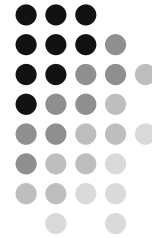


# Enterprise Risk Management in Banking

(April 24th, 12:30-1:45pm)



Dr. Robert Mark , Black Diamond  
Dr. Michel Crouhy, IXIS Corporate & Investment Bank  
Elizabeth Wilson, Washington Mutual Bank

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1

## Talk of the Town (Banks)



- Effective Enterprise Risk Management
  - Policy
  - Infrastructure
  - Methodology
- Implementation of Basel II (2007/2008)
  - Probability of Default (PD)
  - Loss Given Defaults (LGD)
  - Economic Capital vs. Regulatory Capital
  - Operational Risk
- Credit Risk Management
  - Policy, Strategies & Risk Appetite
  - Relaxation of Credit Discipline
  - BASEL II vs. Solvency II
  - Overall Credit Risk Profile
- Credit Portfolio Management
  - Trading Portfolio Management
  - Compressed Margins
    - Flaten Yield Curve
    - Hybrid Securities

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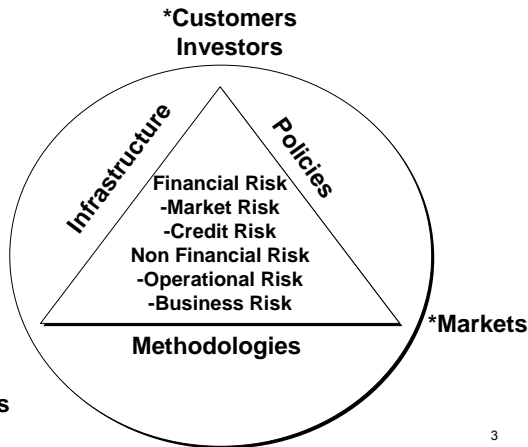
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A significant challenge for a CRO is to stay on top of a complex combination of “Characteristics” which are at the “Core of Superior ERM Solutions”



- The ability to efficiently integrate all the components of risk on a **\*portfolio** basis as well as to effectively operate in complex **\*markets**
- while serving **\*customers** as well as satisfying **\*regulators** is a direct function of the quality of the policies, methodologies and infrastructure

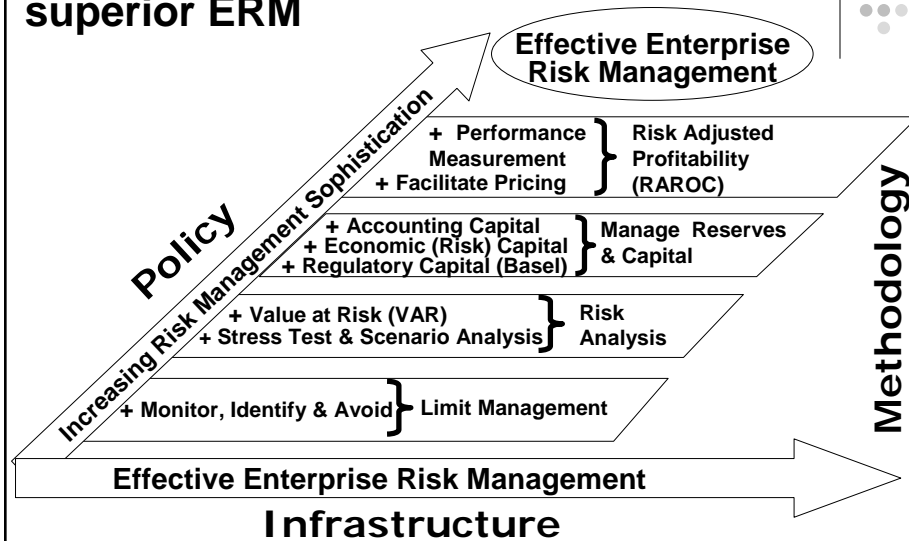
**\*Regulators**  
**Rating Agencies**  
**Equity Analysts**



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A key challenge is to implement an Integrated Risk approach to enable superior ERM



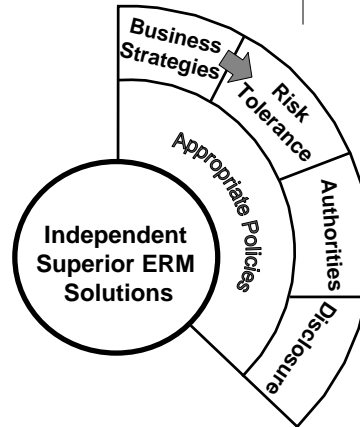
Example: An Integrated Risk Data Infrastructure improves the quality and availability of data

4

## Characteristics of Policies at the Core of Superior ERM Solutions



- A key challenge is to ensure that:
- **The tolerance for risk (financial and non financial) is integrated and consistent with the Business Strategies (and visa versa)**
- **Risk measures are backtested, authorities are expressed in meaningful terms and reflect a desired tolerance for risk**
- **Risk is properly disclosed (e.g. a hit parade of risks) internally and externally on a drill down and integrated portfolio management \* basis**



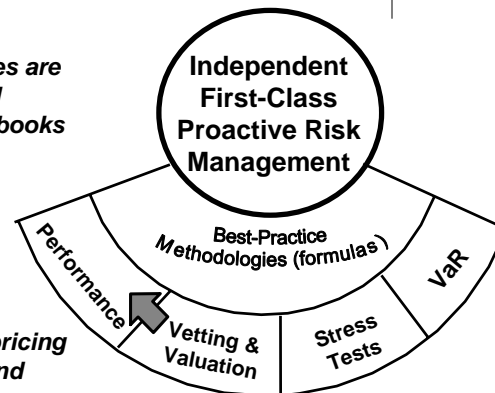
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## Characteristics of Methodologies at the Core of Superior ERM Solutions



- A key challenge is to ensure that :
- **VaR and Stress Test methodologies are predictive of the actual losses and integrated across all risks and all books of business**
- **Mathematical models are properly vetted.**
- **Positions are properly valued**
- **Risk methodologies are tied into pricing and performance measurement (and becomes a bigger deal with SOX).**



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A key challenge is to harmonize the use of economic capital with the Basel driven regulatory capital (which is based on Merton's Model)



Model based on the option pricing approach to credit risk as originated by Merton (1974).

