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FINANCIAL MARKET ANALYSIS

Second Edition

Addenda and Corrigenda

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Important Notices

1. The format of amendments in this document is, in most cases, identical to that of the book, so significant amendments can usually be physically cut and pasted if required.
2. This is the final issue of the document `amdt-1.pdf`.
3. The changes listed here will be incorporated into the second impression of the book, which will be published in 2001. The second impression will also incorporate other, minor corrections that are not of sufficient significance to be listed in this document.
4. Earlier issues of this document included amendments to page 628 that have been largely rescinded. Please note that:
   (a) The only change on this page is that equation (16.28) uses the absolute value of option delta.
   (b) For the convenience of those who have already amended the book, we include 'restored' versions of the earlier amendments, which may be cut and pasted if necessary.
5. The amendment to Exercise 30 on page 649 that appeared in earlier issues of this document was incomplete. A revised version in included herein.
6. If it becomes necessary to make further amendments to the book, these will appear in `amdt-2.pdf`, which will be available from the usual sources. Thus:
   (a) Those with the first impression of the book will need both this document and `amdt-2.pdf` (if implemented).
   (b) Those with the second impression will need only `amdt-2.pdf` (if implemented).

Pages 44, 45 & 49 On line 35 of page 44, in Figure 1.7 on page 45 and on the last line of page 49, the year of enactment for the Financial Services and Markets Act should be 2000, *not* 1999.

Page 102 Equation (3.38) should read:

$$rT = \log_e(F/P); \qquad (3.38)$$

Page 112 The first paragraph of Section 4.1.1 should read as follows:

Money market deposits (MMDs) are fixed-interest, fixed-term deposits of up to one year with banks. The deposits can be for the following terms: overnight, 1 week, or 1, 2, 3, 4, 5, 6, 9 or 12 months. They are not negotiable so cannot be liquidated before maturity. The interest rates on the deposits are fixed for the term and are related to LIBID of the same term. For example, the 1-month deposit rate could be 1-month LIBID *less* 0.125 per cent. The interest and capital are paid in one lump sum on the maturity day. Therefore the amount of interest due at the end of the period is calculated according to the formula for simple interest:

Page 113 The first line should read:

On 15 February, the depositor would get back £1,007,856.16. The effective rate of interest (re) on the

Page 121 Exercise 1 should read:

1 On 10 May you open a 2-month money market deposit paying 8.75 per cent with £5,000,000. What is the maturity value of the deposit?

Page 125 On line 5: delete ‘Deutschmarks’ and insert ‘euros’.

Page 138 Equation (5.21) should read:

$$P_d = \frac{d + (\theta_1 \cdot B_1)}{(1+rel)} + \frac{d + (\theta_2 \cdot B_2)}{(1+rel)^2} + \cdots + \frac{d + (\theta_T \cdot B_T)}{(1+rel)^T}. \tag{5.21}$$

Page 139 The paragraph immediately preceding Example 5.5 should read:

It is also important to take into account any rebasing of the RPI. The two relevant bases are January 1974 = 100.0 and January 1987 = 100.0, the latter representing a rebasing from the 1974-base value of 394.5.

Page 146 Equation (5.34) should read:

$$(1+rs_t)^t = (1+ {}_0rf_1)(1+ {}_1rf_2)\ldots(1+ {}_{t-1}rf_t). \tag{5.34}$$

Page 163 Equation (5.56) and the following (un-numbered) equation should be as follows:

$$BPV = \frac{MD \cdot Pd}{10000}. \tag{5.56}$$

$$BPV = -\frac{\Delta P_d}{\Delta rm} \cdot \frac{1}{10000}.$$

Page 165 The first calculation in Example 5.9 should be as follows:

$$\begin{aligned} C &= \frac{10}{100} \cdot \left[\frac{2}{(1.1)^3} + \frac{6}{(1.1)^4} + \frac{12}{(1.1)^5} \right] + \frac{100}{100} \cdot \frac{12}{(1.1)^5} \\ &= 8.76\,. \end{aligned}$$

Page 177 In Exercise 3, part a) should be amended so that the exercise reads as follows:

3 Consider a UK government bond with a 9.25 per cent coupon. The bond is trading at £95.50 per £100 nominal. How much will an investor have to pay for the bond if he buys it:

a) 3 days following the *ex dividend* date?

b) 7 days following the *ex dividend* date?

c) 100 days following the *ex dividend* date?

