

Seminar on Data Science & Analytics

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New age analytical techniques and technologies to improve organizational Risk culture

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Live Poll



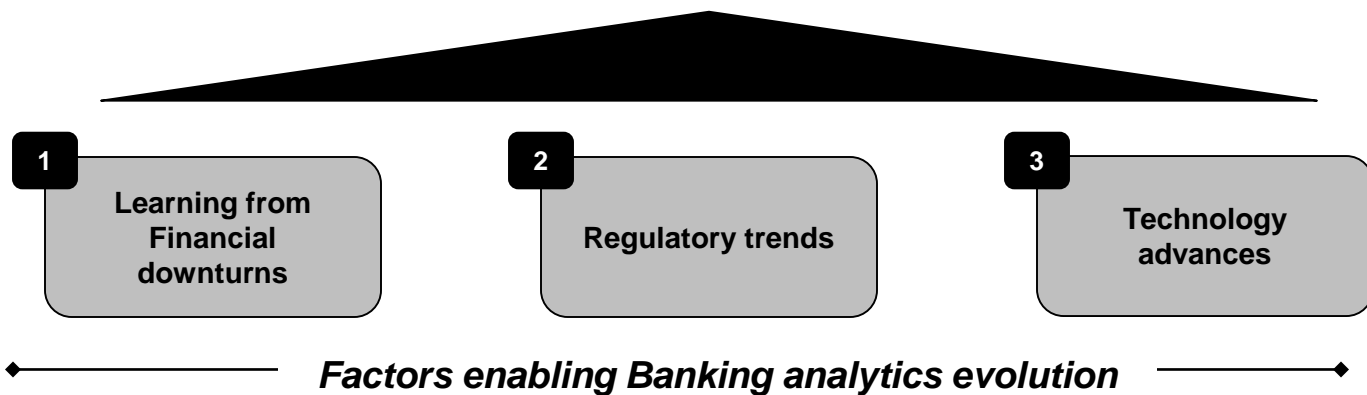
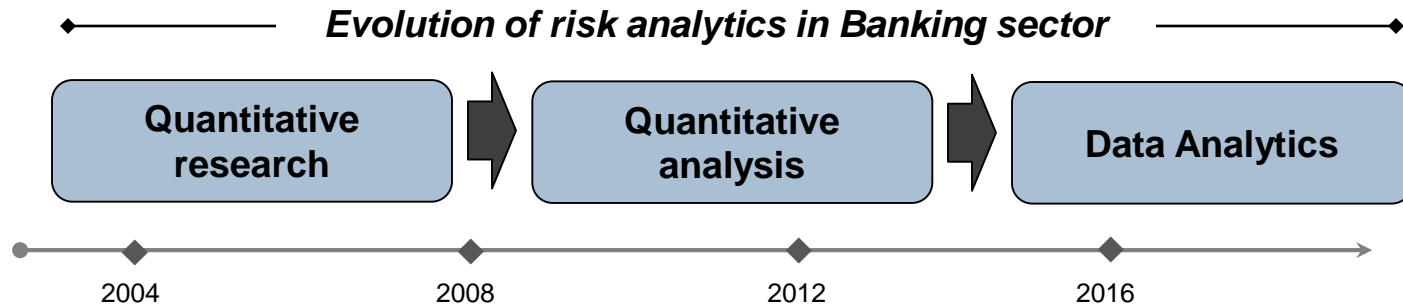
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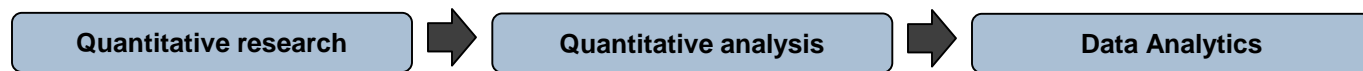
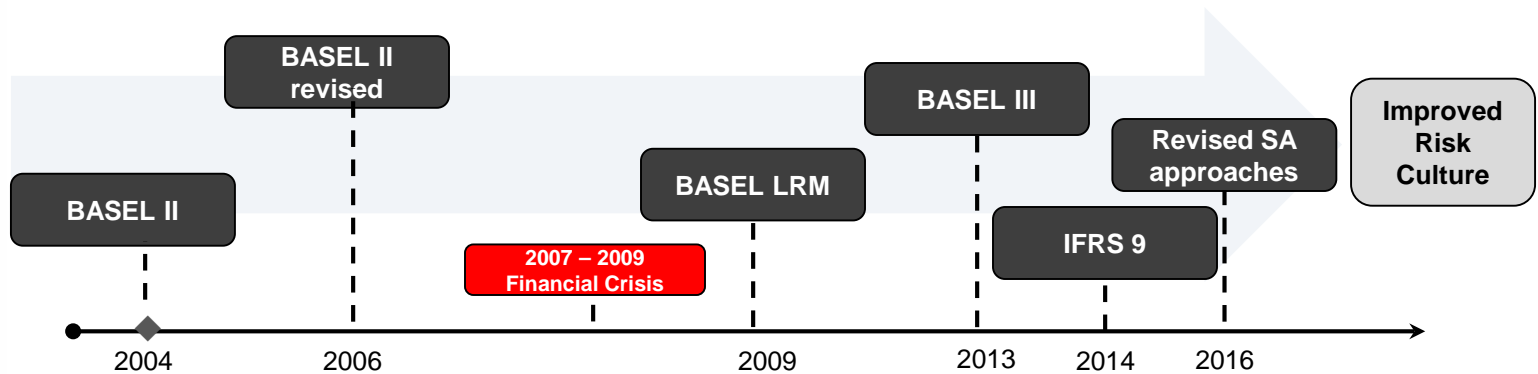
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Setting the context



