Getting Comfortable with Risk

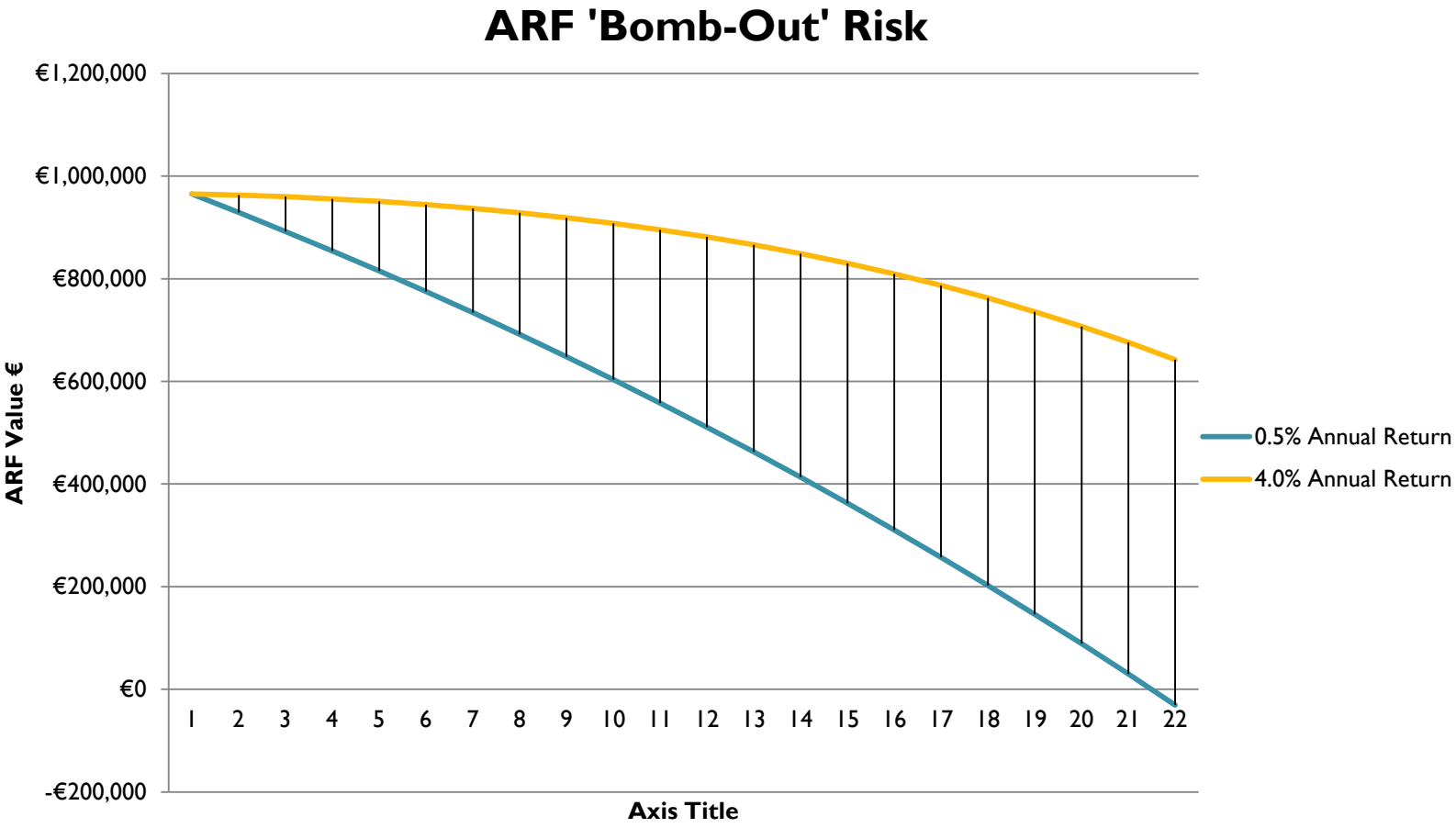
September 2016

HARVEST
FINANCIAL SERVICES

ARF Distribution

- 2015 reduced to 4% if over 61 and under age 70 and funds <€2M; 5% over age 70; 6% if funds >€2M.
- Deposit rates 2010/11 – 4/5% AER 5 year fixed term; 2016 0.4/0.5% AER 5 year fixed term.
- Many don't require income distribution

Risk of ARF "Bomb-out" if funds left in cash



Assume: Annual Drawdown 4% p.a.; Increase in Drawdown 2% p.a.; Inflation 3% p.a.; Initial ARF €1M.

Source: Harvest Financial Services Ltd 14/09/2016

EII Scheme

- Look at investment of after tax income as tax efficiently as possible, e.g. EII Scheme
- What is the Employment and Investment Incentive Scheme (EIIS)?
- Up to 40% tax relief available against all income
- Harvest's approach to EIIS
- Different levels of risk

Why is Risk Important?

- Growth cannot happen without Risk
- Along with Time and Diversification, Risk is the third leg of the Investment stool
- Accept Market Fluctuations

Cash Fund vs. Equity Fund

FTSE 100 over 30 years

Seven Year Asset Class Forecasts

Average Annual Growth Rates

	Nominal	Real
Cash (US/UK/Euro)	1.3%	-0.6%
Bonds (US/UK/Euro)	-0.7%	-2.4%
Equities		
- US	6.0%	3.9%
- Europe	3.9%	2.4%
- Emerging Markets	11.2%	7.2%

- Source: Schroders 2016

"Avoid trying to predict the markets. Remember We have two classes of forecasters: Those who don't know …and those who don't know they don't know"

J K Galbraith

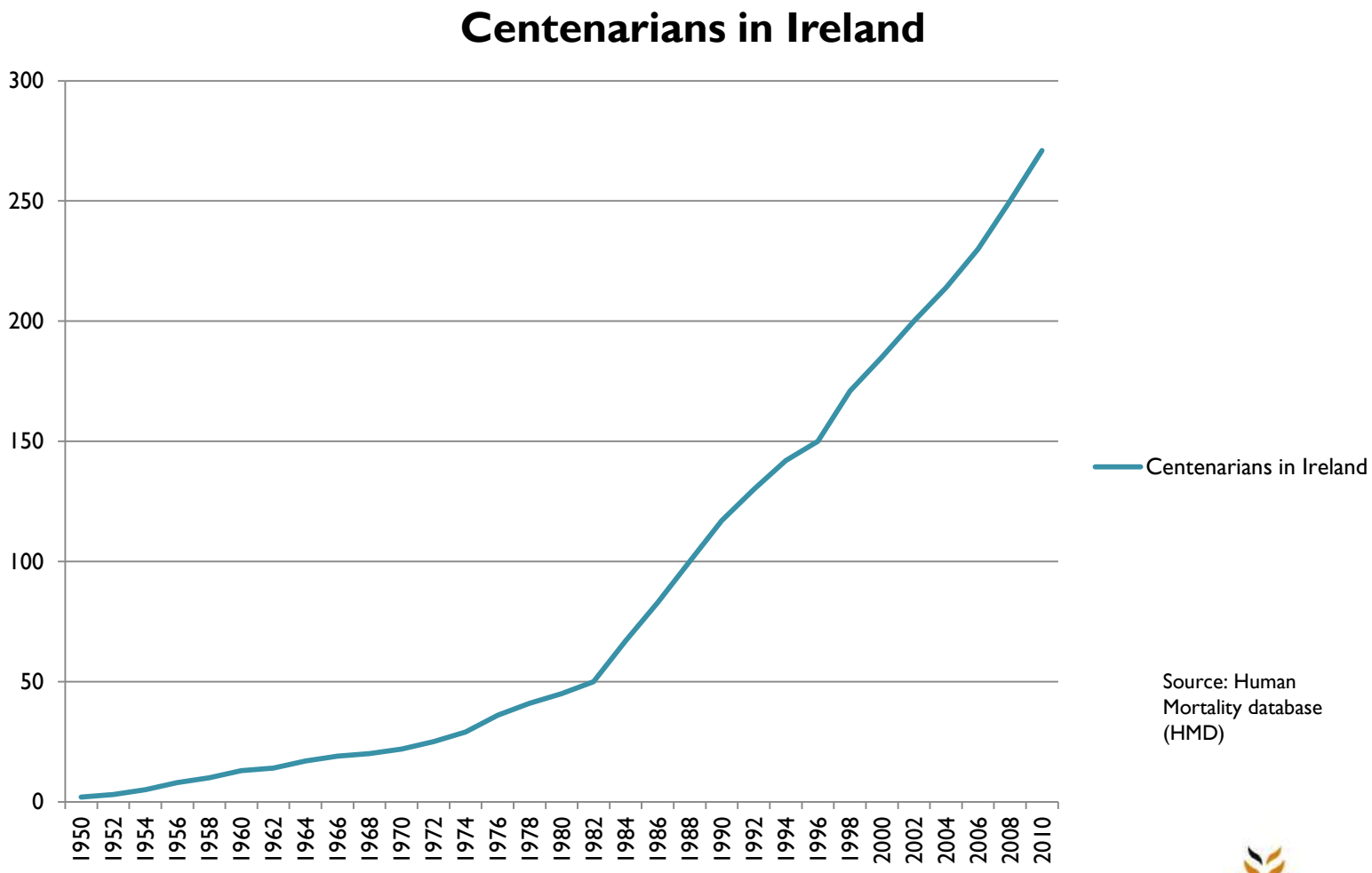
Five Investment Pillars

- Time Horizon
- Asset Allocation/Diversification
- Differentiate between Cyclical and Permanent Losses
- 80:20 Rule
- Income

1. Time Horizon

- Exposure to Risk Assets (Equities, Property) requires a time horizon of five years minimum
- This allows for market cycles to run their course

