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## Equity-at-Risk and Transfer Pricing: Annualised Expected Loss versus Cumulative Expected Loss

A consideration of the necessary time horizon for the calculation of expected loss in the context of transfer pricing according to Base Erosion and Profit Shifting (BEPS) regulations.

**Summary**

This paper presents a qualification of equity-at-risk and risk remuneration capitalization during intercompany debt financing processes.

This article is intended as guidance for transfer pricing professionals in Luxembourg who are considering the equity-at-risk following the calculation of a loan's expected loss when using Moody's Analytics tools. This article does not provide final decision-making processes, which remain at the discretion of the transfer pricing professional, according to the specific case. This article is intended to create elements of thought and paths to economically and financially sound results.

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## 1 Circulaire L.I.R. nr 56/1 - 56bis/1

Transfer pricing rulings have been updated effective January 2017 through the new Circulaire L.I.R.nr 56/1 -56bis/1).

The previous version of the Circulaire insisted on the importance of the substance of the company in Luxembourg but mentioned a floor of 1% of the nominal of the credit line or 2 million euros as equity.

The new Circulaire has been redacted to follow more accurately the Organisation of Economic Cooperation and Development (OECD) guidelines, as described in the Base Erosion and Profit Shifting measures first released in 2015 and updated and specified since.

Far from the pretention of summing up the several hundred pages of the many reports on the subject, this article focuses on the updated Circulaire.

From a purely financial transaction point of view, the Circulaire insists on the need for respecting the arm's length principle, a notion already well-implemented within the industry. The arm's length principle asks for credibility of the transaction if it occurs in a competition-free situation or in a market situation.

This credibility is endorsed by the calculation of a market-related interest rate (also known as risk remuneration), as well as proof that the group's financing company has the financial capacity to assume the loan's credit risk, and that it can support the financial consequences of the risk if it occurs. This financial capacity is referred to as the "equity-at-risk."

Risk remuneration implies specific care given to a comparable analysis. It focuses on two pillars:

- » Identifying the points for comparison. A credit analysis must be done to define the issuer's credit quality. This analysis must be done with techniques and models used and certified by recognized credit professionals.
- » Finding the said comparable. Once the adequate factors have been determined, a comparable must be found through benchmarking of existing transactions in the market. These transactions can include loans, bonds with similar duration and maturity, as well as equivalent credit quality. The transfer pricing professional must precisely define what has been considered as the correct comparable, and it must also provide a list of comparables that have been excluded.

Equity-at-risk is defined as the necessary capital to assume the risk taken in the financial transaction. This notion is similar to current financial institutions regulations such as Basel III and IFRS 9.

However, the provisioned capital required by the Luxembourg Tax Authorities must be less complex and less constraining than for financial institutions. Indeed, regulations attached to the transfer pricing activity differ from banking capital regulations.

This equity-at-risk principle is based on the calculation of the loan's expected loss.

## 2 Expected Loss Definition

Expected loss is not, as such, a calculation of risk, but it is rather a forecast of usual losses. By nature, risk is unexpected. The expected loss on a portfolio of loans represents the loss that must be accepted and priced, due to the nature of the loan activity. Expected loss is a cost of doing business.

As a formula, we calculate expected loss as follows:

Expected Loss (EL) = Probability of Default (PD) x Loss Given Default (LGD) x Exposure at Default (EAD)

EL equals multiplying the chance of default by what is lost in the case of default and the exposure at the default.

Expected loss tends to be considered as a percentage of loss, on which the exposure is applied to create an absolute number.

Probability of default and expected loss are two-dimensional data points: the level of the risk is important, as is the time horizon taken into consideration.

### 3 Differentiating Expected Losses

The notion of Expected Loss has several dimensions, as explained earlier. The time period considered is crucial. We can differentiate three types of expected loss calculations, matching three types of probability of default (multiplied by LGD provides EL). Table 1 shows an extract from Moody's Analytics RiskCalc™ solution. This model provides clients with an EDF™ (Expected Default Frequency) credit measure — a Probability of Default — and also a second output, the LGD necessary for the equity-at-risk calculation.

**Table 1** Example of Expected Loss Term Structure

	1-Year	2-Year	3-Year	4-Year	5-Year
Cumulative	0.86%	1.84%	2.87%	3.91%	4.98%
Forward	0.86%	0.99%	1.04%	1.08%	1.11%
Annualized	0.86%	0.93%	0.96%	0.99%	1.02%

#### Cumulative Expected Loss

The cumulative expected loss notion represents the expected loss as it can be expected over the analyzed loan's lifetime.

A cumulative EDF credit measure gives the probability of default over that time period. For example, a five-year cumulative EDF credit measure of 4.98% means that a company has a 4.98% chance of defaulting during that five-year period. The second row in Table 1 provides an example of the cumulative one- to five-year credit measures produced by the RiskCalc model.

When we multiply this output by the LGD following the correct time horizon, the cumulative EDF aids in calculating a cumulative expected loss that represents the expected loss over the life of the loan.

