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Secretary General  
Basel Committee on Banking Supervision  
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Centralbahnplatz 2  
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28. Juli 2003

Dear Mrs Nouy,

The Association of German banks very much welcomes the opportunity to comment on the third consultative paper for the new Basel capital accord (Basel II). Over the last months we have had intensive discussions within our association concerning the potentially pro-cyclical effects of the new capital framework. Enclosed you will find a paper which is the outcome of this fruitful discussion and proposes various solutions to mitigate the pro-cyclical effects of the Basel Accord. Apart from the elimination of the expected loss in the risk weight function and the calculation of Capital Requirements based on 3-year average PDs/Ratings, we consider especially the usage of internal credit risk models as a risk sensitive and appropriate way to reduce the potentially pro-cyclical effects of Basel II. We would be very pleased if these ideas were taken up by the Basel Committee.

Yours sincerely,



Steuer



von Kenne

Enclosures

# Potential Pro-Cyclicality of the Basel-2 Framework Analysis and Possible Solutions

- Working Paper -

## 1 Origin of the Analysis, Type of Analysis Performed

The large variation of QIS-3 results (see [QIS03]) as well as some bank-individual studies indicated a strong pro-cyclicality of the Basel-2 approach based on ratings only.

Regulators discuss this issue as well but do not come to a conclusive result (see [Cor03] [Hei03] [Seg02]).

If Basel II has much stronger pro-cyclical effects than previously expected this may negatively impact the banks ability to lend throughout the economic cycle. This might have a serious impact on the stability of financial systems.

A future regulatory capital requirement based on CP 3 will depend on the business cycle because PD as a risk parameter is an input factor to the risk weight function. PD is correlated with the economic development, i. e. PD increases with decreasing business cycle. In times of an economic recession the capital requirements increase but the minimum regulatory capital ratio remains constant. Therefore, in times of economic recession, banks can basically reduce risk weighted assets (f.e. cut down lending), or increase capital, or a combination of both actions.

Both actions taken by a majority of banks of a country at the same point in time may destabilise the financial system of that economy.

Based on those indications, four German banks performed a couple of sensitivity analyses in order to quantify the potential pro-cyclicality of the Basel-2 framework as well as to develop mitigants to that. The paper is organised as following:

In section 2, the sensitivity of Basel-2 risk weights on PD shifts is analysed. We applied PD shifts on the QIS-3 data of four German banks. Furthermore, actually observed changes of average PDs by publicly available data sources (KMV, S&P bond issuer ratings, Moody's Corporate Bonds) as well as their hypothetic effect on Basel-2 risk weights were calculated. The analysed time period is 5 years for KMV and S&P data and 22 years for Moody's data.

In section 3, potential consequences of the identified pro-cyclicality are discussed.

In section 4, five different mitigants to dampen the pro-cyclicality effect are described as well as their pros and cons are presented.

Content of section 5 is a summary, our recommended solution as well as proposed next steps.

## 2 PD Sensitivity Analysis

### 2.1 PD-Variation on QIS-3 Data of four German Banks

The analysis was based on the QIS-3 data spreadsheets from four German banks. We multiplied the PDs / PD bands for the non-defaulted assets. The calculated PD shifts as well as their effect on RWA can be seen in the following table:

PD shifts	- 20 %	20 %	50 %	100 %	150 %
Effect on Basel-2 RWA	- 11 %	9 %	21 %	37 %	51 %

**Table 1: QIS-3 - PD Shifts and Effect on Basel 2 Risk Weights**

Sensitivity results at the participating banks were quite similar, differences in portfolio structure had only a minor effect on sensitivity.

Results based on Basel-QIS-3-spreadsheets differed only slightly from the calculation based on the original portfolio data. The results are also consistent with similar studies performed by regulators.

