Bank capital: Basel II developments

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The Basel Committee on Banking Supervision (BCBS) is in the process of establishing a new Accord ('Basel II') to increase the risk sensitivity of minimum capital requirements for internationally active banks. This will replace the first Basel Accord agreed in 1988. In January 2001, the Committee set out its proposals in a detailed consultation paper (CP2)[1]. But work has continued since then to ensure that the new rules reflect the risk profiles of different areas of business and achieve the Committee's broad objectives. This has led to a number of revisions to the 2001 proposals.

ON 1 OCTOBER 2002[2], the Committee set out the latest version of its proposals and launched a major exercise (the third Quantitative Impact Study, QIS 3) to assess the likely effects on the minimum capital requirements for banks worldwide. The Committee is planning to release a final consultation paper in the second quarter of next year and to agree the new Accord by end-2003, with full implementation in the G10 by end-2006. Banks that propose to adopt the more advanced approaches recognised under the new Accord will calculate the new requirements in parallel with the current Accord during 2006. These advanced approaches are the internal ratings based approach for credit risk, or IRB, and the advanced measurement approach for operational risk.

This article discusses the issues raised following CP2 and describes the adjustments made to the proposals as a result. The timetable is shown in Table 1 and the main elements of the new Accord are summarised in Box 1.

Table 1: Timetable

First Consultation Paper (CP1)	June 1999
QIS 1	July 2000
Second Consultation Paper (CP2)	January 2001
QIS 2	April 2001
QIS 2.5	November 2001
QIS 3	October 2002
Third Consultation Paper (CP3)	Spring 2003
Finalisation of the Accord	End 2003
Parallel running of sophisticated approaches with current Accord	2006
Implementation	End 2006

Issues identified in response to CP2

Assessing the implications of the introduction of more sophisticated risk-based capital requirements for the banking system is complex. The outcomes for individual banks depend on their risk profiles and portfolios. Although there will be differences from bank to bank, the Committee's objective has been to ensure that on average, across all internationally active banks in the G10, minimum capital requirements should be left broadly unchanged by the introduction of the new Accord.

While developing the new proposals, the Committee has used quantitative impact studies to calculate the effect on minimum capital of all the proposed approaches – the more straightforward approach based on external ratings (the standardised) and the IRB approaches based on banks' own ratings. In these studies, a large number of banks from a range of different countries have provided data to estimate the capital that the new Accord would require against their current portfolios. This approach does not of course capture the effects that could stem from behavioural changes induced by the Accord.

The first Quantitative Impact Study (QIS 1) was carried out in the fourth quarter of 2000, before the proposals for the second consultation paper were finalised. As might be expected, the results indicated that there were substantial differences in the impact across banks. But there were many data problems

1: Basel Committee on Banking Supervision (2001) 'The New Basel Capital Accord: Consultative Package', BIS January; see also Jackson, P D 'Bank Capital Standards: the New Basel Accord', *Bank of England Quarterly Bulletin* Spring 2001.

2: Basel Committee on Banking Supervision (2002) Quantitative Impact Study 3 Technical Guidance. www.bis.org/bcbs/qis/index.htm

Box 1: The main elements of the new Accord

The Accord will consist of three pillars: Pillar 1, setting minimum capital requirements for credit and operational risk; Pillar 2, requiring banks to assess their capital requirements in relation to their risks, including an outlier approach to interest rate risk embedded in the banking book, and supervisors to take action if risks are too high; and Pillar 3, establishing core disclosure by banks to improve market discipline. Much of the work of the Committee since January 2001 has been focused on refining the Pillar 1 charges, but Pillar 3 has been substantially streamlined to require core areas of disclosure.

Pillar 1 credit risk requirements

The Committee has agreed two broad approaches to setting the risk weights (which, as in the current Accord, are percentages of the core 8% risk asset ratio).

(1) The standardised approach

Risk sensitivity in this approach for corporate, sovereign and interbank exposures comes from the recognition of external ratings. Banks will slot exposures into bands according to whether they are rated by a recognised rating agency or unrated (Tabel A). There are two options for interbank exposures: option 1, where loans are slotted according to the rating of the sovereign (according to the place of incorporation); and option 2, where they are slotted according to the banks' own rating. For the latter approach exposures of less than three-month maturity will receive preferential treatment.

