 6%/7%/9%/8%/4%/6%/2%	Failed and failing states
• 2% - 2%/1%/1%/3%/2%/2%/2%	Transnational crime and corruption
• 3% - 3%/3%/2%/5%/4%/5%/2%	Retrenchment from globalization
• 6% - 6%/9%/7%/5%/6%/7%/1%	Regional instability

Societal (11% - 16%/11%/11%/7%/8%/9%/12%)

• *5% - 4%/3%/3%/5%/6%/7%/8%*	*Pandemics/Infectious diseases*
• 1% - 1%/1%/2%/1%/1%/1%/2%	Chronic *diseases*
• 6% - 6%/6%/7%/6%/6%/5%/6%	Demographic shift
• **2% - 5%/2%/2%/1%/1%/1%/2%**	**Liability regimes/regulatory framework**

Technological (8% - 11%/10%/10%/6%/5%/4%/7%)
• 6% - 10%/8%/8%/5%/4%/3%/5% Cyber security/Interconnectedness of infrastructure
• 1% - 1%/1%/1%/1%/1%/1%/2% Technology/space weather

Question 2. Out of these five, what one emerging risk would you rank number one as having the greatest impact?
157 total responses

Economic – 69 responses 44% (54%/56%/48%/63%/65%)

• 2 responses	1% (5%/3%/9%/6%/12%)		Oil price shock
• 8 responses	5% (7%/2%/11%/26%/18%)		Fall in value of US $
• 9 responses	6% (5%/5%/14%/4%/3%)	5	Chinese economic hard landing
• 13 responses	8% (9%/6%/10%/22%/25%)	2 4	Blow up in asset prices
• 37 responses	24% (28%/40%)	1	Financial volatility

Environmental – 9 responses 6% (6%/4%/7%/12%/4%)

• 7 responses	4% (5%/2%/4%/6%/3%)	Climate change
• 0 responses	0% (0%/0%/2%/3%/1%)	Loss of freshwater services
• 0 response	0% (1%/1%/1%/2%/0%)	Natural catastrophe: Tropical storms
• 0 responses	0% (0%/1%/0%/1%/0%)	Natural catastrophe: Earthquakes
• 2 responses	1% (0%/0%/0%/0%/0%)	Natural catastrophe: Severe Weather

Geopolitical – 26 responses 17% (23%/22%/28%/14%/18%)

• 6 responses	4% (1%/2%/4%/2%/3%)	International terrorism
• 1 responses	1% (1%/2%/7%/4%/3%)	Proliferation of weapons of mass destruction (WMD)
• 3 responses	2% (3%/1%/5%/1%/1%)	Interstate and civil wars
• 7 responses	4% (8%/12%/8%/2%/2%)	Failed and failing states
• 1 responses	1% (0%/0%/0%/1%/1%)	Transnational crime and corruption
• 2 responses	1% (3%/2%/3%/1%/2%)	Retrenchment from globalization
• 6 responses	4% (7%/4%/1%/3%/4%)	Regional instability

Societal – 20 responses 13% (6%/5%/4%/2%/2%)

• 1 responses	1% (1%/2%/3%/2%/2%)		Pandemics/Infectious diseases
• 0 response	0% (1%/0%/1%/0%/0%)		Chronic diseases
• 4 responses	3% (2%/3%/3%/5%/7%)		Demographic shift
• 15 responses	10% (2%/1%/0%/0%/0%)	3	Liability regimes/regulatory framework

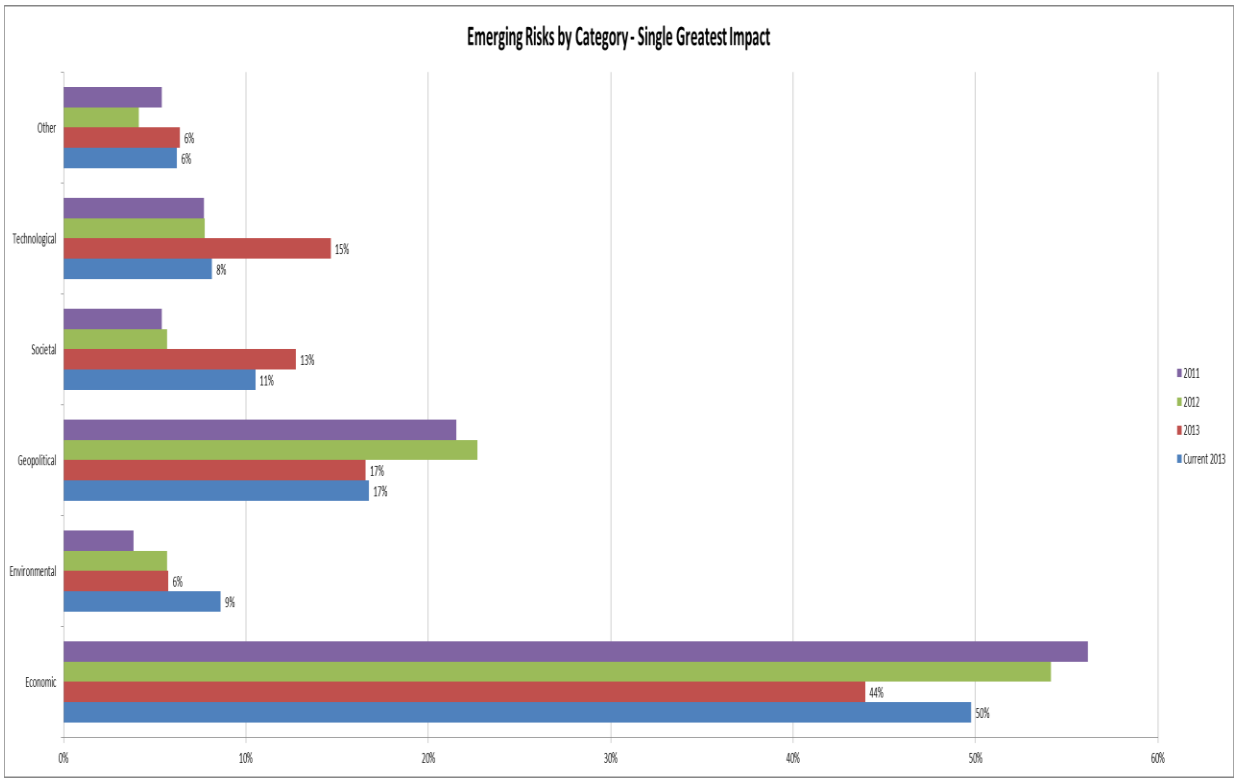
Technological – 23 responses 15% (8%/8%/9%/6%/6%)

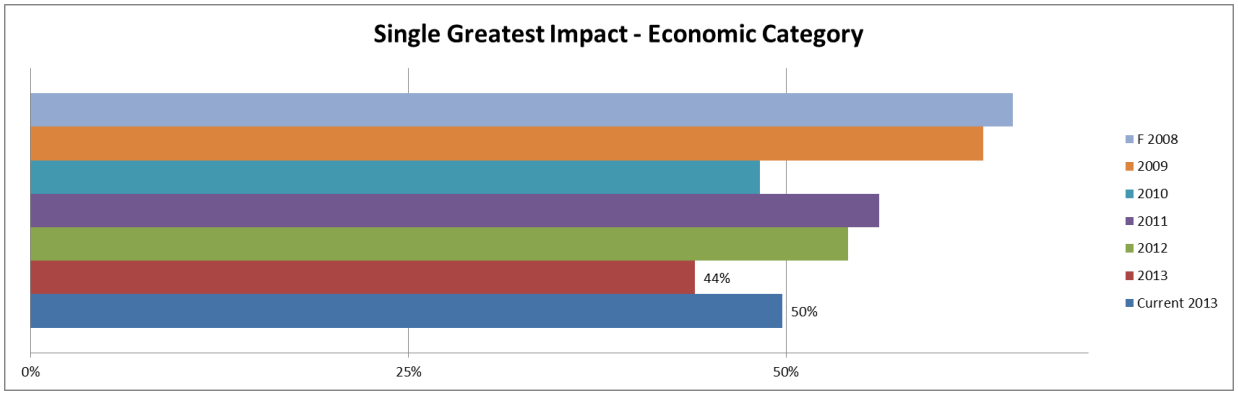
• 22 responses	14% (7%/7%/9%/4%/6%)	2	Cyber security/interconnectedness of infrastructure
• 1 response	1% (1%/1% (0%/1%/0%)		Technology/Space weather

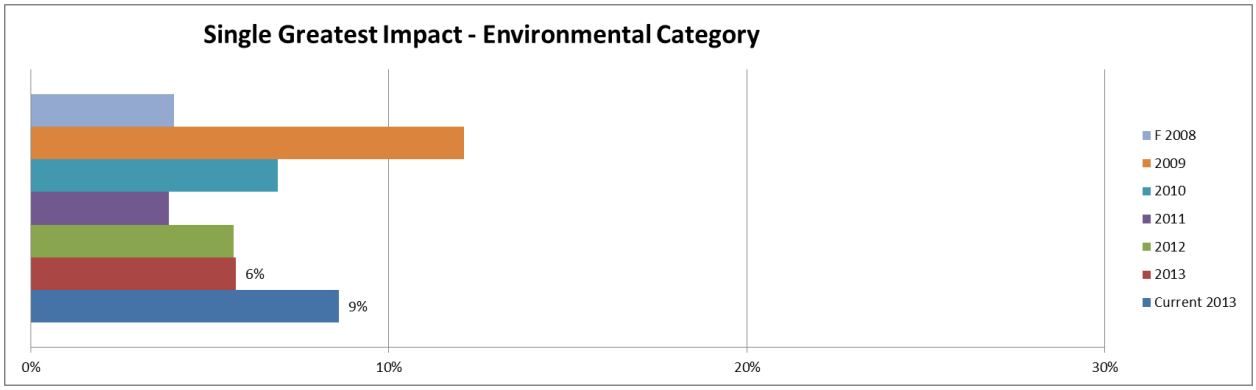
Other – 10 responses 6% (4%/5%/3%/3%/3%)

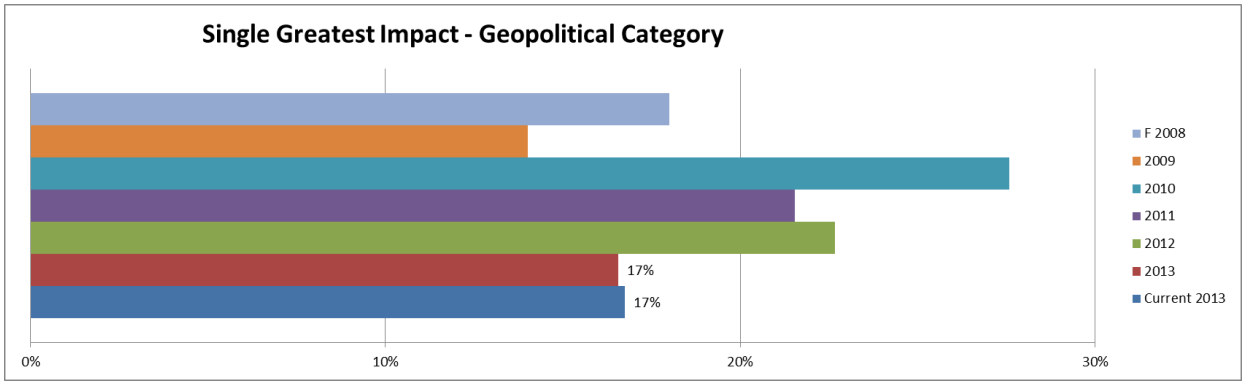
- Political instability
- U.S. Public Finance
- US dollar loses its reserve currency status
- US dollar no longer reserve currency
- Power of the Tea Party in Government

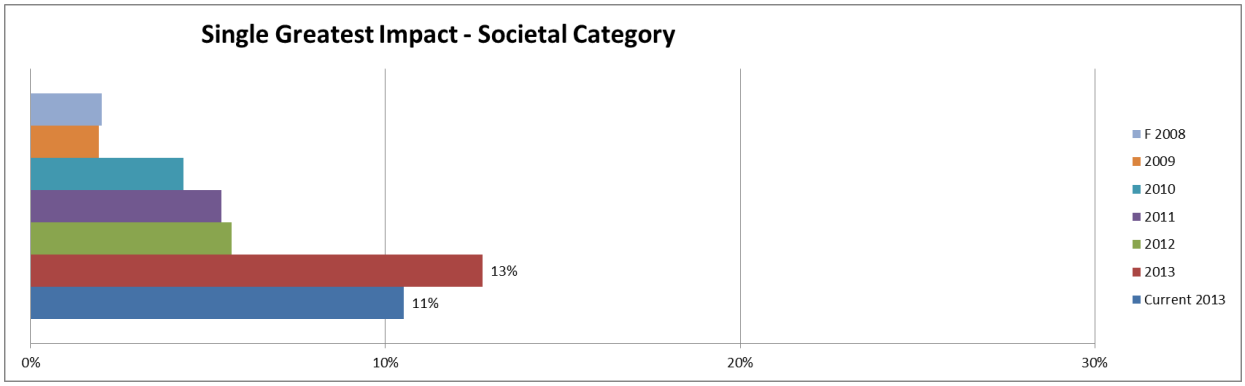
- Extreme Interest Rates
- Continuation of negative real interest rates
- Healthcare reform
- Food security / Crop failure / Depletion of fish stocks

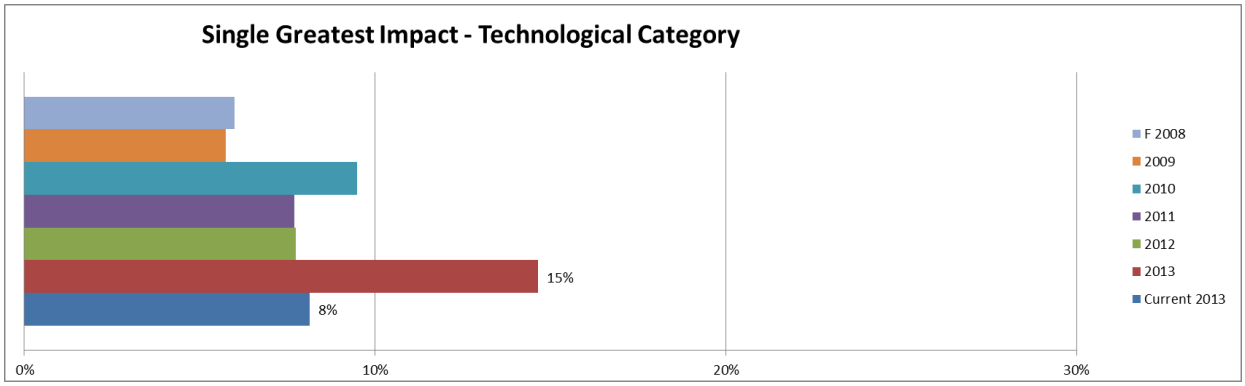












Question 3. Of the 23 emerging risks, are there combinations that you believe will have a large impact over the next few years? These could occur at the same time (concurrent) or follow each other (sequential). Select up to three combinations of two risks each. A follow-up question applies to the first combination listed so make that the one you think will have the largest impact.

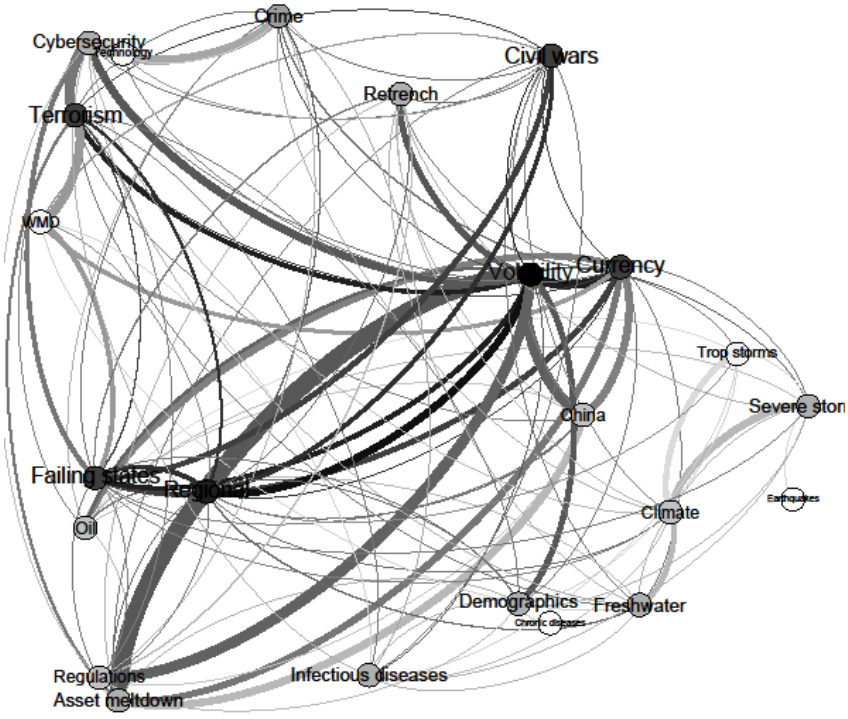
Total mentions (risks are numbered)

