

# Aircraft Financing and Basel II

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## Basel II Overview

The bank crises of the 1970's highlighted the need for stricter regulation and supervision of banks. These tasks were taken on by the Bank for International Settlements (BIS), headquartered in Basel, Switzerland. This effort led to the introduction in 1988 of the Basel Capital Accord (Basel I) to impose common minimum capital standards among banks. It imposed a minimum ratio of 8% between capital and weighted assets and defined the notions of capital and specified risk weights for each class of assets and counter parties. These new rules are often credited with bringing on the relative resilience of Banks in the current economic downturn. However, both the BIS and banks nevertheless felt a need to overhaul the current rules. The BIS wanted to broaden the scope of its controls while banks wanted to introduce more discrimination in the way risk weights were assigned to their assets. This is leading to the introduction of the New Basel Capital Accord, usually referred to as Basel II. The goal of the Basel Committee is to finalize the New Accord by the middle of 2004 and to have full implementation by the end of 2006.

In order to ensure stability in the banking system, Basel II still relies heavily on capital adequacy, which is the first pillar of the New Accord. However, Basel II also stresses the need for strong bank supervision by national Supervisory Agencies (Pillar II) and for more transparent financial disclosure (Pillar III) that would allow market participants (i.e. investors, lenders and depositors) to better assess the "riskiness" of a particular bank and price their loans or deposits accordingly. Of these three pillars, the most significant and the most relevant in the context of aircraft financing, is certainly Pillar I, dealing with risk weighting of assets, for the purposes of this paper, aircraft-backed assets.

Basel II leaves the existing basic capital adequacy equation unchanged:

$$\frac{K}{\sum_i w_i A_i} \geq 8\% , \text{ where } K \text{ is the bank capital}$$

and  $w_i A_i$  is the sum of each individual asset of the bank (A) multiplied by the appropriate risk weight (w). The change, however, is in the risk weights that are assigned to each category of assets. Under Basel I, risk weights were very coarse and penalized exposure to corporate credit (all credit exposure, even to AAA corporations had a 100% risk weight) while under-weighting exposure to sovereign risk where you could apply a 0% weight to all sovereign exposure within the OECD. Under Basel II, risk-weights are going to be much more granular and will depend not only on the nature of the counter-party but also on its "riskiness". There will also be consideration given to credit risk mitigants, such as loan collateral.

Basel II proposes different approaches to derive asset-specific risk weights, including options for Internal-Rating Based (IRB) approaches where the bank derives its own risk weights based on its own experience:

- Standardised Approach
- Foundation IRB Approach
- Advanced IRB Approach

Under the Advanced IRB Approach, banks will determine their own risk weights, subject, of course, to review and approval by the Supervisory Agency. The risk weight for each category of asset, will be based on each bank's own experience of Probability of Default (PD), Exposure at Default (EaD) and Loss Given Default (LGD). This approach is expected to be taken up by the larger banks that will have the resources and sophistication to determine each of the above-mentioned parameters that should be applicable to each type of transaction entered into by the bank.

Under the Foundation IRB approach, banks will come up only with their own estimate of the Probability of Loss while the Supervisory Agency will come up with the other parameters (EaD and LGD).

Banks who will be unable to provide their own estimate of PD, will fall under the Standardised Approach, where the bank will apply risk weights based on Risk Categories determined by the Supervisory Agency.

### Aircraft Financing in Basel II

Under the definitions of Basel II, aircraft financing is found as a type of Object Financing (along with ships, satellites and railcars), itself a sub-category of Specialized Lending. For most banks that will be regulated under Basel II, the aircraft financing portfolio will probably represent only a tiny fraction of their total assets and will therefore be unlikely to become a major area of focus at board level as banks prepare for the impact of the new rules. Likewise, while the treatment of certain classes of assets, notably loans to small and medium enterprises have been the subject of much debate and lobbying during the drafting of the successive consultation papers, aircraft financing has raised none of these passions.

