Basel II and UK banks

What are the costs and benefits of IRB qualification?

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Abstract

In most cases, the more advanced Basel II approaches for estimating the minimum capital requirement to cover credit and operational risk lead to less regulatory capital than the standard approaches. There has, therefore, been a presumption that banks ought to go ahead and make the investment necessary to implement the advanced approaches.

We question this assumption by estimating the risk-adjusted change in the cost of funding bank balance sheets and comparing this with the cost of implementing the advanced IRB approach for credit risk. The short-term cost of IRB implementation is about 5 basis points. This greatly exceeds our estimate of an annual aggregate benefit of, at most, 0.4 basis points. Accordingly, we advise banks to spend shareholder money very cautiously on Basel II. Adoption, beyond the absolute minimum requirement, should be pursued only where this helps banks respond to wider strategic issues.

Introduction

UK banks are all involved to a greater or lesser degree in implementing the new capital adequacy requirements under the Basel II accord. However, the FSA has given UK banks choices. For credit risk, they may choose whether to implement the "standard" approach or one of two internal rating (IRB) approaches—"foundation" or "advanced". For operational risk, banks have a similar choice, between a basic indicator, standardised, or advanced management approach (AMA).

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There has been a presumption that banks ought to go ahead and make the investment necessary to implement the approach that achieves the lowest level of regulatory capital. Yet is this presumption justified?

Advisors will point to lower capital requirements as a self-evident justification and they might add that implementing the more sophisticated approaches available under Basel II may also improve banks' internal controls and demonstrate to the outside world that they have adequate systems for managing risk. Is this enough?

We have not come across any economically coherent studies that weigh up the costs and benefits of different approaches to Basel II implementation. Accordingly, we examine the costs and benefits of early adoption. Should banks seek to achieve qualification for IRB and AMA in time for the 2007 implementation deadline? Or are they better to set their own timetable, even if this means that they qualify for the more sophisticated treatment well after 2007?

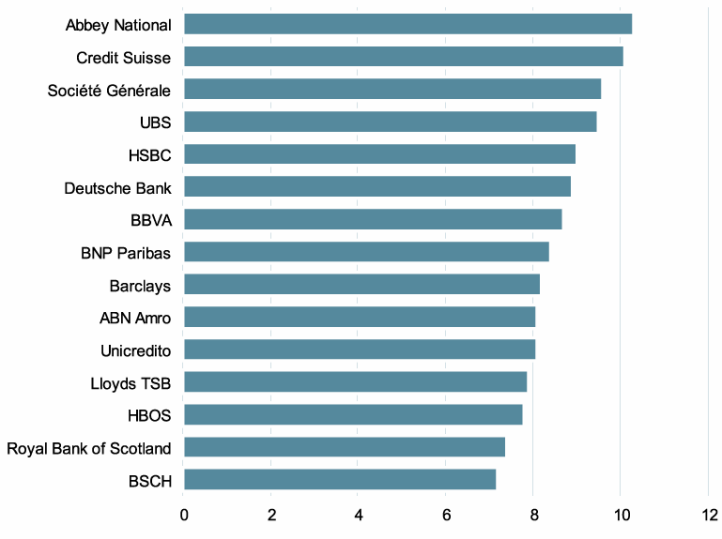
To address these questions we examine the benefits of lower regulatory capital and then compare this with published estimates of the cost of implementation. We ask:

- Should banks care about the total level of regulatory capital at all? (See Section A)
- What impact will changes to regulatory capital have on the cost of funding loans within a particular loan category and in aggregate? (See Section B)
- How does the cost of implementation weigh up against the benefit of lower regulatory capital requirements? (See Section C)

A. Regulatory capital and banks' total capital

Figure 1, collated by the Financial Times, demonstrates that many UK banks have Tier 1 capital available that is significantly in excess of the 4% minimum requirement. In this case, it is worth asking whether Basel II will actually impact their overall capital base at all. How much does regulatory capital need to change before bank boards will alter the level of capital they judge is necessary?

Figure 1: Tier 1 capital estimates 2003 (%)



Source: Financial Times, 5th January 2004

There are cases where this is clear: (1) if a bank's board sets total capital as a margin over regulatory capital then changes to regulatory capital will have a direct impact on the total capital employed; or (2) if changes to regulatory capital are so large so as to exceed the level that a bank believes is fundamentally necessary or available.

