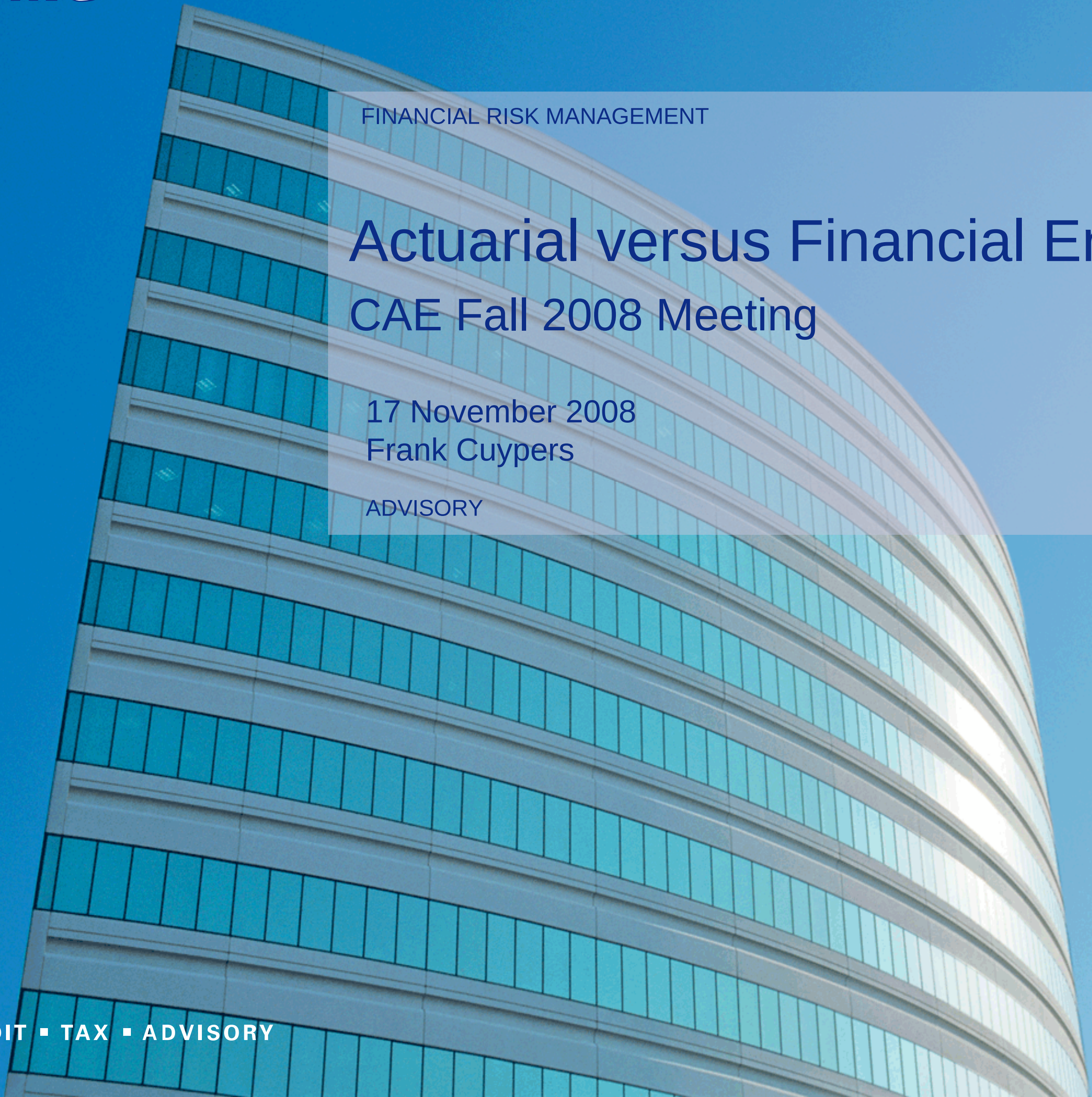
FINANCIAL RISK MANAGEMENT

Actuarial versus Financial Engineering

CAE Fall 2008 Meeting

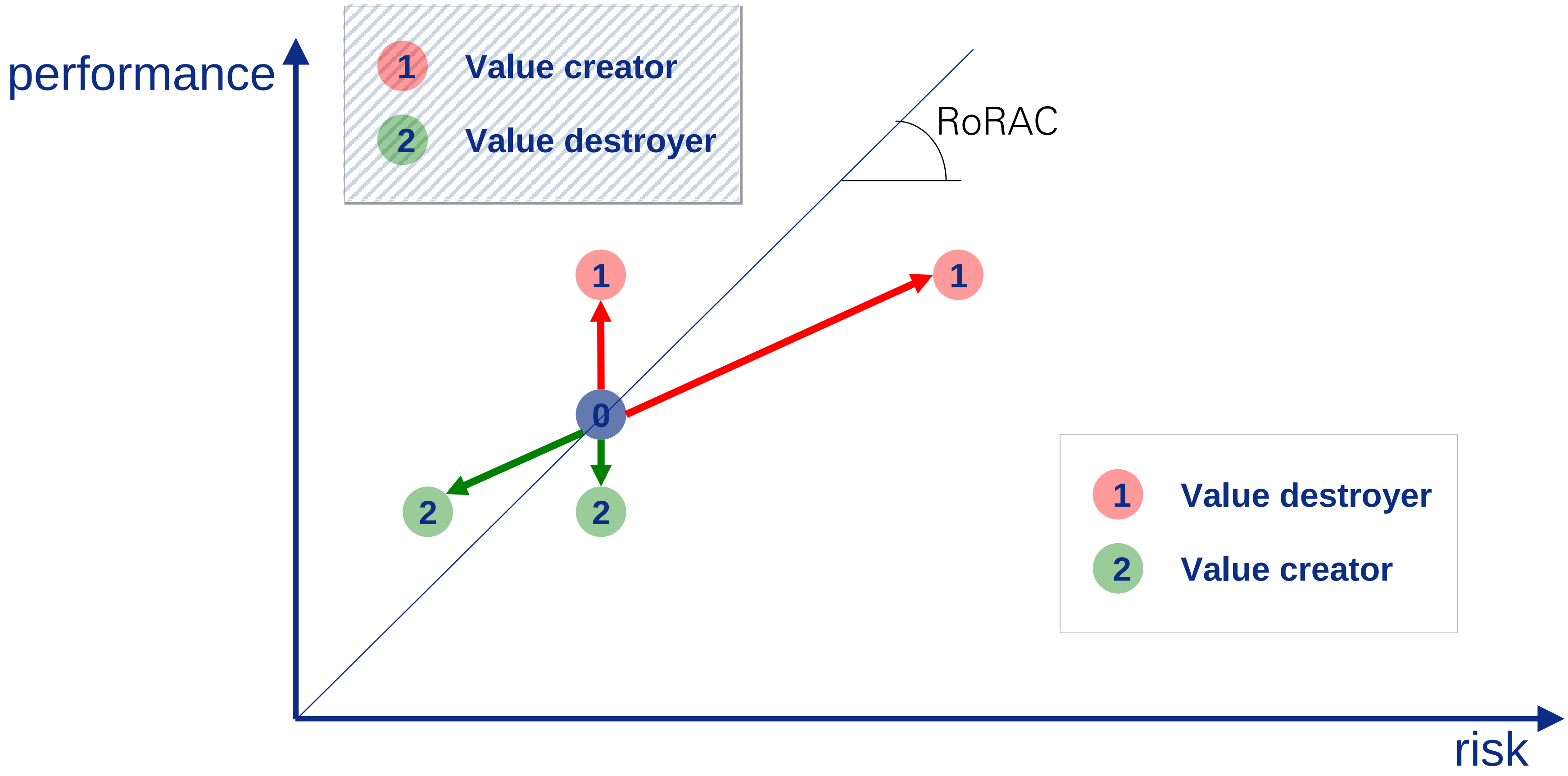
17 November 2008
Frank Cuypers

ADVISORY

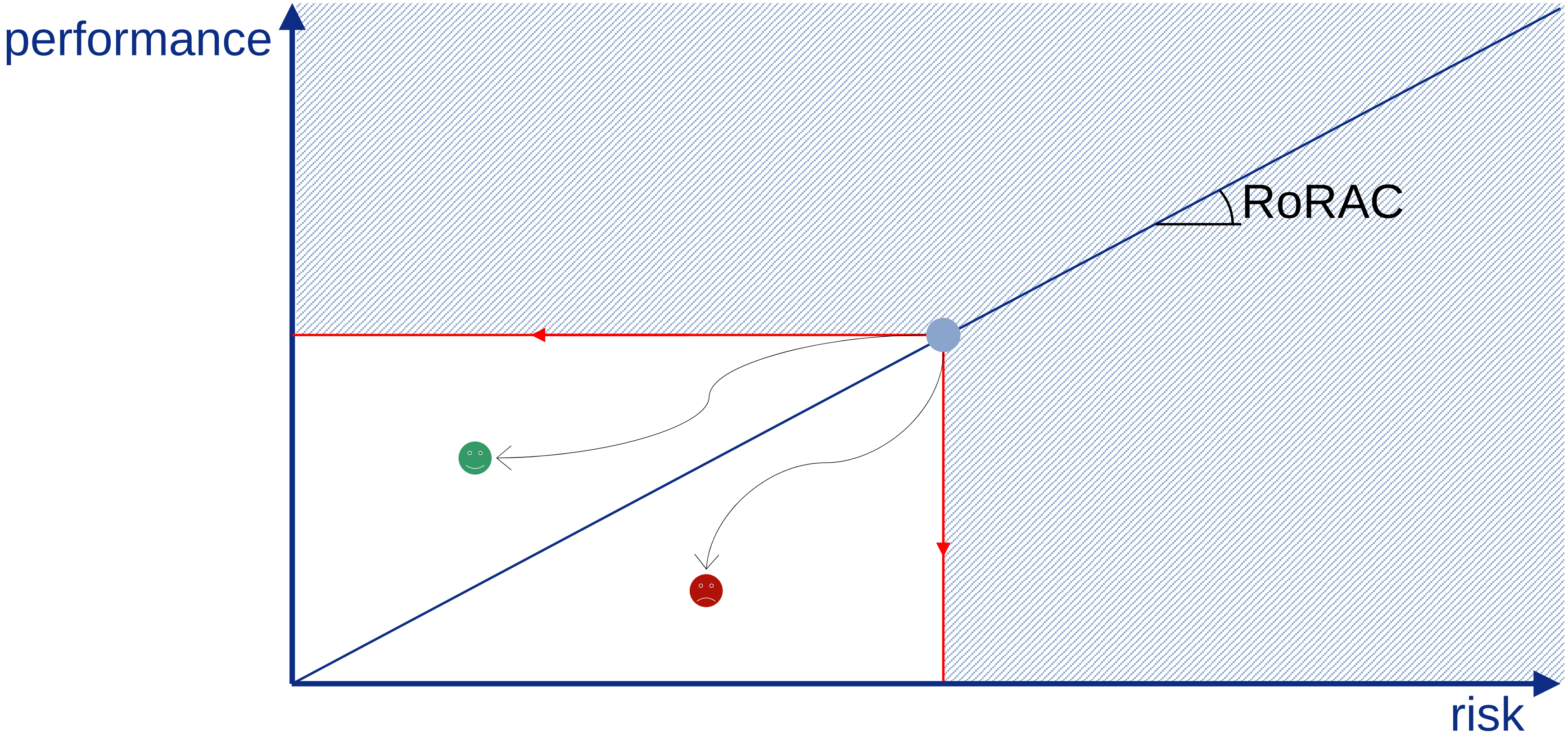


AUDIT ▪ TAX ▪ ADVISORY

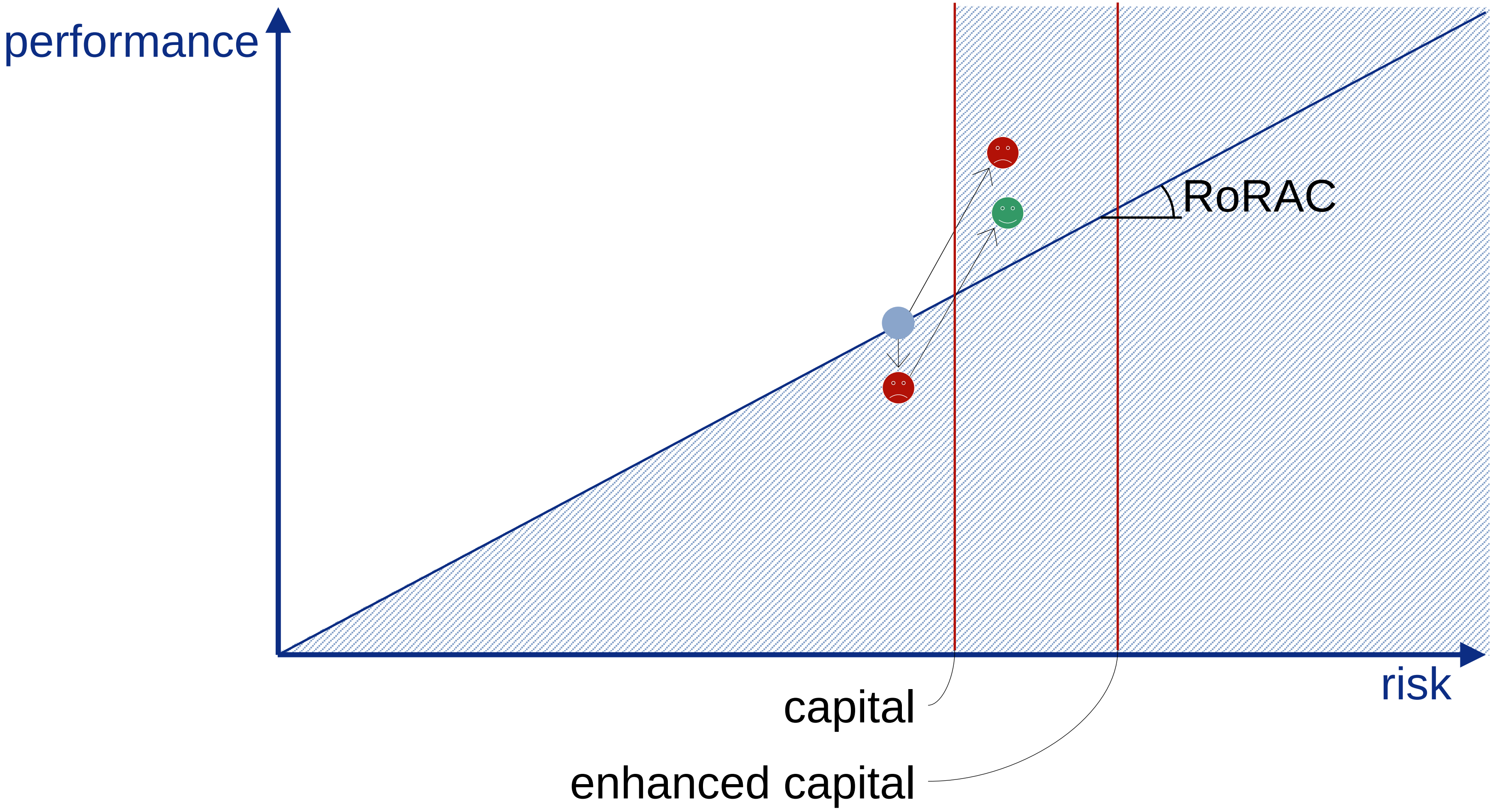
Performance, Risk and Capital



Value Added of Insurance