Economic – 40% (46%/48%/45%/53%/49% in previous surveys)			
• 3% (9%/9%/10%/13%/12%)	1		Oil price shock
• 8% (6%/6%/13%/18%/12%)	2	2	Fall in value of US $
• 6% (7%/8%/10%/8%/6%)	3		Chinese economic hard landing
• 7% (8%/6%/7%/11%/14%)	4	4	Blow up in asset prices
• 16% (15%/19%)	5	1	Financial volatility
Environmental – 11% (9%/7%/11%/13%/9%)			
• 4% (4%/2%/5%/6%/4%)	6		Climate change
• 2% (2%/2%/3%/2%/2%)	7		Loss of freshwater services
• 2% (1%/1%/2%/2%/2%)	8		Natural catastrophe: Tropical storms
• 0.2% (1%/2%/1%/1%/0%)	9		Natural catastrophe: Earthquakes
• 3% (1%/1%/1%/2%/1%)	10		Natural catastrophe: Severe Weather
Geopolitical – 32% (32%/32%/35%/25%/32%)			
• 6% (6%/6%/9%/6%/8%)	11	5	International terrorism
• 4% (4%/2%/4%/4%/3%)	12		Proliferation of weapons of mass destruction (WMD)
• 4% (4%/3%/4%/1%/3%)	13		Interstate and civil wars
• 6% (8%/9%/8%/3%/5%)	14		Failed and failing states
• 4% (1%/2%/2%/1%/1%)	15		Transnational crime and corruption
• 3% (3%/3%/4%/3%/4%)	16		Retrenchment from globalization
• 6% (7%/7%/5%/6%/8%)	17		Regional instability
Societal – 9% (7%/6%/5%/5%/8%)			
• 2% (2%/1%/4%/4%/7%)	18		Pandemics/Infectious diseases
• 0.4% (1%/1%/0%/1%/1%)	19		Chronic disease
• 3% (3%/3%/5%/4%/6%)	20		Demographic shift
• 4% (1%/1%/0%/1%/0%)	21		Liability regimes/regulatory framework
Technological – 9% (5%/7%/4%/3%/2%)			
• 7% (5%/6%/3%/2%/1%)	22	3	Cyber security/Interconnectedness of infrastructure
• 1% (1%/1%/0%/1%/0%)	23		Technology/Space weather

Two risk combinations – 474 total responses

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	0	9	2	1	4	0	1	1	0	1	1	0	0	0	2	0	3	0	0	0	0	0	0
2	0	0	11	9	13	0	1	0	0	2	1	5	2	7	3	1	1	0	0	2	0	2	0
3	0	0	0	11	16	0	0	0	0	0	1	0	1	2	0	2	3	0	0	0	1	0	0
4	0	0	0	0	28	0	0	0	0	0	4	0	1	1	0	1	1	0	0	2	1	0	0
5	0	0	0	0	0	0	0	1	0	1	6	0	1	6	1	8	10	2	0	8	16	11	2
6						0	7	8	0	10	0	0	1	1	2	1	1	2	0	0	0	1	0
7						0	0	0	0	1	1	1	1	0	0	1	3	2	0	0	0	1	0
8						0	0	0	0	2	0	0	0	0	0	0	1	1	0	1	0	0	0
9						0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
10						0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	0	0	0
11											0	13	1	3	1	0	4	1	0	1	1	16	0
12											0	0	3	6	0	0	2	1	0	0	0	0	0
13											0	0	0	7	1	1	5	2	0	0	0	2	1
14											0	0	0	0	1	3	6	0	0	1	2	6	0
15											0	0	0	0	0	0	3	1	0	0	1	13	1
16											0	0	0	0	0	0	2	0	0	0	3	0	0
17											0	0	0	0	0	0	0	0	0	2	1	0	0
18																		0	0	2	0	1	0
19																		0	0	3	0	0	0
20																		0	0	0	2	0	0
21																		0	0	0	0	2	0
22																						0	7
23																						0	0

A graphical representation using the open source Gephi source graphing software provides an interesting visual analysis of the combination data.



Leading combinations were

28 responses (7%) 5% in prior survey, ranked #2
Blow up in asset prices
Financial volatility

16 responses (4%) 4%, #4
Chinese economic hard landing
Financial volatility

16 responses (4%) 1%, NR
Financial volatility
Liability regimes and regulatory framework

16 responses (4%) 2%, #9
International terrorism
Cyber security/interconnectedness of infrastructure

13 responses (3%) 3%, #6
Fall in value of US $
Financial volatility

13 responses (3%) 4%, #3
International terrorism
Proliferation of weapons of mass destruction (WMD)

13 responses (3%) 0%, NR
Transnational crime and corruption
Cyber security/interconnectedness of infrastructure

11 responses (3%) 3%, #7
Fall in value of US $
Chinese economic hard landing

11 responses (3%) 2%, NR
Chinese economic hard landing
Blow up in asset prices

11 responses (3%) 1%, NR
Financial volatility
Cyber security/interconnectedness of infrastructure

10 responses (2%) 2%, NR
Climate change
Natural catastrophe: Severe weather

10 responses (2%) 3%, #8
Financial volatility
Regional instability

9 responses (2%) 2%, #10
Oil price shock
Fall in value of US $

9 responses (2%) 2%, #10
Fall in value of US $
Blow up in asset prices

Leading combinations in 2013 not in the top 14 in the current survey

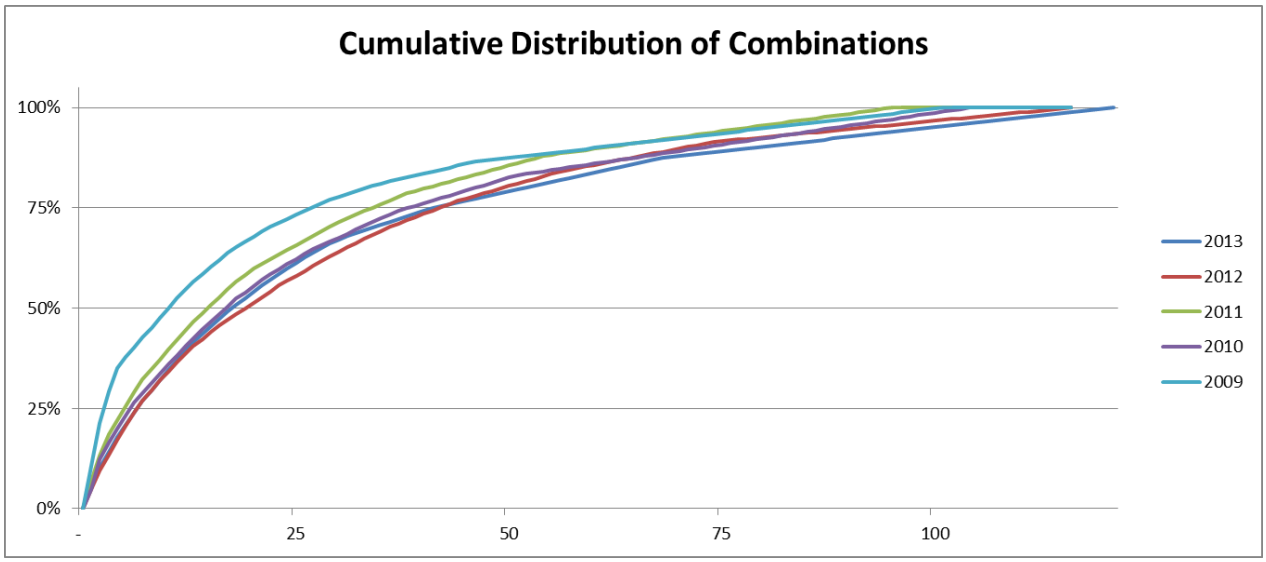
#1 24 responses (5%)
Oil price shock
Financial volatility
#5 17 responses (3%)
Financial volatility
Failed and failing states
#8 13 responses (3%)
Failed and failing states
Regional instability
#11 10 responses (2%)
Oil price shock
International terrorism

Combinations by category

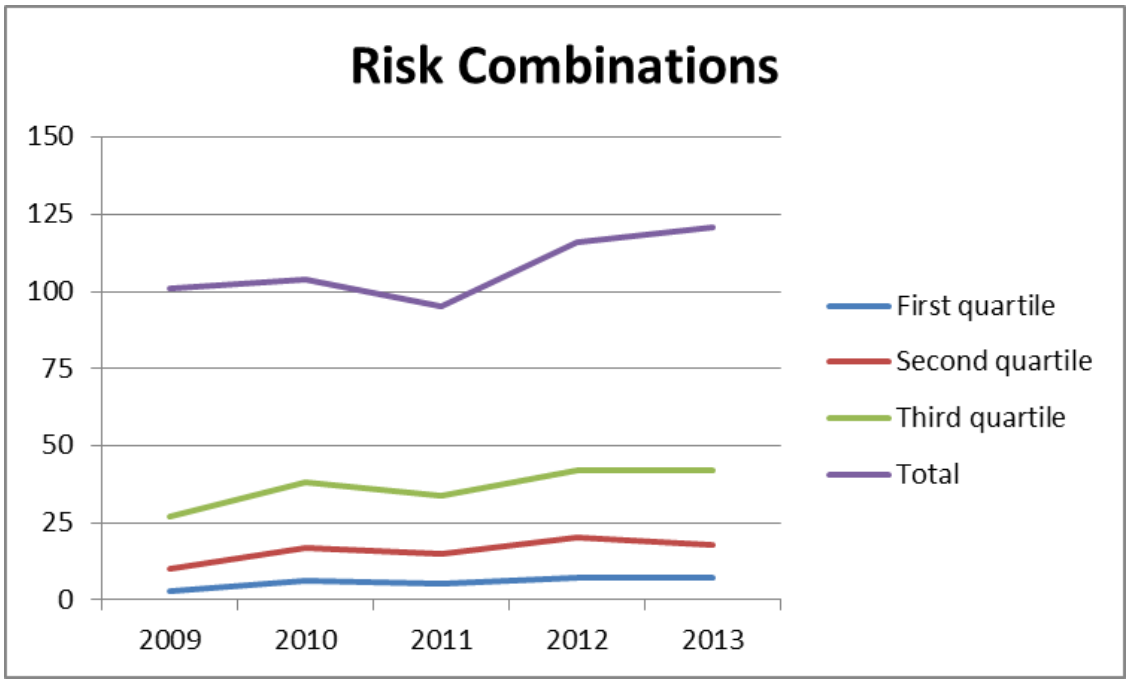
		2008	2009	2010	2011	2012	2013
Economics	Economics	34%	42%	29%	29%	29%	24%
Economics	Environmental	2%	3%	5%	3%	3%	2%
Economics	Geopolitical	22%	16%	21%	24%	21%	18%
Economics	Societal	2%	3%	2%	6%	6%	7%
Economics	Technological	1%	1%	3%	4%	3%	4%
Environmental	Environmental	7%	9%	7%	4%	6%	7%
Environmental	Geopolitical	2%	2%	3%	2%	2%	4%
Environmental	Societal	5%	3%	2%	2%	1%	2%
Environmental	Technological	0%	0%	0%	0%	0%	0%
Geopolitical	Geopolitical	16%	14%	20%	14%	18%	15%
Geopolitical	Societal	4%	2%	2%	1%	2%	4%
Geopolitical	Technological	1%	2%	3%	7%	4%	9%
Societal	Societal	2%	1%	2%	1%	2%	2%
Societal	Technological	1%	0%	1%	0%	1%	1%
Technological	Technological	0%	1%	0%	1%	1%	2%

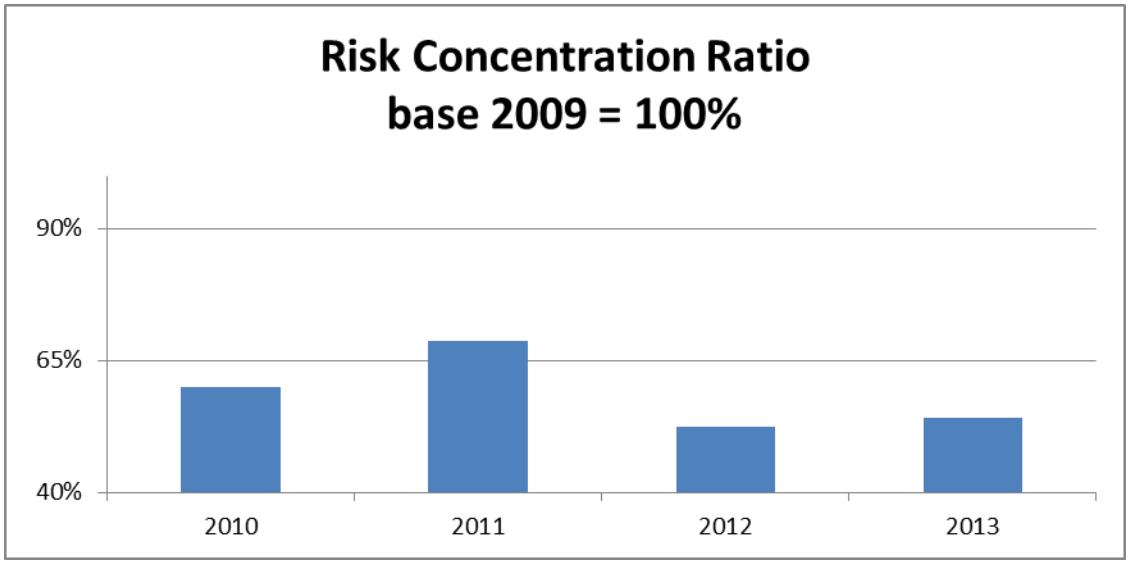
Combinations by choice 1, 2, 3

		Combo 1	Combo 2/3	Combo 1	Combo 2	Combo 3	Total
Economics	Economics	39%	16%	61	28	15	104
Economics	Environmental	1%	2%	2	3	3	8
Economics	Geopolitical	18%	17%	28	22	25	75
Economics	Societal	7%	8%	11	9	12	32
Economics	Technological	2%	4%	3	7	5	15
Environmental	Environmental	6%	7%	10	13	7	30
Environmental	Geopolitical	3%	4%	4	10	2	16
Environmental	Societal	3%	2%	4	1	5	10
Environmental	Technological	1%	0%	1	1	0	2
Geopolitical	Geopolitical	9%	18%	14	23	25	62
Geopolitical	Societal	3%	4%	5	4	8	17
Geopolitical	Technological	6%	11%	10	15	14	39
Societal	Societal	0%	3%	0	3	4	7
Societal	Technological	0%	1%	0	1	2	3
Technological	Technological	1%	2%	2	4	1	7
		100%	100%	155	144	128	427



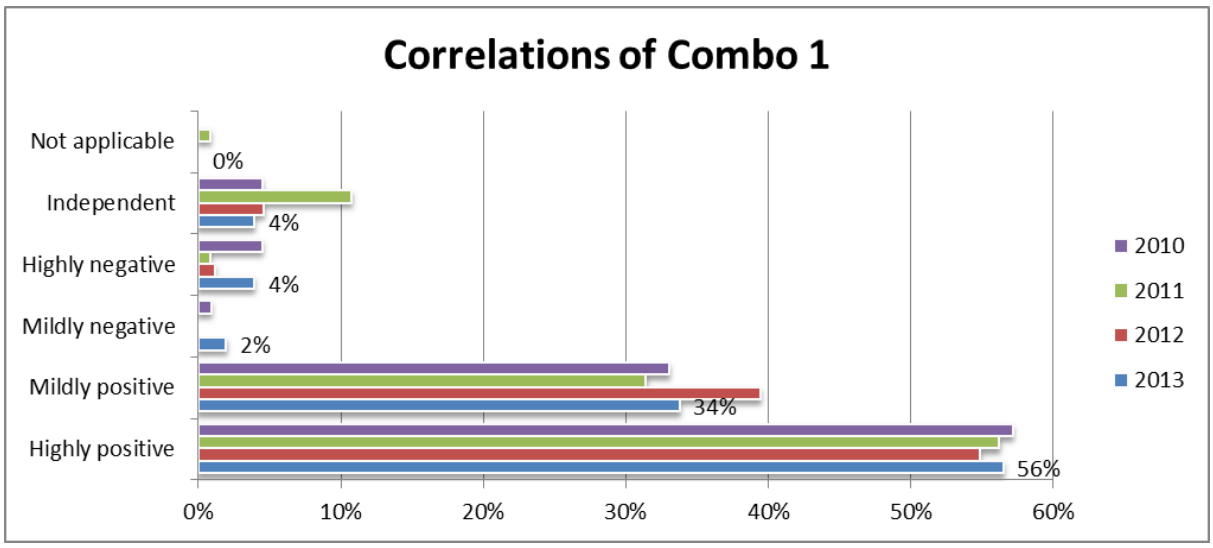
Risk Concentration Ratio								
						Compared	Avg prior to	
	2009	2010	2011	2012	2013	to 2009	Current Yr	Avg/Curr Y
First quartile	3	6	5	7	7	43%	5.3	0.75
Second quartile	10	17	15	20	18	56%	15.5	0.86
Third quartile	27	38	34	42	42	64%	35.3	0.84
Total	101	104	95	116	121		104.0	0.86
Remaining	152	149	158	137	132			





Question 4. For the first combination listed in Question 3, do you feel that the risks chosen will operate independently or be correlated?