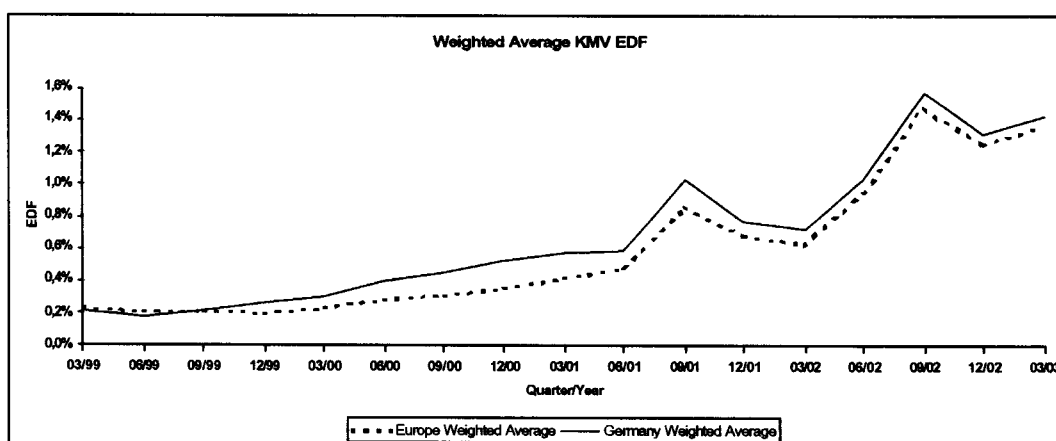
## 2.2 Cohort Study of KMV Credit Monitor™ Database

Using the KMV Credit Monitor™ database Europe from March 2003, we analyzed a weighted average EDF™ shifts for German and European corporates. Only those customers with valid data for the whole time period considered (03/1999 to 03/2003) were included in the analysis (cohort study). The analysis is based on quarterly values. In order to calculate a weighted average EDF™ for a point in time, a single company's EDFs™ was weighted by the asset value of that company relative to the sum of the asset values of all companies in that point in time.

The results of the EDF™ changes are shown in the following table and figure.

EDF™ increase	Europe	Germany
03/02 - 03/03	118 %	98 %
03/01 - 03/03	227 %	150 %
03/00 - 03/03	476 %	372 %
03/99 - 03/03	488 %	558 %

**Table 2: Differences of weighted average EDF™ for European / German Corporates based on Cohort Study of KMV Credit Monitor™ data**



**Figure 1: Weighted average EDF™ variations for European / German Corporates from KMV Credit Monitor™**

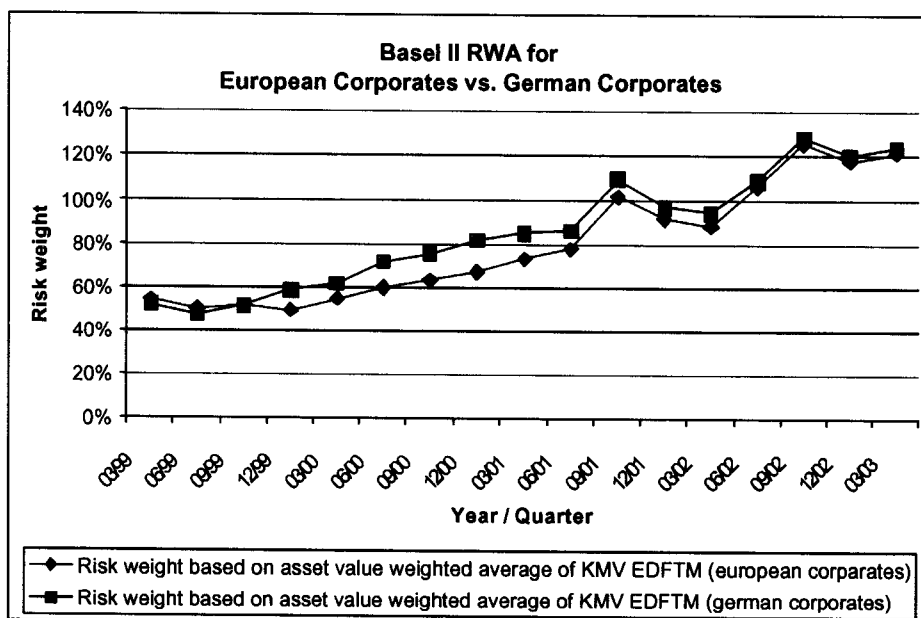
Over the last four years the weighted average KMV EDF™ increased by about 500% in Europe and about 550% in Germany.

Based on this data the corresponding capital requirement was calculated. The corporate risk weight function without size adjustment and with implicit maturity assumption (2.5 years) was applied. LGD was set to 50%.

The above mentioned specifications and the weighted average EDF™ of a quarter were applied to calculate the risk weight for that point in time.