Value Added of Credit



Plan

Financial & actuarial engineering

Insurance linked securities

Financial vehicles for insurers

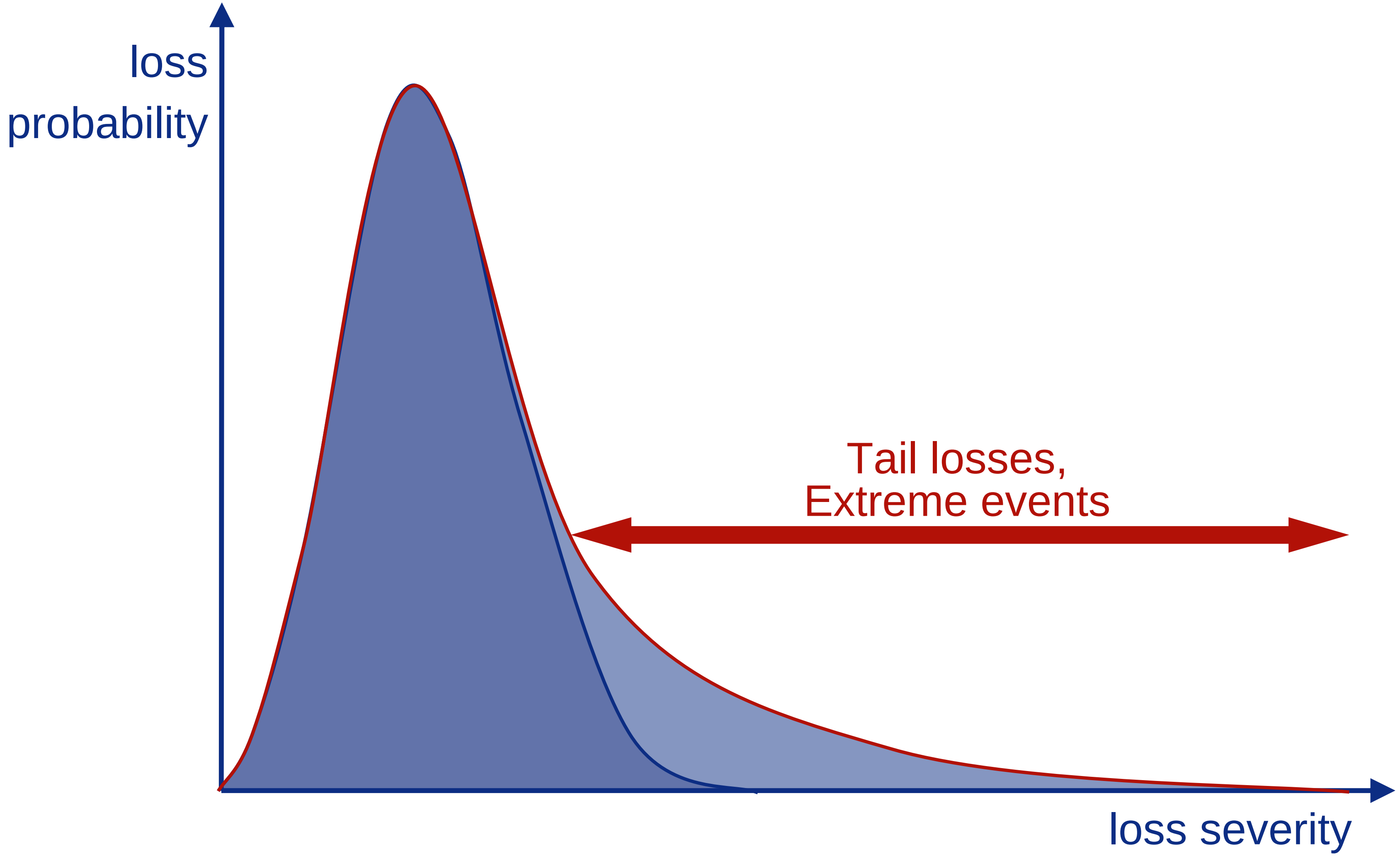
Financial & Actuarial Engineering

Similar Challenges

	Financial Engineers	Actuarial Engineers
Data availability	✓	✗
Time series analysis	✓	✗
Timeframes	short	≥ 1 year
Reliance on rating agencies	✓	✗