In either case, there is no doubt that the bank's board should be weighing up the pros and cons of the different options available under Basel II (see Sections B and C).

However, for many banks the connection between total capital employed and the total level of regulatory capital is indirect. They are more concerned with the view taken by rating agencies on capital adequacy than with regulatory requirements. Within reasonable limits, these banks should ask themselves whether they care—at all—about the level of regulatory capital. These banks have a fundamental question to address: what economic benefits, if any, are there from investment in Basel II implementation—beyond the minimum necessary for compliance?

B. The implications of different approaches to the cost of funding loans

Even where banks do make judgments about their capital adequacy by reference to regulatory capital, the actual cost implications of increasing or decreasing capital allocated to loans may be over-emphasised.

Calculated correctly, the pricing and business impact of adopting different choices are remarkably small. It is true that the changes in capital requirements are large. An increase in regulatory capital requirement of one-half, roughly the scale of the impact of Basel II on small business exposures, sounds like a major change. Such large prospective increases in regulatory capital requirements have made for dramatic headlines and aroused significant political concerns about the potentially negative impact on access to bank credit. But, as we show, an increase of regulatory capital of

even this magnitude increases the risk-adjusted cost of funding by only a few basis points.

We apply the standard corporate finance approach to quantifying the impact of a change in capital structure on what we refer to as the "risk-adjusted cost of funding" or the "Weighted Average Cost of Capital (WACC)". One of the key insights of corporate finance is that a reduction in equity capital increases the riskiness and therefore the cost of equity capital. That is, less regulatory capital does not automatically mean that the risk-adjusted cost of funding is lower. A second key insight is required for this to be the case. This insight is that debt is an allowable expense for tax purposes while dividends are not. Accordingly, although a bank with lower regulatory capital does have a lower risk-adjusted cost of funding, the extent to which it is lower is driven by this tax effect which is not large.

In Table 1 we set out our background assumptions and then in Table 2 and Table 3 we set out the impact of changing assumed risk weightings from 50% to 25% for mortgage lending and 150% to 200% for lending to small businesses.

Table 1: Risk-adjusted cost of funding assumptions

Tier 1 capital requirement	4%
Tier 2 capital requirement	4%
Risk-free rate	4%
Cost of Tier 2 debt	5%
Cost of other debt	5%
Corporate tax rate	30%
Cost of equity using standard approach	10%

Given the assumptions adopted above, Table 2 shows the surprising result that reducing the risk weighting for mortgages from 50% to 25% only reduces the risk-adjusted cost of mortgage lending by 0.007%, i.e., less than one basis point.

As equity is more expensive than debt it is often thought that a move from debt to equity ought to have a more material effect on the cost of funding. But the reason this is not so is clear from lines i, j and k on Table 2. For every €100 million in mortgage lending, Line i indicates that the cost of debt would rise by €35,000 per annum. However, Line k indicates that the cost of equity would only fall by €40,000—representing a 13.3% fall in the cost of Tier 1 equity when its level declined by 50%.

As stated above, if the level of equity falls its riskiness increases—in this case this is reflected in a rise in the cost of equity capital from 15% to 26% (see Line j). This effect eliminates almost all of the benefit of moving from debt to equity. If analysts make the mistake of forgetting to leverage adjust the cost of equity in this way, then the apparent impact is much greater. We suspect the failure to make such an adjustment may explain the general perception that Basel II will have a major impact on the cost of lending.

Table 2: Change in cost of mortgage lending

Reduced IRB Capital Requirement for Mortgages	Standard Approach	IRB	Change
a. Value of loans €	100	100	
b. Risk weighting	50%	25%	
c. Capital requirement: Tier 1 €: *a x b x 4%*	2.0	1.0	-1.0
d. Capital requirement: Tier 2 €: *a x b x 4%*	2.0	1.0	-1.0
Cost of debt			
e. Cost of Tier 2 debt employed €: *d x 5%*	0.1	0.1	
f. Cost of other debt employed €: *[a - c - d] x 5%*	4.8	4.9	
g. Gross cost of debt employed €: *e + f*	4.9	5.0	
h. Tax €: *-g x 30%*	-1.5	-1.5	
i. After tax cost of debt employed €: *g + h*	3.430	3.465	0.035
Cost of equity			
j. Leverage adjusted COE: *4% + [15% - 4%] x [$b_1 \div b_2$]*	10%	16%	
k. After tax cost of Tier 1 equity €: *c x j*	0.20	0.16	-0.040
Hurdle interest rate on lending			
l. After tax break even loan charge: *[i + k] ÷ a*	3.630%	3.625%	-0.005%
m. Pre tax break even loan charge: *l ÷ [1 - 30%]*	5.186%	5.179%	-0.007%

