

CMP Upgrade 2023/24

Subject SA7

CMP Upgrade

This CMP Upgrade lists the changes to the Syllabus objectives, Core Reading and the ActEd material since last year that might realistically affect your chance of success in the exam. It is produced so that you can manually amend your 2023 CMP to make it suitable for study for the 2024 exams. It includes replacement pages and additional pages where appropriate. Alternatively, you can buy a full set of up-to-date Course Notes / CMP at a significantly reduced price if you have previously bought the full-price Course Notes / CMP in this subject. Please see our 2024 *Student Brochure* for more details.

This CMP Upgrade contains:

- all significant changes to the Syllabus objectives and Core Reading.
- additional changes to the ActEd Course Notes and Assignments that will make them suitable for study for the 2024 exams.

1 Changes to the Syllabus objectives

This section contains all the *non-trivial* changes to the Syllabus objectives.

The syllabus objectives have changed mainly in terms of command words (for example 'understand' in place of 'discuss'). However for completeness, since there have been many such changes, the full syllabus is included below. Note that objective 3.2.3 is a new objective.

Objectives

1. The framework for investment management (30%)

1.1. Describe the financial markets in the developed and emerging economies, including:

- public and private market assets *Chapter 4*
- over the counter and exchange traded derivatives *Chapter 5*
- the historic behaviour of major asset classes and market indices. *Chapters 4, 11*

1.2. Describe the key domestic and global influences over the economic and capital markets environment in the United Kingdom and other jurisdictions from:

- global economic trends *Chapter 4*
- Central Banks *Chapters 3, 8*
- government policy *Chapter 8*
- market regulation *Chapters 7*
- regulatory capital requirements (including the Basel Accords and Solvency II).
Chapters 3, 7

1.3. Describe how the principles of a legislative, taxation and regulatory conduct framework apply to investment management in the United Kingdom and other jurisdictions.

Chapters 3, 7, 12

1.4. Understand the key principles of corporate finance including capital structure and financing, and how these relate to different asset classes.

Chapter 6

2. Meeting investor requirements (35%)

Understand the investment needs of a range of asset owners and financial institutions and how an investment strategy can be created to meet those needs.

- 2.1. Understand the principles and objectives of investment management, along with the main factors influencing investment strategy, and analyse the investment needs of an investor.
- 2.1.1. Understand the particular liability characteristics, investment requirements and the influence of the regulatory environment (including capital requirements) on the investment policies of the following institutions:
- a life insurance company transacting with-profits, non-profit or unit-linked business
 - a non-life insurance company
 - a defined benefit pension fund
 - a defined contribution pension fund
 - an endowment or charity
 - a bank, hedge fund or other proprietary investor
 - other unconstrained investors, including a sovereign wealth fund.
- Chapter 3*

3. Management and risk control for an investment manager (35%)

Understand how an investment management company operates and the issues it needs to consider when designing or managing investment portfolios.

- 3.1. Understand the principal approaches and techniques in investment portfolio management.
- 3.1.1. active management approaches, both within and across asset classes, and over different time horizons. *Chapters 9, 10, 11*
- 3.1.2. passive management and quasi-passive management including factor-based approaches. *Chapter 11*
- 3.1.3. investment risk control techniques and risk-based portfolio construction approaches. *Chapter 11*
- 3.1.4. the impact of environmental, social and governance (ESG) factors to investment performance and different approaches to incorporate ESG factors. *Chapter 11*
- 3.1.5. derivative based strategies for risk taking or for risk mitigation. *Chapters 5, 11*
- 3.1.6. liability benchmarking or replicating portfolio as part of an investor's investment strategy. *Chapter 11*
- 3.1.7. psychological aspects, including behavioural finance, which influence investor behaviour. *Chapter 10*
- 3.2. Understand the techniques used for investment management assessment and selection.
- 3.2.1. methods of organising the investment management of a large portfolio. *Chapter 12*
- 3.2.2. structure of a typical institutional investment department. *Chapter 12*

- 3.2.3. fund-of-funds and outsourced approaches to investment management, such as fiduciary management and outsourced CIOs. Chapter 13
- 3.2.4. function of a performance measurement service. *Chapter 13*
- 3.3. Understand the impact of technology on investment management, including:
- trading in derivative, equity and bond markets
 - product development. *Chapters 2, 3, 5*

2 Changes to the Core Reading

This section contains all the *non-trivial* changes to the Core Reading.

Chapter 1

Section 1.1

The first sentence of the paragraph on personal pensions now reads:

Personal pension schemes are typically run through insurance companies or wealth management companies and self-select fund platforms.

Chapter 3

Section 9

The first paragraph on Banks has been updated to include the bankruptcy of the three US banks in 2023, and now reads:

9.1 Understanding how banks work

The key feature of retail and commercial banks is the way they take in short-term deposits and transform these into longer-term loans. Understanding this ‘maturity transformation’ process gives clarity on the risks banks must manage and the regulations designed to make them safer. Bank that fail to manage this maturity mismatch are exposed to the risk of a bank run, where many depositors want their cash back at the same time and the bank does not have appropriate short-term assets to meet these. A bank run is often terminal for a bank with several mid-tier US banks suffering this fate in 2023.

In the middle of section 9.2, there is a paragraph that references Northern Rock. An additional sentence has been added, and the paragraph now reads:

Finally, the government can stop a liquidity crisis by essentially nationalising a bank, as it did in the UK for Northern Rock building society and Royal Bank of Scotland. Once the government owns the bank, depositors stop fearing for the return of their money and the bank run stops. A bank run can also be stopped by arranging a takeover of an affected bank by a (usually much larger or significantly better capitalised) rival which likewise gives depositors confidence their money is now safe. Shareholders of the bank are typically left with little or nothing in this scenario.

The ActEd self-assessment question in the central bank section has been reworded to include the current higher short-term interest rate environment. It now reads:



Question

Why have central banks been criticised as transforming themselves into investment managers?

Solution

When a central bank embarks on a 'QE' strategy, it involves borrowing large amounts of money and buying large government bond portfolio. The central bank is exposed to the risk that government bonds underperform cash because it owns a massive portfolio. The money 'created' to carry out QE activities is essentially borrowed at overnight rates, which were extremely low, but are now quite a bit higher. The revenue generated when government bond yields are higher than the overnight deposit rate can be viewed as the profits of the QE strategy (in the UK, 2009 to 2021). When the government portfolio yields less than the overnight rate (2022 onwards), the loss on the portfolio increases the government's deficit.

The transformation into investment manager can go further if the QE strategy involves buying other assets such as corporate bonds, and even ETFs containing non-bond assets. The profitability of the exercise will be judged in the longer term, but will rely greatly on the choice of assets, the choice of term, and the timing of the expansion or contraction of the activity.

QE activities often account for the lion's share of many central banks' balance sheets at the present time, so the profitability of these activities is of great importance for all taxpayers.

QT aims to sell down these portfolios, but can only be actioned gradually over time.

Chapter 4

Section 5

The first few paragraphs have been updated with current market sizes, and now read:

The term 'fixed income' markets is used here in the broadest possible sense, to include bonds, loans, debt and other instruments involving an initial exchange of principal between the investor and the borrower, and not only those where the interest payments are fixed. The key difference between a fixed income security and an equity security is that the former is a liability to a company and the latter is ownership of a company.

Fixed income markets are often less familiar to ordinary (individual) investors – but the markets are bigger, and sometimes much bigger, than equity markets in most countries.

The largest government bond market in the world is the US followed by China. Other large markets include Japan, Italy, Germany, France and the UK. The US also has the world's largest government strips market.

In a number of important countries, including Japan and Germany, maturities rarely exceed ten years. However, in the US and in France, maturities extend up to thirty years. A deep bond market like this can influence other financial products. For example, in the US a

typical home mortgage might have a rate that is fixed for 30 years. In the UK it is unusual to have fixed rates beyond 5 years.

Section 8

A new section has been added to section 8 on cryptocurrencies, included below along with the ActEd description:

8.1 Cryptocurrencies

In recent years various forms of digital currency have emerged, such as Bitcoin. These are usually based on a form of decentralised ledger or blockchain technology. Their highly volatile price has made them a favourite among speculative retail investors however as a currency they remain deficient – not least because of this volatility. Most people would find it disturbing to have their savings or wealth change materially overnight due to fluctuations in the value of a cryptocurrency. They can be used as a medium of exchange although their ‘non government’ nature has arguably made them more attractive for transactions that may not be 100% legal. They have limited use and appeal for institutional investors.

Another problem with cryptocurrency is the fact that it is necessary to convert standard currency into a crypto ‘wallet’ and then to convert it back at some point. This exposes the user to the risk that the company conducting this business goes bust or is exposed to fraud or cyber-attack. However, there are countries that have tried to boost the use of cryptocurrency by accepting it for local transactions, and there have been companies that have openly accepted cryptocurrency in return for their products. Other central banks have actively strived to discourage individuals and companies from using crypto, saying that the risks of fraud and volatility are too great and represent a systemic risk.

A Central Bank Digital Currency is very different, as it is not necessarily a distributed ledger, and transactions are monitored and controlled by the Central Bank. The currency can also be created by the Central Bank, so there may not be a finite supply of them over time.

In addition, the charts in the Core Reading at the end of this chapter have been updated and are attached as **replacement pages** at the end of this upgrade note.

Chapter 7

Section 3.5

A new paragraph on climate change has been added:

Climate change is also a matter of increasing concern for asset owners – both institutional and individuals – and as a result their agents (like asset managers) are increasingly expected to report on as well as have practical plans for how they are engaging with investee companies to monitor and reduce their impact on climate change. For asset managers at a minimum this means developing appropriate monitoring systems and tools (or using third party providers) and being able to give evidence to their clients on how they are engaging with corporate managements.

Chapter 8

Section 3.3

The section on 'Impact on price inflation' has been deleted.

In the same section, just before the section 'Influence of the media', a new paragraph has been added, which (along with the ActEd text) reads as follows:

3.5 Exiting QE

After a prolonged period of little or no inflation, recent years have seen a return of inflation as an issue for Central Banks, particularly in Western countries. After initially rising relatively slowly, a sharp spike in energy and food prices in 2022 caused a sharp jump in inflation rates to levels not seen since the 1970s. Central Banks responded by raising interest rates – effectively ending the policy of QE.

In doing so, Central Banks have had to finely balance the speed of (short-term) rate increases against the ability of the economy to absorb the higher borrowing costs, which in turn affects default rates and bank funding costs. The collapse in 2023 of several smaller US banks and Credit Suisse, a larger Swiss one, can be traced back to an inability to cope with higher rates within the rapid timeframe for institutions with more aggressive business models or weaker risk oversight.

The US banks referred to above invested new funds that they received during the pandemic in long-term US government bonds. These bonds fell sharply after the pandemic, partly due to the central banks selling their bond portfolios, and partly due to inflation. This left the commercial banks with unrealised losses. When depositors learned of the unrealised losses they removed their deposits very rapidly, leading to the collapse of the banks in question.

The charts in section 3 of this chapter have been updated and are attached as **replacement pages** at the end of this upgrade note.

Section 5

A new section has been added, just before section 4 (now section 5) 'Political and fiscal influences on markets'. It is included below:

4 Central banks as directors of market movements

Over the past 30 years, central banks have come to be viewed as key influencers of market movements by using monetary policy – and specifically lowering interest rates in times of stress – to cushion the markets from excessive negative returns when faced with macroeconomic shocks. The ‘Greenspan Put’ was an example of this, named after Alan Greenspan who was chair of the Federal Reserve from 1987 to 2006. Throughout his tenure, he sought to support the US economy by actively using the federal funds rate and other policies to buoy the markets during times of stress. Investors came to expect the Fed to ‘ride to the rescue’ whenever there was a shock which became self-fulfilling, *ie* markets declined less than they might have because investors expected the Fed to intervene to prevent a material negative return.

Central banks also determine investor sentiment to a large extent. Comments from central bank officials are carefully scrutinised (over-analysed) for potential information about the future direction of interest rates and any suggestion of a faster than expected increase (a ‘hawkish’ statement) is viewed negatively, often resulting in a market sell-off. Conversely, benign statements suggesting lower rates (a ‘doveish’ statement) tend to buoy the markets.

Chapter 11

Section 4.1

At the very end of this section a new paragraph has been added:

The EU’s Sustainable Finance Disclosure Regulation (‘SFDR’) is another example of regulatory guidance regarding ESG factors. It requires financial market participants, financial advisers and asset managers to publish information about their policies on the integration of sustainability risks into their investment decision-making and investment advice.

Section 4.2

A paragraph has been extended and now reads:

Another perspective is that selecting companies with strong ESG credentials tilts the portfolio towards companies which may be more successful in future (or stay in business for longer) and therefore the ESG constraints act as a filter to identify future profitable enterprises. Yet another perspective is that taking account of ESG considerations may harm the asset owners in indirect ways. For example, the members and beneficiaries of a pension fund in the coal industry may find it problematic if the scheme’s investment policy prevents it from investing into their industry, thereby removing capital from their employer and threatening their jobs. See the Appendix for the results of some empirical studies on the impact of ESG.

Section 8.6

The first paragraph in the following section has been enhanced and now reads:

Historical development of LDI

LDI has been a growing choice for defined benefit pension funds wanting to reduce the investment risk inherent in their portfolio, particularly due to future changes in interest rates or inflation. In the UK, according to a survey by KPMG, the amount of fund assets managed as LDI between 2011 and 2016 increased from around £400bn to nearly £900bn, with the number of schemes using it more than tripling over the same period. The UK market has tended to focus on achieving an interest rate and inflation hedge using government bonds and swaps, typically using leverage. This approach (by employing leverage) is not without risk as was illustrated during the 'mini budget' of 2022 where rates increased rapidly and some schemes and pooled LDI funds were unable to post the necessary collateral.

Section 11.6

A new section has been added to the chapter, and reads as follows:

11.6 Sustainability risk

In recent years the concept of sustainability risk has gained increasing traction among regulators, asset owners and asset managers. Sustainability risk broadly encompasses the probability of material losses relative to the expected return of an investment that are caused by ESG issues. Common sustainability risks are:

- **Climate risk:** The risk associated with physical impacts due to climate change, such as storms or flooding, which impact on businesses' ability to function, on their supply chains or customers.
- **Transition risk:** The risks arising from a transition to a low-carbon economy in order to mitigate climate change. This might include obsolescence of certain technologies or increasing regulation and higher cost of capital associated with 'undesirable' industries, such as fossil fuel mining.
- **Social risk:** A broad range of factors, traditionally considered 'non-financial' that can impact an issuer's operational effectiveness as well as its public perception, from things like labour relations and community relations.
- **Governance risk:** Investors may suffer losses due to corporate malfeasance which are enabled by insufficient board independence, weak oversight by senior management, poor audit or tax management, and so on.

