Lecture

IAQS | INSTITUTE OF ACTUARIAL & QUANTITATIVE STUDIES

Class: TY BSc

Subject : Basel

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Chapter: Unit 3 Chapter 2

Chapter Name : Basel 2.5

Today's Agenda

1. Why was Basel II.5 introduced?
   1. Changes
2. Stressed VaR
2. Incremental Risk Capital Charge
2. Comprehensive Risk Measure

1 Why was Basel II.5 introduced?

- The implementation of Basel II coincided with the financial crisis of 2007 – 2009.
- Some people blamed Basel II because banks using the advanced internal ratings based (IRB) approach to calculate credit risk were allowed to use their own estimates of probability of default (PD), loss given default (LGD), and exposure at default (EAD).
- Some believed Basel II was a move toward self-regulation and allowed banks to underestimate risks.
- As a result, the Basel Committee on Banking Supervision implemented a series of changes to the calculation of market risk capital.
- These changes were part of Basel II.5, implemented December 31, 2011

1.1 Changes

The Basel Committee responded with updated rules for capital for the trading book, making three major changes:

- VaR calculations were expanded to include a stressed-VaR component
- Capital for incremental risk was added (roughly capturing the jump-to-default risk)
- Comprehensive risk capital requirements were added for securitizations and related instruments.

2 Stressed VaR

- Most banks computed capital under the market risk amendment using historical simulation, (i.e., 1-day VaR was computed by drawing daily changes in value from recent history and then converted to VaR by multiplying by √10).

- During periods of low volatility, such a practice causes measured VaR to gradually decline because all or nearly all of the historical observations have small changes in value.

- When volatility rises again, as it did in 2007 for many assets, VaR from historical simulation was slow to follow because most historical observations were from a low- volatility period.

- The Basel Committee introduced a requirement for use of stressed-VaR measures to counter such tendencies. Rather than drawing daily observations from the most recent historical period, a bank is required to identify the one-year (i.e., 250 day) period from the most recent seven years that was most stressful for its current portfolio.

- Because this will be the sub-period with the highest fraction of portfolio-weighted large declines in value, the resulting 1-day VaR will be relatively large and will not change much as time passes (unless a period of low volatility persists for 7 years).

2 Stressed VaR

Stressed VaR was combined with the traditional VaR measure in an expanded formula:

$$\mathbf{MR_{2.5} = \max(VaR_{t-i}, m_c * VaR_{avg}) + \max(SVaR_{t-i}, m_s * SVaR_{avg})}$$

Where:

VaR_{t-1} = previous days VaR, 10-day time horizon, 99% confidence level
VaR_{avg} = the average VaR over the past 60 days, 10-day time horizon, 99% confidence level
m_c = multiplicative factor, determined by supervisor, minimum value of three
$SVaR_{t-1}$ = previous days stressed VaR, 10-day time horizon, 99% confidence level
$SVaR_{avg}$ = the average stressed VaR over the past 60 days, 10-day time horizon, 99% confidence level
m_s = stressed VaR multiplicative factor, determined by supervisor, minimum of three

2 Stressed VaR

Because the definition of the stress period is such that the most recent period cannot be more stressed than the stressed period, and the charges based on traditional and stressed VaR are summed, MR2.5 must be at least twice as large as MR calculated under the 1996 Amendment as long as the multipliers are equal.

2 Example

Spartan State Bank has calculated a market risk VaR for the previous day equal to $15.6 million. The average VaR over the last 60 days is $4.8 million. The bank has calculated a stressed VaR for the previous day equal to $17.7 million and an average stressed VaR equal to $18.4 million. Spartan State Bank has an accurate risk measurement model and recorded only two exceptions while back testing actual losses against the calculated VaR. As such, the multiplicative factors, both mc and ms, are set to 3. Calculate the total market risk capital charge.

Solution:

Total capital charge = $15.6 million + ($18.4 3)

= $70.8 million

3 Incremental Risk Capital Charge

- The incremental risk charge (IRC) combines two strands of work, one released in 2005 as a reaction to regulatory arbitrage opportunities between the banking and trading book, and the other released in the wake of the crisis.

- Although the specific risk charge was intended to capture default risk (as well as other sources of idiosyncratic risk), banks had learned by the early 2000s that even with the specific risk charge, most banking-book exposures had smaller capital requirements in the trading book than in the banking book. Thus, many illiquid instruments posing default risk were placed in the trading book.

- To remove this incentive, the Basel Committee proposed adding an incremental default risk charge (IDRC).

3 Incremental Risk Capital Charge

Two variants were proposed:
• An internal model of default risk calibrated to the same 99.9th percentile at a one-year horizon as the Committee's IRB approach
• Or, in the absence of such a model, either a "standardized" or a "current exposure" approach that had some similarity to Basel I capital charges for specific risk.

- As a practical matter, capital in the trading book would be the greater of market risk capital and banking book capital.
- Late in the crisis, however, the Committee had realized that most losses in portfolio value associated with credit risk had been due to changes in ratings, credit spreads, or liquidity, not defaults.
- As a result, the scope of the proposal was increased to include changes in ratings. The same 99.9th percentile was used, but in addition to defaults, banks were required to estimate losses associated with rating downgrades.
- Portfolio credit quality is held approximately constant by an assumption that any position that is downgraded or that defaults is replaced by a position with the same pre-downgrade rating. A loss is recorded from sale of the downgraded or defaulted position. The period over which replacement could occur differs across positions according to their liquidity but is never less than three months.

4 Comprehensive Risk Measure

- The comprehensive risk measure (CRM) is a single capital charge for correlation-dependent instruments that replaces the specific risk charge (SRC) and the IRC. The measure accounts for risks in the correlation book.

- Instruments that are sensitive to the correlation between the default risks of different assets include asset-backed securities (ABS) and collateralized debt obligations (CDOs).

- In normal periods, there is little risk of loss for highly rated tranches of these instruments. However, in times of stress, as in the 2007 - 2009 financial crisis, correlations with other instruments increase and even the highest-rated tranches can be vulnerable to loss.

- The committee has specified a standardized approach for rated instruments. Due to the experience of the financial crisis, resecuritizations, such as CDOs of ABSs, have higher capital requirements than normal securitizations such as mortgage-backed securities.

4 Comprehensive Risk Measure

Standardized Capital Charge for Correlation – Dependent Instruments

Type of Instrument	AAA to AA–	A+ to A–	BBB+ to BBB–	BB+ to BB–	Below BB– or Unrated
Securitization	1.6%•	4%	8%	28%	Deduction
Resecuritization	3.2%•	8%	18%	52%	Deduction

For unrated instruments or instruments rated below BB, the bank must deduct the principal amount of the exposure from capital. This is equivalent to a 100% capital charge; banks must hold dollar-for-dollar capital against the tranche. For unrated tranches banks are allowed, with supervisory approval, to use an internal model to calculate the CRM. If a bank is allowed to use an internal model, it must routinely perform rigorous stress tests.

4 Comprehensive Risk Measure

Internal models must be sophisticated and capture the cumulative effects of several factors including:

- Credit spread risk.
- Multiple defaults.
- The volatility of implied correlations.
- The relationship between implied correlations and credit spreads.
- The costs of rebalancing hedges.
- The volatility of recovery rates.

The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) does not allow ratings to be used in setting capital requirements. As such, the United States is trying to devise its own CRM rules that do not use ratings.