

Basel II

Tamer Bakiciol

Nicolas Cojocaru-Durand

Dongxu Lu

Roadmap

- Background of Banking Regulation and Basel Accord
- Basel II: features and problems
- The Future of Banking regulations

Background of Banking Regulation and Basel Accord

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Banking Supervision and Capital Regulation

- Purpose of banking supervision is
 - to ensure that banks operate in a safe and sound manner.
 - to ensure that banks "hold capital and reserves sufficient to support the risks that arise in their business".
 - sound practices for banks' risk management
- Regulatory Capital
 - list of the elements that count as capital for regulatory purposes
 - the set of conditions these elements must comply with in order to be considered eligible.
- Risk-Weighted Assets
 - all exposures after conversion into assets and after having received supervisory risk weights according to their degree of risk.
 - A supervisory risk weight
 - is a percentage used to convert the nominal amount of a credit exposure into an amount of 'exposure at risk'.
- Economic Capital: trade off between profitability and insolvency

Basel



What is the Basel Committee?

- Basel Committee on Banking Supervision was established by the central-bank governors of the G10 countries in 1974
 - Belgium, Canada, France, Germany, Italy, Japan, Luxemburg, Netherlands, Spain, Sweden, Switzerland, UK, US
- Meets at the Bank for International Settlements in Basel
- Its objective was to enhance understanding of key supervisory issues and improve the quality of banking supervision worldwide.
- Not a formal supranational supervisory authority and conclusions do not have legal force.
- Formulates broad supervisory standards and guidelines
- First major result was the 1988 Capital Accord
- 1997 developed a set of "*Core Principles for Effective Banking Supervision*", which provides a comprehensive blueprint for an effective supervisory system.

Basel Capital Accords Chronology

- Basel I Capital Accord (1988)
 - Amendment to the capital accord to incorporate market risks (1996)
- Basel II Capital Accord
 - First Consultative Paper (1999)
 - Second Consultative Paper (2001)
 - Third Consultative Paper (2003)
 - Final Document (2004)
 - “Basel II: International Convergence of Capital Measurement and Capital Standards: a Revised Framework”
- Amendment (2005)
 - The Application of Basel II to Trading Activities and the Treatment of Double Default Effects
- Final Version(2006)
 - “Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework - Comprehensive Version”
- Proposed revisions to the Basel II market risk framework (2008)

Motives for Basel I

- Deregulation period after 1980
- Increase in International presence of banks
- Decline in capital ratios of Banks just as increase in riskiness
- Risk posed to the stability of the global financial system by low capital levels of internationally active banks
- Competitive advantage accruing to banks subject to lower capital requirements
- Create a level of playing field

Motives and Objectives for Basel II

- Motives: Problems with Basel I
 - Club-rule (being a member of OECD) is not meaningful in terms of riskiness
 - “Broad brush” and lacks risk differentiation: One size fits all
 - Divergence between Basel I risk weights and actual economic risks
 - Regulatory arbitrage (Solved?)
 - Inadequate recognition of advanced credit risk mitigation techniques (securitization and CDS)
- Objectives
 - Eliminate regulatory arbitrage by getting risk weights right
 - Align regulation with best practices in risk management
 - Provide banks with incentives to enhance risk measurement and management capabilities.

“Basel II is not intended simply to ensure compliance with a new set of capital rules. Rather, it is intended to enhance the quality of risk management and supervision.”

Jaime Caruana
Governor of the Banco de España
Former Chairman of Basel Committee

Features and Problems of Basel II



3 Pillars of Basel II

Pillar 1	Pillar 2	Pillar 3
Minimum Capital Requirements: <ul style="list-style-type: none">• Risk management incentives• New operational risk capital charge• Risk weighted assets (RWA) for credit more risk sensitive• Market risk largely unchanged	Supervisory Review: <ul style="list-style-type: none">• Solvency reports• Regulatory review• Capital determination• Regulatory intervention• Addresses risks that are not captured in Pillar 1 like concentration, interest rate, and liquidity risks	Market Discipline: <ul style="list-style-type: none">• Minimum disclosure requirements• Scope• Capital transparency• Capital adequacy• Risk measurement & management• Risk profiling

The second pillar – supervisory review – allows supervisors to evaluate a bank’s assessment of its own risks and determine whether that assessment seems reasonable. It is not enough for a bank or its supervisors to rely on the calculation of minimum capital under the first pillar. Supervisors should provide an extra set of eyes to verify that the bank understands its risk profile and is sufficiently capitalized against its risks.

The third pillar – market discipline – ensures that the market provides yet another set of eyes. The third pillar is intended to strengthen incentives for prudent risk management. Greater transparency in banks’ financial reporting should allow marketplace participants to better reward well-managed banks and penalize poorly-managed ones.