Regulators are increasingly expecting asset managers to explicitly consider and report on their sustainability risk management. The EU's SFDR mentioned in Section Error! Reference source not found. is an example of that.

3 Changes to the ActEd material

This section contains all the *non-trivial* changes to the ActEd text.

There have been some minor updates to the wording on events such as BREXIT and inflation levels to reflect the changes in circumstances and changes in these variables.

ActEd Course Notes

Chapter 8

Section 6 (previously section 5)

Some revised ActEd questions and solutions have been introduced to the chapter to reflect the amount of QT (rather than QE) activity in the world.



Question

Discuss the reasons why QE became the dominant monetary policy in developed countries from the financial crisis in 2008 until the end of Covid in 2021. Discuss why QT is now commonly undertaken in developed economies.

Solution

Why QE became the dominant policy

One of the main reasons is that the other traditional tool, lowering and raising short-term overnight interest rates, became constrained by the fact that rates in most developed countries were close to or at zero. If central banks wished to stimulate growth (through borrowing) then there was no more scope for interest rate reductions. QE is then the tool of choice as its use is not constrained. A central bank can theoretically increase its balance sheet indefinitely as it is not subject to regulatory constraints such as Basel II or Basel III.

A second reason is that the developed countries found that the currencies of countries that did not embark on QE strengthened on the FX markets, causing difficulties for exporters, and causing an increase in imports from overseas. It therefore became difficult to resist the trend when other countries were engaging in QE. This was linked to the fact that some central banks believed that competitive devaluation of their currency was the right thing to do at that stage in the economic cycle.

A third reason was the threat of deflation. This has been considered to be a danger since various economies became stuck in a devaluation 'spiral', whereby consumers put off any purchases because they believed that prices would be lower in a year's time. This further weakened spending and therefore caused companies to further decrease prices to sell their products, and hence deflation became worse. Many developed country central banks believed that QE was a way to avoid this, by ensuring that the commercial banks had plenty of scope to increase their lending books and expand money supply.

A fourth reason is perhaps that QE led to a catch-22 situation, whereby if a central bank that had undertaken significant QE stated that the policy is to end (tapered) or be unwound (Quantitative Tightening), the bond markets became very nervous. This left the central bank as a large holder of government bonds, exposed to large losses (which are transferred annually to the government that underwrote the policy).

Why QT is now common

The money supply of most western economies was significantly expanded in the years from the 2008 financial crisis leading up to 2021, and the inflationary impact took a long time to materialise. But after the pandemic, as economies began to return to normal, inflation rose rapidly, and became difficult to control. The Ukraine war then added some cost-push inflationary pressures to the system, leading to a situation where inflation has become hard to contain. Central banks can use short-term interest rates, but these impact mortgage borrowers more than other individuals. Governments can use tight fiscal policy, but western governments are already raising more tax from their economy than they have in post-war history; raising more risks a severe recession. Cutting public spending is proving politically unpalatable. Which leaves the option of reducing money supply gradually through QT.

3.7 Quantitative Tightening (QT)

Although the bulk of the Core Reading in this chapter refers to QE, it is worth thinking about how the economy will be influenced by QT as central banks around the globe try to unwind the massive government bond portfolios that they have acquired over the last decade at relatively low long-term yields. During the Covid period, when governments wanted to borrow very heavily, central bank policies were very accommodating, and most central banks printed as much money as the government wanted to borrow, providing a ready investor to complement the government which was a heavy issuer. This resulted in a massive increase in the bond portfolios that central banks owned, all invested at historically low long-term yields (which is good for the government, but bad for its central bank). The printed money to buy the government bonds is financed at short-term floating rates, so when inflation began to rise in 2021, central banks had a difficult conundrum. If they raise short-term rates to tackle inflation, they push their own bond portfolios into a sizeable revenue loss. These losses from the QE bond portfolio have to be compensated by the government, adding to the government's already sizeable deficit. So central banks will simultaneously sell down the government bonds for cash which is used to pay off the financing overdraft, and at the same time raise short-term interest rates to counteract inflation pressures. Selling the bond portfolio (*ie* QT) will reduce money supply, and therefore be deflationary, but it will also be recessionary. Higher short-term rates will reduce economic growth and reduce inflation. The combination can have quite a severe impact on the economy.

Selling the bonds is also not as easy as it seems. Governments around the world have not managed to balance their budgets, and are overspending by quite large amounts as at the time of writing. This means that they must issue a lot of bonds on the stock market to finance the deficit. However, there is no longer a central bank in the market buying those bonds. In fact the central bank is also a seller, which can lead to a very difficult market in government bonds.

LDI crisis

It was partly this market problem that led to the spike in yields in the UK in September 2022, when gilt prices fell too fast for market participants to digest. The UK mini-budget that was announced increased investors' fear of higher government borrowing, and generated a wave of negative sentiment about gilt prices. As gilt prices fell, collateral on swaps and geared LDI products rocketed upwards, and gave institutional investors real problems raising the cash quickly enough to avoid technical default. A cycle arose where institutions sold bonds to raise collateral cash, but by selling the bonds they pushed prices down further, which raised the amount of collateral cash required even further. The only way out of the cycle was for the central bank to step in with printed money and become a bond buyer. Institutions have been asked to stress test their portfolios for an even greater rise in government bond yields to check they have sufficient liquid assets.



Question

Discuss the trade-off that a Central Bank faces in an inflationary environment between raising short-term interest rates and unwinding their QE bond portfolio (QT).

Solution

Short-term interest rates directly impacts the money people have in their pocket, and therefore directly influences inflation. Increasing short-term rates also raises the value of the national currency which makes imported goods fall in price and therefore impacts cost-push inflation.

QT involves selling the bonds that the Central Bank owns and using the cash to pay down the Central Bank overdraft, so it reduces money supply in the economy. As money supply reduces, according to economic theory, demand pull inflation should also reduce. But the link between demand-pull inflation and money supply is less rigid in the short term, so QT will only have an impact over the longer term.

Raising short-term interest rates will increase the amount that the Central Bank has to pay on the overdraft it created to buy the government bonds. When they rise above the average return on the bond portfolio, the QE bond portfolio will make a revenue loss, which will have to be financed annually by the government, adding to the government's deficit.

Selling government bonds at the same time that the government is selling government bonds will make it harder for both entities to achieve their goal.

Some inflationary measures are impacted by money supply and short-term interest rates, but others are not. For example rising oil prices are due to international supply and demand issues, and raising interest rates or selling QE bonds will have no impact at all on this source of inflation.

If selling bonds pushes bond yields up significantly, it can push up the interest cost of servicing the government's debt and make the deficit worse. If the government deficit, or falling bond prices has a knock-on impact on the national currency, then it may fall, causing additional cost-push inflation and negating the impact of the Central Bank bond sales.

It is complex!

Chapter 9

Section 5

There is an ActEd section on topical issues, which has been updated. It now reads:

5 Recent topical issues

By definition, these will change with the passing of time, but at the time of writing (June 2023) the major issues are:

Inflation

Due to a huge amount of Quantitative Easing (QE) in almost all major economies, there is a great deal of money in a great many accounts, all chasing a finite supply of goods, and this caused significant demand-pull inflation and supply chain bottlenecks as economies emerged from the pandemic. Central banks believed that this was a temporary feature, increased by Ukraine commodity supply issues (which added 'cost-push' inflationary pressures to the mix). As a result, interest rates remained low for too long, and inflation climbed rapidly. Central Banks are now tackling this issue as a priority, trying to avoid inflation becoming endemic in the western economic system. But it is certainly the case that institutions are once again very concerned about their inflation-matching strategies.



Question

A UK pension scheme wishes to improve its inflation hedging strategy. What instruments could act as good inflation-hedging assets?

Solution

Good inflation-hedging assets

- Index-linked bonds, which are available in various terms in the UK and are relatively marketable.
- Infrastructure bonds, which are relatively long term, can be found in reasonable size, but are usually unmarketable.

- Property assets, where rents should rise in line with inflation. Although these should match inflation over the long term, the short-term price fluctuations may make this category a poor hedge.
- Inflation swaps, which offer actual inflation on one leg in return for a fixed stream ('expected inflation'). These would need to be combined with a government bond to supply the fixed stream. They are relatively easy to undertake in significant size, but are difficult to exit from.
- Index-linked bonds of overseas (non-UK) governments. Much inflation is global, and caused by commodity price rises, labour cost increases, climate costs, *etc*, so any index-linked bonds should provide high correlation to UK index-linked bonds. There would be a currency risk. However, according to purchasing power parity, the currency should hedge UK inflation in the longer term. If the UK has higher inflation than the overseas country, its currency should be weaker, and the overseas currency should be stronger. So the additional return on the currency should make up for the lower return on the overseas index-linked bonds.
- Liability-driven pooled funds that aim to give index-linked returns. These funds are offered by fund managers and will contain inflation-linked securities and derivatives, but they benefit from being simple to purchase and value, and may have improved marketability.

Fortunately we have not seen currency crises in the major economies which can add further cost-push inflationary pressures to the mix.

Central Banks combat inflation by increasing short-term rates, which discourages individuals from borrowing, and encourages saving. However, this impacts only a certain part of society, and is not very effective. Quantitative Tightening (QT) reduces money supply which should over time impact inflation, but the amount of money printed is so large that it will take over a decade to reduce the additional supply in a meaningful way. It is also difficult when governments are overspending and borrowing. QT also has to be reversed when a banking or other financial crisis erupts (such as the LDI crisis in the UK), which can undo much of the tightening that had been done to that date. Other policies for tackling inflation involve strengthening the national currency, and fiscal austerity.

Government overspend and outstanding debt

This has been an issue for more than a decade in most major economies, and the debt outstanding has become very large indeed. Credit quality concerns have not been a major issue so far but it is worth considering how institutions may react if credit concerns were to surface.



Question

A UK pension scheme wishes to reduce its credit exposure to government credit. Describe the ways that this can be achieved and the issues that would occur.

Solution

Reducing government credit exposure

- Corporate bonds, both quoted and unlisted (such as infrastructure debt) would be a good alternative. Capacity would be a problem in many markets, and the fact that many infrastructure debt issues rely on a government or local government income streams. The liquidity would be greatly reduced and a lot more research would be required by the scheme.
 - Receive fixed, pay floating swaps provide a means of replicating the cashflows on a fixed coupon bond. The strategy does rely on the scheme being able to generate floating interest on the uninvested funds so that it can pay the floating leg of the swap, but it succeeds in replacing government credit with bank credit.
 - Overseas bonds with currency hedging derivatives would generate a fixed return and would avoid domestic government credit exposure. The currency hedging programme would be complex and involve further credit exposure, and it would have to be dynamically reviewed to ensure that all currency exposure was eliminated.
 - Long term property leases with upward-only rent reviews should provide an income yield that will be higher than government debt and should only rise over time. This method exposes the scheme to void risk and to uncertainty about the property value at the end of the lease term.
 - Structured products will provide bond-like exposure, but these often invest in government bonds as well as swaps, and so the credit exposure is not avoided.
 - Cash plus long bond futures will give an approximate government bond exposure, but will be restricted by the range of bond futures available in the market, and by capacity. The cash would also have to be securely invested to give a risk-free return.
-

Trade disputes

Relations between the US and Europe and their main trading partners in Asia have been strained. Trade sanctions and trade barriers have been erected. Such trade barriers can lead to increases in prices if overseas competition is eliminated from a market.

LDI policies

Following the problems in 2022 in the UK, where pension funds with derivative-based LDI strategies experienced severe liquidity problems, there has been a much greater focus on the availability of cash for collateral purposes. Asset classes such as commercial property have been very unpopular as they cannot be easily or quickly sold to raise cash to fund losses. Institutions have been running much more severe stress tests to ensure that they can raise collateral when required, and it is likely that gearing levels will reduce over time.

Chapter 13

Section 0

There has been a paragraph added to explain the meaning of the term used in the new syllabus objective. It reads:

The syllabus objective refers to 'outsourced CIOs' which is short for outsourced Chief Investment Officer. It means that the pension scheme outsources some or all of the investment decision making function to an asset manager or investment consultant, who will then hire and fire managers, and monitor and report on the performance of the asset managers on behalf of the fund sponsors or trustees.

4 Changes to the X Assignments

Assignment X1

Question X1.2 has been completely rewritten. X1.5(iii) has been changed so that the yields reflect current market norms. **Replacement pages** are attached at the end of this upgrade document.

Assignment X2

The yields in X2.1(iii) have been changed to reflect new market norms. Also X2.2 has been adjusted so that the swaption reflects current market yields, and the calculations have been revised. **Replacement pages** are attached to the end of this upgrade document.

Assignment X4

Question X4.1 has been updated to reflect the fact that QE is no longer carried out and has been replaced by QT. Most parts of this question have been rewritten. **Replacement pages** are attached to the end of this upgrade document.

Assignment X5

The swap in X5.2 has been changed from 1.8% to 4.5% and the maths has been updated and changed in the solutions. **Replacement pages** are included.

