Risk and Asset Allocation

Springer (2005) - by Attilio Meucci

ERRATA

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Errata in all reprints

- p. 39, in (2.24): $\mathrm{E}\left\{e^{i\boldsymbol{\psi}'\mathbf{X}_A+\boldsymbol{\omega}'\mathbf{X}_B}\right\}$ should read $\mathrm{E}\left\{e^{i\left(\boldsymbol{\psi}'\mathbf{X}_A+\boldsymbol{\omega}'\mathbf{X}_B\right)}\right\}$.
- p. 79, before (2.191): "The covariance matrix is defined if $\nu > 0$" should read: "The covariance matrix is defined if $\nu > 2$"
- p. 98, after (2.299): "Therefore the normal distribution is stable" should read: "Therefore the normal distribution is infinitely divisible"
- p. 210, Figure 4.17: the point "$f_{\boldsymbol{\theta}}$" should lie close to, but not onto, the stress-test line
- p. 223, second line of 4.6.1: "the influence curve and the jackknife" should read: "the sensitivity curve and the jackknife"
- p. 240, after (5.10): "simple invertible affine transformation" should read: "simple affine transformation"
- p. 240, after (5.11): "$\mathbf{B}$ is a suitable conformable invertible matrix" should read: "$\mathbf{B}$ is a suitable conformable matrix"
- p. 243, in (5.30), the second line should read

$$e^{-\frac{1}{2}[\boldsymbol{\Delta}_{\boldsymbol{\alpha}}+\boldsymbol{\Gamma}_{\boldsymbol{\alpha}}\boldsymbol{\mu}]'\boldsymbol{\Sigma}(\mathbf{I}_K-i\omega\boldsymbol{\Gamma}_{\boldsymbol{\alpha}}\boldsymbol{\Sigma})^{-1}[\boldsymbol{\Delta}_{\boldsymbol{\alpha}}+\boldsymbol{\Gamma}_{\boldsymbol{\alpha}}\boldsymbol{\mu}]\omega^2},$$

- p. 312, above (6.47): "convex programming is an optimization" should read: "cone programming is an optimization"

Errata in first and second re-print only.

- p. 14, last three lines: "If the skewness is positive (negative), occurrences larger than the expected value are more (less) likely than occurrences smaller than the expected value." should read: "If the skewness is positive (negative), the distribution is bulkier on the left (right), see Figure 1.4."
- p. 22, after (1.84): "The parameter ν, which takes on integer values" should read "The parameter ν, which takes on positive values"
- p. 22, in (1.86) "$f^{\mathrm{St}}_{\nu,\mu,\sigma}$" should read "$f^{\mathrm{St}}_{\nu,\mu,\sigma^2}$". Also, (1.87) should read:

$$F^{\mathrm{St}}_{\nu,\mu,\sigma^2}(x) = \frac{1}{2} + \frac{1}{2}\left[I\left(1; \frac{\nu}{2}, \frac{1}{2}\right) - I\left(\frac{\nu\sigma^2}{\nu\sigma^2 + (x-\mu)^2}; \frac{\nu}{2}, \frac{1}{2}\right)\right] \operatorname{sign}\left(\frac{x-\mu}{\sigma}\right)$$

- p. 23, before (1.88): "the cumulative distribution function of the general Student t distribution" should read "the characteristic function of the general Student t distribution"
- p. 23, (1.90) should read:

$$\mathrm{Sd}\{X\} = \sqrt{\frac{\nu}{\nu-2}\sigma^2}$$

- p. 27, (1.111) should read:

$$F^{\mathrm{Ga}}_{\nu,\sigma^2}(x) = P\left(\frac{x}{2\sigma^2}; \frac{\nu}{2}\right).$$

- p. 31, (1.127) should read:

$$\widehat{\mathrm{Sd}}_{i_T} = \sqrt{\frac{1}{T}\sum_{t=1}^{T}\left(x_t - \widehat{\mathrm{E}}_{i_T}\right)^2}$$