For retail exposures the weights are set by type of exposure. The latest proposal is for residential mortgages to carry a 40% weight and other retail exposures a 75% weight.

(2) An internal ratings based approach (IRB)

Under this approach banks would assign probabilities of default (PDs) to borrowers and the capital requirements for those PDs would be determined according to a formula set by the Committee. The final capital requirement is the charge from the function multiplied by the loss given default (LGD).

Table A:
Percentage risk weights

	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to BB-	B+ to B-	Below B- and defaulted	Unrated
Sovereigns	0	20	50	100	100	150	100
Banks 1	20	50	100	100	100	150	100
Banks 2							
<three months	20	20	20	50	50	150	20
>three months	20	50	50	100	100	150	50
Corporates	20	50	100	100	150	150	100

Where banks have commitments, these are included according to the likely exposure at default (or EAD). There are two variants within the IRB. The IRB foundation, where the bank sets the PD but the Committee lays down the LGD and EAD to be used, and the advanced IRB where the bank sets all three parameters. Retail exposures will be covered by an advanced approach for all IRB banks. The basic risk-weight functions are the same for the two variants. The formula for a curve is as follows[1]:

$$\text{Capital Requirement} = LGD \times N\left(\frac{N^{-1}(PD) + \rho^{\frac{1}{2}} N^{-1}(C)}{\sqrt{1-\rho}}\right) \times EAD$$

Four inputs are needed:

- the LGD and EAD for the exposure – set by the Committee for foundation IRB
- the PD of the obligor – set by the bank
- ρ (the asset correlation) – set by the Committee
- C (the confidence level) – set by the Committee.

The Committee distinguishes between the risks of different exposure types by setting different ρs (the higher the correlation the higher the unexpected loss for a given PD).

The correlations proposed by the Committee are as follows:

corporate, sovereign, interbank –

$$\rho(PD) = 12\% \times \left(\frac{1-e^{-50 \times PD}}{1-e^{-50}}\right) + 24\% \times \left(1 - \frac{1-e^{-50 \times PD}}{1-e^{-50}}\right)$$

1: This is derived from a one factor version of CreditMetrics under the assumption of infinite granularity (see 'A Risk-factor Model Foundation for Ratings-based Bank Capital Rules' by Michael Gordy (2001) – website http://mgordy.tripod.com).

SMEs with turnover €T million –

$$\rho(PD) = \text{As above} - 4\% \times \left(1 - \frac{(T-5)}{45}\right)$$

retail mortgages:

$$\rho(PD) = 15\%$$

revolving retail credit:

$$\rho(PD) = 2\% \times \left(\frac{1-e^{-50\times PD}}{1-e^{-50}}\right) + 15\% \times \left(1 - \frac{1-e^{-50\times PD}}{1-e^{-50}}\right)$$

other retail:

$$\rho(PD) = 2\% \times \left(\frac{1-e^{-35\times PD}}{1-e^{-35}}\right) + 17\% \times \left(1 - \frac{1-e^{-35\times PD}}{1-e^{-35}}\right)$$

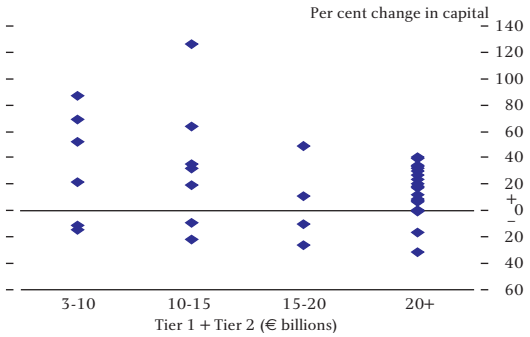
In the case of revolving retail credit, the capital charge is reduced by 90% of the expected loss on the exposure.