Experience modelling	✓	✓
Extreme events	✗	✓
Risk measures	VaR	expected shortfall
Tail dependences	✗	✓
Exposure modelling	✗	✓
Innovation	✓	✗

Financial & Actuarial Engineering

Extreme Events



Financial & Actuarial Engineering

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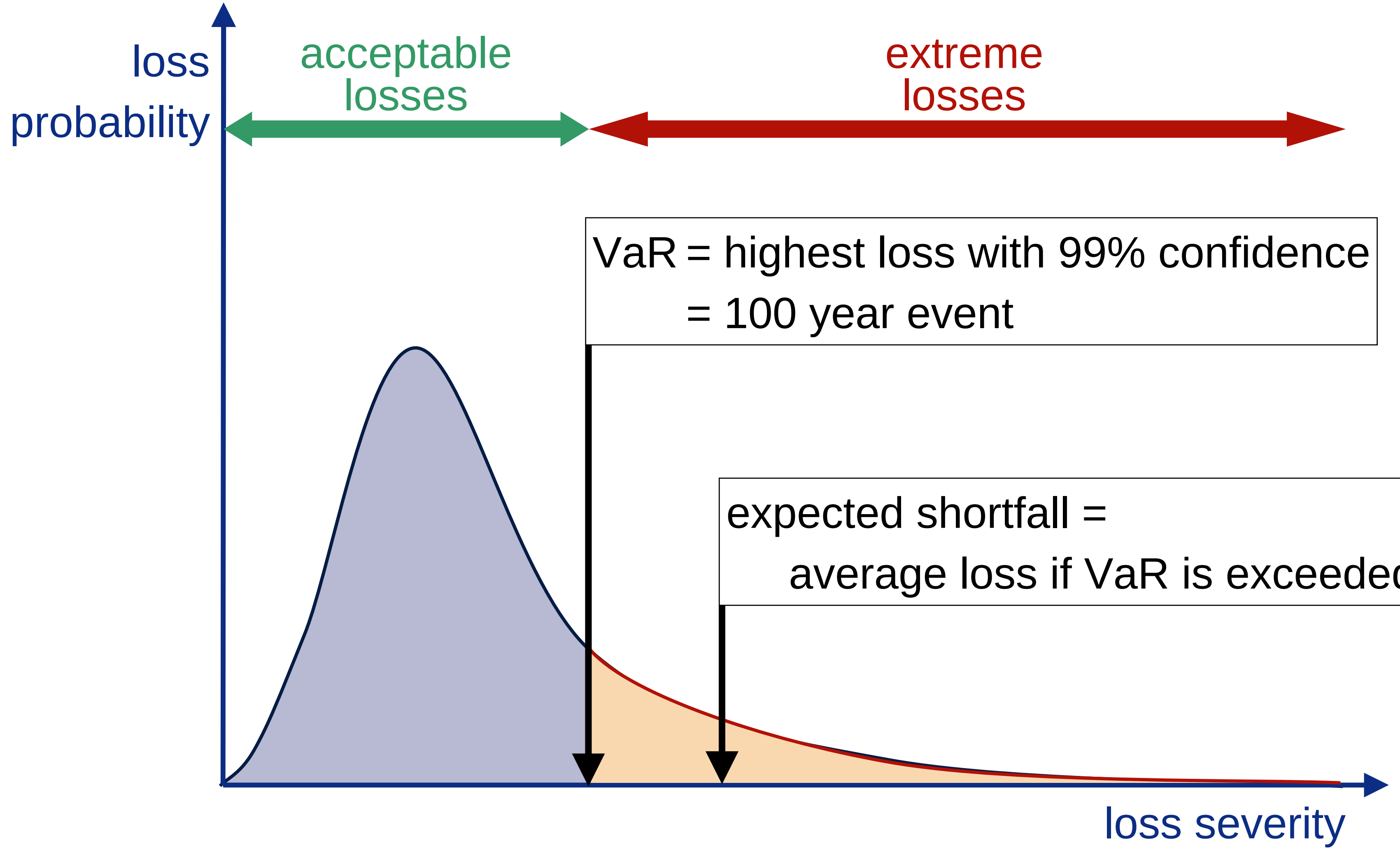
Financial & Actuarial Engineering

