Economic Capital and ALM:
A Practicioner's Approach

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Presenter Notes

- Long-time IPS-Sendero client
  - Implemented in 1987
  - Used for 2 service bureaus and consulting
- First presentation on Basel II was in ’00 in Paris
- The ALM Network is a virtual consulting company
  - Partners in software, accounting, and consulting firms
  - Consulting, Assessment, Review, and Education services
  - ALM, BOLI, and Capital management
- Meyer-Chatfield is a privately-held boutique consulting firm specializing on delivering investment solutions with a BOLI engine

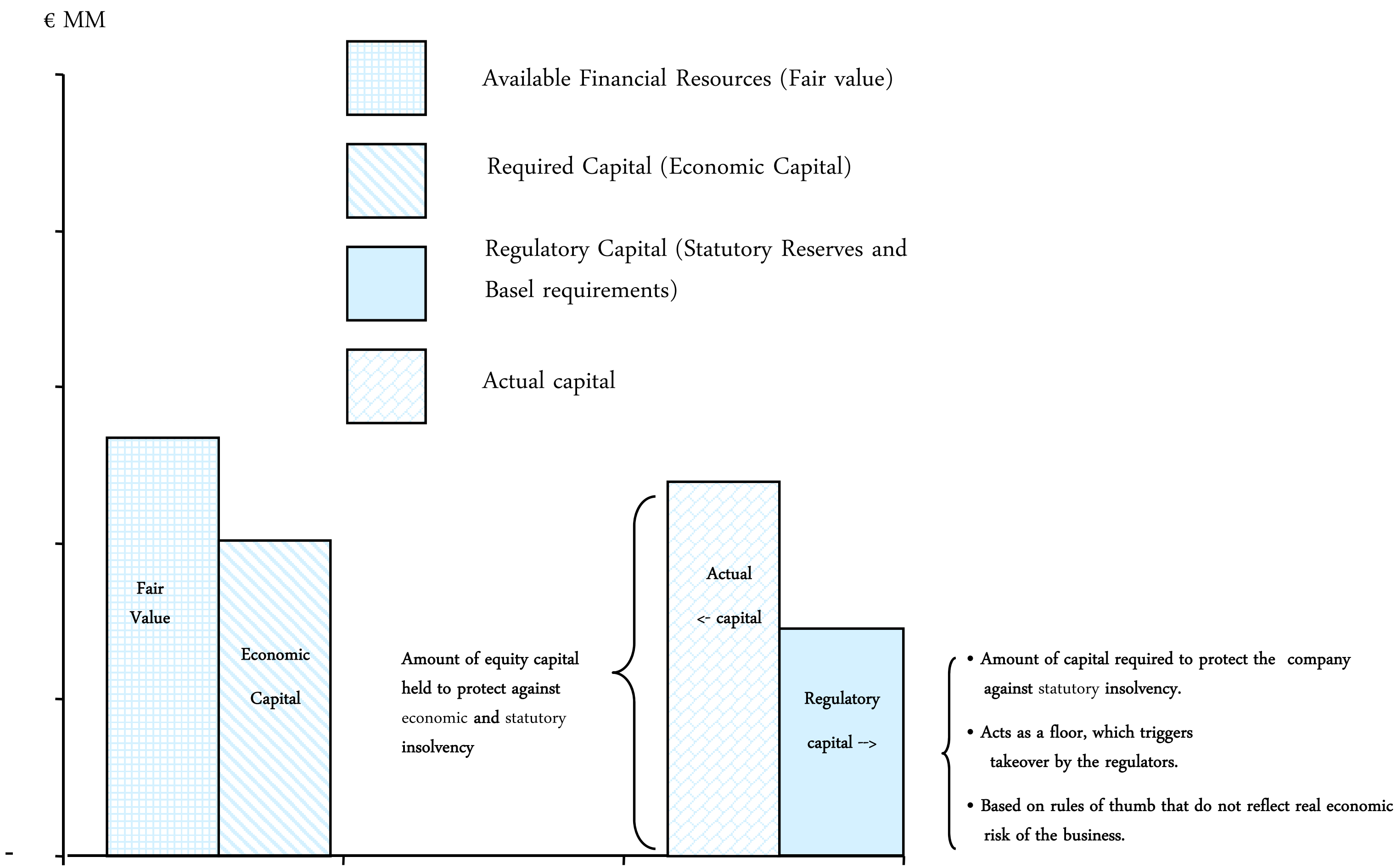
Presentation Outline

- Economic Capital (EC)
  – What is it?
  – What is it used for?
- Asset/Liability Management (ALM) & EC
  – What is it?
  – What is it used for?
- Market examples
- Consulting solutions
- Comments, questions, current practices
- What session is next for conference attendees?

What is Economic Capital?

- Measures risk to income and/or value
- Economic Capital is buffer for Unexpected Losses (UL)
- Method of allocating capital as part of value creation and performance measurement process
- Approach to estimating capital levels (Basel II)
- Distinguish between other types of capital

What is EC?
Another look at capital



What is EC?

Types of Capital… this slide takes awhile….

Thanks to Luc Henrard – Chief Risk Officer, Fortis

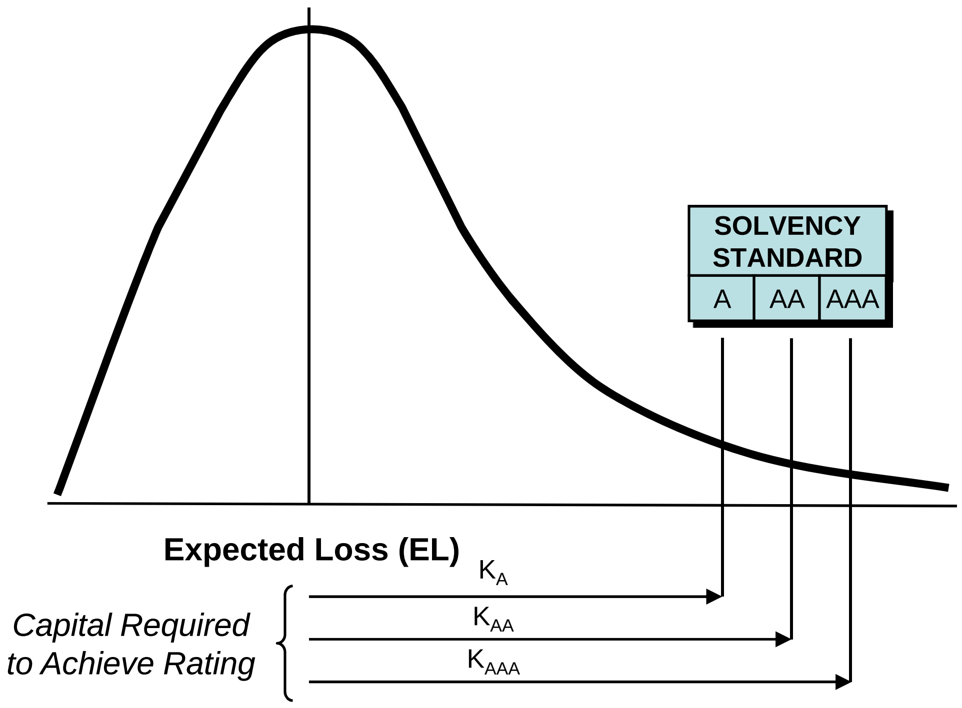
REGULATORY CAPITAL	AGENCY DRIVEN CAPITAL	ECONOMIC CAPITAL	ACTUAL CAPITAL
• Amount of capital required to protect the bank against ***statutory*** insolvency over a one-year time-frame	• Amount of capital the rating agencies expect in order to feel comfortable giving the bank an 'A' rating	• Amount of capital required to protect the bank against ***economic*** insolvency (over a one-year time-frame)	• Amount of equity capital actually held to protect the bank against ***economic*** and ***statutory*** insolvency over a one-year time-frame
• Based on undifferentiated rules of thumb that do not reflect the real economic risks of the business and usually based on (relatively) public information • Designed to protect policy holders and creditors • Acts as a floor, which triggers takeover by the regulators	• Based on relatively undifferentiated rules of thumb (bank), and/or simple models (insurance) • Not formulaic – other factors such as quality of management and likelihood of Government bail-out are also considered	• Reflects real risks taken in the sense of unexpected movements in the value of assets and liabilities and on the confidence interval management wishes to tolerate • Designed to be a tool for management	• Accounting result
BARE MINIMUM CAPITAL YOU MUST HAVE	**CAPITAL YOU ARE EXPECTED TO HAVE**	**CAPITAL YOU OUGHT TO HAVE**	**CAPITAL YOU ACTUALLY HAVE**

