Buying U.S. Treasury bond futures and S&P 500 Index futures creates synthetic bond position and synthetic stock index fund positions, respectively. Client F is long $10 million in cash, which can be used to fund the purchases.

Case 12: Montero

1.   Solution: B.

Since the fear is that the U.S. dollar will weaken against the Brazilian real, the appropriate hedge is to enter into a long forward contract to lock in the purchase price of the real. She is correct in this regard. But Bazlamit is incorrect about the type of currency risk. The currency risk faced here is best described as transaction exposure, not translation exposure.

2.   Solution: B.

Future value of call premium in 60 days = 150,000 [1+ (0.015 + 0.005) (60/360)] = USD150,500

Effective loan proceeds = 50,000,000 − 150,500 = USD49,849,500

Loan interest = 50,000,000 [(0.0225 + 0.005)(180/360)] = USD687,500

Call payoff = 50,000[Max(0, 0.0225 − 0.01)(180/360)] = USD312,500

Effective interest = 687,500 − 312,500 = USD375,000

Effective annualized loan rate = [(50,000,000 + 375,000)/49,849,500](365/180) − 1 = 0.0215, or 2%

3.   Solution: C.

Bazlamit is correct with regard to the type of interest rate swap but incorrect with regard to the impact of the swap on the interest rate sensitivity of the overall position. Because Viewmont Corporation has a variable rate loan, entering into an interest rate swap to pay a fixed receive a variable interest rate would stabilize cash outflows and thus hedge the firm's interest rate risk. But, the swap converts the variable rate loan to a fixed rate loan. Because the duration of the fixed-rate loan will exceed the duration of the variable rate loan, the interest rate sensitivity of the overall position increases.

4.   Solution: A.

He is correct about the purchase of the payer swaption. But the net interest payment is likely to be in excess of 3.5%. If the fixed rate in 60 days is above 3%, the swaption will be exercised, thus locking in 3%. But the loan has a rate of LIBOR + 0.50%, and the floating receipt on the swap is LIBOR. So the net effect is that the interest payment will likely be in excess of 3.5%.

5.   Solution: C.

Montero is correct. Viewmont can reduce its overall borrowing costs by borrowing in U.S. dollars and engaging in a currency swap for Brazillian reals. This swap not only reduces borrowing costs but also hedges currency exposure.

6.   Solution: C.

Implied notional BRL principal = BRL5,000,000/(0.05/4) = BRL400,000,000

Equivalent notional USD principal = BRL400,000,000/1.72 = USD232,558,139.53

Implied USD interest payment = USD232,558,139.53 x (0.03/4) = USD1,744,186.05

Case 13: Bing

1.   Solution: B.

The number of futures, N_f, is calculated as follows:

$$N_f = \left(\frac{\beta_T - \beta_S}{\beta_f}\right)\left(\frac{S}{f}\right) = \left(\frac{1.2 - 0.8}{1.23}\right)\left(\frac{321,000,000}{223,300}\right) = 467.49$$

That is, buy 467 S&P Small Cap 600 futures contracts.

2.   Solution: A.

To create a synthetic equity position (equitize cash) using the $15 million cash inflow, Bing should purchase futures and invest in risk-free bonds. The number of contracts is:

$$N_f = \frac{V(1+r)^T}{qf} = \frac{15,000,000(1+0.015)^{0.25}}{223,300} = 67.42 \; ; \text{that is, Bing should go long 67 contracts.}$$

The amount to be invested in risk-free bonds is: $V^* = \frac{N_t^* qf}{(1+r^*)^T} = \frac{67(223,300)}{(1+0.015)^{0.25}} = 14,905,516$.

3.   Solution: C.

$950,000,000 × 0.05 = $47,500,000 to be converted from equity to cash to bonds.

$$N_{sf} = \left(\frac{\beta_T - \beta_S}{\beta_f}\right)\left(\frac{S}{f_s}\right) = \left(\frac{0 - 1.45}{1.12}\right)\left(\frac{47,500,000}{481,900}\right) = 127.61$$

$$N_{bf} = \left(\frac{MDUR_T - MDUR_B}{MDUR_f}\right)\left(\frac{B}{f_b}\right) = \left(\frac{5.3 - 0}{4.89}\right)\left(\frac{47,500,000}{165,260}\right) = 311.52$$

4.   Solution: C.

The type of exchange rate risk that causes overseas sales of a US manufacturer to decline in the face of a stronger US dollar is economic exposure. In contrast, transaction exposure arises when overseas sales denominated in a foreign currency must be converted to the domestic currency. In the face of a rising dollar, eurozone sales will convert to a lower amount in dollars relative to the amount repatriated if the dollar declines versus the euro. Translation exposure is not relevant here because KPM Inc. does not have overseas subsidiaries. Translation exposure arises when the financial statements of an overseas subsidiary must be converted to the domestic currency.

