2023 CFA Program: Level III Errata

31 October 2023

If you find something in the curriculum that you think is in error, please submit full details via the form at http://cfa.is/Errata.

- Corrections below are in bold, and new corrections will be shown in red; page numbers shown are for the print volumes.
- The short scale method of numeration is used in the CFA Program curriculum. A billion is 10^9 and a trillion is 10^{12}. This is in contrast to the long scale method where a billion is 1 million squared and a trillion is 1 million cubed. The short scale method of numeration is the prevalent method internationally and in the finance industry.

Volume 1

Asset Allocation with Real-World Constraints (Reading 7)

- In Exhibit 2 (page 409 of print), Portfolio D_2 should be located to the left and below Portfolio A. The text accompanying Exhibit 2 is correct.

Volume 2

Options Strategies (Reading 8)

- In the lesson "Uses of Options in Portfolio Management," Scenario 3 and 4 immediately before Exhibit 39 (page 63 of print), should read as follows:

  Scenario 3: The Euro Stoxx 50 index has decreased and is trading at 3000. Dubois must pay €500 (€3,500 − €3,000) to settle the (short) three-month put option at expiration. The (long) put option with three months remaining to expiration is deep in the money and, assuming volatility is still unchanged **and €15 of Time Value, it is worth €515 (given by Intrinsic Value of €500 + €15 of Time Value)**. If Dubois sells this put to a dealer, she will lose €39 (= €515 − €500 − €54) on the put calendar spread.

  Scenario 4: The Euro Stoxx 50 has decreased and is trading at 3000, and the implied volatility has significantly increased. Dubois must pay €500 (€3,500 − €3,000) to settle the (short) three-month put option at expiration. The (long) put option with three months remaining to expiration is deep in the money and, assuming volatility has increased **and €30 of Time Value, it is worth €530 (given by Intrinsic Value of €500 + €30 of Time Value)**. If Dubois sells this put to a dealer, she will realize a loss of €24 (= €530 − €500 − €54) on the put calendar spread. Exhibit 39 adds the profit and loss diagram for the calendar spread at the time of the expiration of the three-month put, assuming that implied volatility of the six-month put has significantly increased.

Swaps, Forwards, and Futures Strategies (Reading 9)

- The last sentence of Practice Problem 10 (page 125 of print) should read, "Explain how Ko can use this information to understand potential movements in the ~~current~~ federal funds rate." And the following sentence should be added: "Calculate the probability of an increase in 25 bps in the target range."

Currency Management: An Introduction (Reading 10)

- In Example 8, the left-most column header in the table immediately before the practice questions should read, "$\sigma(\%\Delta S_{GBP/USD})$

- In Practice Problem 25 (page 217 of print), the third sentence of the second paragraph should read, "Overall returns can be enhanced by capturing opportunities between the US dollar and the Indian rupee (INR) within a range of plus or minus 25% from the neutral position **consisting of 100% of the portfolio as valued in USD**."

- The first sentence of Practice Problem 34 (page 220 of print) should read, "Calculate the net cash flow (in euros) **as of today** to maintain the desired hedge." The Solution (page 234 of print) should read:

When hedging one month ago, Delgado would have sold USD2,500,000 one month forward against the euro.

To calculate the net cash flow (in euros) today, the following steps are necessary:

1 Sell USD2,500,000 at the one-month forward rate stated in the forward contract. Selling US dollars against the euro means buying euros, which is the base currency in the USD/EUR forward rate. Therefore, the offer side of the market must be used to calculate the inflow in euros

All-in forward rate = 0.8914 + (30/10,000) = 0.8944

USD2,500,000 / 0.8944 = EUR 2,795,169.95

2 Buy USD2,500,000 at the spot rate to offset the USD sold in Step 1 above. Buying the US dollar against the euro means selling euros, which is the base currency in the USD/EUR spot rate. Therefore, the bid side of the market must be used to calculate the inflow in euros.

USD2,500,000 / 0.8875 = EUR2,816,901.41

3 Therefore, the net cash flow is equal to EUR 2,795,169.95– EUR2,816,901.41, which is equal to a net outflow of EUR21,731.46.

