

**Enterprise Risk Management: Working with Elephants and Swans in
the Real World**

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Question

Which of the following causes more deaths in the US each year?:

1. Colon Cancer
2. Motor Vehicle Accidents

Most Common Answer

Which of the following causes more deaths in the US each year?:

1. Colon Cancer
2. Motor Vehicle Accidents

Real Answer

Which of the following causes more deaths in the US each year?:

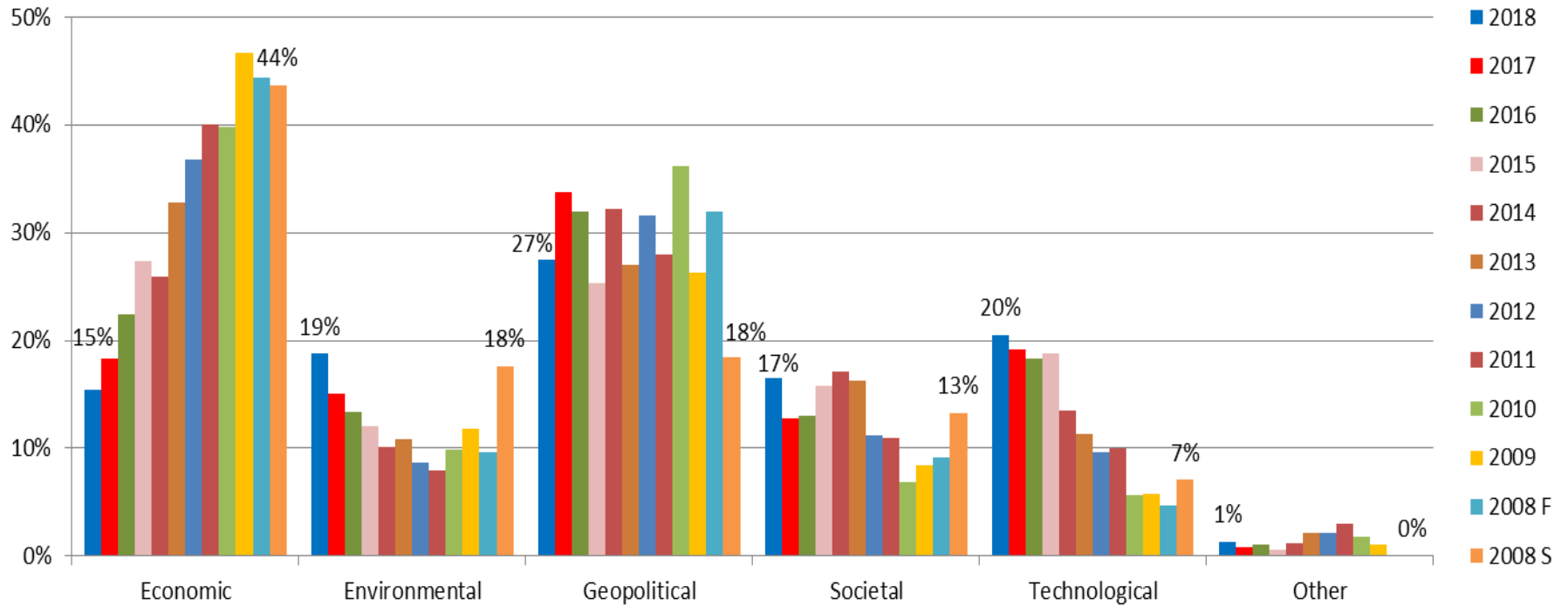
1. Colon Cancer
2. Motor Vehicle Accidents

Availability Heuristic

Vivid Events, Easily Imagined, Consistent with Memory Structures are Judged to be more likely than equally probably events.

Trends in JRMS Emerging Risk Survey

**Emerging Risks by Category
(up to Five Risks Chosen per Survey)**



Models- Our “Bread and Butter”

- Related to overreliance on models
 - Tail events are unknown, huge
 - Cannot be hedged away
- Focus: how to manage through them

[Complex] systems are not confined to historical experience. Events of any size are possible, and limited only by the scale of the system itself. Since we have scaled the system to unprecedented size, we should expect catastrophes of unprecedented size as well.

