

Towards an Integrated Risk Management Framework utilizing a Process Approach

ERM 2005 Symposium: Chicago USA

2-3 May 2005

Presenter: Pieter G. Vosloo, PhD

pg.vosloo@telkomsa.net



Agenda

- ✘ Risk and strategy process need to be aligned
- ✘ Realities confronting managers
- ✘ Key management challenges
- ✘ Account Life Cycle
- ✘ System Dynamics and perspectives
- ✘ Complexity of the risk environment
- ✘ Different management philosophy
- ✘ Research contribution and value
- ✘ Business Health Forum
- ✘ Conclusion

● Basel II propagates alignment between risk and strategy process...

Board and senior management oversight

728 ".....responsible for ensuring that the formality and sophistication of the risk management processes are appropriate in light of the risk profile **and business plan.**"

729 "The analysis of a bank's current and future capital requirements in relation to its **strategic objectives is a vital element of the strategic planning process.** The strategic plan should clearly outline the bank's capital needs, anticipated capital expenditures, desirable capital level, and external capital sources. Senior management and the board should view **capital planning as a crucial element in being able to achieve its desired strategic objectives**"

International Convergence of Capital Measurement and Capital Standards - June 2004:BIS

● Dynamic Environment poses Specific Realities

- ✘ Only environmental constant is "change"
- ✘ BII implementation directed at data, system & model development
- ✘ Application of model outcomes as management tool in decision making not a key focus area
- ✘ Good corporate governance requires 'hands-on' involvement in oversight and responsibility (alignment between strategy, risk and business objectives)

Specific Realities lead to Key Challenges

- ✦ Ad hoc decisions are part of day-to-day business
 - Should be within acceptable risk management principles
 - Should contribute in the execution of the strategic business plan

Specific Realities lead to Key Challenges

- ✦ Executives need to keep their eye on ALL the balls
 - Specific value drivers need to be managed simultaneously to ensure success – e.g. from a credit risk perspective
 - Earnings perspective (Liquidity – Cash flow impact “cash is king”)
 - Value perspective (AC133, IAS39, FASD133 – Impact of ALCO and risks on the value of the business - measured by the fair value of the book)
 - Need to align strategy, business objectives, and risk management to strategic objectives and direction
- ✦ Requires a generic approach from a management perspective

● Risk environment highly complex e.g. credit risk management

✦ Need to map the account life cycle to illustrate complexity

- High managerial involvement as risk increases
- Differences in requirements at various stages
- Client sophistication and market strategy high importance in segmentation issues
- Differentiation broader than regulatory and statutory impediments
- Data, systems and deliverables need to address the life cycle in total (end-to-end)

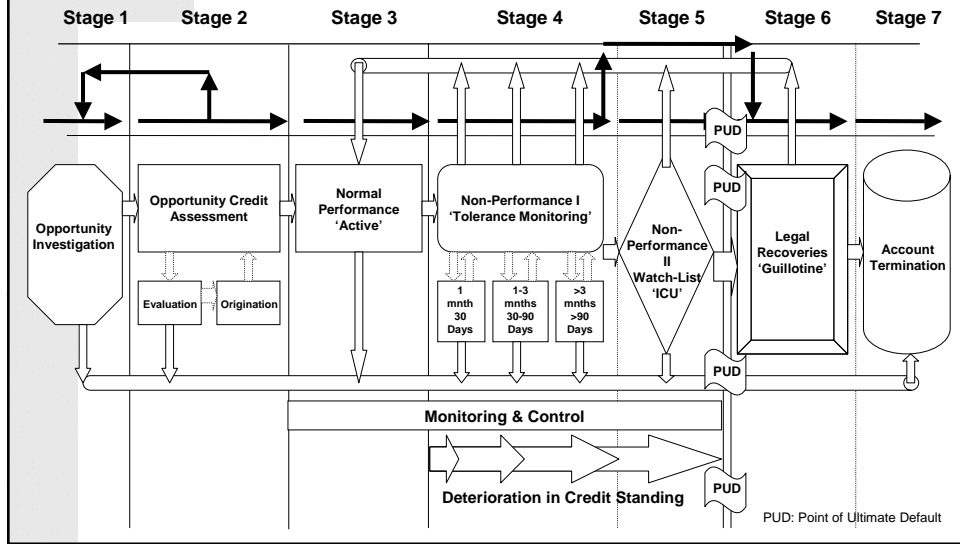
● Risk environment highly complex e.g. credit risk management

