

Model Risk: Ignore at your Peril

PRIM, Luxembourg, 13 November 2007

Agenda

1. Trends and Drivers for Change in Financial Services
2. Integrated Risk and Performance Management (IRPM[®])
3. Investment Strategies
4. "Hidden" Risks and Evolution over Time
5. Understanding the Risks Involved
6. Examples of Model Risks
7. Beyond Model Risks
8. Suggested Approach

Appendix

- I. avantage Capita Limited - Overview
- II. avantage Capita Limited - Contact Details

Trends and drivers for change within Financial Services include...

Evolving Regulatory Environment

International > European Union > Luxembourg

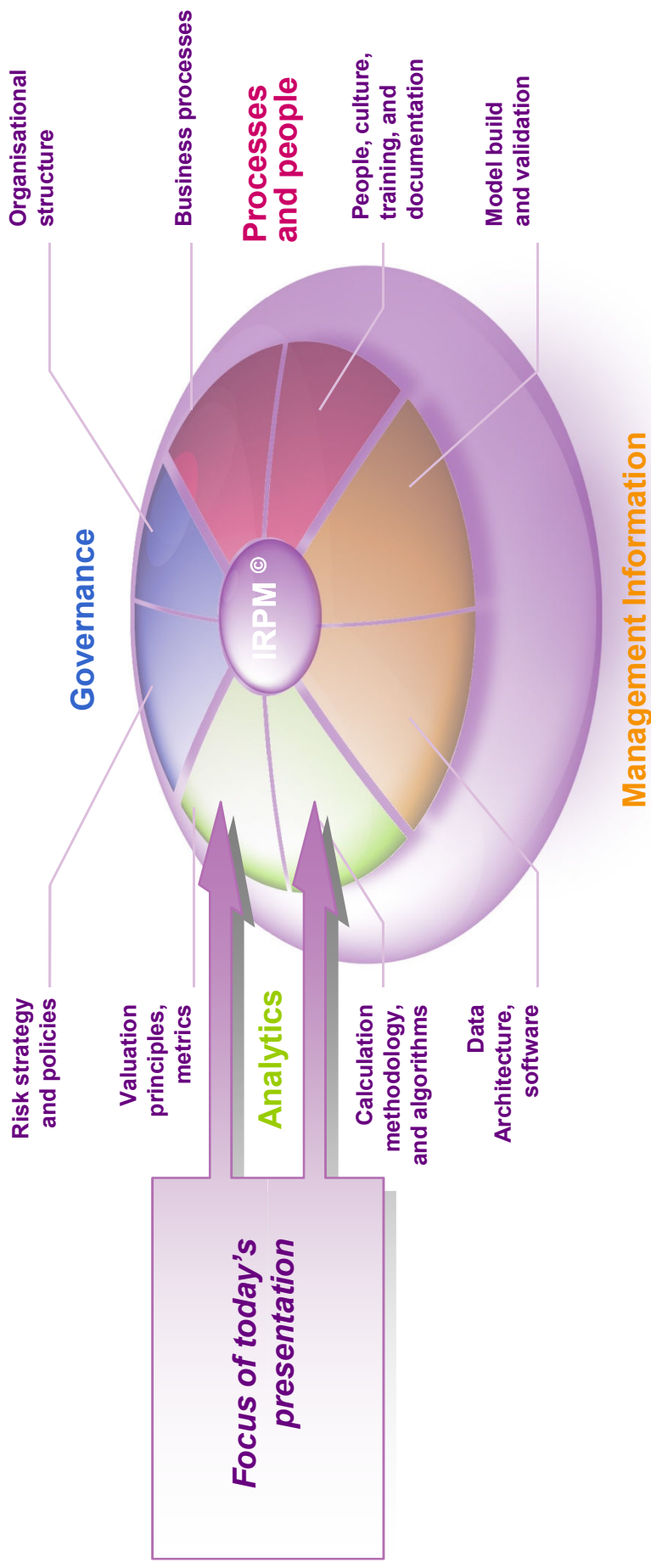
Basel II	CRD	CSSF 07/301
...	MIFID	CSSF 07/308
	UCITS III	...
	...	

Clients Expectations

- Increased portfolios returns
- Portfolio tracking
- Hedging
- ...

...which increase regulatory and clients expectations for improved risk management.