Period	Basel II Risk weight increase	
	Europe	Germany
03/02 - 03/03	37%	31%
03/01 - 03/03	66%	46%
03/00 - 03/03	123%	99%
03/99 - 03/03	126%	138%

**Table 3 Effect of of KMV-EDF™ variations on Basel 2 Risk Weights**



**Figure 2 Effect of of KMV-EDF™ variations on Basel 2 Risk Weights**

### 2.3 Cohort Study of S&P Credit Pro™ Data

We analysed the ratings of 257 European and 2295 North-American corporate bonds and their changes from December 1998 to December 2002 (see the following migration matrices)

Rating	Issuers	AAA	AA	A	BBB	BB	B	CCC	D	NR
AAA	23									3
AA	59									9
A	96									21
BBB	46									14
BB	20									5
B	13									4
CCC	0									0
	257	14	28	73	57	14	5	3	7	56
Equivalent PD		0,01%	0,03%	0,06%	0,25%	1%	5%	20%	100%	

**Figure 3: S&P Rating Migration of European Corporate Bonds from 1998 to 2002**

Rating	Issuers	AAA	AA	A	BBB	BB	B	CCC	D	NR
AAA	37									7
AA	136									18
A	448									53
BBB	597									100
BB	476									106
B	577									124
CCC	24									6
	2295	24	72	329	516	332	257	46	305	414
Equivalent PD		0,01%	0,03%	0,06%	0,25%	1%	5%	20%	100%	

**Figure 4: S&P Rating Migration of North-American Corporate Bonds from 1998 to 2002**

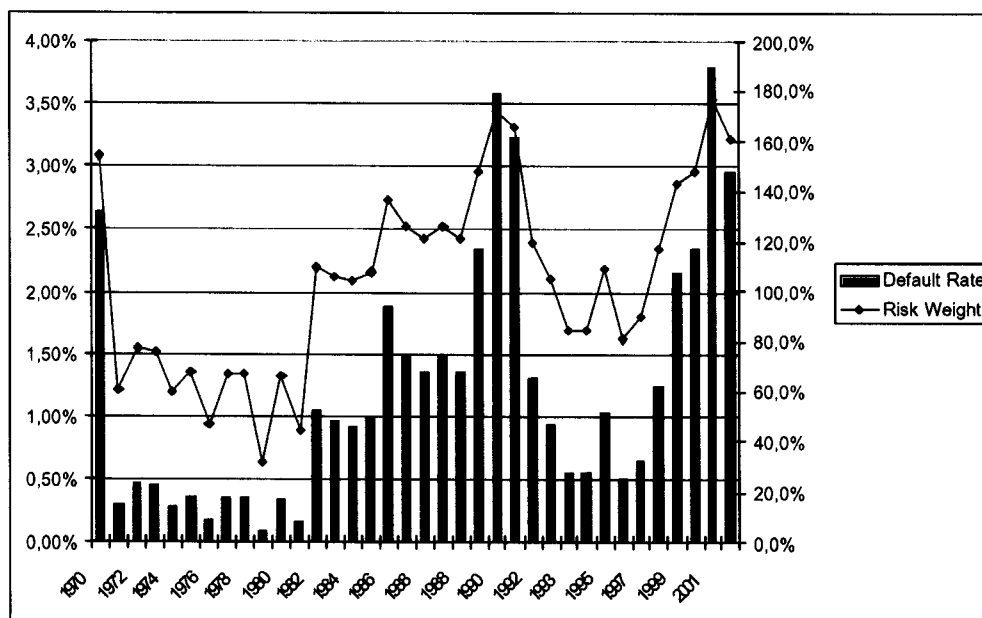
When assigning equivalent PDs to the rating classes (see bottom row), we calculated average PDs for 1998 and 2002 respectively, as been shown in the table below.

Weighted average PDs	Europe	North-America
1998	0,41 %	1,75 %
2002	4,07 %	17,64 %
1998 - 2002 increase	892 %	908 %

**Table 4: Weighted Average PDs based on Cohort studies of S&P CreditPro™ data**

## 2.4 Study of Moody's average PD of Corporate Bonds

The following analysis was based on [Moo03]. The data is described as "annual global issuer-weighted default rates by whole letter rating, 1970-2002. We selected the default rates for "All Corporates". Basel 2 risk weights were then calculated according to the same assumptions as stated under 2.2. The result of the analysis is shown in figure 6.



**Figure 5: Weighted Average PD as well as corresponding Basel-2 risk weights based on Corporate Default data from Moody's**

Between 1970 and 2002 the PDs increased at a maximum by about 4000% (1979 to 2001). Between 1998 and 2002 the PD increased by about 360%. This would imply a Basel-2 RWA to increase by 460% between 1979 and 2001 and by 37% between 1998 and 2002 respectively.

