

## Expanding the horizon: Actuarial Science in Banking

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**Session P5**  
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# Actuarial Science in Banking

Expanding the horizon: Opportunities for young actuaries in banking practice

## Agenda

1. Introduction and background
2. Actuaries' skills set relevant to banking practice
3. Traditional and emerging areas of actuarial practice
4. Role of banks in financial systems
5. The changing environment presents opportunities and challenges
6. Areas of actuarial practice in banking
7. Application of actuarial techniques in banking: example
8. IAA Banking Working Group Survey
9. Actuarial Society of South Africa Banking Applications subject for actuaries
10. Questions from the audience

Institute of Actuaries of India would like to invite you to participate as a financial partner and exhibitor at 20th Global Conference of Actuaries (GCA) to be held at Renaissance Hotel, Powai, Mumbai, India, on 5th & 6th March, 2019.



**20<sup>th</sup> Global  
Conference of Actuaries**  
4<sup>th</sup> - 6<sup>th</sup> March, 2019 | Mumbai, India

Institute of  
Actuaries of India

## *Introduction and background*

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Actuaries have been involved in banking for more than a decade in jurisdictions such as Australia and South Africa. Other jurisdictions are only starting to develop awareness and capabilities.

Actuaries, as risk management professionals, add significant value in a range of banking areas.

We will discuss a range of issues aimed at raising awareness of actuarial practice in banking.

# Codifying an actuary's skillset

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Quantitative



Communication



Business Analytics



Economics



Risk Management



Professionalism



Stakeholder Management



Decision Making

*This strong combination of skills enables actuaries to have a remarkable impact across industries*

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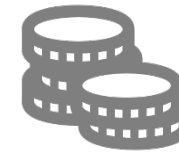
Health Care



Short-term & general insurance



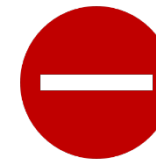
Life Assurance



Finance & investment



Pensions & Employee Benefits



Enterprise Risk Management



Older

Newer

# Banking provides crucial services to a wide range of clients

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## Important economic functions

Deposit taking

Lending and financing

Treasury

Payments

Transactional support

Capital Markets

Trading

Risk Management

## Across a wide range of clients with varying characteristics



*Individual & retail  
banking*

Income groups (high to low)

Individual demographics

Behavioural classes



*Business & corporate  
banking*

Local to global operations

Size (SME's to corporates)

Heterogeneous financing needs

# Banking and its future is changing fast as the environment shifts

## Opportunities and Challenges come with the changing environment



### Systemic risk

*Increased global connectedness has materially increased risk correlations*



### Volatility

*Globally volatility remains high*



### New currency systems

*Rise of cryptocurrencies and new modes of transacting*



### Shadow banking

*New entrants that are not confined to same regulatory standards increasing risk in markets*



### Data analytics

*Gaining traction and affecting banks' business models and profitability*



### Demographic movement

*Changing demographics, and rise of the silver economy*



### Regulation

*Continuously changing regulatory standard both in local and global context*

*(Basel, GDPR, P2SD)*



### Fintechs

*Start-ups are gaining significant attention*

# Actuaries are making an impact in a range of areas within banks

Product houses	Product R&D	Actuarial and statistical insights drive innovative product construct, new funding and appealing client propositions across retail, corporate and investment banking. Product development required to take into account latest regulatory and reporting changes.
	Credit risk modelling and scorecard development	Actuarial and statistical techniques applied to better understand, segment and price credit risk on bank books
	Pricing	Product pricing improved through intelligent use of actuarial techniques to attain and maintain competitive positions in the market across retail and corporate banking
	Customer analytics and value management	Utilisation of customer data to improve value to both customer and bank, product pathway analysis and incentives as well as intelligent lapse prediction and retention management. Successful CVM drives material upsell and stickiness of clients
	Trading and pricing derivatives	Actuarial knowledge driving innovative solutions to trading, sales & structuring and derivative offerings
Group and central	Group Risk Management	Managing operational, market, interest rate, currency, liquidity and business risks. Setting the risk appetite, subsequent risk limits and tolerance levels. This includes the extent to which risk is managed centrally or within business units. Includes elements such as funds transfer pricing that directs business strategy and tactics.
	Balance sheet mgmt & Provisioning	Regulatory capital calculations, regulatory relationship management and sufficiency and ICAAP.
	Capital management	Capital management in the context of strategic objectives enables the bank to meet its long term vision, while ensuring regulatory needs are met. This includes the capital management policy, capital allocation for the banking group, for risk, per business unit as well as return measures.
	Reporting	Supporting business management, enabling deeper and dynamic business insights through statistical analysis and dashboard based reporting
Strategic	Corporate Development	Strategy development, new business incubation and supporting internal and external M&A exercises