- 87 responses 56% (55%/56%/57%) Highly positively correlated
- 52 responses 34% (39%/31%/33%) Mildly positively correlated
- 3 responses 2% (0%/0%/1%) Mildly negatively correlated
- 6 responses 4% (1%/1%/4%) Highly negatively correlated
- 6 responses 4% (5%/11%/4%) Independent
- 0 responses 0% (0%/1%/0%) Not applicable



Question 5. Which risks in the next year do you expect (including interactions) to create the greatest disruption in your firm or industry? (please select no more than three)

158 respondents chose at least one for a total of 376 responses (2.4 average)

Economic – 171 responses (46%)
- 1 responses 0% Oil price shock
- 28 responses 8% 4 Fall in value of US $
- 9 response 2% Chinese economic hard landing
- 36 responses 10% 3 Blow up in asset prices
- 97 responses 26% 1 Financial volatility

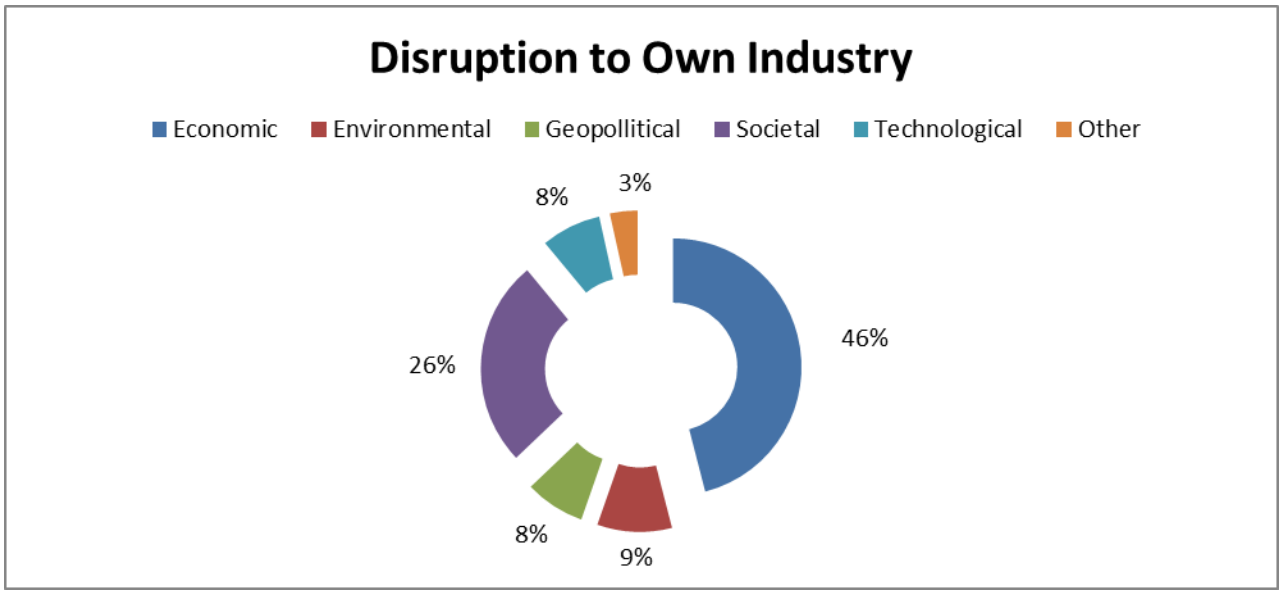
Environmental – 35 responses (9%)
- 4 responses 1% Climate change
- 1 responses 0% Loss of freshwater services
- 12 responses 3% Natural catastrophe: Tropical storms
- 4 responses 1% Natural catastrophe: Earthquakes
- 14 response 4% Natural catastrophe: Severe Weather

Geopolitical – 28 responses (8%)
- 4 responses 1% International terrorism
- 0 responses 0% Proliferation of weapons of mass destruction (WMD)
- 2 responses 1% Interstate and civil wars
- 7 responses 2% Failed and failing states
- 1 responses 0% Transnational crime and corruption
- 6 responses 2% Retrenchment from globalization
- 8 responses 2% Regional instability

Societal – 97 responses (26%)
- 16 responses 4% Pandemics/Infectious diseases
- 8 responses 2% Chronic diseases
- 22 responses 6% 5T Demographic shifts
- 51 responses 14% 2 Liability regimes/regulatory framework

Technological – 28 responses (8%)
• 22 responses 6% 5T Cyber security/Interconnectedness of infrastructure
• 6 responses 2% Technology/Space weather
Not Sure – 4 responses (1%)
Other – 13 responses (3%)

- Regulatory pressures
- Inability of US government to get spending under control
- U.S. Public Finance
- Setting ph dividends too low
- Economic slow-down
- US dollar no longer reserve currency
- Regulation changes
- US Debt default
- Extreme Interest Rates
- Continuation of negative real interest rates
- Sharp rise in US rates
- Obama care instability
- Healthcare reform



Question 6. Some risk managers seek ways to exploit risk by finding opportunities to add those that are mispriced or provide diversification. Which, if any, emerging "opportunities" do you monitor, and why?

- None
- Steepness of yield curve to 'prepurchase' assets
- Mispricing within securitization, reinsurance, and selective investment categories
- None
- Financial instability / could represent good investment opportunity

- Demographic shifts for products and market focus
- None – **the real risks are not predictable**
- Opportunity to purchase assets at depressed prices if credit spreads widen – we did this in 2009.
- I prefer to stick to my knitting, New Zealand EQ risk seemed like a great diversification play, … until it wasn't.
- Health cures and their impacts on mortality
- Blow up in asset prices because it is a good opportunity to purchase undervalued assets
- VIX futures contracts / Catastrophe bond prices on secondary market / Deep out of the money index puts /
- Adoption of technologies after they have been proven. Careful deployment into new opportunities such as health insurance exchanges.
- None
- Capital minimization schemes.
- Equity markets for pockets of severely out of favor classes
- N/A
- Mortality and longevity trends
- **Arbitrage created by evolving experience (ex. Mortality) compared to static assumption scenario for pricing of insurance coverages**
- None
- None.
- US
- **Demographic shift. U.S. is completely unprepared for it, and U.S. public finance is a disaster.**
- Regulatory changes as this strongly affects the profitability of insurance products. E.g., with higher capital requirement, some products no longer have high economics, some product features are banned to protect policyholders' interest.
- Interest rate movements since our firm took out a loan to bolster surplus and will we get a return greater than the interest being paid on the surplus note?
- Yes, it is part of unknown risk we need to take for this decision /
- International investing
- Watch for changes in cash flows and investor sentiment
- Slow-down
- None
- None
- Potentially mispriced assets – so that we can buy/sell at a lower/higher value than "fair value".
- Diversification between longevity risk and mortality risk because we sell Term and the parent company sells Annuities
- Demographic shifts – can adjust product line-up to adapt to changes
- Financial volatility. To see when is most opportune time for pension plan sponsors to terminate and fairly settle their plan.
- Technology disruption and demographic changes

- Risk of US self-induced economic chaos suggests investing in emerging markets which are currently undervalued
- Do not currently have a monitoring program in place. Would be curious to know how other companies monitor this.
- Interest rate movements. Major short-term risk.
- Disruptive technology via use of internet
- Emerging risks
- None
- **Climate change, demographic changes, regional instability,**
- None
- Changing demographics to see if marketing approaches & products remain relevant.
- All key risks are monitored, none specifically for opportunities.
- (re)insurance and securitization of risks
- Demographic Shift – to evaluate current and future product offerings / Financial Volatility – To use volatility to find value-priced investments
- Opportunities that we monitor are related to deepening existing distribution channels.
- Interest rate changes and market dislocation.
- Liability Regimes and regulatory framework because they are (believed to be) the most likely, most impactful risks the enterprise faces.
- Failure to invest in future generations and managing future risks
- Interest rates and the interest rate curve. Strong upward movements or an inversion of the curve will suggest an opportunity to sell assets short. I also watch the growth of M2 – if the rate of growth slows it might indicate that asset prices in current bubble areas of the economy, such as stocks and bonds, are about to fall, which will provide a profitable opportunity to short those assets.
- They may be opportunities in financial volatility
- Monitor underlying pricing assumptions
- Blow up in asset prices. **Volatility is opportunity** in this space.
- f/x mostly due to optionality in multi-currency product line.
- **I look for investment opportunities due to climate change such as warmer climates in Canada more receptive to farming and wetter climates near the Sahara allowing recapture of cropland.**
- Product segments abandoned by others due to recent poor experience or regulatory change
- None
- We monitor all risks and emerging situations looking for upside opportunities and competitive advantages.
- Financial volatility
- **Increased use of solar. It is both an opportunity and risk**
- The inability of our competitors to attract talent and perpetuate their business as senior associates retire will create a huge opportunity for our organization. That and failure to reinvest profits in new technology, systems and strategy are also

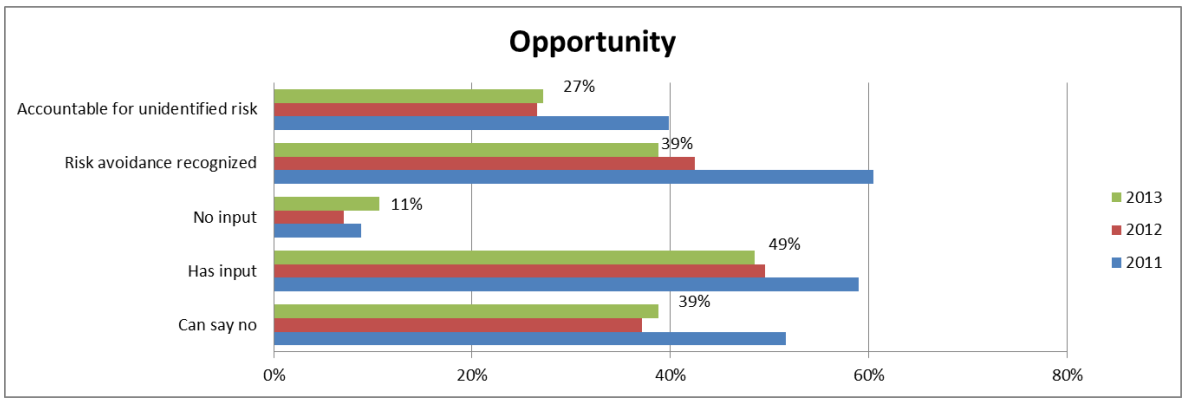
where companies in our industry will surpass those not making similar investments since we will use these capabilities to take clients.
- Price of US equity indices; price of energy (oil, natural gas); price of gold; US$/C$ and US$/euro exchange rates.
- None
- None
- Dollar value
- Investment risks and economic risk that effect our ability to identify and quantify risks and exposures to our industry segments.

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)

155 responses - percentages back out those stating question is not applicable to them

- 40 responses 39% (34%) Our ERM function can say no to a strategic opportunity
- 50 responses 49% (25%) Our ERM function has input but not a vote when a strategic opportunity is being considered
- 11 responses 11% (33%) Our ERM function has no input when a strategic opportunity is being considered
- 40 responses 39% (5%) If the firm avoided a risk identified by the ERM department, the value of the department is recognized
- 28 responses 27% (28%) If the firm was subjected to a risk not identified, the ERM department would be held accountable
- 52 responses Not applicable

Note that for the first 2 responses there were 3 who chose both so 87 (84%) could say no to a strategic opportunity and/or have input.



Comments / Examples

- The business units' quarterly earnings seem very persuasive…
- Not involved in those decisions
- I actually don't know

- Major move into a new market segment.
- No formal ERM Program in place until 2013. CRO is involved in strategic decisioning.
- Depends on whether you are referring to enterprise, sub, or JV Board.
- I feel that most ERM programs are seen as a necessity to meet regulatory/rating agency needs…not as a strategy integrated into their business
- **Totally disagree with premise**
- **The ERM function is informally connected to strategic decisions.**
- **ERM function lacks practical relevance.**
- Our ERM function is decentralized. That is, the ALM committee has a strategic say in ALM issues but these are also reported to the ERM committee. However the ERM committee itself does not have a say, per se.

Question 8. No list of risks is ever complete. Are there other emerging risks that you feel are significant that should be considered for future surveys?

Option 1

- Cultural shift due to changing demographics and immigration
- US Government breakdown
- Changes in legal system
- Spike in interest rates
- Impact of social networking on company reputation
- Inflation
- Social Contract Risk – Pension Risk transfer to employees
- Regulatory risks
- Government shutdown
- Proliferation of Cheap Underwriting Tools and Genetic Testing leading to anti-selection
- Political Risk including Currency and Trade Policy, Expropriation or confiscatory taxation.
- Rising Margin Debt on US equities
- Very hostile regulatory environment for health insurance
- Reduced value of education and hard work in the US
- Inability of US government to control spending
- Mortality & longevity
- Citizenry distrust of country leaders
- U.S. Public Finance
- Impact of US Gridlock
- Culture difference embedded in market
- US Equity Asset Bubble
- Medical breakthroughs affecting longevity risk
- Government gridlock/doesn't function
- U.S. legislative gridlock
- Excessive debt worldwide

- Improvements in mortality affecting public pension schemes
- Global Food Shortages
- Pollution Damage to water supply
- Political dysfunction
- Excessive regulation (taxation)
- US dollar loses its reserve currency status
- Long term low real asset returns
- US Government Default Risk
- Environmental damage in China
- Rising interest rates
- Economic imbalances
- US dollar no longer reserve currency
- Dysfunction in Washington; Party factions having too much power due to congressional districting and threats to re-election
- Economic damage by governments not willing to understand macroeconomics
- Concentration of wealth
- Stability of US financial situation
- Elimination of manufacturing jobs as technology, 3-D printing, etc. replace manual labor
- Failure to address effects of focus shift from western to Asian economies
- Changes to medical system and deployment of services
- Temporary collapse of US economy when it finally addresses its debt issues
- Worldwide income inequality
- Treatment-resistant infections
- Tax Reform / Corporate Tax Laws
- Political
- Risks does not exist unless you are trying to do something – such linkage is missing from this survey.
- Political & regulatory risks
- Political risk
- Deflation
- Lack of accountability of leaders (incl. politicians)
- Disaggregation of the EURO currency union
- Political dysfunction in western economies
- Business succession
- Food security
- Longevity risk
- Hyperinflation
- Political risks

Option 2

- Law shifts recognizing increased exposure of takaful in non-theocracies
- Professional malpractice
- Political instability – failure of democracy to work together

- Change in Standard Reserve Currencies
- Reputation risks/business practices
- Digitization Risk and Power of Rapid Dissemination via Social Media (increased reputation risk)
- **Overregulation of industries**
- Inability of US government to control spending
- Growing discrepancy between pay for workers at the bottom and the top of the management structure
- Inability of US government to do anything productive
- Sovereign debt crises
- Inability of ageing population to maintain itself
- Impact of sequestration
- Disruption to food supply
- High inflation
- Food shortage
- Excessive regulation (business requirements)
- Global food shortage
- Sudden increase in inflation
- Government deficits and debts
- Infrastructure chaos – losing power grid due to hacking etc.
- Further separation of the haves and the have nots – declining middle class
- Disruptive technologies
- Shrinking of middle class
- Replacement of local retail outlets by on-line shopping and distribution outlets
- US Debt Ceiling
- Rising Interest Rates
- Inflation, stagflation, hyperinflation
- Religious risk
- Attracting employees
- Disruption to electrical grid
- Government dysfunction or default on debt
- Economic risks

Option 3

- Increased economic friction due to increased focus on security
- Scientific ignorance
- Infrastructure failures
- Central Bank Philosophy Shifts
- Actuarial assumptions
- Large Scale US Power Grid Failure
- US Decline in Global Influence
- Asteroid impact
- Monetary expansion
- Corporate financial failures

- End of low interest rates policies
- **Just in time delivery in many industries thwarted by climate/hacking/terror interruption to infrastructure**
- Social unrest driven by recognition of increasing inequality
- Globalization
- Scarcity of fresh water resources
- Product Migration/Evolution
- Risk of litigation, which can ruin a company
- Training/education of staff
- Pension crisis
- Extended period of low Treasury rates – Japan scenario
- Regulatory risks

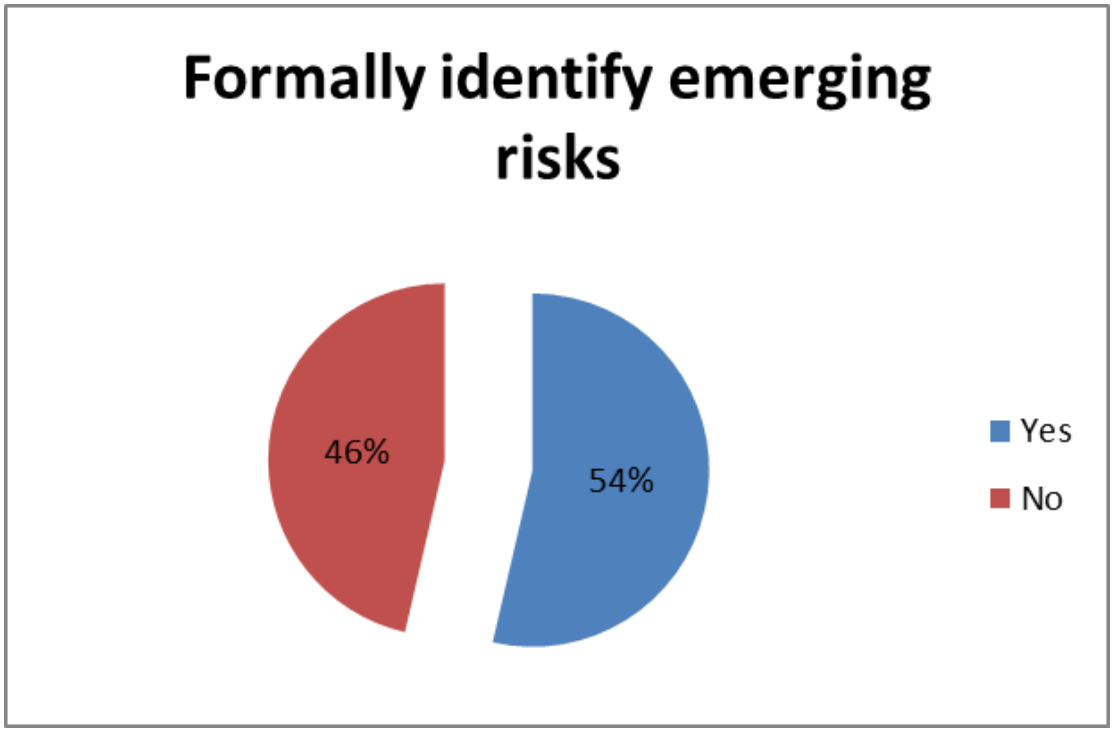
Section 2: Leading Indicators

Some questions require an industry perspective. Please choose an industry where you are a risk expert and answer questions consistently throughout.

Question 1. Do you formally identify emerging risks?