Tracing back regulatory evolution in Banking Industry



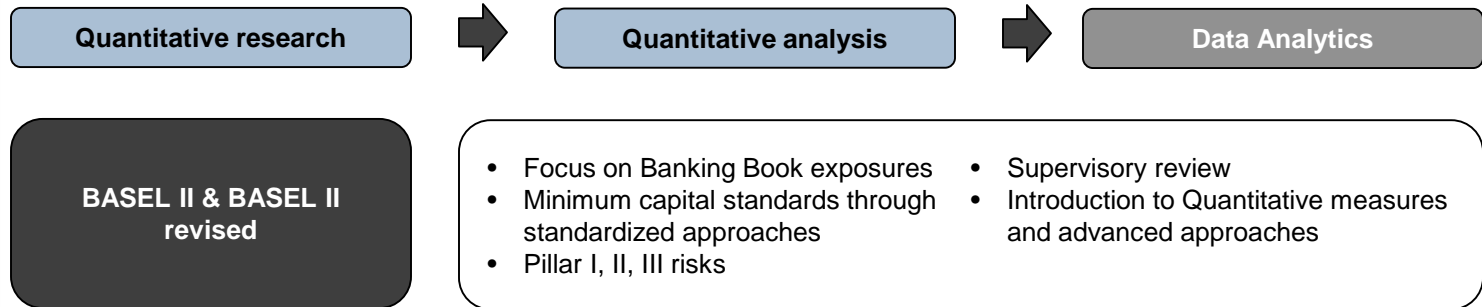
Risk analytics lifecycle

- Theoretical research led by academic researchers
- Limited practical application in industry with a preference for less complex methods
- Lack of incentives for business application

- Sub-optimal application of quantitative techniques
- Largely driven by regulatory push after industry events
- Focus more on regulatory compliance than business usage

- Quantitative analysis used to understand data trends
- Focus on embedding analytics into business processes
- Business decisions taken considering quantified risks

Lack of integration between risk analysis and business decisions prior to Financial Crisis



- 1** *Supervisory review framework not robust enough to standardize quality of disclosure*
- 2** *Lack of incentives to embed quantitative risk measures into business decision making process*
- 3** *Quantitative risk measure usage focussed towards compliance rather than improving risk culture*

Case study: Impact of disconnect between business and risk analysis

Case Study 1: Underwriting of high risk loans

- Sub-prime lending was one of the most profitable businesses for lenders in US towards the latter half of the housing boom
- These loans were underwritten with minimal risk assessment although they were high RWA assets



- **Defaults on sub-prime losses led to bankruptcies for multiple lenders in US during the housing crisis**