Under the present regulation (Basel I) aircraft loans fall under Corporate exposure and therefore receive a 100% risk weight, which takes no account of the quality of the counter-party or that of the collateral securing the transaction. This presently translates into an 8% capital allocation for all aircraft financing deals (except for deals guaranteed by non 100% counter-party weighted entities such as OECD banks and export credit agencies).

### Standardised Approach

The Standardised Approach is in fact very similar to the current Basel I rules, where aircraft financing is treated as a Corporate exposure. The novelty is the differentiation of risk weight according to the rating of the counter-party, as per the table below:

External Rating	Risk Weight	Capital
AAA to AA-	20%	1.6%
A+ to A-	50%	4.0%
BBB+ to BB-	100%	8.0%
Below BB-	150%	12.0%
Unrated	100%	8.0%

However, given the almost complete absence of airlines that are rated above BBB+, this new rule is unlikely to provide any reduction in capital requirements below current levels. With many airlines currently rated (well) below, BB- the adoption of the Standardised Approach would lead to an increase in the capital required for the aircraft financing operation of a bank. In addition, under the Standardised Approach, aircraft are not eligible collateral as a credit risk mitigant and therefore provide no justification for capital reduction.

Under these circumstances, we expect that most of the banks that are active in aircraft financing will adopt one of the Internal Rating Based approaches.

### Internal Rating Based Approaches

The simplest of the IRB approaches is to use the regulatory slotting criteria. Under this method, the banks classify their asset in one of four categories and apply the appropriate risk weight. For aircraft financing the categories and equivalent weights are as follows:

Category	Eq. Transaction Rating	Risk Weight
Strong	BBB- or better	75%
Good	BB+ or BB	100%
Satisfactory	BB- or B+	150%
Weak	B to CCC-	350%
Default	D	625%

The risk category is determined by each bank using a qualitative assessment of several parameters including, the quality of the obligor, the re-marketability of the asset, country risk, counter-party risk and structural risk.

Given that the Basel II keeps the 8% minimum ratio of Capital over Risk-Weighted assets, we can deduce the

capital requirements and implied leverage for each of the risk categories:

Category	Capital	Leverage
Strong	6.0%	15.7 : 1
Good	8.0%	11.5 : 1
Satisfactory	12.0%	7.3 : 1
Weak	28.0%	2.6 : 1
Default	50.0%	1 : 1

These weights can be greatly altered (in many cases further lowered) for institutions opting for the more advanced IRB approaches.

In order to qualify for one of the two more advanced IRB approaches, banks will have to demonstrate that they are able to calculate their own estimates of PD and LGD. This requires some sophisticated tools in order not only to rate the counterparty risk and loss risk but also to be able to quantify these risks systematically. To be validated for use under the Advanced IRB method, the banks tools must have been in use for no less than three years and be used for pricing and internal evaluation of deals as well as for calculation of capital requirements. One additional difficulty comes with validating the data to demonstrate their statistical significance to the Supervisory Agency. This can only be achieved by reviewing a relatively large pool of transactions over several years, something that will be more difficult to do for banks with only limited aviation experience. We understand that several banks are trying to get around this difficulty by pooling their historical data together, not only in aviation but also in other areas of object financing in order to jointly achieve the minimum size pool of transactions to have statistically significant data and meet the requirements to qualify for use of the Advanced IRB Approach.

For banks that can meet these requirements, the benefits can be substantial. Using KMV<sup>1</sup>'s mapping of PD

<sup>1</sup> KMV, part of Moody's rating services provides Expected Default Frequencies for publicly traded

over one year vs. S&P ratings, we would obtain the following capital allocation. (The calculations for this table were made using 45% LGD for Senior exposure, as would be the case under the Foundation IRB approach.)

