Errata for:
"An Introduction to Financial Markets: A Quantitative Approach"
by Paolo Brandimarte, Wiley, 2018

The list of errata will be periodically updated (hopefully, not too many times....).
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Page 39, line −7. "... option expire worthless" should read "... option expires worthless".

Page 95, first line after the example box. "... the overall cash flow will not be zero" should read "... the overall cash flow will not be certain".

Page 99, top of page. The text should read:

The change in value of the hedged portfolio can be approximated as follows:

$$\begin{aligned} \delta V^H &= \delta V + \sum_{j=1}^{m} \phi_j \cdot \delta H_j \\ &\approx \sum_{i=1}^{m} \frac{\partial V}{\partial R_i} \cdot \delta R_i + \sum_{j=1}^{m} \left(\phi_j \sum_{i=1}^{m} \frac{\partial H_j}{\partial R_i} \cdot \delta R_i \right) \end{aligned}$$

Page 109, displayed equations in Example 2.10. There is a (textual) swap between the two bonds, and the two equations should read

$$\begin{aligned} &C_{1,t} = 9, \qquad && C_{2,t} = 7, \qquad && t = 1, 2, 3, 4 \\ &C_{1,5} = 109, && C_{2,5} = 107 \end{aligned}$$

Page 111, line −7. "Enter into a long position" should read "Enter into a short position".

Page 121, second displayed equation. The definition of discounted gain should read:

$$G^*(\omega) \doteq V^*(T, \omega) - V^*(0) = \sum_{i=1}^{n} h_i \cdot \delta S_i^*(\omega).$$

Page 123, line 5. The text after the first displayed equation should be modified as follows:

Since the positions in risky assets for portfolios $\mathbf{h}$ and $\widetilde{\mathbf{h}}$ are the same, the discounted gain $\widetilde{G}^*$ (which is not affected by the position in the bank account) is just

$$\widetilde{G}^*(\omega) = G^*(\omega), \qquad \forall \omega \in \Omega.$$

Then, the initial value of portfolio $\widetilde{\mathbf{h}}$ is strictly negative and its terminal value is non-negative:

$$\begin{aligned} &\widetilde{V}^*(0) = -\delta < 0, \\ &\widetilde{V}^*(T, \omega) = \widetilde{V}^*(0) + \widetilde{G}^*(\omega) = -\delta + G^*(\omega) \geq 0, \quad \forall \omega \in \Omega, \end{aligned}$$

where the last condition follows from the choice of δ as the minimum discounted gain of portfolio $\mathbf{h}$. Therefore, portfolio $\widetilde{\mathbf{h}}$ satisfies the conditions (2.28).

Page 127, first displayed equation. Replace h_m by y_m (last element of the vector of decision variables).

Page 127, Equation (2.44). It might be clearer to write the equation as

$$\mathrm{E}_{\mathbb{Q}_n}[G_i^*(\omega)] = \sum_{j=1}^{m} G_i^*(\omega_j)q(\omega_j) = 0, \qquad i = 1, \ldots, n,$$

i.e., this applies to each primary security. Then, it also applies to any portfolio built with the primary securities.

Page 136, Problem 2.1, last line of the table. Replace 12% with 9%.

Page 152, caption of Table 3.2. The caption should read

Calculating the EAR_n obtained by applying a fixed annual percentage rate (APR_n) of 5%, with different compounding frequencies n.

By the way, some people find the subscript n in EAR_n confusing, as the effective rate itself does not depend on a capitalization frequency n. The idea is that EAR_n is associated with APR_n. However, you might wish to drop that subscript everywehere in this section.

Page 155, Equation (3.9). 6,383% should read 6.383%.

Page 156, third line of Example 3.5. Replace "annual holding period return" with "holding period return" (indeed, *annual holding period return* does not make any sense; given the holding period return, we may find the annualized return, i.e., yield).

Page 167, lines 10 and 13. The calculations of example 3.8 are correct, but there is a typo in the last discount factor: $e^{-0.037\times 2}$ should read $e^{-0.043\times 2}$, for both bond prices.