Assignment X6

The economic discussion in X6.1(iv) reflects the new interest rates, QT and the impact on the buyout market. The solution to this part now reads:

Solution X6.1(iv)

Risks and governance issues that are removed by a buyout

A buyout involves the life company assuming the liability to pay the pensions of a block of members to remove that liability from the scheme. [½]

Only a subset can normally be bought out, as there may be some liabilities which are still uncertain ... [½]

... such as active members, deferred members, or other salary-related benefits or discretionary benefits. [½]

There are a lot of risks that the scheme would no longer have to bear, including:

- political risks from government changing minimum benefits or increasing administration costs [1]
- duration risk from the mismatch between the term of liabilities and the term of assets [½]

- inflation risk if any liabilities bought out are linked to inflation or LPI [½]
- longevity risk [1]
- expense risk from the cost of managing the assets, and communicating with members [1]
- legal risk from any errors in administration, data breaches ... [½]
- market risk if any assets are not matching the liabilities [½]
- credit risk from default within the asset portfolio, including government default [½]
- liquidity risk from having to have cash resources to pay the benefits, and maintain collateral accounts for derivatives. [1]

The costs of paying the pensions would be assumed by the life company as well as the regulatory burden of ensuring that the asset portfolio is sufficient to meet the benefits. [1]

The scheme would be able to reduce the size of the portfolio that it manages, and therefore reduce the burden of manager selection, hiring and firing, ... [1]

... as well as having to train trustees in the business of asset management. [½]

There would still (probably) be a rump of liabilities that could not be bought out, which may cost much more as a proportion of the funds under management. [½]

Costs involved

The largest cost would be the cost of making the scheme fully funded. This would be potentially quite large and would involve a large cash transfer from the sponsor, or an asset transfer. [1]

In addition to that, the costs of negotiating the deal, and having competitive bids (which may not all be comparable), as well as the management time, need to be considered. [1]

Getting clean data is also a costly undertaking. [½]

There are many providers in the market these days, and potentially a lot of interested parties to discuss with. [½]

In addition, there would be the costs of arranging the portfolio into one that could be accepted as payment by the life company, ... [½]

... which include:

- shifting into bonds and out of any property, equity or infrastructure assets that the life company is not able to value or sell easily. [1]
If the scheme is large, this could push market prices. [½]
- the costs of removing any overseas currency exposure (if the scheme has mainly domestic liabilities). [1]

Handling the media, and negotiating with other interested parties would all take time and cost money. [1]

Administrative problems

While the bidding process is underway, the company would have to be careful with data quality that it sends to the bidding companies ... [½]

... as well as data security. [½]

The process would involve a clear timetable, whereby members are notified at an appropriate time, and unions are informed. [½]

The unions and credit rating agencies may be happy with the deal, particularly if the scheme is returned to full funding. [½]

It should be remembered that the company would lose the goodwill that comes from members when they feel that the company is preparing a pension for them. [1]

It should also be pointed out that the life company chosen can choose to sell the liabilities at a later date to another life company which is not so well-known. [1]

Life companies should be well capitalised, with a solvency margin above the value of the liabilities to protect the members. [½]

Other parties

A market announcement should be made so that shareholders or bondholder know the impact on their investment. Insider trading should be carefully avoided by the management and staff. [1]

The scheme's actuary should be prepared for the buyout, including what it means for their contract and relationship with the company and the trustee board. [½]

Current market conditions (Some comments on current global or UK market levels are expected)

At present (May 2023), bond yields have risen considerably from their lows, due to Quantitative Tightening (QT) and the emergence of inflation concerns ... [1]

... and also partly due to the large government deficits in most western economies which requires the government to issue a lot of bonds in the market. [1]

Equity markets have been relatively stable for many years despite the uncertainty caused by the virus/pandemic problems and the Ukraine war. [1]

Selling equities may be relatively easy but selling commercial property may prove difficult in the current environment. [½]

The higher level of long-term interest rates means that life company liability valuations will be lower, and the buyout will be more affordable than in the recent past. [1]

However, if the scheme has been accurately matching duration and inflation risk, they should find that the asset values may have decreased at the same time as liability values have fallen. There may therefore be no improvement in funding levels. [½]

There is a competitive market, and lots of innovative products to buyout certain sections of the liabilities, which makes it more cost effective. [½]

The risks facing financial markets are arguably higher than they have been in a while, so the risks outsourced by this move are arguably costly risks. [1]

[Maximum 3 for current market commentary]

Alternative action

There are few comparable actions, other than a buy-in. A buy-in involves buying annuities from a life company that pay amounts equating to the liabilities that the scheme needs to pay. [1]

These should be cheaper than a full buyout as the scheme remains responsible for paying the benefits and for the administration / regulation of the benefits. [1]

The scheme and the company continue to gain the goodwill from the members that is gained by being the pension provider. [½]

They also retain the ability to add discretionary benefits if these become affordable in the future, such as increases to pensions in payment ... [½]

... and to repair the funding situation more gradually over time if the scheme is in deficit. [1]

The cost of buyout may fall in future, giving the scheme the opportunities to move from a buy-in to a full buyout when conditions in the market are right. [1]

[Maximum 3 for alternative]

[Markers award marks for other relevant ideas.]

[Maximum 21]

5 Other tuition services

In addition to the CMP you might find the following services helpful with your study.

5.1 Study material

We also offer the following study material in Subject SA7:

- Flashcards
- Mock Exam and AMP (Additional Mock Pack).

For further details on ActEd's study materials, please refer to the 2024 *Student Brochure*, which is available from the ActEd website at www.ActEd.co.uk.

5.2 Tutorials

We offer the following (face-to-face and/or online) tutorials in Subject SA7:

- a set of Regular Tutorials (lasting three full days)
- a Block Tutorial (lasting three full days)
- an Online Classroom.

For further details on ActEd's tutorials, please refer to our latest *Tuition Bulletin*, which is available from the ActEd website at www.ActEd.co.uk.

5.3 Marking

You can have your attempts at any of our assignments or mock exams marked by ActEd. When marking your scripts, we aim to provide specific advice to improve your chances of success in the exam and to return your scripts as quickly as possible.

For further details on ActEd's marking services, please refer to the 2023 *Student Brochure*, which is available from the ActEd website at www.ActEd.co.uk.

5.4 Feedback on the study material

ActEd is always pleased to get feedback from students about any aspect of our study programmes. Please let us know if you have any specific comments (*eg* about certain sections of the notes or particular questions) or general suggestions about how we can improve the study material. We will incorporate as many of your suggestions as we can when we update the course material each year.

If you have any comments on this course please send them by email to SA7@BPP.com.

There are relatively few drawbacks other than the fact that the charges will be quite high relative to equity and bond CISs. Investors may also find that the forestry portfolio is invested more globally than they would prefer, exposing them to currency and political risks.

Perhaps the lack of ability to control the investment directly could be a negative. But in reality there are not many sub-sectors into which to divide forestry, so control may not be that much of an issue.

Depending on the commodity involved, the investment horizon could be short (many crops have 12-month or shorter growing cycle) or very long term (a timber tree may take many years to reach suitable size for harvesting).

The investor would also need to evaluate whether they have the necessary skills to set up, manage and harvest or extract the commodity. A typical pension fund, for example, is unlikely to have expertise running a plantation but may deem it worthwhile to obtain such expertise or partner with a production company if the perceived reward from the plantation investment is high.

10 Historical performance of asset markets

The following section is quite long and looks at the historical performance of various asset classes. It is more important to know the general shape of the historical performances, and the reasons for the trends and any sharp movements, rather than know the exact returns over historical periods.

The following charts illustrate the historical behaviour of various main market indices and indicators.

10.1 Equity markets

Global equity markets

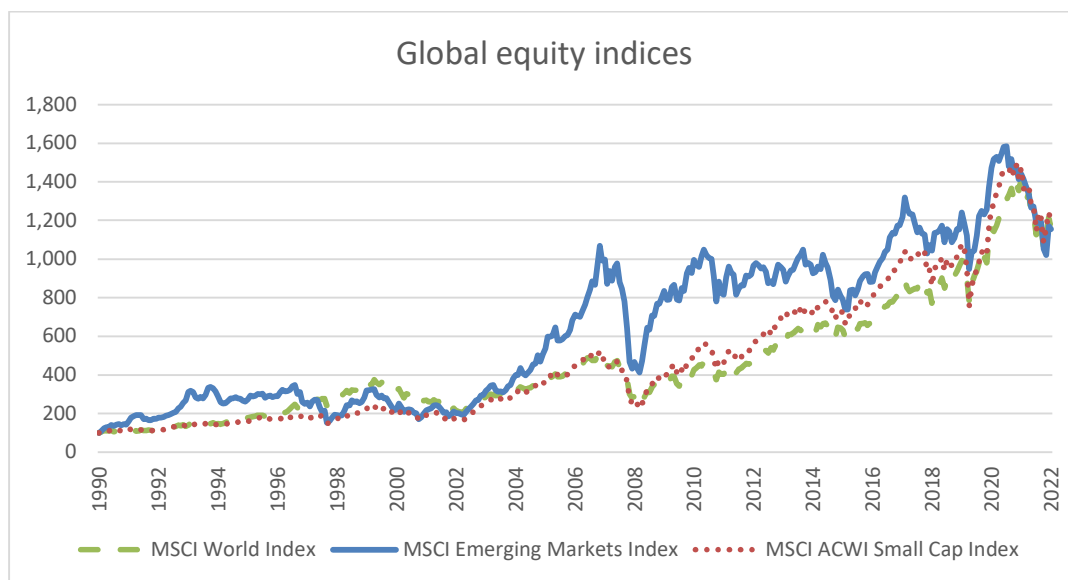


Figure 4.10.1

Source: MSCI: IFoA calculations

The World index is the one that is less volatile in the picture, and emerging markets is most volatile, mainly above the other lines.

Performance of the MSCI World Index, a widely used index for global developed market equities, and the MSCI Emerging Markets and small cap indices, rebased and shown from Dec 1990 – Dec 2022.

The World Index is dominated by developed markets, notably the USA. Note how performance is positive overall, but with significant negative periods corresponding (in the case of World Index):

- to the 'dot.com' bubble bursting in 2000-2001
- to the 2008-2009 financial crisis
- (in the case of the Emerging Markets Index) additionally to the Russian and emerging markets debt crisis of 1997-1998.

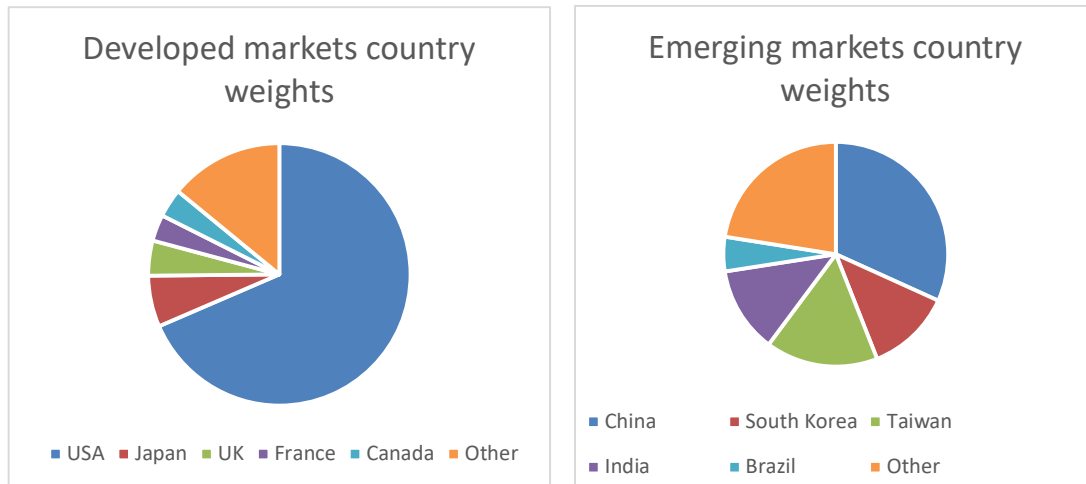


Figure 4.11.2 (both charts)

Source: MSCI; As at 31 March 2023

If the colour categories cannot be easily seen in black and white, the segments begin at 12 o'clock and work clockwise (eg in the first graph USA is the largest, then clockwise Japan, UK, France, ...)

The USA is the world's largest equity market, representing over half of global market capitalisation. In emerging markets, China has grown rapidly over recent decades to become the largest single constituent.

The information technology sector is the largest individual sector in both, making up around 20% of each index.

The historic dividend yield for the MSCI World Index is around 2% while the MSCI Emerging Markets Index yield is about 3% as at March 2023. It has been in the range 1.5%–2.5% for most of the past decade.

US equity markets

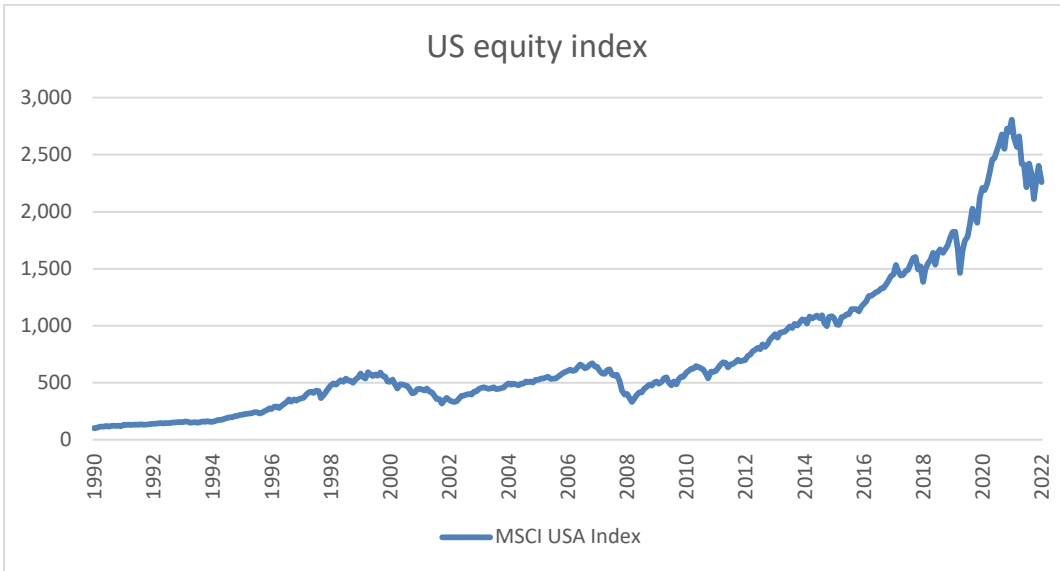


Figure 4.10.3

Source: St Louis Federal Reserve; IFoA calculations

The performance of the S&P500 Index is widely used for large cap shares in the US equity market, and the Russell2000 Index for small cap shares, both rebased and shown from Dec 1990–Dec 2022.

Small cap shares have outperformed very slightly over the period 1990 to 2021 but with periods of under- and outperformance at various times.

UK equity markets

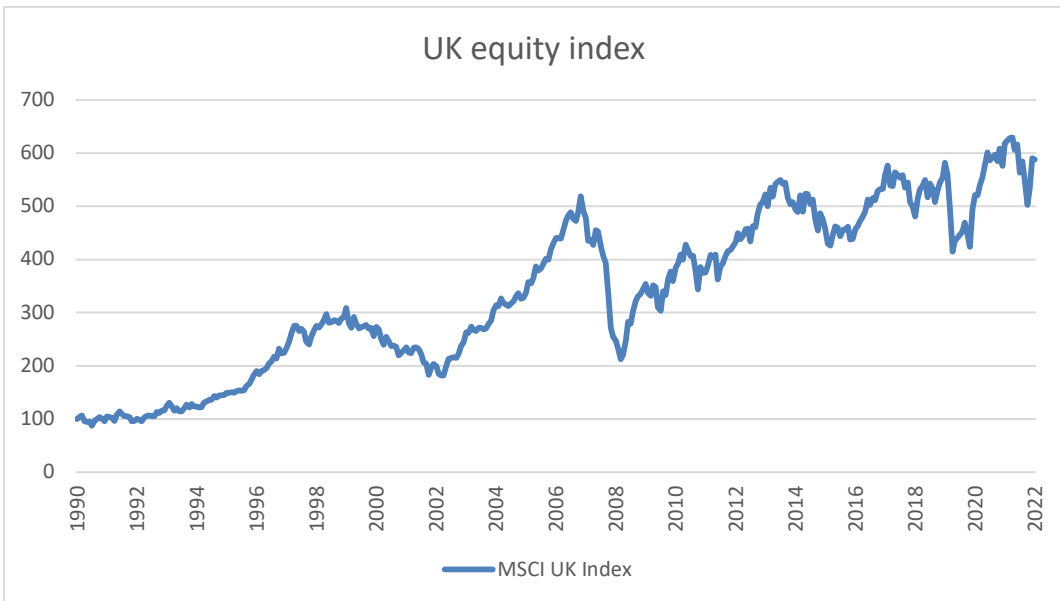


Figure 4.10.4

Source: London Stock Exchange; IFoA calculations

Performance of the MSCI UK Index, the main market index for the UK equity market, rebased and shown from Dec 1990 – Dec 2022.