And We All have More Time than we Think …

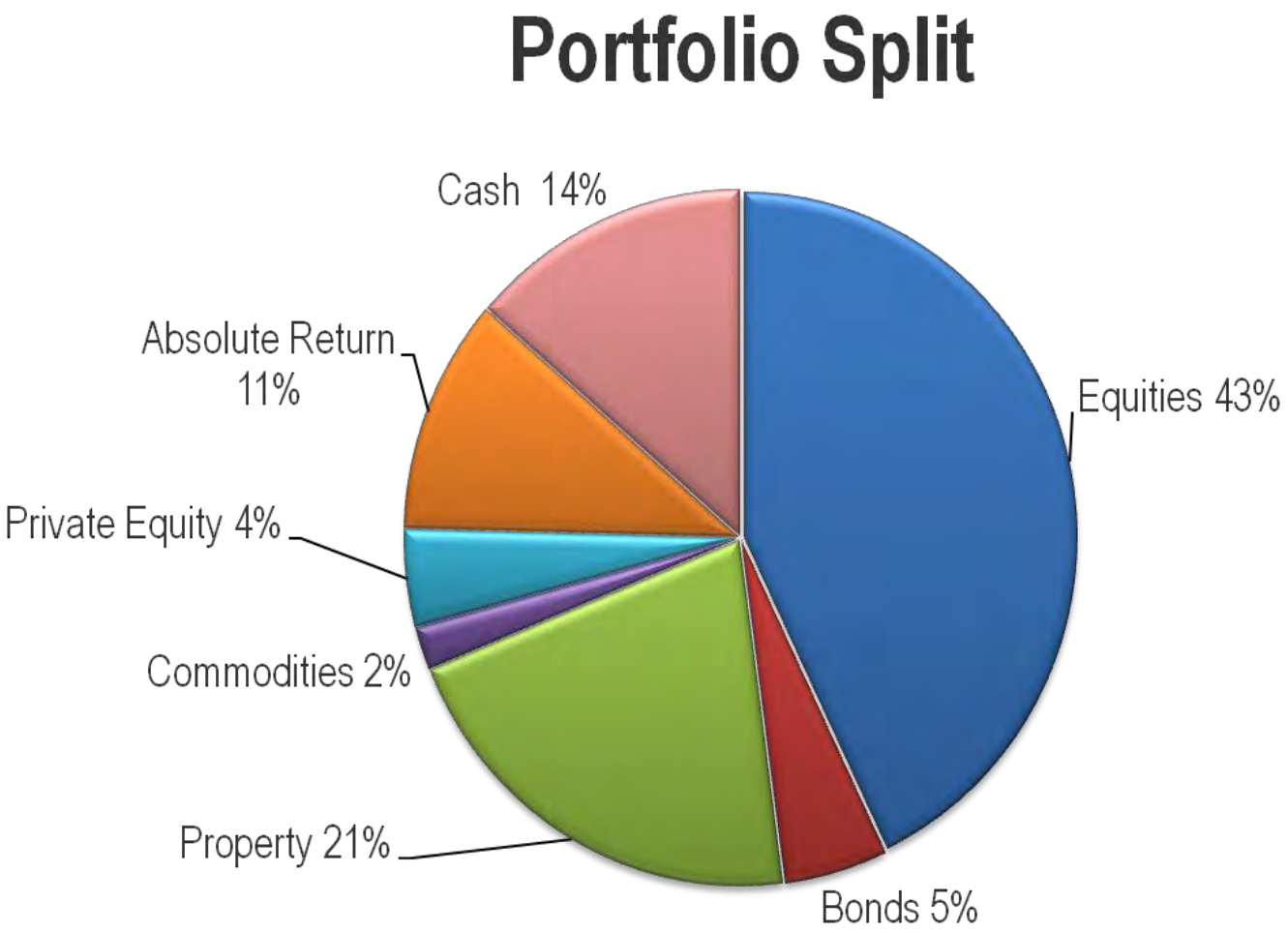


Source: Human Mortality database (HMD)

2. Asset Allocation and Diversification

- Important to achieve appropriate balance between the major asset classes
- Market timing is a very difficult thing to get right so at times of uncertainty phased investment is advisable

Balanced Asset Allocation



3. Cyclical and Permanent Losses

Portfolio Losses

Cyclical

- Diversified Equities
- Ungeared Property

Permanent

- Single Stocks
- Geared Property
- Debt of any Kind
- Private Equity

4. Follow the 80:20 Rule

- Ensure at least 80% of your portfolio is diversified, liquid and does not involve gearing

- The corollary is that a maximum of 20% of the portfolio should run the risk of permanent loss

5. Income

- Build in an income focus to a portion of your portfolio
- Income a real measure of value
- Compensation during volatile times
- Currently not difficult to beat Income from cash

‘The biggest risk is not taking any risk. The only strategy that is guaranteed to fail is not taking any risks.’

Mark Zuckerberg

The information contained herein is based on Harvest Financial Services Limited's understanding of current Revenue practice as at May 2016 and may change in the future.

This information has been provided for discussion purposes only. It is not advice, it is provided for general information purposes only and does not fully take into account your financial position, investment needs and objectives, attitude to risk, liquidity needs, etc. It should therefore not be relied upon to make investment decisions.

The value of your investment may go down as well as up.

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CheckRisk

Simplifying the Complexity of Investment Risk

Harvest ARF Seminar

Nick Bullman
Chairman, CheckRisk

September 2016

www.check-risk.com

Advances in risk knowledge and how behavioural finance can help.

Setting the scene

A tale in three parts…

First part:

- **What is risk?**
- **Does what we think matter? Sensation seeking and risk…**
- **Why is risk important?**
- **What are the current systems for looking at risk?**

The future of risk …

Second part: Risk in reality

1. **Forward Looking Risk Models.**
2. **Network Risk Models**
3. **Causality, Cascades & Stress Testing**
4. **Nowcasts**
5. **Early Warning Risk System**

Your future risks…

Third part: The State of Financial Risk Today

Applying what we have learned…

1. **Breaking Unconventional Monetary Policy (B.U.M.P)**
2. **Associated Risks**
3. **The period 2017-2020 a crisis in the making.**

What is risk?

What is risk?

- **The possibility that something unpleasant or unwelcome will happen? The possibility of financial loss?**

- **Is risk just a negative?**

- **Is risk uncertainty? A risk is not uncertainty. (Uncertainty is where neither the probability nor the mode of occurrence is known.)**

What is risk?

- **Risk is the potential to miss one's target**
- **Risk is the probability of loss multiplied by the potential loss**
- **Risk is the potential that a chosen action or activity (including the choice of inaction) will lead to a loss or a missed opportunity**
- **Risk is a sensation we feel when outside our personal comfort zone. (Personal perception)**

BUT….

How cmoe yuor bairn is albe to udnertsnad tihs snetnece eevn tghouh olny the frist and lsat ltetres of ecah wrod are crreoct ?

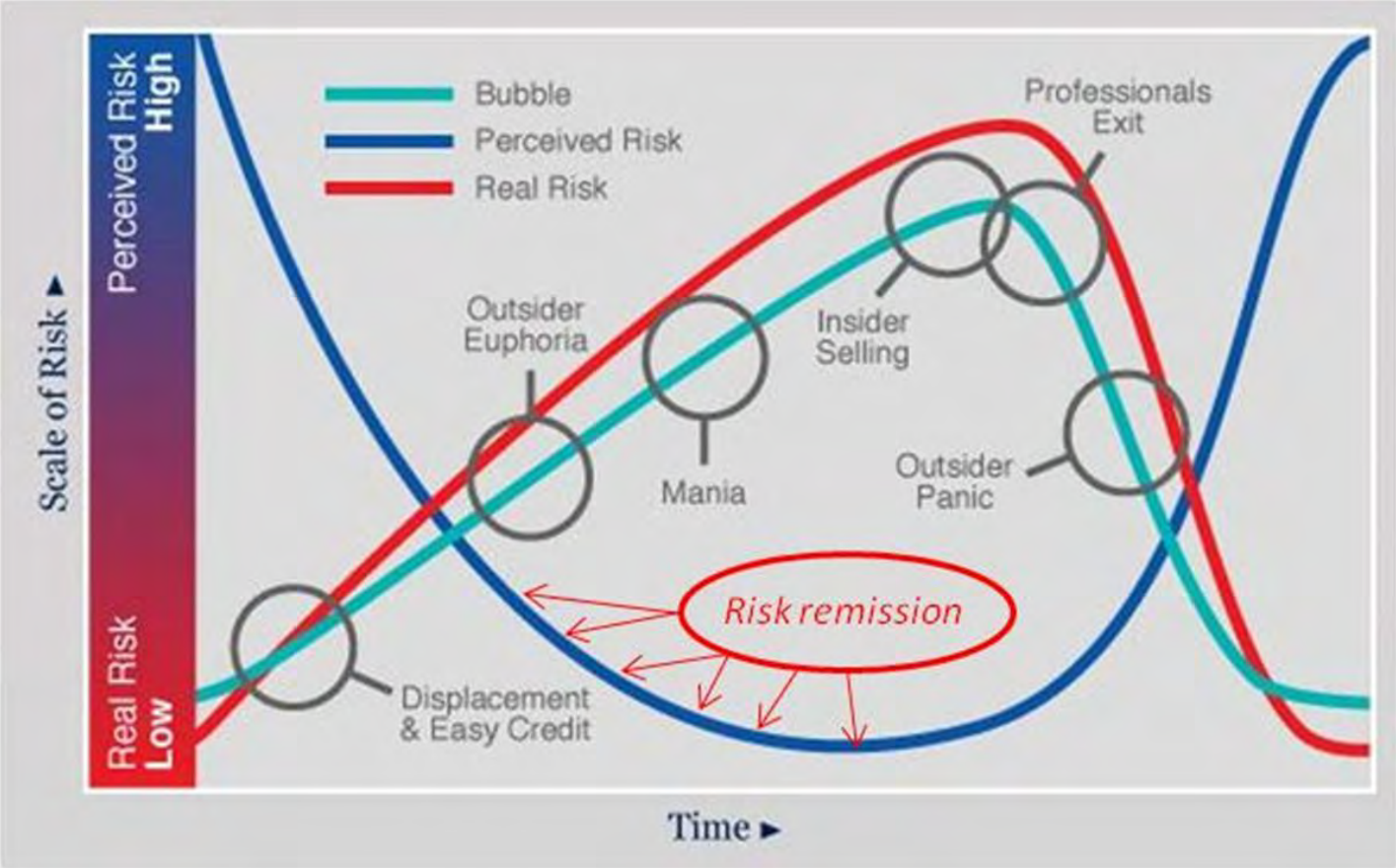
Risk Analysis Behavioural Considerations

- **Decisions tend to be based on the latest information (Recency Bias)**

- **We tend to be less sceptical if we are enjoying something (Reward)**

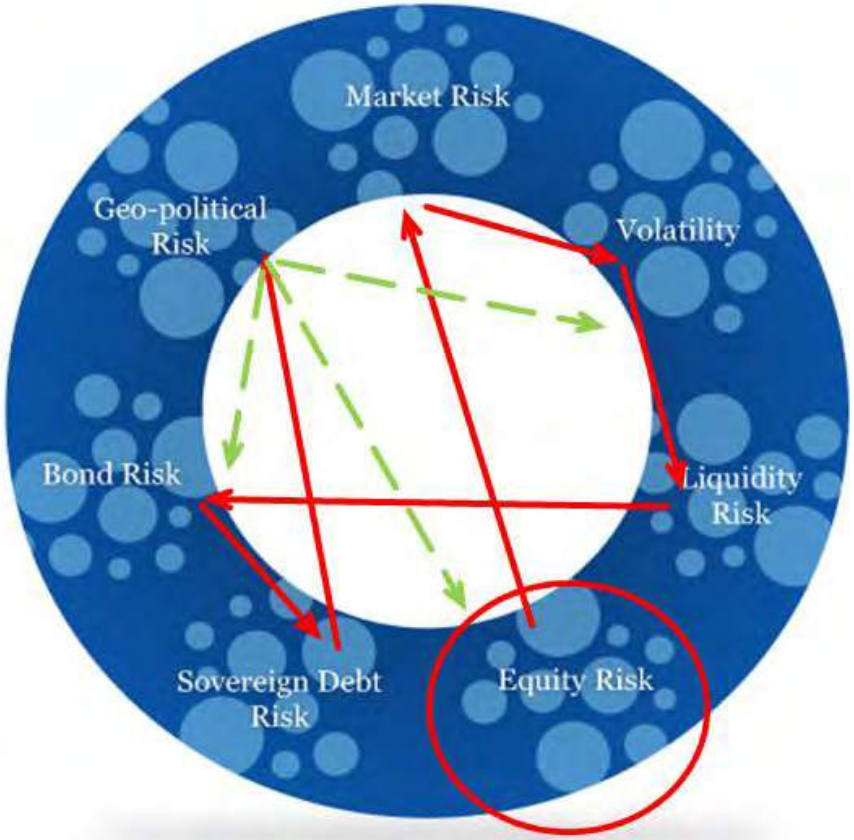
- **We use pattern recognition to make decision making easier even if the outcome is less optimal than applying logic.**

The nature of bubbles



Source: CheckRisk LLP

Risk Clusters



Source: CheckRisk LLP

Heuristics

What is a heuristic?