Obligor Rating	PD	Weight	Capital
AAA	0.03%	14.75%	1.18%
AA+	0.05%	20.03%	1.60%
AA	0.08%	26.47%	2.12%
AA-	0.11%	31.91%	2.55%
A+	0.16%	39.57%	3.17%
A	0.22%	47.24%	3.78%
A-	0.28%	53.79%	4.30%
BBB+	0.37%	62.12%	4.97%
BBB	0.48%	70.61%	5.65%
BBB-	0.70%	83.95%	6.72%
BB+	1.03%	98.59%	7.89%
BB	1.51%	113.86%	9.11%
BB-	2.27%	131.46%	10.52%
B+	3.41%	152.34%	12.19%
B	5.12%	180.16%	14.41%
B-	8.07%	224.22%	17.94%
CCC	14.00%	296.91%	23.75%

By itself, this usage of the Foundation IRB approach leads to a substantial reduction of capital relative to the standard approach.

For a bank adopting the Advanced IRB approach and being able to demonstrate to its Supervisory Agency that the collateral protection provided by its aircraft portfolio helps reduce the LGD, the reduction in capital requirement could be even greater. The capital requirement reduces linearly as the LGD decreases.

For a B obligor, the variation in capital depending on LGD would be as follows:

companies. KMV's PD for a AAA rating is actually 0.02%, we used 0.03% here as the minimum allowed under Basel II rules.

LGD	Weight	Capital
45.00%	178.27%	14.41%
40.00%	158.46%	12.81%
35.00%	138.65%	11.21%
30.00%	118.85%	9.61%
25.00%	99.04%	8.01%
20.00%	79.23%	6.41%
15.00%	59.42%	4.80%
10.00%	39.62%	3.20%

This should open the door to reduction of the capital being held against very secure transactions such as super-senior fully amortizing loan tranches.

Another new feature introduced by the Basel II rules relative to the existing rules is the realization that risk is also dependent on the maturity of a transaction. Indeed Risk Weights under the Advanced IRB method reflect the maturity of the transaction. This has a linear effect on the capital weights requirements. The tables displayed above were calculated using the assumed "standard" 2.5 years maturity. If we vary this maturity, for a B rated obligor, with a LGD of 25%, we would obtain the following table:

Maturity	Weight	Capital
1.0 y.	89.96%	7.20%
1.5 y.	93.33%	7.47%
2.0 y.	96.71%	7.74%
2.5 y.	100.09%	8.01%
3.0 y.	103.47%	8.28%
3.5 y.	106.84%	8.55%
4.0 y.	110.22%	8.82%
4.5 y.	113.60%	9.09%
5.0 y.	116.98%	9.36%
5.5 y.	120.36%	9.63%
6.0 y.	123.73%	9.90%
6.5 y.	127.11%	10.17%
7.0 y.	130.49%	10.44%
7.5 y.	133.87%	10.71%
8.0 y.	137.24%	10.98%

Leases will be treated slightly differently. Only the amortizing part of the lease (i.e. the payment stream plus any full recourse balloon obligation) will be weighted as a loan, using the appropriate PD and LDG.

The residual value, however, will be risk weighted at 100% regardless of the regulatory approach adopted by the institution.

### Asset-Backed Securities

It doesn't necessarily follow that smaller banks that adopt the standardised approach will be condemned to holding higher capital if they want to be involved in aircraft financing. One solution is to buy Aircraft Backed Securities (ABS, EETC, CLO or CDO) and rely on the ratings provided by external rating agencies under the Rating Based Approach within the securitisation framework.

One important limitation to this is that the Basel II rules stipulate that "Banks that apply the standardised approach to credit risk for the type of underlying exposure(s) securitised must use the standardised approach under the securitisation framework". This gives rise to the existence of two sets of weights for the same assets depending on whether the holding banks are operating under the Standardised approach or an IRB approach.

In the case of ABSs where a public transaction rating has been provided by an external rating agency, banks will be able to apply the corresponding risk weight as per the table below depending on their overall approach:

Transaction Rating	Standard Weight	IRB Weight
AAA	20%	20%
AA	20%	25%
A	50%	35%
BBB+	100%	50%
BBB	100%	75%
BBB-	100%	100%
BB+	350%	250%
BB	350%	425%
BB-	350%	650%
Below BB-	Deduction	Deduction

Relative to the risk weights that would apply for a direct exposure, we can see that there are some potential arbitrage opportunities. A AAA tranche of an ABS would carry only 20% weight (under either approach) while the same slice of transaction would require a 75% risk weight if kept on book by a bank

using the regulatory slotting criteria IRB approach.