# Actuarial techniques can be applied and add real value in banking

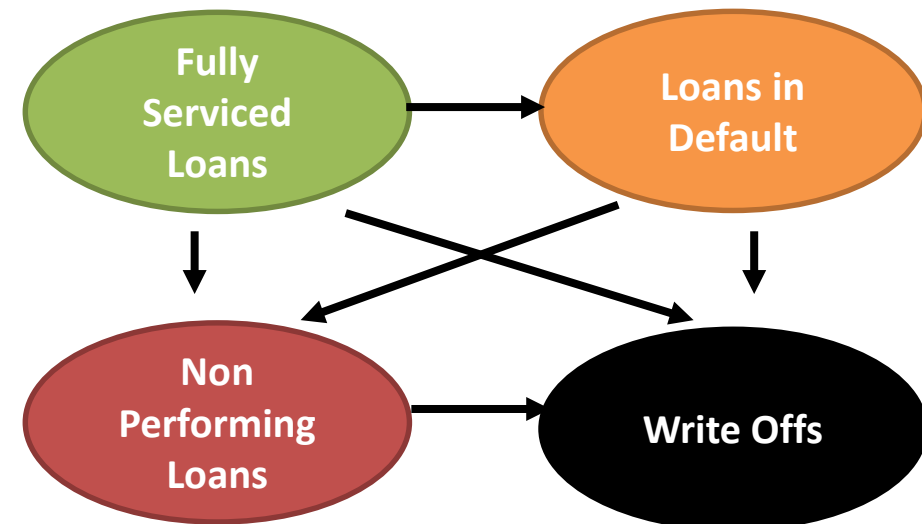
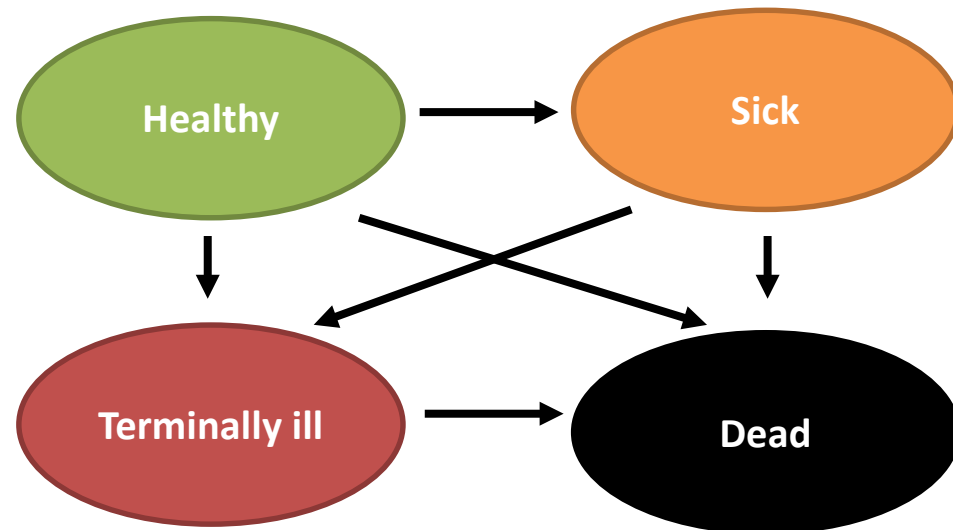
## Example: Understanding Credit Risk