5.   Solution: B.

Torres is correct on both accounts. The duration of the original loan is −1.5. The fixed leg of the interest rate swap has a duration of 1.5, and the duration of the variable leg of the swap is −

0.125. Thus, the duration of the overall position is –0.125. The overall sensitivity is reduced. The firm will find it harder to predict cash flows, however, because the net exposure is to the variable Libor rate. Therefore, Torres is correct that the swap serves as a poor hedge from the perspective of predicting cash flows.

6.   Solution: B.

The correct combination of swaps is:

Equity swap: Pay return on $47.5 million on the S&P 400 MidCap Index and receive LIBOR on $47.5 million;

Interest rate swap: Pay LIBOR on $47.5 million and receive return on $47.5 million on the Barclays US Aggregate Bond Index.

Case 14: Matthew Wintermantle

1. Solution: C.

The number of futures, N_f, is calculated as follows:

$$N_f = \left(\frac{\beta_T - \beta_S}{\beta_f} \right)\left(\frac{S}{f} \right) = \left(\frac{0.8 - 1.2}{0.9} \right)\left(\frac{25,000,000}{484,750} \right) = -22.92$$

That is, sell 23 S&P 500 futures contracts.

2. Solution: A.

In order to create a synthetic equity position (equitize cash) using the $15 million cash inflow, Wintermantle should purchase futures and invest in risk-free bonds. The number of contracts is:

$$N_f = \frac{V(1+r)^T}{qf} = \frac{600,000,000(1+0.015)^{0.25}}{8,935,000} = 67.4 \text{, that is, 67 contracts long.}$$

The amount to be invested in risk-free bonds is:

$$V^* = \frac{N_t^* qf}{(1+r)^T} = \frac{67(8,935,000)}{(1+0.015)^{0.25}} = 596,420,893$$

3. Solution: A.

In order to fully hedge currency risk, both the foreign equity market exposure and the currency risk must be hedged. Cai is long the Nikkei and the JPY. In order to completely hedge currency exposure Cai would need to know how many JPY to deliver in the future but this unknown and is dependent on the future value of the Nikkei.

The only way that this amount is known now would be to hedge the exposure to the Nikkei by using Nikkei futures to lock in the amount of JPY to be delivered in the future.

4. Solution: A.

The number of S&P 500 futures, N_f, is calculated as follows:

$$N_f = \left(\frac{\beta_T - \beta_S}{\beta_f} \right)\left(\frac{S}{f} \right) = \left(\frac{0 - 1.35}{0.9} \right)\left(\frac{800,000,000}{484,750} \right) = -2475.5 \text{ or 2,476 contracts.}$$

The number of S&P 400 futures, N_f, is calculated as follows:

$$N_f = \left(\frac{\beta_T - \beta_S}{\beta_f} \right)\left(\frac{S}{f} \right) = \left(\frac{1.25 - 0}{0.95} \right)\left(\frac{800,000,000}{138,600} \right) = -7594.75 \text{ or 7,595 contracts.}$$

5. Solution: B.

Wittke is correct. Futures contracts can be used to gain exposure to an asset class in advance of a cash receipt. This is called pre-investing in an asset class. A long position in a futures contract is

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equivalent to being long the underlying plus a loan. That is, it is a fully leveraged position on the underlying asset.

6. Solution: B.

Wittke is incorrect about the type of exchange rate risk. PWCC faces transaction exposure in this case the risk that the euro will strengthen against the US dollar and cause PWCC to pay more in US dollar terms. Wittke is correct that the exchange rate risk can be hedged using a long forward contract on euros.

8.   SS18 Trading, monitoring and rebalancing

Case 1: Brooks

1.   Solution: C.

Effective spread is a measure of execution costs that captures both the effects of price improvements and market impact. The effective spread is two times the deviation of the actual execution price from the midpoint of the market quote at the time an order is entered.

Effective spread = 2× (Actual execution price - Mid-point of market quote at time of order entry) = 2× ($20.03 - $20.02) = 2 cents.

Quoted spread = $20.04 - $20.00 = 4 cents.

The price improvement from the trade has resulted in an effective spread that is lower than the quoted spread by 2 cents (0.02 effective spread - 0.04 quoted spread).