What is Economic Capital?

- *"the potential unexpected loss of economic value over one year calculated at a pre-specified confidence level."*
  - Confidence level is used in statistical sense, that is, 99% confidence level is 1 in 100 event
  - Rating agencies use similar methodologies and terminologies for default and/or loss
    - BBB rating is around 99.5% level for 1 year
    - Basel II is around 99.9% level for 1 year

What is Economic Capital?

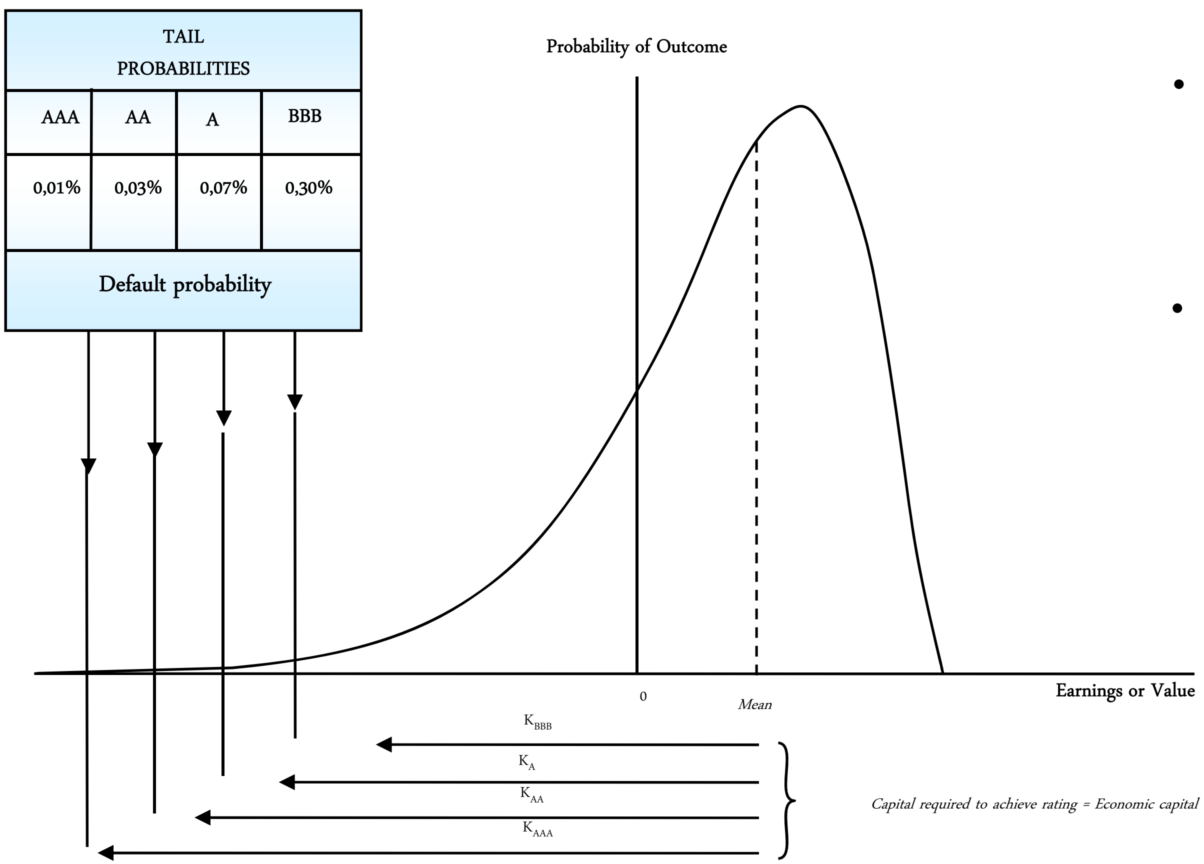
A Common Currency for Risks Across Businesses;
Risk is Based on a target credit rating (solvency standard)



- Economic capital is the capital required to buffer from default up to a target solvency standard (and thus confidence interval)
- For the same risk profile, an institution targeting a better credit rating will need to hold more capital (AA institutions require more capital than single A)
- The confidence interval for the company should be linked to credit rating and anchored to observable financial instruments (e.g. bonds)

What is EC Used For?
Model risk in terms of earnings or value volatility and target debt rating of your bank ... thanks to Mercer Oliver Wyman

