Supervisory Views on Bank Economic Capital Systems:

What are Regulators Looking For?

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Economic Capital: What is It?

- Capital is held to ensure that a bank is likely to remain solvent, even if it suffers unusually large losses
- ***Available*** Economic Capital:
  - The amount by which the value of all assets ***currently*** exceeds the value of all liabilities
- ***Target or Required*** Economic Capital:
  - The amount by which the value of all assets ***should*** exceed the value of all liabilities to provide a very high *probability* that capital will not be wiped out over a one year period
- Typically, banks aim to have a high (e.g., 99.95%) probability of remaining solvent

Bank usage of EC models and RAROC

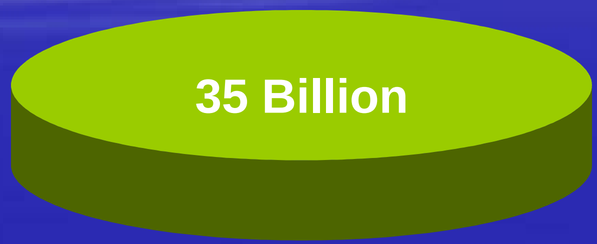
- Capital decisions
  - Reserves, capital hold levels
- Emerging risk identification
- Pricing and profitability decisions
  - RAROC: Risk-Adjusted Return On Capital
    - Return based on capital allocated to the business
    - Allocation is based on unexpected loss
    - But often fails to account for correlation
- Allocation decisions: boosting high RAROC business lines or asset classes
- Business strategy / acquisition decision-making

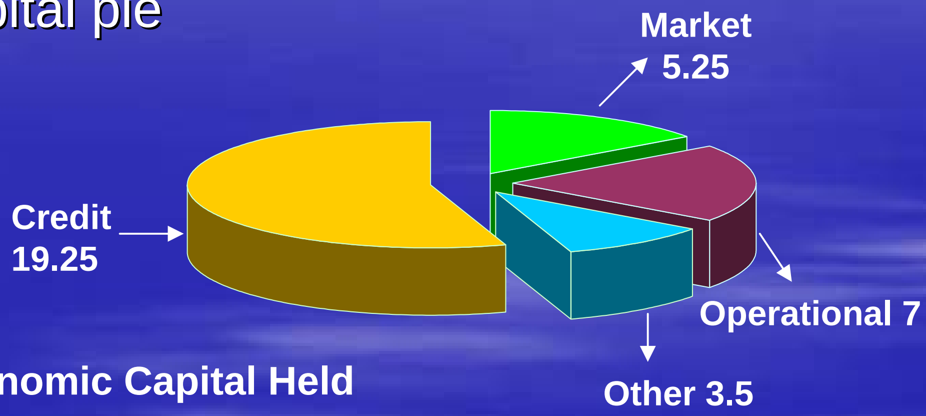
FRB Reviews of Internal Capital Adequacy Process

- Supervisory Guidance (SR 99-18)
  – Assessing capital adequacy in relation to risk at large banking organizations and others with complex risk profiles
- Looking for internal processes that:
  - Identify and measure material risks
  - Relate economic capital to measures of risk
  - Set capital adequacy goals based on risk measures
  - Review performance in relation to goals

Focus of Reviews

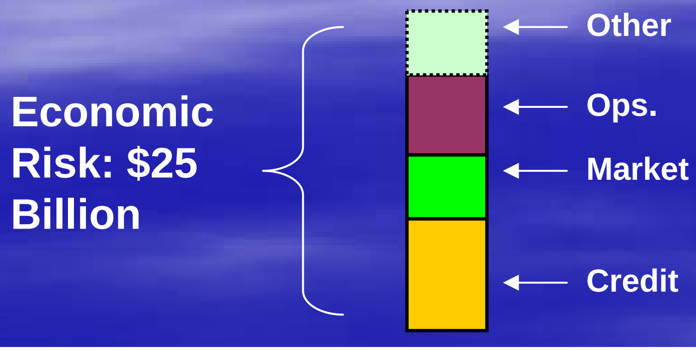
- Supervisors evaluate internal capital assessment process
- Focus on capital adequacy – attribution, not allocation
  - Not splitting up the existing capital pie