2.   Solution: A.

Placid did not execute the DEF stock transaction at its target execution cost because of the market impact cost of 7 cents, which exceeded Placid's 5 cent target for market impact cost. The limit order created a missed trade opportunity cost of 4 cents, which was below Placid's 5 cent target for missed trade opportunity cost. The remaining explicit costs (commissions) and implicit costs (bid–ask spread) were equal to the target.

DEF transaction cost = 16 cents.

Explicit cost—commissions: 1 cent

Implicit cost—bid–ask spread: 4 cents

Implicit cost—market impact: 7 cents

Implicit cost—missed trade opportunity cost: 4 cents

Market impact = $32.32 (execution price on the second 100 shares) − $32.25 (execution price on the initial 100 shares) = 7 cents.

Missed trade opportunity cost = $32.29 (closing price) − $32.25 (ask price at order entry) = 4 cents.

3.   Solution: C.

Gaming (trade delaying) is a disadvantage of VWAP. The VWAP is partly determined at different points of time in the day. Having that knowledge, a trader can compare the current price with an estimate of that day's VWAP and decide to trade that day or wait until the next day. Another disadvantage of VWAP (trade size) is that it is less informative for trades that represent a large fraction of volume. In extreme cases, if a single trading desk were responsible for all the buys in a security during a day, that desk's average price would equal the VWAP and thus appear to be good, regardless of how high the prices paid. Despite these disadvantages, an advantage of the

VWAP is that it is readily obtainable and is a useful measure of quality of execution for smaller trades in non-trending markets.

4. Solution: C.

Implementation shortfall is 91 bps and is calculated as follows.

Cost of paper portfolio = 1,000 shares × $50.00 decision price = $50,000.

Return on paper portfolio = ($50.50 price when order canceled - $50.00 decision price) × 1,000 shares = $500.

Value of real portfolio = 700 shares × $50.50 Wednesday closing price = $35,350.

Cost of real portfolio = (700 shares × $50.40 limit price) + $25.00 trading costs = $35,305.

Return on real portfolio = $35,350 - $35,305 = $45.

Dollar implementation shortfall = Return on paper portfolio - Return on real portfolio = $500 - $45 = $455.

Percentage implementation shortfall = Dollar implementation shortfall/Cost of paper portfolio = $455/$50,000= 0.0091% = 91 bps.

Implementation shortfall may also be calculated via its separate components:

Commissions = 5 bps.

Calculation: $\frac{\$25}{\$50,000} = 5$ bps

This amount consists of the trading commissions and costs as a percentage of the paper portfolio.

Realized (-Profit) / Loss = -14 bps.

Calculation: $\frac{700}{1,000} \times \frac{\$50.4-\$50.5}{\$50}$=0.7%× $(-0.002\%) = -14$bps

This amount reflects the difference between the execution price and the relevant decision price and is based on the amount of the order filled.

Delay costs = 70 bps.

Calculation: $\frac{700}{1,000} \times \frac{\$50.5-\$50}{\$50}$=70bps

This amount reflects the price difference attributable to the delay in filling the order and is based on the amount of the order filled.

Missed trade opportunity cost = 30 bps.

Calculation: $\frac{300}{1,000} \times \frac{\$50.5-\$50}{\$50}$=30bps

This amount reflects the difference between the price at cancellation and the original benchmark price (decision price) and is calculated on the amount of the order that was not filled.

5. Solution: B.

Value-motivated traders trade only when the price moves into their value range. Their motivation

is to take advantage of perceived valuation errors. With respect to trade execution, their preference is price (versus time). They often use limit orders.

6. Solution: A.

Liquidity at any cost is a trading tactic for immediate execution in institutional block size. Liquidity at any cost tactics are typically used by information-motivated traders who require timely execution. Weaknesses of liquidity at any cost include high costs, such as commissions and price concessions, related to market impact.

Case 2: Truck

1.   Solution: B.

Truck anticipates strongly positive equity performance for the next few years. Perold-Sharpe analysis clearly illustrates that a buy-and-hold strategy can be expected to outperform a rebalancing discipline in an upward trending market.

2.   Solution: A.

Heidi's investments are held in a taxable account, and tax costs are one of the costs that arise when rebalancing to a strategic asset allocation. Truck recommends rebalancing only to the allowed range for Heidi rather than fully back to target weights as he does for the elder Hardings. Rebalancing to the allowed range typically results in lower after-tax rebalancing costs than rebalancing to target weights.

