

# Actuaries in Banking

By Chittaranjan Mishra

11 May 2015  
Gulf Actuarial Society

# Discussion Points



# Discussion Points

- Speaker Introduction
- Actuarial Science from a Banker's perspective
- What skills sets do Actuaries possess for Banking?
- How can Actuaries add value in Banking? (Examples)
- Why are there a limited number of Actuaries in Banking?
- Conclusion
- Q&A

# Speaker Introduction



# Speaker Introduction

- **Chittaranjan Mishra, FRM**
- **Head - Market Risk, Liquidity Risk and Analytics**  
at National Bank of Oman
- Previous Roles: **Chief Manager (Treasury/Risk Management)** at State Bank of India
- Over 27 years of Banking Risk Management Experience

# Market Risk and Analytics



# Market Risk & Analytics

## Objective:

**Market Risk** monitors risks in Foreign Exchange positions, investments as well as the interest rate and liquidity risks.

## Key Responsibilities:

- Recommendation for approval and monitoring market risk limits
- Measurement of interest rate risks in the banking book
- Computation of loan equivalent exposure on account of IRS
- Computation of VaR of FOREX positions
- Monitoring of Investment Trading book as well AFS book as assigned limits
- Vetting from Risk perspective of all investment proposals.
- Monitoring of liquidity risks through MAL/Liquidity Recap/Lending Ratio reports
- Preparation of ICAAP, Stress Testing, Preparation of market risk MIS reports for Asset Liability Committee and Board Risk Committees

**How can Actuaries add value in Banking?**





# How can Actuaries add value in Banking?

## 1) Structuring and valuing Derivatives

- Treasury sellers just structure them to sell them, the big banks in the world price them
- Strong mathematical and statistical skillset
- Pricing of swaps and futures
- Knowledge of Pricing Models i.e. Black Scholes  
Option Pricing

- Example

# How can Actuaries add value in Banking?

## 2) Econometrics in Investments

- Requires strong knowledge of econometrics
- Heteroskedasticity
- Autocorrelation
- Co-Linearity
- Overall solid skill set in statistics

# How can Actuaries add value in Banking?

## 3) Modeling Operational Risk

- Toughest job in Risk Management
- Losses can be huge, potential frequency and severity
- Modeling Tail Risk i.e. Kurtosis, Extreme Value Theorem
- Example

# How can Actuaries add value in Banking?

## 4) Credit Risk Management

- Stress testing of macroeconomic factors
- Establishing Credit limits and early warning signs through PDs and LGDs
- Setting up provision models and projecting costs of bad loans
- Example

**What skills set do Actuaries possess for Banking?**



# What skills set do Actuaries possess for Banking?

- Moody's shows that the probability of a bond rated Caa defaulting during the third year is roughly 9% ( i.e,39-30)
- This is unconditional default probability
- But what is the conditional default probability?
- The probability that it will survive to the end of second year is about 70%.
- The CDP ( that the bond will default in 3rd year provided it has not defaulted earlier) is  $9/70=13\%$  approx
- This is default intensity or hazard rate

# What skills set do Actuaries possess for Banking? (Cont.)

**Table 22.1** Average cumulative default rates (%), 1970–2006. *Source:* Moody's.

<i>Term (years):</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>7</i>	<i>10</i>	<i>15</i>	<i>20</i>
Aaa	0.000	0.000	0.000	0.026	0.099	0.251	0.521	0.992	1.191
Aa	0.008	0.019	0.042	0.106	0.177	0.343	0.522	1.111	1.929
A	0.021	0.095	0.220	0.344	0.472	0.759	1.287	2.364	4.238
Baa	0.181	0.506	0.930	1.434	1.938	2.959	4.637	8.244	11.362
Ba	1.205	3.219	5.568	7.958	10.215	14.005	19.118	28.380	35.093
B	5.236	11.296	17.043	22.054	26.794	34.771	43.343	52.175	54.421
Caa–C	19.476	30.494	39.717	46.904	52.622	59.938	69.178	70.870	70.870

# What skills set do Actuaries possess for Banking? (Cont.)

- **Mathematics!!!**

$$dv/dt = -v\lambda$$

( $\lambda$  = hazard rate ,  $v$ =survival rate)

- Thus,

$$dv/v = -\lambda dt$$

- Which gives us,

$$\log v = -\int \lambda dt$$

- from which we get

$$v = \exp\left(\int (-\lambda dt)\right)$$

- All this mathematics looks familiar to you, because **this is precisely how to calculate death probabilities.**
- This is, essentially, the probability of death given the person has survived till now. Again **lambda or  $\lambda$ .**



## What skills set do Actuaries possess for Banking? (Cont.)

- Actuarial knowledge useful in calculating the default probabilities of loan books
- The default probabilities estimate is a multi-billion dollar industry
- Requires analytical rigor and intellectual vigor

**Why are there a limited number of Actuaries in Banking?**



# Why are there a limited number of Actuaries in Banking?

## Challenges – Overview

- Actuarial Science is a high talent-intensive, though uncommon, profession
- Limited availability of fundamental roles (especially in emerging markets)
- Banking is more practical. Requires experience, besides statistics, to appreciate whether a customer will default or not. Analysis fills the gap.

# Why are there a limited number of Actuaries in Banking?

## Challenges – (contd.)

- Front Office skills should complement analytics. Requires interaction with customers: borrowers, the derivative buyers and sellers, etc. Essential to understand the market prior to number-crunching.
- Augmenting knowledge of the finance world: understanding balance-sheets, other financial statements

# Conclusion



# Conclusion

- Recommend Actuaries to venture into the banking industry
- Large industry with respectable remuneration for talent
- Supplement analytics with front office skills and involvement in the financial world challenges
- Basel III requirements for Risk Management
- Scope for growth through involvement in decisions



Q & A