The firm's asset value,  $V_t$ , follows a standard geometric Brownian motion, i.e.:

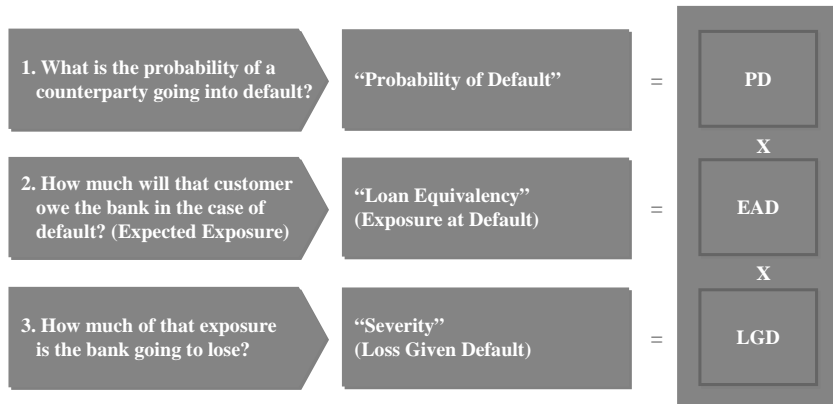
$$V_t = V_0 \exp \left\{ \left( \mu - \frac{\sigma^2}{2} \right) t + \sigma \sqrt{t} Z_t \right\}$$

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## IRB

- A key challenge is to pass the use test, e.g. to utilize PD, EAD and LGD to predict Expected Loss (EL)

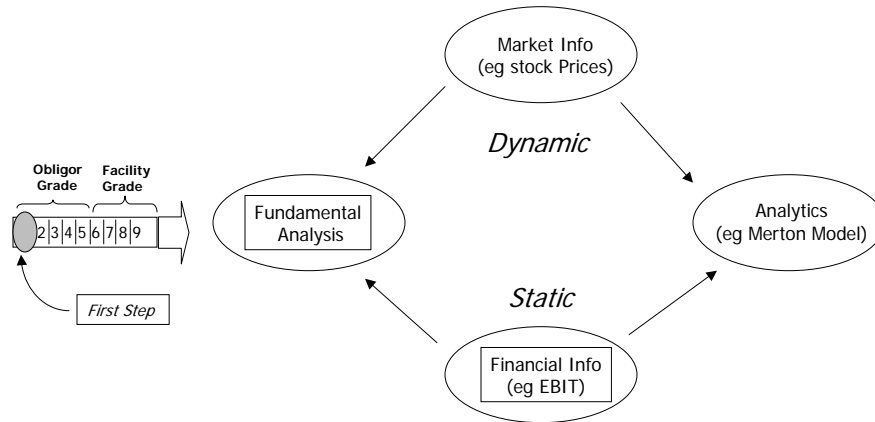


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# IRB

- A key challenge is to collect all the necessary information to support the Credit Risk Analysis Process necessary to satisfy Basel II.
- A key challenge is to consistently perform the Financial Analysis as part of the first step of a complex process to arrive at a credit grade.



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# Example : A key challenge is to construct benchmark financial ratios for the internal rating system (ex utilizing XBRL)

U.S. industrial long-term debt		AAA	AA	A	BBB	BB	B
<b>Period 1 medians</b>							
1.	EBIT interest coverage (x)	16.05	11.06	6.26	4.11	2.27	1.18
2.	EBITDA interest coverage (x)	20.3	14.94	8.51	6.03	3.63	2.27
3.	Funds from operations/total debt (%)	116.4	72.3	47.5	34.7	18.4	10.9
4.	Free operating cashflow/total debt (%)	76.8	30.5	18.8	8.4	2.4	1.2
5.	Pretax return on capital (%)	31.5	23.6	19.5	15.1	11.9	9.1
6.	Operating income/sales (%)	24.0	19.2	16.1	15.4	15.1	12.6
7.	Long-term debt/capital (%)	13.4	21.9	32.7	43.4	53.9	65.9
8.	Total debt/capitalization (%)	23.6	29.7	38.7	46.8	55.8	68.
<b>U.S. industrial long-term debt</b>							
<b>Period 2 medians</b>							
1.	EBIT interest coverage b(x)	13.5	9.67	5.76	3.94	2.14	1.17
2.	EBITDA interest coverage (x)	17.08	12.8	8.18	6.0	3.49	2.16
3.	Funds from operations/total debt (%)	98.2	69.1	45.5	33.3	17.7	12.8
4.	Free operating cashflow/total debt (%)	60.0	26.8	20.9	7.2	1.4	(0.9)
5.	Pretax return on capital (%)	29.3	21.4	19.1	13.9	12.0	9.0
6.	Operating income/sales (%)	22.6	17.8	15.7	13.5	13.5	12.3
7.	Long-term debt/capital (%)	13.3	21.1	31.6	42.7	55.6	65.5
8.	Total debt/capitalization (%)	25.9	33.6	39.7	47.8	59.4	69.5
<b>U.S. industrial long-term debt</b>							
<b>period 3 medians</b>							
1.	EBIT interest coverage (x)	17.99	9.74	5.35	2.91	2.09	1.01
2.	EBITDA interest coverage (x)	22.63	12.82	8.0	4.82	3.5	1.9
3.	Funds from operations/total debt (%)	97.5	68.5	43.8	29.9	17.1	9.9
4.	Free operating cashflow/total debt (%)	51.0	29.7	20.2	6.2	3.4	1.1
5.	Pretax return on capital (%)	28.2	20.6	16.7	12.7	11.6	8.3
6.	Operating income/sales (%)	22.0	17.7	15.2	13.2	13.6	11.6
7.	Long-term debt/capital (%)	13.2	19.7	33.2	44.8	54.7	65.9
8.	Total debt/capitalization (%)	25.4	32.4	39.7	49.5	60.1	73.4