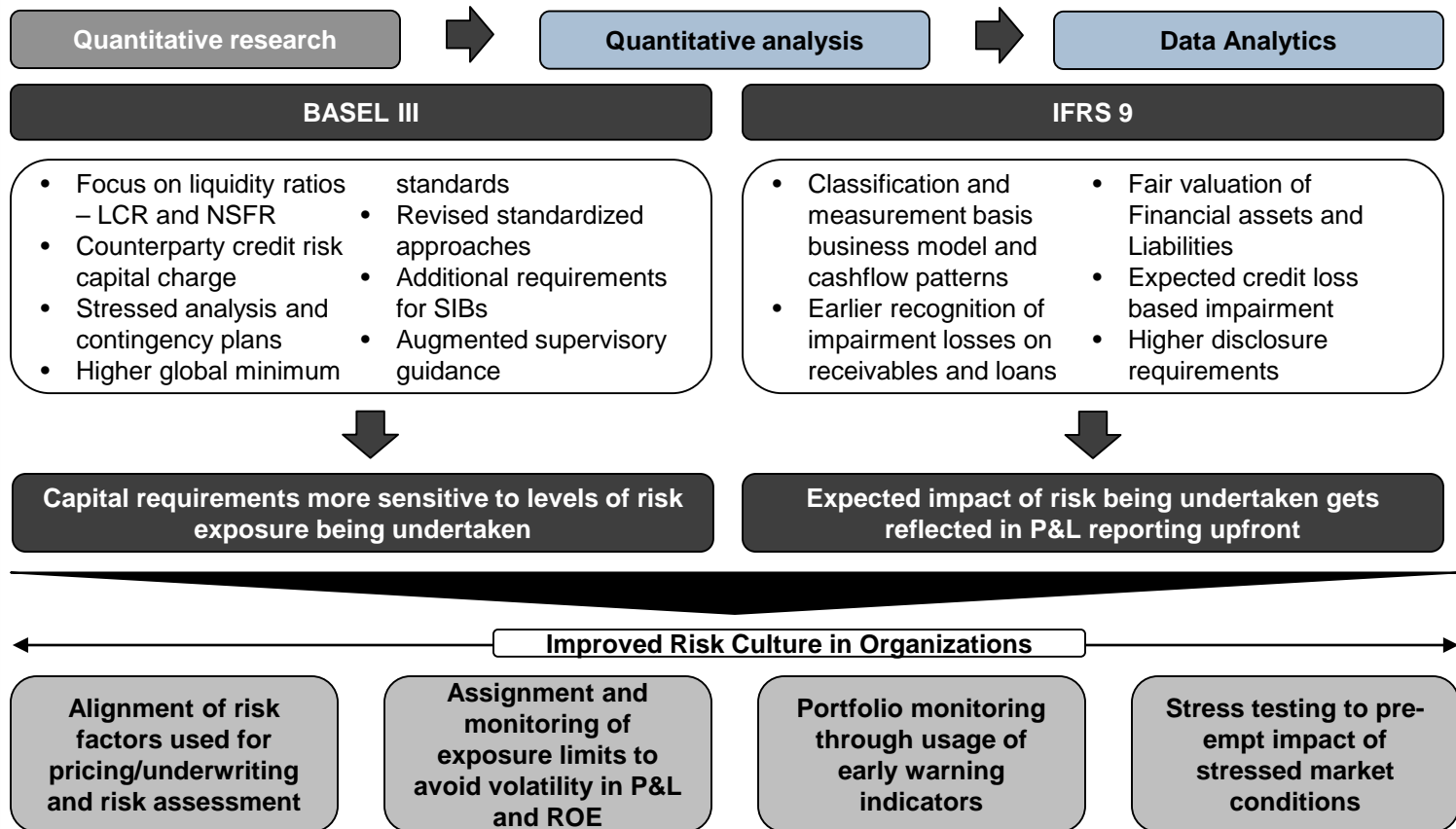
Case Study 2: Counterparty credit risk faced during Lehman bankruptcy

- Lehman Brothers and Bear Sterns were two of largest financial institutions which went bankrupt during the Financial Crisis
- Large counterparties of Lehman had hedged their risk using CDS instruments