3.   Solution: A.

Rebalancing trades can occur on any calendar date for percentage-of-portfolio rebalancing, in contrast to calendar rebalancing. To take advantage of the low transaction costs for longer holding periods in the new international equity fund, semiannual rebalancing may be beneficial.

4.   Solution: A.

Because of Heidi's inheritance, the Hardings no longer have to keep as much cash on hand to meet any needs that might arise in establishing her career. Cash is the asset class offering the lowest risk and return (Exhibit 1), which is offset by the benefits of high liquidity. With the need for higher liquidity removed, the IPS can target a higher return that is consistent with reduced cash reserves in the strategic asset allocation.

5.   Solution: A.

If we assume that an investor's strategic asset allocation is optimal, then any divergence in the investor's portfolio from this strategic asset allocation is undesirable and represents an expected utility loss to the investor. The Hardings' domestic and international stock holdings are below their strategic asset allocation targets, both in value and on a percentage-of-portfolio basis (Exhibit 1). This decline represents an inadequate allocation toward assets with a higher risk premium and would increase the Hardings' risk of not achieving their return objectives if rebalancing does not occur.

End of Current Year Selected Data	Historical Risk / Return Rankings	Strategic Asset Allocation	Dollar Allocation	Percentage Allocation
Domestic stocks	Higher	40% +/- 3%	$1.5 million	37.5%

International stocks	Highest	20% +/- 2%	$0.7 million	17.5%
Fixed income	Lower	30% +/- 5%	$1.6 million	40%
Cash reserves	Lowest	10% +/- 2%	$0.2 million	5%

6.   Solution: B.

A lower volatility should lead to a wider corridor, all else being equal. When the asset class volatility is lower than the historical average, this segment of the portfolio can drift farther from the optimal mix with less of an impact on overall risk at the portfolio level.

Equity market volatility that has been lower recently than historical levels, and Truck's research supports the idea that it will persist, argues in favor of wider corridors if his expectations are realized. In contrast, the Hardings' decrease in wealth may lead to a decreased risk tolerance, which would suggest a narrower optimal corridor. Similarly, the lower costs associated with their new international stock fund are consistent with a narrower corridor because rebalancing costs are reduced.

Case 3: Ahmed

1.   Solution: B.

	Trade 1	Trade 2
Number of shares (for weighted average)	1,500	500
Midpoint of the market when the order is entered (average of bid and ask)	£15.43	£15.43
Execution price	£15.46	£15.50
Effective spread [2 × (Execution − Midpoint)]	£0.06	£0.14
Weightings	1,500 ÷ 2,000 = 0.75	500 ÷ 2,000 = 0.25
Share-volume-weighted effective spread	**(£0.06 × 0.75) + (£0.14 × 0.25) = £0.08**	

2.   Solution: C.

C is correct. The first trade at 11:15:09 was executed for 1,500 shares at £15.46 (Exhibit 2) when the ask was £15.48 (Exhibit 1), therefore Tweed's trader was able to purchase the shares for less than the ask which is a favorable price movement for the trader.

3.   Solution: C.

C is correct. Because the order represents a substantial portion of the daily volume of WWT (450,000 shares, see Exhibit 2) and could affect the price, which is important to the client, Moore would most likely use an iceberg order. An iceberg order is a limit order with instructions to show only a portion of the order at a time, to try to avoid moving the market price unfavorably. A principal trade would not be suitable because it often requires price concessions and price is important in this situation.

4.   Solution: B.

B is correct. The implementation shortfall is the difference between the money return on a paper portfolio based on the benchmark or decision price ($25.50 in Exhibit 3) and the actual portfolio's money return and is calculated as follows:

Portfolio Money Returns	Price £	Number of Shares	Total £
Paper portfolio original cost	25.50	1,000	−25,500
Paper portfolio end value	26.75	1,000	26,750
Paper portfolio profit			1,250
Real portfolio	26.25	800	−21,000
Commission			−135
Real Portfolio total original cost			−21,135
Real portfolio end value	26.75	800	21,400

Real portfolio profit	265

Implementation Shortfall		
in £s: paper profit − real profit	1,250 − 265	985
As % of cost of paper portfolio	985 ÷ 25,500	3.86%
in basis points		**386**

5. Solution: A.

A is correct. Moore's statement is incorrect, only explicit costs such as the £135 commission cost should be included in assessing the trader's performance. The missed trading opportunity cost is also a result of market movement.

6. Solution: A.

A is correct. Direct market access would be most suitable for the order of JAK—a small order of a liquid stock trading on a well-organized market (LSE).