

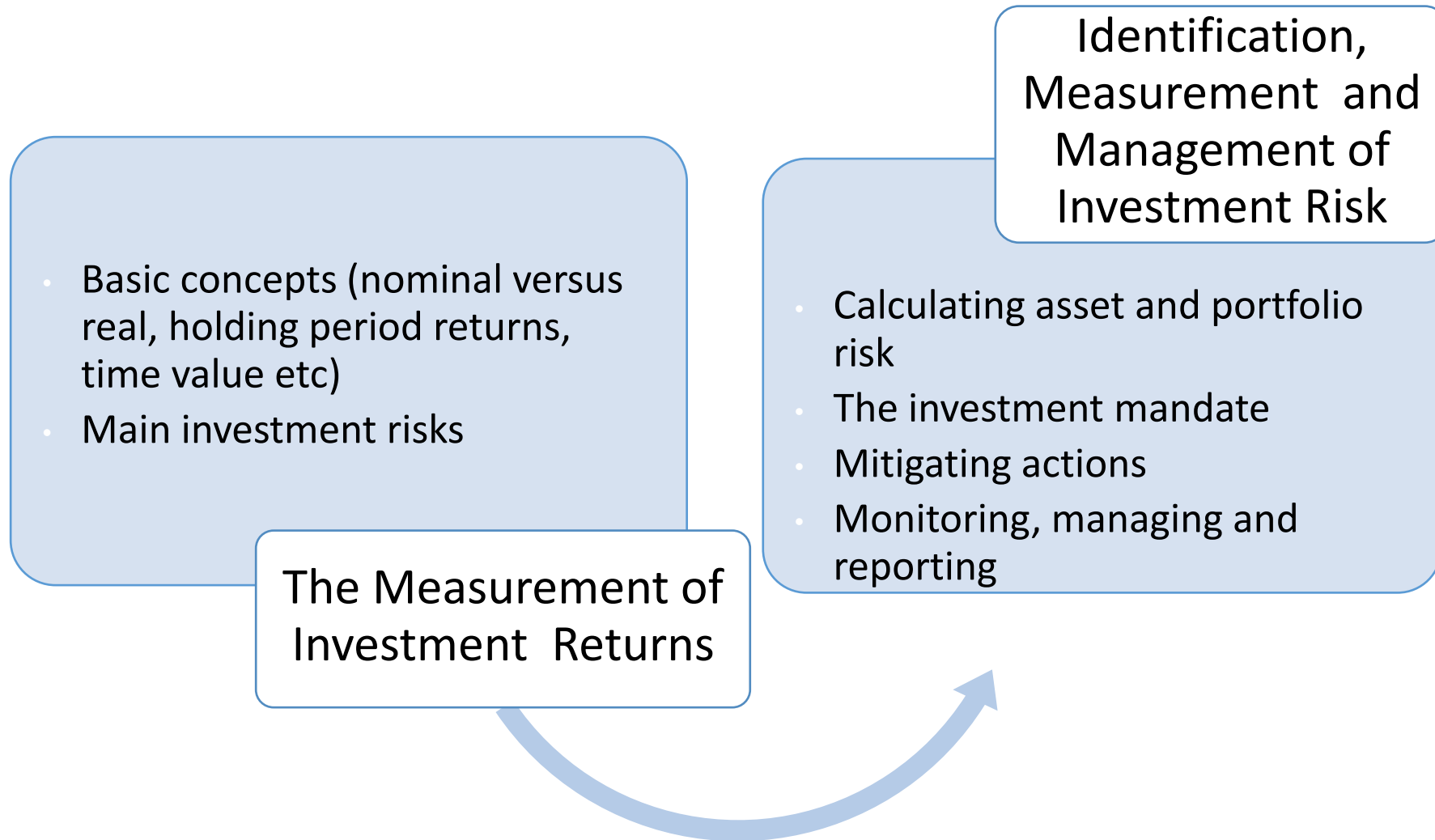


Chapter 6

Investment Risk

Questions - 11





Investment Risk

The combination of risks involved in providing the **right level** of return to the investors