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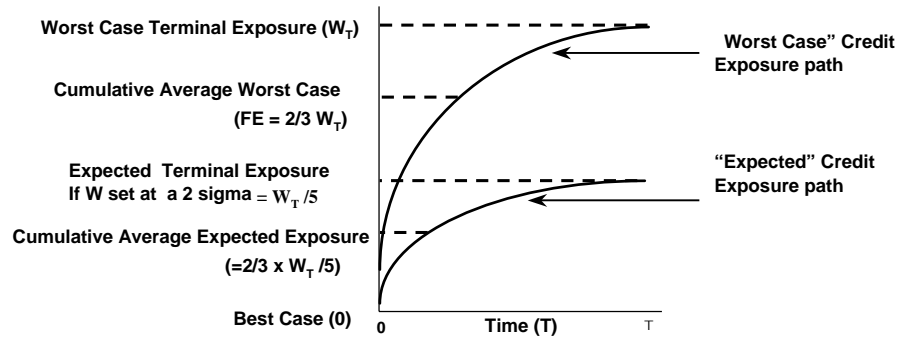
EBIT refers to earnings before interest and taxes  
EBITDA refers to earnings before interest, taxes, depreciation, and amortization

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## A key challenge is to integrate trading credit risk exposure with credit risk banking book exposure



- Ex: Credit Limit exposure for derivatives is typically measured through using a single Worst Case (W) or 2/3 W exposure and then combining it with credit risk limits in the banking book against the same obligor



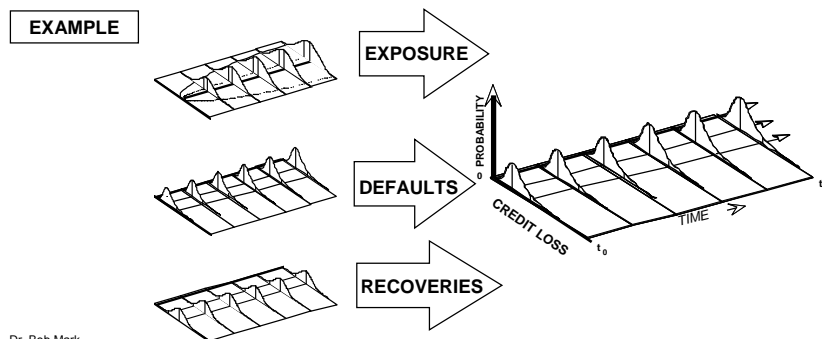
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## ...as well as to translate the credit exposures analytics into credit loss analytics



- The term structure of PD's (from the obligor rating) and RR's (from the facility rating) is typically applied to the sum of direct credits in the banking book plus derivative exposure calculations in Trading Book



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## A key challenge is to price and mitigate operational risk



1. Internal Fraud
2. External Fraud
3. Employment Practices and Workplace Safety
4. Clients, Products & Business Practices
5. Damage to Physical Assets
6. Business Disruption and System Failures
7. Execution, Delivery & Process Management

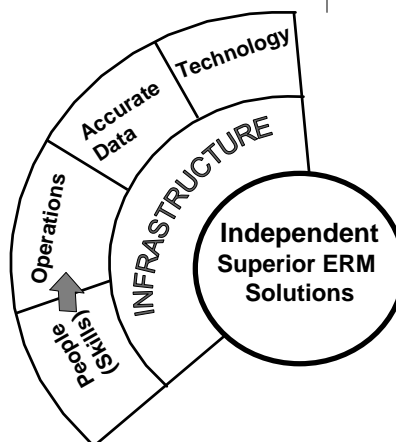
Note: Level 2 and level 3 of Basel are shown in the appendix

## Infrastructure

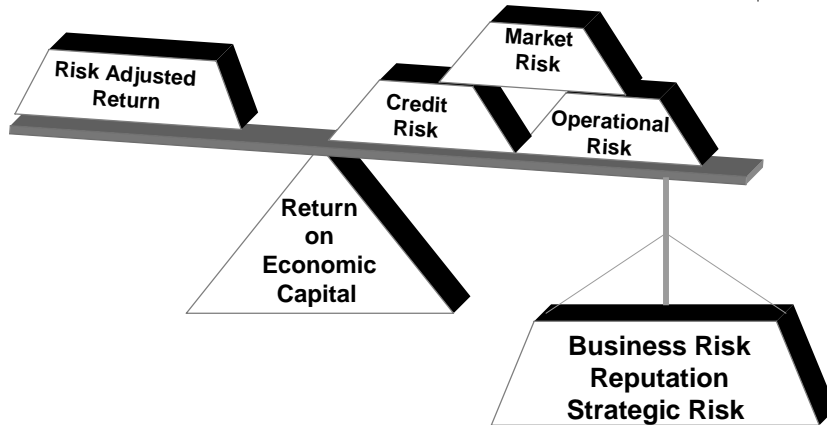
### Key Characteristics at the Core of Superior Risk Solutions