EARNINGS OR VALUE VOLATILITY

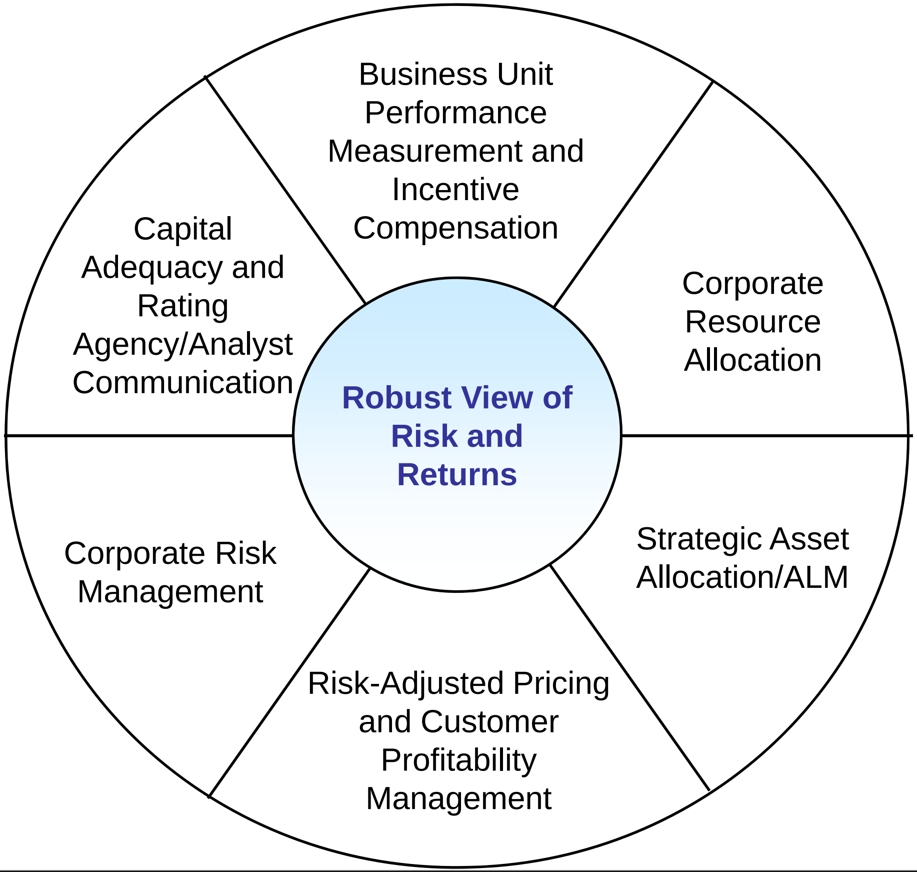


MEASUREMENT REQUIREMENTS

- Board to define the risk profile i.e. the confidence interval and target risk
- All risk need to be adjusted for the same capitalization horizon (Basel 2 Recommendation: one-year horizon)

What is EC Used For?

Risk-Based Performance Metrics Are Critical Inputs to Management Decision-Making Processes… thanks to MOWC



"In our view, the sign of a sophisticated management team is a focus on value-added returns and return on risk-adjusted capital (RAROC)."
– Morgan Stanley equity analyst

Most Sectors of Financial Services Have Adopted or Are Contemplating Adoption of an Economic Capital And RAROC Measurement Framework… again thanks to OWC

Sector	Predominant Risks	Prevalence of Risk-Based Measurements	Commentary
Retail and Commercial Banking	• Credit risk • Interest rate risk	●	• Capital is a scarce resource • Substantial difference in riskiness (and therefore capital requirement) by customer within products • Insights leading to major shifts in capital deployment and active capital management
Capital Markets	• Market risk	●	• Tremendous short-term volatility • Insights leading to reduction in proprietary trading activities and focus on customer flow
P&C Insurance	• CAT risk • Non-CAT liability risk	◔	• Very capital intensive • Substantial differences in riskiness across products • Insights leading to active capital management and repricing
Life Insurance	• Credit risk • Interest rate risk • Equity risk	◕	• Substantial exposure to credit markets • Historical ALM risk overshadowed by equity exposure in guaranteed products • Insights leading to product redesign, altering customer options, etc.
Asset Management	• Operating risk	○	• Capital not a scarce resource • Chief concern is value volatility

What is EC good for: Economic Capital and Basel II?

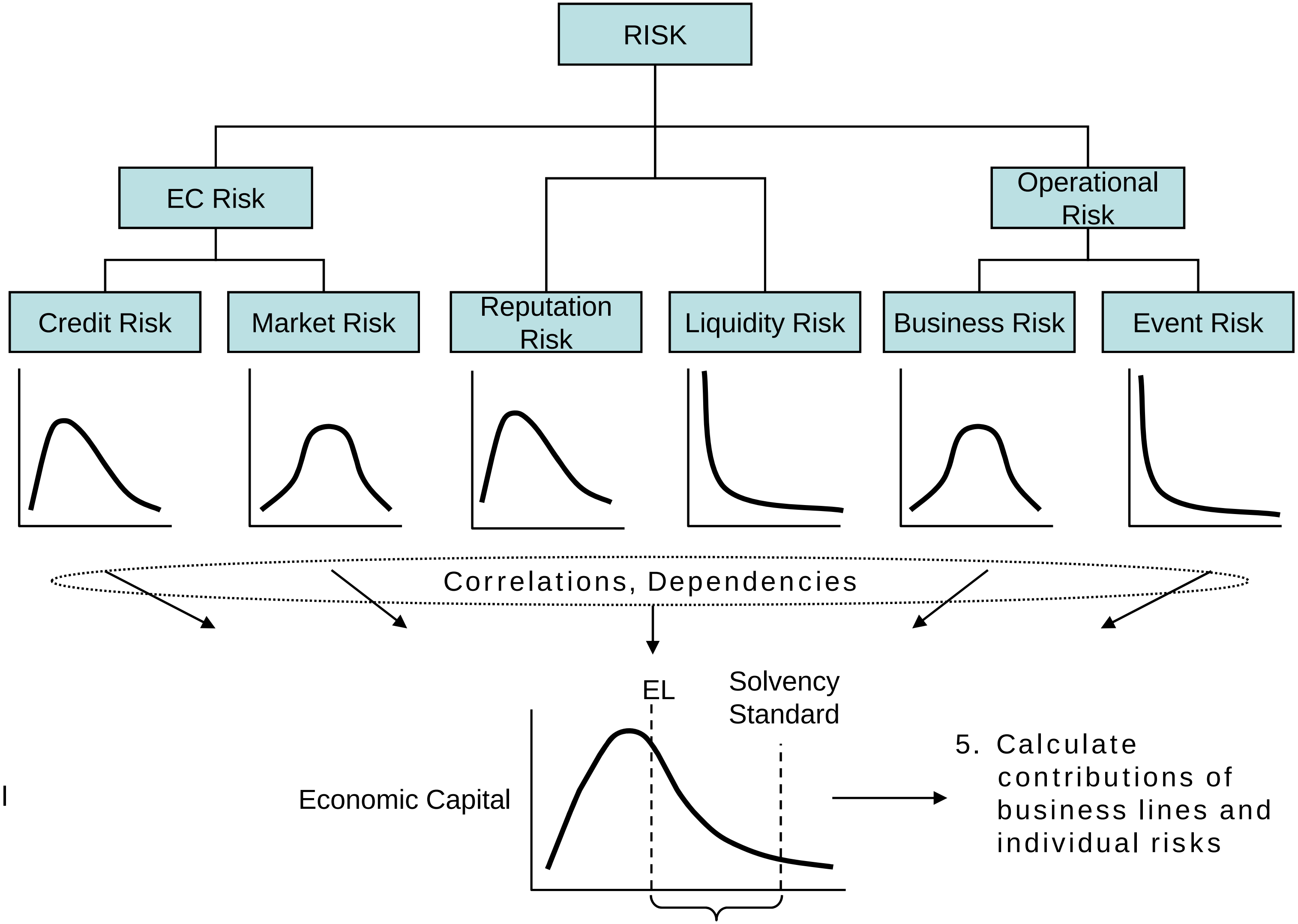
- Basel II capital is based on an economic capital approach to deriving regulatory capital:
  - First, calculate capital required for credit risk
  - Then, add capital required for market risk
    - For trading account only
  - Next, add on capital required for excessive market risk
    - Only for "outlier" banks (more later)
- Remember, Basel II is calibrated to an A- rating
  - Assumes 8% capital with assets 100% risk-weighted

Economic Capital and Better Practices?

- A better practices economic capital approach:
  - Calculate capital required for credit and market risk simultaneously
    - At the business segment level
  - Consider activities and correlations that:
    - Concentrate and increase risks
    - Diversify and naturally hedge risks
  - This approach is more theoretically correct
- Calibrate to your bank's risk tolerance and target rating.... Not every bank targets an "A-" rating...