- p. 53, in (2.70) "$\mathrm{Cov}\{X_n, X_n\}$" should read "$\mathrm{Cov}\{X_m, X_n\}$"
- p. 66, (2.128) should read:

$$\tau\{X_m, X_n\} \equiv 4\int_{\mathbb{Q}}\left(F_{U_m,U_n}(u_m,u_n) - \frac{1}{4}\right) f_{U_m,U_n}(u_m,u_n)\, du_m du_n$$

- p. 74, in (2.167) "$\mathrm{Cov}\{X_n, X_n\}$" should read "$\mathrm{Cov}\{X_m, X_n\}$"
- p. 77, above (2.187): "whose integer value determines the relative importance" should read "whose positive value determines the relative importance"
- p. 78, in (2.189) "$\phi^{\mathrm{St}}_{\nu,\boldsymbol{\mu},\boldsymbol{\Sigma}}(\mathbf{x})$" should read "$\phi^{\mathrm{St}}_{\nu,\boldsymbol{\mu},\boldsymbol{\Sigma}}(\boldsymbol{\omega})$"
- p. 84, first sentence of Section 2.6.6: "Consider a set of random variables" should read "Consider a set of N-dimensional random variables"
- p. 84, (2.221) should read:

$$\mathbf{X}_t \sim \mathrm{N}(\mathbf{0}, \boldsymbol{\Sigma}), \quad t = 1, \ldots, \nu \geq N.$$

- p. 89, (2.245) should read:

$$\widehat{\mathrm{Cov}}_{i_T} \equiv \frac{1}{T}\sum_{t=1}^{T}\left(\mathbf{x}_t - \widehat{\mathrm{E}}_{i_T}\right)\left(\mathbf{x}_t - \widehat{\mathrm{E}}_{i_T}\right)'.$$

- p. 96, in (2.280) "γ" should read "$\boldsymbol{\gamma}$"

- p. 96, under (2.281): "Then

$$\alpha\mathbf{X} + \beta\mathbf{Y} \sim \mathrm{N}\left((\alpha+\beta)\,\boldsymbol{\mu}, (\alpha+\beta)\,\boldsymbol{\Sigma}\right).$$

  Therefore setting $\gamma \equiv 0$ and $\delta \equiv (\alpha+\beta)$ the relation"
  should read: "Then from (2.163) we obtain:

$$\alpha\mathbf{X} + \beta\mathbf{Y} \sim \mathrm{N}\left((\alpha+\beta)\,\boldsymbol{\mu}, \left(\alpha^2+\beta^2\right)\boldsymbol{\Sigma}\right).$$

  Using (2.163) again we can verify that setting $\boldsymbol{\gamma} \equiv \left(\alpha+\beta-\sqrt{\alpha^2+\beta^2}\right)\boldsymbol{\mu}$ and $\delta \equiv \sqrt{\alpha^2+\beta^2}$ the relation"
- p. 111, last line: "defines new invariants for the equity market" should read "defines new invariants for the fixed-income market"
- p. 125, in (3.76) "$\mathrm{Cov}\{\mathbf{X}_{T+\tau,\widetilde{\tau}}\}$" should read "$\mathrm{Cov}\{\mathbf{X}_{T+\tau,\tau}\}$".
- p. 125, after (3.76) erase: "More in general, a multiplicative relation such as (3.75) or (3.76) holds for all the raw moments and all the central moments, when they are defined".
- p. 149, (3.196) should read:

$$\sum_{K=1}^{N} \binom{N}{K} = 2^N - 1.$$

- p. 152, after (3.212): "For example, the correlation of the one-year rate with the two-year rate is less" should read "For example, the correlation of the one-year rate with the two-year rate is higher".
- p. 179, footnote: "heurisitc" should read "heuristic".
- p. 189, in (4.71) "i_T" should read "I_T".
- p. 205, (4.150) should read:

$$\mathrm{PErr}^2\left(\widehat{\boldsymbol{\Sigma}}, \boldsymbol{\Sigma}\right) = \frac{1}{T}\left(1 + \left(1-\frac{1}{T}\right)\frac{\left(\sum_{n=1}^{N}\lambda_n\right)^2}{\sum_{n=1}^{N}\lambda_n^2}\right).$$