To maintain the desired hedge, Delgado will then enter into a new forward contract to sell the USD2,650,000. There will be no additional cash flow today arising from the new forward contract.

Overview of Fixed-Income Portfolio Management (Reading 11)

- The second bullet after Exhibit 8 (page 248 of print) should read, "Coupon-paying bonds have less convexity than zero-coupon bonds of the same duration: A 30-year coupon-paying bond with a duration of approximately 18 years has **less** convexity than an 18-year zero-coupon bond. **Coupon-bearing bonds have coupon payments that act as cash flows that partially offset changes in interest rates. These periodic coupon payments create a flatter price-yield curve compared to zero-coupon bonds, leading to lower convexity**."

- Equation 7 (page 259 of print) should read,

    E(ΔPrice based on investor's view of yield spreads) = (− ModSpreadDur × ΔSpread) + [½ × Convexity × (ΔSpread)²]

- In Example 4, Exhibit 11 (page 260 of print), the current average bond price should be **£97.11**.

Volume 3

Yield Curve Strategies (Reading 13)

- In Section 3.1 (page 14 of print), fifth sentence of the third paragraph should read, "The **rolling yield** return component of Equation 1 (sometimes referred to as "carry-rolldown") incorporates not only coupon income (adjusted over time for any price difference from par) but also additional return from the passage of time and the investor's ability to sell the shorter-maturity bond in the future at a higher price (lower yield-to-maturity due to the upward-sloping yield curve) at the end of the investment horizon."

- The first sentence in Example 4 (page 19 of print) should read, "An investment manager who pursues the cash-based yield curve strategies described in Exhibit 5 faces an inverted yield curve (with a decline in long-term yields-to-maturity and a sharp increase in short-term yields-to-maturity) instead **of a static yield curve post implementation**."

- In the table under Exhibit 9 (page 29 of print), the column heading "Coupon" should instead read "Yield to Maturity."

- Exhibit 24 (page 34 of print) should read as follows:

Strategy	Description	Targeted Return	Portfolio **Duration** Impact
Long bond call option	Purchase right to take forward bond delivery	Max (Bond price at lower yield − Strike price, 0) − Call premium	Increase portfolio duration ~~and convexity (up-front premium)~~
Long bond put option	Purchase right to deliver bond in the future	Max (Strike price − Bond price at higher yield, 0) − Put premium	Decrease portfolio duration ~~and convexity (up-front premium)~~
Long payer swaption	Own the right to pay-fixed on an interest rate swap at a strike rate	Max (Strike rate − Swap rate, 0) − Swaption premium	Decrease in portfolio duration ~~and convexity (up-front premium)~~
Long receiver swaption	Own the right to receive-fixed on an interest rate swap at a strike rate	Max (Swap rate − Strike rate, 0) − Swaption premium	Increase in portfolio duration ~~and convexity (up-front premium)~~
Long call option on bond future	Own the right to take forward bond delivery at a strike price	Max (Bond futures price at lower yield − Strike price, 0) − Call premium	Increase in portfolio duration ~~and convexity (up-front premium)~~
Long put option on bond future	Own the right to deliver bond in the future at a strike price	Max (Strike price − Bond futures price at higher yield, 0) − Put premium	Decrease in portfolio duration ~~and convexity (up-front premium)~~

- In Example 15 (page 46 of print), the heading "Rolldown Return" after the table should read "**Rolling Yield**."
- In Example 16, the heading "Rolldown Return" after the table (page 48 of print) should read, "**Rolling Yield**."
- Practice Problem 21 (page 55 of print) should read:

An active investor enters a duration-neutral yield curve flattening trade that combines 2-year and 10-year Treasury positions. Under which of the following yield curve scenarios would you expect the investor to realize the greatest portfolio **loss**?