The only other difference between the approaches is that for the corporate, sovereign and interbank curve, the charges are adjusted for maturity. National supervisors can choose between assuming a 2.5 year maturity or an explicit maturity function in IRB foundation. In IRB advanced, for all exposures to firms with annual turnover of over €500 million, an explicit maturity function is compulsory.

with this initial study, severely limiting the effective sample size.

Following the release of CP2 a more extensive exercise, QIS 2, was carried out to look in detail at the effects. This involved 138 banks in 25 countries. This study again showed substantial variation across banks in the effects of both the standardised and IRB approaches but with a much wider range for the IRB approach[3]. Chart 1 shows that for the QIS 2 sample of banks the largest expected increase in minimum capital under the IRB was around 125% (ie minimum capital for that bank would have been more than double that under the current Accord) and the biggest reduction for any bank was over 30%.

Chart 1:
QIS 2 – overall change in capital requirements, under the foundation IRB, for a sample of G10 banks with Tier 1 capital of at least €3 billion



Source: QIS data.

QIS 2, with a larger sample of banks than QIS 1, demonstrated that the proposals set out in CP2 led to higher overall minimum capital levels than the Committee was targetting. On average the banks in the sample would have had an 18% increase in minimum required capital under the standardised approach and 24% under IRB foundation. A few banks (22) were able to complete the IRB advanced approach, where the bank can set its own figures for the loss given default (LGD) and exposure at default (EAD). The results indicated that this approach came closer to achieving the Committee's objective, with just a 5% overall increase in capital. All these figures included lower capital requirements to cover operational risk than proposed in CP2 – 12% of minimum regulatory capital for the standardised approach and 10% for the IRB approaches – following a decision by the Committee to reduce the operational risk requirement.

Many banks felt that too much capital was required under the IRB approach for higher risk corporate loans. The retail lending weights, which were very provisional, were also thought to be significantly higher than warranted by risk. All of this led to some rethinking of the risk weights proposed in CP2.

Cyclicality

Another issue that the Committee considered was the potential for IRB capital requirements to increase sharply in recessions. Greater variability in capital

3: Basel Committee on Banking Supervision, 'Results of the Second Quantitative Impact Study – November 2001' www.bis.org/bcbs/qis/index.htm

requirements is inherent in any risk-based capital regime (such as that proposed by Basel II) because capital requirements will increase as the assessed risks rise. The extent of the variability does, however, depend upon at least two elements – one being the rate of increase in capital requirements for a given change in the probability of default (PD), the other the extent to which banks take into account the possibility that economic conditions will change when setting their internal ratings. For example, banks that assign ratings in booms on the assumption that economic conditions will continue unchanged will experience much more volatility in ratings (and therefore capital requirements) in recessions than those that consider the effects of a possible future downturn when assigning ratings.

The Committee has proposed new flatter risk-weight curves[4] (ie risk weights that rise less steeply with PD) but the way that ratings are set remains an issue. Research in the Bank of England[5] indicates that, even with a significant reduction in the steepness of the curves, some rating systems would still lead to significant increases in capital requirements when economic conditions deteriorate. The research is based on a hypothetical corporate loan portfolio with a quality distribution constructed to represent an average G10 bank. The rating distributions were shocked using a recession transition matrix (calculated for the period December 1990 to December 1992) for Moody's ratings and also a transition matrix for PDs estimated using a Merton type model. The deterioration in the quality of the portfolio led to an increase in capital requirements (using the CP2 curves) of 22% for the Moody's ratings and 59% for Merton. The flatter corporate curve set out in the October 2002 QIS 3 technical guidance reduces these increases to 16% and 36% but the increase under the Merton approach remains high. Moody's ratings are designed to be more stable through different economic climates, with different scenarios being taken into account when the rating is assigned. Estimates of PD from Merton type models use the current share price, which takes into account forward looking information, but also depends on current liabilities, which are not forward looking.