## 3 Results and Consequences

### 3.1 Summary of Findings

Analysis of publicly available PD data series show the following changes over the last five years (2002 versus 1998):

KMV Credit Monitor EDF™ Corporates Europe	+ about 500 %
S&P Credit Pro™ Migration data	+ about 900 %
Moody's Corporate Bonds	+ about 360 %

Changes (in terms of PD) to the individual portfolios at the participating banks vary significantly, due to risk measurement instruments developed and risk management strategies applied. However, in several of the individual portfolios PDs doubled in the observed period.

What is the reason for the large discrepancy between externally observed PD shifts and those of bank-internal portfolios? Portfolios of banks are actively managed. Banks in general try to avoid large changes in provisioning of their portfolios and hence keep

the average credit quality of a portfolio as constant as possible. Such a strategy might be much harder to maintain in an environment where pro-cyclic capital requirements add additional volatility on the financial system as a whole.

Therefore, working with a scenario of average PD shifts of 100% appears to be cautious though reasonable, given the developments in the actively managed bank portfolios over the last years.

A PD increase of 100% will cause regulatory capital requirements to grow by about 40%, see Table 1 (effect of defaulted assets not yet taken into account).

A volatility of +/- 40% in regulatory capital requirements would put a serious stress on the stability of any financial sector.

### **3.2 Expected Consequences**

Increasing capital requirements (due to declining internal ratings / PD's) in an economic downturn are likely to have a negative impact on bank ratings, which would result in bank funding costs to increase, an additional burden to bank earnings.

For individual banks raising capital in order to behave contra-cyclic will be expensive. For the banking sector as a whole it will be impossible in economic downswing periods.

Consequently, the requirement of stable capital ratios even in economic downswing periods will cause the banking sector to reduce the loan portfolio.

Reduced (new) lending will reinforce the macro-economic effects of the economic downturn.

## **4 Discussion of Potential Solutions**

### **4.1 Revision of the Regulatory Capital Definition**

As a potential solution the existing definition of regulatory capital could be revised. Additional capital elements as a buffer for recession periods could be included, for example by introduction of tax-deductible "fluctuation reserves".

#### *Pros:*

An advantage of this proposal is that the risk-sensitive measurement of RWA will be maintained. RWA will continue to be able to serve as a risk indicator.

In addition, no changes are needed on the current design of Basel-2 framework and the level of complexity is not further enhanced.

#### *Cons:*

However, one could argue whether banks, in general are in a position to build up these buffers in 'better times'. Competition / pressure from analysts will make it very hard for the senior management of a bank to "invest" in additional buffers rather than into new business.

Furthermore, definition changes on the supervisory rule-set have to be accompanied by the respective changes on the tax side, which on an international level will not be quick and easy to be achieved.

#### *Recommendation:*

As regulators repeatedly voiced that they envision changes to the regulatory capital definition only in a future Basel-Accord revision, this solution should not be pursued at this time but rather postponed to Basel 3.

## 4.2 Capital Requirements based on 3-year average PDs / Ratings

Another potential solution is to base the minimum capital requirement on the current exposure, but to apply average customer specific PDs / Ratings. For example, the average could extend to three years, so that the current and the two preceding years PD / Rating data would be used.

### Pros:

A clear advantage is that portfolio changes are captured as the current exposure is used (mirroring that fact that bank portfolios are actively managed).

In addition, banks expect that the respective implementation burden will be still acceptable.

This potential solution will bring along only moderate changes to the Basel-2 RWA calculation