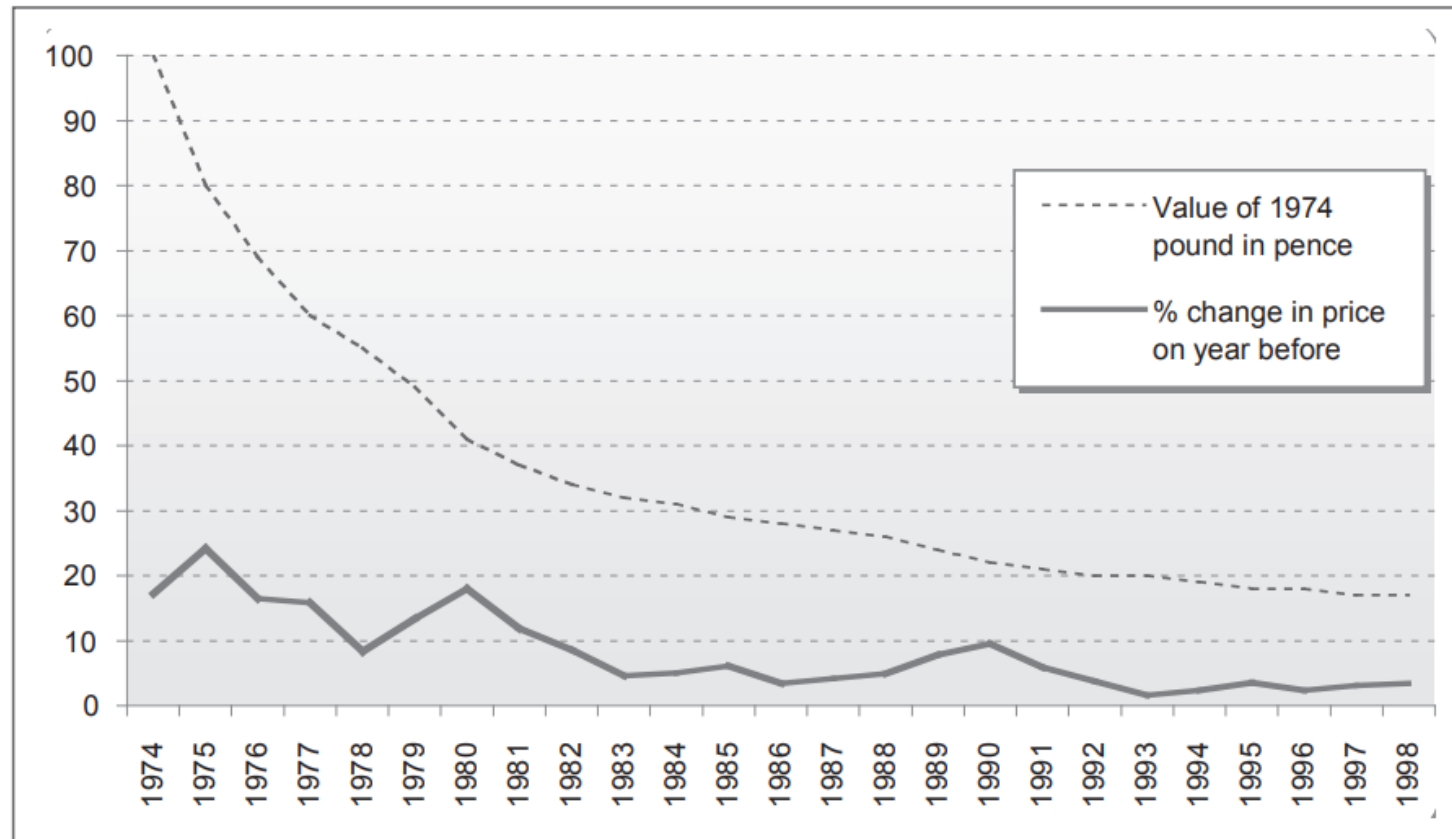


The Measurement of Investment Returns

Inflation

An overall general **upward price movement** of goods and services in an economy

Value of the £, 1974–1998



Basic Concepts and the Measurement of Investment Returns

Nominal Returns

- The return it gives, **unadjusted for inflation**.