- p. 206, (4.154) should read:

$$\mathrm{PErr}^2\left(\widehat{\boldsymbol{\Sigma}}, \boldsymbol{\Sigma}\right) = \frac{1}{T}\left(1 + \left(1-\frac{1}{T}\right)N^2\right).$$

- p. 216, first paragraph after (4.190): "...$\mathbf{x}$ varies in a wide range in the space of observations and as the distribution of the invariants $f_{\mathbf{X}}$ varies in a wide range..." should read "...$\mathbf{x}$ varies in the space of observations and as the distribution of the invariants $f_{\mathbf{X}}$ varies in a wide, yet bounded, range..."
- p. 218, (4.207) should read:

$$\boldsymbol{\psi}(\mathbf{x}, \boldsymbol{\mu}, \boldsymbol{\Sigma}) \equiv \begin{pmatrix} \text{as in the book} \\ w\left(\mathrm{Ma}^2_{\mathbf{x},\boldsymbol{\mu},\boldsymbol{\Sigma}}\right)\mathrm{vec}\left[(\mathbf{x}-\boldsymbol{\mu})(\mathbf{x}-\boldsymbol{\mu})'\right] - \mathrm{vec}\left[\boldsymbol{\Sigma}\right] \end{pmatrix}$$

- p. 220, (4.218) should read:

$$\boldsymbol{\psi}\left(\mathbf{x},\mathbf{f},\mathbf{B},\boldsymbol{\Sigma}\right)\equiv\begin{pmatrix}\text{as in the book}\\ w\left(\mathrm{Ma}^{2}_{\mathbf{x},\mathbf{Bf},\boldsymbol{\Sigma}}\right)\mathrm{vec}\left[\left(\mathbf{x}-\mathbf{Bf}\right)\left(\mathbf{x}-\mathbf{Bf}\right)'\right]-\mathrm{vec}\left[\boldsymbol{\Sigma}\right]\end{pmatrix}$$

- p. 222, (4.225) and below should read:

$$\boldsymbol{\psi}\equiv\begin{pmatrix}\text{as in the book}\\ \zeta\left(\mathrm{Ma}^{2}_{\mathbf{x},\boldsymbol{\mu},\boldsymbol{\Sigma}}\right)\mathrm{vec}\left[\left(\mathbf{x}-\boldsymbol{\mu}\right)\left(\mathbf{x}-\boldsymbol{\mu}\right)'\right]-\eta\left(\mathrm{Ma}^{2}_{\mathbf{x},\boldsymbol{\mu},\boldsymbol{\Sigma}}\right)\mathrm{vec}\left[\boldsymbol{\Sigma}\right]\end{pmatrix},$$

  where the functions γ, ζ and η satisfy some regularity criteria and are such that $\boldsymbol{\psi}$ is bounded.
- p. 222, (4.227) and below should read:

$$\widehat{\boldsymbol{\Sigma}}=\sum_{t=1}^{T}\frac{\zeta\left(\mathrm{Ma}^{2}_{\mathbf{x}_t,\widehat{\boldsymbol{\mu}},\widehat{\boldsymbol{\Sigma}}}\right)}{\sum_{s=1}^{T}\eta\left(\mathrm{Ma}^{2}_{\mathbf{x}_s,\widehat{\boldsymbol{\mu}},\widehat{\boldsymbol{\Sigma}}}\right)}\left(\mathbf{x}_t-\widehat{\boldsymbol{\mu}}\right)\left(\mathbf{x}_t-\widehat{\boldsymbol{\mu}}\right)'.$$