A Bear steepening

B Bull flattening

C **Yields unchanged**

The Solution (page 58 of print) should read:

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C is correct. A duration-neutral flattening trade involves a short 2-year bond position and a long 10-year bond position, which have a "matched" duration or portfolio duration of zero. This portfolio will realize a **loss** if the slope of the yield curve—that is, the difference between short-term and long-term yields—**increases**. The bear steepening in A involves **a rise in the 10-year yield-to-maturity more than in the 5-year yield-to-maturity, causing a portfolio loss.**

- In the Solution to Practice Problem 6 (page 56 of print), the second sentence should read, "The bullet portfolio has the same convexity as the **4.5-yea**r bond, or 22.1."

Fixed-Income Active Management: Credit Strategies (Reading 14)

- [Updated:] In Example 4, the Solution to Question 2 (page 71 of print) should read,

For the yield spread measure, neither the **1.29%** spread nor the 7-year government rate of 1.39% has changed, so an analyst considering only these two factors would expect the bank bond price to remain unchanged.

However, for the G-spread measure, the **20** bp increase in the 10-year government YTM causes the 8-year interpolated government YTM to change.

The 7-year and the 10-year bond weights for the interpolation are the same as for Question 1, $w_7 = 66.7\%$ and $w_{10} = 33.3\%$.

The new 8-year government rate is a weighted average of the 7-year bond rate and the 10-year bond rate using the weights in Step 1.

$r_{8yr} = w_7 \times r_{7yr} + w_{10} \times r_{10yr}$

$= (66.7\% \times 1.39\%) + (33.3\% \times \textbf{1.86\%}) = \textbf{1.55\%}$

The bank bond YTM has risen by **0.07%** to **2.75%** (=**1.55%** + **1.20%**).

The bank bond price change can be estimated by multiplying the yield change by modified duration ($-\text{ModDur} \times \Delta\text{Yield}$) as in earlier lessons. This change can be calculated as **−0.497%** ($=-7.1 \times$ **0.07%**).

Note that we can confirm this using the Excel PV function (=−PV (rate, nper, pmt, FV, type)) where "rate" is the interest rate per period (0.0268), "nper" is the number of periods (8), "pmt" is the periodic coupon (2.75), "FV" is future value (100), and "type" corresponds to payments made at the end of each period (0).

Initial bank bond price: 100.50 (=−PV (0.0268, 8, 2.75, 100, 0)

New bank bond price: **100** (=−PV (**0.0275**, 8, 2.75, 100, 0)

Price change: **−0.497%** (= (**99.39** − 100.50)/100.50)

- In the second paragraph after Example 9 (page 80 of print), the second and third sentences should read, "For fixed-rate bonds priced at a spread over the benchmark, ~~roll-down~~ return from coupon income is higher by the bond's original credit spread. The rolldown return due to price appreciation will also be higher than for an otherwise identical government security because the higher-yielding instrument will generate greater carry over time.
- In Example 10 (page 80 of print), several instances of "roll-down return" should instead be "rolling yield."
  - The first sentence of the example should read, "A London-based investor wants to estimate **rolling yield** attributable to a fixed-rate, option-free corporate bond versus UK gilts over the next six months assuming a static, upward-sloping government yield curve and a constant credit spread."
  - The first practice question should read, "Calculate the annualized **rolling yield** to the UK corporate bond versus the government bond over the next six months."
  - The second practice question should read, "Describe how the relative **rolling yield** would change if the investor were to use an interpolated government benchmark rather than the actual 9.5-year gilt."
  - The first sentence in the Solution to 1 should read, "Solve for the annualized difference in **rolling yield** by calculating the change in price plus the coupon income for both the corporate bond and the government bond." And the next sentence (after the 1) should read, "Calculate the corporate bond **rolling yield** per £100 face value."
  - The sentence before Solution to 2 should read, "The annualized **rolling yield** difference is the 2.75% corporate bond realized return less the 1.80% UK gilt realized return, or 0.95%."
  - The last sentence in the example should read, "Because the UK gilt yield curve is upward sloping in this example, we can conclude that the relative **rolling yield** using an interpolated benchmark would be lower than the 0.95% difference in Question 1."
- Equation 10 (page 82 of print) should read,

  $$E\,[\textbf{ExcessSpreadReturn}] \approx Spread_0 - (EffSpreadDur \times \Delta Spread) - (POD \times LGD)$$