This highlights the importance of banks considering how volatile their ratings may be with fluctuating economic activity and the possible effect on required capital. The Committee has now changed the guidance on ratings by stating that although the time horizon used in PD estimation is one year, banks using the IRB approaches must use a longer time horizon in assigning ratings. A borrower rating must represent the bank's assessment of the borrower's ability and willingness to meet commitments despite adverse economic conditions or the occurrence of unexpected events. A bank can satisfy the requirement by basing rating assignments on stress scenarios or by taking into account borrower characteristics that render it vulnerable to adverse economic conditions. In addition, given that there is still likely to be some volatility in bank capital requirements, banks must stress test required capital to consider the effect of, at least, a mild recession on the risk assessments that underpin the capital calculations (PD, LGD and EAD).

Another cyclical element in the CP2 proposal was that it potentially generated a large requirement on defaulted assets, even where a bank had provided against them. A sizeable capital charge was required on the written down asset exposure (the exposure less the specific provision) even though the provision might actually have covered much of the risk. The Committee has now changed the treatment of defaulted assets under the IRB approaches to reduce this effect. Under the new proposals the capital requirement on a defaulted asset will be calculated on the gross exposure and specific provisions will be offset against these requirements. No capital requirement will arise on defaulted assets where a bank has fully provided against the loss.

Simplification

A common theme in comments on CP2 was the need to simplify the proposals, but at the same time there was a view that the requirements needed to reflect more closely the actual risks in different areas of business. Areas for simplification were found. For example, the treatment of residual risks in credit risk mitigation techniques will now be at the discretion of the banks' supervisors. Also banks able to set PDs for specialised (project finance) loans will be able to treat

4: This was partly achieved by construction. The CP2 curves had been calibrated with a 99.5% confidence level and a scaling factor was included to cover measurement errors in PD and the lower loss-absorbing capacity of subordinated debt. Part of the flattening was achieved by using a higher confidence level (99.9%) rather than a scaling factor. But the main element has been changing the correlations.

5: Catarineu-Rabell, E, Jackson, P and Tsomocos, D 'Procyclicality and the New Basel Accord – Banks' Choice of Loan Rating System', forthcoming Bank of England working paper.

these in the same way as corporate loans, rather than having to use a stand-alone specialised lending treatment – unless the loan relates to highly volatile commercial real estate, where there is a compulsory treatment with higher risk weights. The implementation has also been simplified by allowing banks using the IRB approaches to delay introducing it for overseas subsidiaries, where market data may be less readily accessible or less satisfactory.

On the other hand, some additional options and approaches have been added to calibrate the proposed capital requirements more accurately with the risks involved.

Adjustments in the proposals since CP2 and QIS 2

Corporate requirements

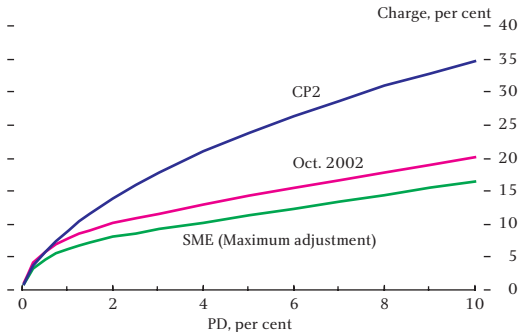
A number of concerns were expressed that the corporate risk weight curve rose too steeply with rising PD. In particular there was some evidence that the correlation amongst losses was less for smaller companies – which tend to dominate the higher PD bands – than for large companies[6]. Defaults seem to be less concentrated in economic downturns than is the case with larger corporates, reducing the unexpected losses that are realised in any year. To deal with this issue, changes were made to the correlations underlying the curves. Rather than being constant, the correlation gradually falls from 24% for high quality corporates to 12% for lower quality ones. In addition, for small companies, with annual turnover of less than €50 million, there is a size adjustment that reduces the capital requirements by 10% on average and by 20% for the smallest companies. Chart 2 shows the original corporate curve in CP2 and the new proposed corporate curve (October 2002) with the lower SME curve for the smallest companies.

Retail requirements

The Committee's proposed requirements for retail lending exposures set out in CP2 were only indicative. Work continued on the retail distributions following CP2 using large quantities of data from the banks. In order to align the capital requirements with the risks in different portfolios, three different curves were needed.