- **CDS on Lehman was largely underwritten by few large insurers triggering massive losses for them**
- **AIG was bailed out to avoid default on its underwritten liabilities**

Regulatory push to drive risk culture through risk analytics



Analytical techniques used in Banking risk analysis

SNo.	Modelling techniques	Typical use cases
1	Stochastic models and simulations	<ol style="list-style-type: none">1. Valuation of derivative products2. Market risk modelling - Value at risk modelling3. Counterparty credit risk modelling
2	Econometric models	<ol style="list-style-type: none">1. Credit risk/ IFRS modelling – Estimation of PD, LGD, EAD2. Behavioural modelling – ALM cashflow forecasting3. Capital requirement forecasting – CCAR, Economic capital
3	Deep learning and machine learning	<ol style="list-style-type: none">1. Credit scoring2. Fraud analysis3. AML
4	Survival models	<ol style="list-style-type: none">1. Credit scoring2. Credit risk analysis

Role played by new age technologies in driving organizational risk culture

1

Lesser time to process computation

1. *Cheaper compute power helps reduce computation time*
2. *Open-source platforms give access to extensive analytical libraries and computation optimization techniques*
3. *Above trends enable embedding of complex quantitative analysis into real-time business decision making*

2

Effective integration of risk analysis

1. *Ability to integrate of visualization tools with open-source technologies*
2. *Access of dashboards through handheld devices*
3. *Visualization tools enable end-user delivery of risk analysis which can get consumed for business decision making with ease*

3

Control over risk data

1. *New age technologies allow control over data processing through front end interface*
2. *Integration with visualization enables control over data quality and data lineage throughout the data analysis flow*

Case study: Driving improved risk culture by embedding risk analytics

Case Study 1: Use of Liquidity metrics for business decisions

- LCR and NSFR were two liquidity metrics introduced by Basel to monitor liquidity stability of Banks after Financial crisis
- Existing technology infrastructure allowed Banks to monitor these on a t+2 basis



- **Banks are leveraging new age technologies to generate these metrics faster and build into treasury decision making on a daily basis**

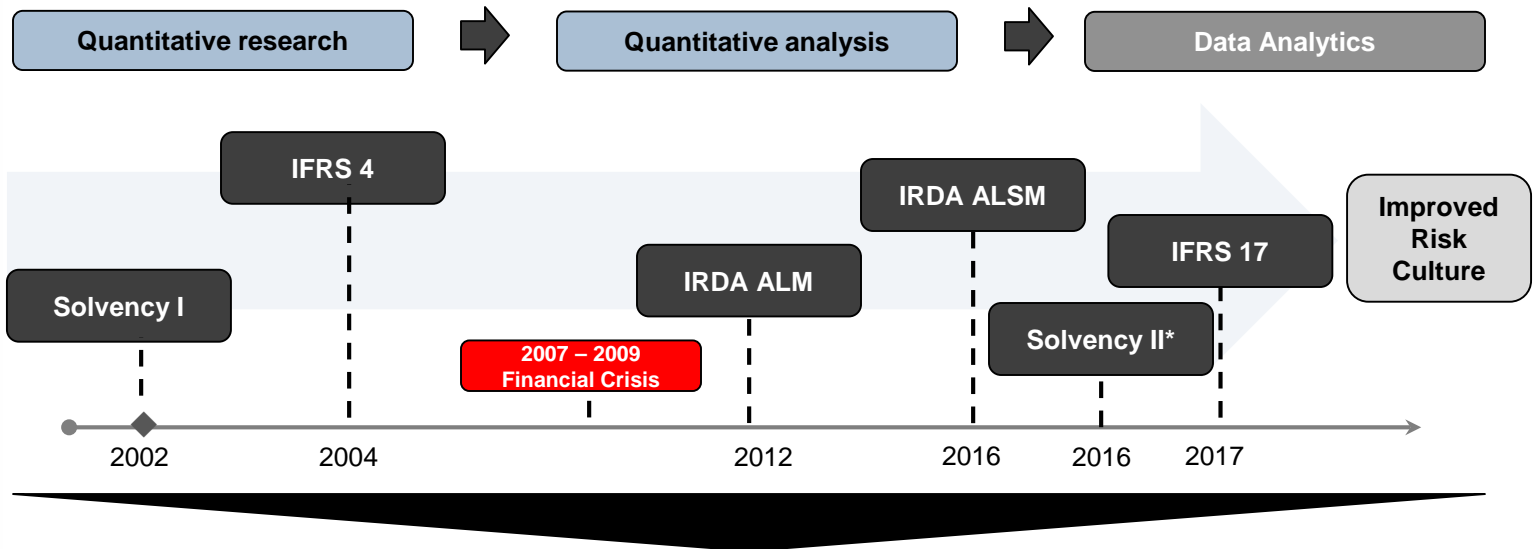
Case Study 2: Credit underwriting models