157 responses - percentages back out those stating question is not applicable to them

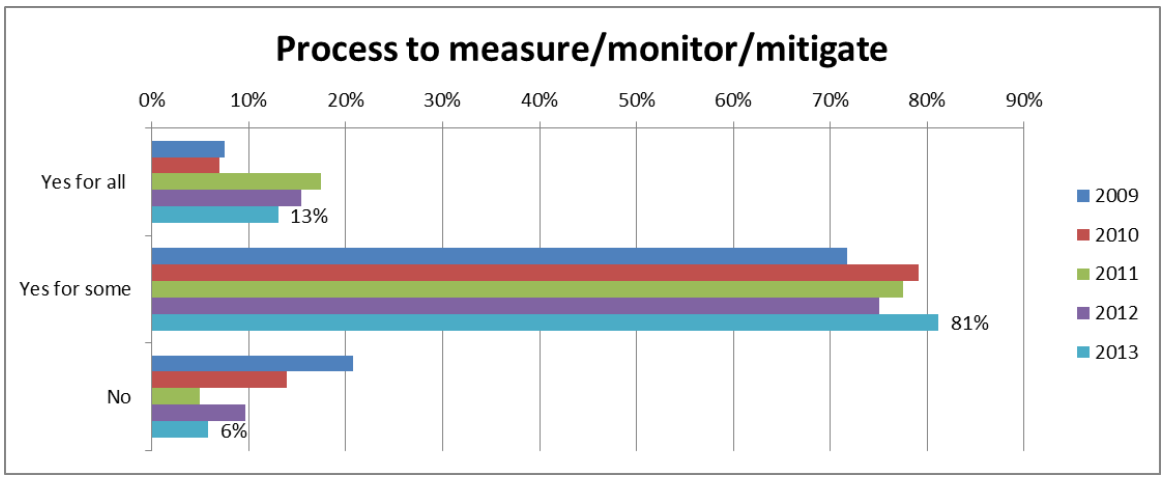
- 74 responses 54% Yes
- 64 responses 46% No
- 19 responses Not applicable



Question 2. Once an emerging risk is identified, do you have a process to measure, monitor, and/or mitigate the risk?

73 responses

- 9 responses 13% (15%/18%/7%/7%) Yes for all
- 56 responses 81% (75%/78%/79%/72%) Yes for some
- 4 responses 6% (10%/5%/14%/21%) No
- 4 responses Not sure



Question 3. If yes, please provide examples.

- Regulatory environment – watching guidance from a number of agencies, getting more involved in the creation of regulations
- No, any examples would be proprietary
- None available.
- Monitors that are updated periodically
- Internet based sales distribution / see if there have been lawsuits / other insurance companies getting off of the platform
- Confidential
- 1. Cyber risk / 2. Change management – aligning interests among employees of the company in this more volatile, uncertain world.
- Demographic shifts
- Data security
- Sales pipelines, medical trend, expense drivers, regrettable turnover, healthcare reform, large case integration, service metrics, regulatory compliance.
- Economic valuation can be conducted on certain emerging risks. Other risks are discussed in forum of experts to reach consensus on potential magnitude.
- Monitor media and trade publications related to the risk.
- For Regulatory risk, resources were identified and allocated to monitor regulatory developments and to report internally on a regular basis.

- Watch financial market behavior and then adjust investment portfolios accordingly.
- Cyber-security is an emerging risk. It's not that it hasn't been with us in the past, but its importance has multiplied many times in the last few years. We take great care to monitor our cyber-security through a wide variety of metrics.
- Future litigation risks – based on historical experience / / Pandemic risk – broad estimates based on professional modeling.
- We identify mortality risk, measure it and monitor it.
- **In Australia (and other parts of the world) there has recently been increased incidence of Priests and other vocations dealing with children being sued for damages to the victims of child abuse. This was picked up early and reserved for. Risk is still emerging.**
- Continue to monitor regulatory changes, including ones that won't have impact for a few years out. One of our committees will monitor.
- Earnings/Market Risk due to volatility, Credit Risk
- Depends on risk
- Cat risks, emerging market liabilities
- **Continuously monitor anticipated effects of climate change and use this information to set risk limits and capacities**
- Impact of ACA legislation / / Pandemics
- **Obesity, potential changes to tax legislation**
- A de-peg of the HKD. Asian equity collapse triggered by rising USD bond yields.
- Genetic Testing / Social Media
- E.g., Regulatory changes – monitor changes via industry news and conferences, conduct internal assessments of potential impact
- We maintain an Emerging Risk Tracker and have bi-weekly calls to discuss those risks as well as determine if any new risks should be added or if any risks should be removed. Some macro examples include issues such as the ER Sovereign crisis and US Government and Debt Ceiling Debate. Other risks are more specific regulations affecting our business.
- Economic capital affected.
- Survey relevant life insurers
- Once identified operation gaps, must come up with process improvement to mitigate the gap and also amend BCP in order to cover such gap.
- **Watch for newspaper/internet references**
- Any financial risks would be captured in additional alternative scenarios and shocks to stochastic analysis.
- Regulatory change is an identified emerging risk. We monitor the regulatory environment and provide quarterly updates to the Emerging Risk committee
- We maintain an Emerging Risk Tracker and have bi-weekly calls to discuss those risks as well as determine if any new risks should be added or if any risks should be removed. Some macro examples include issues such as the ER Sovereign crisis and US Government and Debt Ceiling Debate. Other risks are more specific regulations affecting our industry. Other risks include those related to

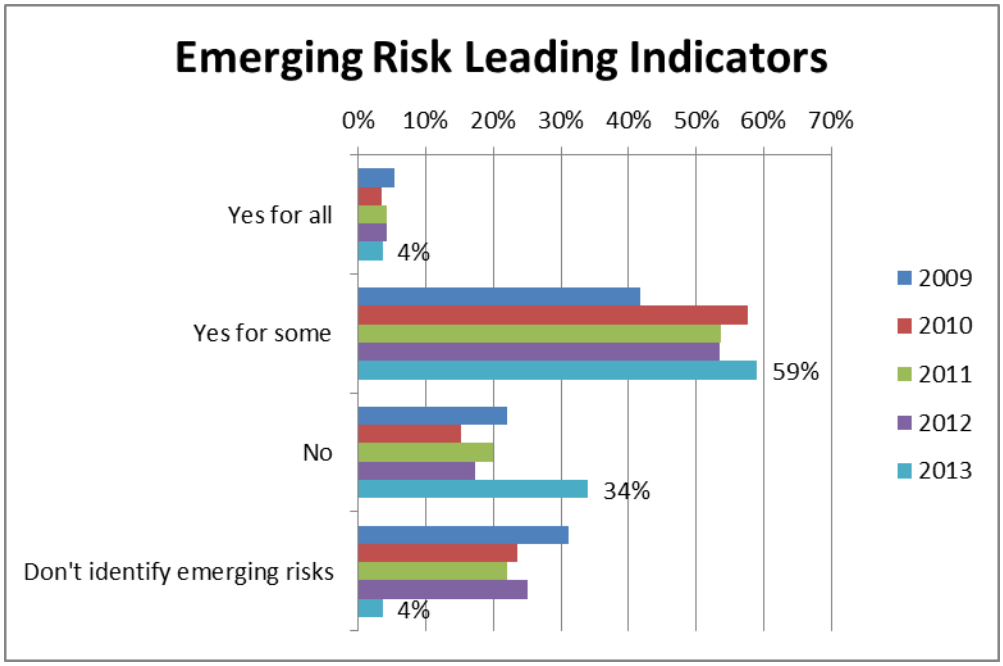
sustainability, such as climate change, and corporate social responsibility (CSR), such as potential impacts from the Sustainability Accounting Standards Board.

- Staff retirements, integration of business units, competitive pressures, supply chain risk, regulations, liability
- **New life insurance reserving rules in the US: monitor developments of the rules and assess impact on reserves and profit; determine if need to change product design as a result.**

Question 4. Once an emerging risk is identified, do you select leading indicators to measure changing likelihoods? (Example: In 2009, the threat of missiles fired by North Korea received much publicity. One company monitored investment flows to/from North or South Korea as an advance indication of the threat's credibility.)

63 responses - percentages back out those stating question is not applicable to them or they are not sure of the correct response

- 2 responses 4% (4%/4%/4%/5%) Yes for all
- 33 responses 59% (53%/54%/58%/42%) Yes for some
- 19 responses 34% (17%/20%/15%/22%) No
- 2 responses 4% (25%/22%/24%/31%) We do not formally identify emerging risks
- 7 responses Not sure



Question 5. If yes, please provide examples of these methods, including the specific emerging risk and leading indicators.

- None available.
- Talent retention/knowledge transfer / look at turnover of highly rated employees / mitigate highly rated employees retiring simultaneously
- Confidential
- Employee satisfaction / retention. Leading indicator used is unemployment rate and independent surveys of employee ratings of their companies in our metropolitan area.
- **Counts on rolling 4-week sales, lapses, and pipeline. Counts on FTE's. Year over Year trend indicators. Counts on regrettable turnover. Integration dashboards. Service performance versus targets.**
- We discuss economic and other data points that provide some predictive power on emerging risks.
- A particular product set was identified as an emerging risk; industry sales were monitored as well as field feedback was regularly solicited for a period of time to get a leading indicator of the threat.
- Read news items from applicable regions. Try to find a local perspective.
- Stagflation – monitor world markets / severe recession – monitor world markets
- Experience study
- Number of articles on child abuse in the national and key city papers.
- Interest rate, spreads, return on non-fixed income assets, inflation from macroeconomic indicators
- Information density, probability indicators,
- Climate change – sea water temperatures, arctic ice coverage
- Low interest rate environment. Industry Portfolio Yields, Treasury Rates, Fed Monetary Policy
- Tracking of uninsured, state programs
- Population mortality studies, industry studies, trends, medical advances
- E.g., Financial crisis – monitor credit events, credit spreads
- Government Default – Political consultant monitored chatter to determine likelihood /
- For our industry specific risks, we monitor regulation closely by following the state regulators, meet regularly with state regulators and work with other companies facing the same risks through trade associations.
- Annual review of frequency and changes for all significant risks
- Investments in Iran
- For our industry specific risks, we monitor regulation closely by following the state regulators, meet regularly with state regulators and work with other companies facing the same risks through trade association.
- **We identify a supplier (in our case an insurance company/product) that is having financial problems, and then monitor rating agencies and their annual financial results to confirm their ongoing stability. Or, in attracting**

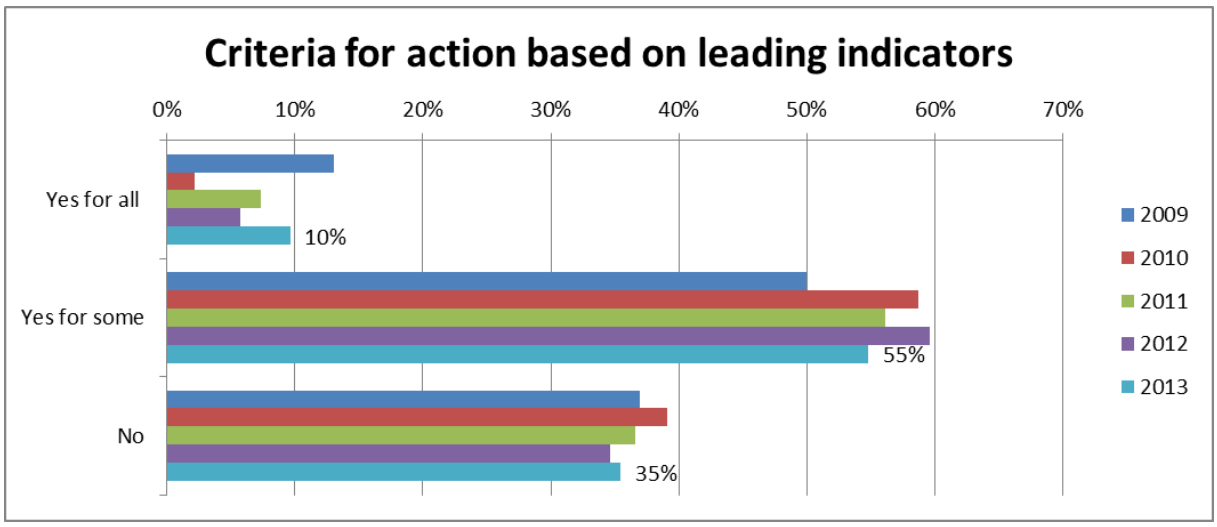
employees we monitor the number of resumes or the unemployment rate as to how easy/hard it will be to find good talent for positions as we grow.

- **New life insurance reserve rules in the US: monitor new product designs of other companies**

Question 6. If you identify leading indicators of emerging risks, do you have criteria for when to take action to mitigate (or accept) the risk?

36 responses

- 3 responses 10% (6%/7%/2%/13%) Yes for all
- 17 responses 55% (60%/56%/59%/50%) Yes for some
- 11 responses 35% (35%/37%/39%/37%) No
- 3 responses Not sure
- 20 responses Not applicable



Question 7. If yes, please provide examples.

- Confidential
- Escalation of issues into monthly and quarterly management forums from the weekly performance management reporting.
- If the risk is material, we would use appropriate risk committee to take appropriate management action when emerging risk leading indicator is increasing
- **If the perceived risk is considered high (based on a subjective evaluation) adjustments will be made to either take advantage of the potential gain from the emerging risk or to mitigate the consequences.**
- Adjust investment strategies / / accumulate, rather than deploying, capital
- We reappraise or unlock valuation assumptions when dashboard values hit trigger points
- Reinsurance wording, monitoring

- Climate change – input parameters to risk models to estimate impact and set thresholds
- **Formal process where emerging risks are reviewed monthly by ERM committee. If group determines a risk tolerance is breached, an action plan is created, reviewed by senior management and presented to Board at next quarterly meeting.**
- For the government default, we considered staffing, among other changes. If the default had occurred, we had an action plan in place to address the impact. (Default was effective Thursday, plan was effective on the following Monday).
- Strategic feedback and direction is given twice annually on risk actions
- As investments pass initial filters buy those assets
- When we get three or less candidates for a position, or when a rating is downgraded in the case of a supplier risk

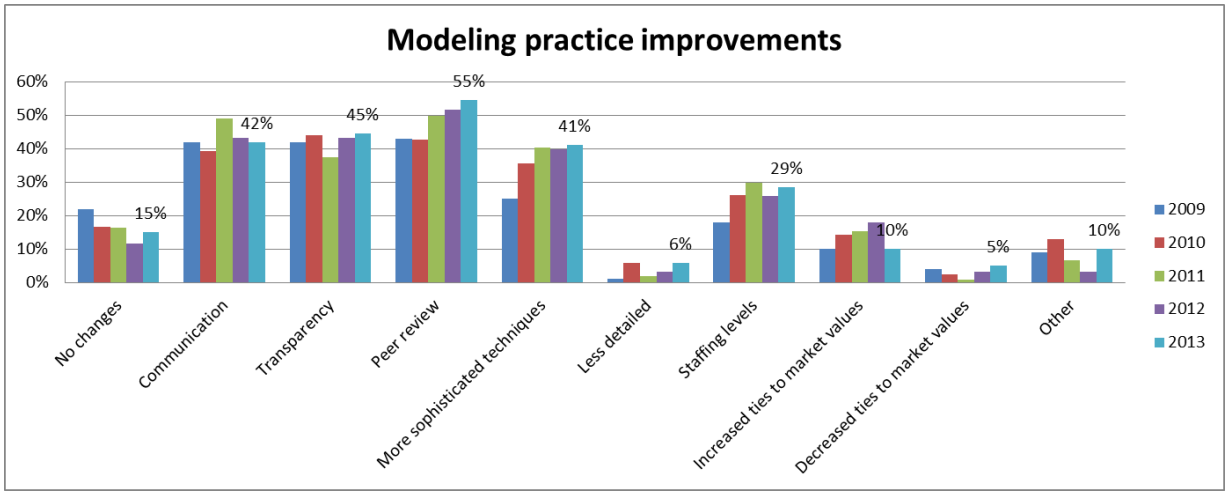
Section 3: Methodology

Question 1. Models have received increased scrutiny and review over the past several years. How have your modeling practices improved over the past year? (please select all that apply)

322 responses from 119 (2.7 average)

- 18 responses 15% (12%/16%/17%/22%) No changes
- 50 responses 42% (43%/49%/39%/42%) Communication
- 53 responses 45% (43%/38%/44%/42%) Transparency
- 65 responses 55% (52%/50%/43%/43%) Peer review
- 49 responses 41% (40%/40%/36%/25%) More sophisticated techniques
- 7 responses 6% (3%/2%/6%/1%) Less detailed
- 34 responses 29% (26%/30%/26%/18%) Staffing levels
- 12 responses 10% (18%/15%/14%/10%) Increased ties to market value
- 6 responses 5% (3%/1%/2%/4%) Decreased ties to market value
- 12 responses Not applicable
- 16 responses 13% (3%/7%/13%/9%) Other
    - Lesser focus on stochastic modeling
    - Software change
    - Enhanced model validation
    - Our modeling practices are in flux and have gotten worse.
    - More documentation
    - All on common platform.
    - Creation of model oversight committee to slow things down
    - Incremental improvement
    - Better controls
    - Internal standard of practice
    - Significant increase in controls.
    - More skepticism about the value of models
    - Less blind reliance

- More annual validation, but little real impact.
- Outsourcing production to Asia
- Validation practices have improved



Question 2. Historical data is rarely available for emerging risks. How do you develop assumptions for the quantification performed by models?

- I don't do it
- Emerging risks are addressed within the current risk framework by engaging business experts (internal) and asking for their subjective input.
- **Expert opinions – internal and external**
- Depends on the data being analyzed and the purpose for its use.
- Expert judgment and use of structured scenarios
- Largely guesstimates and boundary analysis
- Ad hoc
- Make them up
- Look at extremes for previous related events
- **By reading broadly**
- Not sure
- Judgment
- **Judgment triangulation of similar but not identical risks; assessment of migration of risks over time**
- Industry surveys/consultants/professional organizations
- We map the external threat events that describe the emerging risk into scenarios we CAN model that frame how the threat event could translate into harming us.
- Experience study and judgement
- **Use best expert judgment where data is not available and perform sensitivity tests around those assumptions where limited data is available.**
- Judgment and observing market proxies where possible
- Calculate exposures to concentrations of risks.
- Subject matter experts reach a consensus on best estimate.