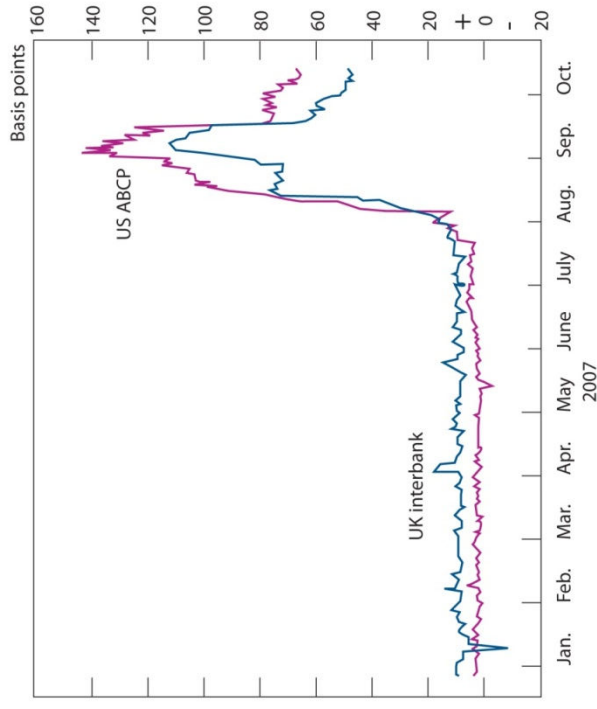
We assess the needs of an organisation from an integrated risk perspective...



...and identify where improvements are possible and warranted.

Your clients use different strategies to build their portfolio...

US asset-backed commercial paper and UK interbank risk premia^(a)



Source: Bloomberg.

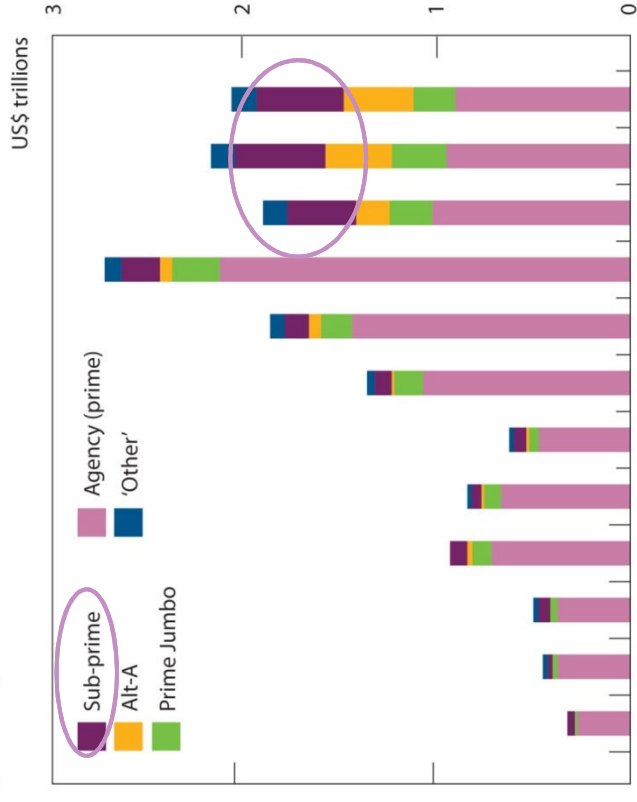
(a) Three-month AA-rated US asset-backed commercial paper spread over US dollar overnight index swaps; three-month sterling-Libor spread over overnight index average swaps.

- Hedging
- Higher returns
- Tracking Error/Volatility
- Alpha Performance
- Arbitrage
- Etc.

...and make informed decisions using yield curves, etc.

When you clients choose a certain strategy...

US residential mortgage-backed securities (RMBS) issuance^(a)



Source: UBS

(a) Issuance is on a gross basis.

...Often, there is **additional risk hidden behind and this does not stay constant over time.**

It is important that you also understand the risks involved...

Probability Space

Parameters:

Default Probability
Distributions:
• Exposure
• Industry
• Geographic
Recoveries
Maturities
Amortisation profiles
Taxation
etc.

Random Variables

Structure:

Tranching
Cash flow
Coverage tests
Triggers
Over collateralisation
Credit enhancements
Fees
Maturity
Correlations
etc.

Distribution

Performance:

Returns
IRR, ROI
Tranches:
Default probabilities
LGD
Expected loss
Loss on principal
Loss on interest
Excess spreads
Tranche maturity
etc.

Underlying models: factors, interest rates, portfolios
Market data: macroeconomic indices, interest rates, equity prices

...which requires an understanding of the underlying building blocks of these products.