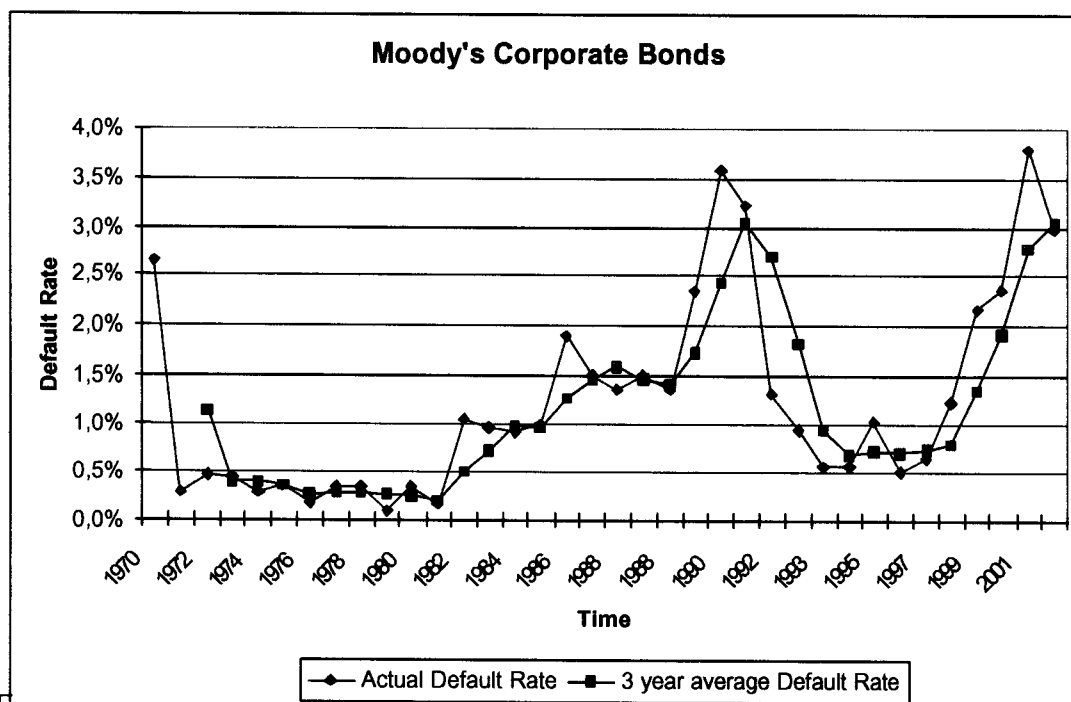
### Cons:

The described risk measurement will lead to a reduced risk sensitivity. It can be argued that this is the first step of abandoning the "point-in-time" treatment for capital requirements. For regulatory purposes to turn our backs to a "point-in-time"-parameter will cause a contradiction to the use-test, as these parameters are clearly preferred for internal capital allocation.

A couple of further questions arise: How should potential changes in rating models be factored in? How can product-specifics (e.g. maturity below 3 years) be treated? How should new customers be treated?

### Effect on Default Rates:

The following analysis is based on Moody's data [Moo03]. As can be seen from the graph, a 3-year average of default rates smoothes the default rate curve, compared to the actual default rate curve.