Quote from Washington Post editorial by James Richards, general counsel of Long-Term Capital Management from 1994-1999.

Our Models

“Each new market crisis demonstrates that correlation in stressed environments is much higher than historical averages would indicate,”

.....

“... the quantification of remote probabilities is more difficult than the quantification of possibilities.”

From the “Credit Crisis Lessons for Modelers” essay by Parr Schoolman, FCAS, Vice president at Aon Benfield Analytics.

Black Swan

- A metaphor.
 -Nassim Nicholas Taleb
- Three attributes:
 - Comes as a surprise, because experience can't point to its possibility – In the eyes of the viewer
 - It carries a major effect.
 - After the fact we produce explanations for its occurrence, making it explainable and predictable (with the benefit of hindsight).

300 Million Years Ago



Recent Meteor Shower in my state



According to [Business Insider article](#), these are '9 black swan events that changed finance forever':

- The Asian financial crisis
- The Dot Com crash
- 9/11
- The global financial crisis
- The European sovereign debt crisis
- The Fukushima nuclear disaster
- The 2014 oil crisis
- The 2015 Black Monday
- Brexit

Are they
really?

1. FINANCIAL CRISIS

A series of currency devaluations beginning July 1997 spread through East and SouthEast Asia



THAI BAHT PLUMETTED

Collapse of the Thai Baht as a result of the government's decision to no longer peg the local currency to the US dollar

REDUCED IMPORT REVENUE



38% ↓

INTERNATIONAL STOCKS TUMBLED

2 DOT!COM CRASH



STOCK PRICES RALLIED AT UNREAL SPEEDS

Several leading tech giants placed huge sell orders on their stocks at markets' peak

THE NASDAQ COMPOSITE

LOST 78% ↓

of its value as it fell from
5046.86 TO 1114.11

SELL : SELL : SELL : SELL

Sparking a wave of **PANIC SELLING**

SELL : SELL : SELL : SELL

TRILLIONS OF DOLLARS LOST

By the end of 2001, the bulk of dotcom companies folded and trillions of dollars of investment capital vanished

3.  **9/11/2001**

9/11 The Twin Towers of New York's World Trade Center were hit by two hijacked airliners on the morning of September 11, 2001.



STOCKS PLUMMETED

NYSE
7.1% ↓

S&P
11.6% ↓

DOW JONES
14% ↓

The first trading week after 9/11 saw the greatest losses in NYSE history. An estimated \$1.4 Trillion in value was lost in those 5 days.

4. GLOBAL FINANCIAL CRISIS

LEHMAN BROTHERS

DEBT \$619 BILLION ↓

Filed for bankruptcy on September 15, 2008



BEAR STEARNS

BEAR STEARNS

Bear Stearns collapses, is bailed out by the NY Fed, and eventually sold to JPMorgan Chase



25,000 EMPLOYEES JOBLESS

Lehman's 25,000 employees awoken to the news that they likely no longer have jobs



HOUSES FOR SALE

The subprime mortgage-induced financial crisis of 2008 is considered the worst financial crisis since the Great Depression

\$10 TRILLION WIPED OUT IN THE GLOBAL EQUITY MARKETS

AFTER THE 2008 GLOBAL FINANCIAL CRISIS,

financially stronger countries like Germany were unable to fund weaker countries out of their debts.

FINANCIALLY WEAKER COUNTRIES

like Greece, Portugal and Spain thus needed a bailout.

There were fears that if one or more Eurozone country members were to leave the Euro and default on its debts, it would bring down the entire world banking system.

5. EUROPEAN SOVEREIGN DEBT CRISIS



6. FUKUSHIMA NUCLEAR DISASTER

The Fukushima Daiichi nuclear disaster was an energy accident initiated by the tsunami following the Tōhoku earthquake on March 11, 2011.