Page 187 The second footnote to Table 6.3 should read:

[b] $30\% = \min\{50\%, 30\%\}$

Page 189 Table 6.4 should be amended as follows:

Gross dividend yield (%)[i]	3.91	14.06

[i] Firm A: $3.13\% \times 100/80 = 3.91\%$. Firm B: $11.25\% \times 100/80 = 14.06\%$.

Page 204 The first line should read:

$$P_0 = d_0(1+h) \cdot \left[\frac{(1+h)^T - 1}{h} \right] + \frac{1}{(1+r)^T} \cdot \frac{d_0(1+g_s)^T(1+g)}{(r-g)}$$

Page 206 The data table in Example 6.2 should read:

Year	*Growth rate*	*Bottom-up method (%)*	*Top-down method (%)*
1	g_1	*5*	*10*
2	g_2	*6*	*9*
3–∞	g	*8*	*8*

Page 212 The entry for Rutterford, J. should be amended to read:

Rutterford, J. (1993) *Introduction to Stock Exchange Investment*, Macmillan, London. (Chapter 5.)

Page 212 Exercise 1 should read as follows:

1 Can share valuation models help us determine whether or not dividend policy affects share prices?

Page 216 In the first paragraph of Section 7.1.1, the world 'always' should be deleted from the sixth line so that the paragraph reads as follows:

In terms of quoting the spot price of foreign currency, most countries use *direct quotation* which expresses the number of units of the domestic currency that can be exchanged for one unit of a foreign currency, e.g., £0.625 per $ or DM1.39 per $. Sometimes, however, *indirect quotation* is used and this method expresses the number of units of a foreign currency that can be exchanged for one unit of domestic currency, e.g., $1.60 per £ or $0.72 per DM. Sterling is, by convention, quoted using this latter method. Whichever method is used, the foreign currency involved is usually the US dollar, so that with direct quotation, we get the domestic currency price of the dollar, while with indirect quotation, we get the dollar price of domestic currency.

Page 218 The last sentence of the third paragraph should be amended to read as follows:

arbitrageur does, however, face *execution risk*, the risk that he buys sterling at 1.5963 from Bank A but Bank B changes its quote to, say, 60–65 before the arbitrageur is able to sell off the sterling to it: the arbitrageur would make a loss of three pips per pound in this case.

Page 225 The first line of the final paragraph should read as follows:

To illustrate this, we can consider the following example. A UK-based investor has the choice of

Page 227 Line following the calculation '$0.7089407[1+(0.05875/4)] = \$0.7193533$.' should read:

The bank would need a three-month forward bid exchange rate for dollars of at most DM1.3901 per

Page 244 The second (complete) pararaph should read as follows:

If there is more than one type of eligible cash market good that can be delivered against the contract, then the short will choose the one that is *cheapest to deliver*. This means that the futures contract will always be priced off the cheapest-to-deliver eligible cash market good. However, not all futures contracts are settled by the delivery of a cash market good; some are settled for cash.

Page 249 The calculation of the effective return should be:

$$
\begin{aligned}
re &= [(1.125)^{365/20} - 1] \cdot 100 \\
&= 758.1\% \quad \text{p.a.}
\end{aligned}
$$

Page 252 The second footnote to Table 8.5 should read:

[b] For the purpose of the contract, Bund means 'Anleihe der Bundesrepublik Deutschland'.

Page 258 In Table 8.9, the tick value should be £5, *not* £10.

Page 270 The tick size on the last line of Exercise 6 is incorrect. The extract from that contract specification should read as follows:

Contract	FTSE 100 stock index contract
Contract size	£10 per full index point
Tick size	0.5

Page 289 The information regarding exercise price intervals that follows Table 9.4 should be amended as follows:

The exercise price interval (see Table 9.1) differs for different shares, ranging from 5p for share prices up to 50p, to 200p for share prices in excess of 4000p. There are also *position limits* on the number

Page 304 The y-axis label in Figure 9.14 should read 'Probability'.

Page 312 The variance of the security price should be:

$$\begin{aligned}\mathrm{Var}(P_T^S) &= q[uP^S - E(P_T^S)]^2 + (1-q)[dP^S - E(P_T^S)]^2 \\ &= 0.5(66-50)^2 + 0.5(34-50)^2 \;=\; 256\,.\end{aligned}$$

Page 318 The line immediately following equation (9.31) should read:

where Φ is the conditional probability that the option expires in the money, $E\left[(P_T^S - X) \mid P_T^S > X\right]$ is

Page 318 Equation (9.34) should read:

$$E\left[(P_T^S - X) \mid P_T^S > X\right] \;=\; P^S e^{rT}\frac{N(d_1)}{N(d_2)} - X \tag{9.34}$$

Page 325 Line 4 should read:

value of the option at the end of year 1, in the case where the option is not exercised, is found by

Page 344 The entry for Magrabe (1978) should be amended to read (trivial):

Magrabe, W. (1978), 'The Value of an Option to Exchange One Asset for Another', *Journal of Finance*, 33, 177–86.