- In Example 20, the last sentence of the solution (page 104 of print) should read, " We can also use the Excel PRICE function to directly calculate the new price of **88.75** and multiply the price change of **−2.25** by the face value to get **$1,125,000**."
- Equation 15 (page 106 of print) should read,

  $$\Delta(\text{CDS Price})\text{/}\sout{\Delta(\textbf{CDS Spread})} \approx - (\Delta(\text{CDS Spread}) \times EffSpreadDur_{CDS})$$

- In Exhibit 27, the Targeted Return for Payer Option on CDS Index (page 107 of print) should read, "Max (Credit spread at expiration − CDS Credit Spread Strike, 0) − Option Premium." The Targeted Return for Receiver Option on CDS Index should read, "Max (CDS Credit Spread Strike − CDS Credit Spread at expiration, 0) − Option Premium."

- The last sentence before Exhibit 29 (page 111 of print) should read, "The shift from an average A rated to BBB rated portfolio in Exhibit 29 is an extension of an earlier case (Example 10) that quantified corporate versus government bond **rolling yields** as the YTM difference assuming constant spreads and default rates."
- The first sentence of the Solution for Example 26 (page 113 of print) should read, "To estimate credit curve **rolling yield** returns, we must solve for the first two return components from Equation 1 (Coupon income +/− Rolldown return) and separate the impact of benchmark yield versus credit spread changes."
- In the Solution to 2 in Example 26 (page 114 of print), the second calculation should read,

  "Price appreciation: $**90,500** (= (101.118 − 100.937)/100.**000** × $50 million)

  And the sentence that follows should read, "Because the yield spread curve is flat at 0.50%, the full $**90,500** price change in the 10-year is benchmark yield curve roll down."

  The last calculation should read,

  "Price appreciation: $**434,500** (= (101.517 − 100.648)/100.**000** × $50 million)

  And the sentence that follows should read, "Because the 0.07% decline in YTM is estimated to be equally attributable to benchmark yield and yield spread changes, each is assumed equal to $**217,250**."

- The Solution to 3 in Example 26 (page 114 of print) should read, "Incremental income due to price appreciation is therefore $3**44,000** (=$**434,500** − $**90,500**), of which $**217,250** is attributable to credit spread changes.

  In total, the incremental roll-down strategy generates $**506,500** (=$**344,000** + 162,500), of which $**292,250** (= $**217,250** + $75,000) is estimated to be due to credit spread curve roll down."

- In Example 28, in the Solutions to 1 and 2 (page 116 of print), Equation 10 is repeated but should read,

  $$E\,[\textbf{ExcessSpreadReturn}] \approx Spread_0 - (EffSpreadDur \times \Delta Spread) - (POD \times LGD)$$
  In the tables for both these solutions, the column header "Excess Spread" should read "Excess Spread **Return**."

- [Updated:] In Example 29 (page 117 of print), the Solution to 1, the first sentence should read, "The investor should **sell** protection on the CDX IG Index and **buy** protection on the CDX HY Index." The second sentence of the second paragraph should read, "Because the investor is long **protection** CDX HY and short **protection** CDX IG, the net annual premium **paid** is $400,000 (=$10,000,000 × (**−5.00%** **+** 1.00%))."
  The last paragraph of the Solution to 1 should read:
  The investor has a $17,800 **loss** from the CDX IG position (= (0.99244 − 0.99066) × $10,000,000) and a $178,000 gain from the short CDX HY position (1.0752 − 1.093) × −$10,000,000). **So the one-year loss is −17,800 + 178,000 − 400,000 = −$239,800**.