Understanding credit risk is not dissimilar from life assurance, including how to predict transition between states

### Insurance

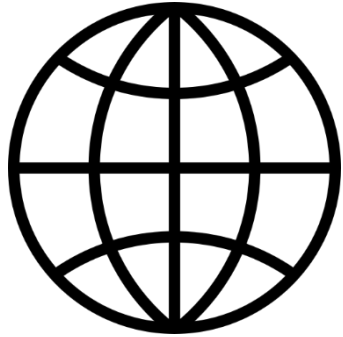
### Banking

Probability of claim	Probability of Default
Sum Insured/Assured	Exposure at Default
Loss Incurred/Sum Insured	Loss Given Default



# Actuaries have begun to recognize their value in the banking context

IAA Banking Working Group survey 2017/2018



**810** respondents

**37** actuarial associations

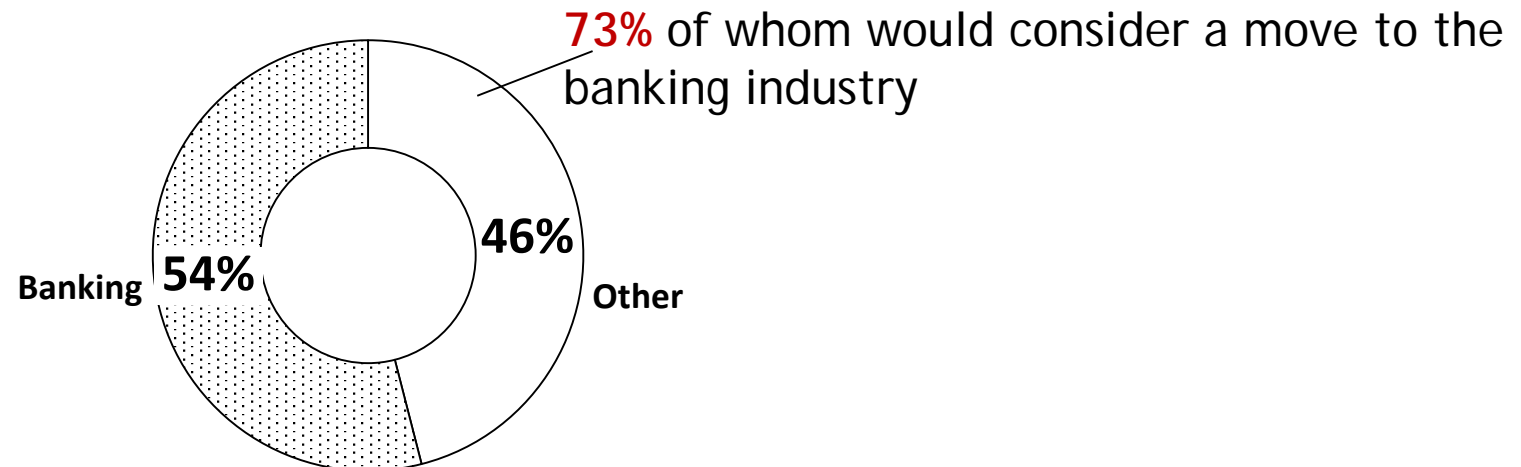
## Key insights

Globally actuaries are gaining interest in banking

**56%** of respondents would consider qualifying as a banking fellow

**75%** of respondents asked to be included in future correspondence on actuaries in banking

... even from those already practicing in other areas



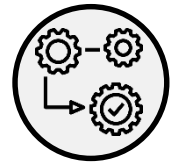
## *Traditionally, actuaries have qualified along traditional lines while working in banks, or waited to then transition*

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### **Different regulatory systems**

Basel III, IFRS 9, BCBS 239, Anti Money Laundering, Financial Crime, ICAAP / CCAR Framework