✦ Roll-up bottom-up into different credit risk dimensions

- Micro Portfolio Management
 - Specific risk discipline e.g. credit
 - Pro-active PRM
 - Active PRM
 - Diversification/ Concentration Management
- Macro Portfolio Management
 - Diversification total risks (all disciplines)
 - Capital Allocation/ calculation
 - Reactive PRM

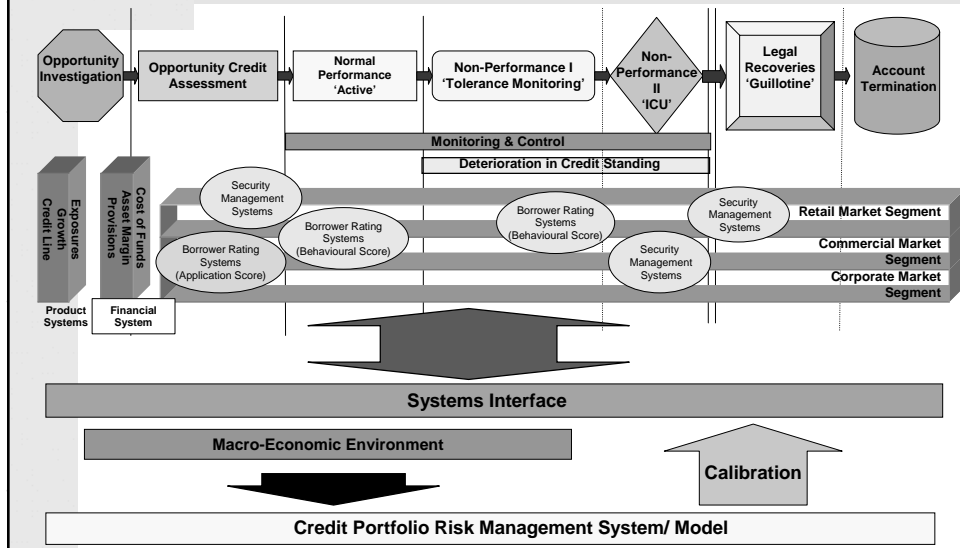
Account Life Cycle and System Dynamics

Credit Risk Management remains a critical component of any account during its life cycle



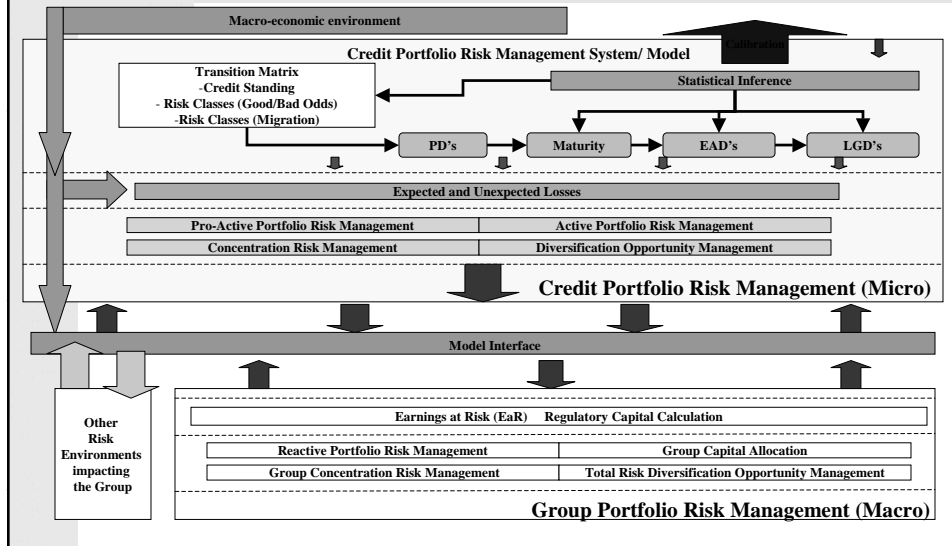
Account Life Cycle and System Dynamics

The credit risk systems and technology enable a more objective and scientific approach to credit risk management, although complexity increases



