

## **FYI - An Update on Emerging Issues in Banking**

### **Risk-Based Capital Requirements for Commercial Lending: The Impact of Basel II**

April 21, 2003

#### **Introduction**

Of all the changes in capital regulation being considered by the Basel Committee on Banking Supervision, the most fundamental shift from current practice is that the risk-based capital requirements for the largest banks would no longer be based on a few pre-set ratios dictated by the regulators. Instead, these banks would play a major role in setting their own capital requirements by using their internal estimates of the underlying risk of each credit exposure as inputs into regulator-defined formulas called risk-weight functions. Collectively, this approach is known as the internal ratings-based (IRB) approach.

The purpose of this article is to demonstrate the mechanics of the Basel II risk-based capital calculation for commercial credit exposures, and to present evidence on the impact of the new calculations on capital requirements for syndicated loans. The article shows that the capital impact depends heavily on the method banks use to estimate future recovery rates on defaulted loans. This illustrates the importance of regulatory decisions about the validation of banks' internal risk estimates under Basel II.

The proposed new risk-based capital regime could result in a meaningful reduction in minimum risk-based capital requirements for syndicated loans at the largest banks. Syndicated loans make up about one-third of total commercial and industrial loans held by U.S. banks. FDIC calculations based in part on rating agency evidence on the characteristics of syndicated bank loans suggests a reduction in risk-based capital requirements for these loans in the range of 10 to 40 percent, depending on the methodology used to estimate loss given default (LGD).

An important distinction should be drawn between Basel II's minimum regulatory risk-based capital requirements for specific portfolios—such as the syndicated loan portfolio discussed in this paper—and the overall capital large banks will actually hold. Overall capital would reflect the capital required for all portfolios as well as other factors. In particular, any reduction in a bank's overall capital under Basel II would be constrained by three factors. First, regulatory Prompt Corrective Action capital triggers, including a requirement to maintain a ratio of tier 1 capital to total assets of at least five percent in order to be designated "well capitalized," would continue to be in effect. Second, market pressures and the need to maintain flexibility to exploit new market opportunities are likely to lead banks to hold more capital than their regulatory minimums would indicate. Finally, Basel II includes a risk-based capital charge for operational risk.

The new minimum regulatory capital requirements for specific portfolios could nevertheless have ramifications both for the type of lending large banks conduct and for the locus of specific types of lending as between the largest banks and other U.S. banks. Regulatory-capital incentives for high-quality lending and strong underwriting at the largest institutions would dramatically increase, as would the stakes involved for banks to be able to demonstrate to their regulators the quality of their loans and risk measurement systems. Differences in minimum regulatory capital requirements for similar activities between the largest banks and other banks could, conceivably, affect which banks make and hold loans and how they are priced. The importance of these competitive effects is uncertain, because the pricing and volume of bank lending depends not only on the regulatory capital requirement but on other factors including the underlying or economic risk of each loan and the nature of competition in the marketplace.

One does not have to look much beyond the current economic climate to gain a perspective on the potential impact of a more risk sensitive capital framework. For example, the U.S high yield default rate reached 16.4 percent in 2002 with nearly \$110 billion in defaulted volume, and corporate downgrades outstripped upgrades on global senior debt in 2002 by a factor of nine to one. These factors move the risk-based capital debate rapidly beyond theory toward practical application as banks look to allocate their capital in the most efficient manner.<sup>1</sup>

## **Scope of the Article**

The most recent version of the Basel technical documents, available on the website of the Bank for International Settlements, requires qualifying banks to use four risk weight functions to determine their capital requirements for most credit exposures. These technical documents form the basis for much of the discussion in this paper because they are the most recent publicly available sources of information on the Basel II proposals. There are three functions for retail credit (mortgages, credit cards, and other) and one for commercial exposures.<sup>2</sup>

This paper focuses on the IRB approaches for measuring the credit risk capital requirement for commercial and industrial loans and related exposures. This segment of the Basel II rules governing commercial loans covers a large portion of total banking exposures. Further, the commercial and industrial risk weight function serves as the basis for determining the capital requirements for other bank exposures.

Specifically, the commercial and industrial risk weight function (C&I risk weight curve) discussed in this paper will be used to determine capital requirements for banks' commercial loans, certain small business loans, sovereign exposures, bank exposures, and to some extent, commercial real estate loans and securitization exposures.

## **Basel II- A New Capital Adequacy Framework**

The creation of a more risk sensitive framework for capital regulation is at the heart of the Basel II Capital Accord. One of the key objectives of a risk-sensitive approach is to provide supervisors, banks and other market participants with a measure of capital adequacy that better reflects the true financial condition of a large bank. Harnessing the internal risk estimates of a bank is intended to provide supervisors with an indicator of the financial strength of the bank that is quicker to reveal looming problems.