Heuristics refer to experience-based techniques for problem solving, learning, and discovery.

IN OTHER WORDS LEARNT BEHAVIOURS

Example Heuristics

Affect: The affect heuristic concerns "goodness" and "badness". Affective responses to a stimulus occur rapidly and automatically

Anchoring: A bias used by clever sales people to tether expectations to an unrealistic price.

Availability: Availability is a cognitive heuristic in which a decision maker relies upon knowledge that is readily available rather than examine other alternatives or procedures. (pattern recognition)

Similarity: "Like causes like" and "appearance equals reality"

Over confidence: A heuristic based on our inability to calculate probability

Recency Bias: The most recent information has the most influence

Herding: If everyone else is doing it, it must be right.

Example Heuristics

DO GROUPS MAKE BETTER RISK DECISIONS?

GROUP RISKY SHIFT

ANA Flight 60… Group risky Shift?

The historical model… Value at Risk

The Problem with VaR, Modified VaR, and Extreme VaR

S&P Daily Return Data from January 1928 to October 2010

Average	**0.026%**
Sample number	20,788
Standard Deviation (σ)	1.195%
Kurtosis	17.515
Skewness	-0.095
Max Daily Return	16.61%
Min Daily Return	-20.47%

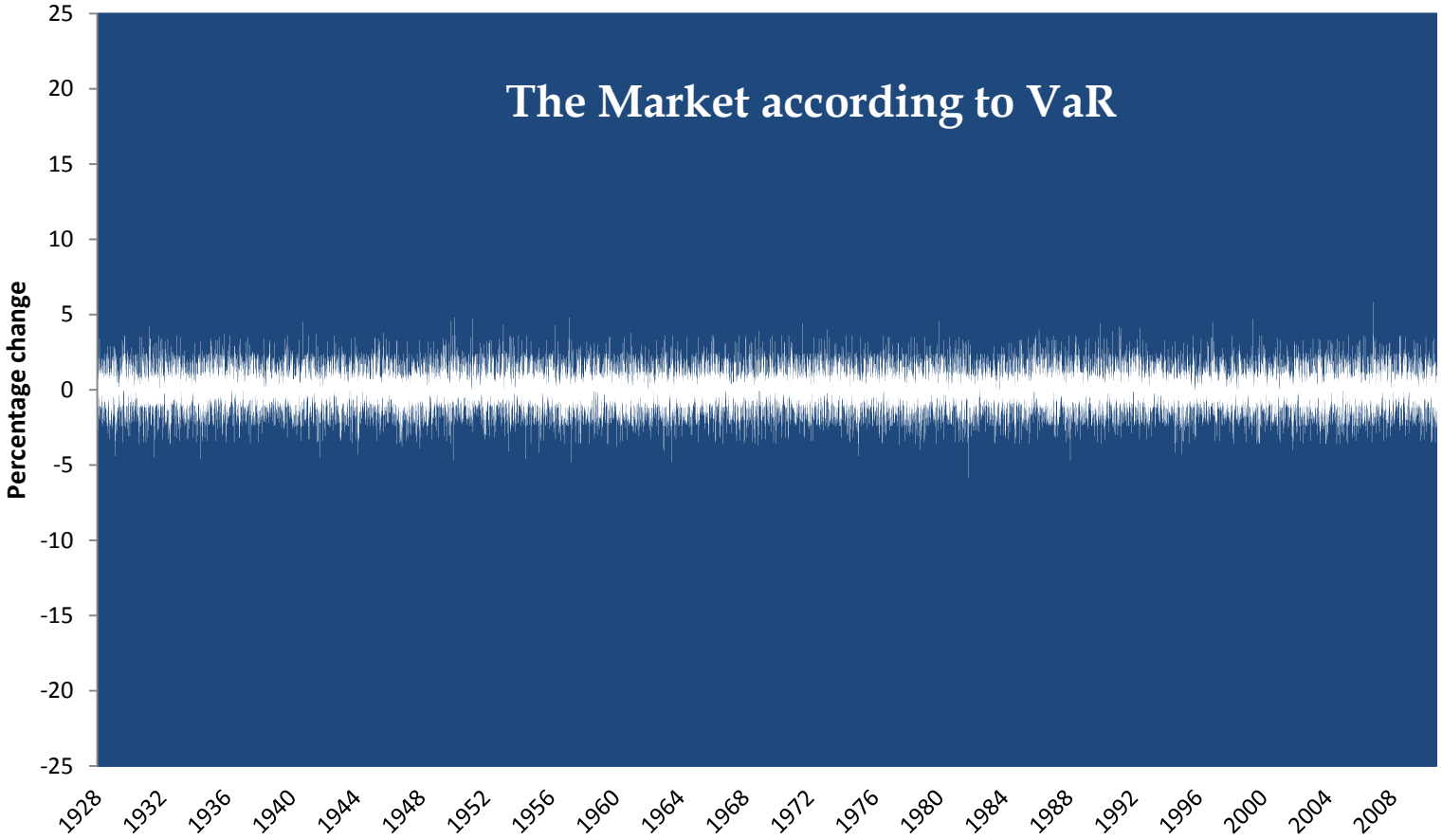
Source: CheckRisk LLP

Problems with VaR

		Normal Distribution		ACTUAL Distribution	
# of Standard Deviations from the Mean	Daily Return Range	Predicted	Percentage	Observed	Percentage
+6σ or more	Above +7.17%	0	0.00%	26	0.13%
+5σ	5.97% to +7.17%	0	0.00%	16	0.08%
+4σ	+4.78% to +5.97%	1	0.00%	32	0.15%
+3σ	+3.58% to + 4.78%	27	0.13%	99	0.48%
+2σ	+2.39% to + 3.58%	445	2.14%	297	1.43%
+1σ	+1.19% to +2.39%	2825	13.59%	1502	7.23%
0σ	-1.19% to +1.19%	14192	68.27%	16907	81.33%
-1σ	-1.19% to -2.39%	2825	13.59%	1394	6.71%
-2 σ	-2.39 % to -3.58%	445	2.14%	331	1.59%
-3σ	-3.58% to -4.78%	27	0.13%	101	0.49%
-4σ	-4.78% to -5.97%	1	0.00%	43	0.21%
-5 σ	- 5.97% to - 7.17%	0	0.00%	18	0.09%
-6 σ or more	Below -7.17%	0	0.00%	22	0.11%
Total	~	20,788	100%	20,788	100

Source: CheckRisk LLP

Do Risk Clusters exist? Models say no…



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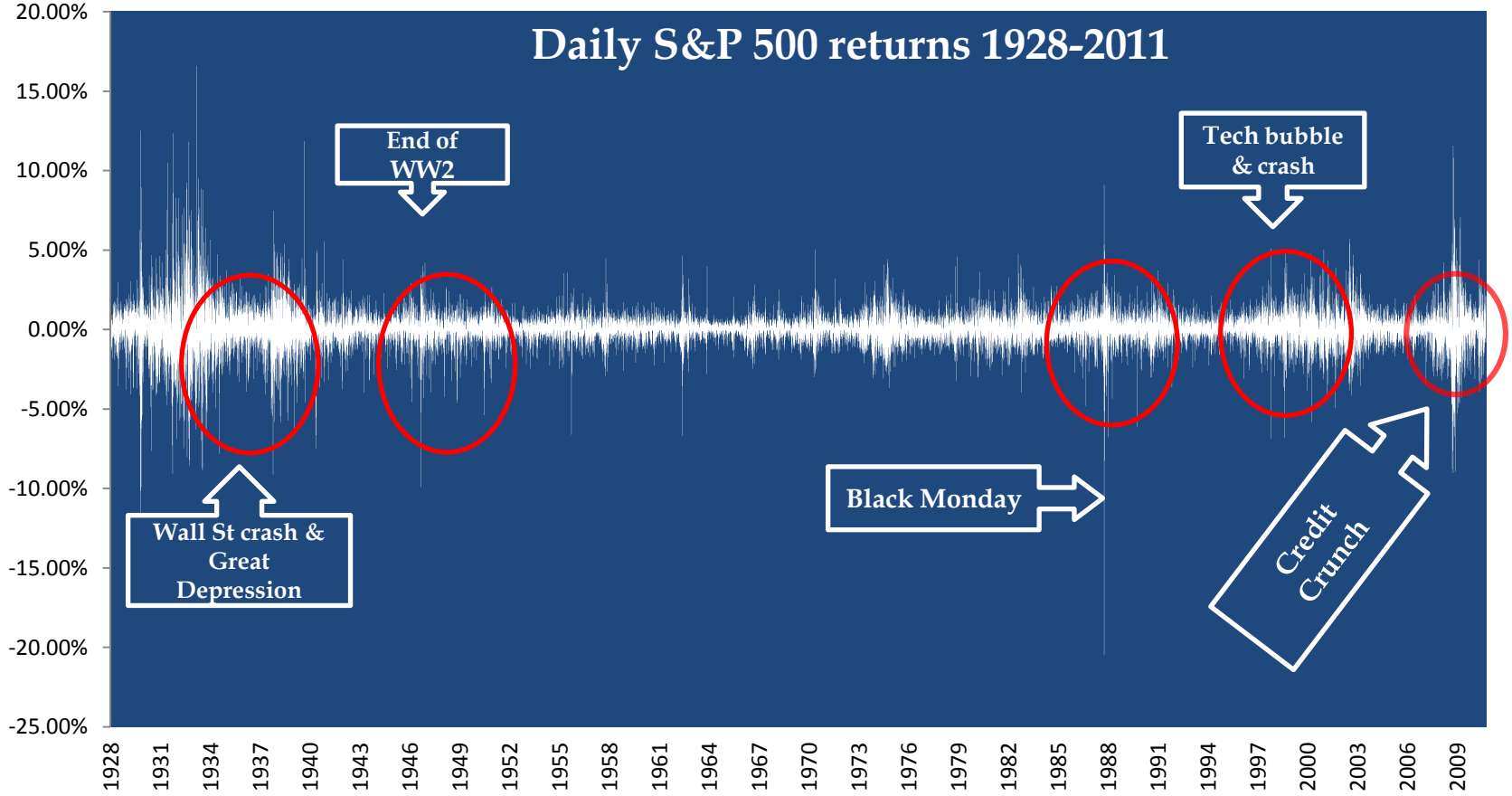


Source: CheckRisk LLP

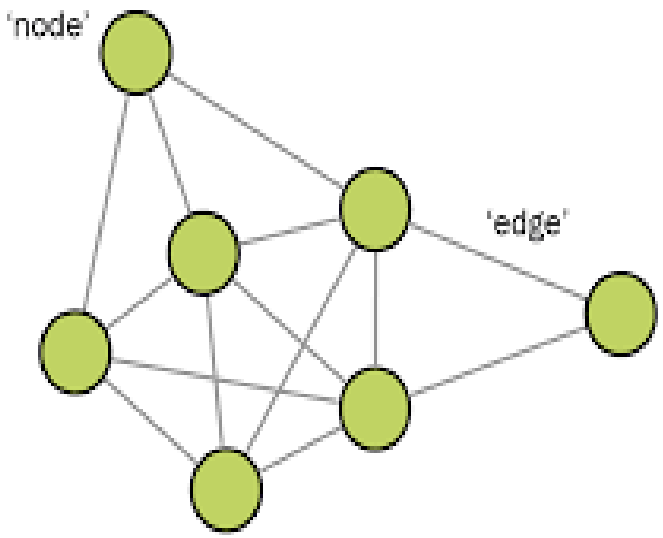
Part 2

Risk in Reality

Tactical Risk

Strategic Risk

Network risk Modelling:



