Erratum to: 'Applied Quantitative Finance for Equity Derivatives'

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Abstract. This document reflects errors that were found in the first edition of the book 'Applied Quantitative Finance for Equity Derivatives'. If you found an error that is not listed here, please send me a note at jherekhealy@protonmail.com. Special thanks to the readers that reported these errors.

1. Vanilla Options - Black p.7. F and K are inverted in d_1. The equation (2.2) of the book should read

$$d_1(F,K) = \frac{\ln\frac{F}{K} + \frac{1}{2}\bar{\sigma}^2(T-t)}{\bar{\sigma}\sqrt{T-t}}\ ,\ d_2 = d_1 - \bar{\sigma}\sqrt{T-t}, \tag{1.1}$$

2. Etore and Gobet approximation - p. 25. The last two terms of second line in equation (2.66) invert d_1 and d_2. The equation (2.66) should read

Those two terms correspond to the near and far parts of the dividends in the Lehman model.

$$\begin{aligned}
V(S,K) =& \eta B\left[\bar{f}\Phi(\eta d_1) - \bar{k}\Phi(\eta d_2)\right]\\
&-\eta B\sum_{i=1}^{n}\hat{\alpha}_i\left(\Phi(\eta d_1 - \eta\frac{v_{t_i}^2}{v_T}) - \frac{T-t_i}{T}\Phi(\eta d_1) - \frac{t_i}{T}\Phi(\eta d_2)\right)\\
&+\frac{1}{2}B\sum_{1\leq i,j\leq n}\hat{\alpha}_i\hat{\alpha}_j\frac{T+t_j-t_i}{T}\frac{\phi(d_1 + v_T - \frac{v_{t_i}^2+v_{t_j}^2}{v_T})}{kv_T}e^{v_T^2 - v_{\max(t_i,t_j)}^2}\\
&-B\left(\sum_{j=1}^{n}\frac{T-t_j}{T}\hat{\alpha}_j\right)\sum_{i=1}^{n}\hat{\alpha}_i\frac{\phi(d_1 - \frac{v_{t_i}^2}{v_T})}{fv_T} - B\left(\sum_{j=1}^{n}\frac{t_j}{T}\hat{\alpha}_j\right)\sum_{i=1}^{n}\hat{\alpha}_i\frac{\phi(d_1 - \frac{v_{t_i}^2}{v_T})}{kv_T}\\
&+\frac{1}{2}B_T\left[\left(\sum_{j=1}^{n}\frac{T-t_j}{T}\hat{\alpha}_j\right)^2\frac{\phi(d_1)}{fv_T} + \left(\sum_{j=1}^{n}\frac{t_j}{T}\hat{\alpha}_j\right)^2\frac{\phi(d_2)}{kv_T}\right]\\
&+B\left(\sum_{j=1}^{n}\frac{T-t_j}{T}\hat{\alpha}_j\right)\left(\sum_{j=1}^{n}\frac{t_j}{T}\hat{\alpha}_j\right)\frac{\phi(d_1)}{kv_T}
\end{aligned}\tag{2.1}$$

3. Almost Vanilla Options - Cash-or-nothing p.265. The d_1 used here is actually not the same as the Black formula d_1 and really corresponds to the Black formula $-d_2$. To be clearer, equation (6.33) should be written as

$$V(K,t) = NB(t,T_d)\Phi\left(\eta d_2\left(F(t,T),K\right)\right) \tag{3.1}$$

with the usual Black formula d_2 and $\eta = 1$ for a call, $\eta = -1$ for a put.

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4. Almost Vanilla Options - Barrier p.269. A factor L is missing from equations (6.49) and (6.50) related to C and D. The correct equations are:

$$C = \delta B(t,T_d)\left[L\left(\frac{L}{S}\right)^{2a+1}C(t,T)\Phi(\eta y_1) - K\left(\frac{L}{S}\right)^{2a}\Phi(\eta y_1 - \eta\sigma\sqrt{T})\right], \tag{4.1}$$

$$D = \delta B(t,T_d)\left[L\left(\frac{L}{S}\right)^{2a+1}C(t,T)\Phi(\eta y_2) - K\left(\frac{L}{S}\right)^{2a}\Phi(\eta y_2 - \eta\sigma\sqrt{T})\right]. \tag{4.2}$$

The sign in equation (6.52) related to F is wrong. The correct equation is

$$F = R\left[\left(\frac{L}{S}\right)^{a+\lambda}\Phi(\eta z) + \left(\frac{L}{S}\right)^{a-\lambda}\Phi(\eta z - 2\eta\lambda\sigma\sqrt{T})\right] \tag{4.3}$$

For a rebate paid at hit, if there is a delay τ between the rebate payment time and barrier hit time, then the discount factor in λ should be adjusted accordingly. We have then $\lambda = \sqrt{a^2 - 2\frac{\ln B(t,T+\tau)}{\sigma^2 T}}$.

5. Acknowledgements. The author thanks Liam Henry and Ingo Schneider for kindly reporting errors present in the first edition of the book [1].

REFERENCES

[1] J. Healy, *Applied Quantitative Finance for Equity Derivatives*, available from Amazon.com and other online stores, 2017. ISBN: 1977557872.