A more risk sensitive minimum capital ratio is also intended to encourage large banks to make lending, investment, and credit risk hedging decisions based on the underlying economics of the transactions. The intent is to eliminate the regulatory distortions and arbitrages under the current rules such as the disincentive to lend to highly rated companies and securitization transactions designed to minimize regulatory capital requirements while transferring little or no risk.

Finally, increasing the risk sensitivity of the minimum capital requirements is intended to give large banks stronger incentives to manage and measure their own risk. Basel II in effect sets minimum risk-based capital requirements at the level of the individual credit exposure, and in so doing sharply differentiates in terms of quality among the universe of credits, a universe for which banks currently face a single, identical, capital requirement for non-problem loans. The qualification standards large banks would have to meet in order to be allowed to use their internal risk estimates are considerable. Meeting these standards would require defined enhancements to the risk-management and measurement systems at the largest banks.

### *A Three Pillar Approach to Measuring Capital Adequacy*

As detailed in the first in the FDIC's series on Basel II, the proposed revisions to the 1988 Accord

comprise three mutually reinforcing "pillars."<sup>3</sup> The first pillar sets out the explicit regulatory capital charges, while the second and third pillars deal with supervision and market discipline, respectively. Banks will have explicit Pillar 1 capital requirements against market risk on exposures residing in the trading book, operational risk and credit risk, and may be subject to other capital requirements under Pillar 2 based on supervisory discretion. Risk-based capital requirements for market risk are unchanged. The new operational risk capital requirement, intended to cover the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events, will vary depending upon the approach used by the bank.

Just as under the current approach, banks will be required to hold total capital of at least 8 percent of risk weighted assets. While the definition of capital and its components (the numerator of the ratio) remains unchanged, risk weighted assets (the denominator of the ratio) could vary significantly from the current rules.

### *The Scope of Application of Basel II in the United States*

Basel II provides three options for measuring the credit-risk component of capital requirements—a standardized approach, and two IRB approaches. One of the IRB approaches is called the "foundation approach" and the other is called the "advanced approach." It is expected that a core group of large, internationally active banks in the United States would be required to adopt the advanced IRB approach. Other banks that meet the risk-management and risk-measurement qualification standards and wish to adopt the advanced IRB approach would be allowed to do so. Banks outside the core group that do not wish to adopt the advanced IRB approach, or cannot qualify, would remain subject to current capital regulations. It is expected, however, that these regulations will continue to be refined over time. The U.S. banking agencies would solicit comment on what, if any, changes to current capital regulations are needed for the vast majority of banks that are not subject to the advanced IRB approach.

The bulk of this paper covers the advanced IRB approach that would be offered in the U.S., and touches on the standardized and foundation approaches to measuring credit risk only briefly, for comparative purposes. The standardized approach offers an expanded fixed bucket approach that relies to some degree on external credit ratings provided by such firms as Standard and Poor's, Moody's, and Fitch. For example, under the 1988 Accord, corporate exposures rated AAA and B are both risk weighted in the 100 percent bucket. Under the standardized approach, the AAA corporate exposure would be risk weighted in the 20 percent bucket, and the B- rated credit would be risk weighted in the newly proposed 150 percent bucket. In that respect, the standardized approach is somewhat more risk sensitive than the current rules. It should be noted, however, that most commercial credit exposures held by small banks are unrated and would retain a 100 percent risk weight.

The foundation approach differs from the advanced approach in the degree to which banks can use their own risk estimates to compute capital requirements. Many of the risk inputs are provided by the supervisors under the foundation approach. The advanced IRB approach is more flexible and allows greater leeway for banks to evaluate elements such as the likelihood that a loan commitment will be drawn or the value of loss protection to be derived from various types of collateral. This reliance on banks' internal risk inputs makes the IRB capital requirements considerably more risk sensitive to changes in borrowers' creditworthiness or collateral support than is the case under the standardized approach or the foundation approach.

### **The Advanced IRB Approach to Credit Risk Measurement**

The advanced IRB approach relies on measures of borrower creditworthiness generated internally by banks as primary inputs to the capital requirement calculation.<sup>4</sup> Risk components provided by banks include probability of default (PD), loss given default (LGD), the exposure at default (EAD) and effective maturity (M).<sup>5</sup> The *Quantitative Impact Study 3 Technical Guidance* details the characteristics of each of these risk components, as summarized below.

### *Probability of Default*

The PD is defined as the probability that a borrower will default over a one-year period. All banks using the advanced IRB approach must provide valid estimates of PD for each borrower grade and for each asset class.