Page 356 The text immediately following Figure 10.9 should be amended as follows:

incurred in maintaining the straddle as of the same date. But the three-month borrowing cost of 7.90 per cent p.a. is identical to the sale of a September Treasury bill for 98.05 (i.e., $100/[1+0.079(92/365)]$). So a long June–September long gilt straddle is equivalent to the sale of a synthetic September Treasury bill future which is a three-month loan at the Treasury bill rate (transaction DA).

Page 377 Equation (10.11) will be clearer if it is amended as follows:

$$P^c = \frac{\tau B}{1+\tau \cdot rf} \cdot e^{-rT} \cdot [rf \cdot N(d_1) - rx \cdot N(d_2)], \tag{10.11}$$

where:

$$d_1 = \frac{\ln(rf/rx)}{\sigma_f \sqrt{T}} + \tfrac{1}{2}\sigma_f \sqrt{T};$$
$$d_2 = d_1 - \sigma_f \sqrt{T};$$

and:

τ = rate-setting frequency (e.g. quarterly);
T = length of time from beginning of cap to payment date of caplet.

Page 415 In line 18, delete '*valuation*' and insert '*directional*'.

Page 417 The table in Example 12.1 should read:

Day	***Action***	***Futures price***	***Initial margin (£)***	***Variation margin (£)***	***Net profit (£)***
1	Buy 1 contract	90.50	–500.00	0	–500.00
2	Hold	90.00	–	–625.00	–1125.00
3	Hold	90.25	–	+312.50	–812.50
4	Hold	90.75	–	+625.00	–187.50
5	Sell 1 contract	91.25	+500.00	+625.00	937.50

Page 420 Equation (12.2) should be amended to read as follows:

$$\Delta P^f = \frac{1}{PF_{CTD}} \cdot \Delta P_{CTD}, \tag{12.2}$$

where:

$$\begin{aligned} \Delta P^f &= \text{change in the price of the long gilt future;} \\ \Delta P_{CTD} &= \text{change in the price of the CTD bond.} \end{aligned}$$

Page 425 The definition of BPV is incorrect (see amendment to page 163). Equations and text on this page should be amended as follows:

$$BPV = \Delta P = \frac{MD \cdot Pd}{10,000}. \tag{12.6}$$

For the gilt we have $BPV_g = 0.11473$, while for the Bund we have $BPV_b = 0.06658$. This shows that the price of the gilt is 72 per cent more responsive to a parallel yield curve shift than the price of the Bund.

The futures price responds to changes in the CTD bond as follows:

$$\begin{aligned} \Delta P^f &= \frac{1}{PF_{CTD}} \cdot \Delta P_{CTD} \\ &= \frac{BPV_{CTD}}{PF_{CTD}} \\ &= \frac{MD_{CTD} \cdot P_{CTD}}{PF_{CTD} \cdot 10,000}. \end{aligned} \tag{12.7}$$

For the gilt contract, we have $\Delta P_g^f = 0.088036$ (i.e. 0.11473/1.3032131), while for the Bund contract, we have $\Delta P_b^f = 0.058145$ (i.e. $0.06658/1.145064$). This shows that the price of the gilt future is 51 per cent more responsive to a parallel yield curve shift than the price of the Bund future.

$\vdots$

$$\begin{aligned} h &= \frac{BPV_g}{BPV_b} \cdot \frac{\text{Face value of long gilt futures contract}}{\text{Face value of bund futures contract}} \cdot e_0 \\ &= \frac{0.11473}{0.06658} \cdot \frac{£100,000}{€100,000} \cdot €1.56 \text{ per } £ = 2.69, \end{aligned} \tag{12.8}$$

where:

$$h = \text{hedge ratio} = \frac{\text{Number of Bund contracts}}{\text{Number of gilt contracts}}.$$

Page 433 In Example 12.9, the illustrations of the butterfly spread should be amended as follows:

The speculator buys the butterfly spread:

Sell 1 × 170 contract	5.25 cents	165–170 spread = –105 ticks
Buy 1 × 165 contract	6.30 cents	
Buy 1 × 175 contract	1.70 cents	170–175 spread = –355 ticks
Sell 1 × 170 contract	5.25 cents	

$$\text{Butterfly spread} \quad = \quad -355-(-105) \ = \ -250 \text{ ticks}$$

The speculator reverses his trades:

Buy 1 × 170 contract	2.40 cents	165–170 spread = –170 ticks
Sell 1 × 165 contract	4.10 cents	
Sell 1 × 175 contract	0.90 cents	170–175 spread = –150 ticks
Buy 1 × 170 contract	2.40 cents	

$$\text{Butterfly spread} \quad = \quad -150-(-170) \ = \ 20 \text{ ticks}$$

Page 437 The first paragraph should read as follows (March becomes June):

A long cash-and-carry (see Figure 12.6) involves borrowing funds at money market rates in June and using the proceeds to purchase a gilt, while simultaneously selling a gilt futures contract to lock in the price at which the gilt can be sold (transaction AB); receiving the coupon yield on the gilt for *N* days between June and September (transaction BC); delivering the gilt against the future in September (transaction CD); and repaying the loan with interest using the proceeds from the sale of the gilt (transaction DA). This strategy will give rise to an *implied repo rate*. If this rate exceeds the cost of borrowed funds or, equivalently, if the basis exceeds the cost-of-carry (i.e. market interest rate *less* coupon yield on the gilt), then a riskless long cash-and-carry arbitrage exists.

Page 456 Exercise 5 should read as follows:

5 What is the difference between 'open position trading' and 'spread trading'? Use examples to illustrate your answer.

Page 482 The last line of data in Table 13.1 is incorrect. The table should be as follows:

Number of securities in portfolio	***Standard deviation of portfolio returns, σ_p (% per month)***	***Correlation with return on the market portfolio***
1	7.0	0.54
2	5.0	0.63
3	4.8	0.75
4	4.6	0.77
5	4.6	0.79
10	4.2	0.85
15	4.0	0.88
20	3.9	0.89

Source: Wagner and Lau (1971)

Page 523 In Example 14.1, the calculation of duration should be amended to read as follows:

$$\begin{aligned}
\text{Duration} &= \frac{d}{P_d}\left[\frac{(1+r_m)^{T+1}-(1+r_m)-r_m T}{(r_m)^2(1+r_m)^T}\right]+\frac{B}{P}\cdot\frac{T}{(1+r_m)^T} \\
&= \frac{13.77}{114.28}\left[\frac{(1.1)^6-(1.1)-0.1(5)}{(0.1)^2(1.1)^5}\right]+\frac{100}{114.28}\cdot\frac{5}{(1.1)^5} \\
&= 4\ \text{years},
\end{aligned}$$

where:

P_d = current (dirty) price of the bond;
B = maturity value of the bond;
T = years to maturity;
r_m = yield to maturity.

Page 530 The line immediately after equation (14.15) should read:

and so lies on the SML. The difference between the actual expected return ($\bar{r}_i$) and the equilibrium

Page 535 The first paragraph should read:

Market timing is equivalent to adjusting the beta of the portfolio over time. If the fund manager is expecting a bull market, he wants to increase the beta of the portfolio (i.e. make it more aggressive). If he is expecting a bear market, he wants to reduce the beta of the portfolio (i.e. make it more defensive). One way of doing this would be to switch into high-beta shares in a bull market and switch out of them in a bear market. However, the transaction costs involved would make this an expensive strategy. An alternative is to keep the portfolio of risky assets (in this case, *A*) constant and raise or lower beta by lowering or raising the proportion of the client's portfolio held in cash. This can be a cheaper alternative, since moving into or out of cash is generally cheaper than moving between different shares. An even cheaper alternative is to use futures or options, and this is examined in Chapter 16.

Page 536 The second line should be amended to read as follows:

$$\bar{r}_p = \sum_{i=1}^{N}\theta_i\bar{r}_i = \text{expected return on the portfolio;}$$

Page 537 In line 4 of the second paragraph, delete 'Bank of England' and insert 'FSA'.

Page 591 Blake et. al. (1999) has now been published. The entry should now read as follows:

Blake, D., Lehmann, B.N., and Timmermann, A. (1999), 'Asset Allocation Dynamics and Pension Fund Performance', *Journal of Business*, 72, 429–62.

