CIPM Experts Review Course

Reading: Topics In Return Measurement

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Reading Overview

- Margin strategies and exposure

- Derivatives exposure analysis

- Multicurrency hedging

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Margin Review

- "Leverage" is the generic term for increasing your exposure to something, with minimal capital outlays. This could include margin, short-selling, or derivatives.
- Specifically, a levered portfolio usually refers to the borrowing cash or securities.
  - "Margin": Generally refers to borrowing cash to buy additional securities.
  - "Short-selling": Borrowing securities to sell, and use the cash for other purposes. Gains exposure to asset depreciation.

- General rule: Borrowed assets must be returned (sometimes with interest), while gains/losses on borrowed assets are kept.

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Margin & Performance

- Margin example: Start with $100, borrow $20 more. Value is $150 at end of month. Margin interest is 9% per year.

$$\text{Margin Return} = \frac{150 - 120 - 0.15}{120 - 20} = 29.9\% \qquad \text{Cash-Basis Return} = \frac{150 - 120}{120} = 25\%$$

Total Profit / Equity / Total Assets

- Short-position example: Start with $100 of A, sell $20 of B short. A ends at $120, B ends at $25.

$$\text{Long Return} = \frac{120 - 100}{100} = 20\% \qquad\qquad \text{Short Return} = \frac{25 - 20}{20} = 25\%$$

$$\text{Margin Return} = \frac{(120 - 25) - (100 - 20)}{100 - 20} = 18.75\%$$

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Margin Focus

- Know the definitions:
  - Long-short: portfolio containing both long and short positions
  - Long-Extension (aka Short-extension, long-short extension): gain additional long exposure to the market, by adding short exposure (still maintains 100% net exposure). Typically 130/30.
  - Market Neutral: Longs and short positions always offset. Net exposure = 0.

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Margin Focus

- Be able to calculate returns on the security, and the portfolio-level…

- Know what direction the signs work…
  - An increase in a short securities is still a *gain* on the security
  - The *position* is negative, which implies a *loss* for the portfolio.

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Derivatives

Derivatives allow exposure to
some other reference security.

- Contingent Commitments:
  - Options
- Future Commitments:
  - Futures contracts
  - Forward contracts
  - Swaps

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Derivatives: Options

Give the holder the right to buy or sell a security
at a specified time, and a specified price

- Calls: right to <u>buy</u> the underlying security
- Puts: right to <u>sell</u> the underlying
- American-style: can be exercised any time prior to the expiration date
- European-style: can only be exercised on the expiration date

➢ Options have their own market price, but provide magnified exposure to the underlying.

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Derivatives: Futures

Create the obligation for the holder to buy or sell a specific asset, at a specific price, at a point in the future.

- Future contract: Standardized terms; trades on an exchange
- Forward contracts: customized terms between private parties
- Swaps: customized terms for regular exchanges of payments

➢ Future/Forward contracts have a zero market price. Futures are marked-to-market daily. Exposure is still magnified.

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Notional Exposure   LOS C

- Basically, the market value of exposure gained through the instrument, had it been purchased outright.
- Use of Notional Exposure allows for more meaningful analysis of <u>segment performance</u> and <u>attribution</u>.
  - ➢ But does <u>not</u> affect Total Portfolio performance.

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Notional Adjustments

1. Beginning of period asset class weightings must be adjusted to reflect the net exposure to the asset, including the derivative. [Notional Adjustment]
2. There must be an offsetting Notional Adjustment to Cash.
3. The Notional Adjustment = sign × quantity × multiplier × price (TBD)
4. Cash-related Income must be pro-rated, just like the Notional Adjustments to asset class weightings.
5. Asset class returns are based on Notional Values (think Profit ÷ Capital).
6. The Total Portfolio Return *should* be unaffected.

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Pricing Futures

- "Cost of Carry": The costs associated with holding an asset. This leads to the preference to hold the futures contract, and not the asset itself.

- Futures Price =

"Cost of Carry"

Spot Price + Cost of financing – Net Income from Underlying

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Derivatives Adjustments: Swaps LOS E

- Essentially the same as Futures on Bonds example
  - Will likely give you the Notional Exposure adjustments; they will not need to be calculated.
- No adjustment to cash needed
- Return on a Segment =

$$\frac{\Delta MV_{Assets} + \Delta N.E._{Swaps} + Net\ Income_{Assets} + Net\ Income_{Swaps}}{Notional\ Value_0}$$

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Derivatives Adjustments: Forwards LOS E