Operationally, banks do not generally assign a PD to each exposure in a given asset class. Rather, they place exposures into "buckets" of similarly graded credits. The Basel II IRB approaches will in effect allow banks to estimate a PD for each bucket, generally based upon at least five years of data. These estimates are expected to represent a conservative view of a long-run average PD for borrowers assigned to the grade in question. At the same time, however, a borrower rating must represent the bank's assessment of the borrower's ability and willingness to contractually perform despite adverse economic conditions or the occurrence of unexpected events.<sup>6</sup> This could, for example, result in a borrower in a highly cyclical industry being slotted into a lower grade than its long-run average PD would indicate. U. S. bank regulators are in the process of developing guidance to banks on this subject and on other Basel II issues that could have an effect on the capital requirements upon implementation.

### *Loss Given Default*

The PD input is not the only component of credit risk. Banks measure not only the *likelihood* that a borrower will default, but also how much they expect to lose -- the LGD -- should a default occur. Roughly speaking, one can think of PDs as reflecting characteristics of the borrower and LGDs as reflecting characteristics of the loan. For example, the PD for Borrower A may be 1 percent, but the LGD attributed to its senior exposures could be far different than for its subordinated exposures. Banks using the advanced IRB approach would provide their own LGD estimates. They would be allowed to recognize a much wider array of collateral, guarantees and hedges than under the existing capital rules, provided they can demonstrate and support the benefits obtained from using these credit risk mitigants. For example, banks that systematically use collateral or guarantees to reduce LGDs in a given facility should have data supporting the loss reductions from the use of these credit risk mitigants.

An advanced IRB bank generally must estimate a long-run average LGD for each facility, with some exceptions. For example, a bank should use LGD estimates that are appropriate for an economic downturn if those are more conservative than the long run average.<sup>7</sup> For comparison purposes, we note that banks using the foundation approach would generally be required to use a supervisor-provided LGD, 45 percent for unsecured general credit obligations and 75 percent for subordinated exposures.

### *Exposure at Default*

While the EAD for on-balance sheet and off-balance sheet exposures is defined as the expected gross exposure of the facility upon the default of the obligation, the calculation of EAD is different for these two types of exposures. For on-balance sheet items such as commercial loans, the EAD estimate generally equates to the *current* drawn amount. For example, the EAD on a \$1 million commercial loan is generally \$1 million. For off-balance sheet exposures, such as unused loan commitments, banks are required to apply credit conversion factors (CCFs) to the unused exposure amount in order to generate an EAD. Credit conversion factors are generally meant to reflect the estimated size and likely occurrence of the credit exposure.

Advanced approach IRB banks would use their own CCF estimates to determine EAD. As in the case of LGD, the bank must base EAD estimates on a conservative estimate of the long run average. Where EAD estimates are volatile over an economic cycle, the bank must use a more conservative economic downturn estimate, not simply the long-run average.<sup>8</sup> For comparison purposes, foundation IRB banks would apply supervisor-supplied CCFs to unused commitments that reside off the balance sheet. For example, a CCF of 75 percent would be applied to commitments regardless of the maturity of the underlying facility. Thus, the EAD for a \$1 million unused loan facility would equate to \$750,000 under the

foundation approach. Commitments that are unconditionally cancelable, such as many types of retail exposures, would earn a 0 percent CCF.

### Maturity

The Basel II proposals incorporate the maturity of the credit exposure into the IRB approach capital requirements since maturity is a material driver of credit risk. Other things equal, a shorter maturity brings a lower capital requirement, and a longer maturity a higher capital requirement. With some exceptions, banks that use the foundation IRB approach will assume that the effective M of all exposures is 2.5 years. For advanced IRB approach banks, the M used for capital calculations must be between one and five years, except that supervisors may exempt certain short-term exposures from the minimum M (i.e., repurchase agreements and security lending).

### Illustrative C&I Risk Weights

The following tables quantify the relationship between a bank's internal risk estimates and its capital requirement. Table 1 shows the risk weights for a series of 1-year PDs corresponding to the selected Standard & Poor's rating. These PDs were paired with combinations of LGD and M. The values of M are 1-year, 2.5 years and 5 years. The values of LGD are 10 percent, 45 percent, and 90 percent. The reader can use Table 1 to quickly determine the risk weight for low, medium and high LGD loans in combination with short, medium and long maturities of the loans by default equivalents.

To understand the table it is critical to note that a 100 percent risk weight corresponds to an 8 percent capital requirement. Thus, if the bank's exposure at default is \$100 and the risk weight for that exposure was 100 percent, the capital requirement would be \$8. Similarly, a 25 percent risk weight equates to a \$2 capital requirement per \$100 of exposure. Note also that currently C&I loans carry a 100 percent risk weight. Table 1 illustrates the points at which the proposed capital requirements differ from the current capital requirements; shaded areas represent increases, and non-shaded areas represent decreases.

