Abbreviations

\(\tilde{a}_i\) Standardized log-return of firm \(i\)
\(\tilde{A}_T\) Asset value at \(t = T\)
\(\mathcal{B}(n, p)\) Binomial distribution with parameters \(n\) and \(p\)
\(\mathbb{C}\) Set of all complex numbers
\(\tilde{D}\) Default event
\(\mathbb{E}(\cdot)\) Expectation value
\(\text{ES}^{(\infty)}\) \(\alpha\) ES at confidence level \(\alpha\) of a portfolio with infinite granularity
\(\Lambda_1\) First-order granularity adjustment
\(\Lambda_2\) Additional term of the second-order granularity adjustment
\(\tilde{L}\) Relative loss
\(\tilde{L}_{\text{abs}}\) Absolute loss
\(\tilde{L}\) Portfolio loss in an accurately adjusted ASRF model
\(\mathcal{L}\) Laplace transform
\(\mathbb{N}\) Set of all natural numbers
\(\mathcal{N}(\mu, \sigma^2)\) Normal distribution with expectation \(\mu\) and variance \(\sigma^2\)
\(O(\cdot)\) Landau symbol
\(\bar{p}\) Average probability of default
\(p(\cdot)\) Conditional probability of default
\(\Delta p\) Shift of the survival probability
\(\mathbb{P}(\cdot)\) Probability
\(q^{(n)}\) Quantile of a granular portfolio
\(q^{(\infty)}\) Quantile of an infinitely granular portfolio
\(\Delta q\) Shift of the loss quantile
\(\Delta q_{z}\) Multi-factor adjustment
\(\Delta q_{z}^{\infty}\) Systematic risk adjustment component of the multi-factor adjustment
\(\Delta q_{z}^{\text{GA}}\) Granularity adjustment component of the multi-factor adjustment
\(\bar{r}_{\text{Intra}}\) Average intra-sector correlation
\(\bar{r}_{\text{Inter}}\) Average inter-sector correlation
\(\mathbb{R}\) Set of all real numbers
V(·) Variance
VaR\(_{\infty}\) VaR at confidence level \(\alpha\) of a portfolio with infinite granularity
VaR\(_{\infty}^{(+)\alpha}\) Lower VaR at confidence level \(\alpha\)
VaR\(_{\infty}^{(-)\alpha}\) Alternative definition of VaR: maximal loss in the best 100 - \(\alpha\)% scenarios
VaR\(_{\infty}^{(\text{int})\alpha}\) Interpolated VaR at confidence level \(\alpha\)
\(\bar{x}\) Systematic factor
\(\bar{x}_s\) Risk factor of sector \(s\)
\(\bar{Y}\) Systematic part of the portfolio loss
\(\tilde{z}_k\) Independent risk factors
\(\bar{Z}\) General idiosyncratic component of the portfolio loss
\(\mathbb{Z}\) Set of all integers
\(\mathbf{1}_\{\cdot\}\) Indicator variable
\(\varphi^{(\infty)}\) Quantile of an infinitely granular portfolio
\(\bar{\beta}\) Average weighted inter-sector correlation
\(\Gamma\) Gamma function
\(\delta(\cdot)\) Dirac’s delta function
\(\tilde{\epsilon}_i\) Idiosyncratic factor of firm \(i\)
\(\eta_m(\cdot)\) \(m\)-th moment about the mean
\(\eta_{m,c}(\cdot)\) \(m\)-th conditional moment of the portfolio loss about the mean
\(\mu_m(\cdot)\) \(m\)-th moment about the origin
\(\mu_{m,c}(\cdot)\) \(m\)-th conditional moment of the portfolio loss about the origin
\(\tilde{\epsilon}_i\) Idiosyncratic factor of firm \(i\)
\(\rho\) Risk measure
\(\sqrt{\rho_i}\) Correlation between firm \(i\) and the common factor in a one-factor model
\(\tilde{\rho}_i\) Correlation between obligor \(i\) and the systematic risk factor \(\bar{x}\)
\(\tilde{\rho}_s\) Correlation between sector factor \(\bar{x}_s\) and the systematic risk factor
\(\rho_{s,t}\) Correlation between the risk factors of sector \(s\) and \(t\)
\(\rho_{\text{Imp}}\) Implicit intra-sector correlation
\(\varphi\) Standard normal PDF
\(\varphi_2\) Bivariate normal PDF
\(\Phi\) Standard normal CDF
\(\Phi^{-1}\) Inverse standard normal CDF
\(\Phi_2\) Bivariate normal CDF
\(\mu\) Drift rate or expectation value
\(\mu_x\) Parameter of the lognormal and logit-normal distribution
\(B\) Liabilities; Beta function; risk bucket
\(b_1\) Factor loading to the systematic factor
\(b_k\) Coefficients of sector factors
\(CCF\) Credit conversion factor
\(CDF\) Cumulative distribution function
Abbreviations