Risk Measures



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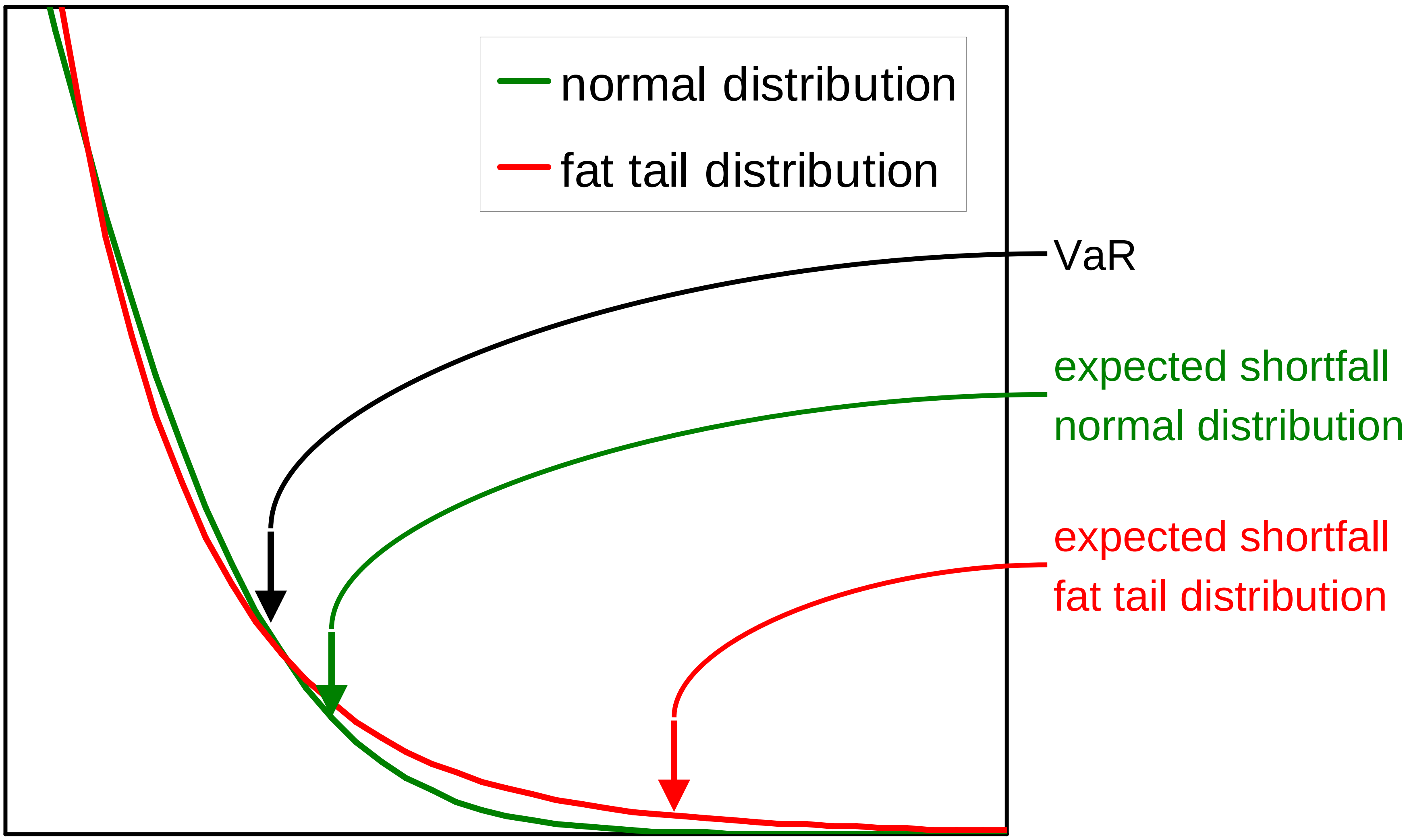
Risk Measures



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Financial & Actuarial Engineering