For example, a loan of \$100 with a BBB- equivalent 1-year PD of 0.35 percent, LGD of 45 percent, and an M of 2.5 years would have a risk weight of 60.4 percent. The credit-risk capital charge would be 8 percent of \$100 times 60.4 percent or \$4.83. Hence a foundation IRB bank with an unsecured loan of \$100, or an advanced IRB bank that estimated its LGD at 45 percent, would need to hold \$4.83 in capital against that loan for credit risk, as compared to the \$8 in capital currently required for \$100 of commercial loans. If the bank had the same loan with a shorter maturity of 1-year, the capital charge would be \$3.56. If the maturity were 5 years, the capital requirement would be \$6.94.

Initial S&P Rating	Cumulative 1-Yr. Default Rate (%) <sup>1,2</sup>	1-Year Maturity			2.5-Year Maturity			5-Year Maturity		
		10% LGD	45% LGD	90% LGD	10% LGD	45% LGD	90% LGD	10% LGD	45% LGD	90% LGD
AAA	0.03	1.72	7.75	15.49	3.28	14.77	29.53	5.88	26.47	52.93
AA+	0.03	1.72	7.75	15.49	3.28	14.77	29.53	5.88	26.47	52.93
AA	0.03	1.72	7.75	15.49	3.28	14.77	29.53	5.88	26.47	52.93
AA-	0.03	1.72	7.75	15.49	3.28	14.77	29.53	5.88	26.47	52.93
A+	0.03	1.72	7.75	15.49	3.28	14.77	29.53	5.88	26.47	52.93
A	0.05	2.56	11.50	23.00	4.45	20.03	40.05	7.61	34.24	68.48

A-	0.05	2.56	11.50	23.00	4.45	20.03	40.05	7.61	34.24	68.48
BBB+	0.12	4.87	21.91	43.82	7.46	33.57	67.14	11.78	53.00	106.00
BBB	0.22	7.37	33.18	66.36	10.50	47.24	94.48	15.71	70.67	141.35
BBB-	0.35	9.90	44.56	89.13	13.42	60.39	120.79	19.28	86.78	173.56
BB+	0.44	11.35	51.08	102.17	15.05	67.70	135.41	21.20	95.40	190.80
BB	0.94	17.02	76.60	153.20	21.12	95.05	190.10	27.96	125.81	251.62
BB-	1.33	19.98	89.93	179.86	24.16	108.70	217.41	31.11	139.99	279.98
B+	2.91	27.80	125.10	250.20	31.91	143.61	287.21	38.77	174.45	348.91
B	8.38	46.73	210.30	420.61	50.79	228.56	457.11	57.55	258.98	517.96
B-	10.32	52.47	236.10	472.20	56.51	254.30	508.61	63.25	284.64	569.29
CCC	21.94	77.99	350.96	701.93	81.70	367.66	735.31	87.88	395.48	790.95

<sup>1</sup>Source: Standard & Poor's, *Special Report - Ratings Performance 2000*, "Static Pools Average Cumulative Default Rates by Rating Modifier", p. 16.

<sup>2</sup> S&P reports the cumulative 1-year default rate for the AAA through AA- categories as .00%, and the A+ rating category as .02%. Basel II incorporates a PD floor of .03%.

Source: FDIC calculations based on Basel QIS-3

Tables 2 illustrates the striking fact that an advanced IRB bank's capital requirement for a C&I loan would be directly proportional to the loan's estimated LGD. This can be seen by comparing, say, the 10 percent and 20 percent LGD columns. The risk weights in the 20 percent LGD column are precisely double those in the 10 percent column. The risk weights in the 90 percent LGD column, similarly, are nine times higher. The economic significance of the LGD estimate becomes acute for higher risk credits. Consider a loan with a PD equivalent to an S&P rating of B. As the lender's LGD estimate increases from 10 to 20 to 30 to 40 percent, risk weights increase from 50 to 200, implying an increase in capital requirements from 4 percent to 16 percent. Clearly, the methodologies to estimate and validate LGD will play a central role in the implementation of Basel II.

Initial S&P Rating	Cum. 1-Yr. Default Rate (%) <sup>1,2</sup>	LGD									
		10%	20%	30%	40%	45%	50%	60%	70%	80%	90%
AAA	0.03	3.28	6.56	9.84	13.13	14.77	16.41	19.69	22.97	26.25	29.53
AA+	0.03	3.28	6.56	9.84	13.13	14.77	16.41	19.69	22.97	26.25	29.53
AA	0.03	3.28	6.56	9.84	13.13	14.77	16.41	19.69	22.97	26.25	29.53
AA-	0.03	3.28	6.56	9.84	13.13	14.77	16.41	19.69	22.97	26.25	29.53
A+	0.03	3.28	6.56	9.84	13.13	14.77	16.41	19.69	22.97	26.25	29.53
A	0.05	4.45	8.90	13.35	17.80	20.03	22.25	26.70	31.15	35.60	40.05
A-	0.05	4.45	8.90	13.35	17.80	20.03	22.25	26.70	31.15	35.60	40.05
BBB+	0.12	7.46	14.92	22.38	29.84	33.57	37.30	44.76	52.22	59.68	67.14

