THC Financial Engineering
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Risk Modeling Bulletin Issue 16

Basel Ⅱ Report

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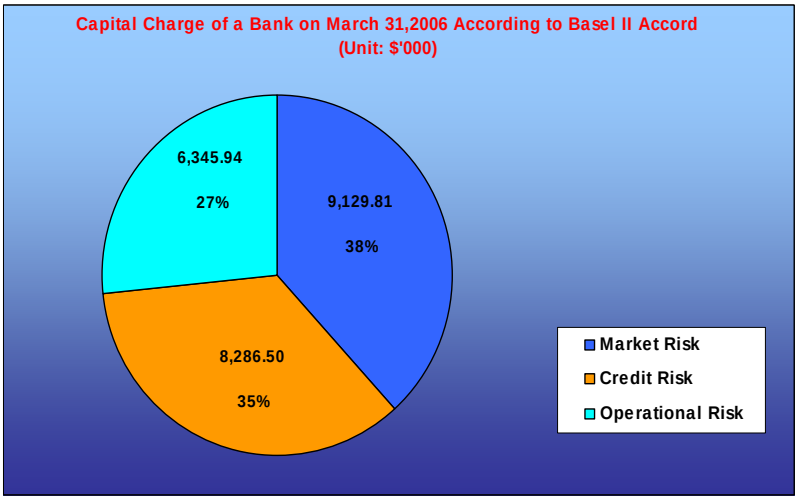
This issue focuses on the Basel Ⅱ Accord. Feature Article introduces the Basel requirements; Market Perspective presents the risk drivers of banks and the methods used at THC Decisions for forecasting different risks.

Feature Article: Basel Requirements

Basel Ⅱ, which will be brought into effect on Jan 1, 2007, is a regulatory response to the lack of risk sensitivity of the existing Accord (Basel Ⅰ Accord). It is made to further strengthen the soundness and stability of the banking system. According to the minimum capital requirement of Basel Ⅱ, banks should have significant capital for market, credit and operational risks.

THC has used a sample bank and measured the capital charge for market risk, credit risk and operational risk according to the Basel Ⅱ Accord. Figure 1 presents the results.

FIGURE 1



The market risk is measured by the 95% VaR. The capital charge for market risk equals a multiple (user defined) of the 3-month market VaR:

$$Capital\ Charge\ for\ Market\ Risk = 3\text{-}month\ Market\ VaR * Multiplication\ Factor_{market}$$

To deal with the credit risk, THC Decisions uses both Basel Ⅱ SA (Basel Ⅱ Standardized Approach) and IRB (Internal Rating-Based Approach). With the Basel Ⅱ SA, the capital requirement equals 8 percentage of the risk-weighted asset. Note that the risk-weighted asset equals the sum of risk-weighted remaining principals of all assets over the balance sheet. Formulas are as follows:

$$Capital\ Charge\ for\ Credit\ Risk_{SA} = Risk\text{-}Weighted\ Asset * 8\%$$

$$(risk\text{-}weighted\ asset = \sum_i remaining\ principal\ of\ asset\ i * risk\ weight\ of\ asset\ i)$$

With the IRB approach, the capital charge equals a multiple (user defined) of the 3-month credit VaR:

$$Capital\ Charge\ for\ Credit\ Risk_{IRB} = 3\text{-}month\ Credit\ VaR * Multiplication\ Factor_{credit}$$

In THC Decisions, the capital charge for the operational risk is calculated by BIA (Basic Indicator Approach). It is a multiple (user defined) of the annualized gross income of a cycle:

