COURSE: INVESTMENTS |CHAPTER 18

PORTFOLIO PERFORMANCE EVALUATION

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Chapter Purpose

This chapter explains how portfolio results are measured, adjusted for risk and explained.

Return Measurement
Arithmetic, geometric, time-weighted and money-weighted returns

Gross and Net
Performance before and after fees and expenses

Benchmarks
Selecting an appropriate standard of comparison

Risk Measurement
Volatility, beta, downside risk and drawdown

Risk-Adjusted Performance
Sharpe, Treynor, Jensen's alpha, information and Sortino ratios

Attribution and Review
Sources of active return, manager evaluation, biases and limits

Learning Objectives

By the end of this chapter, students should be able to:

- Explain portfolio performance evaluation and calculate holding-period return
- Calculate arithmetic, geometric and annualised returns
- Calculate time-weighted return and explain money-weighted return
- Select an appropriate benchmark and calculate active return
- Explain major portfolio-risk measures
- Calculate risk-adjusted performance and interpret Sharpe and Treynor ratios
- Calculate Jensen's alpha, the information ratio and the Sortino ratio
- Explain performance attribution and distinguish skill from luck
- Identify evaluation biases and limitations

SECTION I — PERFORMANCE-EVALUATION FOUNDATIONS

Return alone does not tell the whole story.

What Is Portfolio Performance Evaluation?

Portfolio performance evaluation is the process of determining:

- How much the portfolio earned
- How much risk it accepted
- Whether it beat its benchmark
- Whether results met investor objectives
- Which decisions produced the results
- Whether performance is sustainable
- Whether fees were justified

Evaluating Two Runners

Suppose two runners finish a race in the same time.

Runner A
Runs on a flat road.

Runner B
Runs uphill while carrying a heavy bag.

Although the finishing time is the same, the difficulty was different.

> *Investment returns must also be evaluated relative to risk and conditions.*

Three Core Questions

1. What Was Earned?

Measure portfolio return.

2. What Risk Was Taken?

Measure volatility, beta, downside and other risks.

3. Where Did Performance Come From?

Identify allocation, selection, timing and other decisions.

Who Uses Performance Evaluation?

Asset Owners
Individual investors, pension funds, endowments, donors

Funds and Insurers
Mutual funds, insurance companies

Decision Makers
Investment committees, portfolio managers

Oversight and Advice
Regulators, investment consultants

Performance-Evaluation Process

Step 1
Confirm investor objectives and constraints.

Step 2
Collect accurate valuation and cash-flow data.

Step 3
Calculate portfolio return.

Step 4
Select an appropriate benchmark.

Step 5
Measure risk.

Step 6
Calculate risk-adjusted performance.

Step 7
Attribute performance.

Step 8
Interpret and report results.

Information Required

Performance evaluation may require:

Valuation Data
Beginning value, ending value, holdings, transaction dates

Cash Flows
Contributions, withdrawals, income received

Costs
Fees and expenses

Comparison Inputs
Benchmark returns, risk-free return

Risk Inputs
Portfolio beta, return volatility

Mandate
Investor objectives

Return Is Not the Same as Skill

A portfolio may earn a high return because:

- The entire market rose
- It accepted unusually high risk
- It concentrated in one successful security
- It benefited from luck
- Its investment manager demonstrated skill

Performance evaluation attempts to separate these explanations.

Main Evaluation Challenges

Cash Flows
External contributions and withdrawals distort measured returns

Changing Portfolios
Composition, risk level and investment style change over time

Benchmarks
Inappropriate benchmarks create misleading conclusions

Time Periods
Short evaluation periods are not reliable evidence

Valuation
Illiquid assets and valuation uncertainty

Costs and Data
Fees, taxes, survivorship and selection bias

SECTION II — RETURN MEASUREMENT

Begin with what the investor gained or lost.