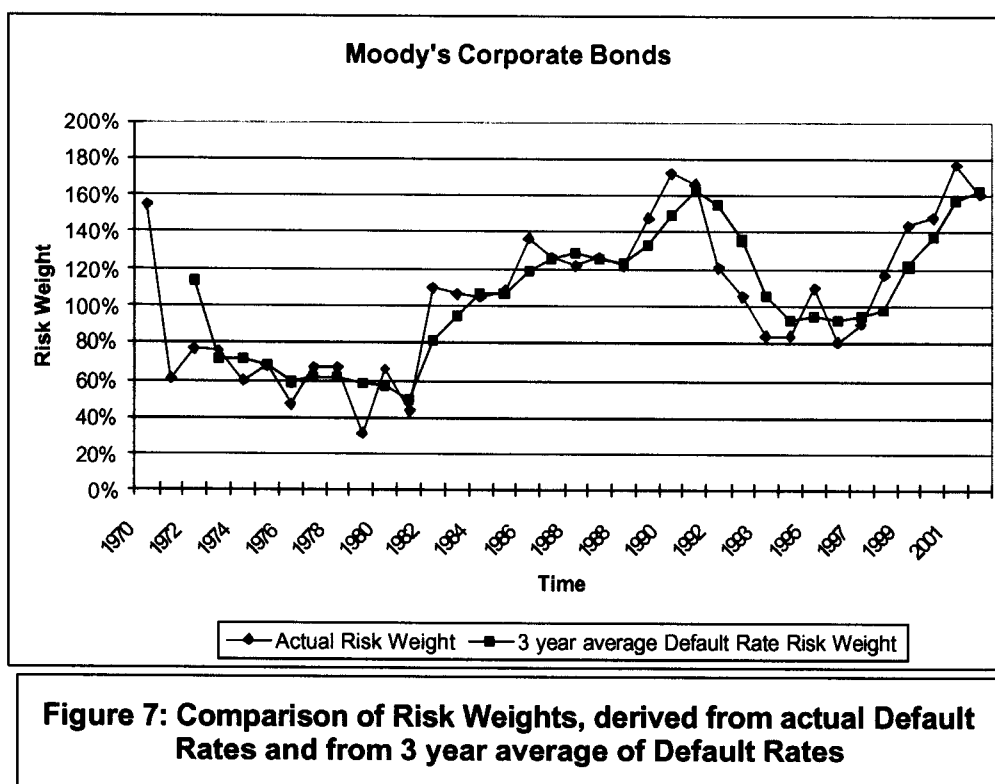


**Figure 6: Comparison of actual and 3-year average PD based on Moody's Corporate Bond data**



*Effect on Risk Weights:*

In the next step, the average default rates were used as probability of default and applied to the Basel II risk weight functions under the same conditions as in chapter 2.4. In times of economic boom (1991-1996) the 3-year average approach results in more capital compared to actual approach. In times of economic recession (1998-2002) the 3-year average approach results in less capital compared to actual approach, and mitigates the pro-cyclicality effect of the Basel II approach.



The smoothing effect of this approach varies between -36% and +29%, i.e. after the recession in the early 1970<sup>th</sup> the 3-year average approach would have lead to a 36% higher capital requirement than the actual approach. In the economic recession period of 1982 the 3-average approach resulted in a 29% lower capital requirement than the actual approach.

*Recommendation:*

The averaging has certainly a smoothing effect on the capital requirement. However, the potential loss of risk sensitivity might be too high a price to implement this approach (for a similar suggestion, see also [Row03]).

**4.3 Modification of the Risk Weight Function**

**4.3.1 Internal Credit Risk Models**

Conceptually, internal models take into account the specific granularity, correlations within, concentration resp. diversification of bank-individual portfolios with regard to

industries resp. countries concerned. Stresses / Hot spots in a portfolio are therefore compensated better than by a simple 1-factor function (as Basel-2).

The majority of banks uses either a KMV-like / Riskmetrics-like model or a derivative of CreditRisk+. The results of the different model calculations are essentially comparable i.e. the difference in results is well understood (see for example [Blu01]). One can therefore say that market standards for models exist.

*Pros:*

Diversification / granularity / concentration are explicitly taken into account.

Based on the fact that internal models are already integrated in bank-internal processes, the usage of internal models for regulatory capital purposes will create an increased acceptance for the new framework within banks.

Furthermore, the treatment would be consistent with market and operational risk treatment under BIS rules.

*Cons:*

Usage of internal models for regulatory capital purposes was repeatedly refused by the regulators.

Validation / regulation is more complex than the current proposal.

*Recommendation:*

It should be voiced again but – due to the strong regulatory resistance – only a potential opening clause of Basel-2 should be lobbied.

#### **4.3.2 Elimination of Expected Loss (EL) in the Risk Weight Function**

Elimination of capital charges for EL leads to a flattening of the risk weight curve respectively avoids potential double-charging.

*Pros:*

Correction is done where part of the problem at the Basel framework originates. From the methodology point of view, capital charges for EL are not justified anyway.

Implementation can be easily made by an adjustment to the risk weight formula.

An implicit acceptance of EL (via FMI charge) for some segments, e.g. revolving lines of credit, is already accepted.