Comparing Basel I to Basel II

Basel I

- Simple measure for credit risk
- Not risk sensitive
- No explicit measure for operational risk

$$\frac{\text{Total capital}}{\text{Credit risk RWA} + \text{Market risk RWA}} = \text{The bank's capital ratio} \geq 8\%$$

Basel II

- Bank's own internal measure for counterparty level risk parameters
- More emphasis on bank's own internal methodologies (Pillar I), supervisory review (Pillar II) and market discipline/disclosure (Pillar III)
- Significant changes to the approaches used to measure credit risk
- More flexibility, menu of approaches, incentives for better risk management
- Increased risk sensitivity
- Inclusion of explicit capital requirements for operational risk

$$\frac{\text{Total capital}}{\text{Credit risk RWA} + \text{Market risk RWA} + \text{Operational risk RWA}} = \text{The bank's capital ratio} \geq 8\%$$

Pillar 1: Minimum Capital Requirements

Pillar 1

**Minimum
Capital
Requirements**

- Credit Risk
- Market Risk
- Operational Risk

Pillar 2

**Supervisory
Review**

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Pillar 3

**Market
Discipline**

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Bank Capital

- Definition of regulatory bank capital
 - established in 1988 under Basel I
 - remains largely the same today and is also applicable under Basel II
 - comprised of three levels (or 'tiers') of capital. An item may be classified under one of these tiers if it satisfies specific eligibility criteria.
- eligibility criteria for capital components ensure the similarity across all the countries. This has led to greater comparability among banks, especially among those that are internationally active.
- criteria are:
 - permanence,
 - freedom (the ability to absorb losses on an ongoing basis),
 - subordination to depositors and other creditors
- The extent to which capital instruments meet these broad criteria will determine the tier of capital in which they are categorized: Tier 1 or Tier 2

Tier 1 Capital

- Deemed to have highest capacity to absorbing losses in order to allow banks continue to operate on ongoing basis
 - common shareholder equity
 - Fully paid therefore available to absorb losses permanently
 - Should losses occur, it is the common shareholders who bear such losses first
 - Disclosed Reserves
 - Published reserves derived from post-tax retained earnings and after dividend payments
 - non-cumulative perpetual preferred stock

Tier 2 & Tier 3 Capital

- Tier 2 cannot exceed 100% of Tier 1 capital
 - subordinated debt
 - undisclosed reserves: availability is more uncertain
 - general loan loss reserves
 - hybrid debt equity capital instruments
- Tier 3 can be used to meet a proportion of the capital requirements of market risk
 - Consist of subordinated debt with some limitations

Credit Risk

Pillar 1

**Minimum
Capital
Requirements**

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Pillar 2

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Credit Risk

- Standardized Approach
- Internal Ratings Based Approach (IRB)
 - Foundation
 - Advanced
- Credit risk mitigation
 - CDS & Counterparty risk
 - Securitization

Standardized Approach

- Based on external credit ratings
- Apply fixed risk weighting to assets based on:
 - Type of entity (Sovereign, Commercial bank, Corporates, retail, etc.)
 - Credit rating (AAA, Aaa,..., Bbb)





Standardized Approach

- Pros:
 - Simple
 - Doesn't require extensive modeling
 - Attractive for smaller banks with less experience
 - Uniform across banks
- Cons:
 - Less flexible and perhaps realistic
 - Rests on credit ratings devised by external agencies (Moody's, S&P, Fitch)

Credit Ratings vs. Risk Weighted Assets

Credit Rating	AAA to AA-	A+ to A-	BBB+ to BB-	Below BB-	Unrated
Basel I Risk Weight	100%	100%	100%	100%	100%
Basel II Risk Weight	20%	50%	100%	150%	100%

Credit Ratings: Sovereigns

OECD Country	S&P Sovereign Rating	Risk Weight (Basel I)	Risk Weight (Basel II)
Turkey 	B-	0%	100%
Mexico 	BBB+	0%	50%
Korea 	A	0%	20%
Germany 	AAA	0%	0%