Page 197, Section 3.7.1. Throughout the section, we should take the snapshot of spot and forward rates at time $t = 0$, in order to be consistent with Eqs. (3.48) and (3.49) and Fig. 3.7. We may take the snapshot at any time t, but then we should modify the equations accordingly.

Hence, every occurrence of $r(t, \ldots)$ and $f(t, \ldots)$ should be replaced by $r(0, \ldots)$ and $f(0, \ldots)$, respectively.

Page 197, second line after Eq. (3.48). The text should read:

We observe that, for a given epoch, say, $t = 0$, and tenor Δ, if the spot curve is increasing in T...

Page 209, last two displayed equations. It is better to use a less ambiguous notation, and there is a swap in sign. Hence these two equations should read, respectively:

$$V_{\mathsf{payfixed}}(T_2) = N \cdot \Delta \cdot [r_n(T_1, T_2) - K_n]$$

and

$$V_{\mathsf{payfloat}}(T_2) = N \cdot \Delta \cdot [K_n - r_n(T_1, T_2)] = -V_{\mathsf{payfixed}}(T_2)$$

Page 213, text after Eq. (4.8). Replace the four line of text:

> Equation (4.8) gives the value of an FRA with unit nominal value from the viewpoint of the *floating* payer, at a time $t < T_1$. Remember that, in our motivating example, the bank pays floating to the firm. The value for the fixed payer is obtained by changing the sign, and for a generic nominal we just multiply by N.

with the following text:

> Equation (4.8) gives the value of the *hedge* with unit nominal value from the viewpoint of the *floating* payer, at a time $t < T_1$. For a generic nominal we just multiply by N. Remember that, in our motivating example, the bank pays floating to the firm; hence, the value of the hedge is the value of an offsetting FRA, i.e., the value of an FRA paying fixed.

Page 214, Section 4.2.2. It is better to make notation consistent with the rest of the chapter, to avoid confusion between the bond values and the FRA value. So, V_{fixed} and V_{float} should read P_{fixed} and P_{float}, respectively.

The second displayed equation should read:

$$P_{\mathsf{fixed}}(t) = Z(t,T_2)\cdot N\cdot\Big[1+\Delta\cdot K_n\Big]$$

The fifth displayed equation should read

$$P_{\mathsf{float}}(t) = Z(t,T_1)\cdot N.$$

The following line should include $P_{\mathsf{fixed}}(t) - P_{\mathsf{float}}(t)$ (rather than $V_{\mathsf{fixed}}(t) - V_{\mathsf{float}}(t)$). The first line of Eq. (4.10) should read

$$V_{\mathsf{payfloat}}(t) = P_{\mathsf{fixed}}(t) - P_{\mathsf{float}}(t)$$

Page 216, first line of second displayed equation. Replace with

$$V_{\mathsf{payfixed}}(0.25) = P_{\mathsf{float}}(0.25) - P_{\mathsf{fixed}}(0.25)$$

Page 216, displayed equations, lines −14 and −12. There are a few numerical typos (which do not change the message in any way). Please replace

$$\begin{aligned}\widehat{r}_0(0.25,0.75) = f(0,0.25,0.75) &= \frac{0.75\times 0.035 - 0.25\times 0.03}{0.75-0.25}\\ &= 0.0375 > 0.037,\\ \widehat{r}_0(0.25,1) = f(0,0.25,1) &= \frac{1\times 0.04 - 0.25\times 0.03}{1-0.25}\\ &= 0.04643 > 0.041.\end{aligned}$$

with

$$\begin{aligned}\widehat{r}_0(0.25,0.75) = f(0,0.25,0.75) &= \frac{0.75\times 0.035 - 0.25\times 0.03}{0.75-0.25}\\ &= 0.0375 > 0.033,\\ \widehat{r}_0(0.25,1) = f(0,0.25,1) &= \frac{1\times 0.04 - 0.25\times 0.03}{1-0.25}\\ &= 0.0433 > 0.037.\end{aligned}$$

Page 224, first line of last displayed equation. Replace V_{swap} with V_{payfixed}.