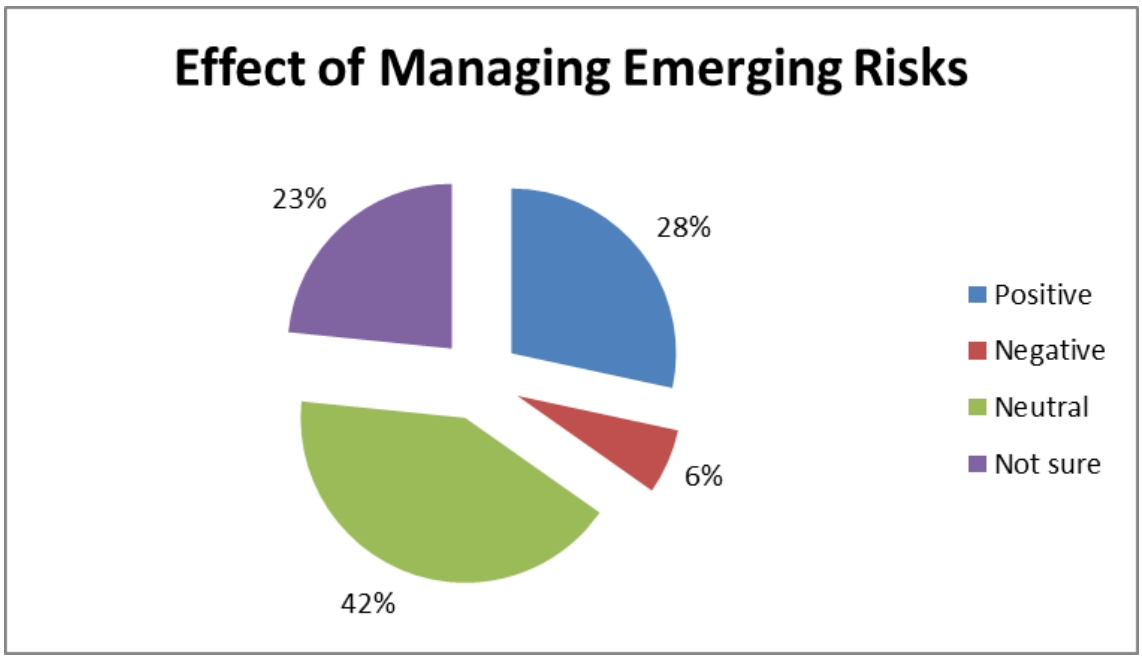
- Adapt past experience to frame the risk
- Subjective judgment
- We don't model emerging risks.
- History always provides best guidance.
- Use time series concept, weight current data more while considering the relevancy of the situation
- N/A to my job functions
- Professional judgment along with historical data
- It is often based on perceptions of risk, which are not often measurable or quantifiable.
- **Emerging risk is handled outside of models**
- Committee discussion, using actuarial judgement
- Professional judgement
- **Delphi techniques; deterministic stress testing**
- Based on experience study and industry data
- Scenario analysis and analysis of similar risks in the past.
- Look for best estimates/industry best practices if available
- First consider worst known possible possibility.
- Scenario planning
- Informed estimates
- Reach out to specialists in area, research, etc. Calibrate to real world events.
- Depends on risk. generally review literature that's available.
- Research, indexation
- We use deterministic scenarios for tail events but do not try to assign a probability for the event.
- Most emerging risks are subject to expert judgement rather than risk models
- Pandemics from best estimates of 1919 flu
- Look at the size/timing of other large risks that have occurred, even if they are very different from risks being considered
- Use existing corporate experience whenever possible. Historic data for economic assumptions. Sensitivity test assumptions.
- Expert judgment when available – otherwise develop assumptions and have them vetted by peers
- The same way somebody assessed this survey as taking only 10 minutes.
- Reference to mature markets plus inputs from experts
- Interviews with subject matter experts to capture best guess impacts to future cash flows
- Frequency and severity assessment
- Stress testing based on working groups, scenario testing (market crash, pandemic)
- Judgement
- The level of granularity depends on the data available
- We do not yet have a process for this, but the intended process will be to engage with subject matter experts in the business.

- Sensitivity testing is key. Understanding the impact a risk can have is as important as predicting an exact value.
- Genius is 10% inspiration and 90% perspiration. The first key set of assumptions is where and which models are likely to help address issues; the next set of assumptions is how to tie model timing to management decision timing, then we get to balance and integrating results from multiple models and other data sources (once upon a time an almost defining characteristic of an actuary), after those mathematical assumptions become relevant
- Test a variety of extreme tail events
- Not sure
- N/A
- Use deterministic stress scenarios that we believe will represent most likely/most negative outcomes.
- Inference, Delphi approach, benchmark and devil's advocate approaches
- Close to a SWAG using experts
- Try to calibrate outcomes to expected results for less severe incidents and then extend to the more severe manifestations.
- Using the "Delphi" method – business leaders from various functions work together to come up with the best approach and assumptions.
- Benchmarking, expert judgment, convergent estimation processes
- Sensitivity and stress tests
- Assumptions for emerging risks are arrived at through any related information and expert opinion. Models for emerging risks are usually less sophisticated when compared to those used for more established and known risks.
- Delphi
- Scenario analysis
- **We use the eye-ball method research and experience of senior staff and experts. More of a qualitative approach.**
- Reference to market prices if they exist and are credible, otherwise use judgement and sensitivity testing.
- Combination of industry experience, company experience, and intuitive thinking

Question 3. Has the management of emerging risks had a positive, negative or neutral effect in your company/industry?

141 responses

- 40 responses 28% Positive
- 9 responses 6% Negative
- 59 responses 42% Neutral
- 33 responses 23% Not sure



Question 4. Why?

- I don't know the answer
- Formal Risk process somewhat new and not fully adopted yet.
- **More proactive scenario planning across organization**
- **Too many willfully ignorant individuals feel the need to be involved in the weeds of the process and refuse to get educated on what they need to know to contribute.**
- Help create a risk culture by raising awareness of risk throughout the organization
- We can be surer of known risks (e.g., extended low interest rates). Few actions have been taken (other than increased monitoring) for emerging risks.
- Inability to identify emerging risks.
- I believe we have mitigated earnings volatility.
- Strong capital position to withstand extreme events
- Management is closing lines of business and unable to take new risks into new ones
- Haven't taken any action yet to monitor/manage
- Still not sure what to do with it after we've identified it
- Too much uncertainty to gain consensus that any particular external threats might emerge in a timeframe so short that we would have to change our plans.
- The company could avoid some risks in advance
- Began relatively recently
- We have been able to provision capital for unexpected risks using probabilistic scenarios.
- **There is a heightened sense of awareness. This leads to a more nimble management response.**
- Increases awareness by managers and development of contingency plans.

- As a domestic health insurer (short tailed liabilities) not a lot of the risks apply to us. Pandemics could be one.
- Not much management of emerging risks going on.
- **Not all emerging risks materialize causing wasted efforts on some perceived risks. this is balanced by advanced preparation/mitigation/monitoring of those emerging risks that do materialize into significant risks.**
- I am not involved in ERM at my company
- Future outcome/value of work is still to be determined.
- I don't think my company really manages emerging risks. I think my company is reactive.
- I am not involved in managing risks at my employer.
- Hard to quantify the financial impact when no scientific model is used with convincing assumptions.
- Not sure
- We are fairly immature in our ERM program so we are focused more on quantifying and managing known risks
- I'm not in risk management, but the company is very aware of legacy product issues that are getting regulatory scrutiny. This has forced us to reconsider product behavior assumptions
- Timing is often a big issue. A perceived risk can increase in magnitude and complexity, raising criticism however from those who feel we are moving in the opposite direction of the consensus view, losing value and market share.
- Not really "managed" but aware of potential
- Hard to measure results of risk management for risks that are emerging (i.e., not occurring yet)
- Well positioned
- Our ERM committee is still in the process of refining our processes and procedures.
- Better documentation and more attention helps
- Any risk that increases costs reduces profit. There is little to be gained from settling these claims.
- Early in the process of making decisions based off of emerging risks.
- Pluses offset negatives. Not clearly understood other than by actuarial team developing analysis.
- Not actively reported
- Can price for risk, enter/exit markets, and alert Board, management and stakeholders of potential impacts
- None have emerged yet.
- Emphasis is on a number of different areas and emerging risks have not been that important
- Awareness of potential vulnerabilities; value-added to clients; positive press/reputation impact
- Do not give formal consideration to emerging risks
- **Relevance not appreciated**
- **Large residual risk prompted additional mitigation action**

- **Management is not yet convinced they need attention.**
- Better feel for thinking about alternative future paths for the organization
- Doing it because someone tells you you must seldom leads to much value
- Awareness, opportunity identification
- The process is new this year.
- **We have not had to take any action to mitigate emerging risks. however, the planning exercises are beneficial.**
- **We have mitigated some and exploited others**
- This is something we are pursuing now.
- **I don't believe risk management programs have really focused on "hitting the ball". Instead they spend too much time worrying about measuring how much the ball will hurt when it hits. Risk measurement is a priority over risk management.**
- Question concerns issues at companies more than approach to emerging risks.
- Keeps them top of mind among management
- Because it is difficult to quantify the impact of many of these risks
- Forces more attention to risks
- I think emerging risks generally aren't seen until it is too late. As such we focus more on having a very strong balance sheet as the way to deal with the unknowable.
- We are in an emerging market, risk consciousness has been low and emerging risk that has not observed in the past tends not to be taken into granted.
- Not effectively linked to decision makers. Too many operational silos.
- It helps me to manage the investment portfolio
- Just being developed. New organization.
- **Not as effective as can be. For each time where the management has been a positive, there has been an overreaction or poor response which actually made things worse.**
- Still too early to tell
- Difficult to translate to actions
- We have a consistent track record of being ahead of emerging risks with action plans in place depending on certain outcomes as well as positioning ourselves to be able to react as necessary.
- Analysis paralysis
- N/A
- We tend to see things and address them sooner, especially when we have a long-term approach in doing so.
- **The tendency is to ignore emerging risks, or trust that they will revert to historical norms, until they are imminent by which time the cost of mitigation (e.g., hedging out the risk) is prohibitive.**
- The 2008 crisis and ORSA have increased the focus on risk to the company.

Question 5. Under what circumstances have quantification efforts enabled better decision making?

- I don't know the answer
- NA
- None at my office. We have gone downhill over the last 7 years.
- **Better ranking of risks, including the impact of correlations**
- N/A
- **Economic capital better reflects how the company is managed**
- NA – we have done little quantification
- Quantification of impact on earnings/surplus from financial market movements has led to improved hedging decisions
- Feedback loop hasn't been established just yet
- When risk could be quantified
- Name exposure management, risk appetite dashboard, dashboard limits.
- It provides a relative measure over time and creates a sense of anticipation around impact from certain events.
- Concentration of risk analyses
- **Almost all – decisions can be made to address risks sooner and more effectively when necessary and conversely, decisions can be made to not address those risks which will not emerge. Alternatively, contingency plans can be made and then shelved until needed.**
- None.
- When done by actuaries.
- Under capital adequacy testing
- Not sure
- VA hedging program has focused on extreme events
- **Resulted in better understanding of the impact of both positive and negative influences.**
- Quantification of certain risks has better allowed us to zero in on where the problems are, and fix them.
- Allow for more effective capital allocation, determine proper sustainable growth rate and understand the potential downside of various lines of business in extreme scenario.
- M&A activities have been examined and delayed or rejected
- Improved capital utilization – which projects are funded.
- Deciding when an emerging risk would be 'material' if it emerged.
- Continuing to refine and develop models to include known risks.
- M&A, credit investments
- Sensitivity testing of market inputs to valuation assumptions have permitted hedging
- Quantification efforts around cyber security have allowed for investments to be made into IT security with cost justification based on reduced loss exposure.
- Helped management focus on risk mitigation.
- None

- Product launch, portfolio management
- **Hedged against spike in interest rates. Identified larger than expected equity risk.**
- **Early approximate quantification supports triage process – i.e., whether or not we should be worried about the emerging risk and whether we should be working on a mitigation strategy**
- None
- Focus on quantification produced a better estimate which helped bring about action
- Quantitative results not yet integrated into the decision-making process
- Quantification is rarely performed unless a risk is already deemed material – and given the subjective nature of assumptions, the effort to quantify will rarely change the initial mindset.
- Better understanding of the frequency and severity of emerging risks
- Helped determine limits for concentration risk, provided better decisions surrounding product offerings, etc.
- Whenever a risk position must be taken that has a significant effect on the financial outcome
- **I would say they haven't. Too much time is being spent arguing about how to quantify the risk and not enough time spend on managing the risk.**
- Issue is not just decision making but managing over time
- **Based on our modeling we have changed products, exited distribution channels, and elected to hold more capital against certain risks.**
- Only in limited ALM areas. We are working on integrating into business review processes.
- Has helped a great deal in area of investments as has lead to more robust hedging strategies
- When more specific mid-term emerging risks are identified that are directly relevant to the execution of our corporate strategy
- Quantification efforts are just one piece of the puzzle. Especially with emerging risks, often the qualitative scanning, assessment, and monitoring are more important, with quantification to follow, influencing decision making. Knowing when and how to balance speed and precision is key to quantification. Clear communication and appropriate governance are key to qualitative assessments.
- Not applicable
- N/A
- By seeing the financial impact, we can then prioritize a previously emerging risk as greater than a known risk and move it up on the list of things to address.
- Quantification of near=term impacts on reported financials enable management to influence analyst expectations.
- Quantification efforts are still emerging. / Quantification of surrenders activity relative to Treasury rates has often led to good leading indicator information.

Question 6. Under what circumstances has qualitative analysis enabled better decision making?

- I don't know the answer
- More associates talking about risks has opened up better ERM thinking across organization, influencing decisions
- **Our qualitative analysis has ensured that our senior managers are better informed about the full range of exposures, specifically including those for which our internal quantification efforts are inadequate.**
- Discussion of ripple effects and associated risks as well of potential mitigation actions helped management better react after a natural catastrophe
- N/A
- Economic capital reflects amounts necessary to take advantage of potential opportunities
- NA – we have done little quantification
- Not sure
- Made employees as well as senior management to become more aware of potential threats to our viability
- Cyber risk analysis resulted in decision to insure the risk.
- We have structured incentive compensation program based on both financial and constituent goals and targets, where the later are mostly qualitative.
- The increased awareness and discussion of issues has allowed for an improved framework for decisions to be made.
- Having managers participate in strategic risk stress scenario sessions.
- Nothing specific.
- Not sure
- None come to mind. It may have happened at a very simple level.
- When done by actuaries.
- Strategic planning
- Not sure
- **View of correlation of risks is fairly qualitative and has caused us to stay focused on the impact of combinations of risks**
- Helps one gauge the mistakes of overreaction.
- Same as above.
- Strategic opportunities
- Have adjusted priorities to account for possible emerging risks.
- Identify magnitude of potential impact.
- Allowed for impacting strategic plan exiting/entering product lines
- Areas where there is a high degree of uncertainty which precludes quantitative modeling.
- Pricing
- None
- Early quantification has led to being able to exclude risk
- None

- Management has become more aware of possible issues affecting a decision.
- No shift of priority in risk assessment if an event occurs
- Planned actions for risk responses
- Communication of the largest risks has proven valuable
- **Qualitative analysis is a much better approach! Understanding what can happen and how to address the risk is more important that specifying the exact impact of a potential event.**
- **Draws people into discussions who are usually missing from quantitative discussions.**
- Qualitative metrics are limited.
- **Particularly in areas of operational risk**
- When more specific mid-term emerging risks are identified that are directly relevant to the execution of our corporate strategy
- Quantification efforts are just one piece of the puzzle. Especially with emerging risks, often the qualitative scanning, assessment, and monitoring are more important, with quantification to follow, influencing decision making. Knowing when and how to balance speed and precision is key to quantification. Clear communication and appropriate governance are key to qualitative assessments.
- Better insight
- N/A
- By thinking through the indirect or non-financial, helps bring into focus better the holistic nature of the issue
- Good question.
- N/A

Question 7. Under what circumstances has a combination of qualitative and quantitative analysis enabled better decision making?

- I don't know the answer
- Same as 6
- Our ERM risk profiling has improved since we have included more qualitative analysis.
- N/A
- Most applicable.
- See above
- Board of Directors is now more aware of risks and reviews them periodically
- Not sure
- Example: income different than plan, what are the reasons not attributable to financial markets. Gives an early warning indicator of what is causing divergence
- Incentive compensation program.
- The risk management structure is a balance of multiple lenses. The various committees mix qualitative and quantitative analysis and the various perspectives of the group are discussed and debated.
- NA
- The combination of qualitative and quantitative is always the best approach.