- Credit scoring is typically done using static rule based algorithms calibrated through use of qualitative analysis and econometric models



- **Banks are moving towards use of machine learning techniques**
- **These techniques monitor risk parameters along with behavioural parameters to refresh scoring rules on an ongoing basis**

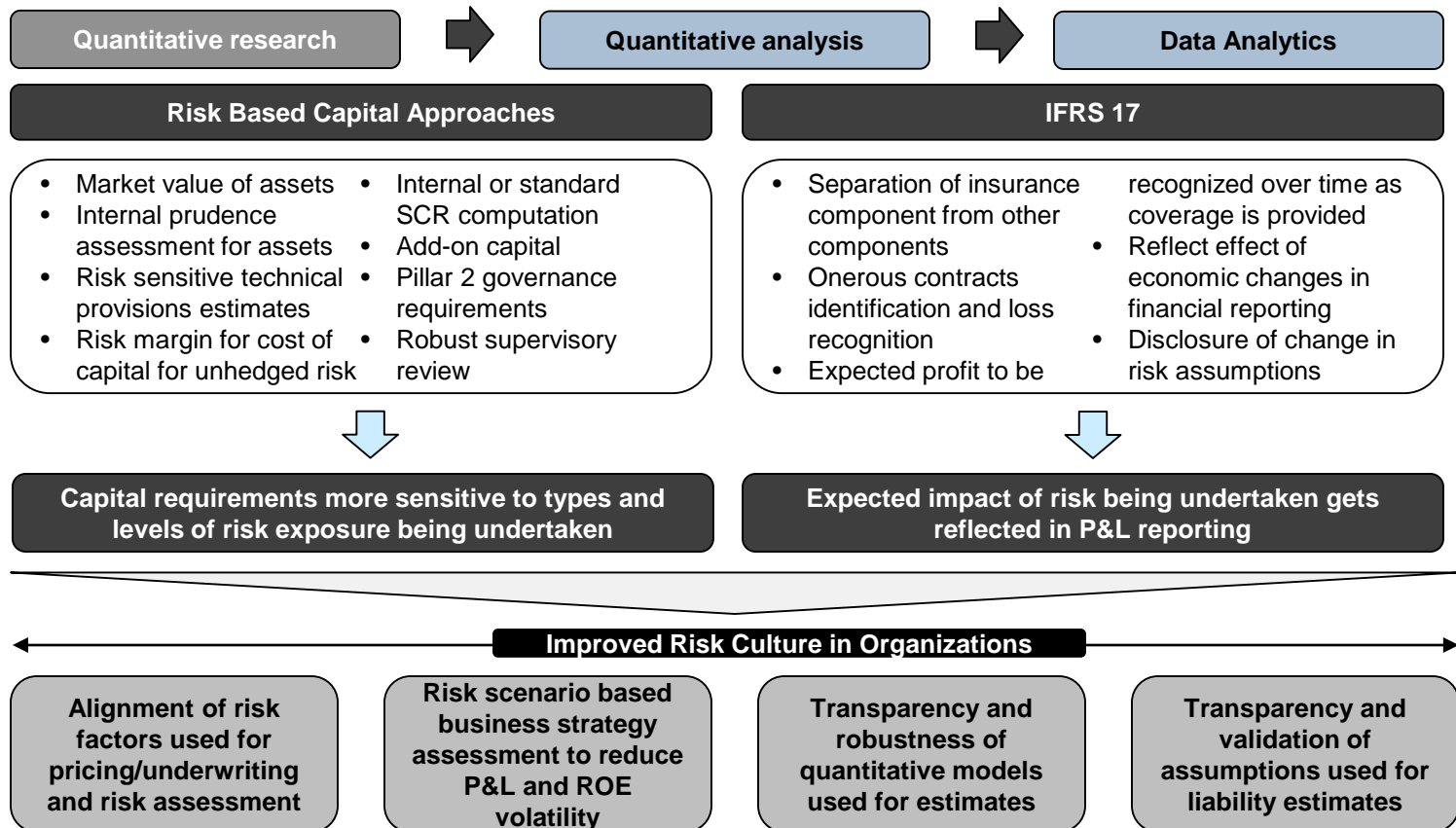
Analyzing Insurance regulatory action trends