BBB	0.22	10.50	21.00	31.49	41.99	47.24	52.49	62.99	73.49	83.99	94.48
BBB-	0.35	13.42	26.84	40.26	53.68	60.39	67.11	80.53	93.95	107.37	120.79
BB+	0.44	15.05	30.09	45.14	60.18	67.70	75.23	90.27	105.32	120.36	135.41
BB	0.94	21.12	42.25	63.37	84.49	95.05	105.61	126.74	147.86	168.98	190.10
BB-	1.33	24.16	48.31	72.47	96.63	108.70	120.78	144.94	169.09	193.25	217.41
B+	2.91	31.91	63.83	95.74	127.65	143.61	159.56	191.48	223.39	255.30	287.21
B	8.38	50.79	101.58	152.37	203.16	228.56	253.95	304.74	355.53	406.32	457.11
B-	10.32	56.51	113.02	169.54	226.05	254.30	282.56	339.07	395.58	452.10	508.61
CCC	21.94	81.70	163.40	245.10	326.81	367.66	408.51	490.21	571.91	653.61	735.31

<sup>1</sup>Source: Standard & Poor's, *Special Report - Ratings Performance 2000*, "Static Pools Average Cumulative Default Rates by Rating Modifier", p. 16.

<sup>2</sup> S&P reports the cumulative 1-year default rate for the AAA through AA- categories as .00%, and the A+ rating category as .02%. Basel II incorporates a PD floor of .03%.

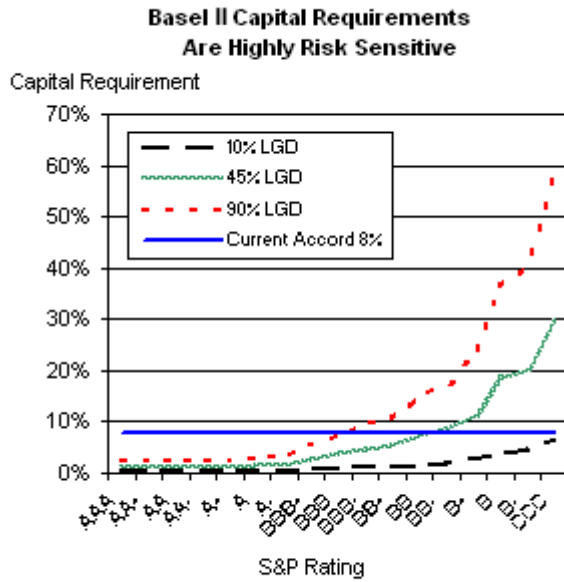
Source: FDIC calculations based on Basel QIS-3

Chart 1 summarizes the relationship between capital requirements for C&I loans at banks that use the advanced IRB approach versus other banks. As illustrated by the "10 percent LGD" line, credit exposures for which advanced IRB banks can justify very low LGDs will receive significantly lower capital requirements than at present, and lower than at non-advanced IRB banks, for almost any reasonable PD. Even for exposures with LGDs up to 45 percent, most such exposures (those with a PD equivalent of a BB rating or better) will have capital requirements less than 8 percent, while exposures with PDs equivalent to B+ or worse would receive higher capital requirements. The "90 percent LGD" line illustrates that for extremely high LGD exposures, those with PDs equivalent to a BBB rating or better would have a capital requirement of less than 8 percent, while exposures with PDs equivalent to BBB- or worse would face higher capital requirements.

Roughly speaking, Chart 1 demonstrates that C&I exposures with default probabilities equivalent to a BBB rating or better, as well as all exposures with low LGDs, would have significantly lower capital requirements for credit risk than is presently the case. Conversely, less than investment grade loans with relatively high LGDs would face significantly higher capital requirements. To the extent that large U.S. banks are motivated by a desire to reduce risk-based capital requirements, Basel II would appear to provide a significant incentive for these institutions to originate and hold better quality loans.

The idea behind the C&I risk weights depicted in the tables and charts is simply that evidence on historical loss rates shows that a portfolio of "good" loans as measured by the Basel II risk weight method will tend to have a more favorable loss profile than would a portfolio of riskier loans. Discussions of specific assumptions and analysis used to generate these Basel II risk weights is beyond the scope of this paper.

Chart 1



Note: Calculations assume M=2.5 years, PD=S&P's default rate by rating modifier.