Tail Dependencies

Kobe EQ

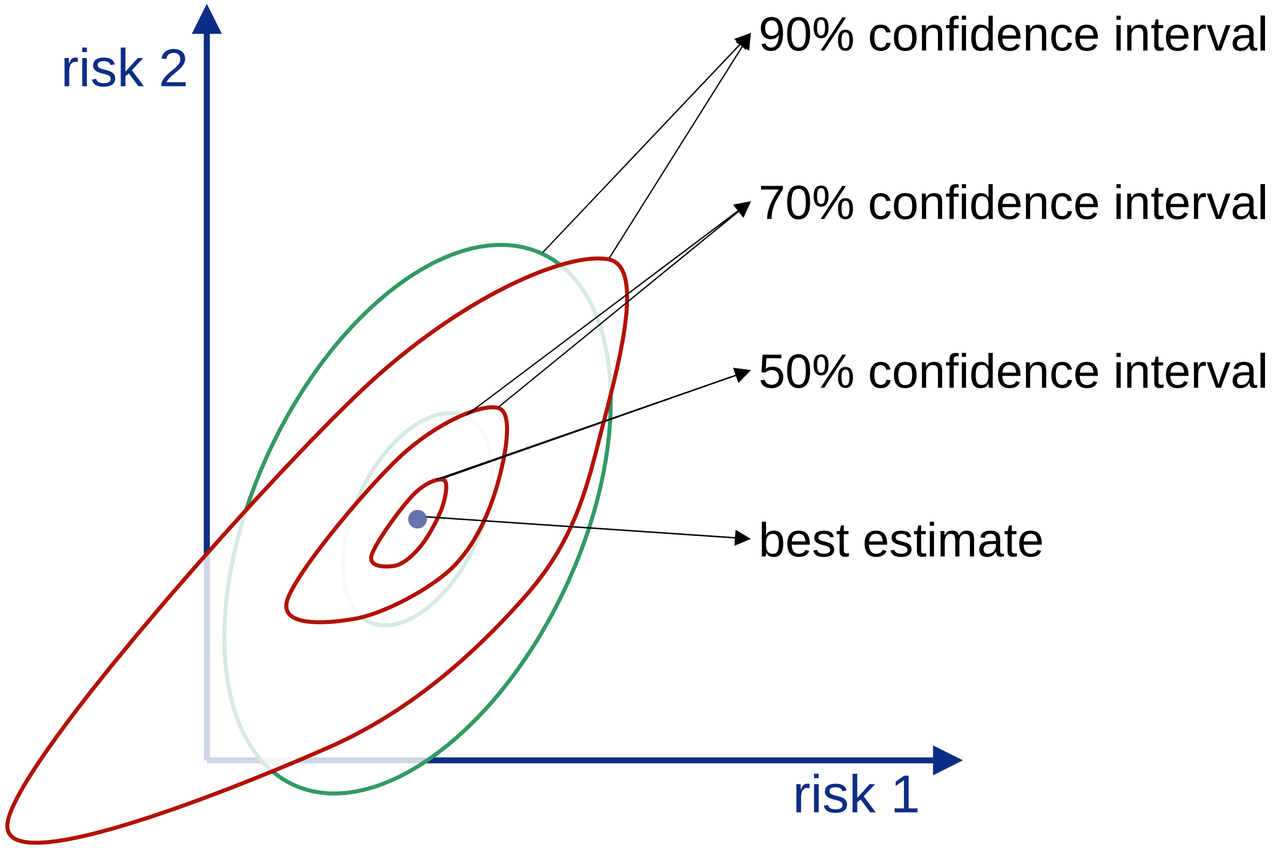
- Property
- Burglary
- Barings Bank

September 11

- Property
- Aviation
- BI
- Life
- Markets
- …

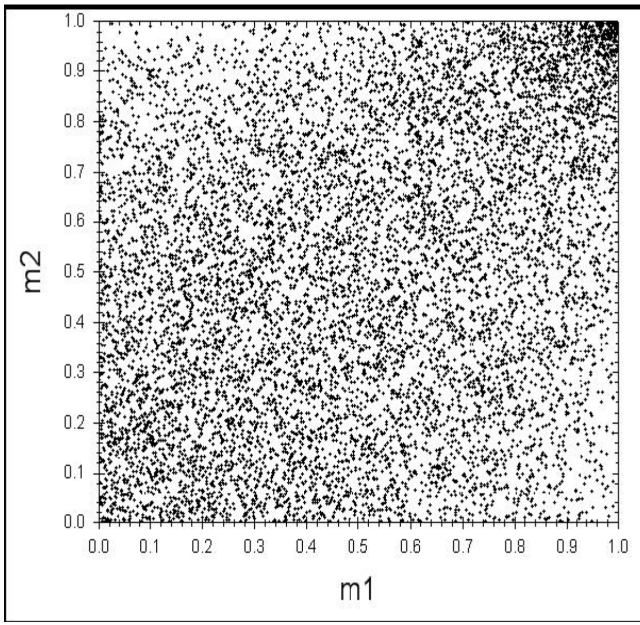
Sub-prime

- ?

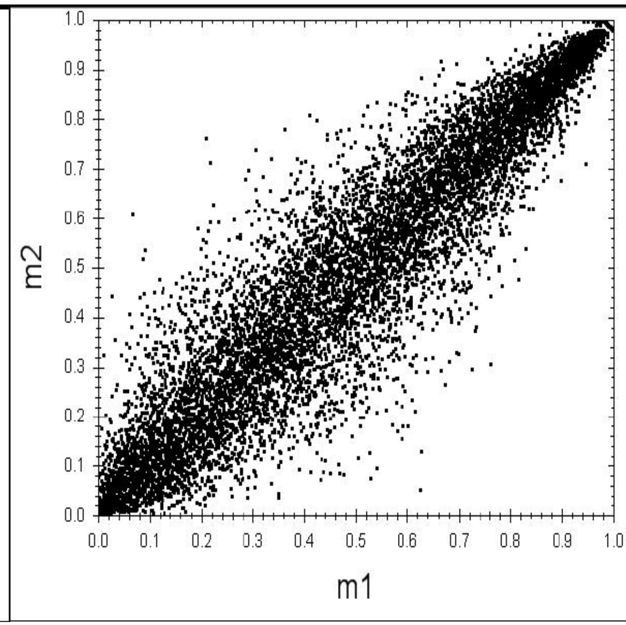


Use copulas with realistic **tail dependence**

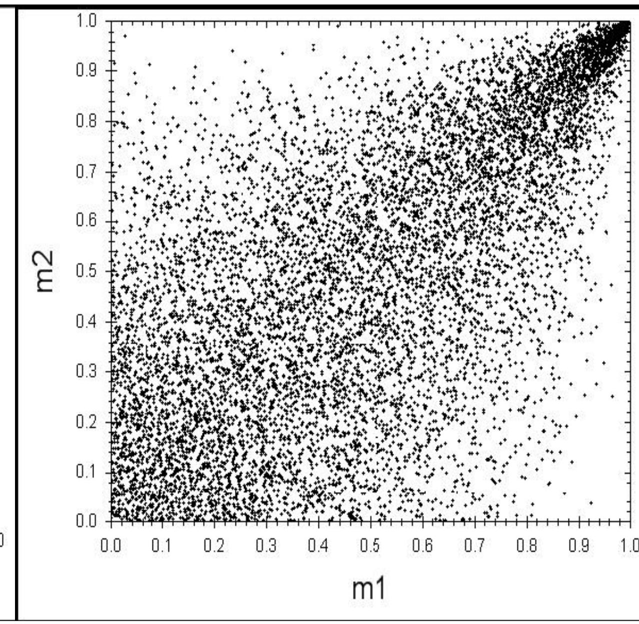
- Clayton, t-copula, grouped t-copula, …
- Not Gauss copula !



almost independent



dependent (Gauss)



tail dependent (Clayton)