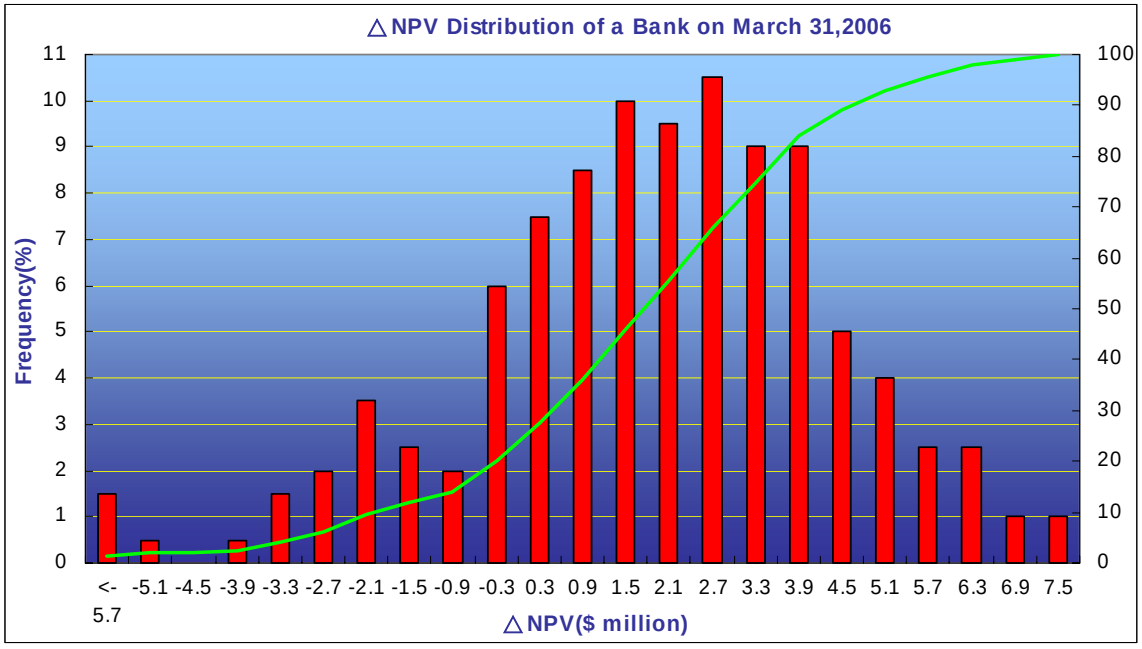
$$Capital\ Charge\ for\ Operational\ Risk_{BIA} = 3\text{-}month\ Gross\ Income * 4 * Multiplication\ Factor_{operational}$$

Market Perspective: Risk Drivers

Basel Ⅱ Accord requires the thrifts to protect a variety of risk exposures: market risk, credit risk and operational risk.

Market risk is measured by VaR in THC Decisions; Monte-Carlo and Delta-Normal methods are both available for the VaR calculation. For the Monte-Carlo method, path values are simulated on arbitrage-free interest rate lattices. Figure 2 depicts the △NPV distribution of a thrift on March 31, 2006. The 95% VaR is $3.043272 million.

FIGURE 2



To measure the credit risk, with the SA approach, credit risk is measured by risk weight, ignoring the correlations. With the IRB approach, we use the rating and seniority to determine the default probability and the recovery ratio respectively. The industry type is used to determine the correlations. Specifically, we assume constant 35% correlation among the bonds in different industries and 15% correlation between the bonds in the same industry. With the information, a multivariate Gaussian copula is formed representing the random distribution of the loss of an asset, given its maturity and principal. We then determine the VaR of a portfolio.

A sample of input data is given below in Table 1: Basel CR Type for SA, Industry Type and Seniority Type for IRB, Credit Rating for the both.

Table 1: Fields Involved in Credit Risk Calculation

SA	SA&IRB	IRB	
Basel CR Type	**Credit Rating Type**	**Seniority Type**	**Industry Type**
1 Sovereigns	0 Other	0 Other	0 Other
2 PSEs	1 AAA	1 Senior secured	1 Banking
3 MDBs	2 AA+	2 Senior unsecured	2 Utilities
4 Banks	3 AA	3 Senior subordinated	3 Insurance
5 Security firms	4 AA-	4 Subordinated	4 Telecom
6 Corporates	5 A+	5 Junior subordinated	5 Energy
7 Retail portfolios	6 A	6 All bonds	6 Media
8 Secured by residential property	7 A-		
9 Commercial real estate	8 BBB+		
10 Past due loans	9 BBB		
11 High risk categories	10 BBB-		
12 other assets	11 BB+		
13 OBS	12 BB		
	13 BB-		
	14 B+		
	15 B		
	16 B-		
	17 CCC		

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