Holding-Period Return

For a portfolio without external cash flows during the measurement period:

$$HPR = (V1 - V0 + Income) \div V0$$

- V0 = beginning value
- V1 = ending value
- Income = dividends, interest or distributions

Holding-Period Example

- Beginning value = ETB 1,000,000
- Ending value = ETB 1,120,000
- Income received = ETB 30,000

$$HPR = (1{,}120{,}000 - 1{,}000{,}000 + 30{,}000) \div 1{,}000{,}000$$
$$HPR = 15\%$$

Components of Portfolio Return

Total return may be separated into two components:

Income Return
Dividends and interest received.

Capital-Gain Return
Increase or decrease in market value.

$$\text{Total Return} = \text{Income Return} + \text{Capital-Gain Return}$$

Both components must be included.

Arithmetic Average Return

$$\bar{R}_A = (R_1 + R_2 + \ldots + R_n) \div n$$

It measures the average return earned per period without considering compounding.

- Useful for describing average historical return
- Useful for estimating a one-period expected return

Arithmetic-Average Example

Suppose annual returns are: Year 1 = 10%, Year 2 = −5%, Year 3 = 20%.

$$RA = (10\% - 5\% + 20\%) \div 3$$
$$RA = 8.33\%$$

Geometric Average Return

The geometric average measures compounded growth:

$$R_G = [(1+R_1)(1+R_2)\ldots(1+R_n)]^{(1/n)} - 1$$

It represents the constant annual return that produces the same ending wealth.

Geometric-Average Example

$$RG = [(1.10)(0.95)(1.20)]^{(1/3)} - 1$$
$$RG \approx 7.84\%$$

The geometric average is lower than the arithmetic average because it reflects compounding and return variability.

Arithmetic vs Geometric Return

Arithmetic Average	Geometric Average
Simple average	Compounded average
Ignores compounding	Reflects compounding
Usually higher	Usually lower
Useful for one-period expectations	Useful for historical wealth growth
Sensitive to extreme returns	Reflects the actual investment path

Why Volatility Reduces Compounded Growth

Consider a Year 1 return of +50% followed by a Year 2 return of −50%.

Arithmetic average = (50% − 50%) ÷ 2 = 0%
But ETB 100 × 1.50 × 0.50 = ETB 75

The investor loses 25% despite an arithmetic average of zero.

Annualising Returns

For a holding period shorter than one year:

$$\text{Annualised Return} = (1 + R_{\text{period}})^{(\text{Periods per Year})} - 1$$

Suppose a six-month return is 8%:

$$\text{Annualised Return} = (1.08)^2 - 1 = 16.64\%$$

Annualisation Warning

Annualising a short-period return assumes that the result can be repeated. For volatile investments, this may be unrealistic.

- State the measurement period
- Avoid misleading extrapolation
- Use annualised risk with consistent frequency
- Distinguish realised from projected returns

The External Cash-Flow Problem

Portfolio returns become more difficult to measure when investors:

- Add money
- Withdraw money
- Receive distributions
- Transfer assets
- Enter or leave during the measurement period

The timing of cash flows can materially affect investor experience.

Time-Weighted Return

Time-weighted return removes the effect of external cash-flow timing.

1. Divide
Split the evaluation period at each external cash flow.

2. Calculate
Compute each subperiod return.

3. Compound
Link the subperiod returns together.

$$TWR = (1+R1)(1+R2)\ldots(1+Rn) - 1$$

Time-Weighted Example

Subperiod 1

Portfolio grows from ETB 1,000,000 to ETB 1,100,000 → R1 = 10%

Subperiod 2

Portfolio grows to ETB 1,680,000 → R2 = 5%

Contribution

Investor adds ETB 500,000 → new value ETB 1,600,000

Calculate Time-Weighted Return

$$TWR = (1.10)(1.05) - 1$$
$$TWR = 15.5\%$$

The ETB 500,000 contribution does not artificially increase the measured manager return.