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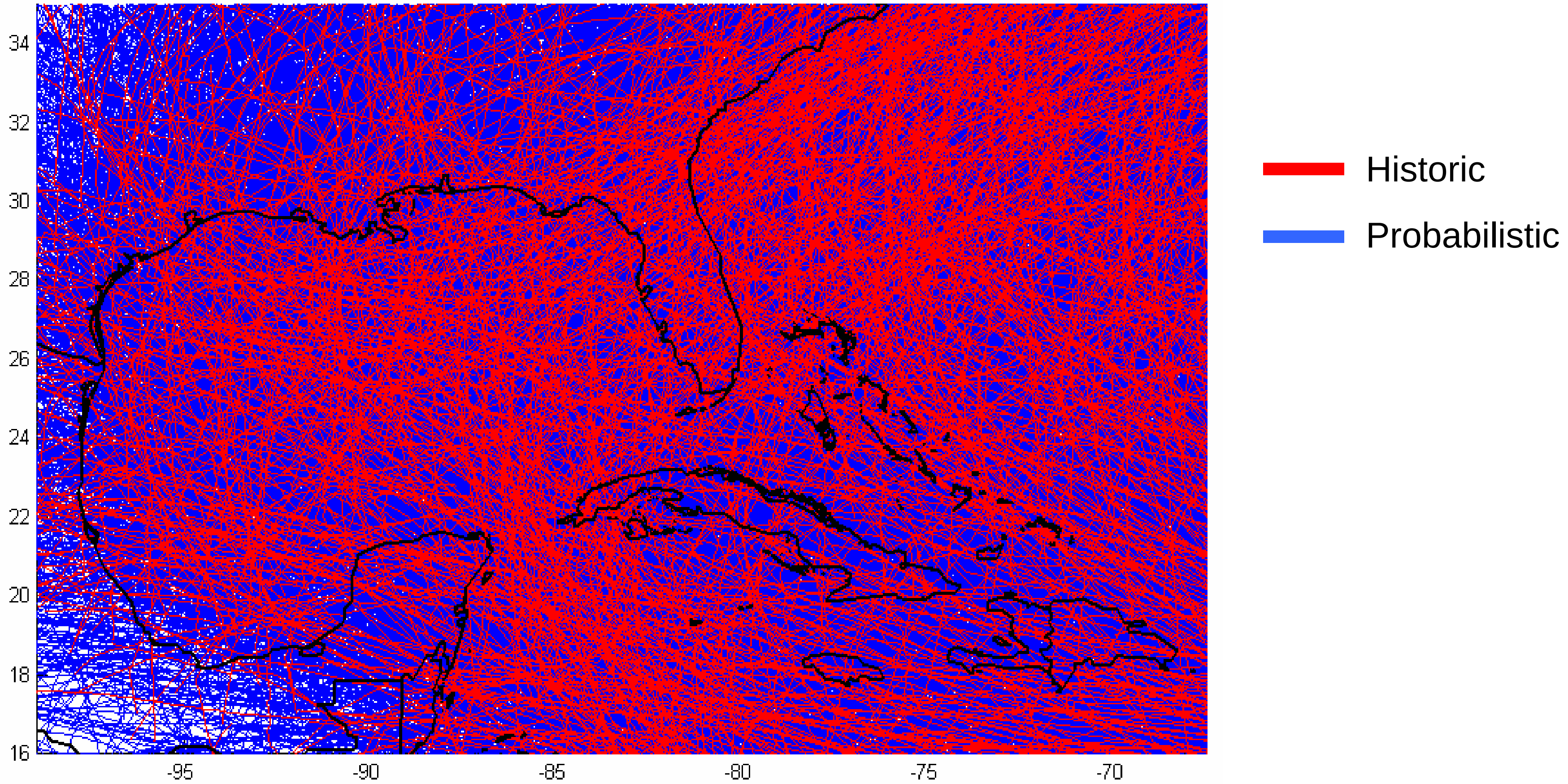
Financial & Actuarial Engineering
Exposure modelling

Homeowners insurance requires simulating hurricanes



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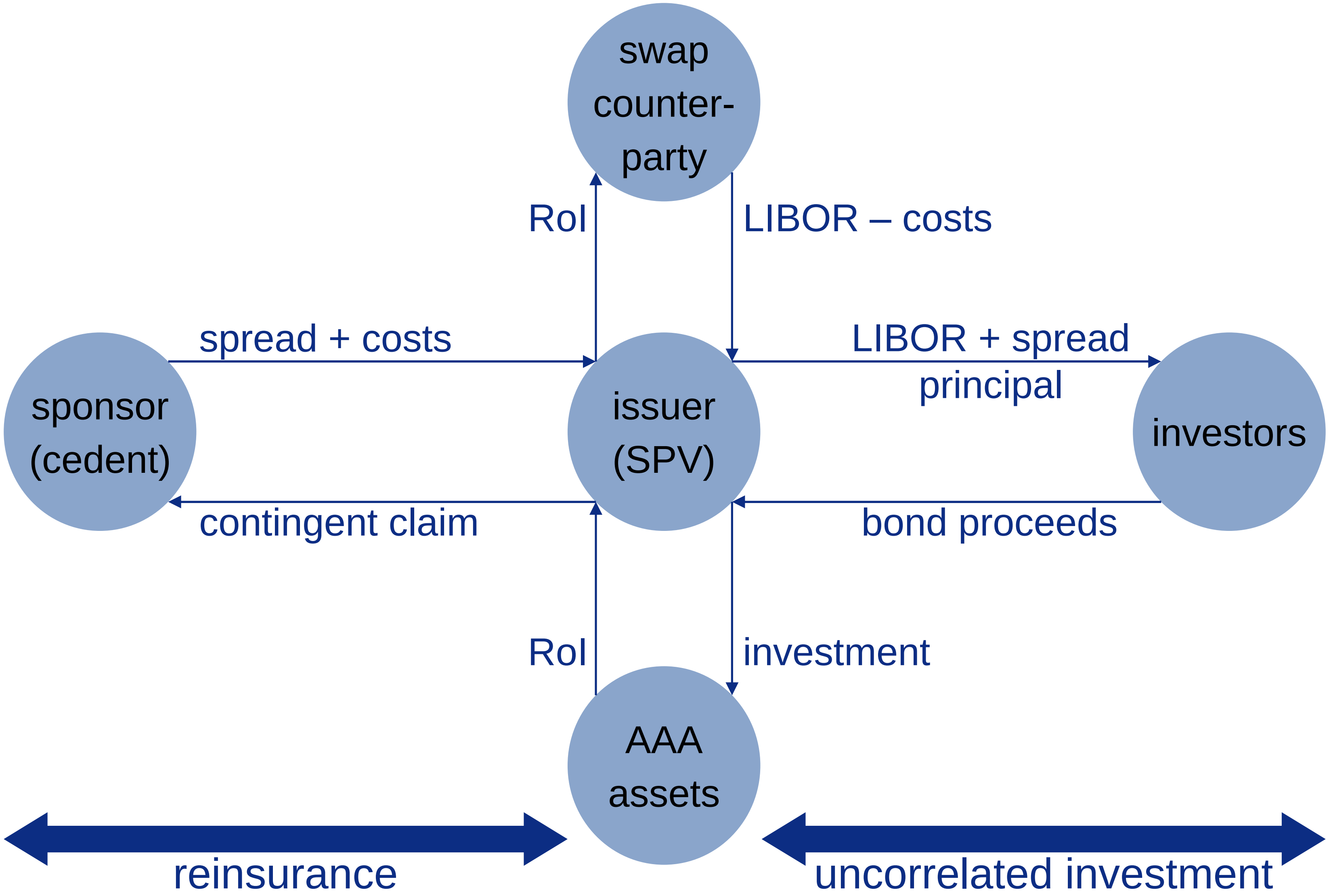
Insurance Linked Securities