The performance pattern is broadly similar to the US market index. More recently the higher number of ‘mega cap’ technology companies on the US market has resulted in some divergence in performance.

10.2 Fixed income markets

Global bond markets

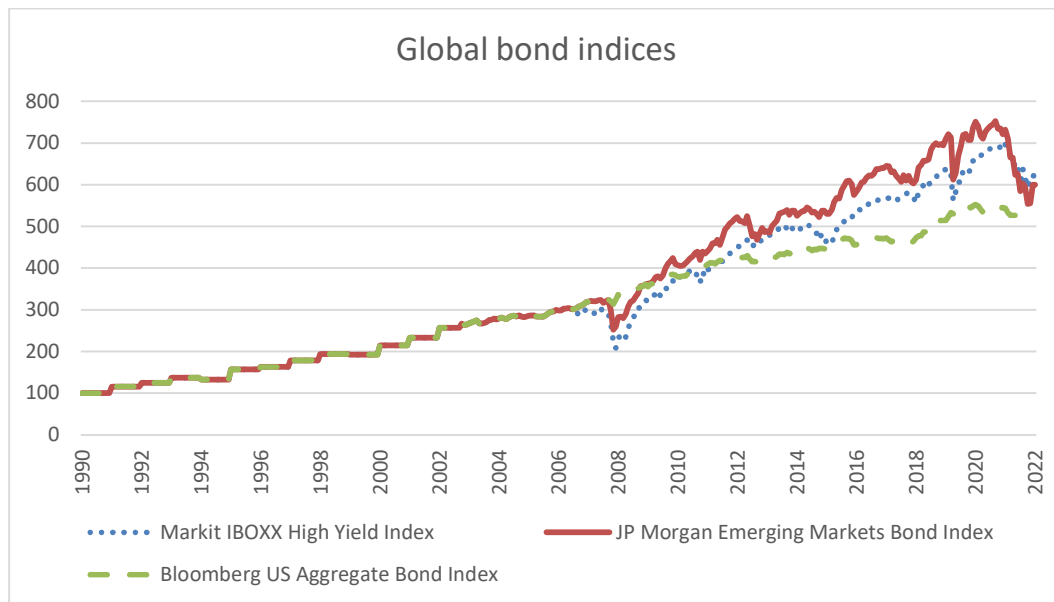


Figure 4.10.5

Source: iShares.com; IFoA calculations

Performance of the Markit iBoxx US Liquid Investment Grade Corporate Bond Index and Markit iBoxx US Liquid High Yield Bond Index, both representative of the US bond market, rebased and shown from Dec 1990 – Dec 2022.

As might be expected bond indices have displayed a smoother, less volatile (and overall less rewarding) profile than comparable equities. Having said that, high yield bonds suffered particularly during the 2008-2009 financial crisis; this may be as expected since the crisis was foremost a *fixed income* or *credit* crisis rather than one affecting equities more generally.

Performance of the JP Morgan Emerging Markets Bond Index, as shown in Figure 4.10.5, is a representative index of emerging market bond performance, rebased and shown from Dec 1990 – Dec 2022.

10.3 Currency markets

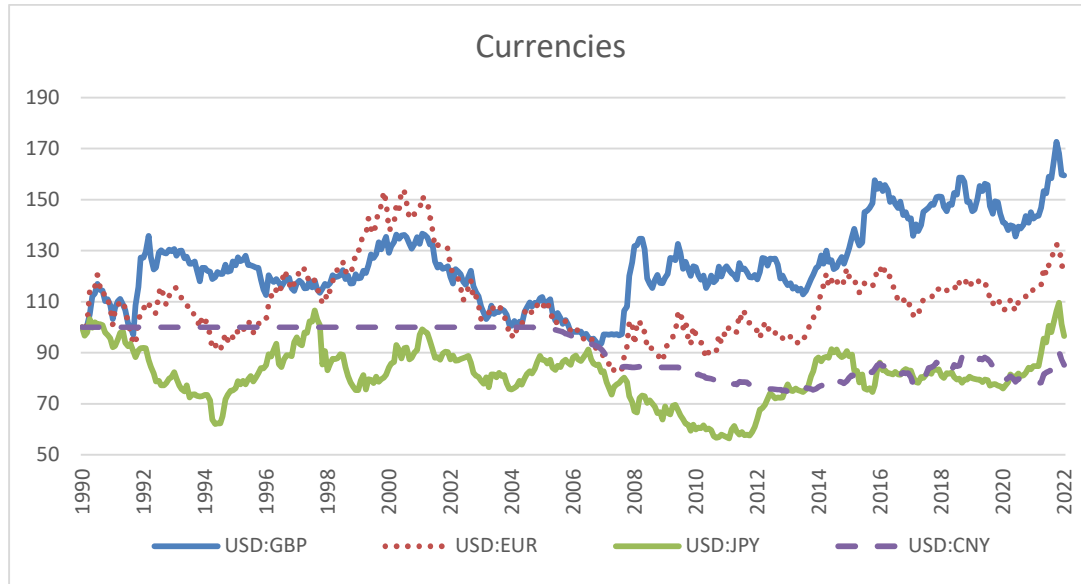


Figure 4.10.6

Performance of the GBP/USD, EUR/USD, JPY/USD and CNY/USD exchange rates, rebased and shown from Dec 1990 – Dec 2021. An increase in the chart level indicates a *weakening* of the respective currency against the US Dollar.

A rise in the currency chart indicates a weakening currency relative to the dollar. The smoother chart is the Chinese Renminbi, the weakest performer (top line) is the pound, and the line that spends most of its time at the bottom is the Yen.

Some exchange rates are driven by market forces whereas others tend to be managed by the relevant Central Bank (that is, the movement in the exchange rate is a combination of market forces and intervention by the Central Bank to achieve a particular level or particular path). The Chinese Renminbi for example, tends to experience less volatile behaviour than, say, UK Sterling because the People's Bank of China is more active in managing the path of its exchange rate.

Over time, exchange rates have fluctuated, however there is also an argument that exchange rates are somewhat mean-reverting – in that they return to a long-term level after short-term deviations. Certainly looking at the historical performance as above shows there have been large intra-period moves, but without an obvious trend in favour of any one major currency. Currencies which are undervalued tend to result in cheaper exports for the country in question, which increases the inflow of foreign currency from foreign consumers, which in turn causes the local currency to re-appreciate. As a consequence, many investors prefer to hedge out their currency exposure, or to engage in short-term tactical currency trading. Few investors consider unhedged currency positions as long-term strategic allocations.

10.4 Commodity markets

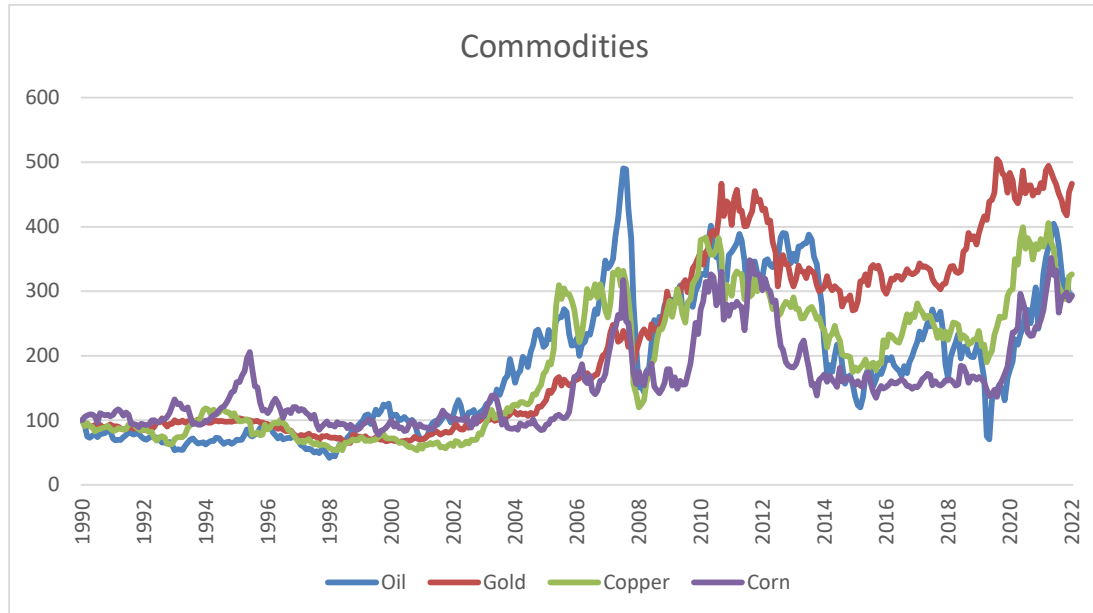


Figure 4.10.7

Source: *macrotrends.net; IFoA calculations*

Performance of oil, gold, copper and corn spot prices, in nominal terms, rebased and shown from Dec 1990 – Dec 2022.

Commodity prices typically exhibit greater price volatility than equities. In particular, commodities can be prone to ‘bubble’ and ‘depression’ behaviour, where belief of a shortage (or conversely belief of excess production) has a significant impact on short term prices. Also, there is an argument that the price of a commodity does not necessarily have any long-term growth underpin – unlike, say, a company which can grow its earnings year by year. Continuously increasing commodity prices would imply either an ever-worsening shortage caused by some combination of ever-increasing demand (with constant supply) or constant demand with a depleting resource. New sources of production or substitutes for demand are often found, causing the market to adjust back to a ‘normal’ level. An example of this would be the discovery / invention of the shale oil process over recent decades which enabled large previously-untapped oil reserves to be accessed. This was initially driven by a high oil price, promoting the discovery and development of new drilling techniques which in turn led to an increase in supply.

Students should be aware of the major events that have occurred in the last 10 years, and the events that dominate financial market discussion leading up to the exam dates (for the 2024 exams for example, that means events up to the end of 2022).

The steep incline for most commodities since 2020 is in part due to the Ukraine war, and the inflationary impact on the costs of many products has had serious implications for global economies. The incline is also due in part to the vast increase in the money supply in almost all economies over the past decade, which has fuelled inflation and fuelled demand.

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3 Key global economic and monetary trends

3.1 Monetary Policy and Central Banks

In 1971, the US officially terminated the convertibility of the US Dollar into gold, thereby making the US Dollar a fiat currency. A fiat currency is one without any intrinsic value. This brought to an end the Bretton Woods agreement for the management of international monetary regimes established at the end of World War II, whereby internationally currencies, not backed by gold, could be converted into US Dollars, which was convertible into gold. The Bretton Woods agreement was a quasi-gold standard. Before Bretton Woods, the gold standard was in operation whereby international currencies were mostly convertible into gold.

Since 1971, the money of most countries does not have any intrinsic value. Historically in such regimes the money eventually became worthless as governments began to print increasing amounts of it. As Voltaire put it, '*Paper money eventually returns to its intrinsic value*'.

A graph showing the growth of OECD broad money (M3) since 1990 is given below:

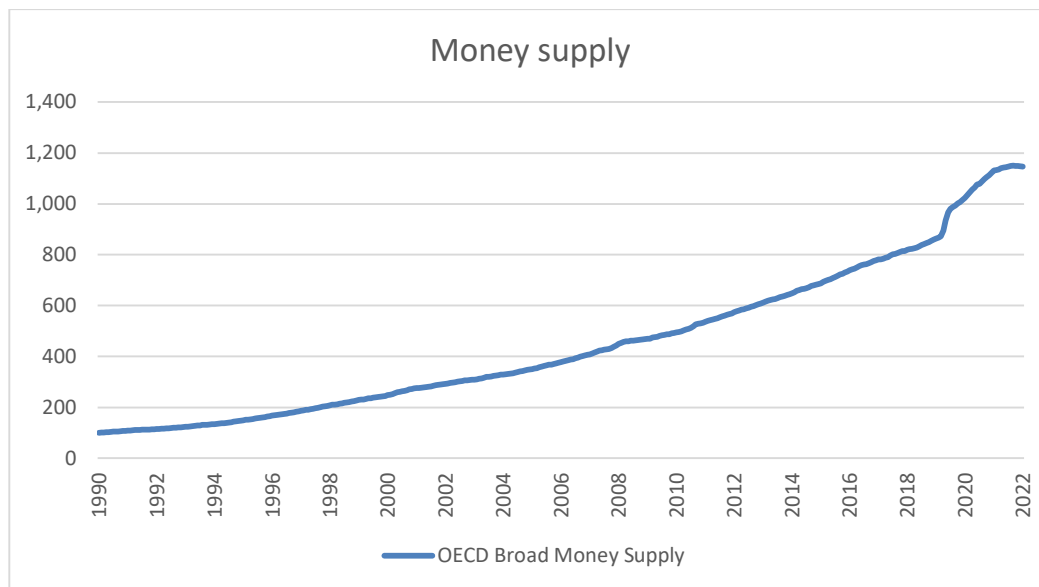


Figure 8.2

Source: <https://data.oecd.org/money/broad-money-m3.htm>

Broad money (M3) is defined by the OECD as currency, deposits with an agreed maturity of up to two years, deposits redeemable at notice of up to three months and repurchase agreements, money market fund shares/units and debt securities up to two years.

The graph shows that money supply has increased at a significant rate since the end of Bretton Woods, and very significantly since the start of 2019 in response to the COVID19 pandemic.