Real Returns

- $(1 + \text{real rate of return}) \times (1 + \text{inflation rate}) = 1 + \text{nominal rate of return}$

Total Returns

- The returns on an investment both from its **income production**, and **capital gains/ losses** it generates

Holding Period Returns

- The total **return on an asset or portfolio** over the period during which it was held



Compound Interest

It happens when an investor leaves his **interest invested** with the main deposit instead of **withdrawing** it to spend.

Example: Compound interest

Suppose that £2,000 is invested at 10% interest for two years.

Year 1

	£
Original capital investment	2,000
Interest on investment of £2,000 at 10% pa	200
Total capital + interest at the end of Year 1	2,200

Year 2

Total capital + interest brought forward from end of Year 1	2,200
Interest on investment of £2,200 at 10% pa	220
Total capital + interest at the end of Year 2	2,420



Effects of Compound Interest and the Time Value of Money

Formula

$$S = X (1 + r)^n$$

Where :

S = The **sum invested after n periods**

X = The **original sum invested**

r = The **interest rate (5%)**

n = The **number of periods** over which we are compounding

Example

If we wish to have £14,641 in four years' time, how much money would we need to invest now at 10% interest pa? (Think of this as being the reverse of the compounding calculations we have already looked at.)

Using our compounding formula, $S = X (1 + r)^n$

Where X = the original sum invested

r = 10%

n = 4

S = the sum we want to achieve = £14,641

$$£14,641 = X(1 + 0.1)^4$$

$$£14,641 = X \text{ times } 1.4641$$

$$\text{so } X = \frac{£14,641}{1.4641} = £10,000$$

So £10,000 now, earning interest at 10% pa, is the equivalent in value of £14,641 after four years. We can therefore say that £10,000 is the present value of £14,641 at year four, at an interest rate of 10%.



Variations in the Rates of Return from Asset Classes

Investments in different asset classes produced historical returns in the following ranges

S&P equities are estimated to have returned around **7.8%** per year.

Treasury bills are estimated to have returned around **1.6%** per year.

Corporate bonds are estimated to have returned around **6.1%** per year.



Identification, Measurement and Management of Investment Risk

Main Investment Risks

Currency Risk

- The risk arising from **fluctuations in the value of currencies** against one another.

Interest Rate Risk

- The risk that **interest rates move** against the **investor**

Issuer Risk

- This is the risk that the **issuer of the bond** could default on its obligations to pay coupons or **repay the principal on the bond**



What is Interest Rate Risk?

- A. The risk of price movements that are more uncertain than usual affecting the pricing of products
- B. The risk caused by adverse movements in exchange rates
- C. The risk arising from fluctuations in the value of currencies against one another.
- D. The risk that interest rates move against the investor

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Advantages of holding bonds

Even if the issuer has poor profits each year, it must still pay **interest on its bonds**

A range of income yields to suit different **investment and tax** situations

A higher place in the **pecking order**

Most bonds have a **fixed maturity date**

Useful role to play in portfolios

A secure **home for their funds**

A dependable **level of income**

A source of funds for an **anticipated expense**



Identification, Measurement and Management of Investment Risk

Main Investment Risks

Equity Risk

- **Capital growth** – if a company does well, the price of its **shares should go up**
- **Income** – through the distribution by the company of its **profits as dividends**

Commodity Risk

- The risk of an **adverse price movement** in the **value of a commodity**



Equity Risk

- Investing in equities carries risks that can affect –
- **The Income** – if the company is not as profitable as hoped, the dividends it pays may not keep pace with inflation; they may fall or not be paid at all. Unlike bond coupons, dividend payments are not compulsory
- **The Capital** – the share price may fall, or fail to rise in line with inflation or with the performance of other, less risky investments



Strategic Risk of the Issuing Institution

Shares are issued by companies, and their performance is linked to the fortunes of those companies.