- *The appropriate people in place with the right skills*
- *An integrated risk operational infrastructure which incorporates and replaces many of the mid office functions (e.g. valuing deals)*
- *An integrated risk data infrastructure*
- *Near real time access to data (e.g. market data, transaction data, legal data, etc)*



A key challenge is ensure that the RAROC calculation widely used to examine the balance of Risk and Return includes all the appropriate factors



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A key challenge is to perform a Risk Information Maturity Assessment (Dimensional Relationships)



**Risk Policies**

- Tolerance
- Authorities
- Monitor
- Disclosure
- Communication Management
- Risk Methodologies
- Value at Risk
- Stress Testing
- Vetting
- Price Valuation
- Customer Valuation
- Risk Based Pricing
- Regulatory Capital Management
- Economic Capital Management
- Performance Measurement
- Integrated Measurement (ERM)

- Risk Operational Data Infrastructure
- Access to Data
- Availability
- Freshness
- Auditability /Traceability
- Granularity
- Integration

- Risk Management Data Infrastructure
- Data Architecture
- Master Data Management
- Metadata
- Relationship/Affiliated Views
- Privacy
- Security
- Reconciliation

- Risk Information Management
- Risk Requirements
- Funding Risk Initiatives
- Prioritization of Risk Initiatives
- Funding Maintenance Model
- Mitigation /Value Measurement
- Service Level Agreements
- Managing Risk BI Requirements

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Performing a Risk Information Maturity Assessment can facilitate the ability to implement superior Risk Policies (eg Authorities)



Risk Operational Data Infrastructure	Risk Policy: Authorities (Limits)					
	Inadequate	Basic	Acceptable	Satisfactory	Progressive	Superior
Access to Data						
Data Availability						
Data Freshness						
Auditability/ Traceability						
Data Granularity						
Data Integration						

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Performing a Risk Information Maturity Assessment can facilitate the ability to implement superior Risk Methodologies (eg Economic capital)

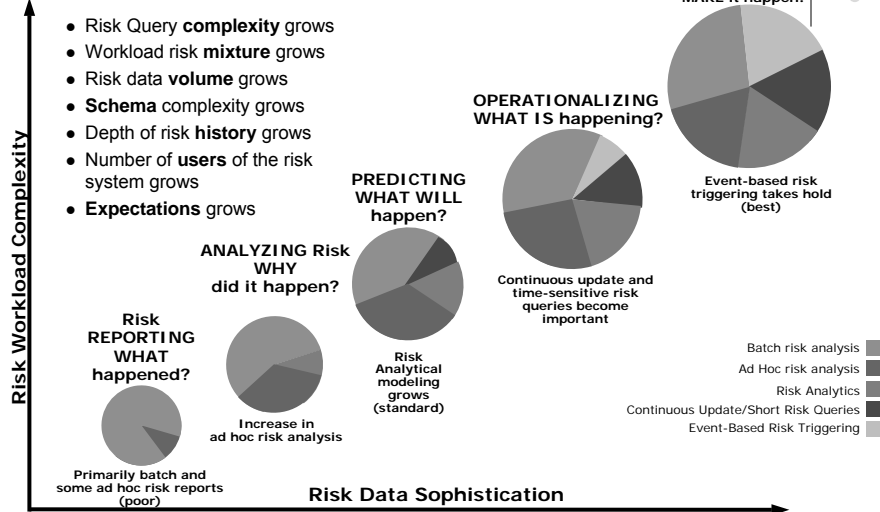


Risk Operational Data Infrastructure	Risk Methodology: Economic Capital					
	Inadequate	Basic	Acceptable	Satisfactory	Progressive	Superior
Access to Data						
Data Availability						
Data Freshness						
Auditability/ Traceability						
Data Granularity						
Data Integration						

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# A key challenge is to Provide a Single Integrated View of the Business to enable Better, Faster Risk Decisions



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# Credit Risk Management

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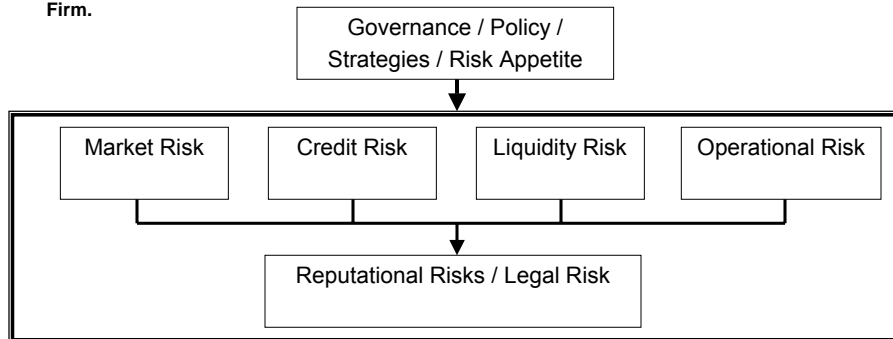
# Risk Management Policy & Strategies



**Risk Management can be defined as a systematic approach that intends to provide a degree of protection to an institution's risk and creates a more acceptable Risk Profile. There are several components to financial risk, including:**

- Credit risk
- Market risk
- Liquidity risk
- Operational risk
- Legal/Compliance risk
- Settlement risk

**A weakness in any of these components can potentially result in reputational risk to the Firm.**



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# Credit Risk Today

## Relaxation of Credit Discipline



- Approving loans/obligations based on a very optimistic assessment of a borrower's operating prospects or on the assumption a borrower will always have ready access to financial markets.
- Failing to perform meaningful stress tests-or, if performed, to take such tests adequately into account-of a borrower's ability to withstand events such as unexpected shocks to operating revenue
- Weakening internal controls critical to maintaining the rigor and discipline of lending decisions.