Structure



Insurance Linked Securities

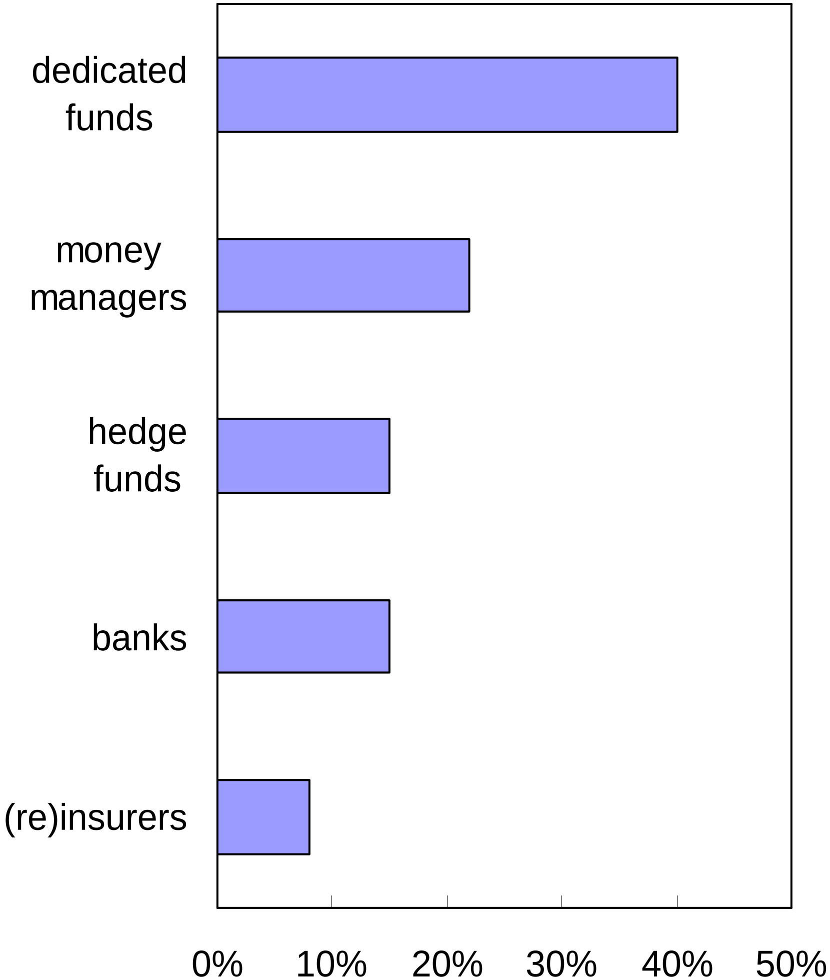
Investor Motivations

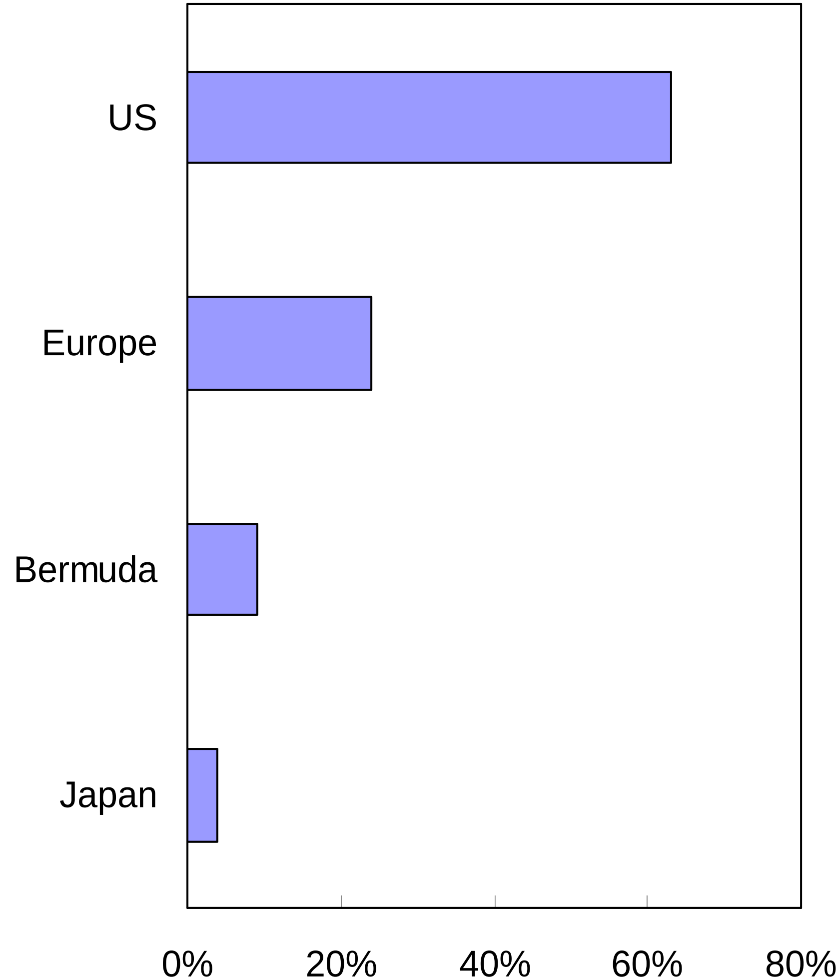
- Higher spreads than other fixed-income assets
- Low (no?) correlation to other fixed-income assets
- Low (no?) impact of adverse credit events

Insurance Linked Securities
Players

Sponsors:	Swiss Re, Hartford, Glacier Re, …	
Issuers:	WinCAT, Parametric Re, Pioneer, Shenandoah, …	
Structurers:	Swiss Re, Goldman Sachs, Aon, …	bankers' realm
Risk consultants:	AIR, RMS, EQE, Milliman, …	insurers' realm
Rating agencies:	Moody's, S&P, Fitch	
Sales:	Swiss Re, Goldman Sachs, Aon, …	bankers' realm
2^{ndary} trading:	Swiss Re, Goldman Sachs, UBS, Nymex, CME, …	bankers' realm
Investors:	mainly capital market players	

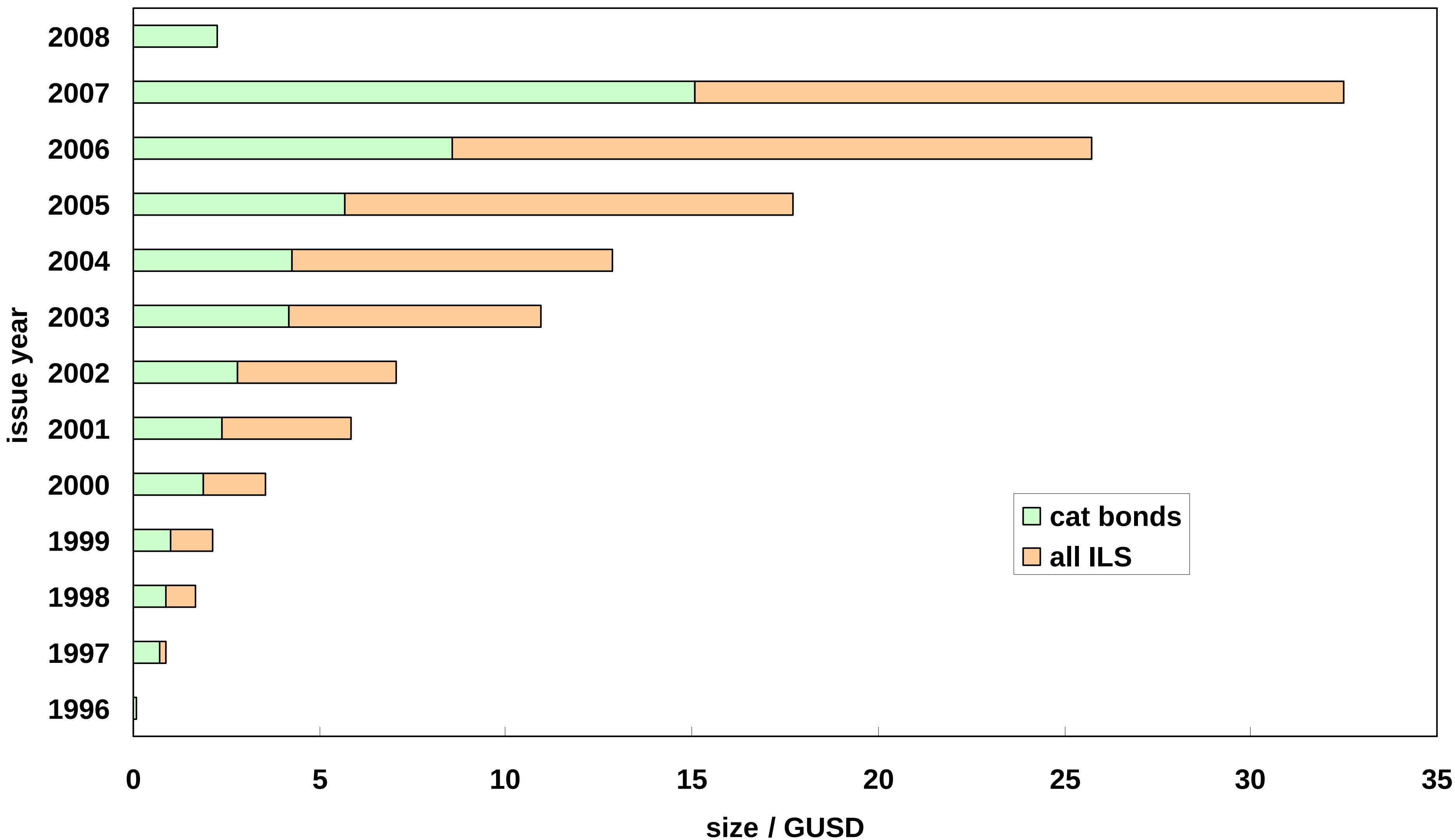
Insurance Linked Securities
Investor Segmentation