EC Considers the Sources of Risk
and the Correlations Between Them… thanks to Mercer Oliver Wyman

1. Identify all sources of risk
2. Characterize the distributions
3. Combine distributions
4. Measure required capital
5. Calculate contributions of business lines and individual risks



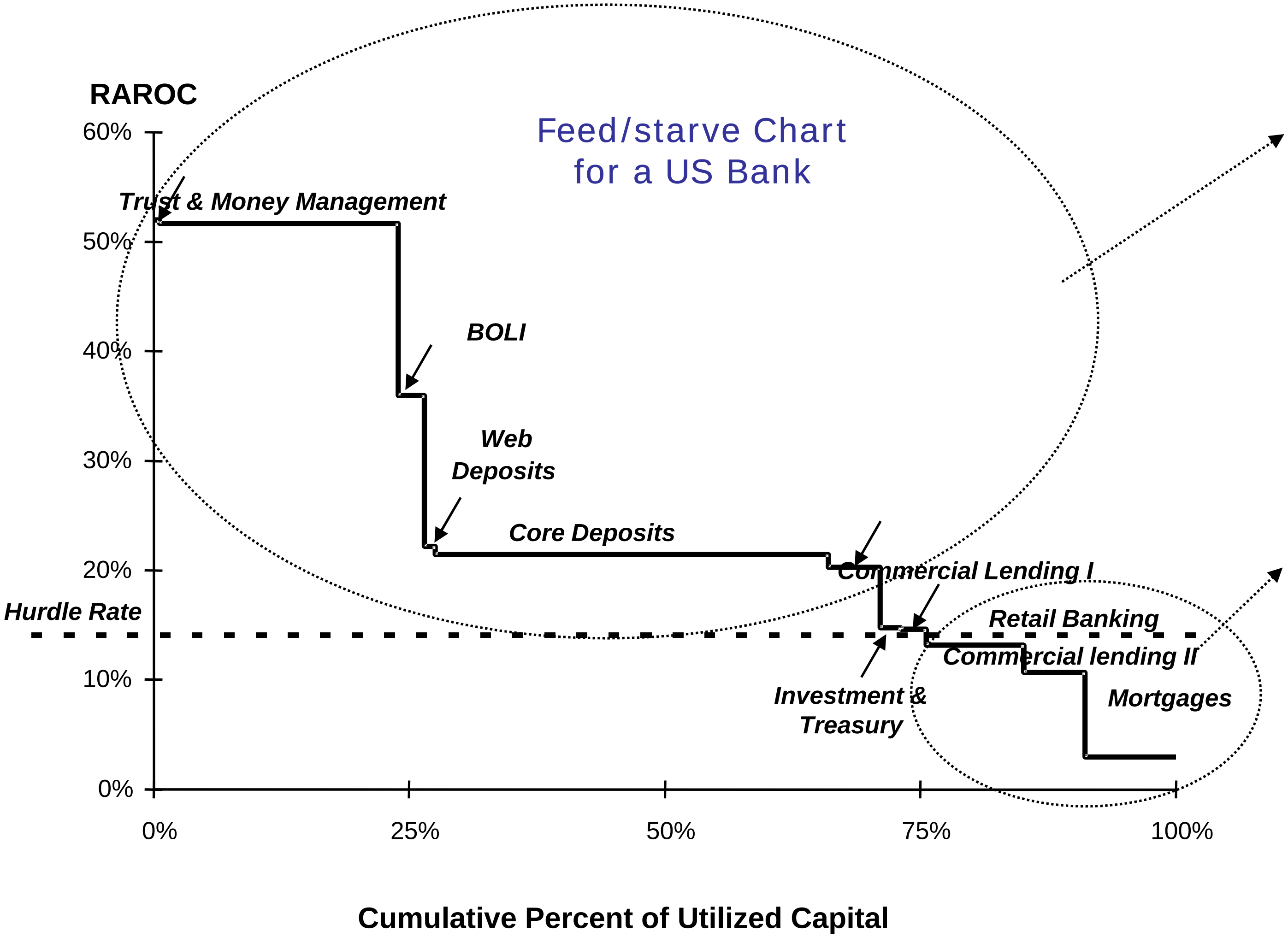
Economic Capital and Better Practices?

- If a bank has excess capital:
  - Accelerate growth, either though organic growth or acquisition
  - Return to shareholders, either through buybacks or dividends
  - Modify EC targets:
    - Increase EC confidence level(s), expressing decreasing risk appetite
    - Lower EC hurdle rate

Economic Capital and Better Practices?

- If a bank has limited capital:
  - Decelerate growth, either organically or via divestiture
  - Raise additional capital or decrease dividends
  - Modify EC targets:
    - Decrease EC confidence level(s), expressing increasing risk appetite
    - Raise EC hurdle rate

RAROC is an Important Element in Determining Corporate Resource Allocation . . . MOWC adapted again



Above Hurdle Businesses

- Identify opportunities to grow organically
- Acquire businesses where market value is less than intrinsic value

Below Hurdle Businesses

- Explore opportunities to increase returns
  - Risk-taking
  - Pricing
  - Costs
- Shrink to profitable core
- Exit

Economic Capital Approaches & ALM I

- The “S”, or Sensitivity to Market Risk component of the CAMELS rating system is based on the exposure to earnings or ***economic capital*** due to changes in interest rates, equity prices, commodity markets, or foreign exchange rates
  - For most banks, their exposure to equity, commodity, and fx markets is either “one-off” or non-existent
  - Interest rate risk and ALM-focused activities are the primary driver of the “S” rating

Economic Capital Approaches & ALM II

- Thanks to Tom Ho
- Economic capital = asset fair value – liability fair value
  - This is our old ALM friend EVE (or NPV)
- Captures the aggregate of future events
  - Embedded options
  - Credit risk impact
  - Profitability in pricing
- Stress tests
  - Basel test on capital ratio

Economic Capital Approaches & ALM III

- Total return metrics are integral to market-based performance metrics
  - CFAI® performance disclosure
- The FASB is moving towards:
  - Economic, or Fair, Value reporting for many types of financial instruments and risk exposures
- The IASB is moving towards:
  - Economic, or Fair, Value reporting for many types of financial instruments and risk exposures

Here’s an EV approach…

from a presentation on last year’s disk…thanks to Randy Payant

Book & Economic Value, Base Case Scenario				
$ million	Book Value	Economic Value	Premium (Discount)	Premium (Discount)%
Cash	100	100	-	0%
FFS & Bank Deposits	250	250	-	0%
Securities	1,250	1,225	(25)	-2%
Loans & Leases	3,250	3,325	**75**	**2%**
Other Assets	150	150	-	0%
Total Assets	5,000	5,050	50	1%
Core Deposits	2,200	1,980	**220**	**10%**
Time Deposits	1,000	990	10	1%
Borrowings	1,250	1,225	25	2%
Other Liabilities	150	150	-	0%
Total Liabilities	4,600	4,345	255	6%
Total Equity	400	705	**305**	**76%**
Total Liab/Equity	5,000	5,050	50	1%

Economic Capital Approaches & ALM IV

- Back to Basel II
  - Market risk is an add-on for outlier banks
- What is an outlier bank?
  - According to ***Market Risk Principles,*** an outlier bank is one with an EC decline of > 20% due to an interest rate shock of +/-2%.
- What does an outlier look like?