A graph showing OECD broad money as a percentage of GDP is given below:

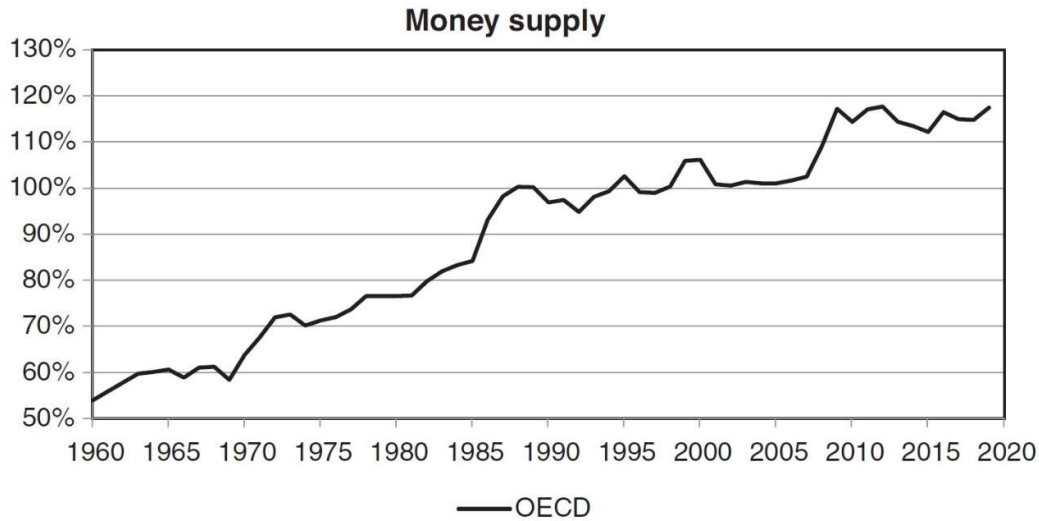


Figure 8.3

Source: OECD

The graph is based on data from the World Bank and shows broad OECD money supply as a percentage of GDP increasing considerably since the collapse of Bretton Woods. For example, in UK the percentage went from 40% to almost 140% from 1960 to 2015.

Since the financial crisis of 2008 - 2009, the main monetary policy used by the large developed economies in the world has been QE. This involves the central banks printing money and buying assets that increase the size of their balance sheets.



Question

Discuss the reasons why QE became the dominant monetary policy in developed countries from the financial crisis in 2008 until the end of Covid in 2021. Discuss why Quantitative Tightening (QT) is now commonly undertaken in developed economies.

Solution

Why QE became the dominant policy

One of the main reasons is that the other traditional tool, lowering and raising short-term overnight interest rates, became constrained by the fact that rates in most developed countries were close to or at zero. If central banks wished to stimulate growth (through borrowing) then there was no more scope for interest rate reductions. QE is then the tool of choice as its use is not constrained. A central bank can theoretically increase its balance sheet indefinitely as it is not subject to regulatory constraints such as Basel II or Basel III.

A second reason is that the developed countries found that the currencies of countries that did not embark on QE strengthened on the FX markets, causing difficulties for exporters, and causing an increase in imports from overseas. It therefore became difficult to resist the trend when other countries were engaging in QE. This was linked to the fact that some central banks believed that competitive devaluation of their currency was the right thing to do at that stage in the economic cycle.

A third reason was the threat of deflation. This had been considered to be a danger since various economies became stuck in a devaluation 'spiral', whereby consumers put off any purchases because they believed that prices would be lower in a year's time. This further weakened spending and therefore caused companies to further decrease prices to sell their products, and hence deflation became worse. Many developed country central banks believed that QE was a way to avoid this, by ensuring that the commercial banks had plenty of scope to increase their lending books and expand money supply.

A fourth reason is perhaps that QE led to a catch-22 situation, whereby if a central bank that had undertaken significant QE stated that the policy is to end (tapered) or be unwound (Quantitative Tightening), the bond markets became very nervous. This left the central bank as a large holder of government bonds, exposed to large losses (which are amortised annually to the government that underwrote the policy).

Why QT is now common

The money supply of most western economies was significantly expanded in the years from the 2008 financial crisis leading up to 2021, and the inflationary impact took a long time to materialise. But after the pandemic, as economies began to return to normal, inflation rose rapidly, and became difficult to control. The Ukraine war then added some cost-push inflationary pressures to the system, leading to a situation where inflation has become hard to contain. Central banks can use short-term interest rates, but these impact mortgage borrowers more than other individuals. Governments can use tight fiscal policy, but western governments are already raising more tax from their economy than they have in post-war history; raising more would risk a severe recession. Cutting public spending is proving politically unpalatable, which leaves the option of reducing money supply gradually through QT.

A graph showing the increase in the size of central bank balance sheets in these countries is given below:

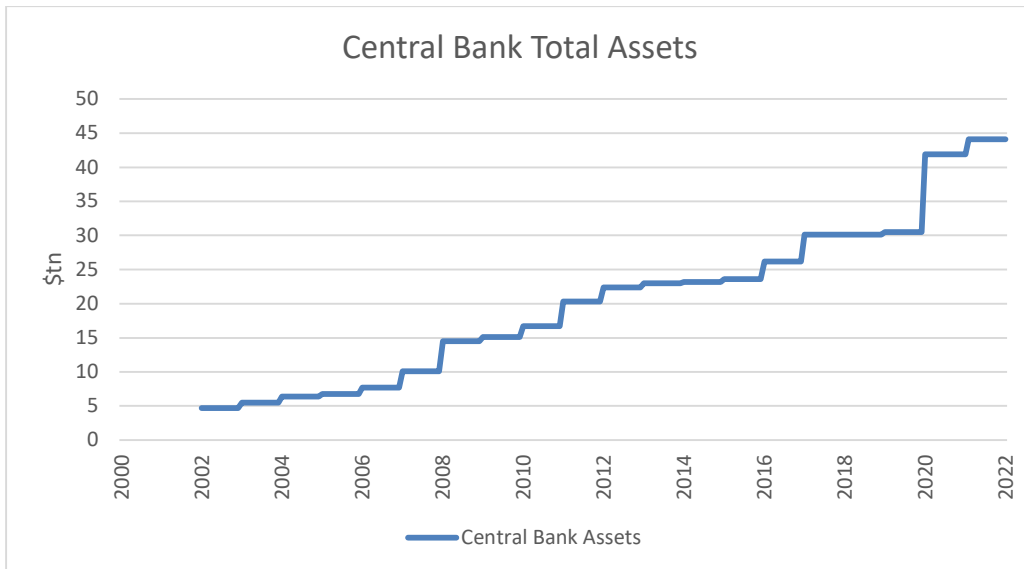


Figure 8.4

Source: Statista

At the time of the financial crisis the rapid increase in central bank balance sheets was unprecedented, and in relative terms remains a very significant increase indeed. With the benefit of hindsight the continued application of QE and more recently the response to COVID 19 has resulted in balance sheets today being many multiples larger than they were before the financial crisis.

3.2 A brief history of political economy

Most western developed economies are 'capitalist' as distinct from the more centrally planned economies of communist and formerly communist countries.

Capitalist economies aim to give more economic freedom to their people. This freedom has usually enabled people to take more risk, by giving them greater access to markets and to speculate on these markets, which may result in a better allocation of capital to profitable projects (as those projects with higher expected returns attract capital). However, the same freedom also increases the volatility of the capitalist economy, as people are free to be fearful and greedy at different points of the economic cycle.

The easier access to markets brought about by financial deregulation and improvements in technology has arguably brought in more investors less well equipped to make good investment decisions (particularly individual investors) which might be regarded as also contributing to the greater volatility.

Some of the challenges of operating a free economic and political model are summarised in a discussion by the American public relations expert, Edward Bernays:

General comment

The Subject SA7 exam will consist of up to four longer questions which should be answered in a period of 3.25 hours. Although the later assignments reflect this structure, Assignments X1 to X4 may include a series of smaller questions aimed at testing your understanding of a greater number of topics to help build your knowledge of the course. Assignments X1 to X4 also contain at least one longer exam-style question which should give you a feel for the difficulties that such questions pose.

The questions that students encounter in SA7 often test material that is relevant and topical in investment consulting, but which may not relate to material in the chapters of the Course Notes or in the Core Reading. The SA7 ActEd Assignments have been designed to be similar to the exams in this respect. You will therefore find that the questions do not always relate to the Core Reading in the course and are much more wide-ranging and general in nature. You should not let this put you off – we hope that it encourages you to read around the subject.

- X1.1** The management of a large commercial bank in a developed country have been reviewing some proposed changes to the regulatory environment, which involves amendments to the risk-weightings used to determine capital ratios, and the introduction of other requirements.

Discuss the rationale behind the following proposed changes, and describe the problems or drawbacks that they may create.

- (a) the risk-weighting for AA corporate bonds and loans will be increased by 10%
- (b) the risk-weighting for any sovereign claim rated AAA to A will be taken as zero
- (c) the introduction of a leverage ratio (which must be greater than 3%), defined as:

$$\frac{\textit{Tier 1 capital}}{\textit{total assets (including off balance sheet items)}}$$

- (d) the introduction of a minimum amount of 'liquid assets' that the bank must hold at all times.

[15]

X1.2 In a developed economy there has been recent instability in the banking sector caused by some banks holding loss-making investments at historical book value rather than marking to market. The loss-making investments were, in most cases, loans and bonds that had been purchased at much lower yields, but are now trading at lower prices in a higher interest rate global environment. The instability resulted in some banks being exposed to 'runs' where deposits were withdrawn in large quantities, forcing the Central Bank to step in as lender of last resort, or to find a buyer for failing banks.

Discuss the following suggestions which are aimed at calming the markets and ensuring that the same situation does not recur.

- (i) Banks could be forced to value all loans and bonds at market value in published balance sheets. [5]
- (ii) Regulations could be changed so that the mean term of the banking asset portfolio must be close to the mean term of the deposit base. In this way, if interest rates change, the assets and liabilities should change by similar amounts. [5]

[Total 10]

X1.3 A small country has a fully-funded national state pension scheme, which is managed by three selected fund managers, each with specified benchmark. Each of the three managers invests substantial sums of money for the scheme, and the remits describe core allocations to different markets, including overseas and domestic market splits.

Because of the desire to be environmentally friendly, there is a large allocation to alternative energy investments. One of the fund managers has identified an investment trust that specialises in alternative energy investments on a global basis, and is considering using this vehicle to gain exposure to this market.

Discuss the suitability of this trust as an investment for the national pension scheme. [13]

Solution X1.2**(i) Publish loans and bonds at market value***Advantages*

The market may be more confident that there are no hidden skeletons in the cupboard, and that the balance sheet reflects what the bank could raise from its assets on the balance sheet date if it had to. This may prevent runs, and other forms of panic. [1]

Such a change would not require other costly changes to existing banking regulation or solvency rules. [½]

Disadvantages

Some banks may disclose significant losses, wiping out a large part of their shareholder equity, and this may in turn cause the banks to breach capital adequacy regulations. [1]

Many loans are not traded, and getting a market price would be almost impossible ... [1]

... and very subjective. [½]

There is a good argument for historical cost accounting for banks as it smooths reported earnings and insulates them from the volatility of financial markets. [1]

There would be an outcry if, at a later stage, banks reported massive profits due to falling yields. [1]

[Maximum 5]

(ii) Mean term of assets and liabilities to be the same*Advantages*

This may calm markets, as depositors would know that any hidden losses in the asset portfolio, valued at book value, would be offset by hidden profits in the liability portfolio. [1]

Asset-liability matching has been common practice in other industries for some times, such as the pension and insurance industries, and is considered good practice. [½]

Disadvantages

Banking assets have traditionally been much longer in duration than their liabilities, ... [1]

... a feature commonly referred to as 'maturity transformation'. [½]

For examples, assets such as mortgages, whether fixed for 2 years, 5 years or longer, have very long terms, and there are almost no liabilities of this term to match. [1]

Such a change would prevent banks from lending in the mortgage market (and many other loan markets). [1]

If hedging was carried out using swaps to shorten key asset categories, the size of the trades would be enormous and there would be no counterparties willing or able to take the other side of these swap positions. [½]

Part of the profit that banks make is due to the higher risk in their asset portfolios, so shortening assets or removing maturity transformation, would remove a lot of banks' profits as well. [1]
[Maximum 5]

[Markers: other ideas should gain marks, such as banking business moving abroad, regulatory arbitrage, the difficulty of changing existing books of business overnight to be compliant with the new rules, etc]

Solution X1.3

This question is designed around a past paper question from Subject SA6 April 2014. It demonstrates the wide-ranging thought process that is required for this subject, and the attention to the specific details in the question. There are a lot of marks available, and many of the points will be worth a half mark. So it is essential to consider:

- *generic aspects of investing indirectly, such as tax, gearing, diversification and liquidity*
- *generic issues concerning the liabilities to be hedged, namely that they are real and fairly long-term*
- *the specific nature of the investing institution, in that it is clearly very large, and is a government agency and as such will be subject to much more scrutiny, press coverage, environmental rules etc.*
- *the specific nature of this trust, in that it invests in alternative energy investments, many of which will be overseas, many of which will be unquoted and perhaps fully owned by the trust, most of which will be difficult to value, and all of which rely on the price of energy, carbon prices, and government subsidy*
- *current market conditions in the alternative energy market, if such knowledge is known.*

Only by dealing with all these issues can students attain the necessary marks.

Investing via such a trust would gain the expertise of the trust manager in alternative energy investments, which the pension scheme itself does not have. [1]

Depending on the size of the trust, there should be a range of different types of alternative energy investments included in the fund, giving a diversified exposure to the market. [1]

Examples of these might include:

- solar power
- wind power
- geothermal energy
- biofuels [½ mark for each example, max 1½ mark]

General comment

The Subject SA7 exam will consist of up to four longer questions which should be answered in a period of 3.25 hours. Although the later assignments reflect this structure, Assignments X1 to X4 may include a series of smaller questions aimed at testing your understanding of a greater number of topics to help build your knowledge of the course. Assignments X1 to X4 also contain at least one long exam-style question which should give you a feel for the difficulties that such questions pose.

- X2.1** A fund manager intends to switch exposure in his fund out of UK equities and into UK bonds. The initial size of the switch is to be £100m in value and you are given the following details about the fund in question:

Current equity portfolio	Value = £600m	Beta = 0.9	Div yield = 4.5%
Equity market index	Index = 5,500	Beta = 1	Div yield = 3.5%
Gilt and corporate bond portfolio	Value = £400m	Duration = 18.2 years	
Long-term bond future	Index = 116.2	Duration = 8.6 years	

- (i) Describe in detail how the manager could achieve his aims using futures. (You should assume that the equity future is designed to have a tick price of one index point, and a tick value of £10, and that the bond future is designed to have a nominal of £100,000 per contract.) [3]
- (ii) Describe in detail the problems that would be encountered if this is carried out. [8]

The manager has been offered an opportunity to invest the money into a bond-based structured product which is being launched. It guarantees that in each year over the coming 10 years the fund will give investors the total return on 20-year government bonds in that year, subject to a maximum of 6% *pa* and a minimum of 2% *pa*.