To illustrate that point, we propose to describe some risks involved in one of the more complex...

Traded Product

- DJ CDS (North America)
- DJ iTRAXX (Europe & Asia)

Description

- Funded contract
- Unfunded contract

iTraxx Europe

The benchmark iTraxx Europe index comprises 125 equally-weighted European names. A HiVol index consisting of the 30 widest spread non-financial names, and three sector indices are also published.

The iTraxx Crossover index comprises the 50 most liquid sub-investment grade non-financials.

The iTraxx indices typically trade 5 and 10-year maturities and a new series is determined by dealer liquidity poll every 6 months. The Europe and HiVol indices also trade 3 and 7-year maturities.

Benchmark Indices	Sector Indices	Derivatives
iTraxx Europe 125 investment grade entities	Non-Financials 100 entities	Tranchéd iTraxx five standardised tranches of iTraxx Europe 0-3% 3-6% 6-9% 9-12% 12-22%
iTraxx Europe HiVol 30 highest spread entities from iTraxx Europe		
iTraxx Europe Crossover 50 sub-investment grade entities	Financials Senior 25 entities	iTraxx Options
	Financials Sub Same 25 entities Financials Senior	iTraxx Futures iTraxx Europe exposure traded as a futures contract

First to Default baskets:

Autos, Consumer, Energy, Financial (Sen/Sub), Industrials, TMT, HiVol, Crossover, Diversified

...but standardised products offered on the Credit Risk market, i.e. a CDS Index.

The risk model will determine the valuation which is built around:

Discount Factor

General formula = $1/(1+r)^t$

assuming that “r” is a fixed annually compound discount rate.

Loss Given Default (LGD)

LGD = 1 - Recovery Rate; estimating the recovery rate either:

- based on CDS spreads; or
- as being constant and equal to the average historical recovery rate on senior unsecured bond for US Corporate (i.e., 40%).

Model Risks

- Assumption regarding “r”
 - CDS spread: Not all entities have a CDS spread; and
 - Historical recovery rate: Recent observations indicate that this may not always be adequate.
- Direct method (CDS spread): Not all entities have a CDS spread; and
- Indirect method (e.g., KMV): Structured tranches may encompass instruments other than equity.
- Gaussian Copula generally works but does it in the Credit Market, i.e. is the correlation in default time equal and constant across entities?

Timing of Defaults

Individual default probability estimated either:

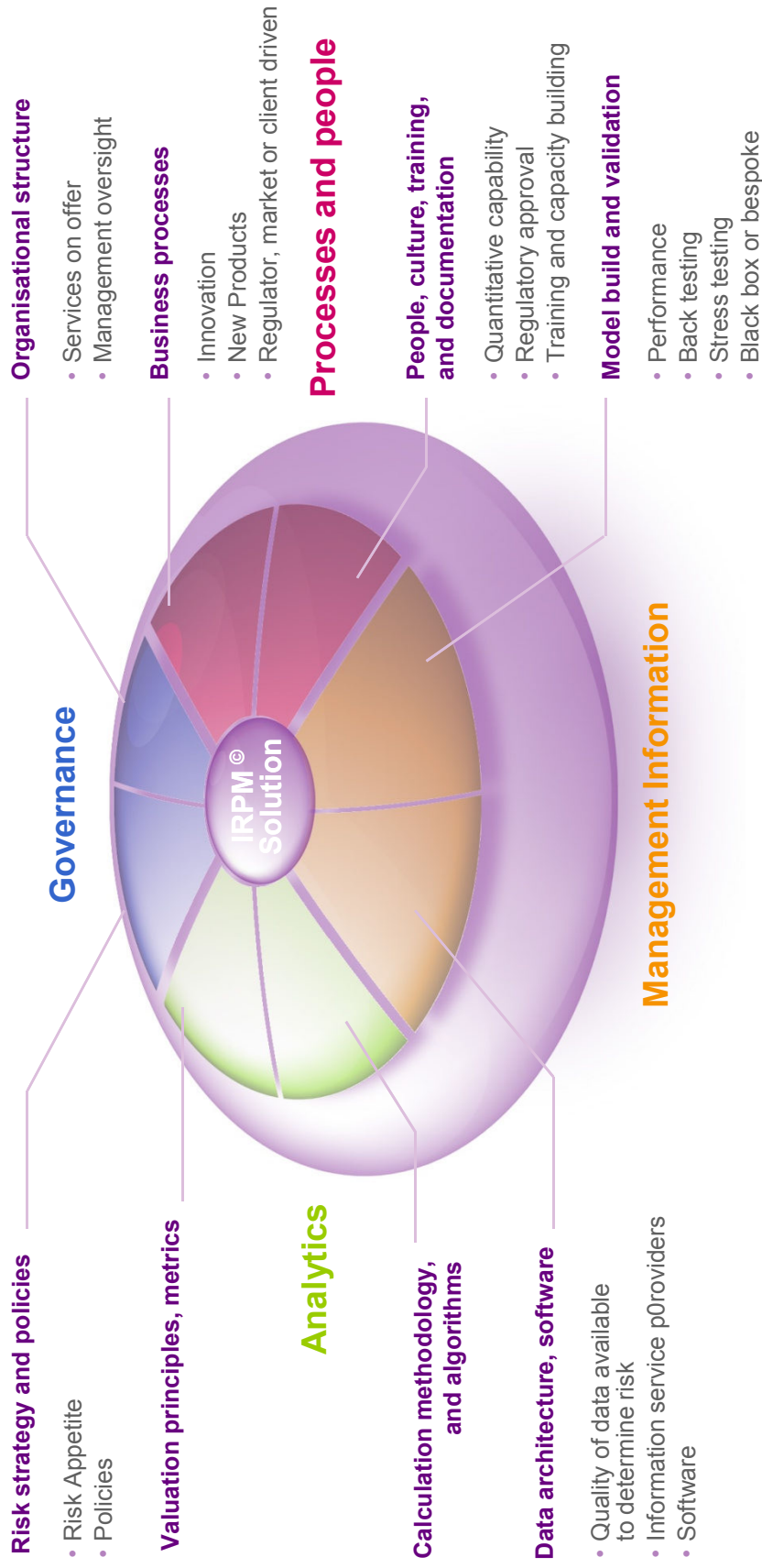
- directly based on the CDS spread for each entity; or
- inferred indirectly from equity prices (e.g., using KMV EDFs)