For lending to small businesses we have assumed that under the standard approach the risk weighting is 150% but under the IRB it is 200%. In this case the effect is larger but still relatively small at 0.014% or 1.4 basis points.

Table 3: Change in cost of lending to small businesses

Reduced IRB Capital Requirement for Mortgages	Standard Approach	IRB	Change
a. Value of loans €	100	100	
b. Risk weighting	150%	200%	
c. Capital requirement: Tier 1 €: *a x b x 4%*	6.0	8.0	2.0
d. Capital requirement: Tier 2 €: *a x b x 4%*	6.0	8.0	2.0
Cost of debt			
e. Cost of Tier 2 debt employed €: *d x 5%*	0.3	0.4	
f. Cost of other debt employed €: *[a - c - d] x 5%*	4.4	4.2	
g. Gross cost of debt employed €: *e + f*	4.7	4.6	
h. Tax €: *-g x 30%*	-1.4	-1.4	
i. After tax cost of debt employed €: *g + h*	3.290	3.220	-0.070
Cost of equity			
j. Leverage adjusted COE: *4% + [15% - 4%] x [b_1 ÷ b_2]*	10%	8.50%	
k. After tax cost of Tier 1 equity €: *c x j*	0.60	0.68	0.080
Hurdle interest rate on lending			
l. After tax break even loan charge: *[i + k] ÷ a*	3.890%	3.900%	0.010%
m. Pre tax break even loan charge: *l ÷ [1 - 30%]*	5.557%	5.571%	0.014%

In other words, the actual impact of changes in regulatory capital on the risk-adjusted cost of funding is much lower than might be expected.

Because banks cannot cherry pick, the same approach has to apply across all of their lending. For diverse banks this limits the short-term gains from adopting advanced IRB. From our own calculations of the current average risk weighting for UK banks and estimates by Oliver Wyman of the aggregate impact of each of the three Basel II approaches, we believe that the aggregate impact of just adopting the standard approach would be very small.

From Table 4, it is apparent that, under Basel I, the average risk weighting of the balance sheets of the major UK banks is about 60%.

Table 4: Estimated average risk weighting for UK banks

Bank	Total Assets £ million	Total Tier 1 Capital £ million	Total Tier 1 Capital Ratio %	Implied Risk Weighted Assets (RWA) £ million	Average Risk Weighting %
	a	b	c	d b ÷ c	e d ÷ a
Barclays	395,727	14,204	8.2%	173,220	43.8%
RBOS	402,889	17,155	7.3%	235,000	58.3%
Lloyds	207,400	9,490	7.8%	121,667	58.7%
HBOS	317,749	14,788	7.9%	187,190	58.9%
HSBC holdings	748,890	38,949	9.0%	432,767	57.8%

Source: Bureau Van Dijk Bankscope database, as at 31 December 2002

Oliver Wyman has suggested that the standard approach under Basel II involves, in aggregate, a minimum capital requirement 15% higher than under Basel I and that the advanced IRB involves a 10% lower minimum capital requirement than Basel I. Accordingly, adopting the standard approach would involve a shift in the average risk weighting across all assets from 60% to 69% and adopting the advanced IRB approach would involve a shift from 60% to 54%. In Table 5 we use these figures to show that not opting for the advanced IRB and just implementing the standard approach would increase the WACC for funding the balance sheet of UK banks by only 0.4 of a basis point. Even if banks absorb this cost entirely, they will reduce value created for shareholders by only 0.4bp of total assets per year.

