

## Portfolio Construction - Answers

Farat Asset Management (FAM) offers a global array of active and passive management styles. For larger investors, FAM offers various funds with a large number of constituents, including some relatively illiquid ones. Four of those funds are described in Figure 1. Over time, there has been substantial variation in returns, variances, and correlations between securities.

### Description of Funds

#### Description of Funds

Fund Name	Fund Description
Archie	Passive investment in one large developed market
Baxter	Passive investment in frontier and emerging markets
Carlie	Passive investment in global developed markets
Dunes	An active global portfolio covering all geographic sectors

Hanna Sole is a portfolio manager with FAM and collects the following notes on the funds in **Figure 1**.

- Note 1: Archie is constructed using a full replication process, defined as a 99% match to the index.
- Note 2: Baxter is constructed using a stratified sampling process.
- Note 3: Carlie is constructed using an optimization process.
- Note 4: Dunes uses aggressive shareholder engagement strategies.
- Note 5: All funds charge a single management fee that covers all costs to investors in that fund.

Sole is also interested in the degree of security-specific risk diversification within FAM's portfolios. She asks the portfolio managers for the Herfindahl-Hirschman Index (HHI) for each of three portfolios. Each portfolio uses some form of market cap or free float weighting. The HHI results are shown in **Figure 2**.

### HHI Calculations

- Portfolio 1 0.0321
- Portfolio 2 0.0027
- Portfolio 3 0.0015

One of Sole's clients is a large endowment portfolio that uses multiple managers and strategies. The board of trustees for the endowment relies on Sole and FAM for advice on manager and strategy allocation. The board asks Sole to evaluate the performance of one of their managers. To do so, Sole first collects the data in **Figure 3**.

### Manager and Benchmark Data

Sector	Weight by Sector		
	Sector Return	Manager Allocation	Benchmark Allocation
Industrials	-1.3%	35%	25%
Finance	4.4%	20%	25%
Consumer	4.4%	30%	25%
Energy	4.5%	15%	25%

The board also asks Sole for advice regarding three new passive index managers they are considering and provides the data in **Figure 4**. All three managers use the same benchmark index.

### New Managers

	Manager 1	Manager 2	Manager 3	Benchmark
Management fee	0.75%	4%	3%	
Cash allocation	3%	0%	2%	

At her next meeting with the board, Sole discusses the results of her analysis. As the meeting is breaking up, one of the newest board members approaches her and asks about a new index manager he has heard of. The manager describes his process as focused on dividends, P/E, and a size factor. The board member says, "This sounds like an active manager and not a passive index manager." Sole promises to look into it before their next meeting.

## Question 1 of 12

Which of the funds in **Figure 1** *most likely* charges the lowest management fee?

- A) Archie.
- B) Baxter. ✓**
- C) Carlie.

### Explanation

Archie is a fully passive approach to a single developed market. However, with 99% matching defined as "full replication," it will likely require some coverage of the least liquid stocks in the index. That means there will likely be substantial transaction costs with a resulting U-shaped relationship between tracking error and the number of securities held.

In terms of the management fee, Carlie might initially fall in between as a passive approach with allocations to multiple (global) developed markets. However, because there has been substantial variation in returns, variances, and correlations of securities over time, the output from an optimization program is likely to apply only to the period from which the data are drawn and not to a future period. Even if current results apply to the future, they might not be applicable for long. This means that optimization would need to be run frequently and adjustments made to the portfolio, which may be costly.

Baxter operates in the least developed markets (emerging and frontier), where operating expenses are likely to be higher. It may initially appear to be the fund to charge the highest management fee. However, given the problems and potential high costs with Archie and Carlie and the fact that Baxter uses a stratified sampling process that avoids the negative results of full replication (and most likely results in a reasonable cost), Baxter is most likely to charge the lowest management fee of the three funds.

(Module 6.2, LOS 6.e) and

### Related Material

[SchweserNotes - Book 2](#)

## Question 2 of 12

Which of the following statements *least accurately* describes the situation with Dunes?

- A) There is a greater risk of insider trading.
- B) There is a greater focus on long-term goals. ✓**
- C) There is a greater potential for conflicts of interest.