Money-Weighted Return

Money-weighted return is the discount rate that equates contributions, withdrawals, distributions and the ending portfolio value.

Money-Weighted Return = Internal Rate of Return

It gives greater weight to periods when more money is invested.

Money-Weighted Example

- ETB 1,000,000 invested at the beginning
- ETB 500,000 added after one period
- Portfolio worth ETB 1,680,000 after two periods

$$1{,}000{,}000(1+r)^2 + 500{,}000(1+r) = 1{,}680{,}000$$
$$r \approx 7.0\% \text{ per period}$$

Time-Weighted vs Money-Weighted

Time-Weighted Return	Money-Weighted Return
Removes external cash-flow effects	Reflects cash-flow timing
Suitable for manager evaluation	Suitable for investor experience
Compounds subperiod returns	Uses an IRR approach
Investor actions have limited effect	Large contributions receive more weight
Industry-standard manager measure	Investor-specific measure

Gross vs Net Return

Gross Return

Performance before management fees and certain expenses.

Net Return

Performance after applicable fees and expenses.

If gross return = 12% and fees and expenses = 1.5%, a simplified net return is approximately:

$$12\% - 1.5\% = 10.5\%$$

Nominal vs Real Return

Real return adjusts for inflation.

$$\text{Approximation: Real Return} \approx \text{Nominal Return} - \text{Inflation}$$
$$\text{Precisely: } 1 + R_{real} = (1 + R_{nominal}) \div (1 + \text{Inflation})$$

A positive nominal return may still represent a loss of purchasing power.

Return-Measurement Pitfalls

Avoid:

- Excluding income
- Ignoring external cash flows
- Mixing gross and net returns
- Comparing different time periods
- Using inconsistent valuation dates
- Annualising very short periods carelessly
- Ignoring currency effects
- Using arithmetic return for compounded wealth
- Treating estimated valuations as actual transaction prices

SECTION III — PERFORMANCE BENCHMARKS

A return is meaningful only when compared with an appropriate standard.

What Is a Benchmark?

A benchmark is a reference portfolio or return used to evaluate performance. It helps answer:

- Did the portfolio outperform?
- Was the return caused by market exposure?
- Did active management add value?
- Was the investment objective achieved?

Characteristics of a Good Benchmark

Relevant
Aligned with the portfolio's opportunity set

Measurable
Return can be calculated reliably

Investable
It could actually be held as an alternative

Specified in Advance
Chosen before the evaluation period

Consistent
Matches the investment mandate

Transparent
Unambiguous and representative of portfolio risk

Types of Benchmarks

Market Index
Broad or specialised market index.

Policy Benchmark
Combination of asset-class indexes based on strategic weights.

Style Benchmark
Reflects a manager's investment style.

Custom Benchmark
Designed for a particular mandate.

Absolute-Return Target
Fixed return or inflation-plus objective.

Peer Group
Performance of similar funds or managers.

Policy Benchmark Example

Suppose the strategic allocation is 60% equities, 30% bonds and 10% cash.

$$RB = 0.60\ R_{Equity} + 0.30\ R_{Bond} + 0.10\ R_{Cash}$$

This reflects the investor's approved long-term asset allocation.

Active Return

$$\text{Active Return} = \text{Portfolio Return} - \text{Benchmark Return}$$

Suppose portfolio return = 12% and benchmark return = 9%.

$$\text{Active Return} = 12\% - 9\% = 3\%$$

Positive Active Return

A positive active return may come from:

- Superior security selection
- Successful asset allocation
- Factor exposures
- Market timing
- Currency positioning
- Higher risk
- Benchmark mismatch
- Luck

Therefore, positive active return alone does not prove skill.

Benchmark Mismatch

A benchmark may be inappropriate if it differs from the portfolio in:

Asset Class
Different opportunity set

Market Capitalisation
Large vs small cap

Investment Style
Value vs growth

Currency
Different currency exposure

Duration and Credit
Different bond risk profile

Geography and Risk
Different regions or risk level

A poor benchmark can create misleading alpha.