#### Annualized Expected Loss

The annualized EDF credit measure is the cumulative EDF value for a given period, stated on a per-year basis. These credit measures are derived from the cumulative EDF values. This means that the average default rate per year for a 4.98% cumulative default rate is 1.02%. The last row in Table 1 shows the annualized EDF credit measures for years one through five.

Applying the same principle to the cumulative expected loss provides the annualized expected loss.

#### Forward Expected Loss

The forward-EDF credit measure is the probability of default between  $t-1$  and  $t$ , conditional upon survival until  $t-1$ . In other words, the four-year, forward-EDF measure is the probability that a firm will default between years three and four, assuming the firm survived to year three. Table 1 displays the forward one- to five-year EDF credit measures derived from the cumulative EDF values. This forward-looking EDF, multiplied by the time-corresponding LGD, can estimate a loan's expected loss, conditional to survival (non-default), at time  $t$ .

The same loan at five years or at one year may seem different. For the calculation of the interest rate, Moody's Analytics recommends examining the loan's full term, taking into consideration the loan's rating for a time period matching the term.

For the equity-at-risk, different approaches should be considered, based on the highly illiquid characteristics of a loan and its over-the-counter nature.

The loan must be considered over its lifetime, but, as stated in the Circularaire, substance must prevail over form.

## 4 Substance Over Form

The Luxembourg Tax Authority confirms that the economic reality of the transaction should prevail over the contractual terms of the agreement. This can affect the credit quality analysis, in the consideration of the country of activity, or, potentially, in the duration of the financial agreement to be taken into consideration.

Considering the loan as either year-by-year rolling capital or as a single, long-term, unalterable deal depends on several characteristics, including rating, liquidity, contracting, and loan formatting. A common practice in provisioning decisions considers the issuer's credit quality as the primary factor.

There are no particular definitions of risky or safe characteristics for a loan. Other capital calculation regulations consider a separation between a security considered investment grade by the model used at origination, with an implied rating above and including Baa3, and a security considered non-investment grade, with an implied rating under and including Baa1.

If this characteristic is taken into consideration, a best practice would consider a one-year expected loss as the decisive equity-at-risk needed for a safe loan. This notion of capital calculation is dynamic, and it is usually reviewed by the banking industry on a term or yearly basis. In this case, the expected loss to consider is the one-year expected loss, with frequent reviews of the expected loss based on new financials and credit risk evolution.

It is important to keep in mind that the expected loss is not time-invariant; it evolves with both macroeconomic and intrinsic changes. However, for private loans, the processes tend to be less dynamic, and this operation is done at loan origination. In this case, two approaches can be considered. For a constant expected loss calculation, the equity-at-risk can be seen as the annualized expected loss, taking into consideration the loan's duration, or at least a long-term, annualized expected loss. Models available on the market tend to provide a five-year annualized probability of default and a long-term loss given default or a five-year expected loss on an annualized basis. The exposure at default is, in all cases, determined by the expected cash flows over the life of the loan. *For example*, the capital-at-risk on a yearly basis for a bullet loan will differ from the capital-at-risk for an amortized loan. This setup is valid regardless of the expected loss method considered, but it is purely a matter of exposure at default.

When an advisory professional requires a more dynamic pattern along with an evolution of the capital over the lifetime of the loan, we recommend considering the forward-looking expected loss. This vantage provides a more accurate view of the loan's credit risk evolution, including the conditional event of non-default. In non-stressed companies, the forward one year is lower after a couple of years than on the first year, coherent with the easing of the equity-at-risk, as the loan is repaid year after year.

If the loan is considered a risk, the expected loss should be proposed on a lifetime basis. For long-term periods, the expected loss can be approximated using the five-year probability of default as a proxy and a calculated lifetime loss given default. The exposure at default remains linked to the cash flows expected during the loan's life. This method should expose a higher equity-at-risk, and it should correctly reflect the need for more liquidity with riskier securities. However, when looking at a loan's full term, it is important to use the present value of the loan and not the nominal, using the exposure at default to correctly adapt the provision on a yearly basis. Discounting value is necessary to avoid over-provisioning, which can damage a company's balance sheet.

We often state that Expected Loss (EL) equals the PD multiplied by the LGD and EAD, a flow concept rather than a stock concept. *For example*, if the coupon covers the expected loss plus the time value of money, the loan will hold its value over time. Computing the EL on a ten-year loan requires a full-term structure of PD values, interest rates, and LGD and EAD estimates.

A credit transaction's expected loss calculation provides an objective valuation of the credit risk embedded in it. The thorough work of financial and legal experts ensures accurate pricing and the sustainability of a transaction according to the arm's length principle recommended by the OECD and implemented by the 2016 Circulaire in Luxembourg.

The multi-dimensionality of the expected loss serves the new regulation well. Additionally, a full understanding of the loan itself enables the correct assessment of the necessary equity-at-risk to justify a safe transaction. This full understanding must go through a non-systematic, dedicated analysis of the said transaction to input expert knowledge and adjust the correct figures.

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