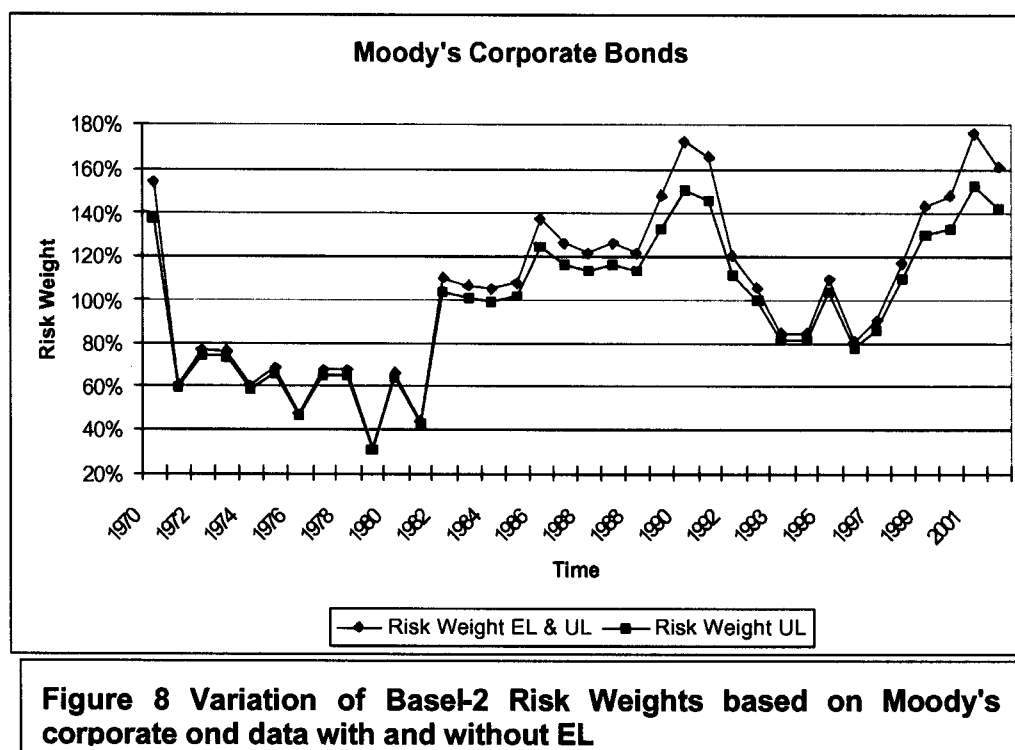
Since EL increases with increasing default rate, i.e. economic downturn, the exclusion of EL from the risk weight function would have a smoothening effect on capital requirements over time. The exclusion of EL from the risk weight function is therefore an additional means to mitigate the pro-cyclical effect of the currently discussed risk weight function.

*Cons:*

Elimination of EL capital charge was repeatedly refused by regulators as they doubt materiality of margin income.

*Effect on Risk Weights:*

Based on Moody's data [Moo03], the EL was calculated as default rate times LGD. LGD was 50%. The EL times 12.5 was subtracted from the risk weight. The EL varies between 0.6% (1979) and 24% (2002) for the considered time period.



*Recommendation:*

The implementation of this concept is easy, and makes sense from a methodological point of view. Furthermore, it is in part already recognised by the Basel Committee in case of the qualifying revolving retail exposures.

**4.4 Individual Confidence Level with ex-post Supervisory Review under Pillar-2 and Disclosure under Pillar-3**

To reduce the negative consequences of an inflexible capital requirement (see section 3 of this study), banks should be allowed to adjust the confidence level. Under pillar-2, the bank supervisor will ex-post review the adequacy of the confidence level examining bank-specific risks and processes. Results based on internal models which could also be included.

One could envision a minimum confidence level for all banks, say 99.5% (which is equivalent to long-term average observed defaults of a low investment grade rating).

The respective confidence level and / or potential multiplier applied by the bank would need to be disclosed under pillar-3; rating agencies, analysts and supervisors can 'translate' confidence level into a respective default probability.

*Pros:*

This potential solution is an implicit recognition of the bank-specific portfolio and risk structure. It therefore brings along the respective pros/cons, when diversification / granularity / concentration is captured.

In addition, this method entails the possibility of building up bank-specific capital buffers under regulatory and public guidance so that the stability of the financial sector in times of economic up- and down-swing is increased. As a consequence, systemic risk is reduced, as banks will not be subject to regulatory-induced herd behaviour (as f.e. most banks raising capital at the same time i.e. in weak market conditions). Rather, banks have a choice between RWA-reduction, capital-increase or accepting a lower rating. Disclosure under pillar 3 makes sure that this bank-specific behaviour is transparent to all market participants (not only regulators and/or rating agencies).

Depositors and bank creditors will not be disadvantaged as they will be able to immediately trace the standing and credit worthiness of a bank due to disclosure requirements under pillar-3.