Benchmark Changes

Changing a benchmark after observing results can bias evaluation. A benchmark should generally be:

- Selected in advance
- Consistent with the mandate
- Changed only for a genuine strategic reason
- Documented transparently
- Applied consistently

Peer-Group Limitations

Peer comparisons may be misleading because:

- Funds have different mandates
- Risk levels differ
- Asset allocations differ
- Fees differ
- Survivorship bias may exist
- Peer-group composition changes
- The median peer may not be investable

SECTION IV — MEASURING RISK

Performance must be evaluated relative to the uncertainty accepted.

Standard Deviation

Standard deviation measures total return volatility.

$$\sigma P = \sqrt{[\ \Sigma(Rt - \bar{R})^2 \div (n - 1)\ ]}$$

A higher standard deviation indicates greater variability around the average return.

Beta

$$\beta P = Cov(RP, RM) \div Var(RM)$$

Beta = 1
Market-level systematic risk.

Beta > 1
Greater market sensitivity.

Beta < 1
Lower market sensitivity.

Downside Deviation

Downside deviation measures returns below a target or minimum acceptable return.

Harmful Volatility

Only unfavourable deviations are penalised.

Contrast

Standard deviation treats favourable and unfavourable deviations equally.

Downside deviation is used in the Sortino ratio.

Tracking Error

Tracking error measures the volatility of active returns:

$$TE = \sigma(RP - RB)$$

A higher tracking error indicates greater deviation from the benchmark.

- Tracking error measures active risk
- It does not measure total portfolio risk

Drawdown

Drawdown measures the decline from a previous peak.

$$\text{Drawdown} = (\text{Current Value} - \text{Peak Value}) \div \text{Peak Value}$$

Maximum drawdown is the largest peak-to-trough decline during the evaluation period.

Drawdown Example

Suppose portfolio values are 100, 120, 90, 105, 130. The largest decline is from 120 to 90:

$$\text{Maximum Drawdown} = (90 - 120) \div 120$$
$$\text{Maximum Drawdown} = -25\%$$

Recovery from Drawdown

A 25% loss requires more than a 25% gain to recover. If value falls from ETB 120 to ETB 90:

$$\text{Required Gain} = (120 - 90) \div 90 = 33.33\%$$

> *Percentage losses and recovery gains are not symmetrical.*

Value at Risk

Value at Risk estimates a loss threshold over a specified time horizon and confidence level.

> *There is a stated probability that the loss will not exceed a particular amount over the selected period.*

Limitation

VaR does not describe the size of losses beyond the threshold.

Risk-Measurement Limitations

Risk estimates may be affected by:

- Short data histories
- Changing market conditions
- Non-normal returns
- Illiquid assets
- Stale valuations
- Changing correlations
- Extreme events
- Model assumptions
- Inconsistent measurement periods

SECTION V — RISK-ADJUSTED PERFORMANCE

How much excess return was earned for the risk accepted?

Sharpe Ratio

$$\text{Sharpe Ratio} = (R_P - R_f) \div \sigma_P$$

- R_P = portfolio return
- R_f = risk-free return
- σ_P = total portfolio volatility

The Sharpe ratio measures excess return per unit of total risk.

Sharpe-Ratio Example

- Portfolio return = 12%
- Risk-free return = 4%
- Standard deviation = 10%

$$\text{Sharpe} = (12\% - 4\%) \div 10\%$$
$$\text{Sharpe} = 0.80$$

Interpreting the Sharpe Ratio

A higher Sharpe ratio generally indicates better excess return per unit of total volatility. However:

- Negative ratios are difficult to rank
- Results depend on the selected period
- Standard deviation may not capture all risks
- Non-normal returns can distort interpretation

Treynor Ratio

$$\text{Treynor Ratio} = (R_P - R_f) \div \beta_P$$

It measures excess return per unit of systematic risk.