Page 244, statement of Problem 5.1, table heading. There is an inconsistency with respect to the rest of the book, where I have always used the term "bid–ask spread." Here, I have used "offer" rather than "ask" by mistake (see the solution manual).

Page 258, Eq. (6.7) and following displayed equations. Replace four occurrences of δ_1 by δy_1

Page 261, line 8. Replace "approximated" by "approximate".

Page 288, line 11. replace "map each lottery to a real number" by "map each lottery into a real number".

Page 302, line −11. Replace the text as follows:

Monotonicity fails, as we have seen in Example 7.2. Furthermore, consider a nonconstant random variable $X_2(\omega)$ bounded below by a constant,

$$\alpha \equiv X_1(\omega) \le X_2(\omega).$$

The monotonicity condition fails since $\mathrm{Var}(X_1) = 0$ and $\mathrm{Var}(X_2) > 0$, i.e., the constant portfolio X_1 looks less risky, even though X_2 is strictly better ($X_2 > \alpha$ in at least one scenario, since it is not constant).

Page 320, last line, above the footnotes. Replace "the return of a risky portfolio" with "the return of the risky asset"

Page 327, line −4. Replace "If we rule out short-selling..." with "If we assume $w \geq 0$..."

Page 341, line 3. Replace "The function is clearly not convex..." with "The function is clearly not concave..."

Page 539, statement of Theorem 13.2, line −3. A discount factor is missing, and

$$f(x,t) = \mathrm{E}_{x,t}\big[H(X_T)\big]$$

should read

$$f(x,t) = e^{-r\cdot(T-t)} \cdot \mathrm{E}_{x,t}\big[H(X_T)\big].$$

Indeed this is the "discounted" version of the Feynman–Kač representation theorem, which includes the right-hand side rf. The discount factor is not there for the PDE without that right-hand side,

$$\frac{\partial f}{\partial t} + \mu(x,t)\cdot\frac{\partial f}{\partial x} + \frac{1}{2}\sigma^2(x,t)\cdot\frac{\partial^2 f}{\partial x^2} = 0.$$

The two versions of the theorem are connected by setting $r = 0$.

Page 540, line −8. The last displayed should begin with $f(x,t)$, not $f(X,t)$.

Page 542, Eq. (13.23). Eliminate two occurrences of $\frac{1}{\sqrt{2\pi}}$, which is included in the PDF $\phi(\cdot)$. Hence, the equation should read:

$$\begin{aligned}\int_q^{+\infty} e^{\mu+\sigma z}\frac{1}{\sqrt{2\pi}}e^{-z^2/2}\,dz &= e^{\mu+\sigma^2/2}\int_q^{+\infty}\phi(z-\sigma)\,dz \\ &= \mathrm{E}[X]\cdot\int_{q-\sigma}^{+\infty}\phi(y)\,dy\end{aligned}$$

Page 548, line −3. The delta of the put is wrong and should be $\Delta_P = -0.3024$, rather than -0.6750. Hence, the last line of page 548 should read

$$\Delta = -10{,}000 \times 0.3250 + 5000 \times 0.3024 + \phi = -1738.46 + \phi.$$

By the same token, on page 549, line 4 should read

$$\phi \approx 1738,$$

i.e., they should hold a **long** position in 1738 stock shares.

Page 572, statement of Problem 13.9, line 10. The payoff of this option is $S_T - S_{\min}$, rather than $S_{\max} - S_{\min}$ (see the solution manual).

Page 575, statement of Problem 13.22, line 21. There is a mistake in the first line of the *hint*: We hold shares of the *fund*, not units of the *index* (we use index derivatives to hedge). It is convenient to think of the portfolio as consisting of 1000 shares of a fund, with unit value \$100 (see the solution manual).

Page 634, second displayed equation. Replace x_i with x.

Page 687, line −12. Replace $\Xi = \mathrm{conv}(\boldsymbol{\xi}_1, \mathbf{x}_2, \ldots, \mathbf{x}_k)$ with $\Xi = \mathrm{conv}(\boldsymbol{\xi}_1, \boldsymbol{\xi}_2, \ldots, \boldsymbol{\xi}_k)$