Ratings as of Sept. 2001



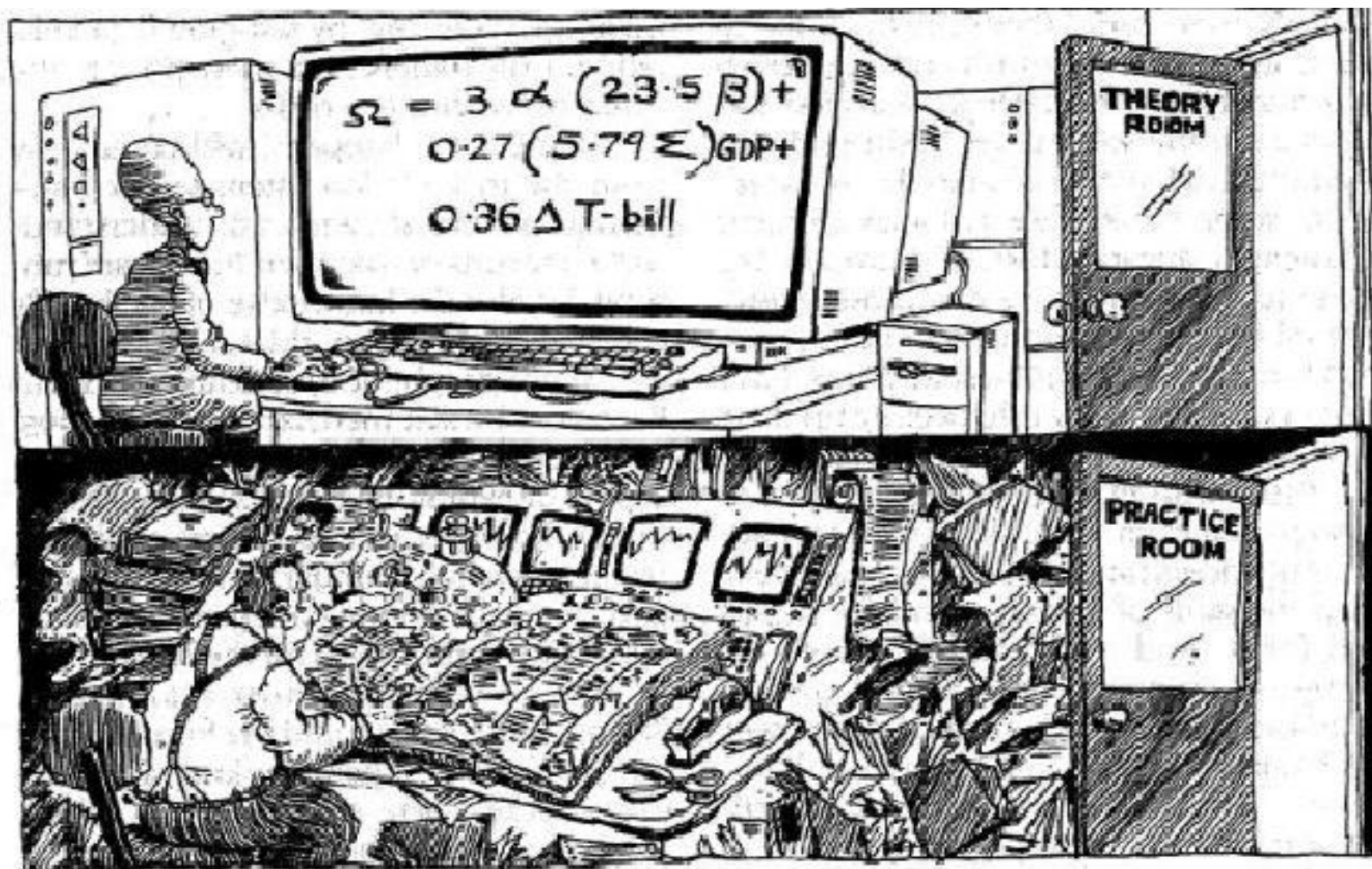
“An interesting resume, but actually, we’re looking for someone more evolved.”

Internal ratings based

- Based on internal loss models
- Two approaches
 - Foundation: Bank produces own loss probability models (i.e. own credit ratings), but uses prescribed estimates of Loss Given Default (LGD) based on ratings
 - Advanced: Bank uses own loss probability models and LGD models