It may be more appropriate for a well-diversified portfolio where firm-specific risk is minimal.

Treynor-Ratio Example

- Portfolio return = 12%
- Risk-free return = 4%
- Portfolio beta = 1.20

$$\text{Treynor} = (12\% - 4\%) \div 1.20$$
$$\text{Treynor} = 6.67\%$$

Sharpe vs Treynor

Sharpe Ratio	Treynor Ratio
Uses standard deviation	Uses beta
Measures total risk	Measures systematic risk
Suitable for a complete portfolio	Suitable for a diversified component
Sensitive to all volatility	Sensitive to market exposure
Based on the Capital Allocation Line	Related to the Security Market Line

Jensen's Alpha

Jensen's alpha compares actual return with the CAPM-required return:

$$\alpha P = RP - [\ Rf + \beta P\ (RM - Rf)\ ]$$

A positive alpha means the portfolio earned more than predicted by CAPM for its beta.

Jensen's Alpha Example

- Portfolio return = 12%
- Risk-free rate = 4%
- Market return = 10%
- Portfolio beta = 1.20

$$\text{CAPM return} = 4\% + 1.20(10\% - 4\%) = 11.2\%$$
$$\alpha = 12\% - 11.2\% = 0.8\%$$

Interpreting Alpha

Positive alpha may reflect:

- Security-selection skill
- Successful timing
- Factor exposure omitted from the model
- Benchmark error
- Higher hidden risk
- Luck

> *Alpha depends on the validity of the model and benchmark used.*

Information Ratio

$$\text{Information Ratio} = (R_P - R_B) \div \text{Tracking Error}$$

It measures active return per unit of active risk. Suppose active return = 3% and tracking error = 4%:

$$IR = 3\% \div 4\% = 0.75$$

Interpreting the Information Ratio

May Indicate

More consistent active performance, better use of active risk, stronger benchmark-relative results

But Depends On

The benchmark, evaluation period, return frequency and stability of active positions

Sortino Ratio

$$\text{Sortino Ratio} = (RP - RT) \div \text{Downside Deviation}$$

- RT = target or minimum acceptable return

Unlike the Sharpe ratio, it penalises only downside volatility.

Sortino-Ratio Example

- Portfolio return = 12%
- Target return = 4%
- Downside deviation = 6%

$$\text{Sortino} = (12\% - 4\%) \div 6\%$$
$$\text{Sortino} = 1.33$$

The M^2 Measure

The Modigliani–Modigliani measure converts the Sharpe ratio into a percentage return.

$$M^2 = Rf + Sharpe\ P \times \sigma M$$

- σM = market volatility

This makes risk-adjusted performance easier to interpret.

M^2 Example

- Risk-free return = 4%
- Portfolio Sharpe ratio = 0.80
- Market volatility = 15%

$$M^2 = 4\% + 0.80(15\%)$$
$$M^2 = 16\%$$

The portfolio would earn 16% after adjusting its risk to the market's volatility under the measure's assumptions.

Performance-Measure Comparison

Measure	Return Comparison	Risk Measure
Sharpe	Risk-free return	Standard deviation
Treynor	Risk-free return	Beta
Jensen's alpha	CAPM-required return	Beta / model
Information ratio	Benchmark return	Tracking error
Sortino	Target return	Downside deviation
M^2	Market-scaled return	Standard deviation

Limitations of Risk-Adjusted Measures

- Historical risk may not represent future risk
- Results depend on data frequency
- Benchmarks may be inappropriate
- Risk may change over time
- Non-linear strategies may produce non-normal returns
- Leverage can distort comparisons
- Illiquid assets may appear artificially stable
- One measure should not be used alone

SECTION VI — PERFORMANCE ATTRIBUTION

Which investment decisions created active return?