  Since $\boldsymbol{\psi}$ is bounded, so is ...
- p. 222, (4.228) and below should read:

$$\gamma\left(x\right)\equiv\zeta^{\frac{1}{2}}\left(x\right)\equiv\eta^{\frac{1}{2}}\left(x\right)\equiv\begin{cases}1 & \text{if } x\leq a^{2}\\ \frac{a}{\sqrt{x}}e^{-\frac{\left(\sqrt{x}-a\right)^{2}}{2b^{2}}} & \text{if } x>a^{2},\end{cases}$$

  where $a\equiv\sqrt{N}+\sqrt{2}$.
- p. 227, (4.244) should read:

$$\binom{T}{T_G}\equiv\frac{T!}{T_G!\left(T-T_G\right)!}.$$

- p. 231, (4.266) should read:

$$\boldsymbol{\Sigma}^{(u+1)}\equiv\frac{1}{T}\sum_{t}\left[\mathbf{C}_t^{(u)}+\left(\mathbf{x}_t^{(u)}-\boldsymbol{\mu}^{(u)}\right)\left(\mathbf{x}_t^{(u)}-\boldsymbol{\mu}^{(u)}\right)'\right]$$

- p. 247, (5.43) should read:

$$\text{SSD: }\mathrm{E}\left\{-\left(\Psi_{\boldsymbol{\alpha}}-\psi\right)^{-}\right\}\geq\mathrm{E}\left\{-\left(\Psi_{\boldsymbol{\beta}}-\psi\right)^{-}\right\}.$$

- p. 248, last paragraph: "...an order q such that a portfolio stochastically dominates or is dominated by another" should read "an order q such that any two portfolios can be ranked"
- p. 252, two lines below the first shaded box: "if and index" should read "if an index"
- p. 283, (5.175) should read:

$$\mathrm{Q}_c\left(\boldsymbol{\alpha}\right)=\mu_{\boldsymbol{\alpha}}+\sqrt{2}\sigma_{\boldsymbol{\alpha}}\,\mathrm{erf}^{-1}\left(1-2c\right)$$

- p. 286, above (5.191): "convexity/concavity of the certainty-equivalent" should read "convexity/concavity of the quantile"
- p. 287, below (5.192): "because the conditional covariance in does" should read "because the conditional covariance does"
- p. 297, (5.229); p. 298, (5.232); p. 299, (5.236); p. 300, (5.241): "$\mathcal{I}[\cdot]$" should read "$\mathcal{I}[\cdot](1)$"
- p. 320, (6.70) should read:

$$(\boldsymbol{\alpha}^*, \lambda^*) \equiv \arg\left(\max_{\boldsymbol{\alpha}\in\mathcal{C}} \min_{\lambda\in\mathbb{R}} \left\{\mathrm{E}\left\{\Psi_{\boldsymbol{\alpha}}\right\} - \lambda\left(\mathrm{Var}\left\{\Psi_{\boldsymbol{\alpha}}\right\} - v^*\right)\right\}\right).$$

- p. 322, above (6.78): "form (3.100)" should read "from (3.100)"
- p. 326, above (6.94): "we focus one affine" should read "we focus on one affine"
- p. 357, (6.216) and above should read: "which in this context is equivalent to:

$$\boldsymbol{\alpha}^* \equiv \underset{\substack{\boldsymbol{\alpha}\geq\mathbf{0}\\ \boldsymbol{\alpha}'\mathbf{p}_T\leq w-\boldsymbol{\alpha}'\mathbf{D}\boldsymbol{\alpha}}}{\operatorname{argmax}} \mathrm{E}\left\{\frac{1}{\gamma}\left(\boldsymbol{\alpha}'\operatorname{diag}\left(\mathbf{p}_T\right)e^{\mathbf{C}_{T+\tau,\tau}}\right)^{\gamma}\right\}$$

- p. 413, in (8.102) the first formula should read:

$$\widehat{e} \sim \mathrm{N}\left(e, \frac{v}{T}\right)$$

- p. 415, in (8.112) "${}^k\boldsymbol{\alpha}_{\mathrm{s}}$" should read "${}_j\boldsymbol{\alpha}_{\mathrm{s}}$".