- In Example 29, the second sentence in the second paragraph of the Solution to 2 (pages 117-118 of print) should read, "~~In this case, the investor takes the opposite position to that of Question 1, namely long CDX HY and short CDX IG, so~~ **The** net annual premium **paid** is $400,000 ~~(=$10,000,000 × (5.00% − 1.00%)~~." The last sentence should read, "**Subtracting** the $400,000 net premium results in a one-year gain from the strategy of **$697,000** under this scenario."
- [Updated:] In Example 32 (page 121 of print), the last five paragraphs of the Solution should read as follows:

  Return on the equally weighted portfolio is equal to 3.30% (= (2.08% + 2.93% + 4.54% + 3.65%)/4). We can estimate the initial iTraxx-Xover price by subtracting the product of EffSpreadDurCDS and the difference between the standard coupon (5%) from the market premium of 400 bps as follows:

  Original iTraxx-Xover 5-year: 95.75 per $**104.25**, or **1.0425** (=1 **+** (4.25 × 1.00%))

  If European high-yield spreads tighten by 25%, the iTraxx-Xover premium narrows by 100 bps to 300 bps, and the protection seller realizes a gain:

  New iTraxx-Xover 5-year: 91.50 per $**108.5**, or **1.085** (=1 **+** (4.25 × 2.00%))

  We can calculate the percentage return on the iTraxx-Xover investment in euro terms by dividing the price change by the initial price to get **4.077 (= (1.085 − 1.0425)/1.0425)**. For a United States–based investor, we must convert the euro return to US dollars as described in an earlier lesson:

  RDC = (1 + RFC) (1 + RFX) − 1

  RDC and RFC are the domestic and foreign currency returns in percent, and RFX is the percentage change of the domestic versus foreign currency.

  We solve for US dollar iTraxx-Xover returns as **5.118**% (= (1 + **4.077**%) × (1 + 1.00%) − 1). Given that iTraxx-Xover carries a weight equal to one-half of the US corporate bond portfolio, the strategy returns **5.86**% (or 3.30% + **5.118**%/2).

- Option C for Practice Problem 12 (page 134 of print) should read, "**5.45**%."
- Practice Problem 17 (page 135 of print) should read, "Which bond rating category offers the highest expected excess return if spreads ~~instantaneously~~ rise 10% across all ratings categories?"
- In the Solution to Practice Problem 6 (page 140 of print), the last sentence should read, "The 12-year swap rate is 2.15% (or (80% × 2.05%) + (20% × 2.55%)), and the difference between the corporate bond YTM and the 12-year interpolated government rate is **0.65**%."
- The Solution to Practice Problem 12 (page 141 of print) should read, "C is correct. **Using Equation 10 (Spread0 – (EffSpreadDur × ΔSpread) – (POD × LGD)), the expected excess return on the bond is approximately 5.45% (=2.75% – (6 × –0.50%) – (0.75% × 40%)).**

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Volume 4

Asset Allocation to Alternative Investments (Reading 20)

- In Example 9, Solution to 1, the third main bullet (page 172 of print) should read:
  - o Sources of immediate liquidity:
    - Cash = $22.5 million
    - **Government bonds are at the midpoint of the permitted range. The allocation could be reduced from 7% to 4% and remain within the permitted range. This would free up $22.5 million ($750 million x 3%) of immediate liquidity. However, if the return scenario is realized (government bonds down 3%), then the government bond allocation will fall below the 4% minimum and additional rebalancing will be required.**
    - $75.0 million in total (less than the $78 million liability)
- In the solution to Practice Problem 18 (page 198 of print), the third-from-last sentence should read, "**UCITS are less appropriate for AElfheah since its liquidity needs are being met.**"
- [Updated:] The solution to Practice Problem 20 (page 199 of print) should be,

  The expected NAV of the fund at the end of the current year is €**22,755,000**, calculated as follows:

  First, the expected distribution at the end of the current year is calculated as

  > Expected distribution = [Prior-year NAV × (1 + Growth rate)] × (Distribution rate).

  > Expected distribution = [(€25,000,000 × 1.11) × 18%] = €4,995,000.

  Therefore, the expected NAV of the fund at the end of the current year is

  > Expected NAV = [Prior-year NAV × (1 + Growth rate) + Capital contributions – Distributions)] ~~× (1 + Growth rate)~~.