Contribution vs Attribution

Performance Contribution

Shows how much each holding or segment contributed to total return.

Performance Attribution

Explains why performance differed from the benchmark.

Attribution may examine asset allocation, security selection, interaction, currency, duration and yield-curve positioning.

Brinson Attribution

A common equity attribution framework separates active return into three effects:

1. Allocation Effect
Weighting decisions across asset classes

2. Selection Effect
Security choices within each class

3. Interaction Effect
Combined effect of both decisions

$$\text{Active Return} = \text{Allocation} + \text{Selection} + \text{Interaction}$$

Attribution Case — Inputs

Asset Class	Portfolio Weight	Benchmark Weight	Portfolio Return	Benchmark Return
Equities	60%	50%	12%	10%
Bonds	40%	50%	6%	5%

Portfolio and Benchmark Return

$$R_P = 0.60(12\%) + 0.40(6\%) = 9.6\%$$
$$R_B = 0.50(10\%) + 0.50(5\%) = 7.5\%$$
$$\text{Active Return} = 9.6\% - 7.5\% = 2.1\%$$

Allocation Effect

Allocation effect evaluates whether the manager over- or underweighted better-performing asset classes.

$$\text{Allocation} = \Sigma\,(wP - wB)(RB,i - RB)$$

For the case: Allocation = 0.5%

The overweight to better-performing equities added value.

Selection Effect

Selection effect evaluates performance within each asset class.

$$\text{Selection} = \Sigma\, w_B\,(R_{P,i} - R_{B,i})$$
$$= 0.50(12\% - 10\%) + 0.50(6\% - 5\%) = 1.5\%$$

Interaction Effect

Interaction captures the combined effect of active allocation and active selection.

$$\text{Interaction} = \Sigma\,(w_P - w_B)(R_{P,i} - R_{B,i})$$

For the case: Interaction = 0.1%

Reconcile Active Return

$$\text{Active Return} = \text{Allocation} + \text{Selection} + \text{Interaction}$$
$$2.1\% = 0.5\% + 1.5\% + 0.1\%$$

The attribution fully explains the difference between portfolio and benchmark return.

Fixed-Income Attribution

Fixed-income performance may be attributed to:

- Duration positioning
- Yield-curve movements
- Sector allocation
- Credit selection
- Spread changes
- Coupon income
- Roll-down return
- Currency exposure
- Trading effects

Bond attribution requires measures different from ordinary equity attribution.

Currency Attribution

For international portfolios, total return may reflect:

Local-Market Return
Performance in the asset's home currency

Currency Movement
Exchange-rate gains or losses

Currency Hedging
Effect of hedges applied

Interaction
Combined asset and currency effects

A strong foreign-market return may be reduced or reversed by currency depreciation.

SECTION VII — INVESTMENT-MANAGER EVALUATION

Distinguishing skill from luck, after costs.

Skill vs Luck

Investment skill should ideally produce performance that is:

- Positive after costs
- Risk-adjusted
- Benchmark-relative
- Consistent with the mandate
- Repeatable
- Explainable
- Supported by a disciplined process

One successful period may reflect luck.

Rolling-Period Analysis

Instead of evaluating only one starting and ending date, calculate multiple overlapping periods — rolling one-, three- and five-year returns.

Consistency
Are results repeated across periods?

Cyclicality
Do results depend on the market cycle?

Start-Date Sensitivity
Do conclusions change with the start date?

Market Conditions
How did the manager perform in different environments?

Performance Persistence

Questions include:

- Does positive alpha continue?
- Does performance survive after fees?
- Does the manager succeed in different markets?
- Is performance concentrated in one period?
- Is the strategy's capacity limited?
- Has the investment team changed?

Historical persistence does not guarantee future performance.

Style Analysis

Style analysis evaluates the exposures that explain portfolio returns.