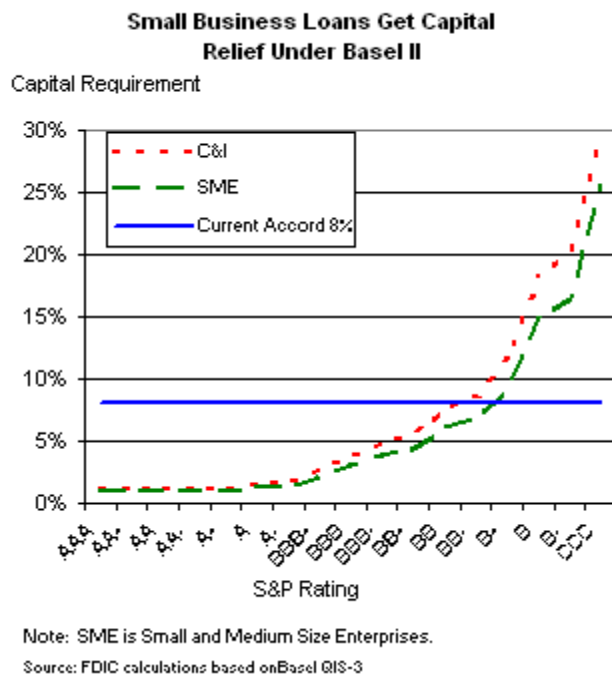
Source: FDIC calculations based on Basel GIS-3

### Adjustments to the C&I Risk Weight Curve for Small and Medium Size Enterprises

Small business lending as practiced by large banks is characterized by small exposure amounts (relative to the size of the bank) extended to a large number of borrowers. In recognition of the potential for diversification in this type of lending, the Basel Committee adjusted the C&I risk weight function for small and medium size enterprises (SMEs). For U.S. purposes, SMEs are corporate exposures where the reported sales for the consolidated group of which the firm is a part is less than \$50 million. This adjustment has the effect of reducing the capital requirements for SMEs compared to other forms of C&I lending. For C&I exposures below \$50 million, the risk weights fall as the dollar amount of the exposure falls. At \$5 million, the risk weight reaches its lowest level. Chart 2 details the SME risk weight curve in comparison with the C&I risk weight curve for a firm with sales of \$5 million.



Chart 2



### External Evidence on C&I Capital Requirements Under Basel II

The results presented so far have been theoretical. We have focused on how much capital would be required for loans of various risk characteristics without discussing anything about the loans banks actually hold. To make an informed assessment of the impact of Basel II on banks' C&I capital requirements, one would need to obtain the following information:

- 1) the distribution of exposures by default probability;
- 2) the LGD by exposure; and
- 3) the amount of the exposures.

When it is published, the Basel Committee's recent Quantitative Impact Study 3 (QIS-3) will be useful for this purpose. QIS-3 is meant to analyze the impact on individual banks -- and for the Basel II banks as a whole -- of the currently proposed risk weights for C&I and other portfolio risk weight curves.<sup>9</sup>

In this section, an external data source is used to provide an independent view of the likely impact of Basel II on capital requirements for syndicated loans at banks that use the advanced IRB approach in the U.S. The FDIC has obtained data from Moody's on the relative distribution of newly syndicated bank loans rated by Moody's in 2002. In order to construct an example in a manner that is consistent with the proprietary nature of this data, the Moody's ratings have been aggregated into buckets of similarly rated exposures. This exercise provides a rough approximation of the distribution of bank commercial loan exposures by ratings bands (and PDs) for a significant subset of the C&I loan portfolio.<sup>10</sup> The PDs used correspond to the midpoints of the ratings buckets. Using this distribution and a representative LGD allows for the creation of a hypothetical risk weight for each bucket.

Under the advanced IRB approach, the bank, "must estimate a long-run average LGD for each facility." Moreover, the bank must use LGD estimates that are: "appropriate for an economic downturn if these are more conservative than the long-run average."<sup>11</sup> While these instructions leave some room for

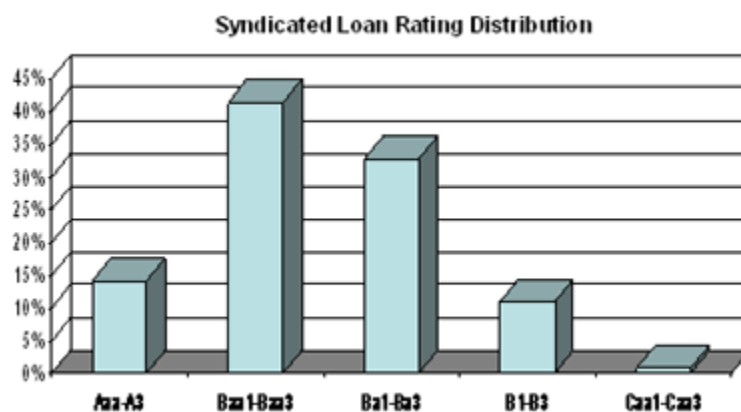
interpretation, it is clear that the intent is to use a period of economic stress to generate the representative LGD if recoveries are much lower during a recession than otherwise.