Number of Defaults

Assuming “N” entities, can be calculated based on a joint default time probability distribution.

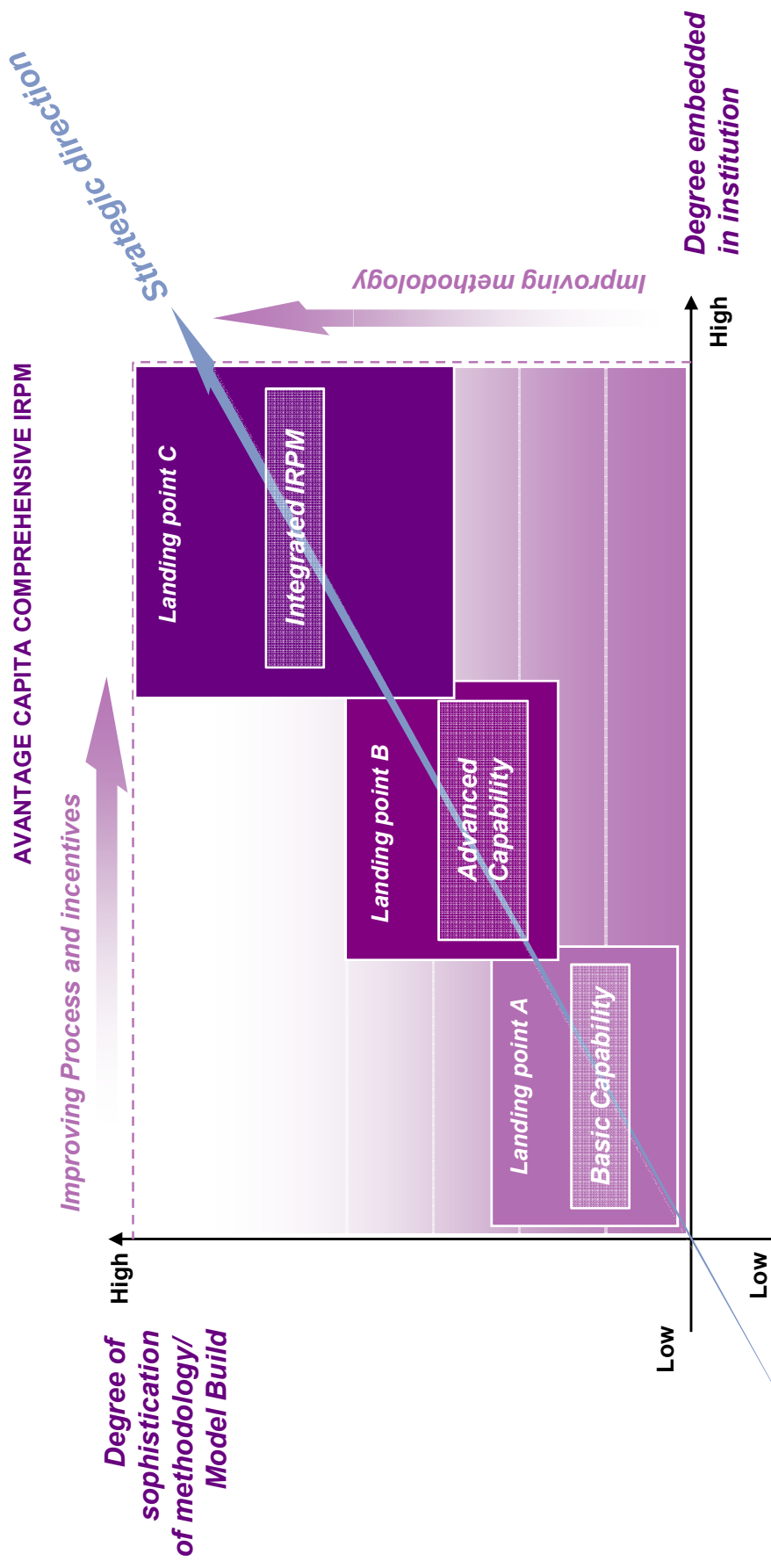
...but is this sufficient considering recent market events?