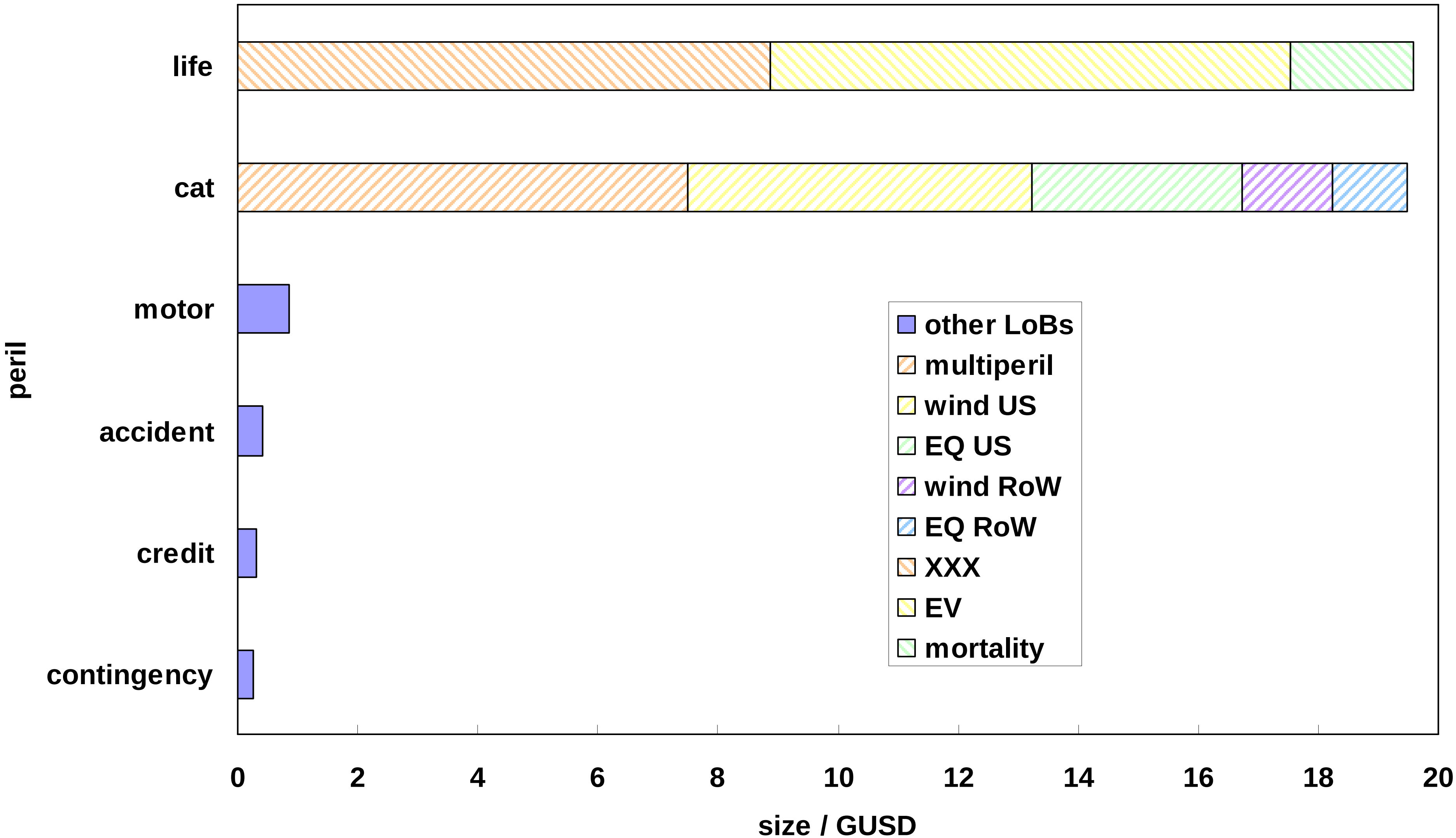


Insurance Linked Securities

Market Capacity



Insurance Linked Securities
Perils



Insurance Linked Securities

Market Potential

	Market [GUSD]	ILS capacity [GUSD]	ILS capacity [%]
XXX	60	9	15%
Cat	200	20	10%
EV	500	9	2%
motor	500	1	0%
mortality	5'000	2	0%

Insurance Linked Securities

Perspectives

Short term

- Reduction of ceded capacity, because
  - soft phase of cycle makes traditional reinsurance more attractive
  - Swiss Re has less need, thanks to the Berkshire Hathaway QS
  - testing more alternative financial vehicles
- More XS layers & non-cat LoBs securitised

Long term

- Solvency II will boost
  - the securitisation of working layers & non-cat LoBs
  - the transition from risk to capital & liquidity management
- Spreads will further decrease
- Liquidity will increase & 2ndary trading dominate
- Alternative financial vehicles will grow & capital markets will increasingly assume the role of reinsurance

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Financial vehicles for insurers

Financial Vehicles

Sidecar

- Transaction with several parties (typically private equity, hedge funds)
- SPV retrocedes large **quota share** to investors
  Insurer can start up new business
  Investor has a predefined exit strategy
- Long due diligence

Financial Vehicles

Ultimate Net Loss contract (UNL)

- Transaction with one party (typically hedge fund)
- Investor deposits cash on blocked account
- If **certain conditions are fulfilled**
  then insurer can withdraw
- ~ fully collateralised working XL w/o RI
- Long due diligence

Financial Vehicles

Contingent Capital

- Transaction with one party (typically investment bank, hedge fund)
- If **certain conditions are fulfilled** (nat cat, GDP, …)
  then investor provides insurer capital at favourable conditions

Financial Vehicles

Industry Loss Warranty (ILW)

- Transaction with one party (typically investment bank, hedge fund)
- If **industry loss index exceeds threshold**
  then seller pays buyer
- Very fast & standard
- Volume ~ 5 GUSD ?

Financial Vehicles
Motivations

- Transferred risk
- Capital enhancement
- Regulatory-Accounting-Tax benefit
- Ceded margins
- Residual risks
- Flexibility

	Effect	RAT benefit	Price	Residual risk	Time
ILS	risk transfer	depends	competitive	basis	3 – 6 months
ILS shelf program	risk transfer	depends	very competitive	reduced basis	2 – 3 weeks
sidecar	risk transfer	good	competitive	credit	3 – 6 months
UNL	risk transfer	good	expensive	tail	3 – 6 months
contingent capital	financing	weak	expensive	credit	1 – 2 months
ILW	risk transfer	depends	volatile	basis, credit	2 – 3 days
hybrid capital	financing	good	volatile	none?	1 – 2 months

Plan

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Insurance linked securities

Financial vehicles for insurers

Presenter's contact details

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