DOW JONES
2.4% ↓

EARTHQUAKE
8.9
MAGNITUDE

TOPIX
9.5% ↓

NIKKEI
16.0% ↓

DAX
4.0% ↓



7. OIL CRISIS

On June 22, two tankers loaded 1.3 Million barrels of crude at a port in Eastern Libya, signalling the end of a decade-long boom in oil markets.



High prices before the reopening of Libyan oil fields a catalyst for US Shale Oil Boom

2008

5 MILLION
BARRELS A DAY

2014

8.5 MILLION
BARRELS A DAY

OVER SUPPLY



CAUSES
PRICES TO DROP

USD **\$110**



TO
USD **\$50**

SLUMP IN OIL PRICES FROM AN OVERSUPPLY IN US SHALE OIL

The low oil prices wreaked havoc with commodity-exporting nations, including exporters of manufactured goods like China. Since these oil exporters were enormous importers, global trade withers.

8.



BLACK MONDAY

Since borrowing was cheap in China, over-speculation in Chinese companies using borrowed money to play the stock market was widespread.



The amount of money invested soon exceeded the rate at which those invested companies could grow so,

**THE CHINESE GOVERNMENT
DECIDED TO DEVALUE THE YUAN
PLAN BACKFIRED**

Causing a wave of panic selling, leading up to

“BLACK MONDAY”



9. BREXIT

POUND FELL
MORE THAN

10% 

AGAINST THE
EURO SINCE
BREXIT



As markets woke up on the 24th of June to news of the British referendum to leave the EU,

**THE POUND TUMBLED TO A 31-YEAR LOW
AGAINST THE DOLLAR**

In terms of the long term economic impact of Brexit however, economists are divided and uncertain about Britain's future. In a poll by Bloomberg, almost three-quarters of economists think that Britain is headed for a recession either this year or next.

Is this a Black
Swan?

Elephant in the Room



Another Metaphor

"Elephant in the room"

“An obvious truth, problem risk that is either being ignored or going unaddressed.”

No one wants to talk about it.

Why?

To do so otherwise would cause great embarrassment, sadness, arguments, more issues, accountabilities, more worries, or is simply taboo.

Question

- Which Would you Rather Have?
 - \$7,000 for sure
 - or 85% chance for \$10,000?

Most Common Answer

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Question

- Which Would you Rather Do?
 - Pay \$7,000 for sure
 - Take an 85% chance of paying \$10,000 and 15% of paying \$0

Most Common Answer

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Question

The U.S. is preparing for the outbreak of a deadly disease that is expected to kill 600 people. Two alternative programs are being considered. Which do you favor?

- Program A: 200 people will be saved
- Program B: Probability of $1/3$ all 600 will be saved, Probability of $2/3$ all 600 will die

Most Common Answer

The U.S. is preparing for the outbreak of a deadly disease that is expected to kill 600 people. Two alternative programs are being considered. Which do you favor?

– **Program A: 200 people will be saved**

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Question

The U.S. is preparing for the outbreak of a deadly disease that is expected to kill 600 people. Two alternative programs are being considered. Which do you favor?

- Program A: 400 people will die
- Program B: 1/3 probability no one will die, 2/3 probability all will die

Most Common Answer

The U.S. is preparing for the outbreak of a deadly disease that is expected to kill 600 people. Two alternative programs are being considered. Which do you favor?