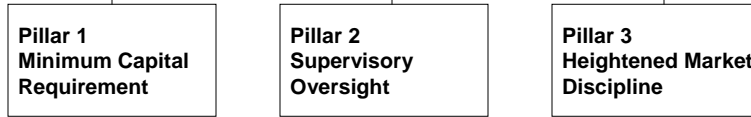
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# Objectives for Revisions to the Basel Accord



Advance a “three-pillar” approach



Develop a measure of capital that is:

- more risk sensitive than the current approach
- better suited to complex activities of internationally – active banks
- capable of adapting to market and product evolution

- Encourage improvements in risk management and enhance internal assessments of capital adequacy
- Incorporate operational risk component into the capital charge (to correspond with the unbundling of credit risk)
- Heighten market discipline through enhanced disclosure

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# Basel II vs. Solvency II



**Basel II has three sets of requirements:**

- > **Pillar I** – minimum capital requirements: standard approach aimed at small unsophisticated banks, and internal ratings based (IRB) approach for sophisticated banks, which allows the use of internal models
- > **Pillar I** tends to focus on credit risk. (i.e., PD&LGD)
- > **Pillar II** – supervisory review process. Pillar II also considers operational risk and interest rate risk.
- > **Pillar III** – market discipline.

**Solvency II likely to contain three sets of requirements- analogous to the similarity structured Basel II.**

- > **Pillar I** – Quantitative Pillar: Concerned with elements of insurance risk that can be measured and managed quantitatively (i.e. measurement and valuation of assets and liabilities as well as the calculation of capital required to meet risks that can be measured quantitatively.)
- > **Pillar II** – Quantitative Pillar: Supervisory Review: includes assessment of risk not accounted for under Pillar I – Operational Risk, Model Risk, Asset Management, Asset/Liability Matching, and Governance and Risk Management.
- > **Pillar III** – Disclosure. Although still considered in the early stages of development, this pillar aims to reinforce market discipline and risk-based supervision.

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# Economic Capital vs. Regulatory Capital

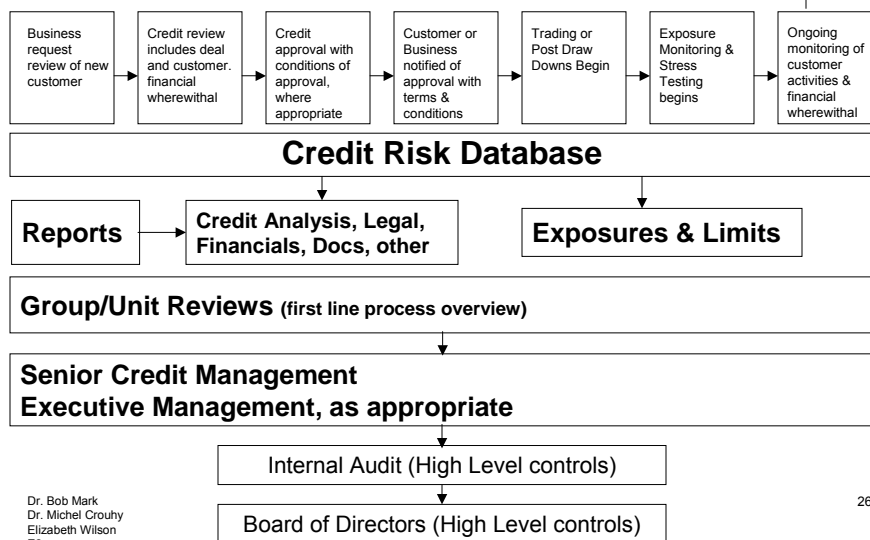


Risk Type	Description	Basel I (Current Regulatory Capital)	Basel II (Proposed Rule)	Economic Capital
Credit Risk	Loss due to a borrower's inability to meet it's financial obligations	√	√	√
	Loss due to change in borrower's credit quality		√	√
Market Risk	Loss due to change in market value of traded positions (primarily interest rate risk)	√	√	√
	Loss due to impact of changes in cost to close accrual positions (primarily interest rate risk)			√
Operational Risk	Loss resulting from inadequate or failed internal process, people and systems, or from external events. The definition includes legal risk. The definition does not include strategic or reputational risks.		√	√

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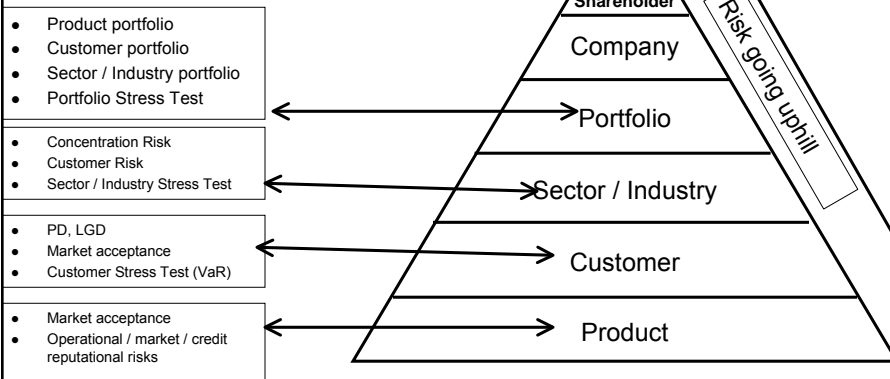
# Overview of Credit Risk Processes and Controls



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# Credit Risk Profile



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## I. Credit Portfolio Management A New Paradigm: “Underwrite & Distribute”



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## Bank Loan Portfolios



- Banks originate and hold loan exposures that are a function of their geography and industry expertise. As a result, they **hold concentrated credit risk**.
- Credit portfolios have become increasingly more concentrated in less creditworthy obligors. This situation has made banks more vulnerable in economic downturns (2001-2002):
  - Disintermediation of banks that started in the 70s continues today: IG firms are less likely to borrow from banks
  - Regulatory rules incent banks to extend credit to lower-credit quality obligors.