Account Life Cycle and System Dynamics

Micro and Macro Dimensions to Portfolio Management – Challenge lies in Integration



Complexity demands a different management philosophy..

Complexity manifests in:

- System, data and segmentation requirements
- Management abilities in account management process involvement
- Operating dynamics of constant change
- Client interpersonal dynamics and realities
- Portfolio impact of decisions
- Different business operating models and environments and support functions

● Complexity demands a different management philosophy..

✦ Lending portfolio not = Equity Portfolio

- Not restricted to cross correlations, diversification, calculations and model developments (large 'soft issue' component)
- Focusing on quantitative models and requirements without accepting the realities imposed by the customer dynamics (reason for existence) – negative impact on shareholder value

● Research contribution and value...

✦ Table methodology to:

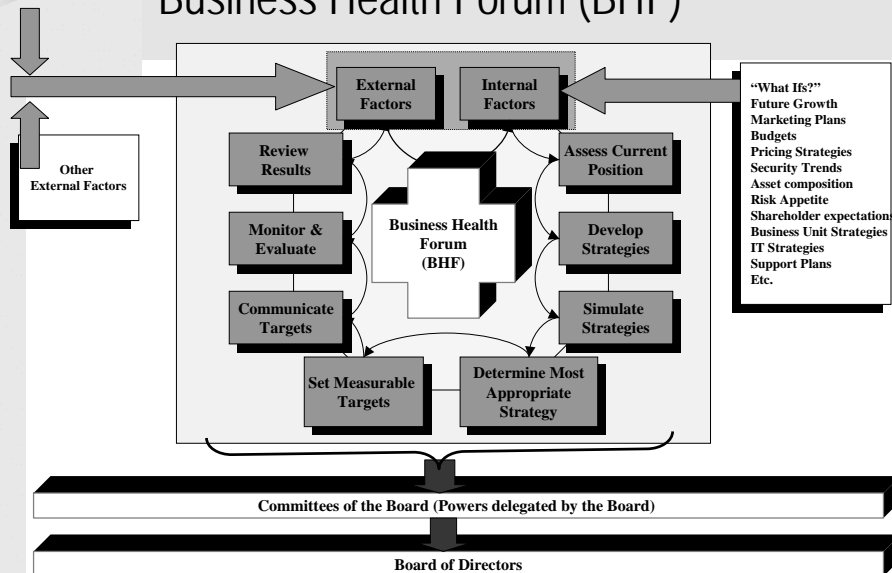
- Affect a new management philosophy i.e. the changeover between business, risk and strategy formulation;
- Incorporate risk intent into strategic management;
- Relate strategic objectives and capital requirements in the strategic planning process;
- Contribute towards good corporate governance practices and board/ management oversight


Research contribution and value...

Methodology's value obtained in the implementation of a Business Health Forum (BHF)

- Accommodate and align internal and external environments in the business entity
- Ensures an integrated approach to Enterprise Risk Management

Business Health Forum (BHF)





Conclusion

- ✘ Risk Management should not be restricted to the quantification of risk (quantitative analyses and model development)
- ✘ Broader multi dimensional impact of objectives and management activities should be recognized
- ✘ Complexity demands a dynamic solution
- ✘ BHF creates vehicle for alignment between risk, strategy and operations
- ✘ Process approach provides a mechanism for an integrated management philosophy in ERM

ENGLISH ABSTRACT

TOWARDS AN INTEGRATED RISK MANAGEMENT FRAMEWORK UTILIZING A PROCESS APPROACH

The operating environment in which banks conduct their business, especially the credit risk environment, underwent significant changes since the latter half of the previous decade. Developments have resulted in a bombardment of quantitative and qualitative credit risk information and data on the one hand, and on the other an absence of a clear focus and management approach and philosophy to effectively manage credit risk.