### Explanation

With aggressive shareholder engagement strategies, the engagement may

- focus on short-term goals (e.g., increasing cash flows or share price) at the expense of the company's long-term goals;
- lead to the acquisition of material nonpublic information, thereby increasing the risk of insider trading; and/or
- create potential conflicts of interest (e.g., an engaged portfolio manager may support company management because management also invests in the manager's fund).

(Module 6.2, LOS 6.d)

### Related Material

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### Question 3 of 12

Based on the data regarding the HHI calculations, which of the following is *most likely* correct?

- A) **Portfolio 3 holds more than 668 stocks. ✓**
- B) Portfolio 1 has the equivalent of 64 stocks.
- C) Portfolio 3 has more nonsystematic risk than Portfolio 2.

#### Explanation

The equivalent number of equal-weighted positions is the reciprocal of the HHI. They are as follows:

Results of HHI Calculations	Equivalent Number of Stocks
Portfolio 1	0.0321 $1 / 0.0321 = 31.15$
Portfolio 2	0.0027 $1 / 0.0027 = 370.37$
Portfolio 3	0.0015 $1 / 0.0015 = 666.67$

From this, we know that Portfolio 1 has the equivalent of 31 stocks, not 62. However, we also know that the portfolios are not likely to be equally weighted, as they use market-cap or free float-adjusted market cap weightings. Therefore, each will contain more than  $1/HHI$  stocks. Portfolio 3 would contain more than 666.67 and almost certainly more than 668, making that the *most likely* correct statement. Given that the equivalent number of stocks in Portfolio 3 is almost double that of Portfolio 2, Portfolio 3 likely has greater diversification and less nonsystematic risk, not more.

(Module 6.3, LOS 6.f)

#### Related Material

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### Question 4 of 12

Based on the data for the HHI calculations in Figure 2 and assuming Portfolio 2 is equally weighted, the number stocks in Portfolio 2 is closest to:

- A) <370.
- B) 370. ✓
- C) >370.

#### Explanation

Since the HHI calculation for Portfolio 2 is 0.0027, the equivalent number of stocks for an equally weighted portfolio is  $1 / 0.0027 = 370.37$  or 370.

(Module 6.3, LOS 6.f)

#### Related Material

[SchweserNotes - Book 2](#)

Suzanne Harlan has a large, well-diversified stock and bond portfolio. She wants to try some alternative investments and has contracted with Laurence Philips, principal of Philips Finance, to help assemble a new portfolio.

Before agreeing to make recommendations for Harlan, Philips wants to determine whether she is a good candidate for alternative investments. He gives her a standard questionnaire that asks open-ended questions of all potential clients. Here are some of Harlan's comments:

- "I'm interested in higher returns. I'm not afraid of risk, and I'm investing this money for the benefit of my eventual heirs."
- "I pay several million dollars in taxes every year, and I want any additional investments to be consistent with my tax situation."
- "While I expect risk on an individual investment basis, I'd like to further diversify my portfolio and reduce overall risk."
- "I pay a lot of attention to expense and return data from my investments and track their performance closely."
- "I'm 65 years old and in excellent health."

After reading Harlan's responses and learning that she is a fairly sophisticated investor, Philips agrees to take her on as a client. Harlan has a lot of experience with investments and has some ideas for where she'd like to invest. She brings Philips the following ideas:

- "I have a colleague in the timber business who says the furniture market is booming, and demand should increase in the year ahead. I'm interested in increasing my exposure to real assets, but I'm unsure how they will impact the risk profile of my overall portfolio."
- "Hedge funds are earning excellent returns, and I expect them to continue doing so. However, other investors have told me that the difficulty lies in assessing the quality of the funds, because they are not well regulated. So, I'm interested in purchasing a fund-of-funds (FoF), so I can diversify my risk while potentially sharing in some outsized returns."
- "I already own public equity securities, but I'm also interested in private equity securities. I've been informed that both public and private companies face similar risk factors."
- "My neighbors founded Kelly Tool and Equipment, a machine-tool business, 20 years ago. I have contacts in the manufacturing business overseas who would be interested in acquiring Kelly's assets. My contacts in Asia are willing to pay about 60% of the book value for the assets, and my neighbors are willing to sell me the company for about 50% of the book value of its assets."

Harlan then tells Philips that it is imperative that the returns of any investments he recommends be in some way comparable to a benchmark.