A network is comprised of nodes and edges

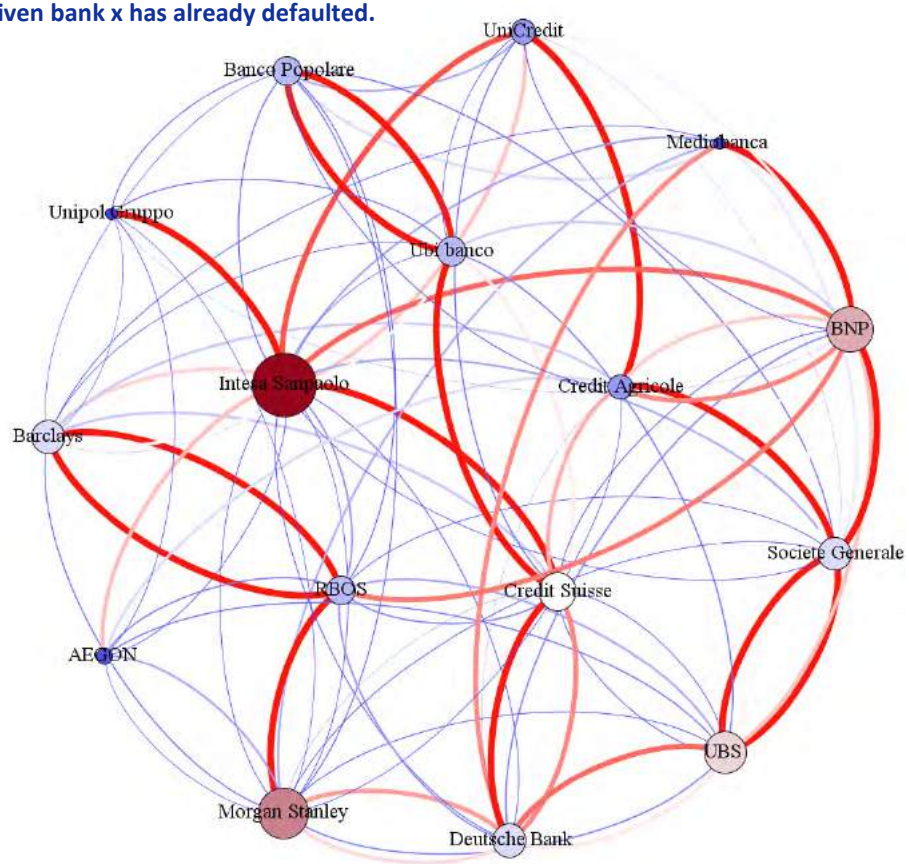
Edge is the line that are the relationships that connect one node to another

Can be theoretical or practical

Source: CheckRisk LLP

Network risk Modelling:

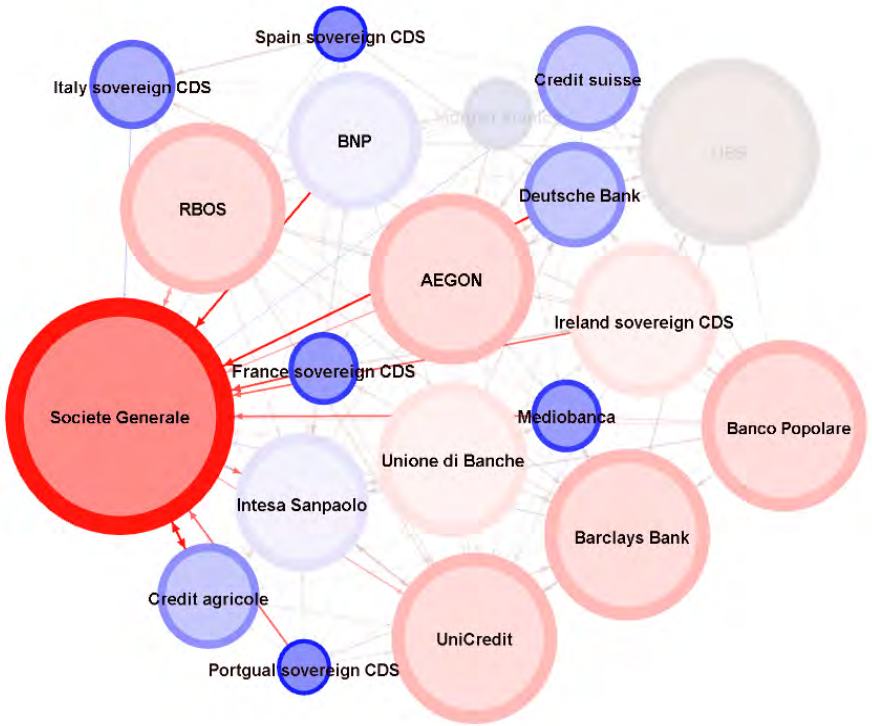
CoVAR (conditional value at risk)(Brunnermeier 2011). This methodology tries to ascertain the probability of bank y defaulting, given bank x has already defaulted.



Size of node represents systemic importance of the bank to the network
Thickness of the line represents network interdependence

Source: CheckRisk LLP

Network risk Modelling:



Size of node represents systemic importance of the bank to the network
Thickness of the line represents network interdependence

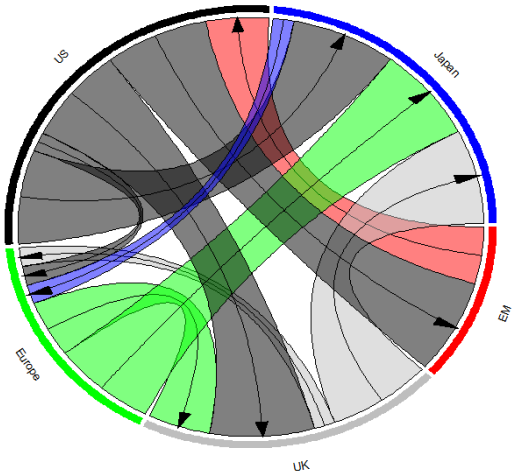
Source: CheckRisk LLP

Causality as a measure of risk

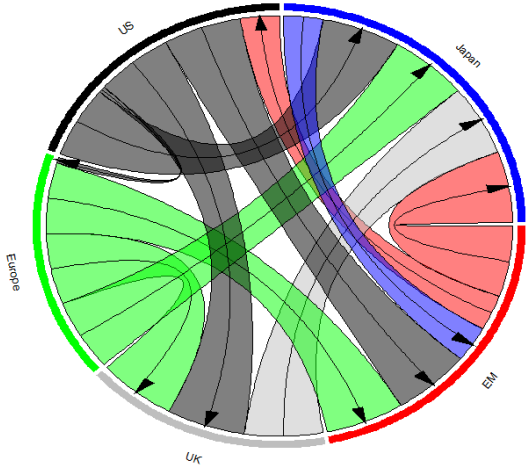
Granger causality is a statistical concept of causality that is based on prediction – the ability of x to predict a future value of y. The hypothetical outcome is passed through various probability tests to determine the strength of the relationship at different time horizons, or whether there is any at all.

Grainger Causality Modelling:

5 Years



1 Year



Data to 1 April 2016

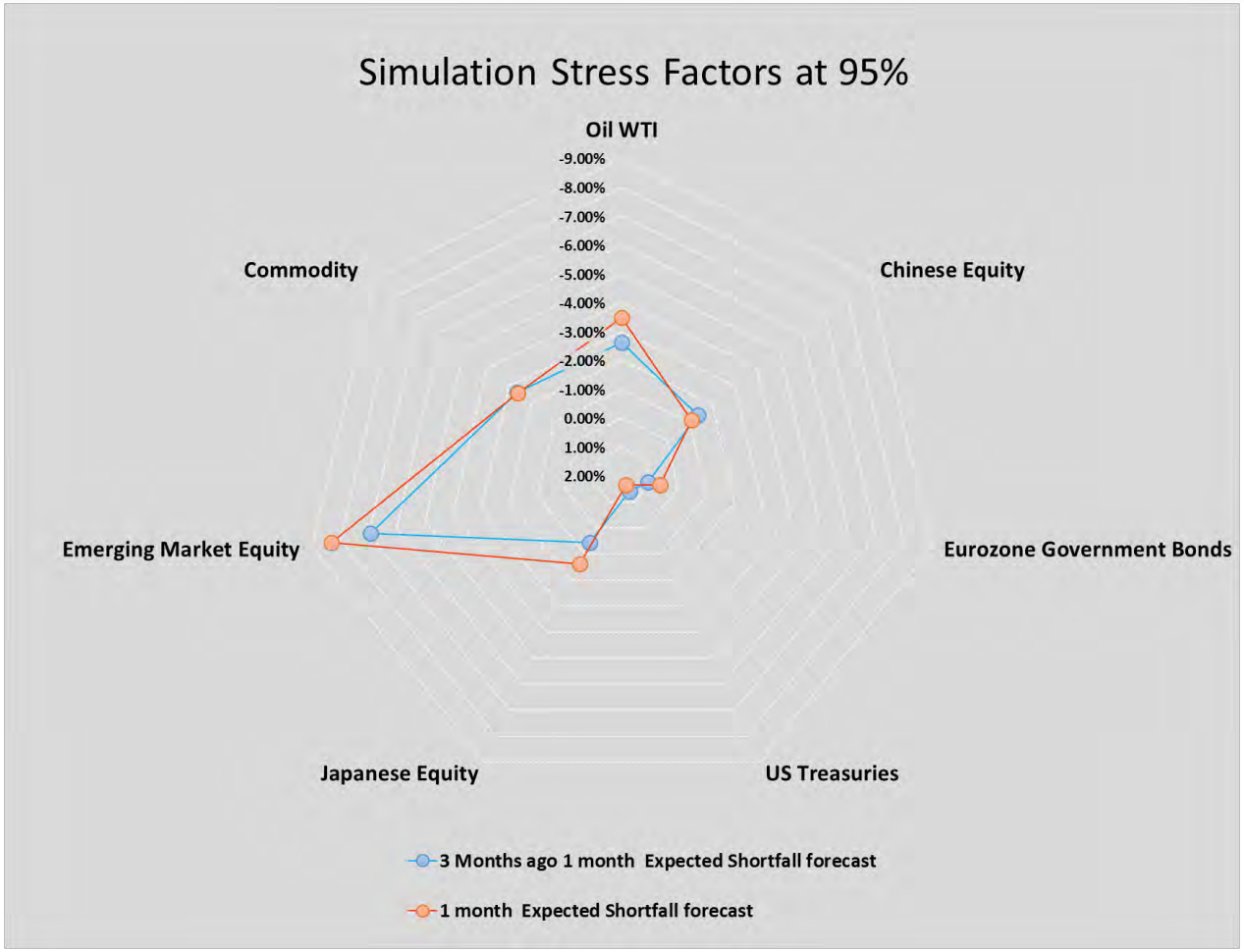
Arrow indicates direction of causation

Thickness of band is the strength of confidence interval. The thickest band is 99% confidence, middle band 95%, and thinnest band 90% confidence.