The primary objective of the research was the formulation of a process approach that could be applied in the management of credit risk of credit asset portfolios. Part of the objective was an implicit requirement that it should form the foundation from where the management of credit risk can be leveraged to exploit all the dimensions of credit risk while focussing on the maximisation of shareholder wealth.

A literature study was undertaken to determine the theoretical aspects and world best practices regarding the management of credit asset portfolios, credit risk management, the credit portfolio risk management approach and its principles. An empirical study aimed to establish the credit risk management practices being applied in the South African Banking Industry.

The process approach developed for managing credit asset portfolios incorporate the account life cycle as point of departure. This was necessary to facilitate the various processes that need to be considered for effective credit portfolio risk management. The specific data requirements, as it culminate in a credit portfolio risk management functionality, enable the credit portfolio risk management approach and principles to be applied to credit asset portfolios within the context of two perspectives to credit portfolio risk management, namely:

- The economic value perspective (also referred to as the shareholder wealth perspective) which has an *ex post* focus (after default has occurred) and which calculates the impact of credit risk on Credit RAROC or shareholder value (Impact of ALCO and risk management for example on the value of the business as measured by the fair value of the book e.g. IAS 39, FASD 133 or AC 133); and
- The earnings perspective which has an *ex ante* focus (before default occurs) and which addresses the bank's loss in income as a result of, and associated with, deterioration in credit standing (the cash flow implication to be considered when credit standing deteriorates – non-performing portion of the book).

Applying the developed process approach to credit asset portfolios, two distinctive but dependent dimensions with underlying sub-dimensions to portfolio risk management is identified namely, micro portfolio risk management and macro portfolio risk management. The former focuses on the credit asset portfolio and the latter on the group portfolio in the context of all risks impacting the organisation. The final stage in the process approach is to establish a Business Health Forum that reports to the Board appointed committees. The forum ensures an independent view of all the risks and activities of the business, including credit risk and provide a mechanism to inculcate an integrated risk management philosophy.

Adopting and applying the developed framework regarding the process approach to managing credit asset portfolios in a South African bank will assist executive management to ensure that the requirements (processes, systems, data) for effective credit portfolio risk management are met. It would also broaden the understanding regarding the interdependency between profit, sustainable growth and effective credit portfolio risk management. The utilization of a process approach as described above provides a framework towards an integrated risk management philosophy and approach. Such a framework facilitates a generic approach towards risk management as it assists management to have their eye on all the balls when conducting business.

Translating Risk Monitoring and Measurement into Decision-Making

Edward B. Dumas
Senior Vice President and Chief Risk Officer

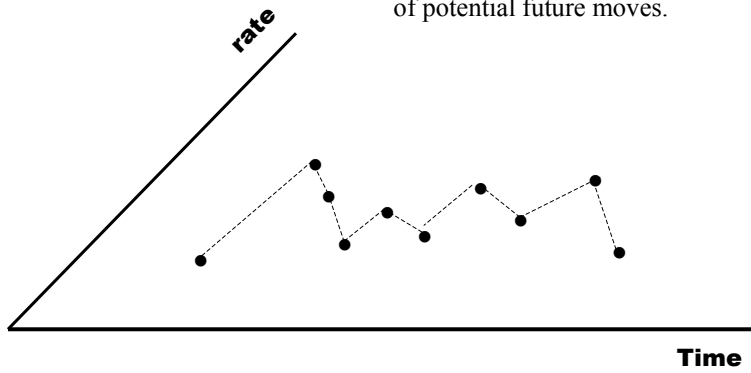
Enterprise Risk Management Symposium
May 3, 2005
Chicago, Illinois

Outline

- ♦ An approach to building metrics for measuring risks.
- ♦ Using metrics for risk measurement and performance measurement.
- ♦ Constructing efficient hedges and measuring hedge effectiveness.
- ♦ Using scenario analysis to manage during periods of market stress.