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Framing Effect

- We are Risk Averse to Gains
- Risk Seeking to Loss

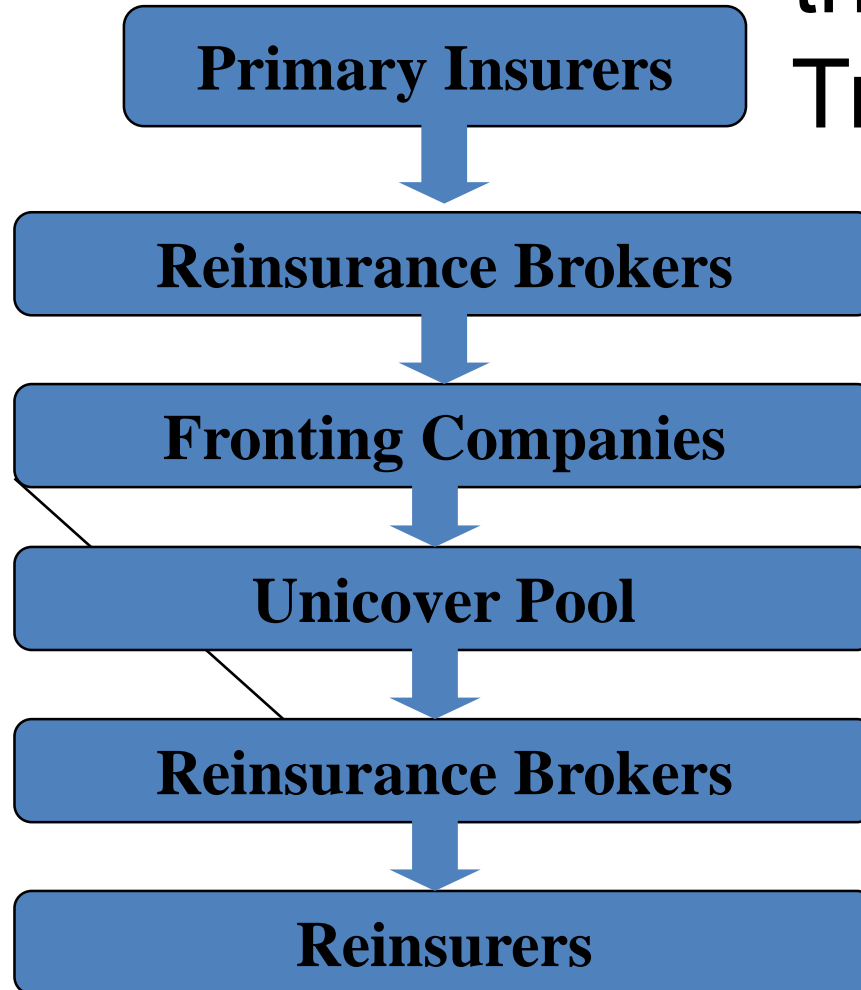
Escalation of Commitment

- Commitment of Resources to a course of action
- Action does not produce a return, but may produce a loss
- Decision is made to commit further resources in order to turn the situation around
- Process may repeat and “escalate” several times as additional resources are invested

Remember Unicover?

Passing
the
Trash

- Unicover was a group of pools that reinsured workers comp
- policies priced at 30% - 40% below expected losses
- then passed most of the “carve out” med/health component to reinsurers
- Reinsurers in turn lowered prices to attract retrocessionaires
- Spiral continued



- Ultimate cost: Estimated at \$2 billion
- Life reinsurers stuck with much of it

Who Made the Quote

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– Harvard Economic Society- Weekly Letter 9/16/29

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– Albert Einstein, 1932

Who Made the Quote

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– David Riesman, Harvard Sociologist, 1967

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- “640K is enough for everyone”

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“640K is enough for everyone”

– Bill Gates, 1981

Overconfidence

- We are paradoxically more confident in estimates of events we are less familiar with than with events we are more familiar with
- We tend to be overconfident on tasks that range from moderate to extreme difficulty.
- People tend to make a specific estimate, which acts as an anchor for their confidence levels, and they don't adjust away from the anchor enough.
- Looking confident looks good.
- Looking as if you are not confident doesn't look good.

ERM Strategy for Risk Discussion

- Search for Disconfirming Evidence
- Reframe The Problem
- Avoid Public Commitment Too Early
- Get Several Perspectives- Avoid Tunnel Vision
- Redefine a Situation
 - Not ‘same old problem”
 - New Problem to be dealt with
 - Change Decision Criteria
- Define/Redefine Accountability
- Set a Limit of Commitment “Cutting Your Losses”