Granger, C. W. J. 1969 Investigating causal relations by econometric models and cross-spectral methods. Econometrica 37, 424-438

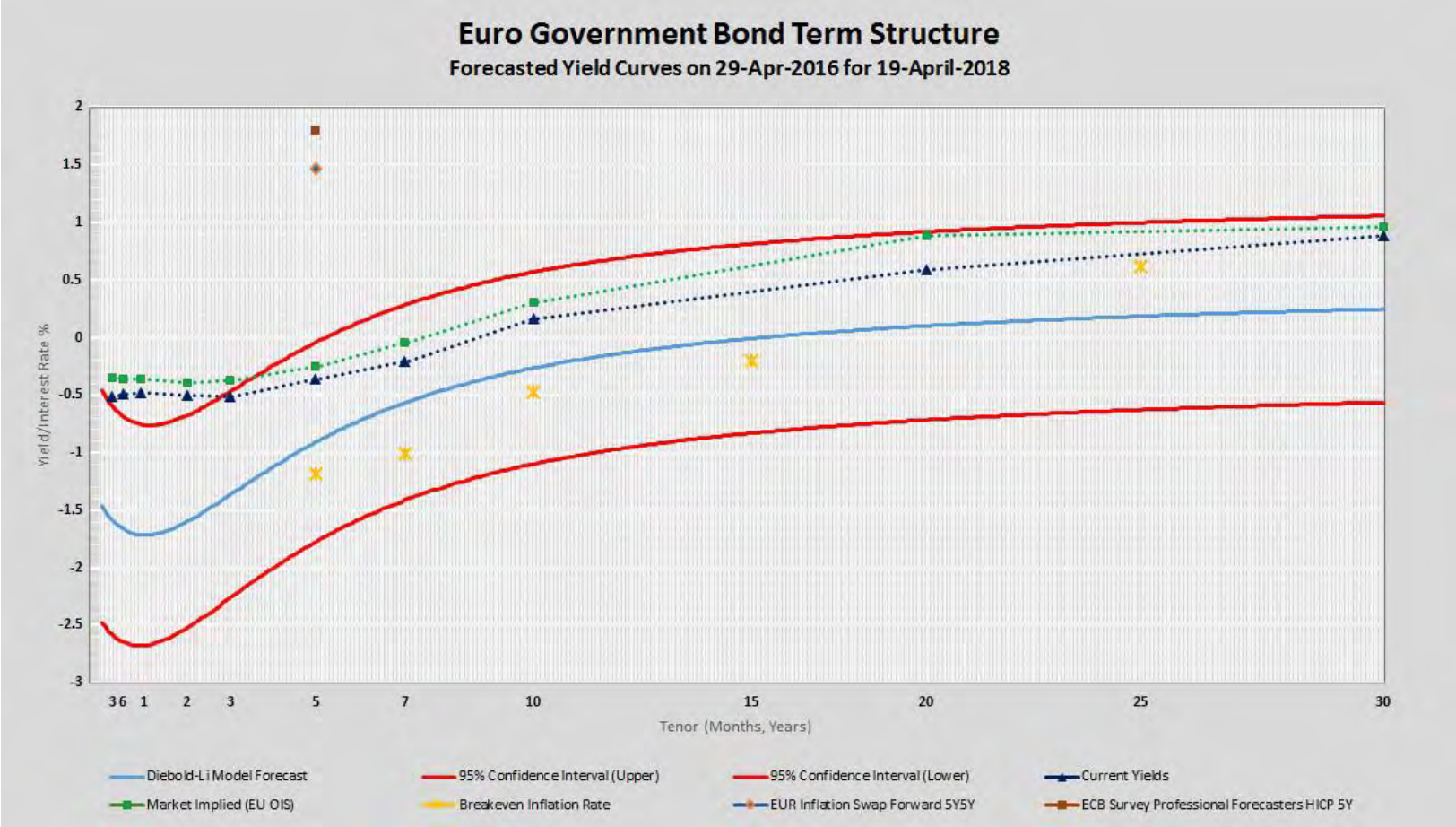
Source: CheckRisk LLP

Scenario Testing: Expected Short falls



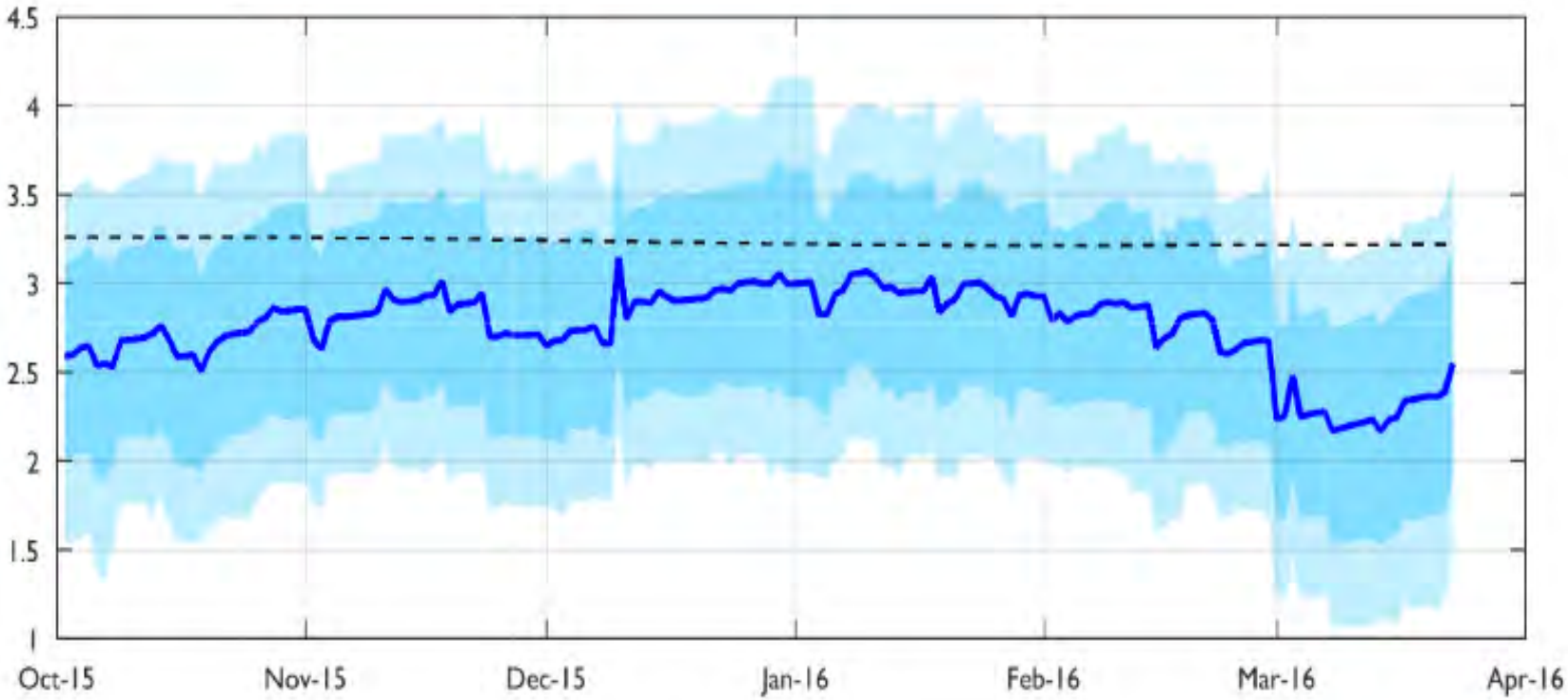
Source: CheckRisk LLP

Diebold Li model: Bond Term Structure



Source: CheckRisk LLP

World GDP 'Nowcast' modelling



Source: Antolin-Diaz, Dreschel, Petrella (2015) [1]
Black line: long-term trend
Dotted blue line: real-time estimate
Sold blue line: estimate using all data
Shaded areas: 68% and 90% confidence levels
[1] "Following the Trend: tracking GDP when long-run growth is uncertain", CEPR Discussion Papers

Source: CheckRisk LLP

Early Warning Risk Systems (EWRS)

- **The methodology of our EWRS indicators weaves together both Macro-economic data and financial market data of mixed frequency (e.g. weekly, monthly etc.**

- **Able to deal with missing data, asymmetric start and end dates**

- **And clustering**

Source: CheckRisk LLP

Early Warning Risk Systems (EWRS)

Headline indicators contain between 90-120 sub-indices, with approximately 30-40 time-series in each category: risk, credit & leverage.

Risk: *Contains many instruments, spreads and indices pertinent to signs of distress/risk aversion in the plumbing of the financial system, including preference for liquidity or diminished liquidity. These come from many different markets including: rates, repo, credit, equity, FX, options, swaps*

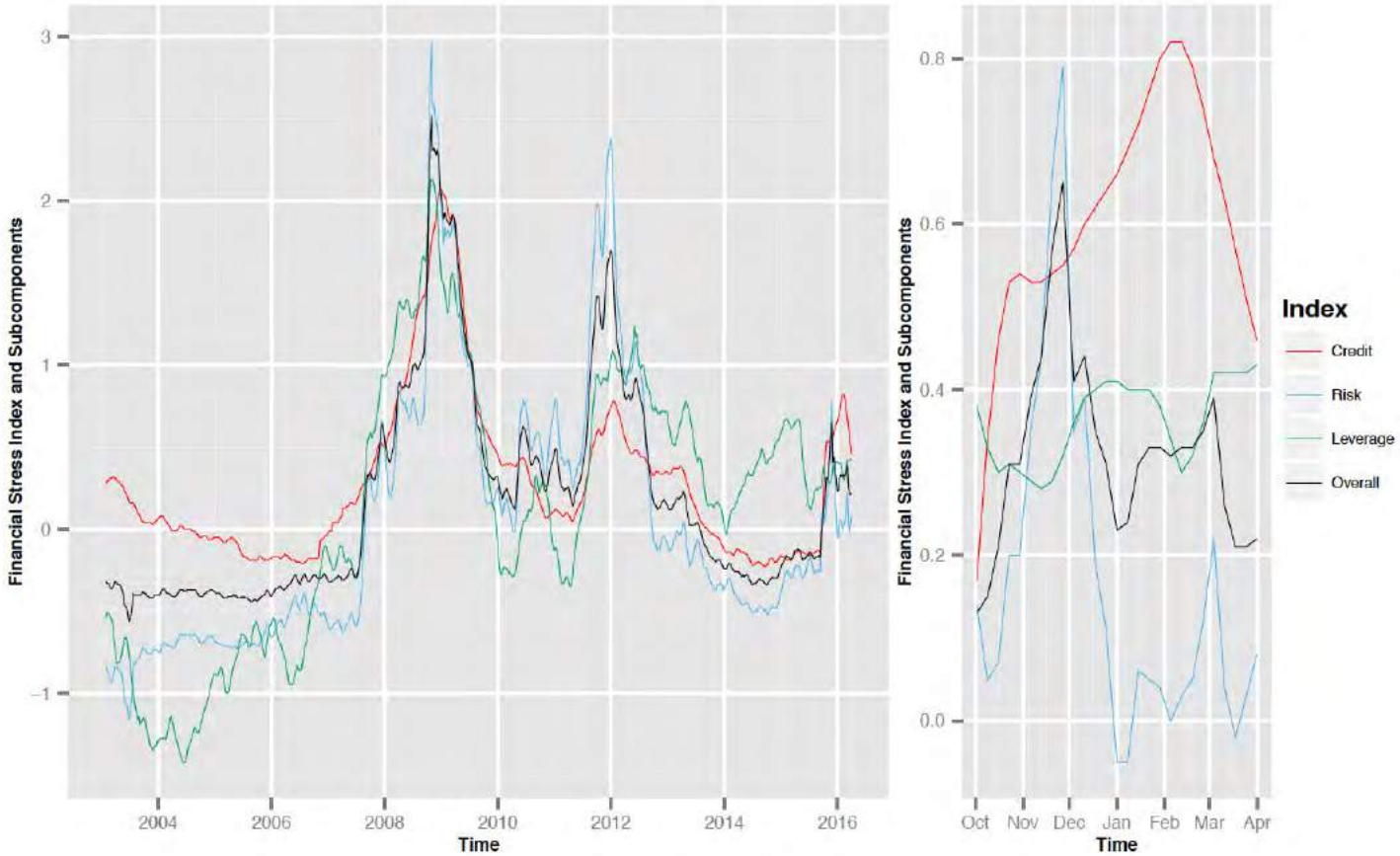
Credit: *The 'credit' risk category not only refers to increasing credit provision, but also that of deteriorating credit quality in different parts of the financial system.*

Leverage: *The 'leverage' risk category aims to quantify by how much debt is building up in different parts of the financial system: from the central bank, the government; to companies, banks, financial institutions and households. Understanding how extended that has become and the rate of change in the signal readings is important as a leading indicator of GDP growth and financial stress.*

Within each risk category evidently, there are some indicators which are more important than others – they are weighted accordingly. Due to the variation in data in both frequency and richness across regions, the underlying time series do vary from region to region.