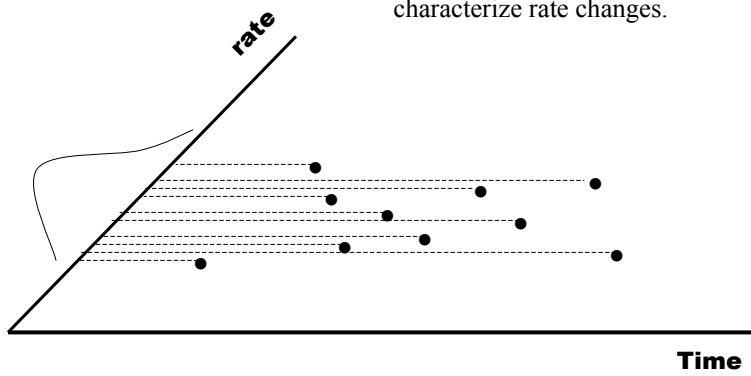
Market Risk Metrics

Modeling day-to-day rate changes allows estimate of potential future moves.

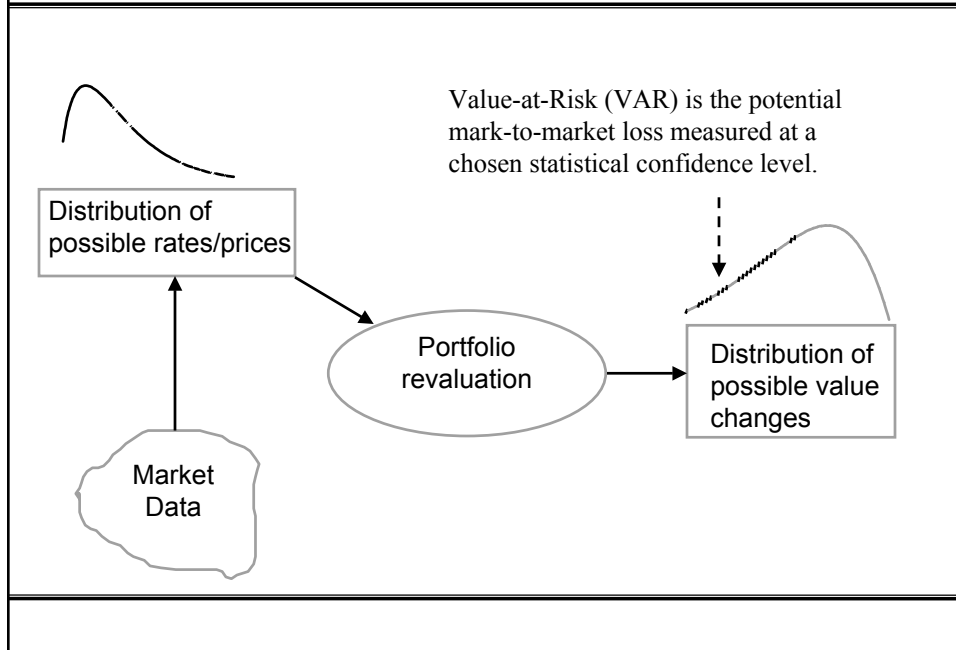


Market Risk Metrics

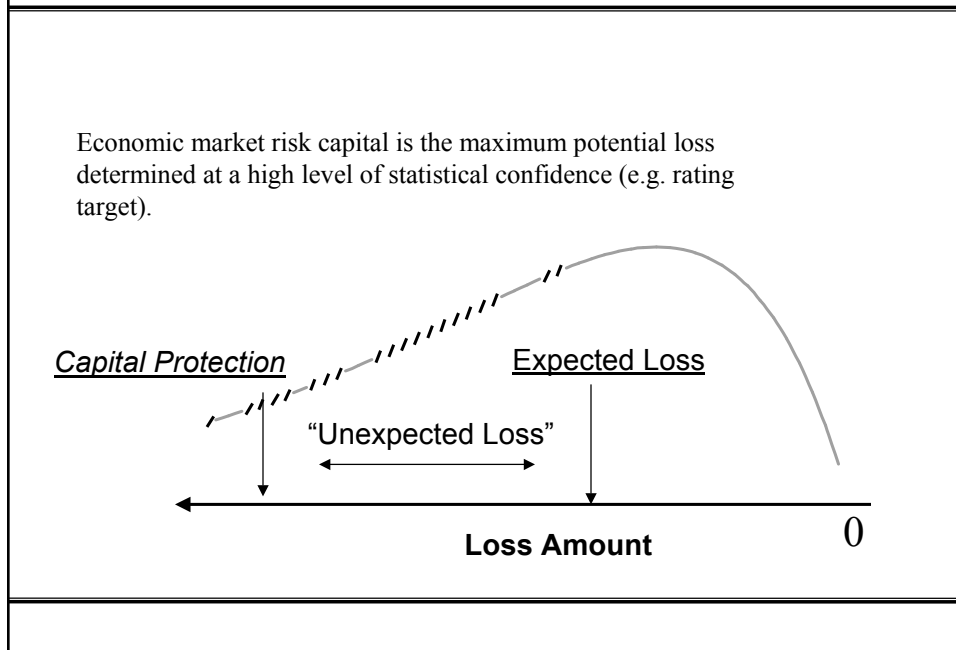
It is common to assume a stochastic process (probability distribution) to characterize rate changes.



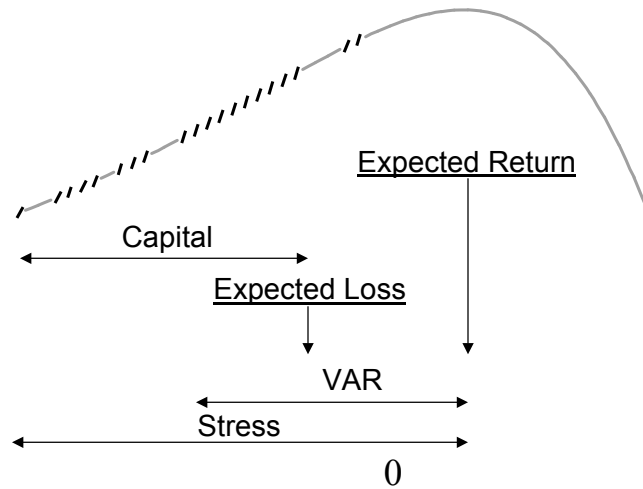
Market Risk Metrics



Market Risk Metrics



Market Risk Metrics



Credit Risk Metrics

Credit Reserves & Capital

- ◆ Credit loss distribution is determined by the integration of Credit Exposure time profile, Default process, and the Loss Given Default.
- ◆ Default process might be determined using 1-year transition probabilities (Ratings-based approach). Observed cumulative default probabilities can also be used, but results are sensitive to assumed treatment of withdrawals.
- ◆ Loss given default amounts can be inferred from historical recovery data. These values typically depend on counterparty credit quality and seniority/collateral. They might also be cycle-adjusted to be consistent with default scenarios.
- ◆ Credit Reserve is the expected value of the Credit loss distribution.
- ◆ Economic Credit capital is the maximum potential loss chosen according to the firm's risk appetite.

Performance Measurement

Return on Economic Capital

- ◆ Return equals the revenue net of expenses divided by the risk-adjusted capital

$$\text{Return} = \frac{\text{Revenue} - (\text{Credit Reserve} + \text{Administrative Costs} + \text{Other Expenses})}{\text{Credit Capital} + \text{Market Risk Capital}}$$