- (iii) Discuss the relative merits of using this product to gain bond exposure rather than investing directly in a bond portfolio. [8]

The fund has experienced strong growth in recent years, and the manager has begun to use derivatives in much higher volumes than previously.

- (iv) Describe in detail the main functions within the organisation that would have to be expanded to cope with derivative business. [8]

[Total 27]

X2.2 You act as an adviser to a UK pension fund for a medium-sized industrial company. At the most recent trustee meeting it was decided that the scheme should reduce the amount of duration risk that it is exposed to, as its asset portfolio was too short.

- (i) Discuss the relative merits of using swaptions or long-term bond futures for this purpose.

[11]

A swaption has been offered to the scheme at a price of £30m. It has a 3-year term, and is the option to undertake a 'receive fixed 4.5% *pa*, pay floating' swap with a nominal of £500m and a term of 30 years. You may assume that long swap rate volatility is 9% *pa* and the risk-free interest rate is 4% *pa* at all terms, and that 4.5% represents the estimate of future swap rates at the present time.

- (ii) Use the formulae below to determine whether the swaption is good value at the current offer price.

[8]

$$\text{Swaption value} = (\text{call}) LA [F_0 \Phi(d_1) - R_X \Phi(d_2)] \text{ (or put) } LA [R_X \Phi(-d_2) - F_0 \Phi(-d_1)]$$

$$d_1 = \left(\frac{\ln(F_0/R_X) + \sigma^2 T/2}{\sigma \sqrt{T}} \right)$$

$$d_2 = \left(\frac{\ln(F_0/R_X) - \sigma^2 T/2}{\sigma \sqrt{T}} \right)$$

The fund manager for the scheme undertakes the following strategies using equity options in a particular quoted share:

Strategy 1	Strategy 2
buy a call option with a strike $X - a$	buy a call option with a strike X
sell two call options with strike X	buy two put options with strike X
buy a call option with strike $X + a$	

All options have the same maturity and X is the current share price of the underlying.

- (iii) Describe, in words, the payoff (including the likely premium) from each of the option strategies. Explain why the manager may have selected these strategies.

[8]

[Total 27]

Assignment X2 Solutions

Solution X2.1

(i) **How to achieve switch using futures**

To reduce the equity exposure would require selling equity futures (a short position). [½]

The amount to be sold is $\frac{£100m}{5,500 \times £10} \times 0.9 = 1,636$ contracts [1]

To increase the bond exposure would require buying futures contracts (a long position). [½]

The amount to be purchased is $\frac{£100m}{1.162 \times £100,000} \times \frac{18.2}{8.6} = 1,821$ contracts [1]

[Total 3]

(ii) **The problems encountered**

The equity portfolio seems to be value based, as evidenced by the higher dividend yield. [1]

It might not be well hedged using a standard market equity futures contract (*ie* cross-hedging risk). [1]

The most liquid futures contracts in most markets are the ones that expire within 3 months. [½]

These would need rolled forward each time they approach expiry ... [½]

... which increases basis risk. [½]

This would also increase costs over the longer term. [½]

It would not be possible to select the most suitable equities to sell in order to make active stock selection profits. [½]

This will increase exposure to 10-year term interest rates (8.6 years duration) which is very different to the long-dated portfolio that is currently held (*ie* further cross hedging risk). [1]

The portfolio contains corporate bonds which will be affected by the credit spreads on these bonds. [1]

The future on the other hand will only be affected by risk-free government interest rates and not corporate credit spreads. [1]

Both futures positions would require margin, which would need to be maintained. This could cause cashflow problems. [1]

For example, if the fund manager is incorrect and equities rise and/or bonds fall, both margin accounts would need substantial funding. [1]

Although the changes in value of the future contracts are offset by the changes in value of the portfolio, the portfolio would not yield extra cash when market values change, therefore margin accounts can cause significant cash issues. [½]

[Maximum 8]

(iii) ***Structured product rather than direct bond investment***

The return is linked to government bonds only, whereas the actual bond portfolio would be expected to earn a higher return due to the corporate bond exposure. [½]

The maximum cap on the return would impact the fund in years when bond prices rose sharply, such as periods of falling inflation or intense Quantitative Easing (QE) activity. [1]

However, the minimum return would guarantee against losses during period of falling bond markets such as a major financial crisis, Quantitative Tightening (QT) or a currency collapse. [1]

As such the volatility of returns would be lower than a direct bond market investment. [½]

The 20-year term of the bond exposure would match closely with the existing maturity of the bond portfolio, and therefore be suitable. [½]

It would also not shorten in maturity over time as a normal fixed interest bond would. [½]

There would be hidden fees in the product, which would be very difficult for the fund manager to determine, given the complex nature of the embedded options. [1]

Valuations would be required for pricing purposes, but these would only be available from the company running the structured product. [½]

This could lead to issues with transparency and subjectivity during valuation exercises. [½]

It would be important to determine whether the structured product was segregated and had its own asset pool, or whether it was on the balance sheet of the company managing the product. This would determine the level of counterparty risk that the fund manager would be exposed to. [1½]

Even if there is a segregated fund, there will be bonds, and over-the-counter options contained in it, exposing the fund manager to counterparty risk indirectly. [1]

If the structured product needs to be sold prior to the end of the 10-year period, it is uncertain what marketability or secondary market would exist. [1]

The tax treatment and accounting treatment of the product should be relatively straight-forward for the fund, similar to the treatment of a bond portfolio. [½]

It would be necessary for the fund manager's legal team to examine the structured product in detail before investment, and this would take time and cost money / resources. [1]

[Maximum 8]

(iv) Expanded functions

The use of derivatives can increase the complexity of various functions, which would need to be expanded in terms of staff numbers and IT capabilities. [½]

Front office

The trading team would need to be expanded. They are responsible for ensuring that the derivatives are arranged at competitive prices, or are arranged on traded exchanges. [½]

They are also responsible for valuation and pricing activities at month end, which may involve the pricing of complex OTC derivatives. [½]

The portfolio management team would need to be expanded to ensure that there is sufficient expertise across all the client portfolio. [½]

Compliance

It is essential to ensure that the company's rules and procedures are robust enough to cope with the higher volumes, and this would be the job of the compliance officer and the support team. [1]

It is essential to ensure that the reporting and pricing of derivatives is not carried out and checked by one person. [½]

Back office

Settlement staff would need to be expanded to ensure that the information is correctly processed on the fund manager's IT systems and correctly communicated to the custodian or any out-sourced settlement companies. [1]

It is necessary to have gross and net exposure updated real time so that risks can be monitored and controlled appropriately. [½]

Collateral management would become much more complex, and staff increases would be required. This involves not just posting collateral on the manager's accounts, but also monitoring that the correct collateral has been posted by the fund manager's counterparties. [1]

Reporting teams that handle accounting, IT reporting and model building for pricing purposes would need to be expanded. [1]

Risk control is an important function when derivative usage becomes higher. In particular the measurement of credit exposure through over-the-counter derivatives is a key function. [1]

Central clearing will have removed a lot of the counterparty risk, but increased the risk to a selection of clearing houses. [½]

The measurement of market risk will become a great deal more complicated when portfolios become a lot bigger. Derivative market risk can involve complex modelling, allowing for hedging of risks and basis risks. [1]

The legal team will be expanded to cope with the higher demand to check OTC contracts and netting arrangements. [1]

This will be particularly important if the volumes are expanding at the same time as the range of derivatives is expanding. [1]

[Maximum 8]

Solution X2.2

(i) **Swaptions vs long-term bond futures for liability duration risk management**

Merits of futures vs swaptions

Futures contracts are agreements between two parties to trade an asset at a certain future time for a certain price. Futures are traded on an exchange and centrally cleared. [½]

Consequently there is less credit risk as exchanges and clearing counterparties are generally AAA-rated. [1]

There are very liquid futures contracts on most major developed bond markets ... [½]

... and costs of trading are extremely low (compared to swaptions) ... [½]

... although contracts are short-term and require to be rolled for the period that the hedge is in place, which can increase costs and operational risk. [1]

If the assets have a shorter term than the liabilities, a long position in the future would be required. [½]

The long-term bond future is usually a future on a bond of a certain term, commonly 10 years. It is not possible to gain exposure to interest rates for longer (*eg* 60 years) or shorter terms (*eg* 5 years). Therefore any duration hedge will be very approximate. [1]

Futures would hedge both upside and downside risks, meaning that if rates fall, the gain on the futures will offset any rise in the liabilities, but if rates rise, the futures contract losses will offset any reduction in the value of the liabilities. [½]

There will be a collateral account to manage on a daily basis, with a collateral agreement. These can be legally complex and expose the scheme to legal risk. Swaptions collateral may not be assessed as frequently. [½]

It is also important to have netting agreements with any counterparties that are used in futures trading to avoid cherry picking in the event of a default event. [½]

Purchasing swaptions would not require a margin account as the option can only be an asset for the purchaser. [½]

Merits of swaptions vs futures

Swaption portfolios can be designed across the full maturity range to accurately match the liabilities. Futures usually only exist in one maturity. [½]

The swaptions required would be option to receive fixed and pay floating interest, over a period that matches the term of the liabilities. [1]

They can also be traded with multiple bank counterparties, diversifying counterparty risk, whereas futures would have a clearing house as a counterparty. [½]

Some swaptions may centrally clear which would mean that the scheme may build up higher exposure to a number of clearing houses. [½]

Swaptions cost a premium to purchase whereas futures do not cost a premium. [½]

Swaptions, once purchased, can be held until an exercise decision is required, and do not need to be rolled forward. This makes them easier to manage once in place. [½]

However, ISDA swap agreements can be legally more complex than futures agreements. [½]

If interest rates move significantly in one direction or the other, the swaption portfolio may move far into the money, or out of the money. If swaptions are out of the money, their delta is near zero, and the scheme will no longer have any interest rate hedging in place from the ruling level of interest rates. [1]

If swaptions are in the money they behave more like bonds, and hedge both upside and downside movements in interest rates from the ruling level. [½]

This means that, on any significant movement in rates, the scheme may need to consider rebalancing the hedge and putting more swaptions in place (or removing exposure to some existing swaptions). [½]

Swaptions are illiquid, and it is difficult and costly to get out of them. It may require selling swaptions to offset the exposure of the existing swaption. [½]

[Maximum 11]

(ii) **Swaption valuation**

The swaption is a put, because if interest rates fall below the strike of 4.5%, the option will be exercised because it will be better than the available market swaps at that time. If rates rise above the strike then the swaption will be worthless and expire. [1]

The term A will be a deferred annuity, where the deferral period is $T = 3$ years and the annuity is an annual annuity in arrears for 30 years. [1]

$$A = (1.04)^{-3} \times \left(\frac{1 - 1.045^{-30}}{0.045} \right) = 14.48 \quad [1]$$

$$d_1 = \frac{\ln\left(\frac{4.5\%}{4.5\%}\right) + 0.09^2 \times \frac{3}{2}}{0.09 \times \sqrt{3}} = 0.07794 \quad [1]$$

$$d_2 = \frac{\ln\left(\frac{4.5\%}{4.5\%}\right) - 0.09^2 \times \frac{3}{2}}{0.09 \times \sqrt{3}} = -0.07794 \quad [1]$$

$$\Phi(-d_2) = \Phi(0.07794) = 0.5311 \text{ and } \Phi(-d_1) = \Phi(-0.07794) = 1 - 0.5311 = 0.4689 \quad [1]$$

$$\text{Value} = £500m \times 14.48 \times [0.045 \times 0.5311 - 0.045 \times 0.4689] = £20.26m \quad [1]$$

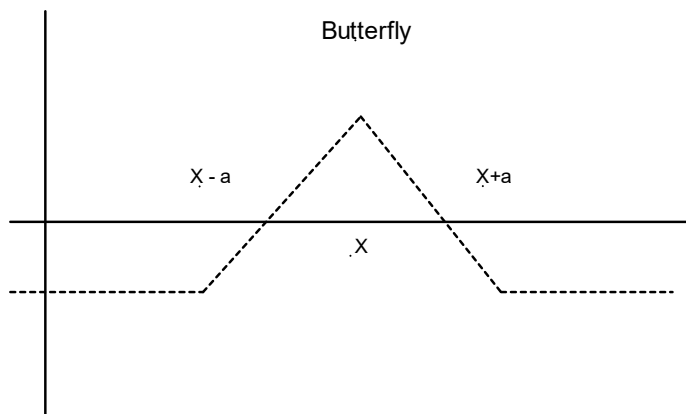
The swaption does not look good value if priced at £30m. The scheme should look for an alternative competitive quote.

[1]

[Total 8]

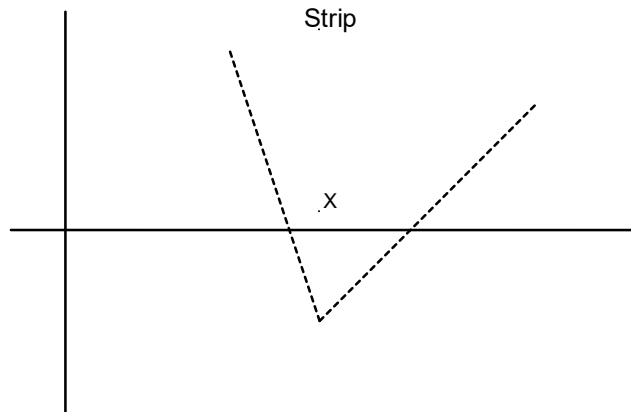
(iii) **Option strategies**

Strategy 1: This strategy produces a fixed loss when the underlying asset expires either below $X - a$ or above $X + a$. Between these boundaries the option strategy has an intrinsic value which grows to a maximum at X on the x-axis. The overall strategy will be profitable when the profit on the options offsets the cost of the option premiums.



[This diagram is not required to score full marks]

Strategy 2: This strategy produces a loss when the underlying expires near to its current price. When the underlying rises significantly, the purchased call makes a profit for the strategy, and when the underlying falls significantly, the two purchased puts generate a profit. The rate of growth of the overall profit is greater when the market is falling due to the fact that there are double the number of puts as there are calls.