One is a mortgage curve with a relatively high correlation among loan losses (15%) to reflect the long maturities and the strong cyclical effects on losses. Banks tend to make sizeable losses on mortgage books only when higher unemployment coincides with a downturn in house prices. This correlation delivers, for a given LGD, a relatively high basic risk-weight curve but when taken together with actual LGD numbers, which are very low (25% or so), it produces low overall capital requirements.

Chart 2:
Capital charges for corporate and SME exposures (LGD 45%)



Sources: BCBS and Bank calculations.

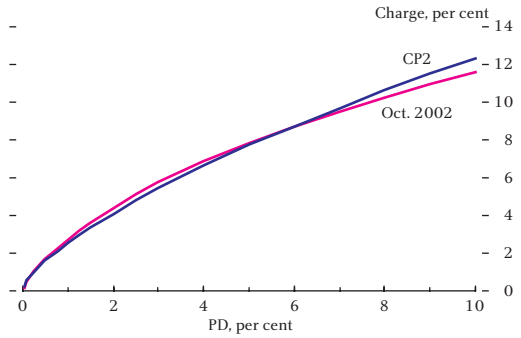
A second is a curve for general non-mortgage retail exposures where, as in the case of corporates, losses on exposures to lower quality borrowers seem to be less dependent on the cycle. (To reflect this, the loan loss correlations fall from 17% for good quality exposures to 2% for low quality ones.) The LGDs for these exposures tend to be much higher than mortgages at around 85%.

There was also evidence that for some revolving exposures, like credit cards, the high margins compared with expected loss cover much of the risk. A third and lower curve has been included, which allows 90% of expected loss to be covered by future margin income and has slightly different loan loss correlations – 15% falling to 2%. All the other risk-weight curves cover expected loss as well as a measure of unexpected loss.

Chart 3 shows the original mortgage curve set out in CP2 (with an assumed 25% LGD) against the latest proposed curve. Chart 4 shows the original CP2 non-mortgage retail curve (with an assumed 85% LGD) against the new curve and the lower curve for revolving credits.

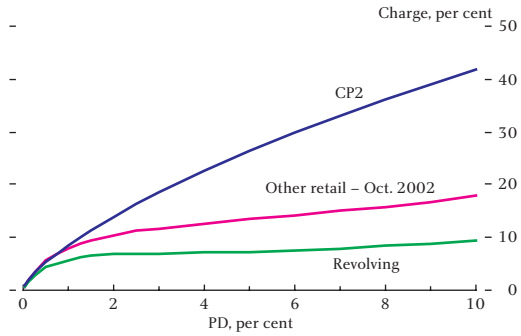
6: Lopez, J A (2002) 'The Relationship between Average Asset Correlation, Firm Probability of Default and Asset Size'. Federal Reserve Bank of San Francisco, Working Paper Series 2002-05.

Chart 3:
Capital charges for mortgages (LGD 25%)



Sources: BCBS and Bank calculations.

Chart 4:
Capital charges for other retail (LGD 85%)



Sources: BCBS and Bank calculations.

The evidence on the riskiness of retail exposures has also been used to adjust the standardised approach. The risk weights for mortgages have been reduced from 50% to 40% and those for other retail loans from 100% to 75%.

Small and medium-sized enterprises

Lending to SMEs will benefit from the lower correlations for high PD corporate loans and the reduction in requirements for smaller firms. It will also benefit from the inclusion of very small corporates in the lower retail curves – loans to SMEs of up to €1 million can be included in the retail portfolios as long as they are managed as retail credits and meet certain other criteria. In the standardised approach, where a bank's total exposure to a small business amounts to €1 million or less, it can be counted as a retail exposure.

Collateral

One feature of the QIS 2 results was the large difference between the IRB foundation and advanced approaches for corporate portfolios. Under the advanced approach banks were generally using lower LGDs than required under the IRB foundation approach; in particular, giving more recognition to collateral. To deal with this the Committee has lowered the majority of the supervisory LGDs in the foundation approach by five percentage points (for example the LGD on senior unsecured exposures was lowered from 50% to 45%) and has recognised more forms of collateral. Receivables and other collateral (eg, plant and machinery and inventory) have been added to the financial collateral and commercial real estate recognised in CP2 for IRB foundation.