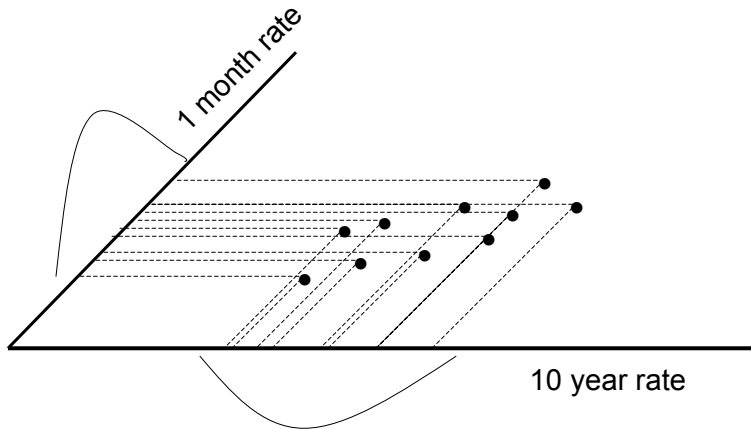
- ◆ Values in the numerator should be converted to “annuity-equivalent” amounts to be consistent with the capital in the denominator (since capital is allocated throughout the life of the transaction).
- ◆ If transactions are perfectly hedged then market risk capital is zero, leaving only capital for credit risk.
- ◆ Credit capital and Market risk capital might not be strictly additive, in the event of dependencies between Credit risk and Market risk.

Hedging

Hedging

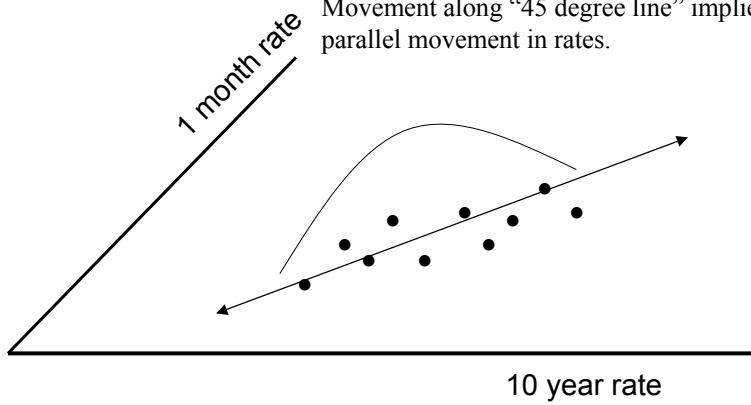
- ◆ Common to construct hedge ratio using DV01 but this does not capture nonparallel shifts nor the likelihood of a shift.
- ◆ Better to evaluate marginal Value-at-Risk (VAR) impact to determine hedge instrument(s) and optimal ratios.
- ◆ REASON: Hedge would be more likely to reduced economic capital charge resulting in larger increase to business performance measurement.

Choosing Scenarios



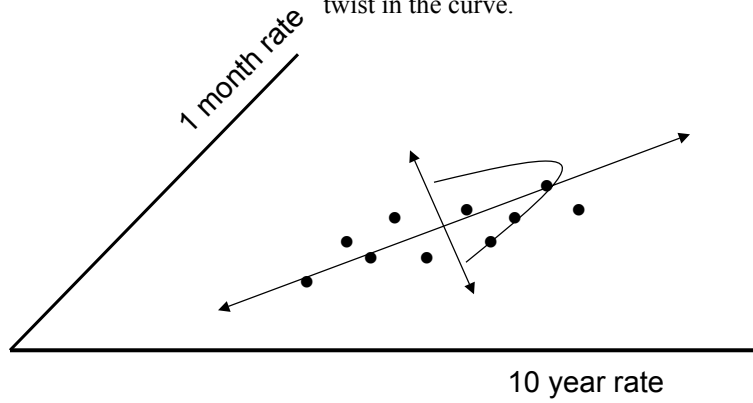
Choosing Scenarios

1st PRINCIPAL COMPONENT is linear combination which maximizes capture of variability.
Movement along “45 degree line” implies parallel movement in rates.