Moody's has a recently published study of recovery rates for various classes of debentures.<sup>12</sup> During the period 1982 to 2002, the average defaulted senior secured bank loan recoveries were 62 percent (LGD of 38 percent) and the median recovery was 67 percent (LGD of 33 percent). As stated earlier, under the Advanced Approach IRB, banks are required to use a conservative long-run LGD, unless there is evidence that this factor tends to rise significantly during a recessionary period. Moody's default and recovery rate study shows how volatile these rates can be through an economic cycle. For example, average defaulted senior secured bank loan recoveries fell from 64 percent (LGD of 36 percent) in 2001 to 51 percent (LGD of 49 percent) in 2002.<sup>13</sup>

Chart 3 represents the aggregated distribution of 2002 syndicated loan ratings and the associated Moody's recovery rates. This analysis shows the distribution of ratings, the risk weights by ratings bands for the various LGDs, and the weighted average or portfolio risk weight for this distribution of loans.

Chart 3

**Potential Capital Impact on a Portfolio of Syndicated Loans  
Under the Advanced IRB Approach**



Note: To estimate the capital requirement, we first construct a distribution and assign a PD to each rating bucket. The above distribution is based on Moody's initial ratings of bank loans in syndication for 2002.

**LGD                      Risk Weights by Rating Band**

1982-2002 (Median)	33%	15%	35%	70%	168%	270%
1982-2002 (Average)	38%	17%	40%	80%	193%	311%
2002 (Stressed)	49%	22%	51%	104%	249%	401%

Note: Next, we combine the ratings/PD distribution with an LGD estimate to calculate a risk weight for each ratings band. We also assumed an M of 2.5 years and that EAD was the dollar amount of the loans. LGDs are based on observed bank loan recoveries from Moody's 2003 recovery rate study.

<b>Comparison of Capital Requirements Under Current Accord &amp; Basel II</b>				
	LGD	Advanced IRB	Current Risk	% Change in Capital

	Assumption	Risk Weight	Weight	Requirement for Syndicated Loans
1982-2002 (Median):	33%	60%	100%	-40%
1982-2002 (Average):	38%	70%	100%	-30%
2002 (Stressed)	49%	90%	100%	-10%

Note: Last, we estimate the risk weights for the portfolio of syndicated loans.

Source: FDIC calculation based on Moody's data and Basel QIS-3.

The results underscore, once again, the critical role LGDs play in this framework. For example, some might argue that the median long-run (1982-2002) LGD is the most representative LGD. This would result in an average risk weight for the syndicated loan portfolio of 60 percent, a 40 percent reduction in risk-based capital requirements compared to the current rule. On the other hand, the Basel IRB instructions provide for using non-long run LGDs if stress period recoveries are significantly lower than the long-run values. For example, if one bank uses the 2002 LGD, the resulting portfolio risk weight would increase to 90 percent, closer to the current capital requirement for commercial credits.

It is important to ask whether the 10 to 40 percent reductions in Risk-Based Capital Requirements for syndicated loans might be representative of the effect of Basel II on Risk-Based Capital Requirements for the C&I portfolio. Syndicated loans, after all, have tended to comprise about one-third of C&I loans. However, there are a number of reasons to be cautious about using the syndicated loan results to draw conclusions about the entire C&I loan portfolio. Our loan sample, rated syndicated loans, may be of higher average credit quality than the unrated portion of the C&I portfolio. If this is true, our results overstate the likely decline in minimum C&I capital requirements. Conversely, our snapshot is taken as of 2002, the third year of a corporate recession. A risk snapshot taken in the midst of an economic expansion might tend to produce lower PDs on average. If this is true, our results understate the likely decline in minimum capital requirements. Disentangling the relative importance of these effects is difficult, and it is clear that predicting the impact of Basel II on C&I loan risk-based capital requirements based on the data presented in this section - or based on any static snapshot of risk indicators - is problematical.

The analysis does show, however, the importance of banks' and supervisors' approaches to estimating and validating LGDs. Seemingly abstruse methodological discussions about whether banks should use "long run" or "stressed" LGDs for Basel II purposes would have immense quantitative significance for minimum risk-based capital requirements under Basel II. In the example given here, minimum risk-based capital requirements for a large subset of C&I are fully half again greater under a stressed-LGD approach as would be the case under a long-run-median LGD approach.

### Next Steps

The New Accord represents a significant shift in the manner in which supervisors and bankers look at regulatory capital requirements. The Basel Committee is expected to release a third consultative paper in the coming weeks detailing the proposals that would serve as the foundation for the New Accord. It is expected that a summary of the results of the third Quantitative Impact Study will also be released in the near future. That summary is expected to provide a preliminary estimate of the impact of Basel II on risk based capital requirements at large U.S. banks, both in the aggregate and for broad portfolio categories. All interested parties will be able to comment on the proposed revisions to the Capital Accord.

Domestically, the U.S. banking and thrift supervisors are at the early stages of the rulemaking process that will consider how best to apply Basel II to U.S. banking organizations. It is anticipated that an Advanced Notice of Proposed Rulemaking will be issued later this year soliciting comment on all aspects of the proposals.

