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**Note on the Third Consultative Paper**
Simplification of the Correlation Formulas in §§ 241f., 252, 299, 301

In its Third Consultative Paper (CP 3) the Basel Committee on Banking Supervision has considerably revised the risk-weight formulas intended to be used for regulatory capital allocation for corporate, sovereign, bank, and retail exposures.

While it can be shown that the proposed risk weight-formulas represent correct calculations of portfolio value at risk in a mainstream credit risk model (cf. Wehrspohn, 2003, Analytic loss distributions of heterogenous portfolios, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=395360) the interpolated correlation functions suggested in CP 3 can still be considerably simplified without loss of precision.

The correlation function proposed in § 241 CP 3 is

$$R(PD) = 0.12 \cdot (1 - EXP(-50 \cdot PD)) / (1 - EXP(-50)) + 0.24 \cdot [1 - (1 - EXP(-50 \cdot PD)) / (1 - EXP(-50))].$$

Note, however, that $EXP(-50) < 10^{-21}$. Moreover, considering that the present correlation function is already an approximation of an empirical relationship between firms' default probabilities and their mean asset value correlations, it can be assumed without loss of accuracy that

$$1 - EXP(-50) \approx 1$$

implying that the correlation function simplifies to

$$R(PD) = 0.12 \cdot (1 + EXP(-50 \cdot PD)).$$

Similarly, the other correlation formulas can be shortened as follows :

§ 242: $R(PD) = 0.12 + 0.12 \cdot EXP(-50 \cdot PD) - 0.04 \cdot (1 - (S - 5) / 45)$

§ 252: $R(PD) = 0.12 + 0.18 \cdot EXP(-50 \cdot PD)$

§ 299: $R(PD) = 0.02 + 0.09 \cdot EXP(-50 \cdot PD)$

§ 301: $R(PD) = 0.02 + 0.17 \cdot EXP(-35 \cdot PD)$

with $EXP(-35) < 10^{-14}$.

Finally note that the difference between the capital requirements resulting with the original correlation formulas in CP 3 and their simplified versions is below the numerical precision of Microsoft Excel.