IRB Example

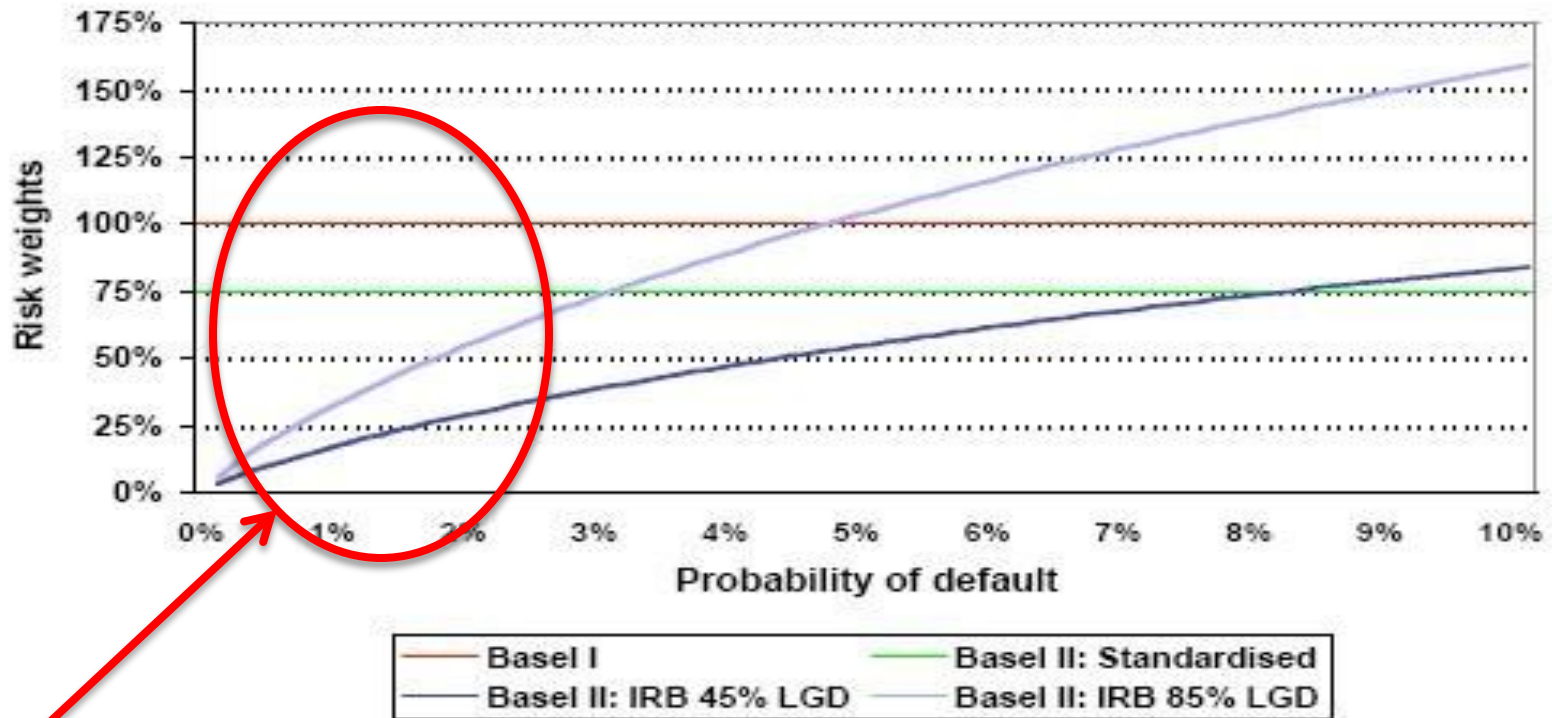
- Correlation (R) = $0.12 \times (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50)) + 0.24 \times [1 - (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50))]$
- Maturity adjustment (b) = $(0.11852 - 0.05478 \times \ln(\text{PD}))^2$
- Capital requirement (K) = $[\text{LGD} \times \text{N}[(1 - \text{R})^{-0.5} \times \text{G}(\text{PD}) + (\text{R} / (1 - \text{R}))^{0.5} \times \text{G}(0.999)] - \text{PD} \times \text{LGD}] \times (1 - 1.5 \times \text{b})^{-1} \times (1 + (\text{M} - 2.5) \times \text{b})$
- Risk-weighted assets (RWA) = $\text{K} \times 12.5 \times \text{EAD}$



Internal Ratings Based

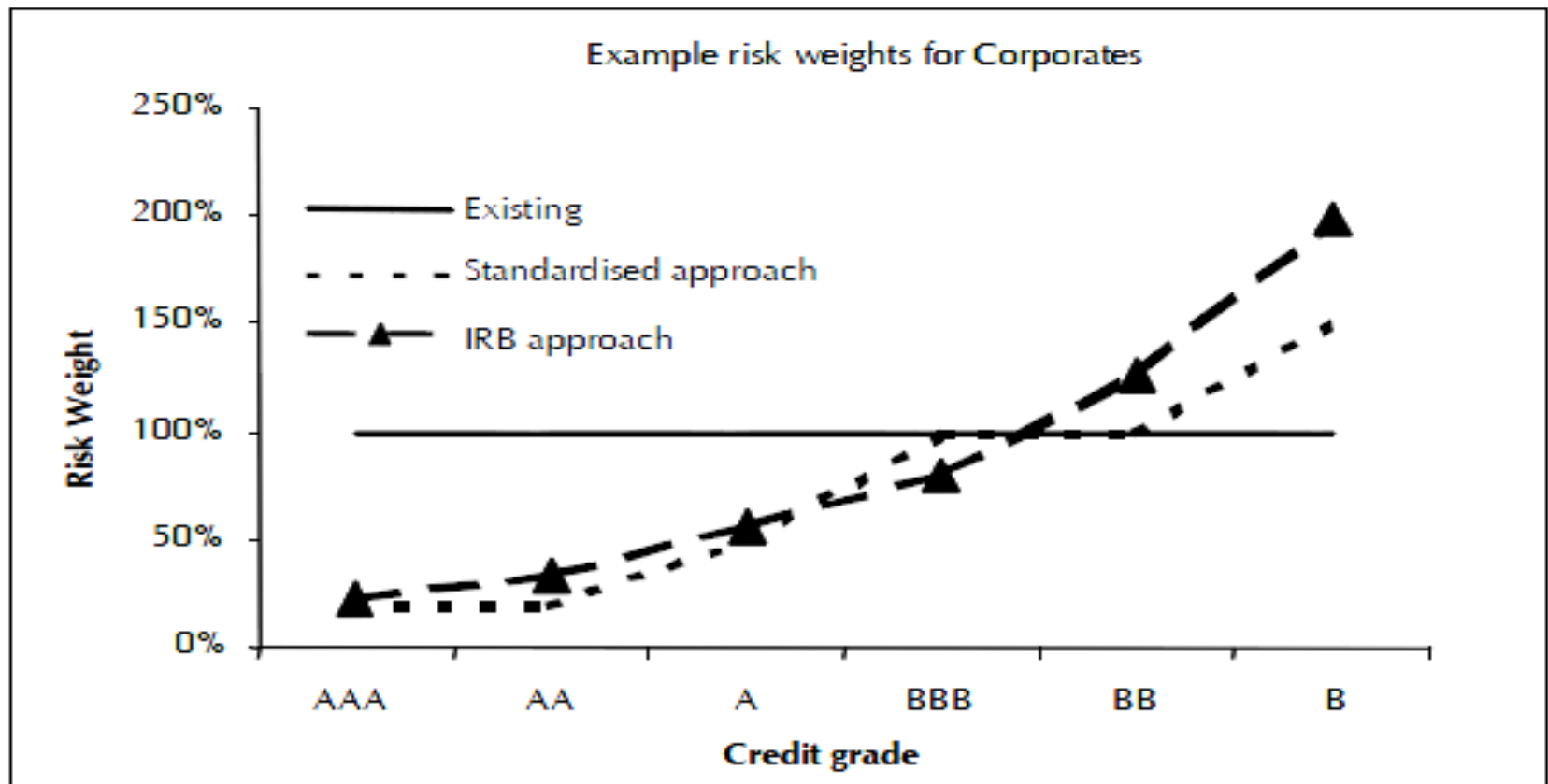
- Pros:
 - More realistic
 - Favored by larger banks, mandatory for large US banks
- Cons
 - Similar to VaR: modeling rare events
 - Large investment needed to put in place and maintain
 - Large data requirement (5+ years)
 - More discretion to banks as to how they value their risks...