Factors

The nature of their industry and its cyclicalities

The competence of the management

The financial soundness of the company

Growth Risk

Will the investor's shares rise (or fall) in price and will the company make enough **profits to pay steady and rising dividends**

Volatility Risk

The degree to which an **investment is prone to swings in pricing**



Commodity Risk



A commodity is an asset, all elements of which are identical in the market.



Commodities tend to have volatile price movements, often linked to natural events such as harvests



Commodity price risk is the risk of an adverse price movement in the value of a commodity



Property Risk

Property as an asset class is unique in its distinguishing features: Each Property is

Unique in terms of location, structure and design, the market is segmented into a **large number of individual markets**.

Valuation is subjective

Requires **high up-front costs**.

Subject to **complex legal considerations** and high transaction costs upon transfer.

Highly illiquid as a result of not being instantly tradeable.

Not divisible. As property can only be bought in discrete units, diversification is difficult.

The **supply of land is finite** and its availability are **restricted by legislation and local planning regulations**.
Price is determined by changes in demand.



Identification, Measurement and Management of Investment Risk

Main Investment Risks

Property Risk

- Location of the property
- The effect of the use of **the property on its value**
- The **credit quality** of the tenants
- The **length of the lease**.

Liquidity Risk

- The likelihood of being unable to **transform assets into cash** within a preferred time
- **sold for cash** – this is linked to market risk because the investor may need to accept a lower price than anticipated if the need for cash is urgent
- Used as **collateral** against which to secure increased cash inflows



What is Liquidity Risk ?

- A. The risk of price movements that are more uncertain than usual affecting the pricing of products
- B. The likelihood of being unable to transform assets into cash within a preferred time
- C. The risk arising from fluctuations in the value of currencies against one another.
- D. The risk that interest rates move against the investor

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Calculating Asset and Portfolio Investment Risk

Volatility

The volatility in the **value of an investment** can be quantified mathematically by calculating the standard deviation of the values

Low standard deviation implies low risk

An investment with returns that do not vary much from its **average return has a low standard deviation.**

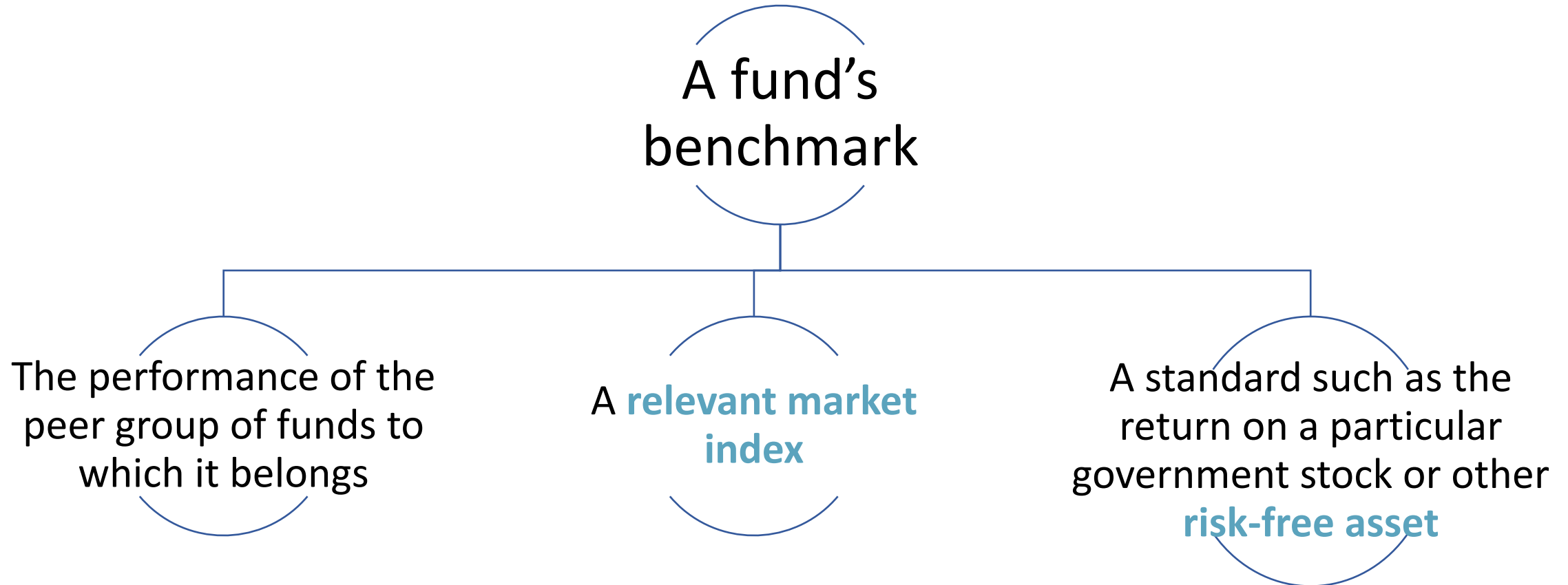
High standard deviation implies high risk