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<sup>1</sup>"Downgrades Rule the Fragile Credit Environment in 2002," Fitch Ratings, February 27, 2003.

<sup>2</sup>Basel II also presents a treatment for equity exposures, and certain commercial exposures commonly referred to as specialized lending.

<sup>3</sup>[www.fdic.gov/bank/analytical/fyi/2003/011403fyi.html](http://www.fdic.gov/bank/analytical/fyi/2003/011403fyi.html)

<sup>4</sup>The Internal Ratings Based (IRB) Approach in its current form can be found in the *Quantitative Impact Study 3 Technical Guidance*, "Chapter III: The IRB Approach," available on the Bank for International Settlements website at [www.bis.org](http://www.bis.org).

<sup>5</sup> An asset correlation function, provided by the regulators, also plays a critical role in setting the capital requirements. Other things constant, a portfolio of borrowers whose assets are likely to be highly correlated requires a higher capital requirement. Further discussions regarding the asset correlation issue is beyond the scope of this article.

<sup>6</sup>QIS-3 Technical Guidance, paragraph 361.

<sup>7</sup>QIS-3 Technical Guidance, paragraph 415.

<sup>8</sup>QIS-3 Technical Guidance, paragraph 422.

<sup>9</sup>The results of the QIS-3 are expected to be released in some form after the publication date of this *FYI*.

<sup>10</sup> The FDIC is indebted to Moody's for allowing the authors to include the syndicated loan data in aggregate form.

<sup>11</sup> QIS-3-Technical Guidance, paragraph 415.

<sup>12</sup> "Default and Recovery Rates of Corporate Bond Issuers," Moody's Investor Services, Special Comment, February 2003.

<sup>13</sup>The Moody's default and recovery rate study also shows how non-normal the recovery rates are for senior unsecured debt over time. These types of distributions are not stable through time and lead to the difficulty of using historical data to quantify the distribution of LGDs for the period of time the regulators are trying to determine the capital requirement for banks.

## About *FYI*

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**Chart 1**  
**Basel II Capital Requirements Are Highly Risk Sensitive**

<b>S&amp;P Rating</b>	<b>10% LGD</b>	<b>45% LGD</b>	<b>90% LGD</b>	<b>Current Accord 8%</b>
AAA	0.31%	1.18%	2.36%	8.00%
AA+	0.31%	1.18%	2.36%	8.00%
AA	0.31%	1.18%	2.36%	8.00%
AA-	0.31%	1.18%	2.36%	8.00%
A+	0.31%	1.18%	2.36%	8.00%
A	0.36%	1.60%	3.20%	8.00%
A-	0.36%	1.60%	3.20%	8.00%
BBB+	0.60%	2.69%	5.37%	8.00%
BBB	0.84%	3.78%	7.56%	8.00%
BBB-	1.07%	4.83%	9.66%	8.00%
BB+	1.20%	5.42%	10.83%	8.00%
BB	1.69%	7.60%	15.21%	8.00%
BB-	1.93%	8.70%	17.39%	8.00%
B+	2.55%	11.49%	22.98%	8.00%
B	4.06%	18.28%	36.57%	8.00%
B-	4.52%	20.34%	40.69%	8.00%
CCC	6.54%	29.41%	58.82%	8.00%

Note: Calculations assume M=2.5 years, PD=S&P's default rate by rating modifier.

Source: FDIC calculations based on Basel QIS-3

**Chart 2**  
**Small Businesses Get Capital Relief Under Basel II**

<b>S&amp;P Rating</b>	<b>C&amp;I</b>	<b>SME</b>	<b>Current Accord 8%</b>
AAA	1.18%	0.93%	8.00%
AA+	1.18%	0.93%	8.00%
AA	1.18%	0.93%	8.00%
AA-	1.18%	0.93%	8.00%
A+	1.18%	0.93%	8.00%
A	1.60%	1.26%	8.00%
A-	1.60%	1.26%	8.00%
BBB+	2.69%	2.13%	8.00%
BBB	3.78%	3.01%	8.00%
BBB-	4.83%	3.86%	8.00%
BB+	5.42%	4.33%	8.00%
BB	7.60%	6.08%	8.00%
BB-	8.70%	6.94%	8.00%
B+	11.49%	9.10%	8.00%
B	18.28%	14.79%	8.00%
B-	20.34%	16.66%	8.00%
CCC	29.41%	25.52%	8.00%

Note: SME is Small and Medium Size Enterprises.

Source: FDIC calculations based on Basel QIS-3

**Chart 3**  
**Syndicated Loan Rating Distribution**

<b>Aaa-A3</b>	<b>Baa1-Baa3</b>	<b>Ba1-Ba3</b>	<b>B1-B3</b>	<b>Caa1-Caa3</b>
0.14	0.41	0.33	0.11	0.01