Economic Capital Approaches & ALM IV

- As of December 2005:
  - Over 40% of thrifts lost >20% of NPV due to an interest rate shock of +/-2% (OTS)
  - Almost 40% of community banks lost >20% of NPV due to an interest rate shock of +/-2% (ORA Benchmarks©)
- While these models are not robust, granular, or dynamic...they might be correct on a directional basis and in order of magnitude

Step 3 : Look at the risk/return "Framework"

Accounting view – RoA / RoE

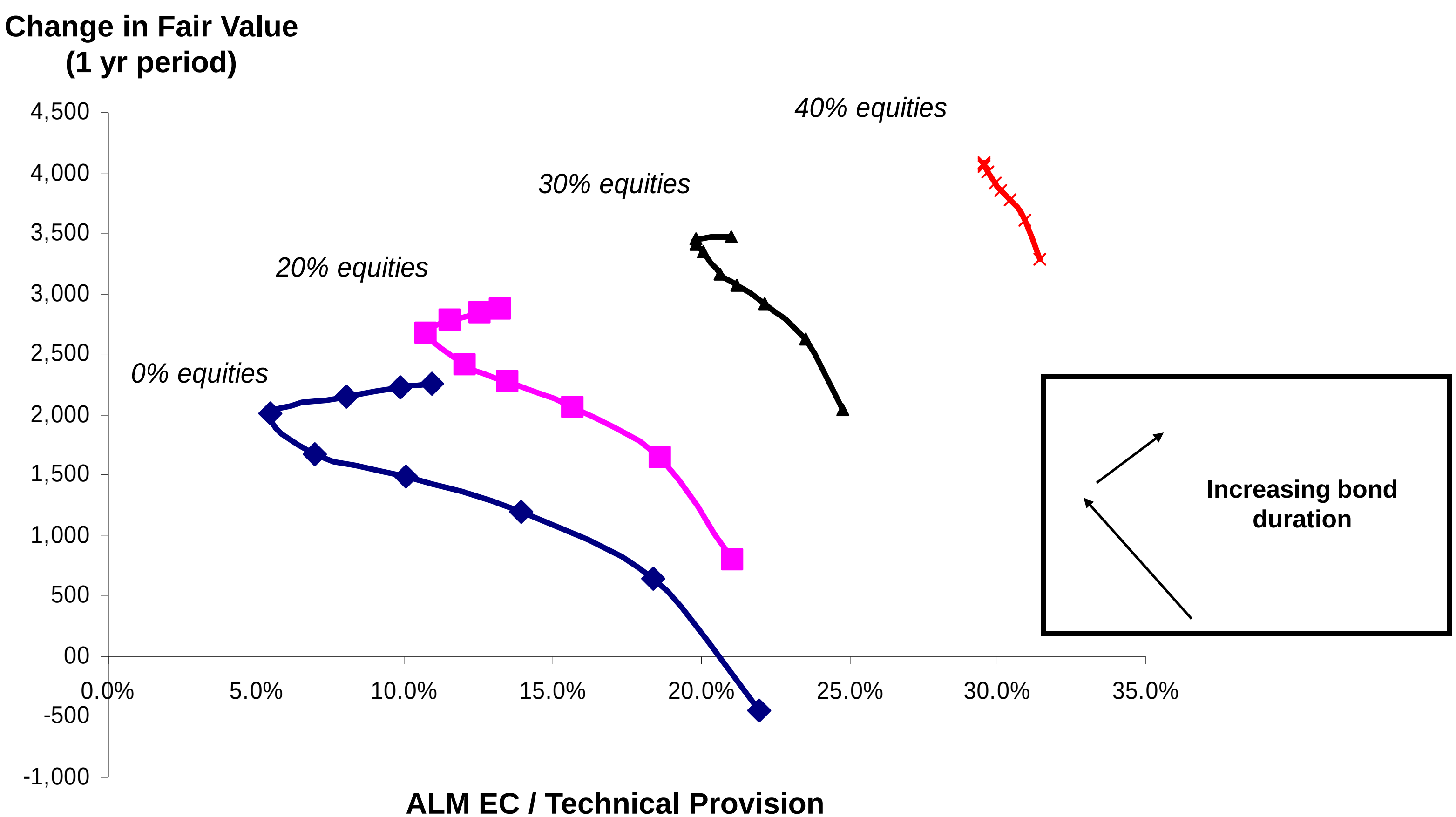
Regulatory view – RoRE

Economic view (Basel 3? – Solvency 3 ?) –

- RARORAC
- RAROC
- RORAC

Example Risk return framework
Alternative investment strategies for Group life product

Profit sharing based on book yield underlying bonds



Consequence : we need to develop an alternative Economic Measure for Solvency capital.

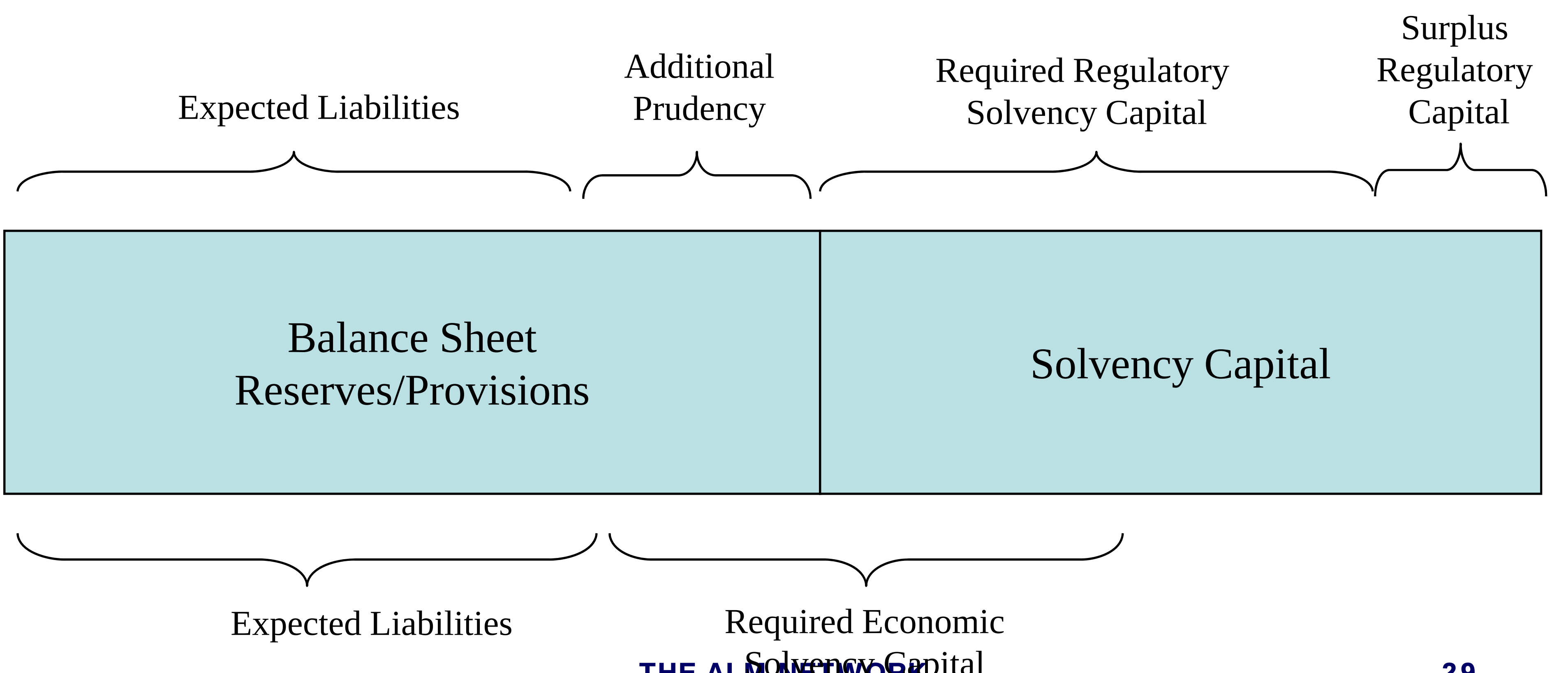
- Needed: discussion between experts (actuaries and non-actuaries) on pragmatic economic solvency measure
- Developments of risk based measures (NAIC RBC/Solvency II)
- Consistency in taxonomy and terminology between Bank and Insurance regulators
- Regulators and rating agencies to familiarize with the way banks/insurance companies measure economic solvency based on ‘real measurement’ of risk; no ‘fixed rules of thumb’. Only then financial institutions can start managing risks and capital