### **Processes and professional landscape differ**



### **Terminology can be different**

e.g. Reversed notion of assets and liabilities compared to insurers

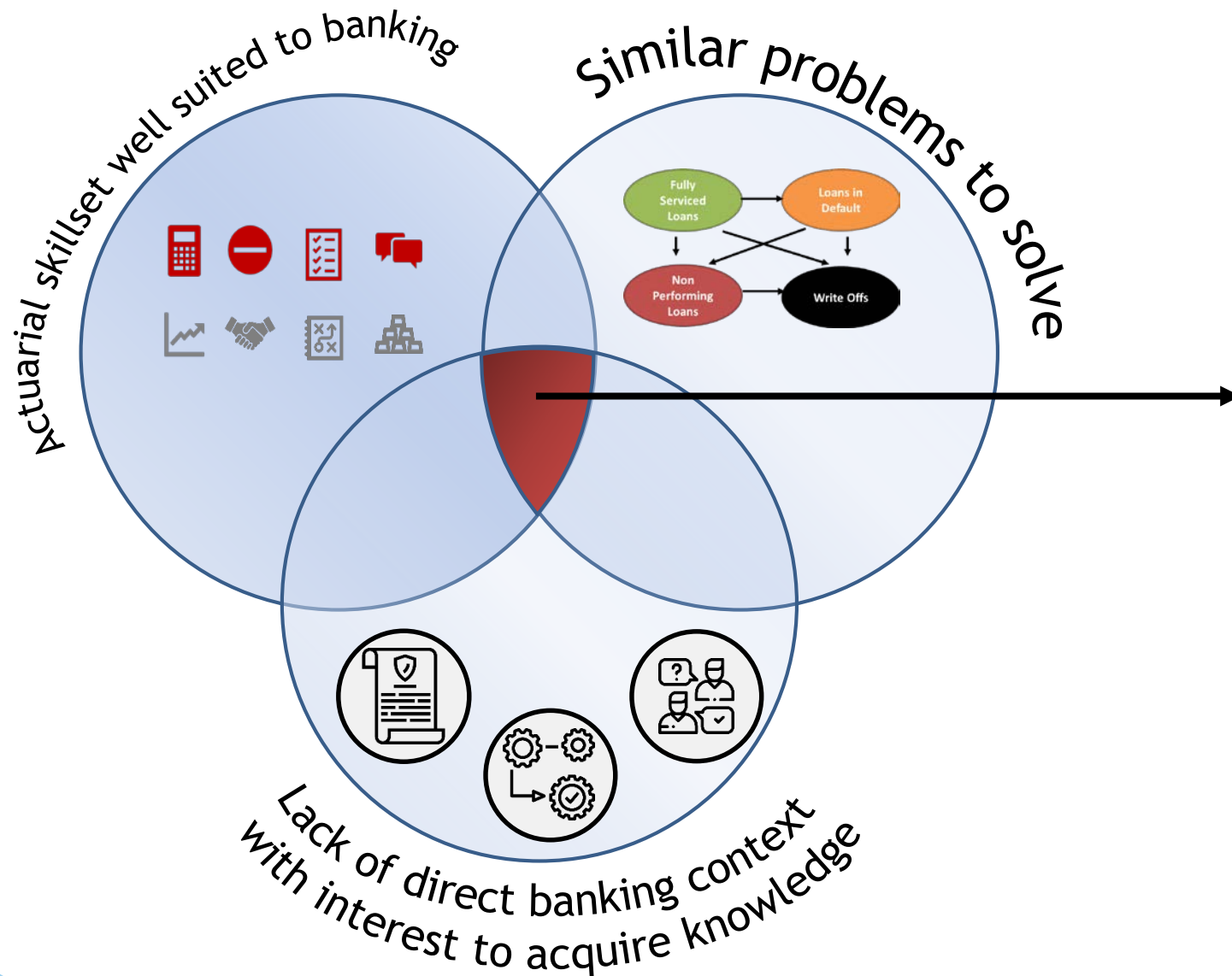
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Students either take longer to qualify as they do not get exposure to the traditional actuarial areas they have to study