Maturity

Another factor behind the difference between advanced and foundation approach results was that the banks, in their advanced calculations, were using separate maturities for individual loans which gave a lower overall average maturity for their corporate portfolios – closer to 2.5 years than the 3 years assumed in the foundation calibration. The foundation maturity assumption has now been reduced to 2.5 years. At national discretion, banks may also be given the option of using an explicit maturity adjustment in the foundation approach. In the advanced approach they have to use an explicit adjustment for all exposures to larger borrowers.

Definition of default

Some banks were concerned that the Committee's five-part definition of default set out in CP2 might not reflect the actual conditions in some markets – triggering the allocation of exposures to the defaulted assets band even where a default was unlikely. By reducing the number of triggers to (a) unlikely to pay in full or (b) more than 90 days overdue, this has been avoided.

Operational risk

A number of changes have been made to the operational risk framework. Overall the target amount of capital to be delivered by the operational risk charge has been reduced since CP2 from 20% of the requirements under the current Accord to 12% or even less. In addition an advanced approach has been introduced, which will enable the banks to model or otherwise assess their operational risk requirements, and there will be no floor under this approach.

Securitisation

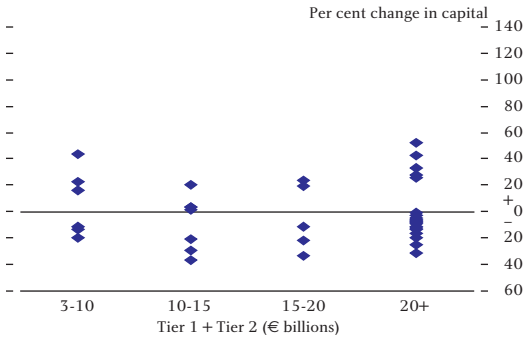
The Committee has set out full proposals for the treatments of securitised assets. These cover assets securitised by a bank, where an interest has been

retained, and securitised assets where the bank is the investor. Under Basel I, the Committee had advised that first-loss positions should be deducted from capital. This will continue and will include first loss provided on securitisations originated by other banks. In addition, in certain circumstances, second loss and other subordinated positions must also be deducted. For other positions (including liquidity facilities) two possible approaches are set out for IRB banks. Under one approach (the supervisory formula), a bank must assess the capital that would have been held against the underlying loans under the IRB and the charges are based on this. Under a ratings based approach, banks holding rated securitised assets can use a table of set charges. Similarly, banks using the standardised approach derive capital charges for securitisation positions from external ratings.

Testing the latest proposals

The effect of the flatter risk-weight curves on the IRB foundation results (but not the revolving credit curve nor the SME size adjustments) was tested in a limited Quantitative Impact Study (QIS 2.5)[7] in the fourth quarter of last year. Overall this study indicated that these curves would deliver results much closer to the Committee's overall goal of broadly unchanged capital. Requirements for the 38 banks included in the study were 2% up on average, relative to current requirements, with 24 of the 38 exhibiting a reduction. The dispersion in results was also reduced (Chart 5).

Chart 5:
QIS 2.5 – overall change in capital requirements, under the foundation IRB, for a sample of G10 banks with Tier 1 capital of at least €3 billion



Source: QIS data.

This assessment was, however, limited in scope. It did not encompass the full proposals nor a wide selection of banks. In contrast, QIS 3 will be very broad, including as many as 200 banks across 40 countries and encompassing all the elements of the new proposals. It is also hoped that a much larger number of banks will calculate the IRB advanced requirements giving a better estimate of the incentives for adopting the different approaches – standardised, IRB foundation and IRB advanced. The more complete information from QIS 3 will enable the calibration of the proposals to be finalised in the course of next year.

7: Basel Committee on Banking Supervision, 'Results of Quantitive Impact Study 2.5' – www.bis.org/bcbs/qis/index.htm