Source: CheckRisk LLP

EWRS: CheckRisk European Financial Stress Indices



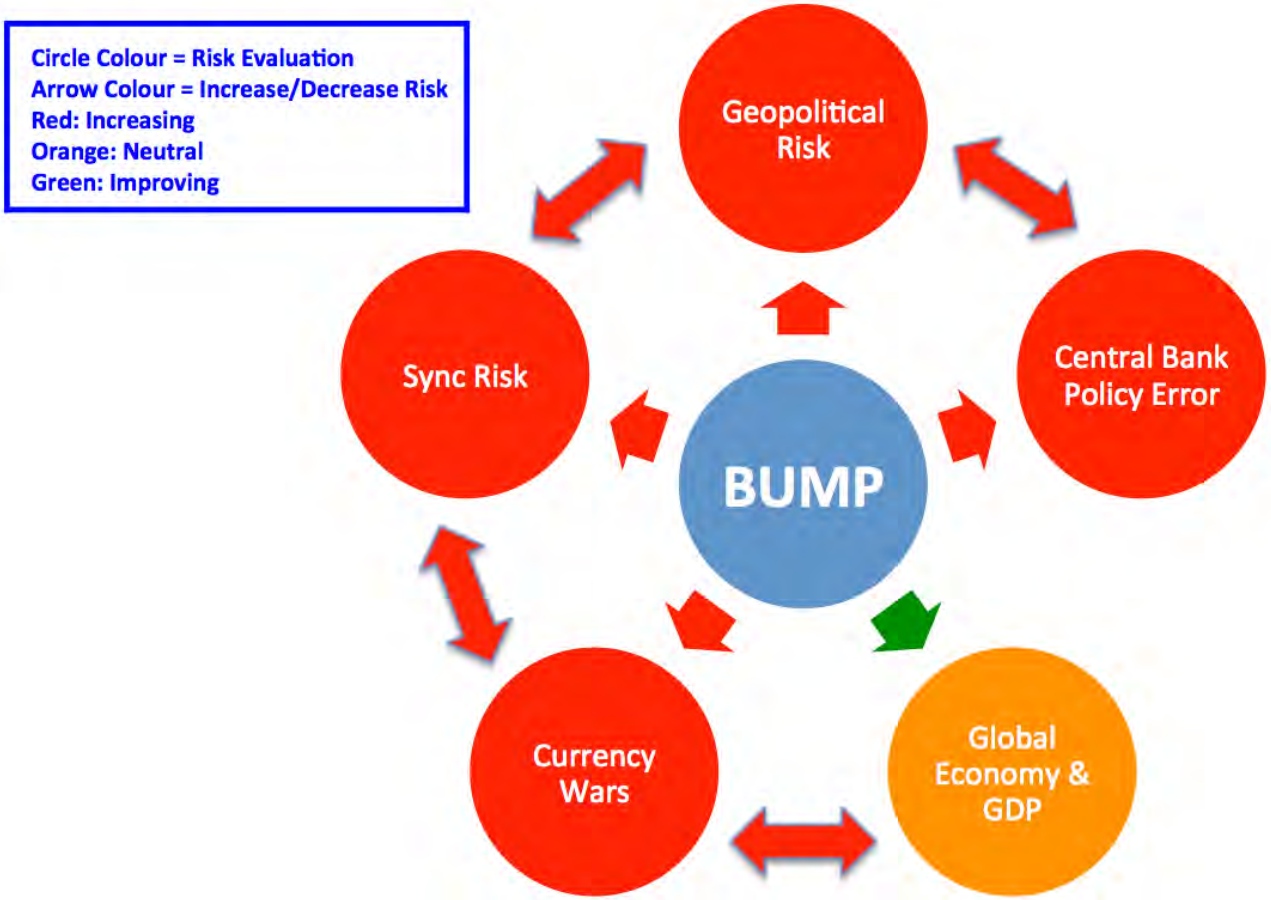
Source: CheckRisk LLP

What is this all for ?

Part 3

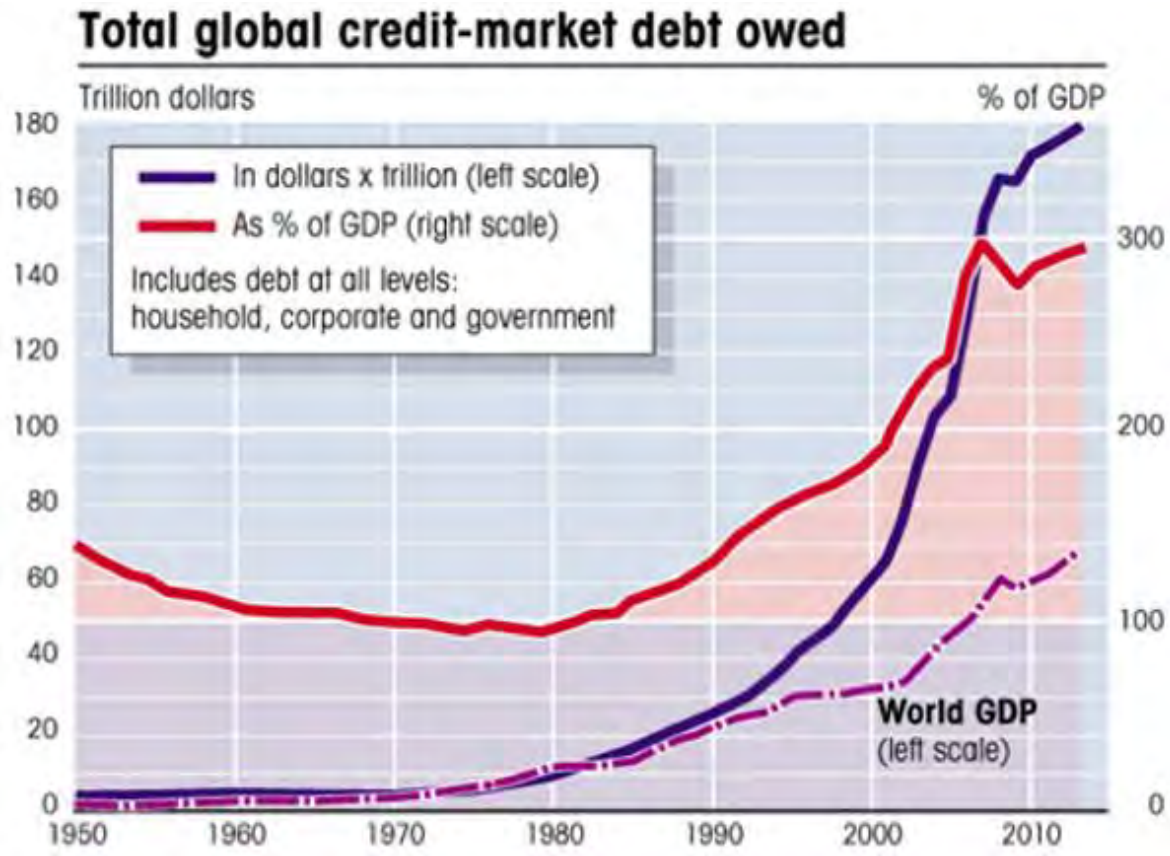
B.U.M.P

What is B.U.M.P ?



Source: CheckRisk LLP

A little history: The scale and perspective



Source: BIS, World Bank, CheckRisk LLP

- $59tn since 2008
- 290% Debt to GDP
- Debt outgrows GDP for almost 5 decades
- Spread widest in history
- Still growing

How big is a trillion?

If you stack a trillion-worth of $1000 bills together, then:
1 million dollars = 4 inches high
1 billion dollars = 364 feet high
1 trillion dollars = 63 miles high (give a foot or two)

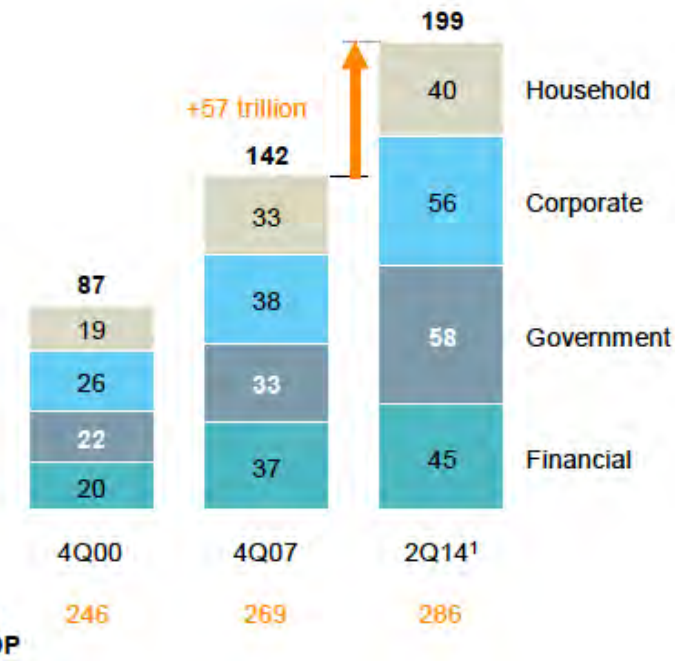
OR:

1 million seconds is about 11.5 days
1 billion seconds is about 32 years
1 trillion seconds is about 32,000 years

1,000,000,000,000 = 10^{12}

Composition of Debt

Global stock of debt outstanding by type[1]
$ trillion, constant 2013 exchange rates



	Compound annual growth rate (%)	
	2000–07	2007–14[1]
	7.3	5.3
Household	8.5	2.8
Corporate	5.7	5.9
Government	5.8	9.3
Financial	9.4	2.9

Source: Haver Analytics, BIS, IMF, McKinsey Global Institute Analysis

What was the purpose of Quantitative Easing?

QE

- **Primary Purpose**
  - **Inflation**
  - **GDP Growth**
- **Secondary Purpose**
  - **Bank stability**
  - **Buying Time**

Has it worked & What is the problem?

Has it worked?

- **Inflation remains well below target**
- **Global GDP growth is below target**
- **US growth is stalling**

A Utopian Dream

- **You cannot solve a debt problem with more debt**
- **Global economy is changing structurally**
- **Distortion of interest rates and funding practices**
- **Banks took the funds and placed them in commodity markets, and Emerging Markets**

Negative Interest Rate Policy N.I.R.P.