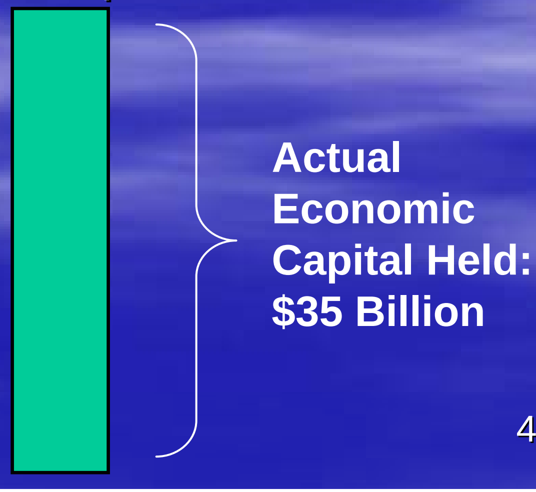




$35 Billion in Actual Economic Capital Held

  - Establishing absolute needs and comparing to capital resources





Key Questions In Our Reviews

- How is risk measured?
  - Simulation, covariance matrices, VaR, qualitative, etc.
- How reliable is EC analysis?
  - Quality of data infrastructure
  - Comprehensiveness of reference data (include economic downturn?)
  - Scope of risks covered
  - Validation process
- How well are concentrations/diversification taken into account?
- What role do factors such as stress testing and economic cyclicality play in EC calculations?
- How important are EC numbers to Sr. Management – is it taken seriously, does it affect capital planning?
- Is Firm Adequately Capitalized for Risk?

FRB Reviews: High Level Findings

- Three tiers of internal capital management sophistication:
  1. Sophisticated statistical approach to measuring risks
  2. Quantitative approaches for some business lines – but, not necessarily sensitive to changes in market conditions or portfolio composition
  3. Simple, qualitative or judgmental approach to EC
- Most large banks are developing or using EC as a risk tool
- Subset using well-developed portfolio credit models
- Limited recognition of credit derivatives or portfolio hedges
- Limited ability to measure correlations/concentration risk
- Significant progress on op risk for subset of largest
- Limited use of internal data; widespread use of external data for key parameter calibration

FRB Reviews: High Level Findings

- Proliferation of vendor-based models for risk management and economic capital applications
- To be useful, model results need to be more transparent
- Banks are committing significant resources to development of the key building blocks of EC
- Validation of EC methodology is a challenge
  - Documentation lags development, fragmented, obsolete
  - Support for decision-making process or modeling choices may be subjective, incomplete or even nonexistent.
  - Lack of check by internal or external 3rd parties

Risk Management Prerequisites

- Strong, credible infrastructure is needed to support EC process
  - Fundamental issues must be addressed first, such as ability to identify, measure, and manage risks
    - In terms of priorities, EC should not come first
    - Don't let the tail wag the dog
    - Bring together basic risk management and strategic economic capital analysis
  - Strong risk management allows credible risk metrics to be used as inputs to the top-of-the-house EC process
    - If risk metrics are sub-par or not relevant for the quantitative measurement tools, EC numbers will lack meaning, and worse become misleading
    - Need to leave room for more qualitative methods in hard to measure areas
  - Need robust controls and governance around entire EC process

- Aggregating within risk types and assessing correlation among risk types is an especially difficult challenge

How Might Economic Capital Fit into Basel II?

- *Pillar II, Principle 1*:

Banks should have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels.

- Sounds a lot like an economic capital planning process

- However, why would banks and supervisors need something beyond Pillar 1?