**OR**

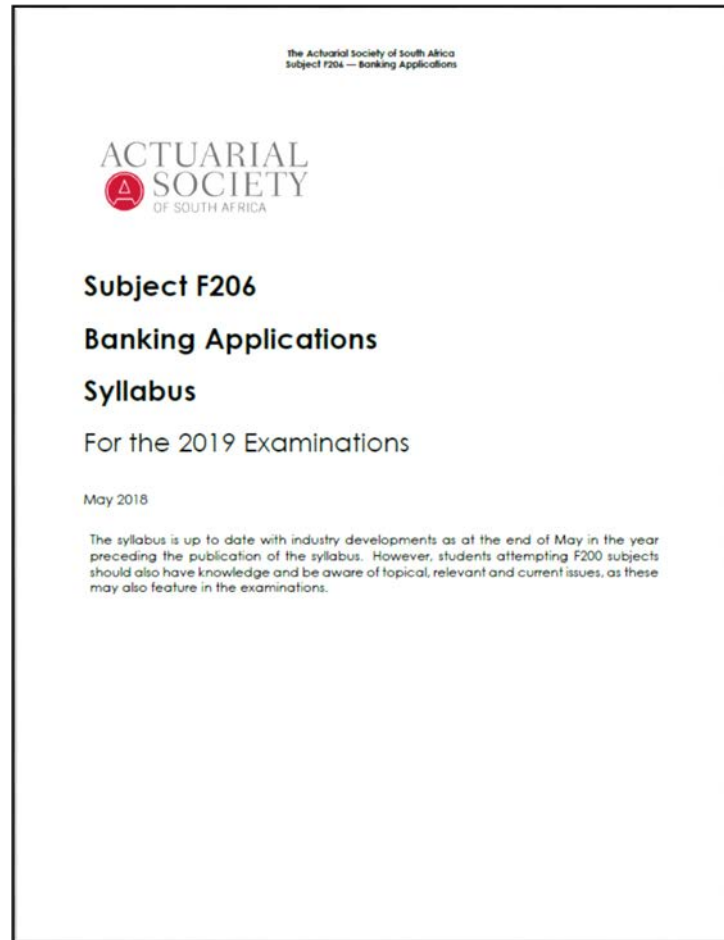
do not gain the theoretical knowledge in studies that acts as a catalyst for performance

# Forces informing the need to equip actuaries and drive expertise in the banking arena



Opportunity to create banking as a practice area for actuaries & secure their position as thought leaders in the industry

# The Actuarial Society of South Africa launched its Banking Applications examination for aspiring banking actuaries in 2015



*A syllabus covering all aspects of retail, corporate and investment banking*

Part	Banking Fellowship Subject Structure
1)	Banking Structure & Banking Marketplace in South Africa
2)	Bank Risk Management
3)	Bank Asset & Liability Management
4)	Bank Strategy & Governance
5)	Bank Problem Solving

South Africa now has 20 banking fellows, that have gone through a challenging exam process. More students are opting for this route to qualification