An investment with returns that do vary greatly from its **average return has a high standard deviation.**



Alpha, Beta and Key Investor Ratios

A benchmark is any **standard** against which it is reasonable to **compare the performance** of a share or fund.



Beta



The beta factor **measures the volatility** of an investment relative to the market.

The **higher the value of beta**, the **greater the movement** in its return.

A fund with a **beta factor of one moves** in line with the market or benchmark.

A fund with a **beta factor greater than one** varies more widely than the market or benchmark

A fund with a **beta factor of less than one** fluctuates less than the wider market or benchmark

Beta values for funds are generally calculated over a **36-month period**, from monthly data



Alpha, Beta and Key Investor Ratios

Alpha

The difference between a **fund's expected returns** based on its beta and its **actual returns**.

→ **Definition**

It does not distinguish between **underperformance** caused by **incompetence and fees**.

→ **Disadvantage**

Two further key investor ratios

The Sharpe Ratio

$$= \frac{\text{return on the portfolio} - \text{risk-free return}}{\text{standard deviation of portfolio}}$$

The Information Ratio

$$= \frac{\text{mean of excess returns}}{\text{standard deviation of excess return from the benchmark}}$$



The Sharpe Ratio =

A. $X(1+r)^n$

B.
$$\frac{\text{return on the portfolio} - \text{risk-free return}}{\text{standard deviation of portfolio}}$$

C.
$$\frac{\text{mean of excess returns}}{\text{standard deviation of excess return from the benchmark}}$$

D.
$$\sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

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Private Equity

Private equity is an illiquid asset class consisting of equity securities in operating companies that are not publicly traded on a stock exchange.

Venture Capital

Venture capital is a type of private equity capital, typically provided to early-stage, high-potential, growth companies

Property

Property has consistently provided positive real long-term returns allied to low volatility and a reliable stream of income



Advantages of Venture Capital

Tax advantages

The potential for **higher returns** than can be achieved by mature companies

Lack of correlation with more standard investments



Key Features and Relevance of Other Asset Classes to Investment Risk



ENVIRONMENTAL

Climate change issues

- Firms 'vulnerability due to climate change

Depletion of natural resources

- water scarcity,
- land use
- raw-material sourcing.



SOCIAL

Human capital issues

- Labour management and health and safety

Product liability issues

- product safety, quality, privacy and data safety issues

stakeholder opposition

- local health and demographic risks and controversial sourcing of materials



GOVERNANCE

Corporate governance

- Management structure
- Board-employee relations

Corporate behaviour

- Business ethics
- Anti-competitive practices
- Tax,
- transparency
- corruption
- Financial system instability



Correlation of Performance between Asset Classes

Equity prices could be going up while bond prices are remaining stable and commodity prices are going down.

Asset correlations change over **time**, and the **discipline** of Asset Allocation

Asset Allocation is the **macro equivalent** of diversifying a portfolio to **reduce its risk**.

Asset allocation considers **assessing the prospects** for each of the main asset classes within each of the world's major investment regions against the backdrop of the world **economic, political and social environment**.