3. Differences Between Insurance and Banking

3.1. Actuaries and bankers have evolved different approaches and terminology

	Banking	Insurance
Terminology	• Expected loss • Rating Master scale • VaR • RARORAC • Economic capital	• Claims • Mortality tables • Embedded Value/Fair Value • Reserves/Solvency/Risk based capital
Focus	• Risk • One year	• Expected outcome • Multi year
Weaknesses	• Insufficient use of statistics • Customer behavior	• Insufficient use of modern Finance theory • Little use of transfer pricing (ALM)

Example different forms of capital life insurance company



3.3. How to bridge the GAP ?

	Basel 2 Requirements for Banks	Statutory Reserves for Insurance Companies	Economic Capital consumed by a Bancassurer
Confidence interval	A?/BBB ?	None	Shareholder's decision
Base Line	Statutory solvency	Statutory solvency	Economic solvency
Valuation	Statutory	Statutory	Fair value
Risk type coverage	excludes Business risk as well as most of the ALM risk (the Banking Book)	Excludes Event Risk	All risk types
Diversification	?*	?**	Yes

* Market risks are highly correlated with credit risk. It is not the case however for operational risk.

** The existing European insurance capital requirements assume some "average" level of correlation within one licensed entity.
In case several such entities form part of an insurance group, any additional diversification (e.g. geographic diversification) are ignored.

Leeway for regulatory arbitrage

Example : CAPITAL REQUIREMENTS FOR "A" RATED CREDIT RISK

TODAY

Banking Regulation (BIS I)

- 8% (minimum 4% must be Tier 1)

Banking Regulation (FDIC)

- US Banks also subject to "prompt corrective action" (PCA) requirements

US Insurance P&C (NAIC RBC)

- 0.3-1.0% for investment grade credit

EU Life Insurance

- Treat as an investment (no explicit focus on credit risk)
- Implicit asset risk charge = 3% outstanding

END INVESTORS

- No capital requirements

TOMORROW

- BIS II will bring regulatory requirements much closer to Economic Capital, decreasing banks' incentives for regulatory arbitrage, although some will remain among lower quality credit (BB-BBB)
- More risk sensitive requirements is also observed in the insurance industry (Solvency II)

CONCLUSION

- Definition of Regulatory capital still differs between banking and insurance.

4. Food for thought: Role of the Actuary

Actuaries in a risk management process...

- Traditionally Actuaries focused on technical insurance risks (mortality, disability, P&C claims risks, etc).
- Today the actuaries' perspective includes the whole risk taxonomy
  - *Integration of ALM and Actuarial departments*
  - *Shift from traditional solvency to Risk based solvency measures*

This has consequences for the academic actuarial curriculum: transition to curriculum all-round financial risk manager integration actuarial science, (mathematical) finance, econometrics financial markets, etc

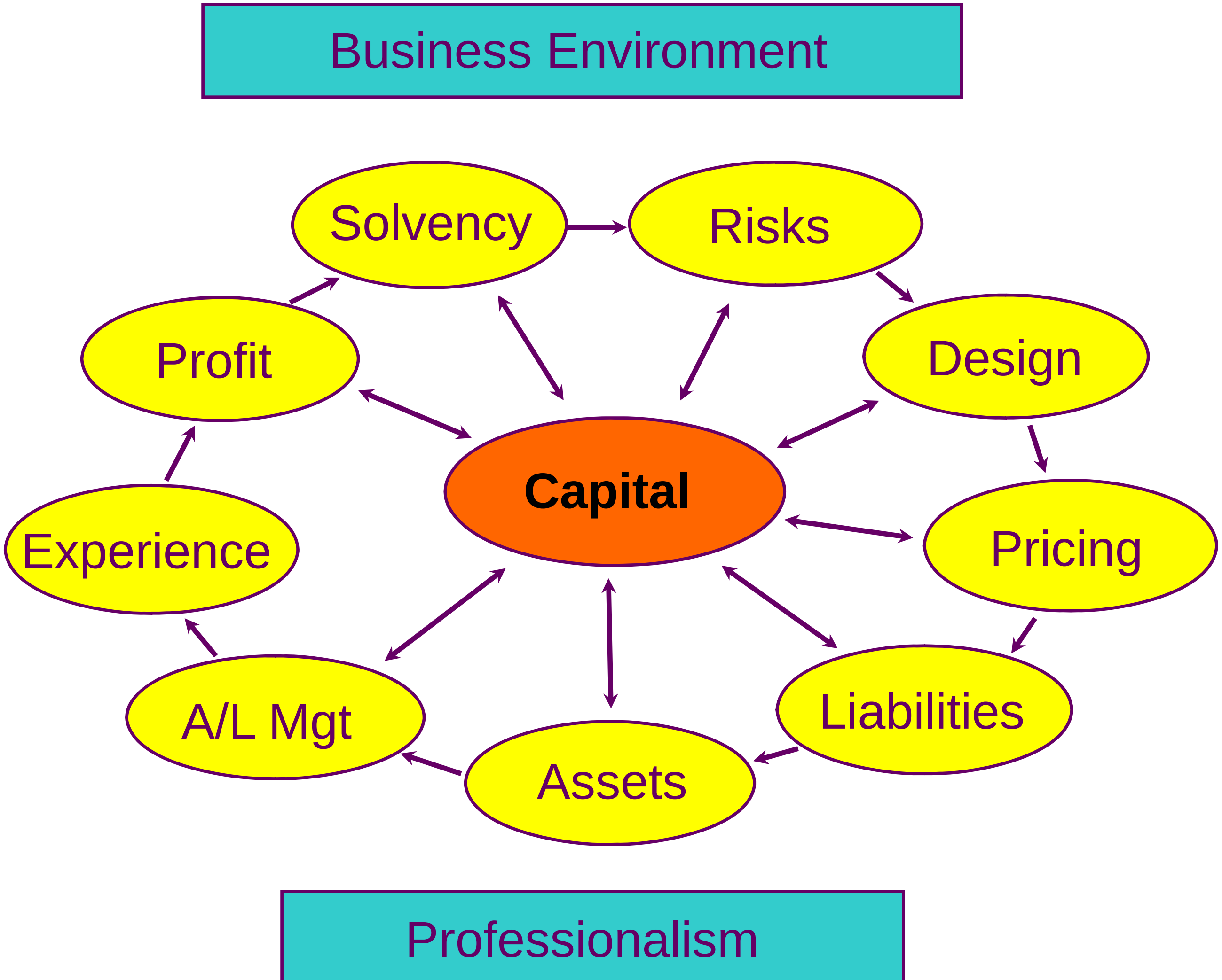
..and the use of current models in a risk framework...