Year	2015	2016	2017	2018
Pass rate	0%	26%	33%	30%

# Practical exam questions, relevant to the complex situations that banks face

Topic	Question asked	Practice area
Understanding changing business models	<p>You are the Analytics head for a large South African Bank. Your bank holds approximately 20% market share across all products in its suite. The bank currently has limited channel presence. All business is conducted through the branch network or the ATM network. The ATM network is predominantly used as a mechanism for disbursing cash.</p> <p>(i) Draft a business case for migrating your customers to cheaper channels and explain what you would take into consideration in the business case. (16 marks)</p> <p>(ii) After 3 years of development and a significant investment into the bank's migration project, the CEO is very disappointed with the outcomes to date. Normalising for the development costs in the bank's financial statements for the last 3 years, he has noticed very little improvement in the cost base of the bank. He has tasked you with investigating why this is the case and has asked for proposals to try to improve this situation. Outline the points you'd make to the CEO (12 marks)</p>	Retail banking strategy
Finding solutions for clients while meeting bank	<p>A large energy fund owned by a large pension fund to house energy assets has approached your Bank for debt financing. It is expected to hold assets worth R30 billion in the first year. In addition to holding completed assets, the fund will also undertake major new energy assets developments and major refurbishment of existing assets. It will spend approximately R10 billion on developments and refurbishments over the next 3 to 5 years.</p> <p>(I) Comment on the appropriateness of each of the proposed funding options from the point of view of the bank in meeting the client's needs whilst managing the bank's risks and recommend what you believe to be the most appropriate option (10 marks)</p> <p>(II) Outline and explain the different pricing components that you expect to be included in the price of the loan.(5 marks)</p> <p>(III) Discuss the terms and conditions that you expect to be included in the loan offer assuming that the lending is directly onto the balance sheet (14 marks)</p>	Investment banking, Structured finance
Treasury and Funds Transfer Pricing	<p>You are an Executive Committee member of the Treasury department of a large South African bank. The bank's Treasury department is well established and considers asset and liability modelling, funding and liquidity management, capital management as well as execution services. The activities of the Treasury department are governed by an Executive Committee, the Asset Liability Committee (ALCO).</p> <p>(I) List the activities that are covered in the terms of reference of the ALCO. (7 marks)</p> <p>(II) At a recent ALCO, the head of risk presented a case study of a European bank that has recently experienced severe liquidity stress and was placed into resolution as a result. Based on her presentation the ALCO has requested you to review the funding and liquidity risks the bank is exposed to and to explain the risk mitigating actions the bank can take. (20 marks)</p> <p>(III) After your presentation, the head of the corporate business notes that the ALCO has too strong a focus on risk management. He explains that the business cannot compete in the market as the Funds Transfer Pricing set by Treasury makes his business uncompetitive. He asks you to review the funds transfer pricing applied to aid the growth of his balance sheet. Outline the response (11 marks)</p>	Group and central banking

# Practical exam questions, relevant to the complex situations that banks face

Topic

Question asked

Practice area

IFRS9 and it's impact

A medium-sized South African bank is developing new credit risk impairment models in preparation for IFRS 9. It currently offers only Retail lending products, and its key exposure is to Retail Mortgages and Credit Cards. The Bank has existing Basel models in place and is currently AIRB accredited.

- (I) Explain why accounting and regulatory bodies developed IFRS9 to replace IAS39 (4 marks)
- (II) Describe the key changes, and the challenges wrt to bank's portfolio (9 marks)
- (III) Calculate the appropriate stage 1 and stage 2 provision for the following mortgage book and comment (22 marks)
- (IV) Comment on appropriate economic linkage PD functions and how mitigating actions can mitigate model shortcoming (12 marks)

Portfolio	Exposure	IAS 39 Provision	Basel Expected Loss	Before Forward Looking		After Forward Looking	
				Stage 1 Expected Credit Loss	Stage 2 Expected Credit Loss	Stage 1 Expected Credit Loss	Stage 2 Expected Credit Loss
Mortgages	2,500,000	190,000	220,000	190,000	300,000	209,000	365,000
Credit Cards	1,000,000	150,000	390,000	280,000	250,000	308,000	340,000
<b>Total</b>	<b>3,500,000</b>	<b>340,000</b>	<b>610,000</b>	<b>470,000</b>	<b>550,000</b>	<b>517,000</b>	<b>705,000</b>

$$PD_{Mortgages} = 0.02 + 0.07. (\Delta GDP) + 0.2. (\Delta PPI) + \varepsilon$$

$$PD_{Credit\ cards} = 0.06 - 0.4. (\Delta GDP) + 0.4. (lagUE) + \varepsilon$$

Changing regulatory environment

Political and regulatory impact on strategy, risk and bank profit

You are the head of credit for the mortgage division of DIY, a Bank in an emerging market economy. The government has conducted consultations and research for a few months on land expropriation without compensation. After much deliberation, the constitution is amended allowing expropriation without compensation. Specific details regarding the implementation thereof are not available at this stage and will be addressed through subsequent regulatory standards.

Explain the potential risks that this legal change can bring to the mortgage portfolios of the bank and describe the actions to mitigate these risks.

(14 marks)

Complex real world problem



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# 20<sup>th</sup> Global \_\_\_\_\_ Conference of Actuaries

4<sup>th</sup> - 6<sup>th</sup> March, 2019 | Mumbai, India

THANK YOU

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