## Transformation of Credit Business



### A New “Securities” Model For Credit

- **Change:**

ORIGINATE &  
HOLD            UNDERWRITE &  
DISTRIBUTE

- **Increase balance sheet turnover**

# Changes in the Approach to Credit

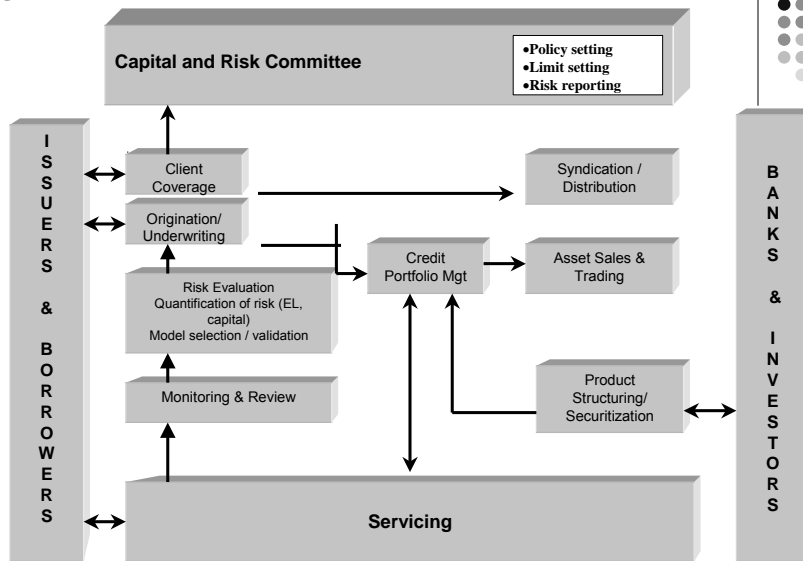


	Traditional Credit Function	Portfolio-Based Approach
Investment strategy	Originate and Hold	Underwrite and Distribute
Ownership of the credit assets	Business Unit	Portfolio Management or Business Unit / Portfolio Mgmt
Risk Measurement	Use notional value of the loan	Use risk based capital
	Model only losses due to default	Model losses due to default and risk migration (MTM)
Risk Management	Use a binary approval process at origination	Apply risk return decision making process
Basis for compensation for loan origination	Volume	Risk-Adjusted Performance
Pricing	Grid	Risk Contribution

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# Originate to Sell Model



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## Credit Portfolio Management



### Credit Portfolio Group

Credit Portfolio  
Management

Counterparty  
Exposure  
Management

Credit Portfolio  
Solutions

- Increases the velocity of capital
  - Reduces concentration and event risk
  - Increase return on economic capital
  - Responsible for financials, but not a profit center
- 
- Hedges and trades retained Credit Portfolio
  - Houses “public-side” Research Analysts, Portfolio Managers, Traders
- 
- Manages counterparty risk of derivatives exposures
- 
- Provides advice to originators on structuring and credit risk mitigation

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## Four Primary Portfolio Actions

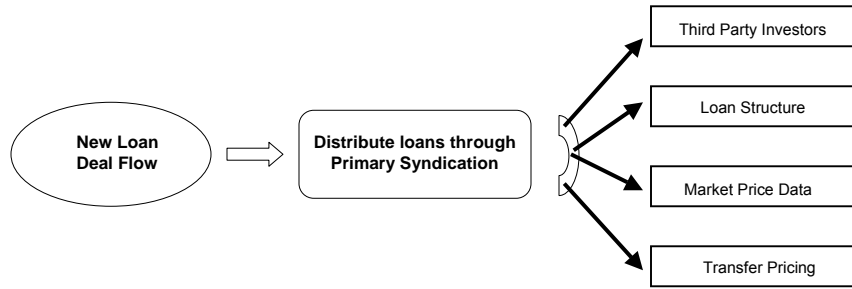


- Distribute loans through primary syndication to desired hold level
- Reduce loan exposures by selling down or hedging concentrated loan positions with credit default swaps
- Focus first on high risk obligors, particularly those that are leveraged in market value terms and experience high volatility of returns
- Simultaneously, sell or hedge low risk, low return loan assets

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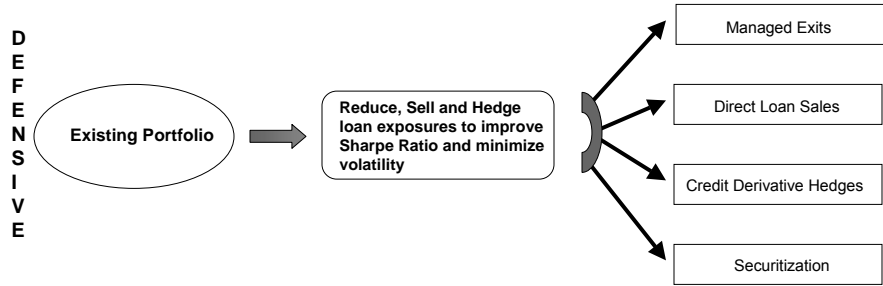
# Primary Syndication