[This diagram is not required to score full marks]

[2 marks each for description, maximum 4]

Reasons for selecting strategies (strategies do not have to be named)

Strategy 1

This strategy would be appropriate if the manager expected the share price to remain broadly where it is and not fluctuate in either direction. [1]

It may be preferred to other strategies because the losses if the share *does* move by a large margin are limited (*ie* there is no unlimited loss on this strategy). [1]

Strategy 2

This strategy would be appropriate if the manager believed that the market or the share in particular was going to move by a large amount one way or another ... [½]

... and it is superior to other strategies if the manager believes that the chances of the share falling are greater than the chances of it rising. [½]

The manager will also gain if implied volatilities in the option markets rise. [½]

The manager has purchased two options, both of which will rise in price in the short term if volatility (used to price the options) rises. [1]

[Maximum 8]

Solution X2.3

(i) **Infrastructure Unquoted Collective Investment Scheme (or 'club')**

Information to find out

The following information would be important:

- the minimum commitment from each participant
- any lock-in periods and arrangements to withdraw funds if necessary
- whether the investment is eligible for capital adequacy purposes under Solvency II or other regulation
- the proposed strategy, and how the investments are to be chosen
- the benchmark for performance measurement purposes
- the fund managers selected for the fund, and their expertise and experience
- any conflicts between investing participants of the CIS, and any conflict between the government and the participants
- valuation and pricing
- fees and expenses charged by the manager and by any other participants
- governance arrangements, and how the key decisions are to be made between the investing members
- whether the capacity exists to invest such a large amount over such a short period without accepting uncommercial investments
- Board participation
- dividend policy
- the possibility that the CIS might gear up and enhance returns
- arrangements for cash drawdown over the early years.

[½ for each, maximum 6]

Merits of the proposal

The purchasing power of the larger fund would be able to command good terms on participation in certain large-scale projects. [½]

Other life funds may have a great deal more experience at carrying out the due diligence on infrastructure investments ... [1]

... and arranging the debt terms to manage and spread the risks. [½]

Infrastructure debt investment have a great deal more investment and default risk in the early years, when the asset is being built, and much less in the later years. [1]

This would mean that over the short term, the life company would be greatly increasing its risk budget to chase higher returns. [½]

The Subject SA7 exam will consist of up to four longer questions which should be answered in a period of 3.25 hours. Although the later assignments reflect this structure, Assignments X1 to X4 may include a series of smaller questions aimed at testing your understanding of a greater number of topics to help build your knowledge of the course. Assignments X1 to X4 each contain at least one long exam-style question which should give you a feel for the difficulties that such questions pose.

X4.1 A trustee to a large defined benefit pension scheme has approached you with a number of questions. The first question is as a result of an article they have read in the financial press, which claimed that short-term interest rates will remain high for the foreseeable future, particularly with many central banks undertaking QT (Quantitative Tightening). The trustee has suggested entering a 5-year swap whereby the scheme will pay fixed (at a rate of 3.5%) and receive floating (at SONIA, which is currently a little above 4%). They have stated that, as the swap requires little collateral funding, the scheme could gain significant exposure to the swap, and benefit its members.

- (i) Explain the effect that QT has on interest rates and discuss the merits of the proposal for the scheme. [12]

The scheme has a portfolio which largely consists of government and corporate bonds, with some geared liability-driven pooled funds to increase interest rate exposure. The remainder of the free assets have been invested in commercial property investment trusts which trade on the stock market.

- (ii) Discuss the risks that exist for the scheme in an environment where the central bank is undertaking QT and the government is simultaneously stimulating the economy by spending more than it raises through tax. [11]

- (iii) Discuss the positive and negative impacts of stubbornly high inflation on the government's ability to balance its spending. [5]

The trustee has read an article suggesting that the government is considering increasing funding for infrastructure projects in the country by mandating that a certain minimum proportion of every pension scheme must be invested in infrastructure.

- (iv) Discuss the pros and cons of such a proposal from the perspective of the scheme, and outline any implementation issues that may occur. [9]

The trustee has also been approached by a bank that would like to undertake a liquidity swap. Under the terms of this, the bank will borrow a large amount of liquid government bonds from the scheme for a period of 5 years, and give the pension scheme a portfolio of illiquid assets as collateral. The illiquid assets could consist of mortgages, corporate loans and personal loans of good quality. A fee for the liquidity will be paid to the scheme for the 5-year period, and the bank intends to Repo the borrowed gilts for cash.

- (v) Discuss the pros and cons of this proposal from the perspective of the scheme. [6]

The trustee has also read about the advantages of ETFs as a means of gaining exposure to certain asset classes.

- (vi) Describe ETFs and explain whether they represent a suitable way for the scheme to gain exposure to fixed bonds, index-linked bonds and domestic equities. [7]

Finally, the trustee is keen on a product offered by an equity manager which offers 90% of the return on the UK FTSE100 index over a 7-year period, but offers a guarantee that the invested funds will be returned if the index ends the period below its current level.

- (vii) Describe the behavioural biases that may be causing the trustee to feel positively towards this product. [2]

- (viii) Explain the psychological issues that can cause many trustees to be attracted by the same investment trends and attracted to the same new products at the same time. [4]

[Total 56]

- X4.2** An institution has a broadly invested portfolio of assets which includes equities, government and corporate bonds, and commercial property both in the UK and overseas.

At a recent investment meeting, the chief investment officer (CIO) made it clear that their view on the economy is changing, and that all analysts and fund managers must consider how this might affect the individual investments in the portfolio.

The CIO now believes that after a period of generous fiscal policy designed to encourage economic growth and to survive a pandemic, the new government will have to move towards a more 'austerity-based' set of policies.

- (i) Explain how these government fiscal policies might be implemented and the subsequent impact on the domestic economy. [6]

- (ii) Describe the likely impact on the institution's portfolio. [12]

[Total 18]

Assignment X4 Solutions

Solution X4.1

(i) *Quantitative Tightening (QT)*

The effect of QT on interest rates

QT in most major countries involves the central bank unwinding the large government bond portfolios that they have acquired through QE, selling the bonds for cash in the stock market. [1]

In some cases, corporate bonds and even equity share exchange-traded funds (ETFs) have been purchased under QE and are unwound as part of QT. [½]

Many central banks have portfolios of mainly medium- and long-term government bonds. [½]

By selling the bonds, the central bank pushes the prices down (and yields up) at the medium and long end of the yield curve, but also indirectly at the shorter end (5 years or less) of the curve. [1]

QT is being carried out in many parts of the world, including the UK, the US, and in continental Europe. [½]

QT does not directly affect short-term interest rates such as SONIA, but can have an indirect impact. Short-term rates tend to be set directly by the central bank as a tool to manage inflation. [1]

Merits of the proposal

QT increases government and corporate bond yields in the medium and long maturities. Swaps are based on 'bank-to-bank' lending rates, which can be a small margin above (sometimes below) government yields. [½]

The scheme will be exposed to a decrease in the short-term floating rates ... [1]

... which could occur, for example:

- during a financial crisis where the central bank was desperate to stimulate the economy, perhaps to protect the banking sector [½]
- if the national currency was to surge higher forcing the central bank to try to weaken it by reducing short-term rates [½]
- if the central bank became worried about deflation and decreased base rates [½]
- if all central banks decided to stop QT, or even to restart QE. [½]

There are times when bank credit becomes preferable to government credit, and in these circumstances the SONIA rate may fall while government short rates rise. [½]

The scheme would also be exposed to the market value of the swaps falling if swap rates for 5-year maturities decrease below 3.5% *pa* (ie market risk). [1]

This might occur for example, if:

- there was a drop in inflation, causing expectations of short-term rates to fall [½]
- international bond market yields fell due to an improvement in government debt levels. [½]

The swap does not obviously hedge any pension liabilities of the scheme, which will be longer dated, and would tend to involve swaps that receive fixed (rather than pay fixed) ... [1]

... and this therefore sounds like speculation. [1]

Acceptance of the swap is unlikely to be recommended. [½]

The suggestion of gearing up by using the low collateral requirement of swaps means that the speculation could be significant in size (and therefore dangerous) relative to the liabilities. [1]

In certain sudden sharp market movements, the collateral requirements on the swaps could generate a liquidity risk for the scheme. [1]

[Maximum 12]

(ii) ***The risks caused by QT***

Risk of yields rising due to central bank bond sales

If bond prices fall as a result of prolonged bond sales by the central bank, then the value of scheme assets will fall. [1]

If the volume of sales spooks the bond market and prices fall sharply in a short period of time, the collateral calls on the geared liability-driven funds could be substantial, requiring large cash resources. [1]

Not providing these cash resources would be a technical default by the scheme ... [½]

... and may require the scheme to sell its other assets in an emergency fire sale. [½]

Government bonds can be sold quickly, but this will push bond prices down further if sales are significant ... [½]

... which would then further increase the amount of cash collateral required. [½]

Commercial property investment trusts will be liquid assets in normal circumstances, and when sales are small in size ... [½]

... but if cash has to be raised in large quantities almost instantly, they will not be liquid enough. [½]

Indeed if other market participants are doing the same thing, the investment trust managers may be forced to use lock-in clauses in the trust, giving them up to 18 months to provide the cash on sales. [1]

If many institutions are selling similar investment trusts, there may be not enough buyers of commercial property at all, meaning that the cash cannot be raised for the investment trust investors. [1]

Risks caused by government overspending

Governments that overspend require to issue bonds to bridge the gap. [½]

This will potentially worsen the bond supply in the market, creating further volatility and downside risk in bond prices. [½]

The government and the central bank may be theoretically independent of one another, but if both are trying to sell bonds in large quantities, there will be a conflict between the two, which could lead to inefficient selling behaviour, which could undermine price stability. [1]

If governments are forced to balance their books, this may lead to severe austerity, which could be bad for the economy and impact any corporate bonds that the scheme owns. [1]

If the government continues to overspend, and debt levels rise, there may be credit risk in the government bond portfolio. [1]

Since the geared liability-driven funds will also invest in government bonds, default risk will also appear here. [½]

Liabilities

In theory, any fall in bond prices should be offset by a fall in liability values, which means that the scheme is no worse off. [1]

However, this is based on the assumption that there will be no credit or default risk in government bonds, and that the scheme will be prepared to hold them indefinitely. [1]

If assets have to be switched at any point in the future, any fall in market value has a real impact on liability security. [½]

[Markers: risks mentioned must be related to the scenario of QT and government borrowing. So legal risks, reputation risks, model risks, etc are not valid here.]

[Maximum 11]

(iii) Positive and negative impacts of high inflation on government deficit reduction

Inflation will increase many of a government's costs, such as:

- public sector wage cost [1]
- infrastructure project costs. [½]

It will also potentially increase long-term bond yields in the stock market. This means that as the government refinances its debt, its interest bill will rise over time. [1]

High inflation can weaken a country's currency, which will increase the costs of materials and services that the government buys from overseas companies and countries. [1]

However, inflation increases salaries in the private sector, which should increase tax receipts from income taxes. [1]

Sales taxes such as VAT will increase as the price of goods and services rise ... [1]

... and other taxes such as capital gains and inheritance will increase if asset values rise with inflation. [1]

Overall the impact of inflation may be mixed and will depend on the specific circumstances of the country. [½]

[Markers: give appropriate marks for other ideas, maximum 5]

(iv) ***Mandating infrastructure investment***

Pros from the scheme's perspective

Infrastructure debt (or equity) will provide a higher return over the long term than traditional government debt, which will reduce the long-term funding costs of the scheme for the sponsor. [1]

Many infrastructure bonds have an underlying government or local government guaranteed cashflow, and are considered very high credit quality. [1]

Cons from the scheme's perspective

Mandating portfolio investment is a dangerous step for a government, and once it starts it may be expanded in other areas in future. [1]

The scheme will have to sell some assets to raise cash for the mandated infrastructure assets, which could lead to a liquidity issue. [½]

This will be especially difficult if all other schemes are in a similar position and selling similar assets (for example government bonds). [1]

If government bond yields rise, the negative impact for the government would offset any benefit gained. [½]

If other assets such as commercial property have to be sold, the scheme may have to accept poor prices in order to raise the cash, which would be to the detriment of scheme members. [1]

Implementation difficulties

The scheme should determine what the definition of 'infrastructure' is to establish what range of investments might qualify in the government quota. [1]

For example it may include debt or equity participation in government projects ... [½]

... but may also include participation in private sector infrastructure projects with no government participation. [½]

It may include pooled funds that achieve a diversified exposure to infrastructure even for smaller schemes ... [½]

... but if it does not, then the scheme should investigate whether it will manage to achieve diversification within its infrastructure portfolio. [1]

It would be necessary for the government to phase such a mandate in over a period of years to allow the scheme portfolios to be gradually changed and for trustees to gain the necessary expertise. [1]

The government will have to explain what happens in circumstances where investments go bust and expose the schemes (and their members) to losses. Is the government responsible for such losses? [1]

Likewise, it would be important to consider what happens where the government mandate cannot be fulfilled because there are insufficient infrastructure projects for schemes to achieve their mandated proportion. [1]

Exemptions for schemes approaching buyout, or schemes that are too small should be considered. [½]

[Maximum 9]

(v) **Liquidity swap**

The benefit for the scheme will be the liquidity premium which will enhance the return while the scheme remains exposed to the gilts. [1]

The term of the illiquid assets should be the same as the government bonds, and therefore the deal should have no negative impact on matching. [½]

During a financial crisis, the liquidity premium might be quite high, but in a normal / benign environment it may be small. [½]

One negative aspect is the fact that the scheme loses access to the government securities that are on loan. This will restrict its ability to manage the portfolio. [1]

A second aspect is that the illiquid assets will be very difficult to value ... [1]

... and the quality of these assets will be difficult to assess. [1]

In the event of a financial crisis, the value of these illiquid assets could fall quickly, and they would no longer cover the loaned gilts. [1]

This would leave the scheme with a credit exposure to the bank. [½]

The scheme would still need the bank to manage the loans and mortgages that would be pledged as collateral, and so the scheme would also have an exposure to the bank in this administrative sense. [1]

There may be regulatory issues as the regulator may not be keen on the systemic risk it poses between the pensions industry and the banking industry. [1]

This would be the FPC in the UK. [½]

[Maximum 6]

(vi) **ETFs**

ETFs are funds that are exchange-traded like normal shares ... [½]

... and are a mix between the traditional collective investment schemes – investment trusts and unit trusts. [½]

There are a large number available in the markets, ... [½]

... and they are linked to all sorts of indices, including equity indices, value/growth shares, sector indices, gold, oil, and bonds. [1]

The charges on ETFs are considerably less than those on unit trusts and investment trusts. [½]

Although they trade on an exchange, the price does not trade at a significant discount (or premium) to the net asset value, as often happens with an investment trust. [1]

This is because the mechanism allows large scale market players to trade with the manager of the ETF, and ask to exchange shares for the matching portfolio, or vice versa. [1]

If the price falls below the net asset value, a market trader may ask to give a large portfolio of the matching assets to the company that manages the ETF in exchange for a bundle of new shares in the ETF. [1]

This will push the price of the shares back up to the NAV and avoid the discount that affects investment trusts. [½]

Only very large traders can do this and the scheme would not be able to obtain shares through this route. [½]

The shares available on the secondary market are generally not available in the size that the scheme would be considering, so it would be difficult to obtain sufficient quantities of shares in the chosen ETF. [1]

In general they are tracking funds, and so do not offer active management. This might be a negative for the scheme. [1]

[Maximum 7]

(vii) Behavioural biases

The trustee could be influenced by 'loss aversion' which is the negative utility that is experienced personally when an asset chosen exposes the fund to a loss. This fund guarantees at least the investment funds returned. [1]

Very similar to this is the concept of 'regret aversion' where the trustee may feel the pain of regret if a bad investment is purchased. It is easier to avoid such regret by buying a guarantee product such as this (similar to loss aversion). [1]

If the fund manager marketed the fund in a certain way, the trustee could have been influenced by framing. [1]

[Maximum 2]

(viii) Psychological issues

Conforming is a common trait found in many investors and asset managers. [½]

Being different and adopting a different strategy involves a brave step at some point ... [½]

... and it is easier to follow the narratives pursued by others than to engage their own Psyche... [½]

... and carry out their own rationalisation (Logos) ... [½]

... in order to discover their own deeper narrative which may be unique to them. [½]

Finding a unique narrative is also time-consuming and difficult ... [½]

... and many trustees do not have (or are not willing and able to commit) the time or energy (Pyr) to develop this. [1]

Trustees also make decisions based on 'ego-defence', whereby they do not want to recommend a different path which, if it goes wrong, will seriously damage their sense of self-worth (*ie* their ego). [1]

Indeed, trustees in a group may exhibit 'group ego' whereby they do not wish to propose something different if it seems to contradict another member of the trustee board and hence damage the other group member's ego. [1]

[Maximum 4]

[Markers accept other reasonable analysis that uses the psychological concepts of Psyche, Nous, Logos, Ego, and Group ego.]