This calculation probably overstates the cost of not adopting the advanced IRB. Banks will be able to pass on at least some of the higher weighted average cost of capital to their customers. Moreover, the Oliver Wyman figures were published in November 2003 and may overstate the prospective reduction in regulatory capital requirements obtainable using the advanced IRB, because they are unlikely to take account of the requirement for "stressed loss given default". The numbers input into the advanced IRB calculations for loan loss in the event of default will have to reflect an extreme outcome where collateral prices have fallen sharply, not average past experience of loss given default. At the time of the Oliver Wyman study, regulators had not made this requirement clear. We estimate that the benefit of choosing the advanced IRB rather than the standardised approach is worth no more than 0.4 basis points of total assets to a typical UK bank.

Table 5: The difference in aggregate between the lowest and highest requirement under Basel II

Reduced IRB Capital Requirement for Mortgages	Standard Approach	IRB	Change
a. Value of loans €	100	100	
b. Risk weighting	69%	54%	
c. Capital requirement: Tier 1 €: *a x b x 4%*	2.8	2.2	-0.6
d. Capital requirement: Tier 2 €: *a x b x 4%*	2.8	2.2	-0.6
Cost of debt			
e. Cost of Tier 2 debt employed €: *d x 5%*	0.1	0.1	
f. Cost of other debt employed €: *[a - c - d] x 5%*	4.7	4.8	
g. Gross cost of debt employed €: *e + f*	4.9	4.9	
h. Tax €: *-g x 30%*	-1.5	-1.5	
i. After tax cost of debt employed €: *g + h*	3.403	3.424	0.021
Cost of equity			
j. Leverage adjusted COE: *4% + [15% - 4%] x [$b_1 \div b_2$]*	10%	11.67%	
k. After tax cost of Tier 1 equity €: *c x j*	0.28	0.25	-0.024
Hurdle interest rate on lending			
l. After tax break even loan charge: *[i + k] ÷ a*	3.679%	3.676%	-0.003%
m. Pre tax break even loan charge: *l ÷ [1 - 30%]*	5.256%	5.252%	-0.004%

C. Costs and benefits

Banking is a competitive industry and small differences in lending margins can have a dramatic impact on returns on equity. We are not encouraging banks to ignore the potential for reducing the risk-adjusted cost of lending, even when the change is relatively small.

The question is: are the costs greater than the benefits? We assume that most banks will ultimately implement the approach that minimises capital requirements. However, the cost of doing so may well be highly time dependent. The cost of packages and expertise is, at the moment, at a premium. Oliver Wyman currently estimates that the cost for large banks is of the order of £100m to £200m or 5 basis points of their asset base. However, this cost is likely to fall dramatically both as specialist expertise is accumulated and as immediate demand abates.

As we have shown, for most banks the average cost of a year's delay should be no more than 0.4 of a basis point on assets, pre-tax, or 0.3 of a basis point post-tax. If the cost of implementation is currently 5 basis points, there must be a very strong case for banks to pull back and consider the decision to implement the more expensive IRB approaches in their own time.

Delay will itself bring other benefits. One of the hidden costs of implementing the IRB approach for Basel II is that it diverts resources from the development of risk management systems designed to meet the strategic requirements of the banks rather than regulation or indeed from other pressing IT projects. Another hidden cost is the diversion of scarce management resources: it is arguable that too much senior management attention is being paid to a decision with relatively small costs and benefits.

Conclusions

Quantitative and regulatory specialists are asking bank boards to approve substantial expenditure programmes for the implementation of Basel II. The implementation plans and models underlying these proposals are often incomprehensible to anyone outside the specialist circle responsible for implementation. However, we believe that, at board level, UK banks should be considering Basel II using a simple, more high-level analysis.

We have two main recommendations:

- Given that the short-term cost of implementation (at about 5 basis points) greatly exceeds our estimate of the annual benefit (of at most 0.4 basis points), banks need not rush to adopt advanced procedures for calculating regulatory capital, such as IRB measures of capital for credit risk or the AMA for operational risk.
- All policies with respect to Basel II need to be considered within the broader context of the bank's own business strategy and the response to trends such as the shift away from balance sheet activities and the growing use of quantitative tools to price risk. In this context, Basel compliance should have lower priority than the development of risk-management, pricing, and information systems that support its own business and are an integral part of its own organisational culture.

In contrast to many consultants, we advise banks to spend shareholder money very cautiously on Basel II. The adoption of Basel II should be pursued beyond the absolute minimum requirement only where this helps banks respond to these wider strategic issues.