Value vs Growth
Equity style tilt

Large vs Small Cap
Size exposure

Domestic vs International
Geographic exposure

Equity vs Fixed Income
Asset-class mix

Duration and Credit Quality
Bond risk exposures

Sector and Factor
Systematic exposures

Style drift may indicate deviation from the mandate.

Market Timing and Security Selection

Market Timing

Changing market exposure before expected market movements.

Security Selection

Choosing securities that outperform others with similar exposure.

Evaluation should determine whether performance came from timing, selection, static risk exposure or luck.

Fees, Turnover and Taxes

Gross outperformance may disappear after:

- Management fees
- Performance fees
- Brokerage commissions
- Bid–ask spreads
- Market impact
- Taxes
- High portfolio turnover
- Currency-hedging costs

> *Investors ultimately retain net return — not gross return.*

Qualitative Due Diligence

Quantitative performance should be combined with evaluation of:

Investment Philosophy
Research process and decision discipline

People
Team experience and staff turnover

Governance
Oversight and risk controls

Operations
Operational systems and valuation practices

Compliance
Regulatory and compliance history

Alignment
Business stability and alignment of interests

Common Evaluation Biases

Survivorship Bias
Failed funds disappear from databases.

Backfill Bias
Successful historical returns are added after selection.

Selection Bias
Only favourable managers or periods are studied.

Benchmark Bias
An inappropriate benchmark improves apparent performance.

Valuation Bias
Illiquid assets are valued infrequently or subjectively.

Performance Report Dashboard

A professional report may include:

Returns
Portfolio, benchmark, active, gross and net return

Risk
Volatility, maximum drawdown, tracking error

Risk-Adjusted
Sharpe ratio, information ratio

Positioning
Asset allocation and performance attribution

Costs
Fees and expenses

Governance
Compliance with mandate, management commentary

Integrated Practical Exercise — Data

Suppose the following results are reported for one evaluation period:

Input	Value	Input	Value
Portfolio return	12%	Benchmark return	9%
Risk-free return	4%	Market return	10%
Portfolio std deviation	10%	Benchmark std deviation	15%
Portfolio beta	1.20	Tracking error	4%
Downside deviation	6%		

Integrated Practical Exercise — Student Tasks

- Calculate active return
- Calculate the Sharpe ratio
- Calculate the Treynor ratio
- Calculate Jensen's alpha
- Calculate the information ratio
- Calculate the Sortino ratio
- Calculate M^2
- Interpret each result
- Identify information still needed
- Assess whether the manager demonstrated skill

Instructor Check — Answers

Measure	Result
Active return	3.0%
Sharpe ratio	0.80
Treynor ratio	6.67%
Jensen's alpha	0.80%
Information ratio	0.75
Sortino ratio	1.33
M^2	16.0%

Key Takeaways

- Return must be measured consistently
- Geometric return reflects compounded growth
- Time-weighted return supports manager evaluation
- Money-weighted return reflects the investor's experience
- Benchmarks must match the mandate
- Risk-adjusted measures evaluate return relative to risk
- Attribution explains the sources of active return
- Fees, biases and benchmark choice affect conclusions
- Qualitative due diligence complements numerical analysis

Discussion Questions

- Why can the same portfolio have different time- and money-weighted returns?
- What makes a benchmark appropriate?
- When should Sharpe be preferred to Treynor?
- Does positive alpha prove manager skill?
- How does attribution differ from contribution?
- Why can illiquid portfolios appear less risky?
- How should fees affect manager evaluation?
- How long should a manager be evaluated before judging performance?

Next Chapter — International Investing and Diversification

Chapter 19 will cover:

Global Markets
Global opportunities, developed and emerging markets

Instruments
International equities, bonds, depositary receipts, funds and ETFs

Risks
Currency risk, country and political risk

Diversification
International diversification and global correlations

Investor Behaviour
Home-country bias

Construction
Hedged and unhedged returns, global portfolio construction

THANK YOU

Questions and Discussion

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