\( c_i \) Factor loading to the idiosyncratic factor; correlation parameter in the comparable one-factor model

**COMM** Commitments

**D** Diversity score

**DF** Diversification factor

\( d_i \) Default threshold of obligor \( i \); weighting factor in the model of Pykhtin

**EAD** Exposure at default

**EC_{mf}** Economic capital in a multi-factor model

**EL** Expected loss in relative values

**EL_{abs}** Expected loss in absolute values

**ELGD** Expected LGD

**ES** Expected shortfall

**ES_{\alpha}** ES at confidence level \( \alpha \)

\( f \) Probability density function

\( F \) Cumulative distribution function

\( F^{-1} \) Inverse cumulative distribution function

**G** Gini coefficient

**HHI** Herfindahl–Hirschmann index

\( \lambda_c \) Critical number of credits

\( J \) Number of observations in a historical or Monte Carlo simulation

\( k \) Number of defaults

\( K \) Number of independent factors

**LGD** Loss given default

\( L_{j,J} \) \( j \)-th out of \( J \) elements of the order statistics

**M** Maturity; moment generating function

\( n \) Number of credits

\( N \) Number of observations

\( n^* \) Effective number of credits

\( N_{PD} \) Number of PD-classes

**OUT** Current outstandings

\( p \) Survival probability \((=1-\alpha)\); probability of a direct default in the model of Davis and Lo

**PD** (Unconditional) Probability of default

**PDF** Probability density function

\( q \) Infection probability in the model of Davis and Lo

\( q_\alpha \) Lower quantile

\( q^\alpha \) Upper quantile

**RC_{s}** Regulatory capital for sector \( s \)

**Res** Residuum

**RR** Recovery rate

\( S \) Annual sales; number of Sectors

**SLGD** Third moment of the LGD about the mean

\( T \) Point in time

**TCE** Tail conditional expectation
### Abbreviations

<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>$TCE_\alpha$</td>
<td>Lower TCE at confidence level $\alpha$</td>
</tr>
<tr>
<td>$TCE^\alpha$</td>
<td>Upper TCE at confidence level $\alpha$</td>
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<tr>
<td>$UL$</td>
<td>Unexpected loss</td>
</tr>
<tr>
<td>$VaR$</td>
<td>Value at risk</td>
</tr>
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<td>$VaR_\alpha$</td>
<td>Lower VaR at confidence level $\alpha$</td>
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<td>$VaR^\alpha$</td>
<td>Upper VaR at confidence level $\alpha$</td>
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<tr>
<td>$VLGD$</td>
<td>Variance of the LGD</td>
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<td>$W$</td>
<td>Wiener process</td>
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<tr>
<td>$w_i$</td>
<td>Exposure weight of credit $i$ in the portfolio</td>
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<tr>
<td>$\alpha$</td>
<td>Confidence level; parameter of the beta distribution</td>
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<tr>
<td>$\alpha_{i,k}$</td>
<td>Factor weight of obligor $i$ from Cholesky decomposition</td>
</tr>
<tr>
<td>$\alpha_{s,k}$</td>
<td>Factor weight of sector $s$ from Cholesky decomposition</td>
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<tr>
<td>$\beta$</td>
<td>Target tolerance; parameter of the beta distribution</td>
</tr>
<tr>
<td>$\lambda$</td>
<td>Fraction of the idiosyncratic risk that stays in the portfolio</td>
</tr>
<tr>
<td>$\sigma$</td>
<td>Volatility or standard deviation</td>
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<tr>
<td>$\sigma_X$</td>
<td>Parameter of the lognormal and logit-normal distribution</td>
</tr>
<tr>
<td>$\tau$</td>
<td>Lagrange multiplier</td>
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