

Portfolio Management Quiz 1

TOPIC: PORTFOLIO MANAGEMENT

THE TOTAL POINT VALUE FOR THIS QUESTION SET IS 12 POINTS

Jim Harper is on the board of trustees of an endowment for a small liberal arts college. Harper and the board have strong convictions that equity markets are generally efficient. They want to hire a manager to actively manage a smaller portion of the equities in the endowment with the rest being indexed. Harper is responsible for finding and meeting with potential investment managers and reporting his recommendations back to the rest of the board.

Michael Peters, CFA, has made it into the final group of managers being considered for the role based on his ability to outperform the broader market index. Peters's expertise is investing in stocks with high projected earnings growth rates. He often utilizes larger-cap stocks and off-index investing. His five-year performance results are shown here.

	5 Year Avg. Return	Standard Deviation (1998–2018)
Peters	16.2%	16.9
Total market index	15.4%	14.6%
Large-cap growth index	18.3%	17.3
Short-term Treasuries	4.4%	—

Harper and the board want to spread the rest of the endowment's equity portfolio across numerous indexes, including the S&P 500, the Russell 2000, and an international index. They also want to allocate some funds to publicly traded companies that donate to charitable causes and have located the Charitable Index, which represents this strategy. The index invests in 500 companies with varying levels of liquidity and uses selection criteria that are sometimes not clearly defined. The performance of the underlying stocks has historically been volatile. The index follows quarterly rebalancing rules, and data on the index is regularly updated. Despite these concerns, Harper and the board feel strongly about adding this index to their portfolio because the charitable focus aligns with the college's beliefs. They would like to pursue this strategy at a reasonable cost.

Question 1 of 9

Calculate Peters's active return and **determine** whether he should be hired. **Justify** your determination.

Explanation

Active return = manager's actual return – manager's benchmark return.

Peters's benchmark is the large-cap growth index because he often uses larger-cap stocks: $16.2\% - 18.3\% = -2.1\%$.

Peters has underperformed the appropriate benchmark over the past five years and therefore should **not** be hired.

Scoring key:

4 points maximum: 2 points for a correct calculation. 1 point for a correct determination. 1 point for a valid justification.

(Module 13.3, LOS 13.k)

Related Material

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Question 2 of 9

Since an ETF option is not available, **determine** the most appropriate method (futures contracts, equity return swap, or separately managed account) for the endowment to invest in the Charitable Index. **Justify** your response by discussing the feasibility of each method (provide your responses in separate paragraphs).

Explanation

The correct answer is a separately managed account.

1. A separately managed equity index-based portfolio is the most appropriate method because it is meant to hold all of the constituent stocks in the index (or a representative sample of the 500 stocks, if full replication is considered impractical). In addition, the fact that the data on the Charitable Index is regularly updated supports the use of a separately managed portfolio.
2. Futures contracts are available on only a limited number of widely used (liquid) indices. The Charitable Index does not appear to be overly liquid, as its underlying 500 companies have varying levels of liquidity, so an appropriate futures contract is not likely to be available among the existing offering of exchange-traded futures.
3. Given the specialized nature of the Charitable Index, there are not likely to be any available hedging instruments; therefore, a dealer is unlikely to offer an equity return swap at any reasonable cost.

Scoring key:

4 points maximum. 1 point for selecting separately managed account. 3 points for the discussing the feasibility of each of the three methods.

(Module P1.2, LOS P1.b)

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Question 3 of 9

Determine which method (optimization, full replication, or stratified sampling) is *most appropriate* to mimic the return of the Charitable Index. **Justify** your choice with *two* reasons.

Explanation

Stratified sampling is the most appropriate method to deal with the unusual features of this index (only *two* are required):

1. The large size of the index makes full replication more expensive and makes stratified sampling more cost effective.
2. The criteria for index inclusion are sometimes not clearly defined, making full replication or optimization difficult.
3. The historically high volatility of the underlying stocks makes optimization less appropriate because optimization relies on the stability of historical relationships.

Scoring key:

4 points maximum. 2 points for selecting stratified sampling. 1 point for each valid justification.

(Module P1.2, LOS P1.d)

Related Material

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Anne Gerard, CFA, is reviewing the liabilities of Eastman Engineering, a UK-based company. Eastman has multiple liabilities that are summarized in Exhibit 1. Gerard has established that Eastman requires immunization of its multiple liabilities and considers the three portfolios shown in Exhibit 2.

Exhibit 1: Summary of Liabilities

Data	Values (£)
Market value of liabilities	327,620,800
Modified duration	8.21
Convexity	47.23

Exhibit 2: Three Portfolios

Asset Portfolios	X	Y	Z
Market value (£)	330,000,000	344,876,923	327,272,727
Modified duration	8.15	7.80	8.25
Convexity	50.52	45.12	49.64

Walter Kimble, CFA, works on the same team as Gerard. Kimble has been asked by an insurer to recommend the most suitable immunization hedge for a single 10-year liability. The client is concerned about the risk of nonparallel yield curve changes.

Kimble considers a range of solutions including bullet, laddered, and barbell portfolios, as shown in Exhibit 3.

Exhibit 3: Proposed Portfolios

Portfolios	Bullet	Laddered	Barbell
Weighted Macaulay duration	10	10	10
Single liability duration	10 years		

At a meeting with the insurer, Kimble's client asks about the impact of a positive butterfly twist in the yield curve.

Question 4 of 9

Using the data in Exhibits 1 and 2, **recommend** which portfolio is *most* suitable to immunize the multiple liabilities. **Justify** your answer with *two* reasons.