Limitations of Pillar 1

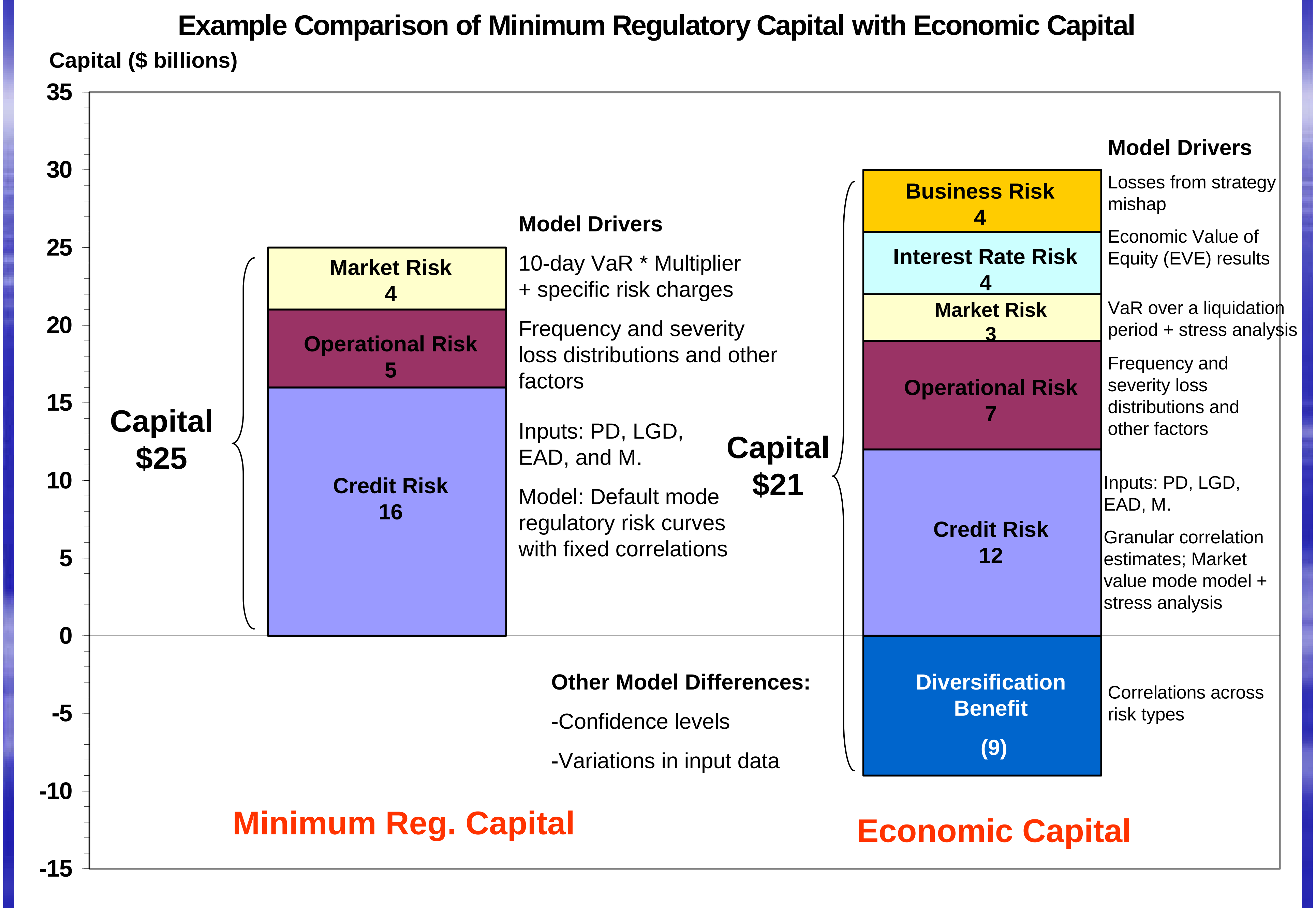
– Pillar 1 capital calculation's primary purpose is for regulatory minimum, not bank capital planning and risk management

– Pillar 1 contains numerous simplifying assumptions to apply to a broad spectrum of international institutions

  - Asset value correlations – dampened to reduce procyclicality
  - Portfolio invariance – all borrowers have one, uniform correlation assumption regardless of individual characteristics
  - Infinite granularity – e.g. no concentrations
  - Solvency standard (e.g. 99.9) tied to relative risk-weights, not absolute needs (calibration performed separately)
  - Technical compromises for cross country comparability
  - Inputs are long run average, not conditioned on current state

– Pillar 1 not tailored to institution's business mixes, strategies, and risk appetites

– Pillar 1 largely focused on set of figures, rather than on process and analysis for understanding capital adequacy and planning for capital needs.


Example Comparison of Minimum Regulatory Capital with Economic Capital
Capital ($ billions)
35
30
25
20
15
10
5
0
-5
-10
-15
Capital $25
Market Risk 4
Operational Risk 5
Credit Risk 16
Model Drivers
10-day VaR * Multiplier + specific risk charges
Frequency and severity loss distributions and other factors
Inputs: PD, LGD, EAD, and M.
Model: Default mode regulatory risk curves with fixed correlations
Other Model Differences:
-Confidence levels
-Variations in input data
Minimum Reg. Capital
Capital $21
Business Risk 4
Interest Rate Risk 4
Market Risk 3
Operational Risk 7
Credit Risk 12
Diversification Benefit (9)
Model Drivers
Losses from strategy mishap
Economic Value of Equity (EVE) results
VaR over a liquidation period + stress analysis
Frequency and severity loss distributions and other factors
Inputs: PD, LGD, EAD, M.
Granular correlation estimates; Market value mode model + stress analysis
Correlations across risk types
Economic Capital

Objectives of U.S. Pillar 2 ICAAP

(Internal Capital Adequacy Assessment Process)

- Overall Objectives:
  1. Identify and measure all material risks
  2. Set internal capital adequacy goals that relate directly to risk
  3. Ensure the meaningfulness and integrity of capital measures

- Other Key outputs:
  - Provide supplemental analysis that informs risk taking
  - Serve the institution's overall management of risk.

Pillar 2 Conclusion

- Pillar 1 satisfies basic need of supervisors to establish regulatory measures across vast array of banks for capital minimums
- Banks need to continue own analysis of capital needs focusing on:
  - Correlation estimates specific to their exposures
  - Capture concentrations, IRR
  - Capture other factors not explicitly considered in Pillar 1
  - Perform sensitivity analysis and stress testing to establish potential range of capital needs.
- Pillar 2 ICAAP may largely build from existing economic capital work and cover measurement, planning and controls