Standardized vs. IRB: by pD

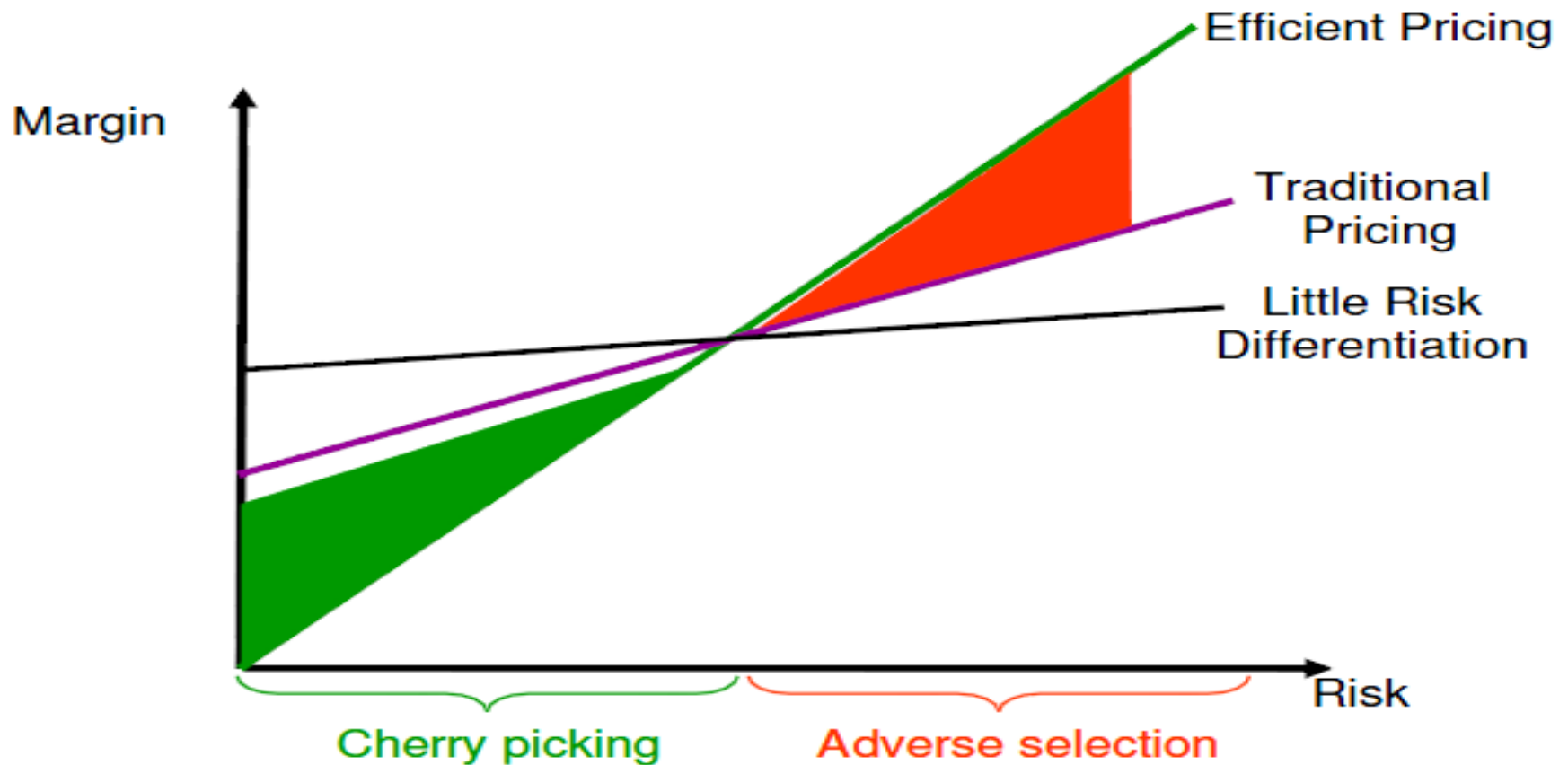


For small prob. of defaults large difference in risk weighting

Standardized vs. IRB: by credit

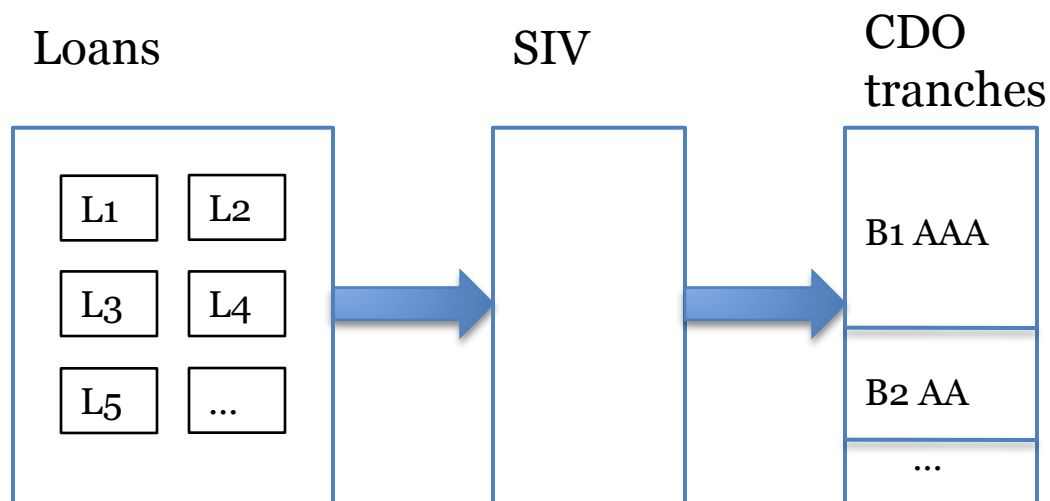


Adverse Selection



Securitization and credit protection

- Just like you can buy life insurance, banks can protect themselves against defaults by buying Credit Default Swaps (CDS)
- This exposes them to counterparty risk however
- They can also get rid of bad loans/risky exposure (even CDS) by repackaging assets in CDOs which are housed off balance-sheet



CDO structure

# default	0	1	2	3		
prob	0.857375	0.135375	0.007125	0.000125	Price	Rating
Senior	1	1	1	0	0.9999	AAA
Mezz	1	1	0	0	0.9928	AAA
Junior	1	0	0	0	0.8574	BBB
				Avg	0.95	
# default	0	1	2	3		
prob	0.729	0.243	0.027	0.001	Price	Rating
Senior	1	1	1	0	0.9990	AAA
Mezz	1	1	0	0	0.9720	A
Junior	1	0	0	0	0.7290	N/R
				Avg	0.9	

- Using low-rated bonds, 2/3 of the new structure has higher rating
- If pD doubles (5% to 10%), the Senior tranche retains its rating, but not the rest

Regulatory arbitrage

- In hindsight, SIV's enabled banks to house risky assets outside the scope of Basel rules
- Because of the diversification coming from the pooling of risky assets, the tranches issued had higher credit ratings
- Limited provisions were made for the liquidity clause banks had with their SIV's especially if they issued short-term assets (ABCP)
- Combined, this reduced regulatory capital to be held and enabled more risk-taking