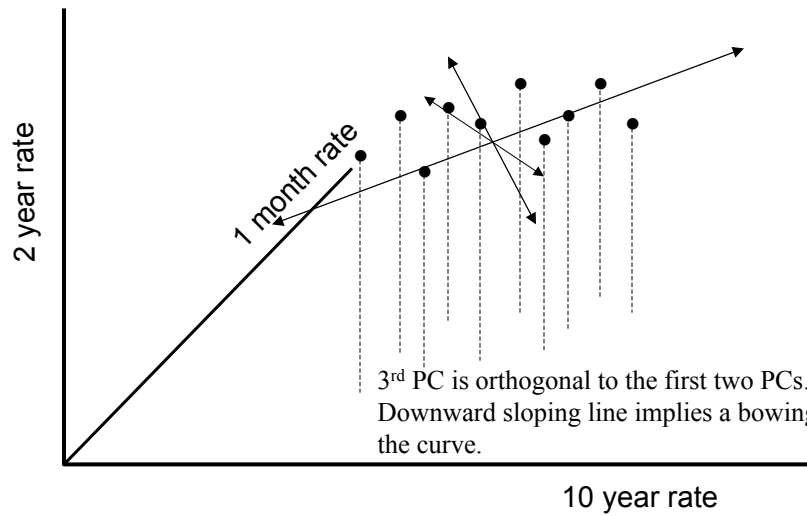
Choosing Scenarios

2nd PC is linear combination which maximizes capture of remaining variability orthogonal to the 1st PC. Downward sloping line implies a twist in the curve.



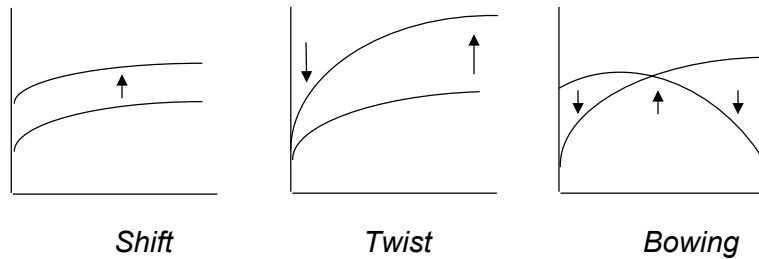
Choosing Scenarios

3rd PC is orthogonal to the first two PCs. Downward sloping line implies a bowing in the curve.



Choosing Scenarios

It is common that first 3 PCs represent shift, twist and bowing of the yield curve and capture most of the total variation in rates.



7

Choosing Scenarios

Principal Components

- ◆ PCs provide a parsimonious description of the correlation structure.
- ◆ PC analysis provides a means to filter noise in correlation estimates.
- ◆ In general, 3 principal components are sufficient to use. However, if curves are constructed with a high number of market-observed points, or if points from multiple curves are included in PC analysis, then more PCs may be necessary.
- ◆ Eigenvalues of correlation matrix represent the proportion to total variance that is due to particular PC.
- ◆ Set algorithm to dynamically select number of PCs sufficient to capture a defined percentage of total variation (e.g., 95%).

Scenario Analysis

Historical Repeat Analysis

Method: Choose a historical time period and determine impact on current positions of the hypothetical reoccurrence of the actual market changes observed for that period.

- ◆ Rate Decline Scenario: 9/6-9/20/2001
- ◆ Rate Increase Scenario: 4/24-5/8/2000
- ◆ Spread Increase Scenario: 9/6-9/20/2001
- ◆ Spread Decrease Scenario: 10/3-10/17/2003

Benefits:

Credible/Easy to understand; Correlation effects implicit.

Scenario Analysis

Structured Economic Scenarios

Method: Construct hypothetical scenario based on macroeconomic forecast and market opinion.

- ◆ Surprise Rate Hike Scenario
- ◆ Inflation Scenario
- ◆ Terror/Disaster Event Scenario
- ◆ Double-dip Recession Scenario

Benefits: Provides insights into potential impact of current concerns.

Scenario Analysis

Impact on Daily Activities

- ◆ Facilitates contingency planning and importance of alternative funding sources.
- ◆ Helps establish Stress Limits and Management Action Triggers, and Sub-limits based on position concentrations.
- ◆ More focus on on implied hedging needs (“gamma triggers”).
- ◆ Can result in general improvement for risk measurement models.

Questions & Answers