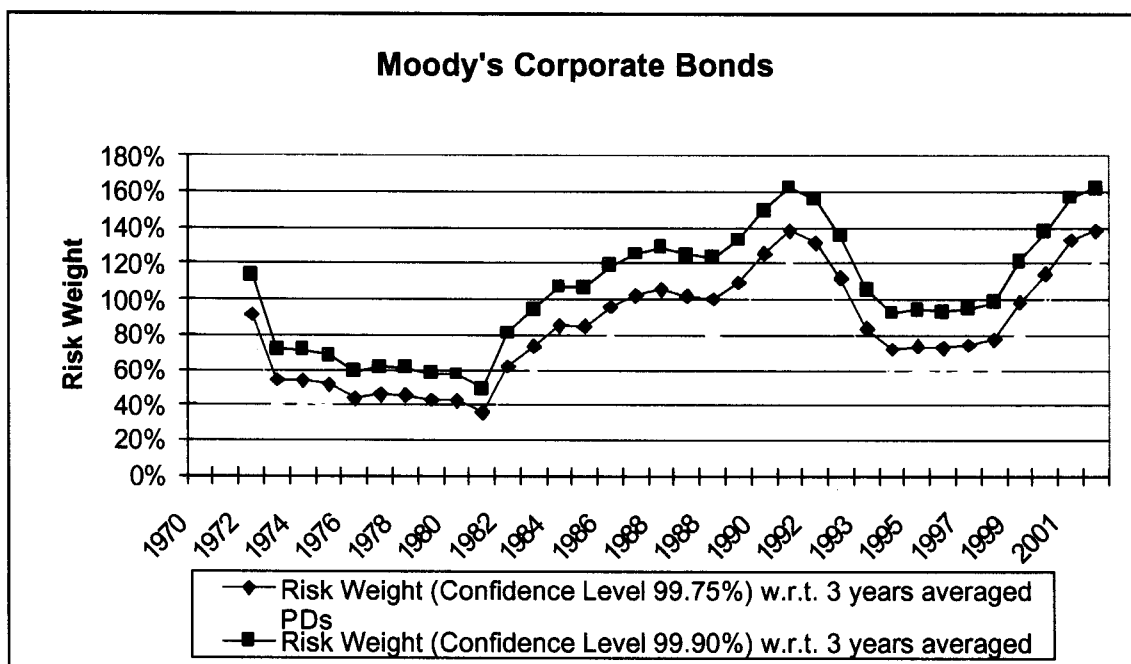
*Cons:*

Potential for regulatory discretion which might be in contradiction with level-playing-field issues.

Validation / regulation is more complex

Finally, this suggested revision is a considerable change to current regulatory approach

*Effect on Risk Weights:*



**Figure 9 Moody's Corporate default data and hypothetical Basel 2 Risk Weights for different levels of confidence**

The effect is shown in *Figure 9*. Choosing a confidence level of 99.5% (equivalent to a BBB-) the capital requirement for the Moody's Corporate Bond portfolio has never exceeded 120%\*8% between 1970 and 2002.

*Recommendation:*

This solution seems to be an elegant way out. We suggest to offer this for discussion within the industry.

## 5 Summary and Recommendation

The QIS 3 results show the need for further adjustments of the new capital accord. One of the major issues in this regard is pro-cyclicality. As discussed in section 2 and 3 the new capital framework contains pro-cyclical effects that could lead to unintended consequences. Pro-cyclicality is a direct result from risk-sensitivity. While a more risk sensitive approach is one of the main ideas behind the new framework and is supported by all involved parties, a volatility of +/- 40% in regulatory capital requirements would put serious risk on the stability of any financial sector.

Therefore, we have evaluated the pros and cons of five different potential solutions to deal with that effect<sup>1</sup>.

Based on the evaluation of the pros and cons of the respective proposals the elimination of the expected loss (EL) in the risk weight function seems to be the easiest solution in the short run (section 4.3.2). It would not require any changes in the overall framework but dampen the volatility of the capital requirements over the cycle.

A more elegant solution is definitely the introduction of a bank-individual confidence level under supervisory review and public disclosure (section 4.4), since banks would then have a choice between RWA-reduction, capital-increase or accepting a lower rating. Disclosure under pillar 3 makes the bank-specific behaviour transparent to all market participants (not only regulators and/or rating agencies).

The most elegant solution would be to allow the usage of internal credit risk models as in market risk under Basel 1 and operational risk under Basel 2 (section 4.3.1). However, many regulators still have concerns about that solution.

We acknowledge the fact that all potential solutions discussed in that paper might have unintended consequences or issues of implementation which we have not discovered yet. However, the identification of the pro-cyclicality of the current Basel 2 framework (section 2) as well as the discussion how to deal with it point to a very simple conclusion:

It will be necessary to conduct further studies on the systemic risk the pro-cyclical Basel 2 framework brings into the financial system and how this can be solved. The proposals discussed in this paper can serve to initiate this discussion within the financial industry.

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<sup>1</sup> There are definitely more potential solutions discussed in the industry, some of which would have required quite significant changes in the proposed new framework and are therefore not included in this paper

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