Philips is not excited about the commodity idea and does not like FoFs. However, he does know several managers of individual hedge funds that might interest Harlan. He talks her out of the FoF idea and suggests she put her money into the Stillman Fund, which is run by one of his college friends. Fund manager Mark Stillman concentrates on spinoffs, generally buying the spunoff company and shorting the parent company.

### Question 5 of 12

Which pair of Harlan's proposed investments represent the *best* choice for Harlan's goal of increasing return and of diversification in her portfolio? Consider each goal separately.

	<u>Net Returns</u>	<u>Diversification</u>
A)	<b>Private equity</b> ✓	<b>Hedge funds</b>
B)	Real assets	Hedge funds
C)	Private equity	Kelly Tool and Equipment

#### Explanation

Private equity and private credit may be viewed primarily as return-enhancing (and risk-increasing) portfolio investments. Real assets may be viewed as risk-reducing (and, thus, lower-return) investments.

The use of a FoF would provide diversified exposure to hedge funds and some portfolio diversification. In contrast, Kelly Tool and Equipment has high security-specific risk and is less likely to provide diversification. Given Harlan's view that it is undervalued, it could also be a return enhancer, but it was not offered as a choice for that goal.

(Module 8.1, LOS 8.a)

#### Related Material

[SchweserNotes - Book 2](#)

### Question 6 of 12

Based on her investment suggestions and survey answers, Harlan is *least* concerned with:

- A) inflation.
- B) liquidity. ✓**
- C) volatility.

#### Explanation

While Harlan's comment about being willing to accept risk may suggest she is not concerned about volatility, she is most definitely concerned on a portfolio level, as evidenced by her desire to use alternative assets for diversification purposes. Nothing in the information presented offers any hint about Harlan's concerns about inflation. However, Harlan's stated desire to build wealth for her heirs suggests that liquidity is not a concern.

(Module 8.2, LOS 8.d)

#### Related Material

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### Question 7 of 12

Which of Harlan's responses is *most likely* to make Philips consider her a bad candidate for alternative investments?

- A) "I'm 65 years old and in excellent health."
- B) "I pay a lot of attention to expense and return data from my investments and track their performance closely." ✓**
- C) "I pay several million dollars in taxes every year, and I want any additional investments to be consistent with my tax situation."

#### Explanation

Alternative assets can provide high returns. A high risk tolerance, low need for liquidity, and long time horizon are positives for investors in alternative asset classes. Being in good health, Harlan could live many more years and is investing for her heirs; thus, she has a long time horizon. And, while many alternative assets are risky, they can provide a substantial diversification benefit when combined with mainstream investments. Investors must ensure that an alternative investment fund's activities and distributions are consistent with their tax situations. However, monitoring of alternative investments can be challenging because their performance reporting can be infrequent and come with significant time lags.

(Module 8.3, LOS 8.h)

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### Question 8 of 12

How should Philips respond to Harlan regarding her statement about benchmarks?

- A) Published alternative investment indices can be used as a valid benchmark.
- B) The performance of an alternative investment strategy can be evaluated against a benchmark.
- C) Instead of using a benchmark, it is better to assess an alternative investment in terms of its return, risk, income, and safety. ✓**

#### Explanation

An appropriate benchmark is difficult to establish for an alternative investment program because its performance depends greatly on active management by the managers chosen. The performance of an alternative investment program should be evaluated in the context of stated goals (return, risk, income, and safety), rather than measured against a benchmark. Also, published indices are often inconsistent with each other in the way they define various alternative investment strategies.

(Module 8.3, LOS 8.h)

#### Related Material

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Rob Baker, an investment manager at Welker Auto Parts (Welker), is responsible for managing his company's defined benefit pension plan. The plan has been underfunded for several months, and Baker is meeting today with Gary Thompson, the company's CFO, to discuss possible ways to erase this liability funding shortfall.

During the meeting, Baker and Thompson make four comments:

- Comment 1: Baker proposes that the plan should increase the value of its pension assets by investing in riskier securities. Currently, the plan invests most of its funds in investment-grade corporate bonds and large-cap equities. Baker is confident that investments in small-cap equities will help bring the fund back to fully funded status.
- Comment 2: Thompson is not confident that shifting to riskier securities will guarantee an increase in pension asset values and points to the company's high debt ratio as an indication of a need to take a more risk-averse stance.
- Comment 3: Baker notifies Thompson of the high correlation of pension asset returns with the firm's operations and states that the high correlation increases the ability to take risk by increasing predictability and diversification.
- Comment 4: Thompson disagrees, suggesting that a firm's high ratio of active to retired lives diminishes the ability to take on more risk.