- **Central Banks are hooked on monetary easing**
  - N.I.R.P is intended to stop Banks from depositing money at the central bank instead of lending to the economy.
  - An unintended consequence of N.I.R.P is to squeeze bank margins forcing them to raise interest rates on products like mortgages and general credit.
  - The result is an unforeseen tightening of credit. Precisely the opposite of what the Central Bank is intending.

- **The risk of Central Bank Policy error increases with N.I.R.P**

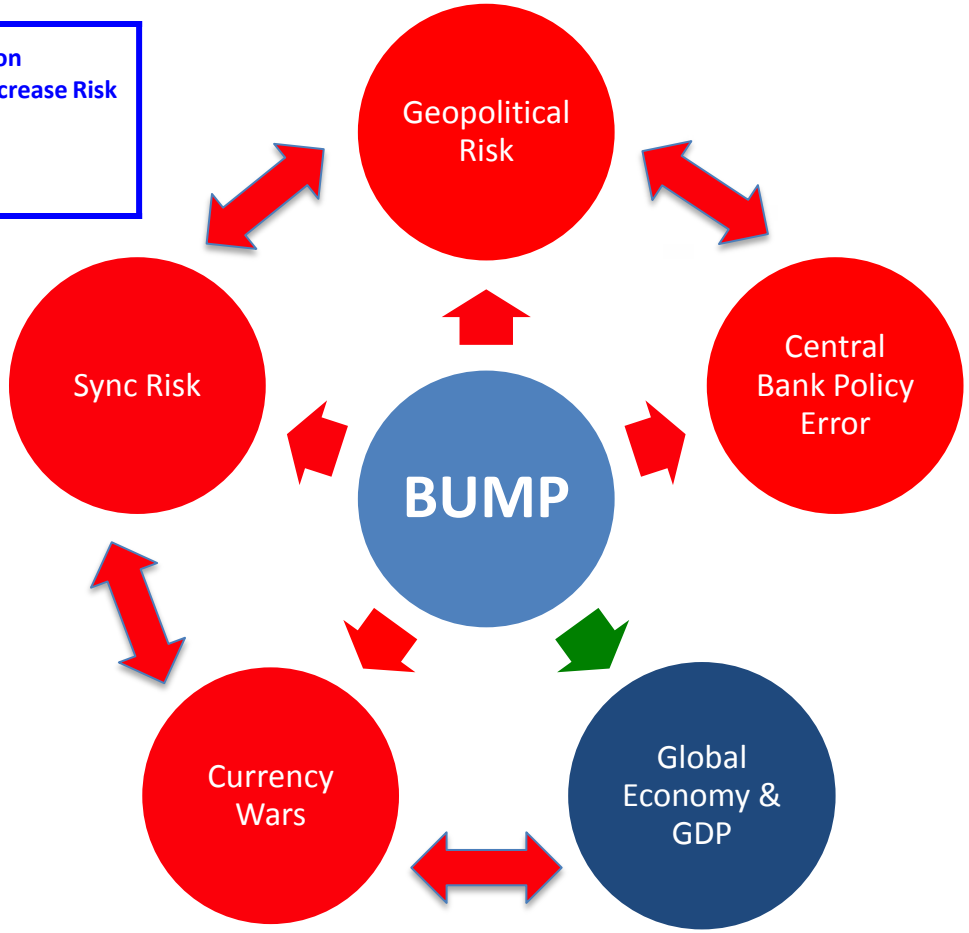
- **Interest Rate Shock Risk versus No Normalisation**

Negative Risk an oxymoron

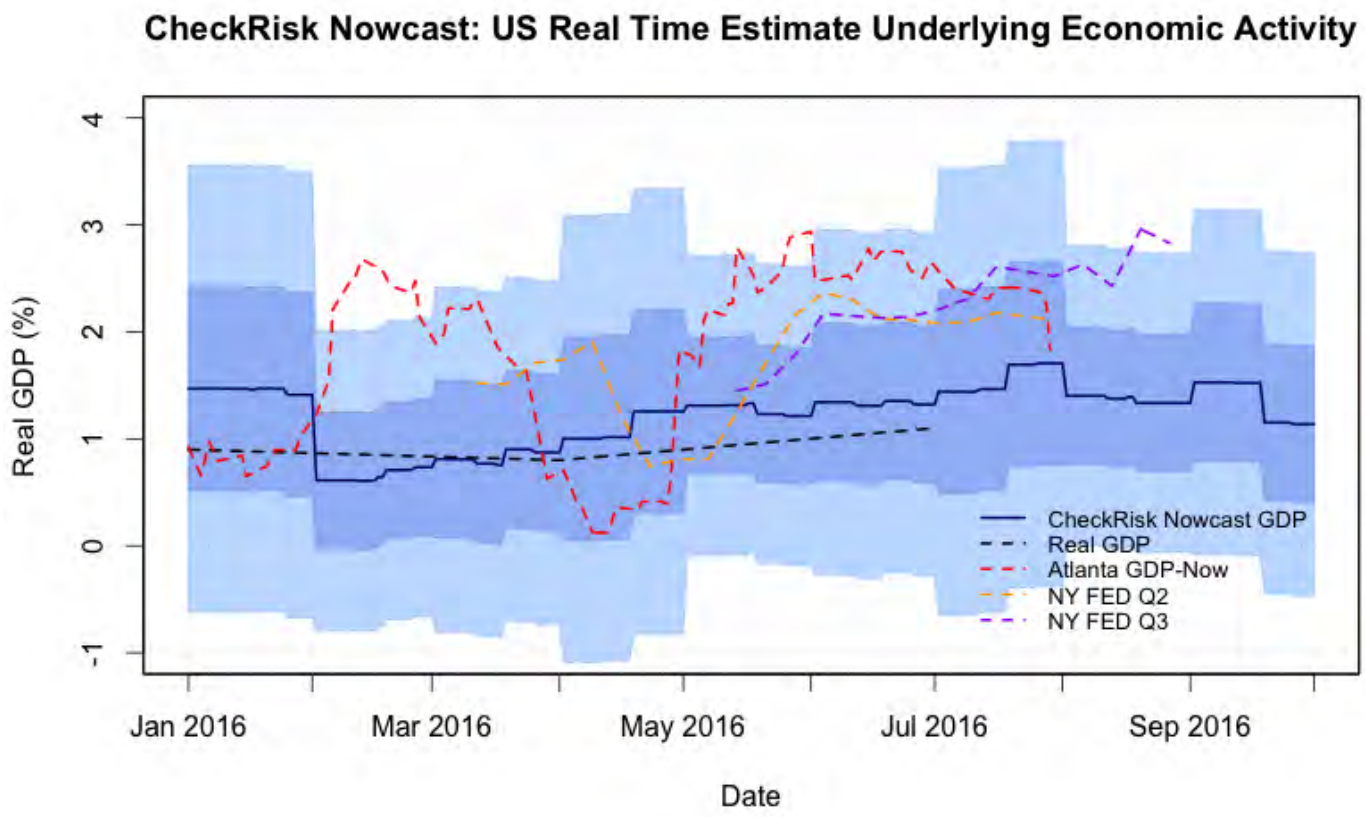
- **Fiat Value of Currency**
- **Cash has a 0% interest rate**
- **Any interest rate is therefore an expression of risk**
- **Negative interest rates imply negative risk**
- **Negative Risk is an oxymoron**

Other sources of Risk: Economics

Circle Colour = Risk Evaluation
Arrow Colour = Increase/Decrease Risk
Red: Increasing
Orange: Neutral
Green: Improving



US Trend Growth slowing

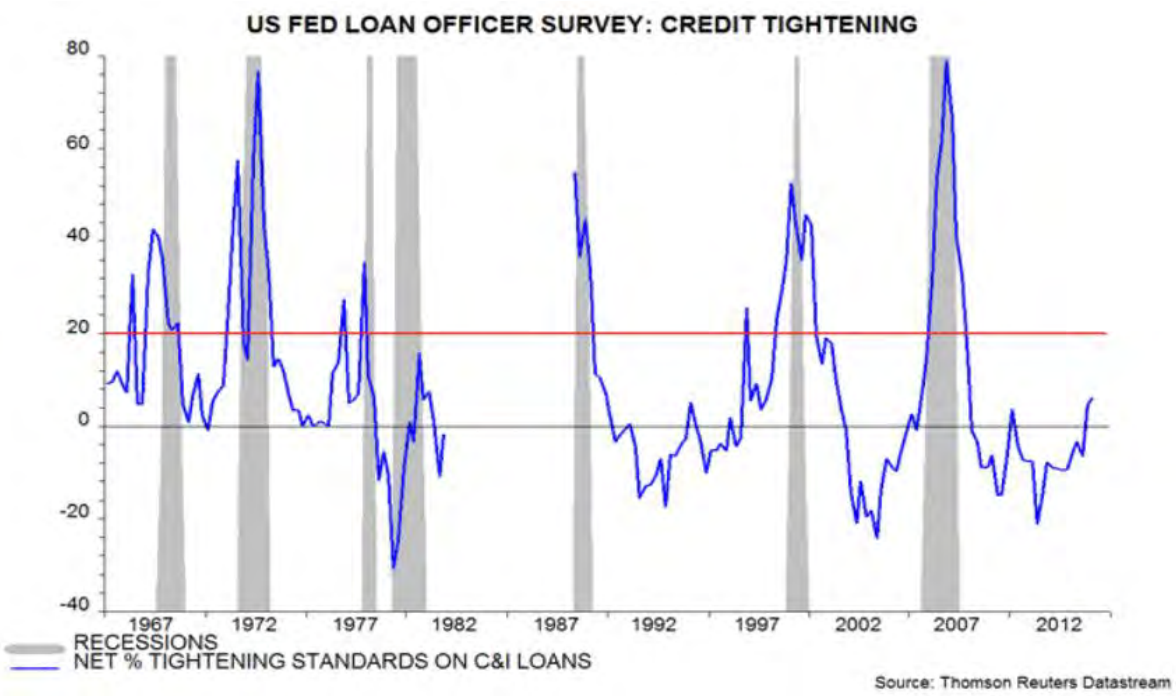


Source: CheckRisk

Shaded areas: 68% and 90% confidence levels

No USA recession yet, but…

Another important measure to monitor in the months ahead is the US Fed Loan Officer Survey for Credit Tightening. It is one of the more important indicators in our 'credit stress index' for the US. The survey reports on banks tightening credit to commercial and industrial companies. If the survey continues to show tightening in the months ahead and reach the 20% level, then this would be a much stronger recessionary signal.