Market Risk

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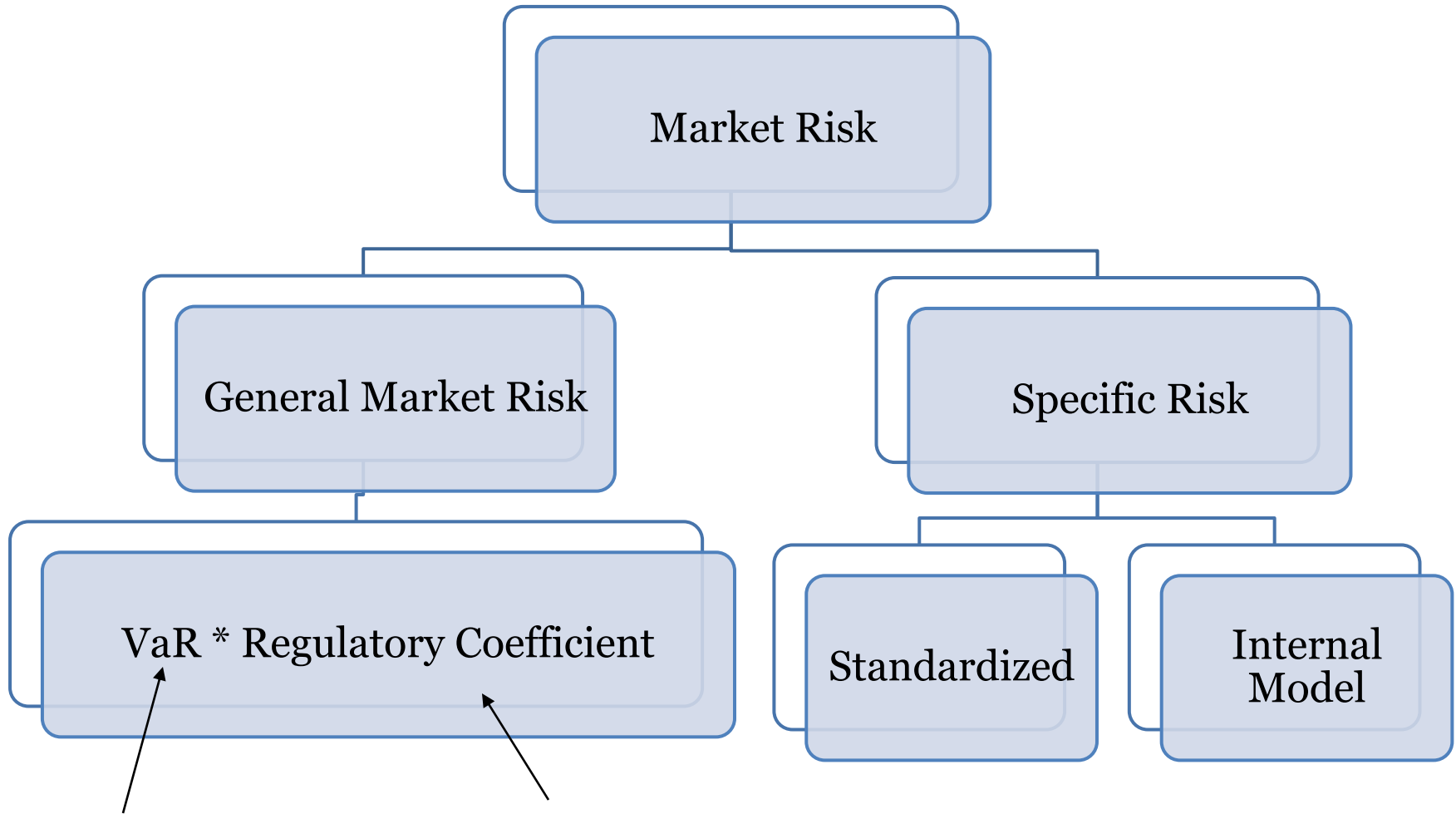
Pillar 3

**Market
Discipline**

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- Risk of losses of on- and off- balance sheet positions arising from movement in market price (interest rate, equity positions, foreign exchange and commodity risk)