Beyond model risks, an organisation should look at risk in an integrated manner...



...avantage Capita supports such an integrated approach using a proprietary model, the IRPM©.

But first and foremost...



...an organisation should decide what its preferred level of risk management capability is.

About advantage

advantage Capita Limited

advantage is an advisory, design, and implementation support firm, specialising in the banking and financial services markets, differentiated on the basis of superior subject matter expertise in risk measurement and management.

Facts

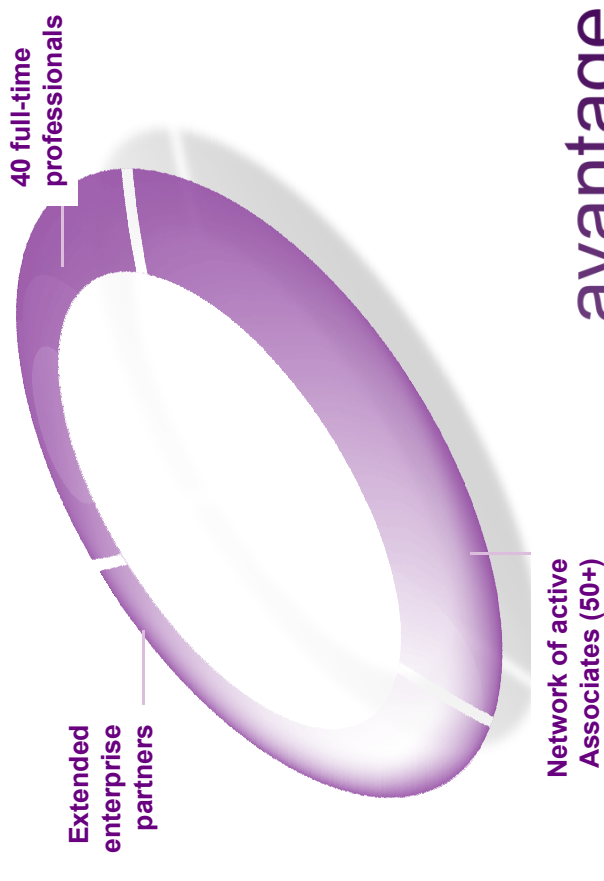
- Operations in Amsterdam, Dublin, London, and Luxembourg.
- Sales exceeding £4.0 million p.a.
- Clients include ABN AMRO Asset Management, ABN AMRO Bank, Allied Irish Bank, Barclays, Lloyds TSB, Royal Bank of Scotland, Renaissance Capital, Sumitomo Mitsui Banking Corporation, Standard Bank, UBS, and the World Bank
- Consultants typically have 10+ years of experience across industry and consulting.

Bringing Solutions to Clients

advantage has a proven track record in delivering solutions to our clients, bringing a practical vision for integrated risk and financial performance management.

Our qualified and seasoned professionals draw on proprietary tools and proven models to accelerate the delivery of solutions to our clients.

Delivery Team



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