Explanation

1. Portfolio X is the most suitable portfolio to immunize the multiple liabilities:

- $\text{BPV liabilities} = \text{modified duration} \times 0.0001 \times \text{market value liabilities}$
- $\text{BPV liabilities} = 8.21 \times 0.0001 \times 327,620,800 = \text{£}268,977$
- $\text{BPV Portfolio X} = 8.15 \times 0.0001 \times 330,000,000 = \text{£}268,950$
- $\text{BPV Portfolio Y} = 7.80 \times 0.0001 \times 344,876,923 = \text{£}269,004$
- $\text{BPV Portfolio Z} = 8.25 \times 0.0001 \times 327,272,727 = \text{£}270,000$
- Portfolio Z is rejected as the BPV is not a close match to the liability BPV.

2. Portfolio X has a convexity slightly higher than the convexity of the liabilities. This is important because the asset portfolio should rise more than, and fall less than, the liabilities when yields change.

- The convexity of Portfolio X is 50.52 versus 47.23 for the liabilities.
- Reject Portfolio Y as the convexity of 45.12 is less than 47.23. The convexity of the assets must be higher than the liabilities.
- Although Portfolio Z has a suitable convexity of 49.64, it is unsuitable as the BPV is not a close match.
- Recommend Portfolio X because its BPV closely matches the BPV of the liabilities, and its convexity is slightly higher than the convexity of the liabilities.

Scoring key:

4 points maximum. 2 points for recommending Portfolio X. 1 point each for a valid justification.

(Module P4.1, LOS P4.b)

Related Material

[SchweserNotes - Portfolio Management](#)

Question 5 of 9

Recommend which portfolio from Exhibit 3 is *most* suitable to immunize the single liability for Kimble's client. **Justify** your answer with *two* reasons.

Explanation

The bullet portfolio is most suitable:

1. The bullet portfolio has a Macaulay duration of 10 years, which matches the liability duration of 10 years. Because the cash flows are concentrated near the liability date, the bullet portfolio provides a closer match to the timing of the single liability than the laddered or barbell portfolios. The barbell and the laddered portfolios have bonds that mature earlier and later than the liability, which introduces structural risk.
2. The barbell and the laddered portfolios introduce yield curve risk that is not present with the bullet portfolio. Both the barbell and the laddered portfolios have exposure to longer-term bonds. If long-term yields rise, the value of the long-term bonds will fall. The bullet has less exposure to nonparallel yield curve changes because its cash flows are concentrated near the liability date.
3. The bullet matches both the Macaulay duration and the convexity of the liability. If the bullet portfolio and the liability are both 10 years, then both the Macaulay duration and convexity will match (as convexity is driven by maturity). The barbell has the highest convexity as it contains the highest weighting in longer-term bonds. The laddered portfolio has lower convexity than the barbell, but higher than the bullet.

Scoring key:

4 points maximum. 2 points for recommending the bullet portfolio. 1 point each for a valid justification.

(Module P4.1, LOS P4.a)

Related Material

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Question 6 of 9

Identify which of Kimble's portfolio allocations is *most likely* to outperform, given the client's potential yield curve scenario. **Justify** your answer with *two* reasons.

Explanation

A positive butterfly twist involves short-term and long-term yields rising, and medium-term yields falling.

The bullet portfolio is most suitable, given this yield curve scenario:

1. The bullet portfolio benefits from the fall in medium-term yields, resulting in a rise in the medium-term bond value in the bullet portfolio. Although the liability will also rise in value, the overall surplus of assets less liabilities will remain approximately the same.
2. The bullet portfolio has no exposure to the rise in short-term and long-term yields. The barbell and the laddered portfolios will suffer losses on the short-term and long-term bonds in the portfolio.
3. The bullet portfolio has no structural risk, as the Macaulay durations of the assets and liabilities are aligned at 10 years. The barbell and the laddered portfolios include bonds that are shorter and longer than the 10-year liability, which introduces structural risks.
4. The 10-year bullet portfolio matches the convexity of the 10-year liability. The convexity of the laddered and the barbell portfolios is higher than the liability. This higher convexity introduces yield curve risk, especially to rises in long-term yields in a positive butterfly twist.

Scoring key:

4 points maximum. 2 points for identifying the bullet portfolio. 1 point each for a valid justification.

(Module P4.1, LOS P4.a)

Related Material

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Apex Capital Investment Management has several portfolio managers who serve different markets:

- Mikaela Jacobs, CFA, manages equity portfolios for high-net-worth individuals. Jacobs is currently monitoring the performance of RoundTop Incorporated because she believes the stock has had a significant run-up, and she is looking to realize some profit for her clients when it reaches a particular price. Jacobs prefers to use an algorithm that will trade close to market prices at the time the order is entered.
- Ian Knight, CFA, is a fixed-income portfolio manager for several institutional clients. Knight believes that the central bank may start to raise interest rates, and he is preparing to sell some of his positions—including structured products, such as mortgage-backed securities—before their prices fall.

Maryanne Touissant, CFA, is the director of operations for Apex Capital. The firm's management has asked her to monitor trading processes to assess whether trades are being executed in a timely manner. Touissant pulls the following information from a recent trade order:

10:00 am	Order entered: buy 5,000 shares of BDC stock	\$15.00 per share
	Trader executes purchase of 3,000 BDC shares	\$15.20 per share
	Commission	\$0.02 per share
4 PM	BDC closing price	\$15.35 per share

Question 7 of 9

Identify and **describe** the *best* type of algorithm for Jacobs to use to execute her trades.

Explanation

Jacobs should use an *arrival price algorithm* to execute at a price close to the market price at the time the trade is placed. This algorithm trades more aggressively to execute shares near the arrival price, reducing the risk that prices move against the order before execution.

Scoring key:

4 points maximum. 2 points for identifying an arrival price algorithm. 2 points for correctly describing the process.

(Module P7.3, LOS P7.e)

Related Material

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