Baker and Thompson then turn to a list of additional discussion items:

- Item 1: Add an option to the plan that will allow participants to retire five years earlier than currently permitted at a 15% reduction in the value of the benefit payout.
- Item 2: Freeze the plan. All new employees will participate in a new defined contribution plan in which they can select from a list of investment alternatives that will range from more conservative to more aggressive than the defined benefit plan.

Each item is independent and is to be considered in isolation, as if it is adopted and no other changes are made.

### Question 9 of 12

Regarding Baker's Comment 1 and Thompson's Comment 2, which of the following *best* describes the appropriateness of their views?

- |    | <u>Baker</u>              | <u>Thompson</u>    |
|----|---------------------------|--------------------|
| A) | <b>Inappropriate</b><br>✓ | <b>Appropriate</b> |
| B) | Appropriate               | Inappropriate      |
| C) | Inappropriate             | Inappropriate      |

#### Explanation

Baker's views are inappropriate. He wants to take greater risk by investing in small-cap equities, but the plan's underfunded status has decreased the ability to take risk; therefore, taking greater risk is inappropriate. Thompson's views are appropriate. A high debt ratio would indicate a decreased capability of making contributions and meeting plan liabilities.

(Module 10.2, LOS 10.e)

#### Related Material

[SchweserNotes - Book 2](#)

### Question 10 of 12

Regarding Baker's Comment 3 and Thompson's Comment 4, which of the following *most likely* describes their accuracy?

- |    | <u>Baker</u>     | <u>Thompson</u>  |
|----|------------------|------------------|
| A) | Incorrect        | Correct          |
| B) | Correct          | Incorrect        |
| C) | <b>Incorrect</b> | <b>Incorrect</b> |

✓

#### Explanation

Baker's statement is incorrect. A high correlation of pension asset returns with a firm's operations reduces the ability to take risk. For example, the ability of the firm to make contributions will be low at the same time that the plan is underfunded. Thompson's statement is also incorrect. A high ratio of active to retired lives usually indicates an increased ability to take risk because it lowers liquidity needs and increases the time horizon.

(Module 10.2, LOS 10.e)

#### Related Material

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### Question 11 of 12

If Item 1 is adopted, what is the *most likely* immediate effect on the plan's liquidity needs and surplus?

- |    | <u>Liquidity needs</u> | <u>Surplus</u>  |
|----|------------------------|-----------------|
| A) | <b>Increase</b>        | <b>Increase</b> |
|    | ✓                      |                 |
| B) | Increase               | Decrease        |
| C) | Decrease               | No change       |

#### Explanation

The early retirement option will increase liquidity needs. While the payments made to a given individual will be discounted by 15%, that individual can start taking money sooner, and disbursements from the plan will increase immediately. Liquidity refers to disbursement needs now, not the final amount of total payments made over time. If the early payout were done at full value of the payout, the cash disbursed (reducing the present value of assets [PVA]) would equal the reduction in present value of liabilities (PVL). However, with the 15% discount applied to the distribution's value, PVA will decline less than PVL and surplus will improve.

(Module 10.2, LOS 10.e)

#### Related Material

[SchweserNotes - Book 2](#)

## Question 12 of 12

Assuming Item 2 is adopted and most plan participants choose more aggressive assets than those in the pension plan portfolio, the risk for the sponsor (Welker) will *most likely*:

- A) increase.
- B) **decrease.** ✓
- C) be unchanged.

### Explanation

The risk of the plan for the plan sponsor will decrease regardless of the investment choices made by each participant. In a defined contribution plan, each participant bears the investment risk, not the sponsor. With a defined benefit plan, the sponsor essentially has an open-ended obligation to fund the plan. With the change to a defined contribution plan for new employees, this open-ended future obligation has been somewhat limited. Note that there is no immediate change in PVA, PVL, and surplus; even so, there is now some new limitation on the future obligations of the sponsor, and thus, of risk to the sponsor.

(Module 10.2, LOS 10.e)

### Related Material

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