- The "Price" used to value the Forward instrument may be subjective…
  - Look for queues from the question.
  - Consider which price would be more volatile and/or transparent.
  - Generally use the Futures price, unless it deviates significantly from the Spot price.
  - This should only be an issue for the Exposure calculation, not the return.
- Return on Forwards: Discounts gain on Forwards. [Cairn questions rationale for this]

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Derivatives Adjustments: Options LOS E

- In addition to normal notional adjustments, option value must be eliminated, and the adjustment to cash becomes a plug.
- Always use the Underlying price to calculate Notional Exposure adjustment, and not the Option price.
- Market value of Options is <u>not</u> a function of the multiplier (but according to the reading it <u>is</u>!)
  - This detail should not affect the ending result. Notional adjustment to equities <u>should</u> factor in the multiplier, the "market value" of the options should be eliminated, and the adjustment to Cash is still a plug.

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Multi-currency Returns

- Exchange Rates ("forex" or "FX")
  - Indirect quote: Foreign currency per unit of domestic currency.
  - Direct quote: Domestic currency per unit of foreign currency.
- Calculations:
  - Convert all values to a common currency, using the relevant exchange rate.
  - Calculate as normal.
- Short-cut: $R_{DC} = R_{FC} + R_{FXdirect} + (R_{FC} \times R_{FXdirect})$

| | Base ccy Return | Local ccy Return | FX Return | Interaction |

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Multi-currency Returns

Avoiding confusion...

- <u>Always</u> confirm which unit is "1":
  - Bacon et al reading: Uses Indirect quotes...
    - "USD/GBP" = 1.5 means... $\frac{1.5\ USD}{1\ GBP}$
  - Conventional public sources: generally uses direct quotes:
    - "USD/JPY" or "USD:JPY" = 120 means... $\frac{120\ JPY}{1\ USD}$

- Know your algebra!

  - If given indirect exchange rates, returns can be calculated as: $\frac{BMV}{EMV} - 1$
  - If given indirect exchange rates, you can divide rather than multiply...

- Keep track of Significant Figures: recommend using 4 decimal places

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Multi-currency Example

- U.S. Domiciled investor has a $1,000 portfolio of half Nikkei 225 index, and half FTSE 100 index.
- FX rates are:
  - 0.5£/$ and 1,000¥/$ at 1 January
  - 0.6£/$ and 1,100¥/$ at 31 January
- Index returns are: 10% for the FTSE 100, -5% for the Nikkei 225

  [($500 × 0.5£/$) × (1 + 10%)] ÷ 0.6£/$ = $458.33
  [($500 × 1,000¥/$) × (1 + -5%)] ÷ 1,100¥/$ = $431.83
  ($458.33 + $431.83)/$1000 − 1 = -10.985%

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Currency Forward Contracts

- Agreement to exchange currencies at a point in the future, based on a rate established today.
- Covered Interest Rate Parity:
  - $F_0 = S_0 \frac{1 + r_{FC}}{1 + r_{DC}}$
- Return on a Currency Forward = $\frac{S_{t+1}}{F_t} - 1$
  - $r_{DC} < r_{FC}$ = Benefit of hedging
  - $r_{FC} < r_{DC}$ = Cost of hedging

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Currency Overlay Strategies

- Enter into a Forward Currency contract to hedge your <u>current</u> exposure (market value) to a given currency.

- Example: (Ex. 5 from reading)
  - £66.67 mil. buys you $100 mil @ 1.5USD/GBP
  - $F_0 = S_0 \frac{1 + r_{FC}}{1 + r_{DC}} = 1.5 \frac{(1+2\%)^{1/12}}{(1+4\%)^{1/12}} = \$1.4976 \, USD/GBP \ldots$

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Currency Overlay Strategies   LOS F

Things you need to know:

1. Calculating the return on the unhedged assets (Principles material)

2. Possibly deriving the implied Forward rate using Covered Interest Parity

3. Calculating the profit & return on the forward contract:

   a) Profit = $Base\ MV\ @\ F_0 -\ Base\ MV\ @\ S_1$

   b) Return = $Profit \div Base\ MV\ @\ S_0$

4. Hedged return = Unhedged return + Return on Forward Contract

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Currency Overlay Strategies   LOS G

Things you need to know:

5. Currency exposure cannot be completely hedged away

   • Ending value of foreign assets cannot be known in advance

   • Interest rate differentials cause Forward currency rates to trade at premiums or discounts

6. Forward contracts (and Currency Overlay "Portfolios") **_may_** have a zero denominator:

   • Note in 3.a, return on the *contract* uses the base MV of the *underlying*

   • Forward contracts cost nothing to enter into, unless you consider stipulated collateral

   • Currency Overlay Managers may have their own "portfolio," and the exposure they assume may have little to no bearing on the capital they actually have discretion over.

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