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# Once You Own The Loan



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## Offensive Credit Portfolio Strategies



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## Adopting Credit Asset Management Strategies



**Portfolio Strategies that focus on adding credit exposures are Emerging within banks in two ways:**

### **Credit Asset Management**

- Designing cash and synthetic portfolios of credit risk purchased and managed on a leveraged and unlevered basis with access to all credit asset classes selecting best relative value investments with a long term investment horizon

### **Credit Trading / Relative Value**

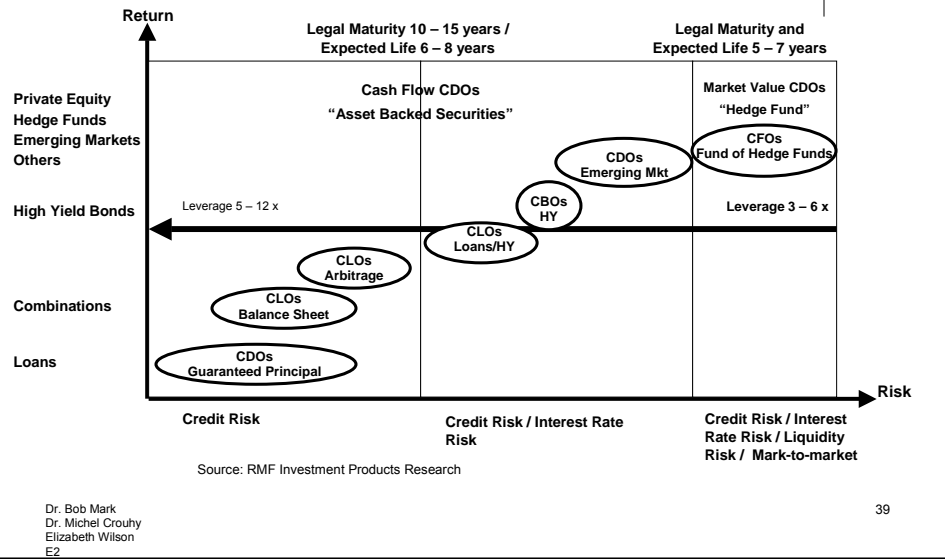
- Acquiring and trading synthetic credit portfolios by selling protection on a leveraged basis with access primarily to investment grade credit default swaps selecting the best relative value trades with a short term trading horizon

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# Credit Asset Management Strategies

## Investing In Credit (cont'd)



## II. Sourcing / Mitigating Credit Risk Using Credit Derivatives and Securitization



## What are Credit Derivatives?



**Credit derivatives are privately negotiated bilateral contracts that allow users to manage their exposure to credit:**

- Enhance yields by purchasing credit synthetically,
- Transfer an asset's risk (and return) to another counterparty without transfer of the underlying asset,
- Reduce risk concentrations in a credit portfolio,
- Access a credit exposure without actually making the loans.

**Credit derivatives allow users to isolate, price and trade firm specific credit risk by unbundling a debt instrument or a basket of instruments into its component parts and transferring risk to those best suited to manage it.**

## Types of Credit Derivatives?



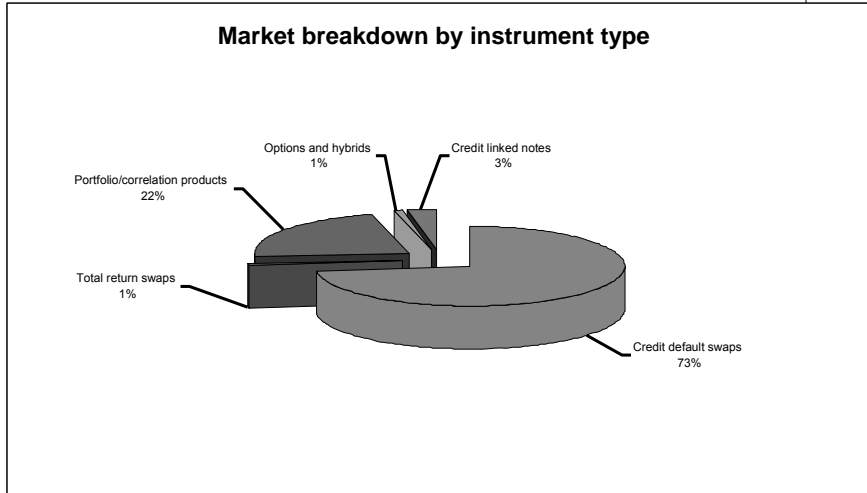
**Credit derivatives:**

- Credit Linked Notes
- Total Return Swaps
- Credit Default Puts
- Credit Spread Options

**vs. traditional mechanisms to mitigate credit risk:**

- Refusal to make a loan
- Insurance products
- Guarantees
- Letters of credit

# Types of Credit Derivatives



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# End-User Applications of Credit Derivatives



End-user applications of credit derivatives	
<b>Investors</b>	<ul style="list-style-type: none"> <li>• Access to previously unavailable markets (e.g. loans, foreign credits, and emerging markets)</li> <li>• Unbundling of credit and market risks</li> <li>• Borrow the bank's balance sheet as the investor doesn't have to fund the position, and also avoids the cost of servicing the loan</li> <li>• Yield enhancement with or without leverage</li> <li>• Reduction in sovereign risk of asset portfolios</li> </ul>
<b>Banks</b>	<ul style="list-style-type: none"> <li>• Reduce credit concentrations</li> <li>• Manage the risk profile of the loan portfolio</li> </ul>
<b>Corporations</b>	<ul style="list-style-type: none"> <li>• Hedging trade receivables</li> <li>• Reducing over exposure to customer/supplier credit risk</li> <li>• Hedging sovereign credit-related project risk</li> </ul>

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## Questions



“Risk Management” introduces and explores the latest financial and hedging techniques in use around the world, and provides the foundation for creating an integrated, consistent, and effective risk management strategy.