Other sources of Risk: Sync Risk

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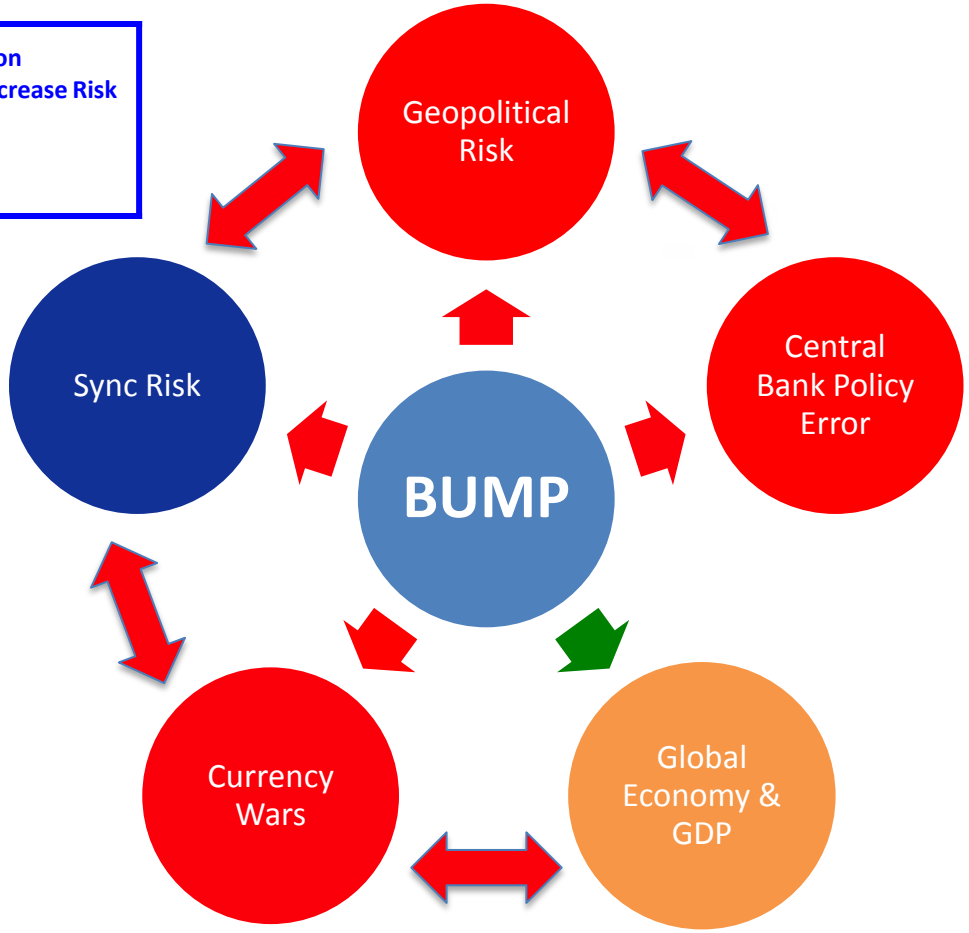

Source: CheckRisk LLP

Synchronisation Risk

- **Federal Reserve tightens as rest of world eases**
- **Net impact reduced**
- **Unintended Consequences**
- **Don't Synchronisation Risks always exist?**

Other sources of Risk: Geopolitics

Circle Colour = Risk Evaluation
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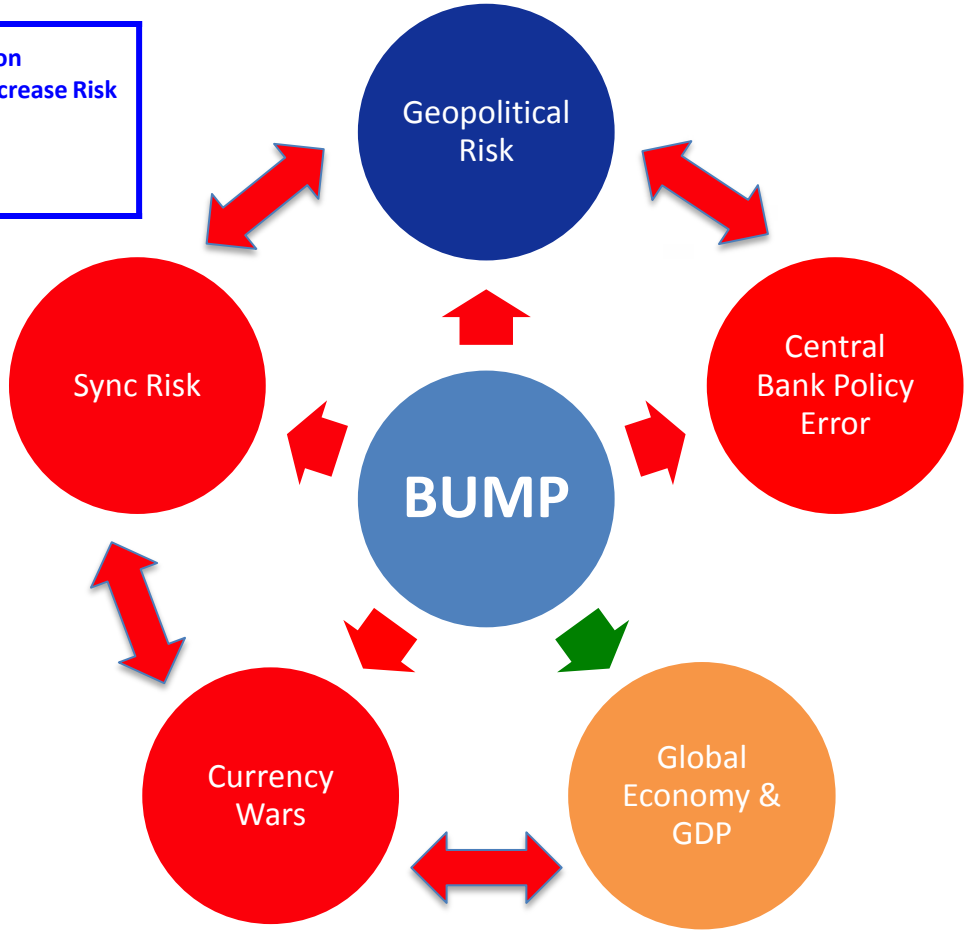


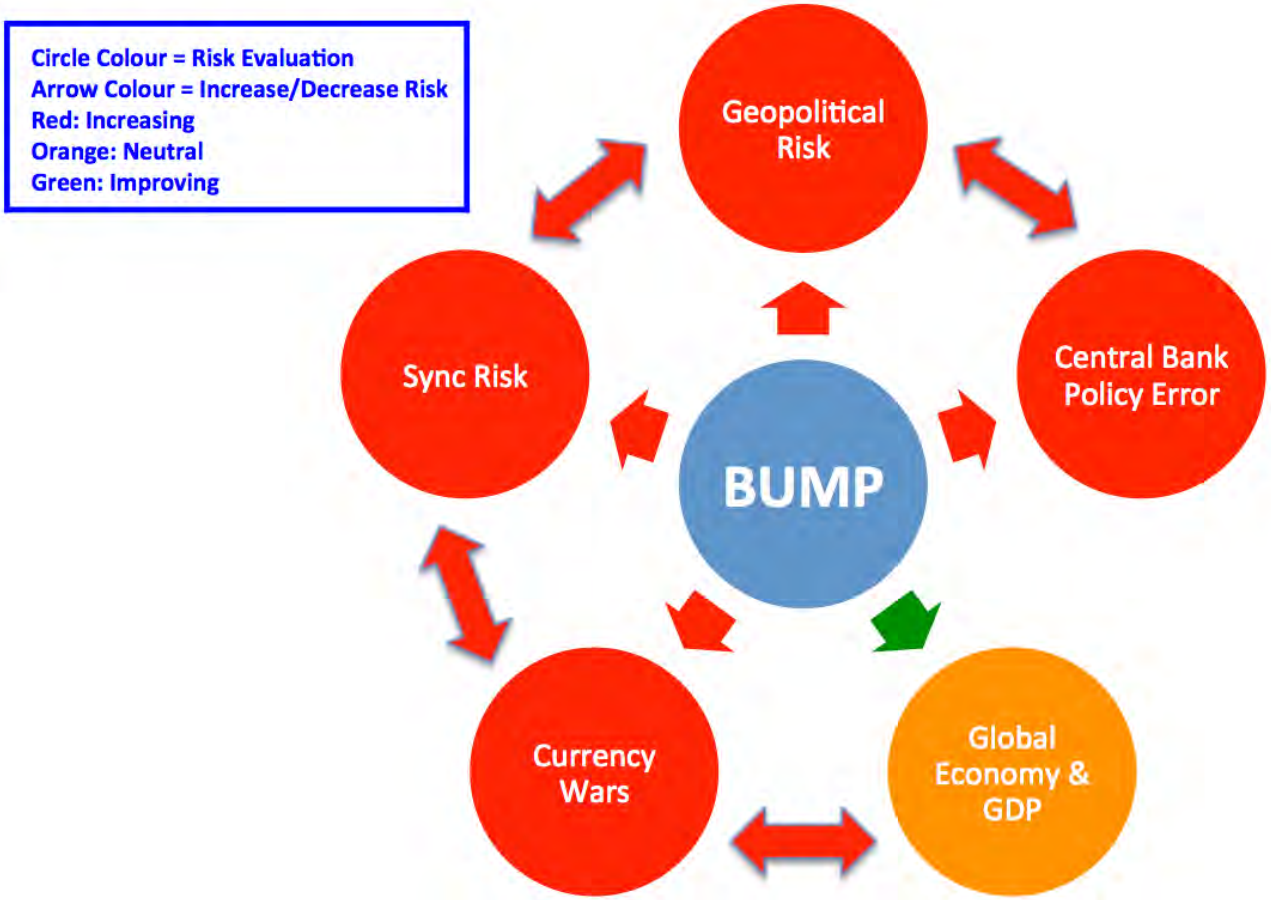
Source: CheckRisk LLP

Geopolitical Risk

Instability in:

- **Middle East: Syria, Iran/Saudi Arabia, Algeria, Tunisia**
- **Europe (Immigration)**
- **Ukraine**
- **China and South China Sea**
- **Brexit**
- **US Elections**
- **Rise of Extreme Politics**

NETWORKING OF B.U.M.P RISKS



Source: CheckRisk LLP

Why is 2017-2020 Risky?

The Perfect Storm?

Natural Economic Cycle peaks in the period 2017-2020 at a time when Central Banks have the least ammunition available. IMF forecasts recession in 2018

& The world is awash with debt…Need 350bps to 500bps interest rate buffer

- Central Bank Policy Errors are key
- Multiple global fault lines remain in the form of imbalances
- Geopolitical risks much higher than usual
- Regional monetary policy likely to remain divergent
- N.I.R.P will tighten credit
- Synchronisation risk is important at zero rate bound
- Middle East Instability

And one more thing:

- **Bank capital is a fraction of World GDP**
- **World GDP is a fraction of the total derivatives outstanding**
- **Most of the derivatives must therefore be speculative**
- **Who delivers on them if Bank capital is insufficient?**
- **Total Gross Derivatives Exposure is $533 trillion, 7x Global GDP**

The way out? THE GREAT ESCAPE

- **GDP Growth**
- **Inflation**
- **Infrastructure Spending**
  - **THE NEXT CENTRAL BANK "THING" WILL BE BASED ON DIRECT INVESTMENT**
  - **HELICOPTER MONEY EXPLAINED**
  - **ROADS, BRIDGES, COMMUNICATION, AIRPORTS, FREIGHT TERMINALS, PORTS.**
- **Deficit Spending = More Debt = Kick the Can**
- **The Emperor has no clothes**

When?

TIMING IS EVERYTHING…

All Depends on Central Bank Policy Actions in the next year

Finally…

WE THINK A PERIOD OF INCREASED RISK IS COMING

THE TIME WINDOW IS QUITE WIDE

IT COULD BE LENGTHENED BY CENTRAL BANK POLICY & INTERVENTION

THE LIKELY OUTCOMES OF CURRENT POLICY ARE NARROWING

THE WARNING SIGNS ARE THERE IF YOU CARE TO LOOK FOR THEM

THERE WILL BE OPPORTUNITIES AS A CONSEQUENCE OF THE NEXT CRISIS

What can you do?

Don't be paralysed by risk. Risk is an opportunity.

Professional advisors are less likely to be emotional about risk decisions

Think long term and ignore short term thinking.

Do not assume positive returns are always available in a NIRP environment

Work harder at it.

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