- ✓ **Clear regulatory push to move towards a more risk based capital assessment and reporting regime**
- ✓ **Increased transparency in risk assessment and public disclosure**
- ✓ **Increased transparency in quantitative approaches being adopted for risk assessment and business decision making**

* Indicates timelines where Solvency II became operative in EU

IFRS 17 and RBC – Regulatory push to embed risk analytics in business decisions



Opportunities to leverage learnings from Banking experience

1

Improve business resilience by rethinking business strategy

1. *RBC and IFRS 17 can be treated as an opportunity to rethink business strategy by assessing risks inherent to the insurance products*
2. *Performing end-to-end impact assessment across product life-cycle would enable re-alignment of business strategy to new regulatory regime*

2

Integrate internal MIS with risk analysis

1. *Risk factors used for business decision making should be aligned with risk factors used for risk modelling and regulatory reporting*
2. *Performance metrics should be revisited to embed risk metrics to ensure risk exposure being undertaken is aligned with company's risk appetite and capital position*

Opportunities to leverage learnings from Banking experience

3

Design a scalable
technology
architecture

1. *It is important to identify business requirements exhaustively based on end-to-end impact assessment of product lifecycle*
2. *Force fitting requirements to available pre-packaged system functionalities should be avoided*
3. *A scalable architecture on top existing technology can be designed by using new age technologies with limited capital investment*

4

Leverage Banking
models

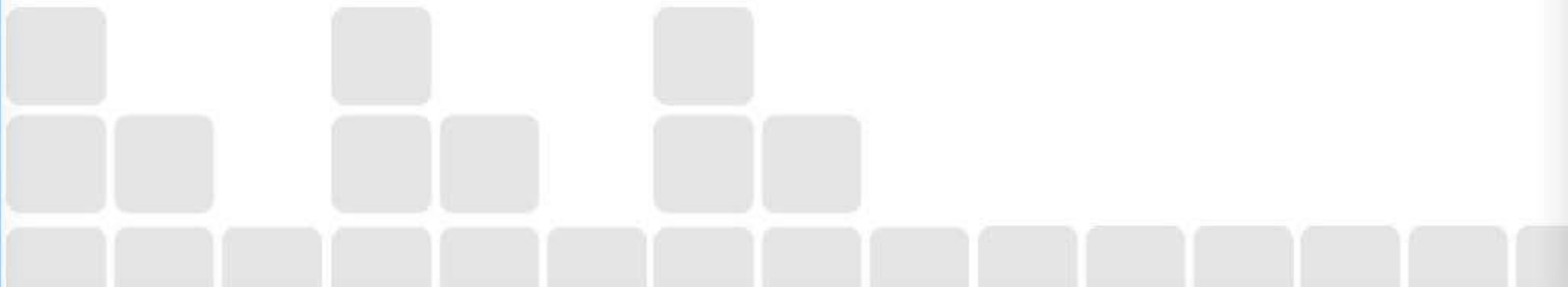
1. *Banking models for investment portfolio have stabilized over the years and can be adopted to meet regulatory standards*
2. *Models used by Banks for credit risk analysis and IFRS 9 can be used for reinsurance credit risk assessment*
3. *Behavioural modelling techniques used for cashflow generation could be leveraged for cashflow forecasting of insurance contract groups*

Q&A



Questions ?

Comments



Thank You

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Institute of Actuaries of India