The tested and comprehensive analyses and insights in “Risk Management” provide the necessary information for:

- \* Risk Management Overview-- From the history of risk management to the new regulatory and trading environment, a look at risk management past and present
- \* Risk Management Program Design-- Techniques to organize the risk management function, and design a system to cover your organization’s many risk exposures
- \* Risk Management Implementation-- How to use the myriad systems and products, value at risk (VaR), stress-testing, derivatives, and more for measuring and hedging risk in today’s marketplace

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## Biographies

- **Dr. Robert M. Mark** is the Chief Executive Officer of Black Diamond which provides corporate governance, risk management consulting and transaction services. He serves on several Boards. He also serves on Checkpoint’s Investment Committee. In 1998, he was awarded the Financial Risk Manager of the Year by the Global Association of Risk Professionals (GARP). He is on the board and is the Chairperson of The Professional Risk Managers’ International Association’s (PRMIA) Blue Ribbon Panel
- Prior to his current position, he was the Senior Executive Vice-President and Chief Risk Officer (CRO) at the Canadian Imperial Bank of Commerce (CIBC). Dr. Mark was a member of the Management Committee. Dr. Mark’s global responsibility covered all credit, market and operating risks for all of CIBC as well as for its subsidiaries.
- Prior to his CRO position, he was the Corporate Treasurer at CIBC. Prior to CIBC, he was the partner in charge of the Financial Risk Management Consulting practice at Coopers & Lybrand (C&L). The Risk Management Practice and C&L advised clients on risk management issues and was directed toward financial institutions and multi-national corporations. This specialty area also coordinated the delivery of the firm’s accounting, tax, control, and litigation services to provide clients with integrated and comprehensive risk management solutions and opportunities.
- Prior to his position at C&L, he was a managing director in the Asia, Europe, and Capital Markets Group (AECM) at Chemical Bank. His responsibilities within AECM encompassed risk management, asset/liability management, research (quantitative analysis), strategic planning and analytical systems. He served on the Senior Credit Committee of the Bank. Before he joined Chemical Bank, he was a senior officer at Martine Midland Bank/Hong Kong Shanghai Bank (HKSB) where he headed the technical analysis trading group within the Capital Markets Sector.
- He earned his Ph.D., with a dissertation in options pricing, from New York University’s Graduate School of Engineering and Science, graduating first in his class. Subsequently, he received an Advanced Professional Certificate (APC) in accounting from NYU’s Stern Graduate School of Business, and is a graduate of the Harvard Business School Advanced Management Program. He is an Adjunct Professor and co-author of “Risk Management” (McGraw-Hill), published in October 2000 and the “Essentials of Risk Management” in December 2005 (McGraw-Hill). He also served on the board of ISDA as well as the Chairperson of the National Asset/Liability Management Association (NALMA).
- **Dr. Michel Crouhy** is Head of Research and Development and Financial Engineering at IXIS Corporate and Investment Bank (Groupe Caisse d’Epargne). He has the bankwide oversight on all quantitative research and the development of new products and applications supporting the trading and structuring businesses. Formerly he was Senior Vice President, Business Analytic Solutions, in the Treasury Balance Sheet and Risk Management Division, at CIBC (Canadian Imperial Bank of Commerce). His responsibilities included the approval of all pricing, balance sheet, risk and capital related models, the development of risk measurement methodologies and models for market, credit (corporate and retail) and economic capital attribution, as well as customer behavior analytics.
- He is a member of The Professional Risk Managers’ International Association’s (PRMIA) Blue Ribbon Panel, and of the International Association of Financial Engineers (IAFE).
- Prior to his current position at CIBC, Michel Crouhy was a Professor of Finance at the HEC School of Management in Paris, where he was also Director of the M.S. HEC in International Finance. He has been a visiting professor at the Wharton School and at UCLA. Dr. Crouhy holds a Ph.D from the Wharton School and is Doctoris Honoris Causa from the University of Montreal.
- He is co-author of “Risk Management” (McGraw-Hill), “The Essentials of Risk Management” (forthcoming – McGraw-Hill) and has published extensively in academic journals in the areas of banking, options, risk management and financial markets. He is also Associate Editor of the Journal of Derivatives, the Journal of Credit Risk, the Journal of Banking and Finance, Asia-Pacific Financial Markets, the Journal of Operational Risk and is on the editorial board of the Journal of Risk.
- **Elizabeth Wilson** is a First Vice President and Senior Credit Risk Manager for Washington Mutual Bank, and WaMu Capital Corp., a financial services company that provides a diversified line of products and services to consumers and small to mid-size businesses. WaMu Capital Corp. is a registered broker dealer, member of the NASD and SIPC, and a wholly owned subsidiary of Washington Mutual Bank.
- As a Senior Credit Risk Manager focused on capital markets risk management, Elizabeth provides leadership for the development and strategic direction of the counterparty risk management team. Prior to joining Washington Mutual Bank, Elizabeth spent 8 years at both Charles Schwab & Co. and Bank of America in various capital markets risk management positions. Elizabeth started her career as a Federal Bank Examiner for the Federal Reserve Bank of San Francisco. In total, Elizabeth brings over 16 years of active risk management practices to the table.

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