It is most interesting to note that the two approaches overlap and that neither provides an absolute advantage across all ratings. The weights under the Standardised Approach are generally higher than those under the IRB, particularly in the A to BBB range where many ABS issues would fall.

At the bottom end of the spectrum, a slice of ABS rated BB- would require a 650% risk weight if carried by a bank under the IRB approach but only 350% risk weight for a bank under the standardised approach. This means that it will not necessarily be the most sophisticated banks (i.e. those with the greatest capacity to analyze and, presumably, to handle risk) that will have the greatest incentive, or lowest disincentive to hold the most risky slices of transactions.

This weighting of ABS also means that it will be highly penalizing for banks to hold sub-investment grade tranches. This could well lead to a search for non-Basel II regulated financial institutions that could hold these tranches more efficiently. As insurance companies are frequently very constrained in their holding of non-investment grade assets, this will lead to a very tight market for these tranches. We understand that some hedge funds are being established with the main purpose of taking advantage of the "abnormal" excess spreads that should become available on high non-investment grade (BB+ or BB) tranches relative to the spread offered on BBB, BBB-tranches.

### **Export Credit Finance**

A large portion of the market for new aircraft financing is covered by Export Credit Agency (ECA) supported debt. Generally, for aircraft manufacturing nations, the ECA carries the full faith and support of the related country and is currently 0% weighted provided the country is part of the OECD. For non-OECD countries, the counter-party weighting is currently 100%. Under Basle II, for banks using the Standardized Approach, weightings are assigned by country rating as follows

<b>Credit Assessment</b>	<b>Risk Weight</b>
AAA to AA-	0%
A+ to A-	20%
BBB+ to BBB-	50%
BB+ to B-	100%
Below B-	150%
Unrated	100%

Under the IRB approaches the bank is able to use its own estimate of PD without being subject to a 0.03% floor as for corporate exposure. If the assigned PD is 0%, it will still be possible to weight such ECA supported loans 0%.

### **Next Steps**

The Basel committee is currently busy preparing the final version of the New Basel Capital Accord, which should be released in the middle of this year. It will be based mostly on the Consultative Paper 3 that was released last April and will also take into account comments received so far as well as the results from the Quantitative Impact Studies that have been compiled by participating banks in late 2003. It is entirely possible that the final version will incorporate significant changes, including with respect to features highlighted in this paper.

Banks in the meantime will need to determine which approach they will take to determine risk weights. Although banks are expected to end up using a single approach for all their assets, it is likely that the introduction phase will see banks using different approaches for different assets. Major banks whose aircraft portfolio (and other Object financing) represents a small portion of total assets, could well decide to use the Standard Approach to risk weighting of this portion of their portfolio, at least initially.

As these banks take time for more thorough review we can expect to witness some slicing of assets and transfer among banks in a way that minimizes the capital requirement for the system as a whole. This will probably lead to a larger role for

unregulated (i.e. non-bank) financial institutions as holders of the lowest rated tranches of aircraft loans. As these tranches will be the riskiest, we should hope that the holders of these tranches would be sophisticated institutions with superior asset technical capabilities and remarketing abilities.

Over the medium to long term, Basel II is likely to lead to a greater specialization of banks. Banks with the greatest experience and expertise should be able to qualify for the Advanced IRB approach and be able to demonstrate lower historical losses, thereby justifying to their regulators the use of lower risk weights. This will in turn give them further competitive advantage, as they will be able to allocate less regulatory capital onto their aircraft financing transactions, thereby achieving higher return on capital for their shareholders.

Bibliography: *The Basel II Consultation Paper 3 is available on the Bank for International Settlements' website:*  
[www.bis.org](http://www.bis.org)