- In order to do risk modeling current models (e.g. Embedded Value models) have to be 'dynamized'
  - From policy-to-policy to model points
  - Full integration with asset side of the balance sheet
  - Stochastic simulations
  - Risk adjusted cash flows
- Calculations with the 'dynamized' model:
  - Economic Capital/Solvency calculations
  - Fair Value type computations
- Development of robust Economic Solvency Framework in the light of Solvency II <u>and</u> link to pricing

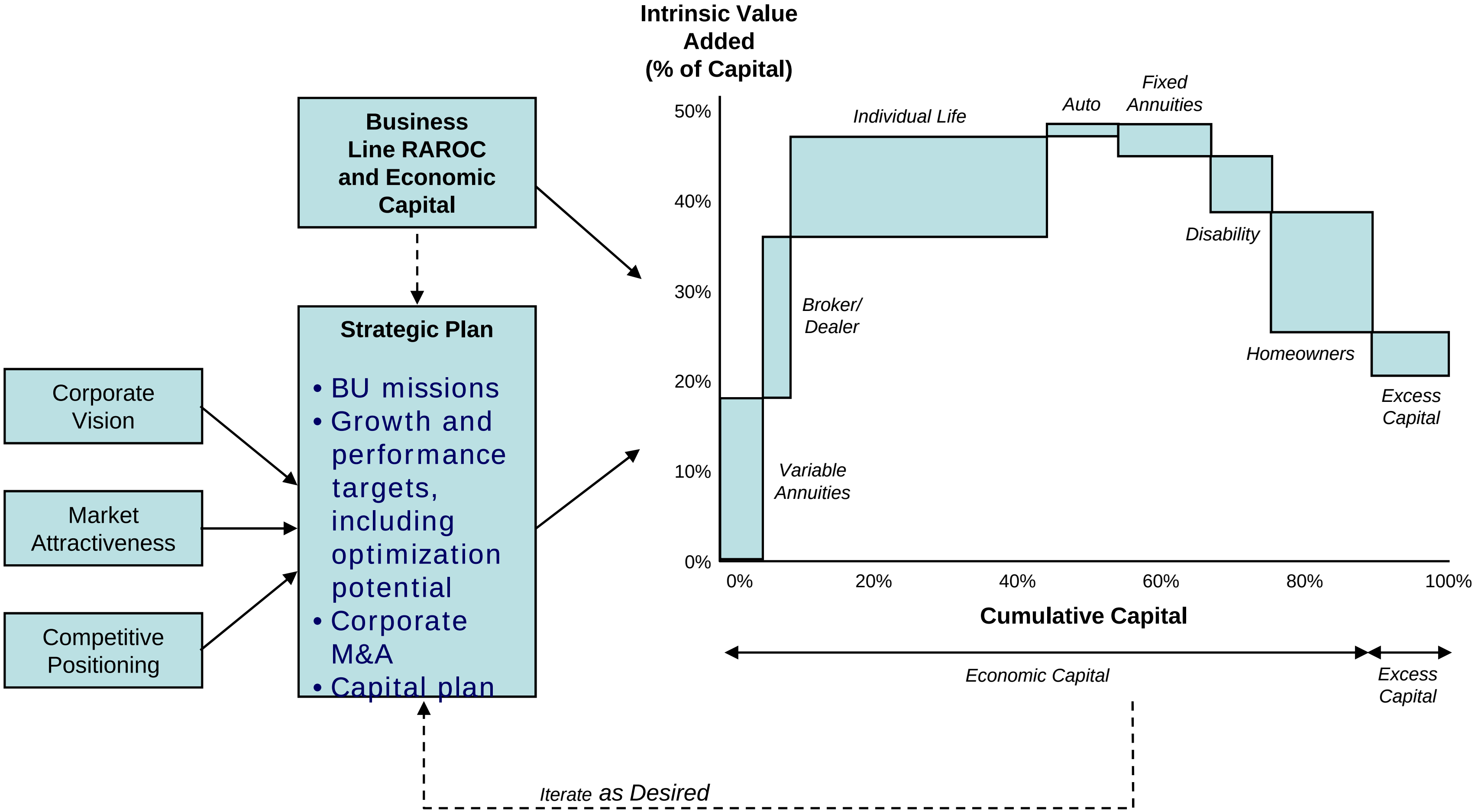
...possible consequences for the actuarial profession

- Actuarial and other financial experts have to educate the external constituencies re the economic risk picture
  - For bank-insurance groups: how can diversification-netting benefits be explained to rating agencies?
- **This has consequences for the academic actuarial curriculum: transition to curriculum all-round financial risk manager integration actuarial science, (mathematical) finance, econometrics financial markets, etc**

Insurer Risk Control Cycle



. . . While More Sophisticated Frameworks Take Prospective Views of Value Creation Linking Financial and Strategic Planning



Economic Capital Determination Key ingredients

- ***Time horizon***
  - Need to recognize full duration of business
  - Need to ensure solvency over a suitable supervisory control horizon such as one or two years
- ***Key elements of risk***
  - ***Systematic risk*** arises from **uncertainty risk** (i.e., model specification error, parameter estimation error, structural risk error) and **extreme event risk** (i.e., high impact one-time shocks, events which may be completely unanticipated and not captured in model)
  - Uncertainty risk is generally considered to be non-diversifiable
  - ***Non-systematic risk*** (also called volatility risk or process risk) represents random fluctuations in experience and is considered to be diversifiable
- ***Confidence level***
  - Depends on time horizon
  - Depends on ratings level target

EC Considers the Sources of Risk
and the Correlations Between Them… thanks to Oliver Wyman