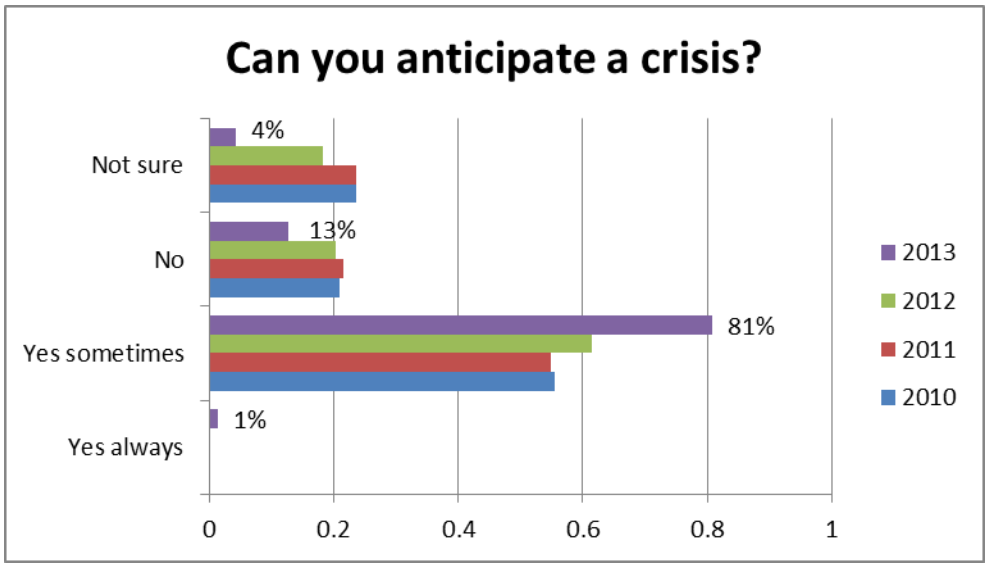
- I don’t think we do quantitative analysis.
- When done by actuaries.
- Business planning
- Not sure
- VA hedging has been guided by assumed correlation of credit risks and equity risks
- The two in tandem can better quantify the impact of mistakes. Otherwise something that is just subjective entails difficulty in assessing the potential risk of loss.
- We use both measures. Both have a place, as the quantitative must be balanced with the qualitative.
- Asset investment strategy – we combine quantitative modeling with qualitative “what if” analysis.
- **Almost all circumstances. Qualitative analysis provides a reality check on any model.**
- Identify magnitude of potential impact.
- M&A
- Real options.
- Pricing
- Almost all emerging risk activity involves a combination of qualitative and quantitative analysis
- None
- We’re not there yet.
- When the risk position is critical and discussed fully
- **I truly believe a quantitative approach driven by qualitative guidance is a superior approach to risk management!**
- When you combine them you get more effective teams with more diverse talents.
- Stayed away from Fannie/Freddie stock based on qualitative views taken by Buffett/Munger and quantitatively because cash flow projections made no sense
- When more specific mid-term emerging risks are identified that are directly relevant to the execution of our corporate strategy
- **Quantification efforts are just one piece of the puzzle. Especially with emerging risks, often the qualitative scanning, assessment, and monitoring are more important, with quantification to follow, influencing decision making. Knowing when and how to balance speed and precision is key to quantification. Clear communication and appropriate governance are key to qualitative assessments.**
- NA
- N/A
- Staffing needs, competitor threats, succession planning, debt management
- Don’t know.
- N/A

Section 4: Predictions

Question 1. Is it possible to anticipate/predict a crisis? (please select one)

140 responses

- 2 responses 1% (new response in 2013) Yes always
- 114 responses 81% (61%/55%/56%) Yes sometimes
- 18 responses 13% (20%/22%/21%) No
- 6 responses 4% (18%/24%/24%) Not sure



Question 2. Comments

- The mortgage crisis (with hindsight) was very predictable. Harder to anticipate the financial effect of world wars.
- Sometimes an individual or company can identify a risk that the market is ignoring.
- **Historical highs or lows in economic indicators often revert to a mean**
- The type of crisis is not likely to be predicted but common problems can be anticipated
- Economic fundamentals – e.g. housing bubble
- **…but not necessarily the timing or severity.**
- Assume a crisis will occur, what specific type is not as important
- You can anticipate trouble, i.e., a market correction, but not a crisis
- Most crises are plausible events, but estimating the timing is the hard part, and unfortunately very important.
- It is relative. Risks go up and down, but the event is difficult to predict with perfect accuracy.
- Can only identify potential crisis. Some may materialize and others may not.

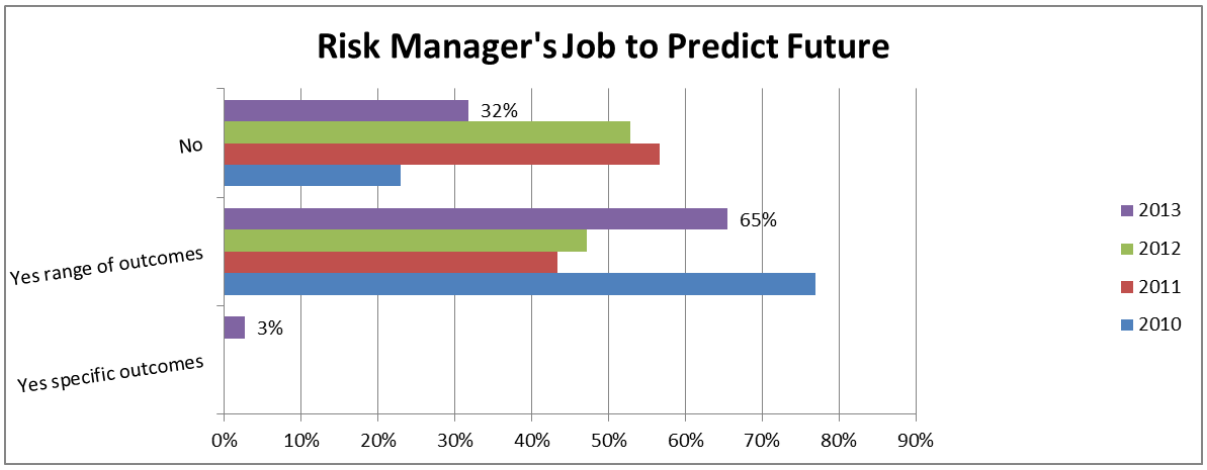
- Some extreme risks (e.g. nuclear war) are noted but largely ignore day to day.
- **It's really hard, because of the known behavioral biases such as herding/group think. Boards and Sr Mgmt are very susceptible to group think.**
- It is always possible to predict, but even blind squirrels find nuts. It is much harder to consistently accurately predict the timing and severity.
- **It is not possible to predict when exactly it will come.**
- At a minimum follow the experts who predicted something like 9/11 or the financial crisis of 2008. Somebody always knows more than you in a particular area. Find those people and follow them.
- History repeats itself in a different way with some common fundamental
- The demographic shift and inability to take corrective actions regarding unfunded social program liabilities in the U.S. will lead to a crisis at some point.
- Awareness and courage to consider the unthinkable as a possibility.
- Through broad reading and considering multiple viewpoints (data analysis by NSA—big data, knowledge of other cultures, looking for leading indicators
- **History is a guide but not a timing mechanism**
- Crises are predictable, but the timing is unknowable.
- For product with guarantee periods so you would expect shock lapse at the end of the term
- **Risk management does not require, and should not rely on, prediction. Planning for what probably won't happen but has a chance of causing real harm is the essence of risk management.**
- Discussion is good, but not sure to what extent you can predict a crisis
- Some indicators can help identifying tensions that appear before a crisis
- The sensitive dependence of commerce/lifestyle on stability is jeopardized by lack of infrastructure spending, climate change, security. For example supply chain disruptions from natural disasters, loss of power grid. Lifestyle changes from similar events. Look at NYC after Hurricane Sandy with empty supermarkets, gas lines, 3 week power outages, incidents of aggression/violence, utilities not being able to get power poles up, lack of adequate shelter etc. Imaging what would happen if a terror attack, malicious hacking, or disaster knocked out the power grid in a large portion of the US or EU?
- **You will sometimes predict crises that don't happen.**
- Hindsight colors our judgment – we overestimate our ability to foresee events
- **Financial crises are predictable, issue is that many don't want to exit first and therefore wait too long, making the crisis worse**
- But it is possible to understand the impact of a crisis
- It is possible, but there are always going to be risks with unexpectedly high velocities and black swans that will occur no matter how much data an analysis is being performed. Tracking emerging risks is one of our strongest tools we have to predict crisis because often they do develop from these.
- Does government shut-down come to minds?
- The types that can be predicted are generally political (caused by the government, such as wars, depressions, inflation, etc.) The timing usually cannot be predicted.

- **Timing is what really matters. For example, if everyone had anticipated the housing market collapse it would have done little good because asset prices would have fallen before the positions could be unwound. The key isn't anticipating a crisis it is to avoid the avoidable.**
- Needs scenario analysis to do this.
- **When a bubble grows you can identify it but not the timing when it bursts as that is more about trust in the system**
- Always in hindsight, but difficult to do in advance. We often know something will eventually happen, but timing is what is extremely difficult. No one wants to get off the gravy train too early and miss gains.
- It is possible, but there are always risks with unexpectedly high velocities and black swans that will occur no matter how much data and analysis is being performed. Tracking emerging risks is one of our strongest tools we have to predict crisis because often they do develop from these.
- **When numbers don't add up anymore. You need to be lucky to look in the right direction, and intelligent enough not to brush it aside**
- Financial crises are recurring phenomenon
- Cyber risk which has a reputational component, if you know it is going to happen sooner or later, addressing it now provides the defense once it does happen because your response can be how you prepared
- **While it may be possible to anticipate a crisis, there are significant costs to getting its timing and/or severity wrong. Better to stay with the herd and not stick one's neck out if you want to keep your job.**
- In part, the 2008 crisis may have been predicted by information known in the 1990s. at that time, there were predictions that the housing market demand would peak in the year 2007 due to the baby boomers reaching retirement age at that time. This combined with late 1990s deregulation of the Glass Steagall Act could have led to the potential prediction of a crisis. **It is often easier to anticipate than predict although there is a cost to continual anticipation.**

Question 3. If you consider yourself a risk manager, is predicting the future part of your job?

113 responses

•	(47%/43%/77%)	Yes (not split prior to 2013)
• 3 responses	3%	Yes – specific outcomes
• 74 responses	65%	Yes – range of outcomes
• 36 responses	32% (53%57%/23%)	No
• 28 responses		Not applicable



Question 4. Comments

- If an unanticipated outcome occurs, we ask the question "should we have seen this coming?", but we are not brought to task for having to predict the future.
- We prefer to say that we 'prepare, not predict', but we do need to look at a range of potential future outcomes
- **Risk management is not predictive, it is defensive.**
- Future reserve and financial reporting paradigms
- The future is not predicted but the impact of several possible futures is quantified
- Not really predicting the future, but offering plausible possibilities.
- **Not predicting, but rather preparing for a range of outcomes.**
- Anticipation of what is possible is the job of a risk manager. Through anticipation, management action can be discussed and employed more quickly and effectively.
- My job is to help other managers identify emerging risks.
- Just to understand the range of potential outcomes and control potential outcomes and control potential effects, not to actually predict one outcome.
- Predicting? No. quantifying under given/stated constraints and assumptions? Yes.
- Contingency planning is, but predicting is not
- Past doesn't not present future and our prediction of future is based on our knowledge from the past →therefore can only predict a range of outcomes
- **Predictions will be wrong. Risk management is preparing for whatever scenario unfolds, regardless of how expected it is.**
- It's not about prediction per se, but rather the consideration of many possible consequences and mitigating the downside consequences as much as possible.
- Itemize possibilities and probabilities
- See previous comment.
- Scenarios planning is key, however, there isn't one possible future but multiple
- Point estimates are not realistic, a fan of outcomes is realistic
- We don't predict. We project and hypothesize.
- It's not predicting the future so much as anticipating what can happen.

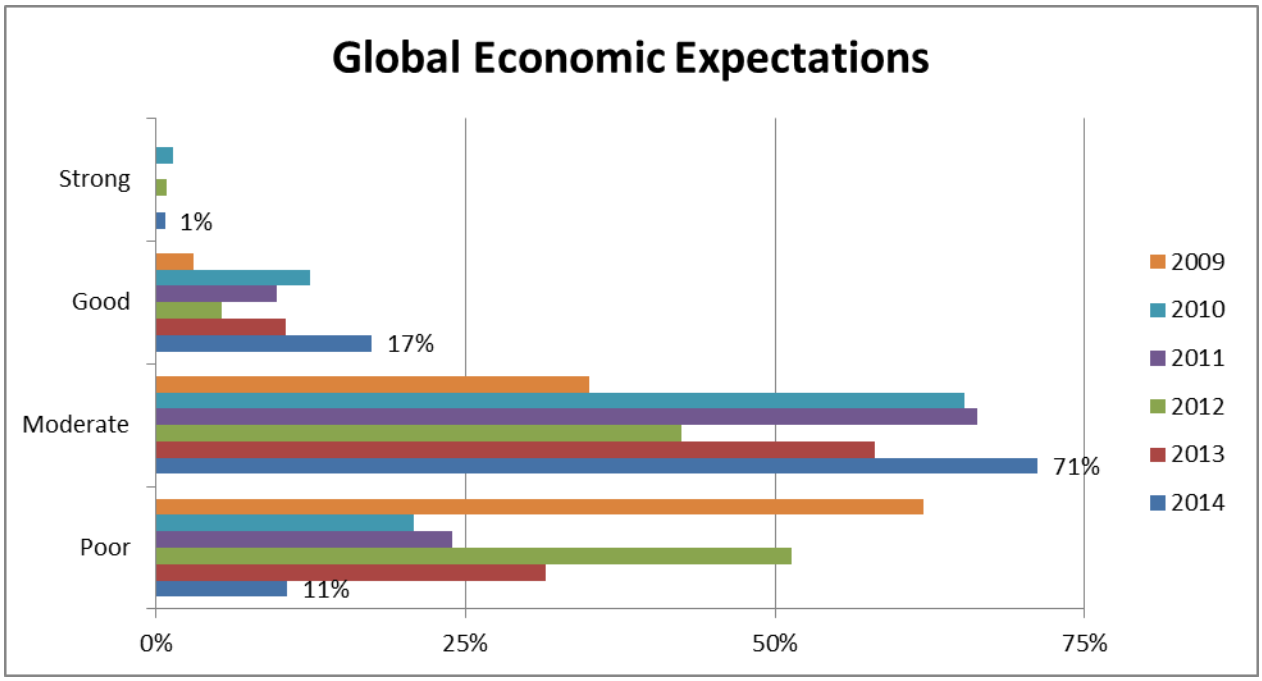
- You can't predict. You can offer alternate futures and let people decide how best to deal with them. You can illustrate what a bunch of assumptions might produce if they all happen to come true.
- While one side of risk management is about accurate predictions, the other piece is monitoring and mitigation. By actively monitoring risks and having mitigation strategies prepared should a risk move in one direction or another, risk managers can manage risk in the moment.
- It is my job to present a range of reasonable outcomes of various degrees of likelihood.
- **Is there any leader or manager who does not have to predict the future in some way?**
- **The WORST thing a risk manager can do is try to predict the future. Good risk management requires an assumption that anything can happen AND that we can't know what is going to happen (or not happen).**
- What could happen, not what will happen
- While one side of risk management is about accurate predictions, the other piece is monitoring and mitigation. By actively monitoring risks and having mitigation strategies prepared should a risk move in one direction or another, risk managers can manage risk in the moment through informed decision making. We make predictions about the future based on certain assumptions or criteria and prepare for multiple outcomes. We do not predict or speculate in absolute terms.
- You have to have a plan to be able to understand variation to plan
- Either learning from others mistakes and sharing that with clients, or thinking what could be a risk in the future and educating stakeholders to see which ones should be addressed now.
- Communicating ranges of outcomes rather than point estimates is good practice.
- We do not predict the future, we merely manage the risk.

Section 5: Current topics

Question 1. Your expectations for the 2013 global economy are:

141 responses percentages are expectations for 2014 and previous expectations for 2013/2012/2011/2010/2009

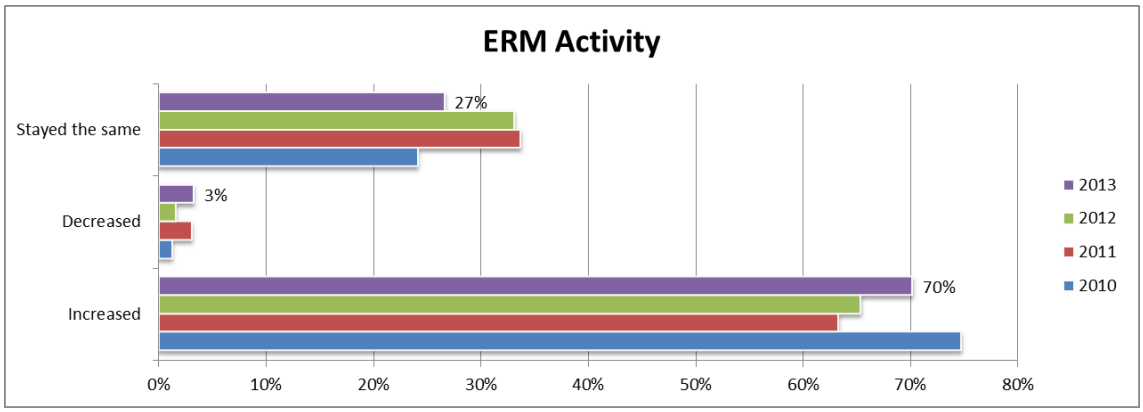
• 14 responses	11% (31%/51%/24%/21%/62%)	Poor
• 94 responses	71% (58%/42%/66%/65%/35%)	Moderate
• 23 responses	17% (10%/5%/10%/13%/3%)	Good
• 1 responses	1% (0%/1%/0%/1%/0%)	Strong
• 9 responses		Not sure



Question 2. Did you experience a change in the level of ERM-focused activities for your organization or clients in 2013?

140 responses

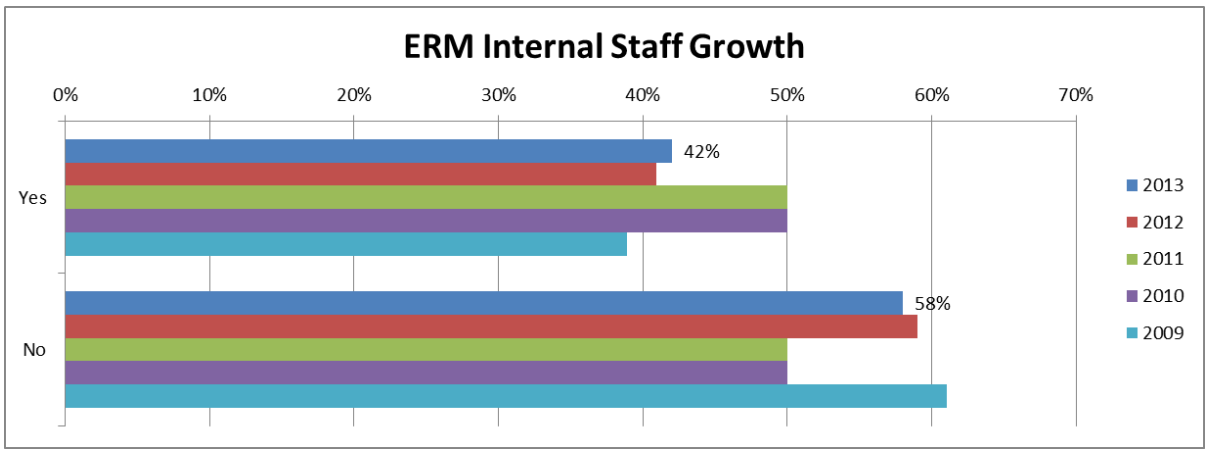
- 87 responses 70% (65%/63%/75%) Increased
- 4 responses 3% (2%/3%/1%) Decreased
- 33 responses 27% (33%/34%/24%) Stayed the same
- 2 responses Not sure
- 15 responses Not applicable



Question 3. Did your internal ERM staff increase in 2013?