Tracking Error

Tracking error is a measure of how closely a **portfolio follows the index** to which it is benchmarked

Historical tracking error is **realised or ex post**

Predictive tracking error is **ex ante**

Historical tracking error is usually calculated as the **standard deviation of returns** relative to the benchmark and is more useful for reporting performance.



Investment Mandate and its Role in Risk Mitigation

A fund's investment mandate determines the fund's aims, the limits within which it is supposed to invest, and the investment policy it should follow.

The
mandate
will
typically
define:

The **fund's aim**

Specific **strategies** it will follow

The **geographic regions** it will invest in

The **sectors** it will invest in

The types of **securities** it will invest in

Allowed to **short sell** and whether it will be **hedged**

Whether it will be **geared** and to what extent

A **benchmark index**

The **maximum error in tracking** the benchmark

Investment restrictions placed on the fund



Systematic and Non-Systematic Risk

- Systematic Risk – risk of being exposed to wider **market movements**
- Non-Systematic Risk – Risk of being exposed to factors which are **specific to securities**

Optimisation and Diversification

- Portfolio construction techniques that obtain the best expected returns from the right mix of **correlations and variances**.
- Portfolio optimisation is often called **mean-variance (MV) optimisation**.



Methods used to Mitigate Investment Portfolio Risk

Portfolio Hedging

- Hedging is a means of **reducing the risk** of adverse price movements by taking an **offsetting position** in a related product.

Short Selling

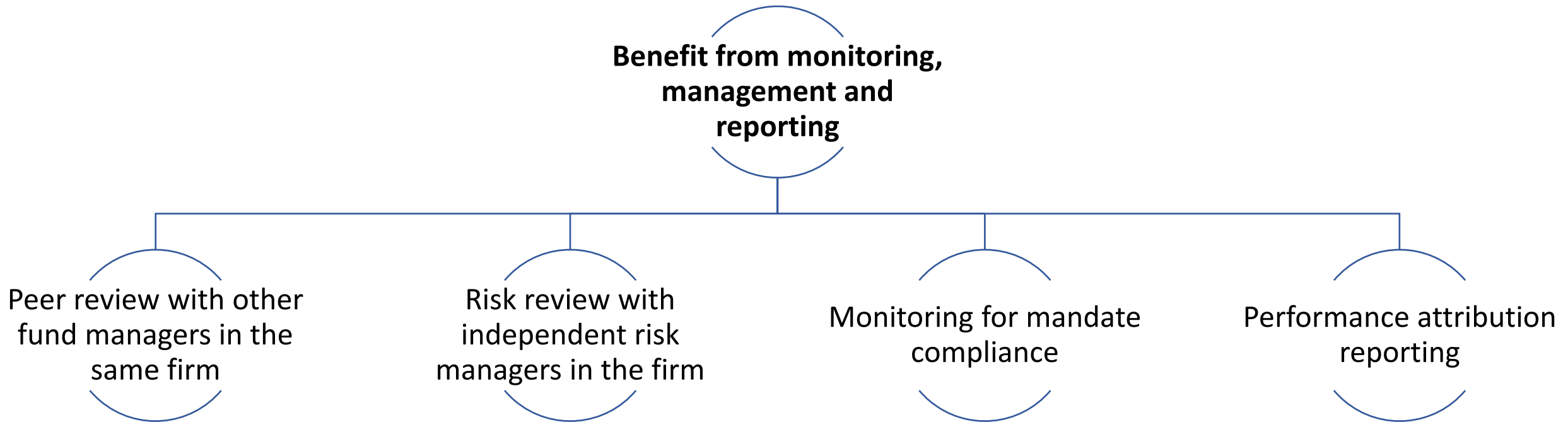
- Selling a security which you do not own, in anticipation of its **price reducing** so that you can buy it back for less than you sold it for.

Risk Transfer

- A portfolio manager may choose to buy or sell protection on fixed income assets whose credit ratings he believes are wrong or about to change in his favour.



Monitoring, Managing and Reporting of Investments



Question Time

Mean-Variance (MV) optimisation is also known as :

- A. Systematic Risk
- B. Non- Systematic Risk
- C. Portfolio optimisation
- D. Portfolio Hedging

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