Page 594 In Exercise 11, the data set for the riskless security is incorrect. The data table should read as follows:

Year	*Riskless security (%)*	*Fund manager (%)*	*Market portfolio (%)*
1	+4	+10	+8
2	+5	+30	+15
3	+4	0	+10
4	+3	−15	−9
5	+4	+12	+7

Page 598 The last line in the balance sheet should be amended to read as shown in the replacement table that follows:

Maturity (days)	*Assets (£m)*	*Liabilities (£m)*	*Net exposed balance before hedging (£m)*	*Net exposed balance after hedging (£m)*
0–90	100	500	(400)	0
91–180	200	0	200	0
181–270	200	0	200	200
271–365	200	0	200	200
Perpetual or interest-rate insensitive	300	500	(200)	(200)

Page 602 The first line of the 'outcome' table should be amended so that the table reads as follows:

Date	*Cash market*	*Futures market*
10 Feb	Borrowing rate $= 13\%\ (12\% + 1\%)$	Sell $20 \times £500,000$ March 3-month interest rate futures contracts at 87.75 (i.e. $100 - 12.25\%$)
10 Mar	Firm borrows £10m for 3 months at $14\%\ (13\% + 1\%)$ Additional interest: $£10,000,000 \cdot \dfrac{0.14 - 0.13}{4}$ $= £25,000$	Purchase $20 \times £500,000$ March contracts at 86.75 (i.e. $100 - 13.25\%$) Profit on contracts: 20 contracts $\times$ 100 ticks $\times$ £12.50 per tick $= £25,000$

Page 604 Line 9 of the text should be amended to read as follows:

rate rises by 0.95 per cent, implying that six-month CDs are slightly less responsive to interest rate

Page 604 Equation (16.7) should read as follows:

$$\text{Number of contracts} = \frac{\text{Face value of cash exposure}}{\text{Face value of futures contract}} \times \beta_p$$

$$= \frac{\text{Face value of cash exposure}}{\text{Value per index point} \times \text{Futures price}} \times \beta_p, \qquad (16.7)$$

Page 607 Equation (16.10) should read as follows:

$$\begin{aligned}
\text{Loss on futures position} &= -\begin{matrix}\text{Number of}\\ \text{contracts}\end{matrix} \times \begin{matrix}\text{Value per}\\ \text{index point}\end{matrix} \times \left(P^{s}_{(30\text{ June})} - P^{f}_{(1\text{ April})}\right)\\
&= -\frac{\text{Initial value of cash fund}}{\text{Value per index point} \times P^{f}_{(1\text{ April})}} \times \beta_p \times \text{Value per index point}\\
&\quad \times \left(P^{s}_{(30\text{ June})} - P^{f}_{(1\text{ April})}\right)\\
&= -\text{Initial value of cash fund}\\
&\quad \times \left(\frac{P^{s}_{(30\text{ June})} - P^{f}_{(1\text{ April})}}{P^{f}_{(1\text{ April})}} \times \beta_p\right); \qquad (16.10)
\end{aligned}$$

Page 611 The third line of the final paragraph should read:

index – cash index) = $-\Delta$(September index – June index)). But the problem is that the June contracts

Page 614 The third line of the paragraph following equation (16.15) should read as follows:

10.5% 2013–15 with a price factor of 1.3032131 and currently trading at £118 per £100 nominal).

Page 628 This is a *revised* version of the amendement to equation (16.28). It restores the original version of equation (16.27) and the paragraph immediately following equation (16.28).

$$\text{Number of contracts} = \frac{\text{Face value of cash exposure}}{\text{Face value of index}} \times \beta_p. \qquad (16.27)$$

For a ratio hedge,

$$\text{Number of contracts} = \frac{\text{Face value of cash exposure}}{\text{Face value of index}} \times \frac{\beta_p}{|\text{Option delta}|}. \qquad (16.28)$$

To illustrate, we will suppose that on 15 July a fund manager has a £5 million portfolio with a beta of 1.15 which he intends to hedge by buying LIFFE November 1850 put options on the FTSE 100 index. The closing index on 15 July is 1825.0, and the fund manager intends employing a fixed hedge. The number of contracts to hedge the portfolio is found using (16.27):

Page 649 Exercise 30 should read as follows:

30 You are observe the following information on 1 November:

Market value of portfolio		=	£3m
Beta of portfolio		=	1.09
Spot FTSE 100 index		=	6920.0
LIFFE March 6950 put:	premium	=	53
	delta	=	– 0.45

Calculate the number of contracts and the cost of putting on a fixed hedge and a ratio hedge using the LIFFE options.

Page 700 The entry for West (1988) should be amended to read:

West, K. (1988), 'Bubbles, Fads and Stock Price Volatility Tests', *Journal of Finance*, 43, 639–59.