124 responses

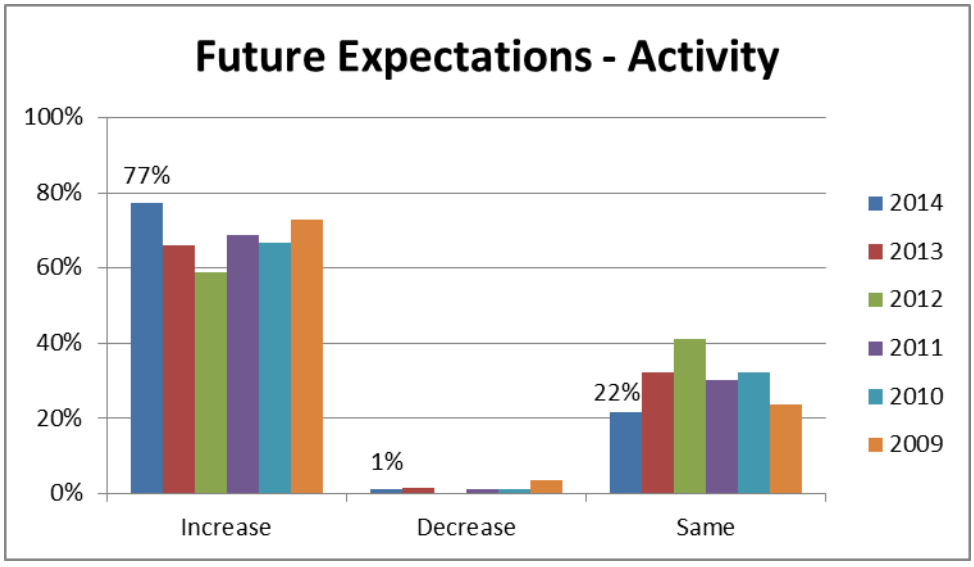
- 42 responses 42% (41%/50%/50%/39%) Yes
- 58 responses 58% (59%/50%/50%/61%) No
- 10 responses Not sure
- 14 responses Not applicable



Question 4. Do you anticipate a change in the level of ERM-focused activities for your organization or clients in 2014 relative to 2013?

99 responses

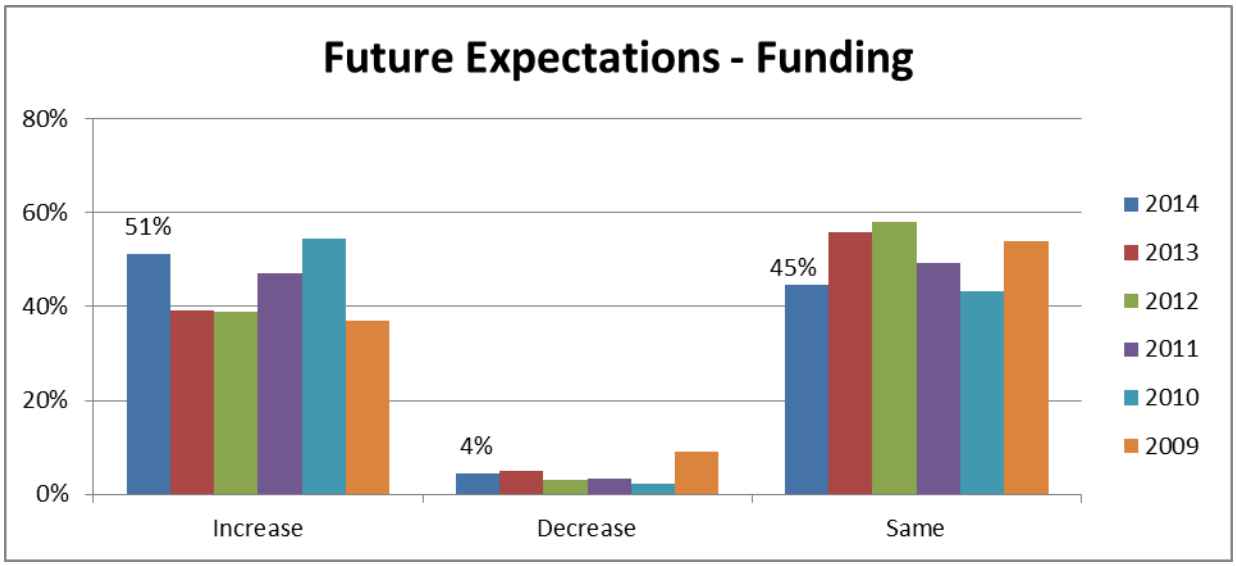
- 75 responses 77% (66%/59%/69%/67%/73%) Increase
- 1 responses 1% (2%/0%/1%/1%/3%) Decrease
- 21 responses 22% (32%/41%/30%/32%/24%) Stay the same
- 2 responses Not sure
- 0 responses Not applicable

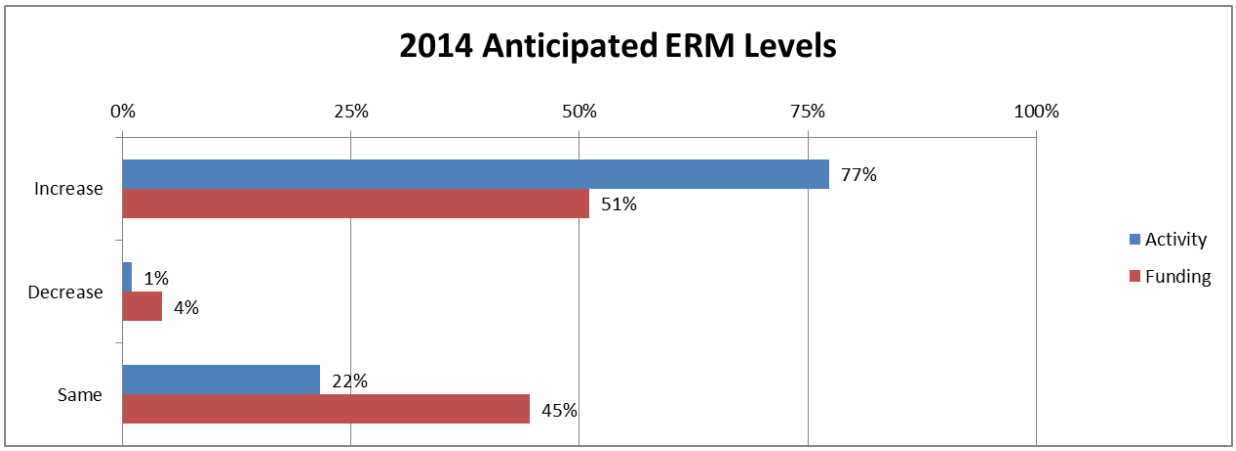


Question 5. Do you anticipate a change in the level of funding dedicated to ERM-focused activities for your organization or clients in 2014 relative to 2013?

100 responses

- 47 responses 51% (39%/39%/47%/54%/37%) Increase
- 4 responses 4% (5%/3%/3%/2%/9%) Decrease
- 41 responses 45% (56%/58%/49%/43%/54%) Stay the same
- 6 responses Not sure
- 2 responses Not applicable



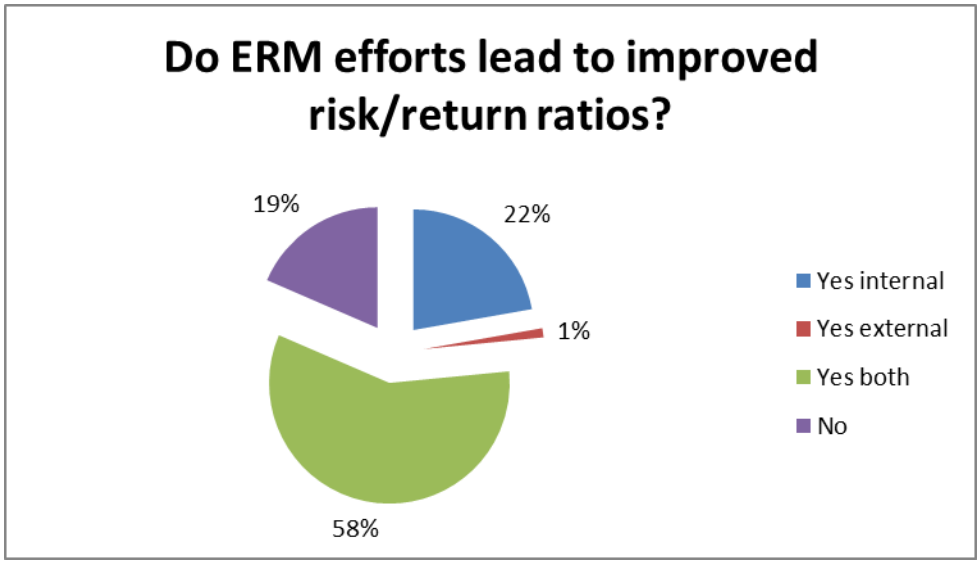


Question 6. Do you believe that ERM, considering both internal and external efforts, has/will improve(d) the return/risk ratio? (please select one)

100 responses

- 18 responses 18% Yes internal
- 1 response 1% Yes external
- 47 responses 47% Yes both

- 15 responses 15% No
- 19 responses 19% Not sure



Question 7. Why or why not?

- Bringing the level of conversation around the risk/reward trade-off into the spotlight can only help. External regulatory requirements have some benefit (increased board engagement) but they are somewhat small relative to the increased infrastructure spend.
- More emphasis on risk management helps to embed it into the culture – whether the driver is internal or external
- Too many of the efforts are misguided, resulting in a lot of wasted time, effort, and money. Once more of the crap is thrown out, the return/risk ratio will improve.
- Regulations help bring industry-wide discipline on top of internal ERM programme
- **Very little focus on return, or on the cost of risk hedging. Right now, ERM is all on or all off, companies have not achieved a balance**
- We do not use it enough, and the CEO is retiring thus limits on new decisions
- Hedging of excess/tail risks
- Transparency will increase, like it or not. So if you define "improve" as the return/risk that all the stakeholders understand to be the organization's risk appetite, then ERM will help ensure stakeholders get what they think they signed up for.
- Improved discipline and consistency of risk/reward analysis
- Has the potential to avoid or reduce some nasty tail effects, though we won't catch them all.
- The new regulatory requirements are a nuisance –too prescriptive.
- **I think that ERM at my company is somewhat like auditing on steroids: checking, certifying, and safety procedures. I don't think there is a strong**

understanding of risk or a belief that understanding risk would actually protect the company.

- More eyes looking at it decreasing the probability of something slipping through the cracks.
- **ORSA will help accelerate work that would otherwise be done over a longer timeframe**
- The focus will increase and therefore losses should be better understood and therefore better mitigated.
- Internal staff will react to emerging experience and regulatory pronouncements
- Influencing decisions due to small probability outcomes is difficult
- New CRO has a predilection for action.
- Because clients don't readily recognize improved forecasting impact they are not immediately ready to fund for more analysis.
- Lowered systemic volatility in long run from external regulation, risk avoidance from internal ERM
- **It has brought a more consistent view of risk/return across the enterprise**
- External requirements will provide additional information for management to approve and consider.
- New regulations will divert resources from working on the most important issues.
- Should get better, but costs are high so return may not be sufficient to offset costs.
- **Risk/Return ratio is a fallacy deep in the tail. It is all about understanding risk in the tail – not worrying about return**
- Firm was already highly risk-focused. Formalization of ERM processes may or may not improve results.
- Significant opportunities exist and ERM review adds valuable assessment
- Too much time spent on quantification and not enough spent on value creation/preservation
- No timeline in your question
- Greater awareness of potential risks and various reductions in exposure to some of those risks
- Tendencies to risk averseness will lead to declining rewards
- **There is much greater focus on taking on only risks where there is an acceptable return given the risk. this is being pushed from both internal and external efforts.**
- ERM is not focused on bottom line, or has not adequately defined process to get there. Too much focus on governance and interface with external parties, rather than on risk metrics and benefit
- It has forced attention to the trade-off, which has both helped us avoid some risks for which we were not receiving proper compensation as well as take some risks we would have otherwise missed in which we received substantial reward.
- Product sophistication and design, competitive intelligence, regulation, and especially internal ERM provide better information with which to make decisions. Not all information is valid and not all models are useful, but on the whole, great strides have been made.
- Increase transparency

- Greater awareness makes our firm perform better and advise clients better, and the analysis we do for clients we can use on our own organization to make it better
- Near-term improvements to the return/risk ratio are due to the financial function managing down capital levels, independent from the ERM view.
- Risk in the entity is better managed now.

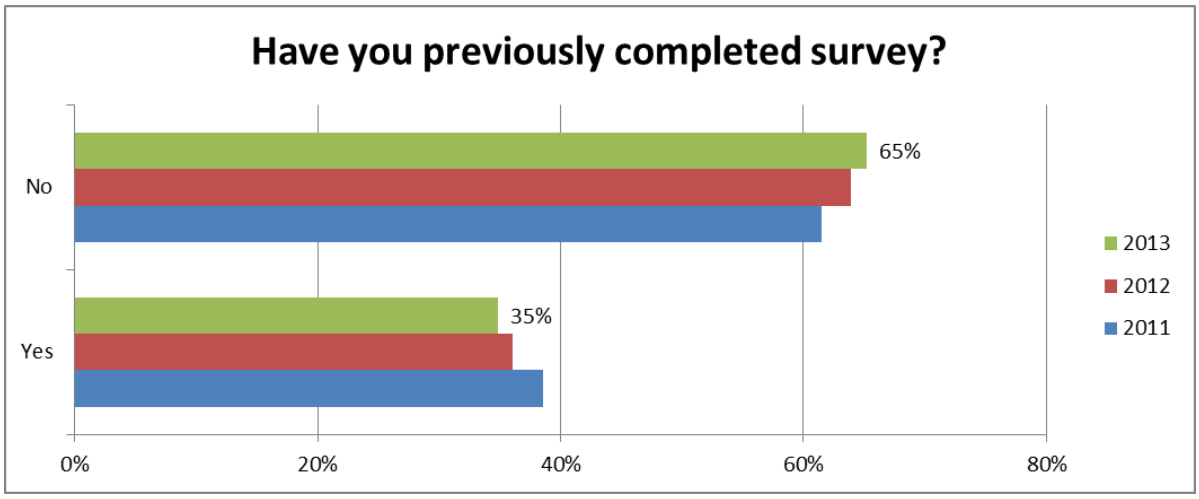
Section 6: Demographics

If you are retired, respond based on your most recent career path.

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

135 responses

- 39 responses 35% (36%/39%) Yes
- 73 responses 65% (64%/61%) No
- 23 responses Not sure



Question 3: What credentials do you currently hold? (please select all that apply)

323 responses from 135 surveys (2.4 average)

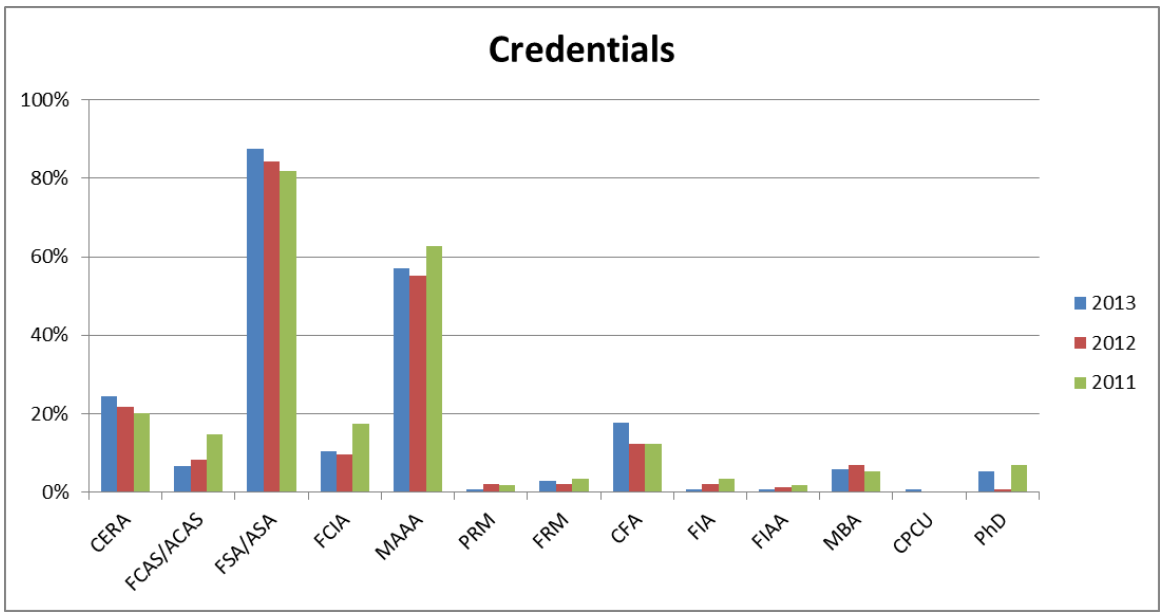
Percentages are based on 135 surveys.