  > Expected NAV = [(€25,000,000 × 1.11) + 0 − €4,995,000] ~~× 1.11~~ =   € **22,755,000**.

Overview of Private Wealth Management (Reading 21)

- In Exhibits 3 and 4 (page 221 and 222 of print), the percentile columns (left-most column) should be flipped to read, "95th, 75th, 50th, 25th, 5th, Successful Trials)

Topics in Private Wealth Management (Reading 22)

- In the section immediately preceding Example 4 (page 286 of print), the equation should be,

$$R_{PL} = \left[(1 + R_1') \dots (1 + R_2')\left(1 - \frac{\text{liquidation tax}}{\text{final value}}\right)\right]^{1/n} - 1$$

And in Example 4 that follows, the last two sentences should read,

Therefore, the portfolio value net of the tax liability is **1.173**:

$1.197(1 − 0.02) = $**1.173**,

and the annualized post-liquidation return is **3.24**%:

1.173$(1/5) − 1 = $**3.24**%.

This compares to an annualized return for the non-taxable investor of 4.13%.

- In Example 5, the Solution to 3, the last bullet (page 292 of print) should read, "Her after-tax return is **9.12%** [(25,000 + 500) − (500 × 0.535) − (25,000 × 0.535)]/130,000."
- In Example 5, the Solution to 5, the fifth sentence (page 292 of print) should read, "Her after-tax return is **−3.40%** [(−10,000 + 500 − 500 × 0.535 + 10,000 × 0.535) / 130,000]."
- In the Solution to Practice Problem 9 (page 356 of print), the bottom cell of the table, the final calculation should read, "Tax under HIFO = ($124 − **$135**) × 0.25 × 200 = −$550 (tax loss or benefit)."

Volume 5

Trade Strategy and Execution (Reading 25)

- In the solution to Practice Problem 19 (page 186 of print), the sentence in the last cell of the table should read, "The portfolio managers at North Circle and Valley Ranch have different aversions to risk, with North Circle's managers having **lower** risk aversion than the Valley Ranch managers."

Portfolio Performance Evaluation (Reading 26)

- Exhibit 7 (page 210 of print) should read:

Duration Bucket	Sector	Duration Effect	Curve Effect	Total Interest Rate Allocation	Sector Allocation	Bond Selection	Total
Short	Government					0.00%	0.00%
	Corporate				0.04%	0.00%	0.04%
	Total	*0.40%*	*0.12%*	*0.52%*	*0.04%*	*0.00%*	*0.56%*
Mid	Government					0.00%	0.00%
	Corporate				−0.05%	0.00%	−0.05%
	Total	*0.23%*	*0.03%*	*0.26%*	*−0.05%*	*0.00%*	*0.21%*
Long	Government					0.00%	0.00%
	Corporate				−0.22%	**0.13%**	**−0.09%**
	Total	*−1.25%*	*0.37%*	*−0.88%*	*−0.22%*	*0.13%*	*−0.97%*
Total		−0.62%	0.52%	−0.10%	−0.23%	**0.13%**	**−0.20%**

- Under Exhibit 12, the third bullet (page 218 of print) should read:
  The large-cap growth benchmark underperformed the total benchmark (**–1.08%** versus -0.03%). Because the portfolio was underweight large-cap value, this led to a positive allocation effect of 0.03.

Case Study in Risk Management: Private Wealth (Reading 29)

- In the text between Practice Problems 3 and 4 (page 428 of print), the second sentence should read, "Susan Hunter informs Chapman that she currently has a life insurance policy of $200,000 and **her husband** has a life insurance policy of $300,000."

Integrated Cases in Risk Management: Institutional (Reading 30)

- In the Investment Committee Meeting Memo 2.0, the figure in the second bullet under Memo 2A: Asset Allocation and Performance (page 473 of print) should read:

Total Portfolio

Alternatives 51%	Equities-Emerging/Frontier 22%
	Equities-Developed 17%
	Fixed Income 9% / Cash 1%