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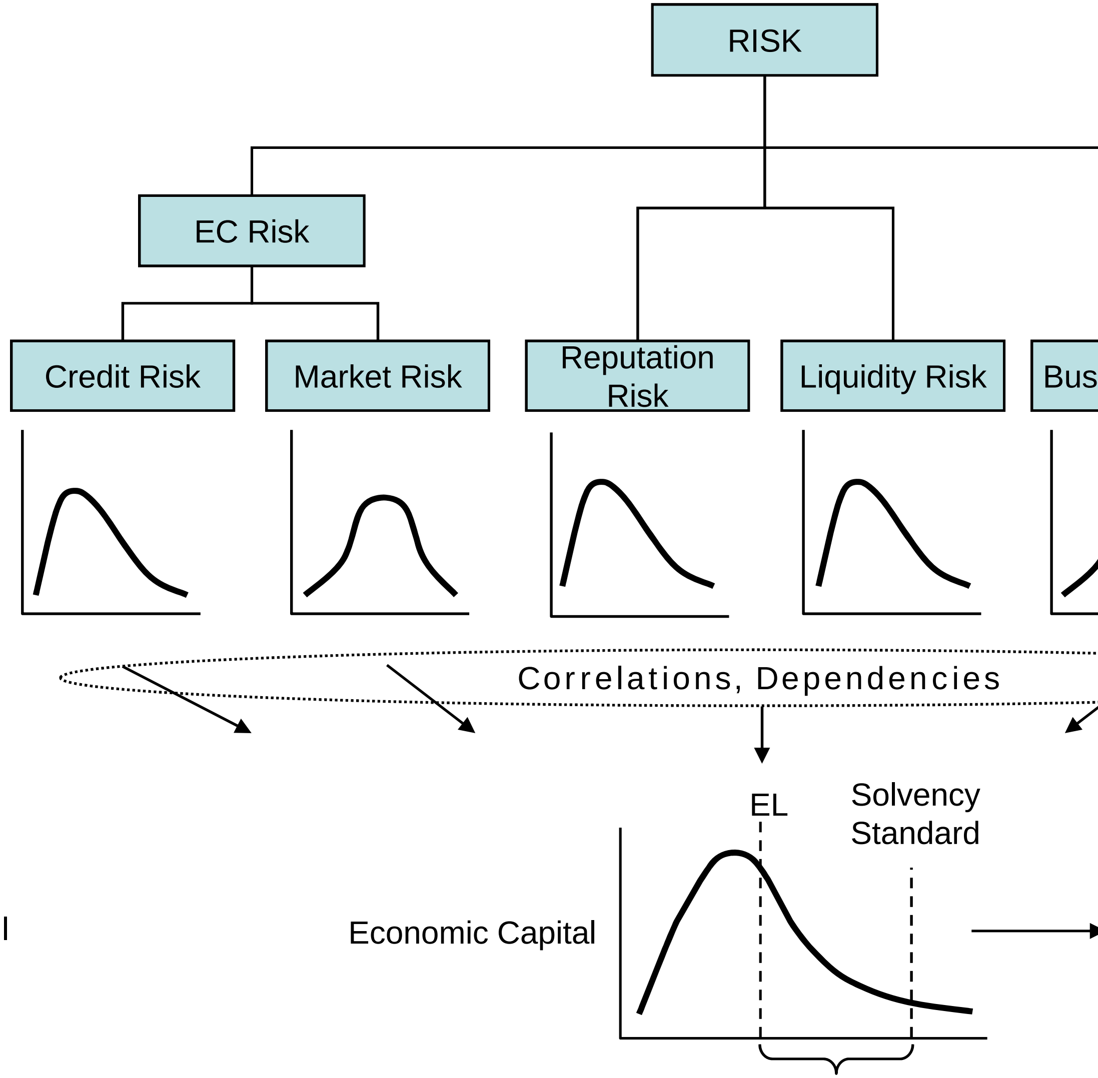
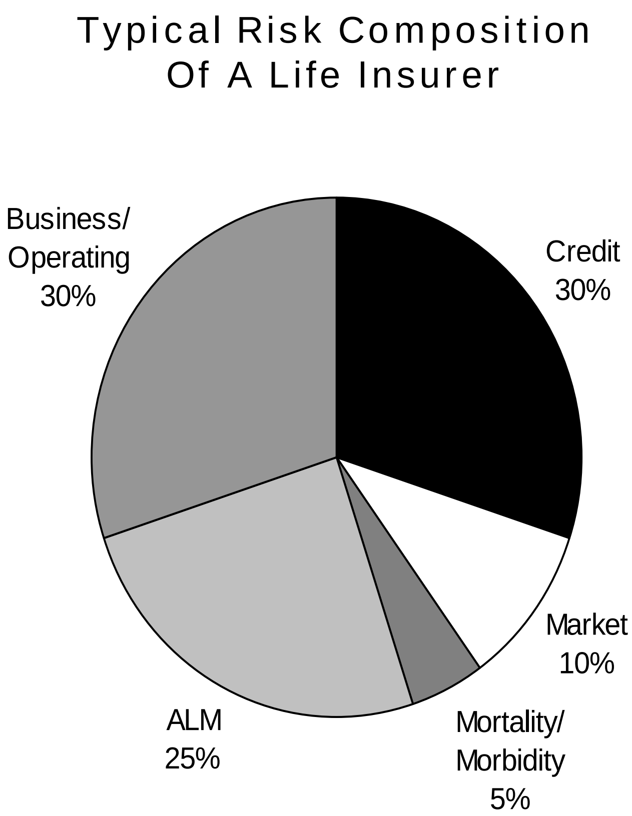


5. Calculate contributions of business lines and individual risks

The Relative Magnitude and Measurement ‘State of the Art’ Suggest Differing Development Priorities Across Risks



- Credit: developed but needing refinement
  - Most insurers have risk ratings, capital charges and credit monitoring
  - Increasing appetite for credit risk, variety of credit risk classes and competition requires increased sophistication especially in risk grading, portfolio management tools and early warning
- Market: less developed but less critical
  - Small size of equity portfolios and buy and hold approach makes advanced measurement less critical
  - Exception is market exposure within variable products
- Mortality and morbidity: strong understanding of ‘mean’, need to better measure ‘volatility’
  - Actuarial processes focus on determining expected losses, not volatility
  - As portfolios shift to more protection-oriented product (especially disability and immediate annuities), more accurate measurement will be needed
- ALM risk: strong effort and infrastructure, needs more discipline
  - Heavy focus of actuaries based upon statutory accounting and regulatory reporting
  - Needs to be tied to probabilistic scenarios, valued at ‘market’ discount rates and tied to pricing
- Business/operational risk: historically not a focus, managing risk is key
  - Operational risk not a historical focus due to the difficulty of quantifying risk – new techniques (using internal and external data) are improving operational risk measurement; experience has shown that monitoring and reporting of operating events reduces incidence
  - Business (especially lapse) risk quantification is increasingly important especially for annuities

Risk Adjusted Return
Key ingredients

- ***Gross return***
  - Should return reflect a short or a long term view of the business?
  - Should return be based on GAAP reporting basis? (Ignores changes in long term value such as EC)
  - Should return reflect changes to EC? (Need to allow for correlation and diversification of risks between lines of business)
- ***Less cost of capital***
  - After tax adjustment to reflect cost of capital employed
  - Perhaps 3-4% of economic capital
- ***Equals risk adjusted return***

Managing Risk, Capital and Value
Key messages

- ***Risk is inherent in all aspects of an insurer's operations***
- ***Capital is vital to the operations of an insurer***
- ***Capital allocation and RAROC are useful tools in managing risk, capital & value***
- ***Carefully choose appropriate measures for numerator and denominator of RAROC***
- ***Capital considerations (time horizon; elements of risk; confidence level etc.)***
- ***Risk adjusted return considerations (short vs long term view; allow for cost of capital)***
- ***No matter how sophisticated the allocation of capital, all of the capital of the company stands behind all of its risks!***

Value creation and performance measurement takeaways

- Economic Capital (EC) allocation is useful for performance measurement and linked to regulatory capital via Basel II
- Economic Profit (EP) approaches are a "better practice" with linkages to shareholder value creation via ROE targeting and EVA® results
- Economic Value (EV) metrics should be considered with EP approaches consistent with FASB moves to EV and correlation results
- Consider approaches congruent with your bank's size, risk, and culture
  - "Better practices" may change the bank for the better

Thanks

- Questions?
- E-mail
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- Website
  - www.almnetwork.com
  - “ERM and Corporate Governance” and “Economics of Banking” articles coming soon in banking publications
  - ALM articles & assumptions