- 33 responses 24% (22%/20%/24%/28%/27% in previous surveys) CERA
- 118 responses 87% (84%/82%/69%/87%) FSA/ASA
- 9 responses 7% (8%/15%/13%/17%) FCAS/ACAS
- 14 responses 10% (10%/17%/14%/13%) FCIA
- 77 responses 57% (55%/63%/45%) MAAA
- 1 responses 1% (2%/2%/4%/2%) PRM
- 4 responses 3% (2%/3%/2%/4%) FRM
- 24 responses 18% (12%/12%/13%/12%) CFA
- 1 responses 1% (2%/3%/2%) FIA

- 1 responses 1% (1%/2%/2%) FIAA
- 8 responses 6% (7%/5%/10%) MBA
- 1 responses 1% (1%) CPCU
- 7 responses 5% (4%/7%/8%) PhD
- 12 responses 9% (6%/6%/5%) Other actuarial credential (please specify)
    - EA (4)
    - ACIA
    - FILAA
    - French actuary
    - AIAI

- 12 responses 9% (14%/11%/12%) Other non-actuarial credential (please specify)

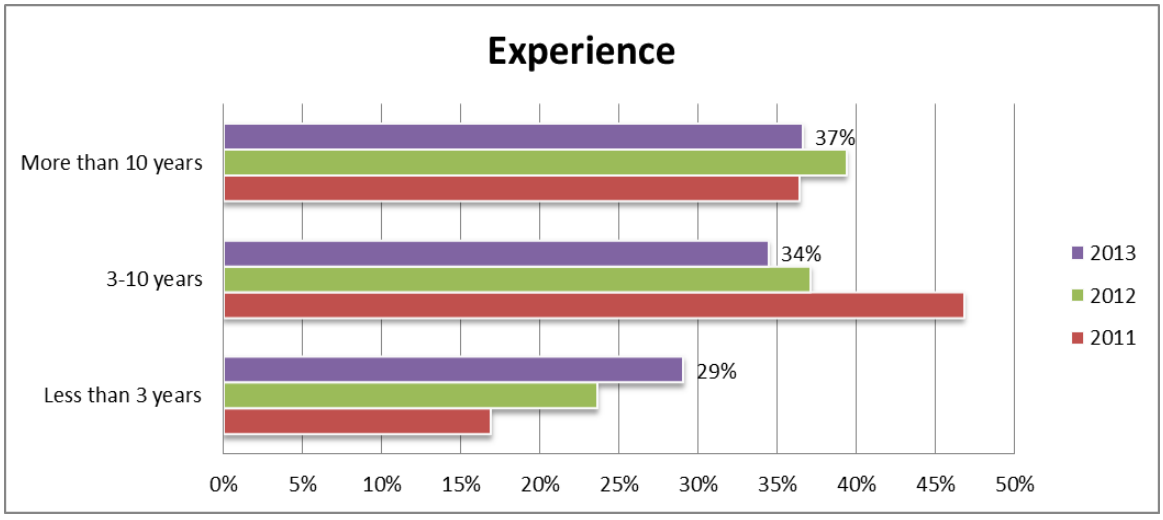
    - FLMI (10)
    - CLU (3)
    - ChFC (4)
    - ACS
    - FFSI (Loma)
    - MA (Economics)
    - MA
    - ALMI
    - CIA
    - FFin
    - Masters in Economics
    - RHU
    - MIRM
    - Certified Risk Manager
    - CPA
    - MSA
- 1 response Not applicable



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

93 responses

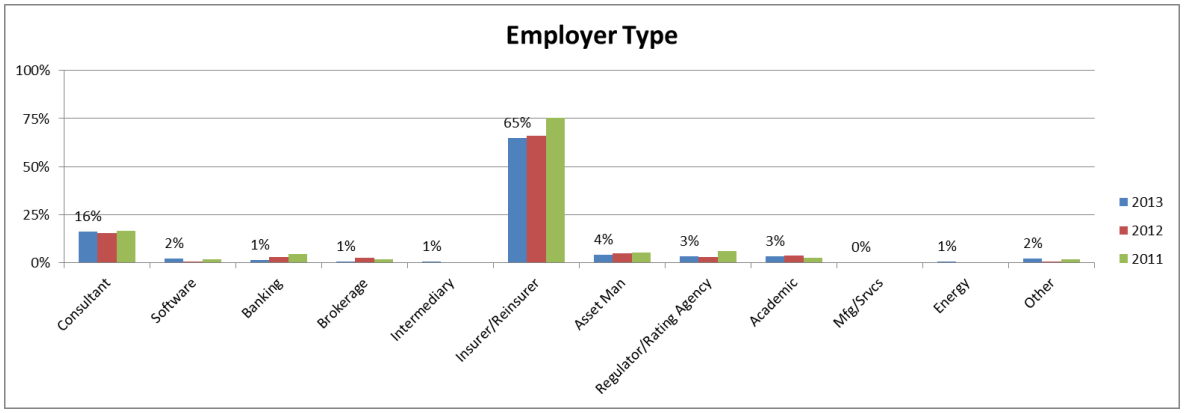
- 45 responses — Not applicable
- 27 responses 29% (24%/17%/22%) — Less than 3 years
- 32 responses 34% (37%/47%/44%) — 3-10 years
- 34 responses 37% (39%/36%/34%) — More than 10 years



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

148 responses with 138 unique (1.1 average)

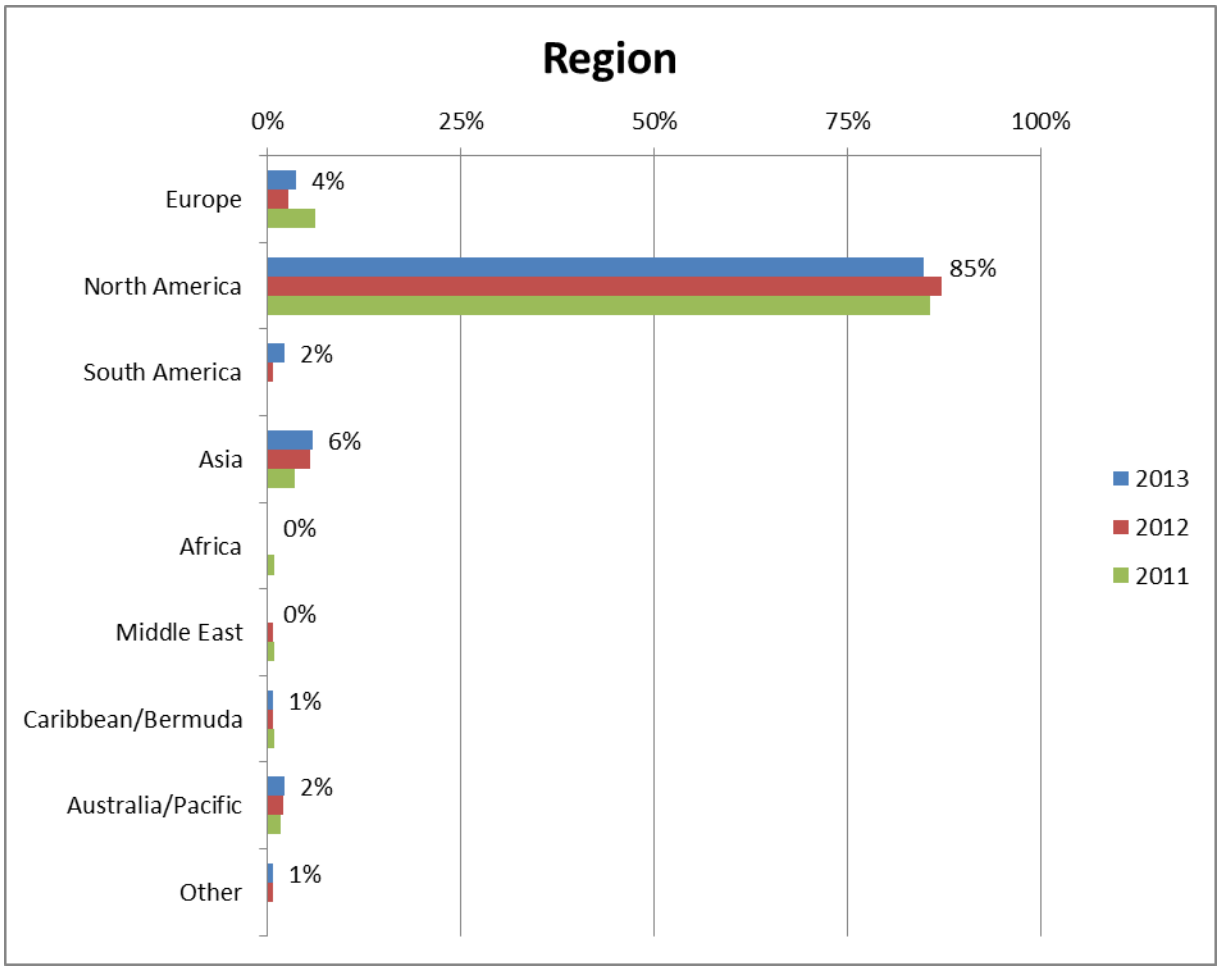
- 24 responses 16% (16%/17%/17%/21%/17%) Consultant
- 3 responses 2% (1%/2%/2%/3%/1%) Software
- 2 responses 1% (3%/4%/1%/3%/2%) Banking
- 1 responses 1% (2%/2%/4%/3%/4%) Brokerage
- 1 response 1% (0%/0%/2%/3%/1%) Intermediary
- 96 responses 65% (66%/75%/69%/54%/70%) Insurance/Reinsurance Company
- 6 responses 4% (5%/5%/2%/4%/7%) Asset Management
- 5 responses 3% (3%/6%/4%/3%/3%) Regulator/Rating Agency
- 5 responses 3% (4%/3%/6%/3%/4%) Academic
- 0 responses 0% (0%/0%/1%/0%/0%) Manufacturing/Services
- 1 response 1% (0%/0%) Energy
- 0 responses 0% Military/defense
- 0 responses 0% CRO (or acting CRO) at CRO Council firm
- 1 response 1% CRO (or acting CRO) at CRO Forum firm
- 3 responses 2% (1%/2%/2%/4%/3%) Other
    - Support Organization
    - Pension plan
    - Investor



Question 5: Primary Region (please select one)

138 responses

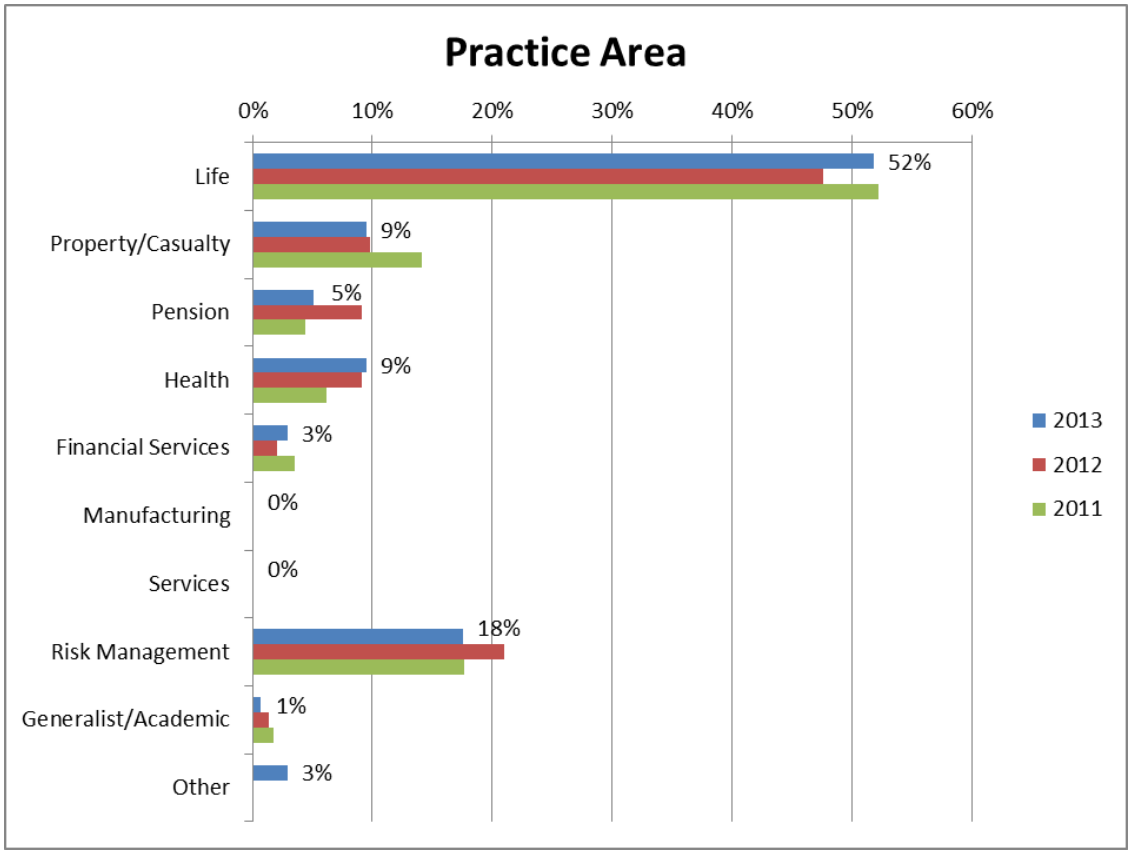
- 5 responses 4% (3%/6%/5%/7%/7%) Europe
- 117 responses 85% (87%/86%/80%/82%/91%) North America
- 3 response 2% (1%/0%/3%/0%0%) South America
- 8 responses 6% (5%/4%/2%/6%/7%) Asia
- 0 response 0% (0%/1%/1%/1%/0%) Africa
- 0 response 0% (1%/1%/2%/1%/0%) Middle East
- 1 response 1% (1%/1%/3%/1%/2%) Caribbean/Bermuda
- 3 responses 2% (2%/2%/2%/2%/6%) Australia/Pacific
- 1 response 1% Other
    - Asia division but located in North America



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

137 responses

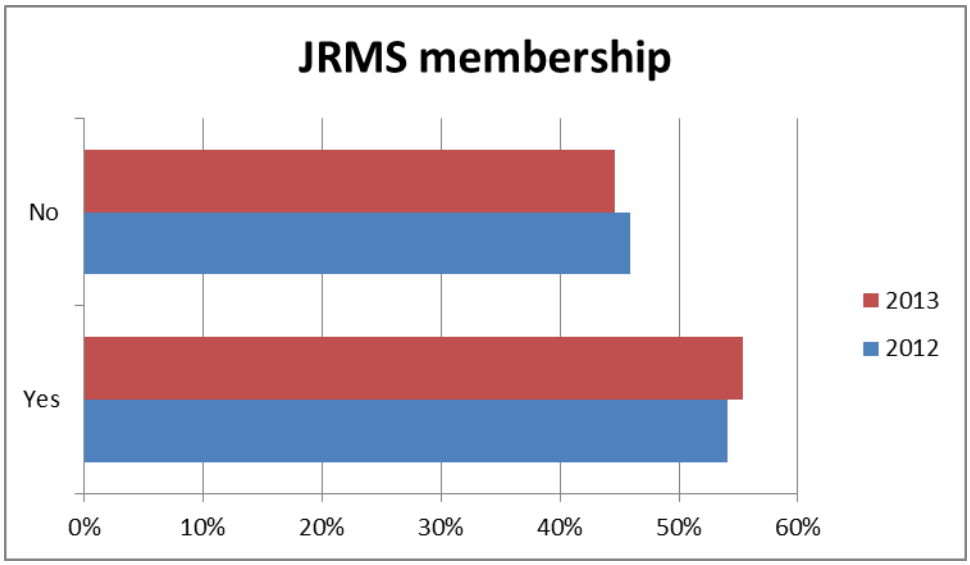
- 71 responses 52% (48%/52%/44%/41%/38%) Life
- 13 responses 9% (10%/14%/17%/19%/13%) Prop/Cas (Gen'l Insurance, Non-Life)
- 7 responses 5% (9%/4%/2%/2%/2%) Pension
- 13 responses 9% (9%/6%/6%/8%/3%) Health
- 4 responses 3% (2%/4%/ (1%) Financial Services (non Insurance)
- 0 responses 0% (0%/0%/1%) Manufacturing
- 0 responses 0% (0%/0%/0%) Services
- 24 responses 18% (21%/18%/26%/20%/33%) Risk Management
- 1 response 1% (1%/2%/1%/3%/3%) Generalist/Academic
- 0 responses 0% Military/defense
- 4 responses 3% Other
    - Investment
    - Group benefits
    - Variable Annuities



Question 8. Do you belong to the Joint Risk Management Section, sponsored by the Casualty Actuarial Society, Canadian Institute of Actuaries, and the Society of Actuaries?

139 responses

- 77 responses 55% (54%/81%/75%/85%/85%) Yes
- 62 responses 45% (46%/19%/25%/15%/15%) No



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

- No
- The CFSI survey of top risks should be included as well
- Nice survey, eager to see the compiled results.
- Ask some regulator specific questions – maybe?
- None. This was a well-put-together survey. Thank you for preparing it.
- It took much longer than 10 minutes. The intro said it was beyond a 305 year period, but several questions were about nearer term. This is confusing. I'm not confident that I answered the questions as you wanted them answered.
- Nope but it is an excellent idea so keep it up.
- Should recognize ASPPA as actuarial body. Should recognize OPEB as specialty of actuarial work. May help to identify those working on public pension plans versus private.
- No
- No
- No
- The questions to corporate goals and in question broaden definition of economy beyond financial markets
- More predictive questions

- I worry that companies submitting more than one response may skew the survey results. It may beneficial to do a shorter survey that is sent out to multiple individuals within an organization, and then have a deeper survey where one official submission is permitted for each company. Also, there were some technical glitches where it said check all that apply and then gave me an error for selecting more than 3, so I was forced to change my answer.
- Explanation of the anchoring effect, to help respondent fight it
- Conducting an emerging risks survey periodically is a good idea. However, please font make the survey longer than it currently is.
- Greater focus on pure financial risks; perhaps more reports on pure risk as opposed to surveys.

Thanks for your participation!

[Researcher's notes for future questions]

Add questions probing

- Does an emerging risk leading indicator ever get dropped? Why?
- What blogs and other sources do you follow?
- What actions have been taken because of work done on emerging risks?
- Time horizon
- Low probability crisis you worry about
- What actions do you take between crises to remain influential
- How prepared is your firm for a major risk event that has never happened before?
- How prepared is your firm for a major risk event of a type that has not happened for more than 10 years?
- Expand Natural catastrophe: Tropical storms to include inland convective storms

May not need Section 4 Question 4 as Comments have become consistent.

Make clear in survey intro that long time horizon should be used for Section 1 but that other questions will have varying time horizons.

Reword Section 1 Question 3.

Change risk from Oil price shock to Energy price shock

Appendix III - Survey Results 2012 and earlier

Prior years' survey results can be found at www.soa.org, along with articles about the survey.