Market Risk

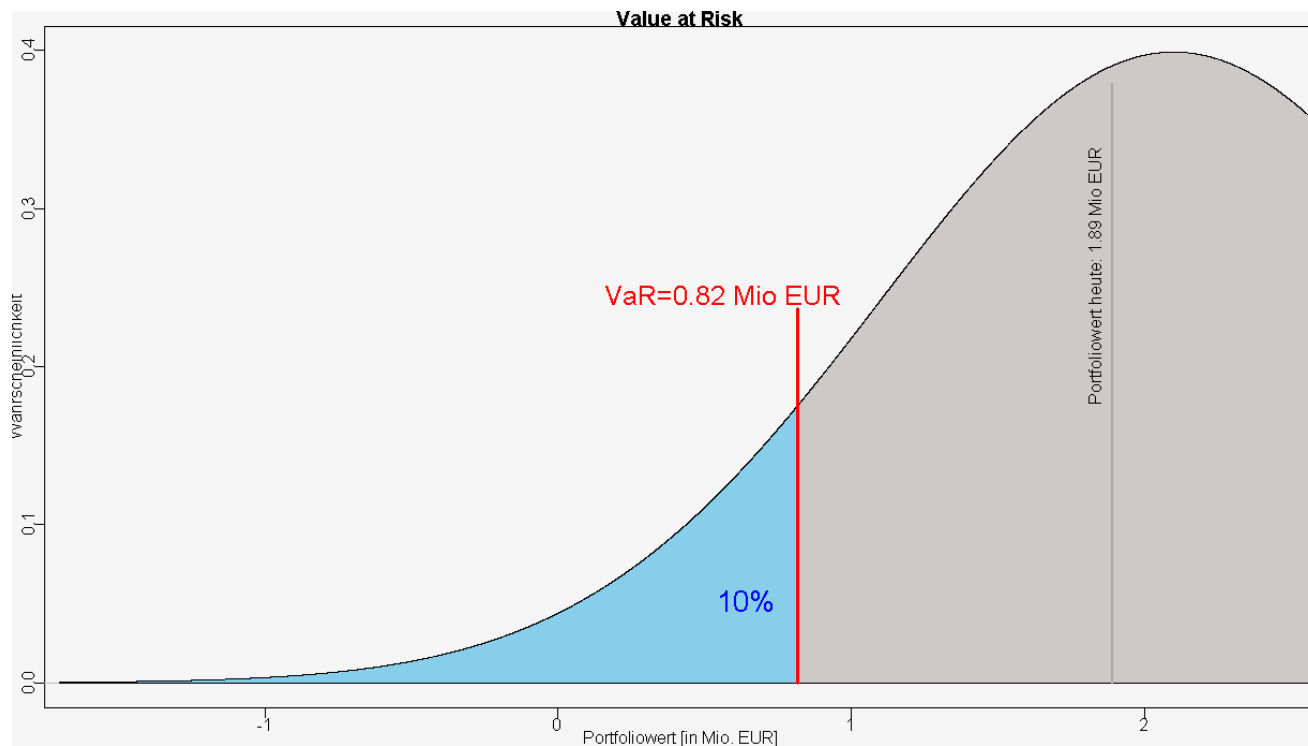


10 day time horizon
99% confidence level

May range from 3.0 to
4.0

Value at Risk

- For market risk the preferred approach is VaR (value at risk).



Problems with VaR

- Does not give the actual size of loss
- “Fat tail” Problem
- Created an incentive to take “excessive but remote risks”

Conditional VaR (CVaR)

- The “CVaR at $q\%$ level” is the expected return on the portfolio in the worst $q\%$ of the cases.

Stress Testing and Scenario Analysis

- Test the portfolio under some stresses(e.g.):
 - What happens if the market crashes by more than $x\%$ this year?
 - What happens if interest rates go up by at least $y\%$?
 - What happens if oil prices rise by 200% ?

Operational Risk

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Risk arising from execution of a company's business functions (e.g. legal risk)

Operational Risk

Increasing sophistication



Basic Indicator Approach

- Operational Risk Capital = α * Gross Revenue
- α is a percentage set by regulator

Standardized Approach

- Operational Risk Capital = β * Gross Revenue per Business Line
- β is a percentage set by regulator

Advanced Measurement Approach

- Operational Risk Capital = the risk measure generated by the bank's own operational risk measurement system

Pillar 2: Supervisory Review

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Requirements**

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Supervisory Review

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.

Principle 2: Supervisors should review and evaluate banks' internal capital adequacy assessments and strategies, as well as their ability to monitor and ensure their compliance with regulatory capital ratios. Supervisors should take appropriate supervisory action if they are not satisfied with the result of this process.

Principle 3: Supervisors should expect banks to operate above the minimum regulatory capital ratios and should have the ability to require banks to hold capital in excess of the minimum.

Principle 4: Supervisors should seek to intervene at an early stage to prevent capital from falling below the minimum levels required to support the risk characteristics of a particular bank and should require rapid remedial action if capital is not maintained or restored.

Pillar 3: Market Discipline

Pillar 1

**Minimum
Capital
Requirements**

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Pillar 2

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Review**

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Pillar 3

**Market
Discipline**

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Market Discipline

The third pillar greatly increases the disclosures that the bank must make. This is designed to allow the market to have a better picture of the overall risk position of the bank and to allow the counterparties of the bank to price and deal appropriately.



Beyond Basel II

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Rethinking Basel II

- Even theoretically sound rules may be sub-optimal because of compliance costs and supervisory limitations: Cost of Basel II?
- Basel 2 Risk rating will be determined by the assessments of external credit rating agencies. Debatable, after shortcomings exposed by subprime crisis
- Macroeconomic: Procyclicality
- More measures of system risk:CoVaR

16 April 2008 Basel Committee announces steps to strengthen the resilience of the banking system

- The Committee reiterates the importance of implementing the Basel II Framework as it better reflects the types of risks banks face in an increasingly market-based credit intermediation process
- The committee acknowledged the deficiencies in the Framework. Further strengthening certain aspects of the Framework:
 - higher capital requirements for certain complex structured credit products, such as so-called "resecuritisations" or CDOs of ABS, which have produced the majority of losses during the recent market turbulence.
 - strengthen the capital treatment of liquidity facilities extended to support off-balance sheet vehicles such as ABCP conduits.
 - strengthen the capital requirements in the trading book. Global banks' trading assets have grown at double digit rates in recent years, and the proportion of complex, less liquid credit products held in the trading book has likewise increased rapidly.

16 April 2008 Basel Committee announces steps to strengthen the resilience of the banking system

- The current value-at-risk based treatment for assessing capital for trading book risk does not capture extraordinary events that can affect many such exposures. Measures will be taken to include potential event risks in the trading book.
- The market turmoil has revealed significant risk management weaknesses at banking institutions. Issuance of Pillar 2 guidance in a number of areas to help strengthen risk management and supervisory practices:
 - management of firm-wide risks
 - banks' stress testing practices
 - capital planning processes
 - the management of off-balance sheet exposures and associated reputational risks
 - risk management practices relating to securitization activities
 - supervisory assessment of banks' valuation practices.

16 April 2008 Basel Committee announces steps to strengthen the resilience of the banking system

- Banks need to have strong liquidity cushions to weather prolonged periods of financial market stress and illiquidity
- Weaknesses in bank transparency and valuation practices for complex products have contributed to the build-up of concentrations in illiquid structured credit products and the undermining of confidence in the banking sector.
 - The Committee will promote enhanced disclosures relating to complex securitization exposures, ABCP conduits and the sponsorship of off-balance sheet vehicles.