Solution X4.2

For this question, you need to draw on a lot of the information you have learned in previous courses. All markets are influenced by a number of factors.

The first and most important is value, which is discussed in Subject CP1 using the concepts of required and expected returns. For equities, for example, the equations are:

$$\text{Required return} = \text{risk-free real yields} + \text{inflation} + \text{equity risk premium (ERP)}$$

$$\text{Expected return} = \text{dividend yield} + \text{expected dividend growth}$$

We can think of the impact of the policy changes on each of these factors and work out what may happen to yields and hence prices.

Second, equity shares will be influenced by supply (through rights issues) and demand from institutions that see equity shares as an appropriate asset for their liabilities in the given environment. Therefore government policy will also affect equity share markets.

Third, price is affected by such issues as fashion or regulation, which may make one asset category more popular than another.

By thinking through these issues for all the important asset categories mentioned in the question we should be able to generate enough points.

The following answer is only one possible solution, and marks are available for reasonable arguments. However, it is most likely that better scores will be achieved by students that follow the method above rather than simply searching for possible buyers and possible sellers of property and domestic equities.

(i) **How the policies might be implemented and impact on the economy**

Fiscal policy – how implemented

The two main ways of implementing a tighter fiscal policy are to tax more and spend less, and thereby reduce the annual borrowing requirement. [1]

Spending decrease

If spending is decreased it would involve a cut in public sector staff or salary levels and a cut in welfare benefits ... [½]

... or support for industry during the pandemic ... [1]

... which would reduce the amount of spending power in the country, and therefore reduce economic growth. [½]

It may result in strike action and social unrest which can be a significant drag on growth and can impact confidence in the national currency. [1]

In the extreme case, it can result in political instability and the fall of the government. [½]

- X5.1** (i) Discuss the advantages and disadvantages for a large defined benefit pension scheme of managing investments 'in-house' as opposed to having them managed by external fund managers. [8]

As consultant to a large defined benefit pension scheme, you are assisting the trustees with the selection of a new equity manager to replace the existing manager. The trustees have decided to remain involved in the decision and have begun the manager selection process.

Two UK equity managers have provided information as follows:

	Manager A			Manager B		
ownership	large retail bank			small LLP		
speciality	UK large cap specialist			chartist and quants		
number of clients	170			55		
funds under management	£175bn			£1.5bn		
number of UK equity managers	145 analysts & managers			20		
average service of managers	3.5 years			12 years		
fees	0.3% <i>pa</i>			0.4% <i>pa</i> + 20% of outperformance of the benchmark in excess of a hurdle		
<i>relative performance and tracking error (calculated each year using monthly relative performance information, and annualised)</i>		perf	tracking		perf	tracking
	2019	-0.4%	1.4%	2019	+3.0%	4.1%
	2020	+0.6%	1.3%	2020	-2.5%	5.8%
	2021	+0.2%	0.7%	2021	-1.5%	3.8%
	2022	-0.2%	0.9%	2022	+2.5%	4.2%

- (ii) Assess the two managers using the data provided. [16]
- (iii) You have been given the fund performance data for one of Manager A's funds over the 3-year period leading up to 1 Jan 2023, both relative to the peer group and relative to its benchmark index. Explain the investigations you would undertake to establish if the data was relevant to your manager assessment and comment on the usefulness of this data as a means of selecting a manager. [8]

[Total 32]

X5.2 A UK pension scheme is exposed to duration risk in that the duration of its assets portfolio is shorter than the duration of its liabilities. It is trying to increase its interest rate exposure for LDI / matching purposes and is considering three ways of achieving this:

- (a) to add a portfolio of pay floating / receive fixed swaps to the existing portfolio
- (b) investing more heavily in longer-dated gilts
- (c) buying a large futures position in the long gilt future.
- (i) Discuss the main advantages and disadvantages of the three options. [10]

The scheme has the following asset portfolio:

	PV (£m)	Duration (years)
Conventional domestic government bonds	1,200	21
Corporate bonds	400	9
Index-linked domestic government bonds	800	24

The liabilities of the scheme have been valued at current interest rates and using an inflation assumption of 3% *pa*, and have a value of £2,700m and an average duration of 25 years.

- (ii) Define and describe the terms 'modified duration' and 'inflation-modified duration' of a government bond. [4]
- (iii) Give formulae for the terms PV01 and IE01 in terms of modified duration and inflation-modified duration. [2]
- (iv) Define the 'interest rate ratio' for a pension scheme. [1]

A fixed/floating swap with £1,000m nominal value has a term of exactly 10 years, and pays annual interest at the rate of 4.5% *pa*. Swap interest rates for 10-year terms are around 4.5% and the swap has approximately zero value. The pension scheme is considering entering into this swap, to receive fixed and pay floating interest.

- (v) Calculate the interest rate ratio for the pension scheme in its current position. (You may assume that modified duration and duration are equal for the purposes of this question part.) [3]
- (vi) Estimate the impact on the ratio if the swap was added to the portfolio of assets. (The swap can be considered to be a 10-year fixed interest bond, funded by borrowing at cash rates.) [5]
- (vii) Discuss the effectiveness of the swap, and improvements that could be made. [5]

About 30% of the liabilities are considered to be inflation-linked in some way.

- (viii) Discuss the scheme's exposure to inflation risk. [4]
- (ix) Discuss the merits of switching some domestic index-linked bonds into overseas index-linked government bonds. [6]

[Total 40]

(iii) **Performance data**

The following would need to be checked before using the data:

- was the same fund manager in charge of the fund over the three-year period as is presently in charge? [½]
- are the economic circumstances the same now as have been relevant over the 3-year period? [1]
- returns have been calculated using an appropriate method such as time-weighted returns or linked internal returns ... [½]
- ... and that tax and cashflows have been allowed for consistently between the benchmark and the fund. [½]
- have the returns of the peer group been calculated consistently (*eg* bid to bid and allowing for taxes)? [½]
- were the risk levels (beta, volatility) of the fund the same over the observed period as they are now? [1]
- what was the performance of the other funds that were managed by this manager over the period? [1]
- what was the performance of the fund over even longer periods – 5 or 10 years is typical for establishing consistent performance? [1]

Usefulness of the data

Past performance is never an ideal method of selecting a manager, as past performance is rarely a good guide to future performance. [1]

There are costs involved in frequent performance measurement and attribution, which are not always justified by the usefulness in manager selection. [½]

Frequent monitoring of managers can have detrimental effects – it can lead the manager to adopt a short-term approach to portfolio management, which may lead to sub-optimal portfolios. [1]

Comparing a manager to a peer group is problematic because managers rarely have the same objectives, risk guidelines and constraints. [½]

For example, one manager may not be allowed to invest in certain assets that the client deems to be less ethically suitable. [½]

Performance over one time period may seem good and performance over others bad. There is no 'correct' time period over which to judge a manager, which can lead to problems in using the data. [1]

[Maximum 8]

Solution X5.2

(i) **Advantages and disadvantages of the three methods**

The main advantages or disadvantages of the three methods are summarised in the following table:

Swap portfolio	Longer-dated gilts	Long gilt future
– There is a counterparty risk in a swap. This can be reduced by margin or by central clearing, but it still is a potential problem.	+ In the current market (May 2023), the yield on gilts is higher in places than the yield on a swap, therefore there is a yield advantage.	– There would be a substantial margin requirement for such a large futures position which may result in cashflow problems.
+ Flexible in term. The scheme can accurately design the exact spread of durations for the swap portfolio that it wants.	– There is a limited number of ultra-longs. The scheme may find it is heavily exposed to these specific issues.	– The gilt future has a term of 10 years (similar in other countries) and may not respond to changes in interest rates at longer durations.
– Swaps are illiquid and may cause operation or valuation problems in the future.	– There is increased exposure to the UK government which would make the scheme vulnerable to a rating downgrade.	– The future would need to be rolled over indefinitely, which would cause basis risk and incur costs.
– A large swap portfolio may cause problems in the future if the scheme is split through mergers or acquisition activity.	– The term of ultra-longs may still be less than required. Swaps are available at longer durations.	+ This would be quick and easy to put in place, but there may be capacity constraints if the scheme has a large position.

[Markers give credit for other advantages / disadvantages which are not covered in the table.]

[1 mark for each +ve or –ve if ‘discussed’, without duplication, Maximum 10]

(ii) **Modified and inflation-modified duration**

The modified duration of a conventional government bond is its volatility with respect to changes in interest rates, defined as $\frac{-1}{P} \frac{\partial P}{\partial i}$ where P is the price of the bond, i is its gross redemption yield.

[1]

For a conventional government bond, the number is a positive number ...

[½]

... and will equal $\frac{\text{duration}}{\left(1 + \frac{y}{m}\right)}$ where y is the annual gross redemption yield and m is the frequency of payment for the bond. [1]

For an index-linked government bond, the volatility or modified duration will be similar to (but slightly greater than) the modified duration of a conventional bond of the same term. [½]

(Slightly greater due to the larger payment at maturity for an index-linked bond)

The inflation-modified duration of a bond is defined as $\frac{-1}{P} \frac{\partial P}{\partial e}$ where e is the expected rate of future inflation. [1]

For a conventional government bond it will be zero, and for an index-linked government bond it will be similar to the modified duration, but will be of opposite sign (*ie* negative). [1]
[Maximum 4]

(iii) **PV01 and IE01**

$$PV01 = \frac{\text{Net Present Value (NPV)} \times \text{modified duration}}{-10,000} \quad [1]$$

$$IE01 = \frac{\text{Net Present Value (NPV)} \times \text{inflation-modified duration}}{-10,000} \quad [1]$$

Where the 'NPV' is the NPV of the asset or liability, for example the market value of £100 nominal of a bond or the present value of pension payments. [½]
[Maximum 2]

(iv) **Interest rate ratio**

The interest rate ratio is defined as $\frac{PV01(\text{assets})}{PV01(\text{liabilities})}$ [1]

(v) **Interest rate ratio for the scheme**

The modified duration for the asset portfolio can be calculated as the weighted average of the duration of the asset portfolio, which is 20 years. [½]

$$\text{The PV01 of the assets is } PV01(\text{assets}) = \frac{£2,400m \times 20}{-10,000} = -£4.8m \quad [1]$$

$$\text{The PV01 of the liabilities is } PV01(\text{liabilities}) = \frac{£2,700m \times 25}{-10,000} = -£6.75m \quad [1]$$

$$\text{The interest rate ratio is therefore } \frac{PV01(\text{assets})}{PV01(\text{liabilities})} = \frac{-£4.8m}{-£6.75m} = 0.71 \quad [1]$$

[Maximum 3]

(vi) **Impact of adding the swap**

The swap is considered to be a 10-year fixed interest bond, funded by issuing a floating rate note, and a notional nominal payment is included at maturity of the fixed side of the swap. The floating rate payments and an equal and opposite notional nominal payment at the maturity of the swap constitutes a floating rate note (FRN), which has value (PV) equal to its nominal value. The FRN would have no interest rate sensitivity; in other words its PV01 would be zero.

The duration of the swap is:

$$\frac{0.045 \left(1.045^{-1} \times 1 + 1.045^{-2} \times 2 + \dots + 1.045^{-10} \times 10 \right) + 1 \times 1.045^{-10} \times 10}{0.045 \left(1.045^{-1} + 1.045^{-2} + \dots + 1.045^{-10} \right) + 1 \times 1.045^{-10}} = 8.2688 \quad [2]$$

This result can be calculated without a spreadsheet using the formula $(Ia)_{\overline{n}|} = \frac{\ddot{a}_{\overline{n}|} - nv^n}{i} = 40.656$ for the first part of the numerator and using the formula for a level annuity in arrears for the first part of the denominator $\frac{1 - 1.045^{-10}}{0.045} = 7.913$.

$$\text{So the swap duration is } \frac{0.045 \times 40.656 + 1 \times 1.045^{-10} \times 10}{0.045 \times 7.913 + 1 \times 1.045^{-10}} = 8.2688$$

The modified duration is $\frac{\text{Duration}}{\left(1 + \frac{0.045}{1}\right)} = 7.9127$ but we can also use the approximation that the duration and modified duration are the same. [1]

[Markers, deduct 1 mark for students that used an approximation of 10 years for the modified duration]

The PV01 of the assets becomes

$$\text{PV01}(\text{assets}) = \frac{\pounds 2,400m \times 20 + \pounds 1,000m \times 7.9127}{-10,000} = -\pounds 5.591m \quad [1]$$

$$\text{The interest rate ratio would become } \frac{-\pounds 5.591m}{-\pounds 6.75m} = 0.83 \quad [1]$$

[Note the PV01 of the assets is not affected by the notional short position in the FRN, because the PV01 of a FRN is zero.]

(vii) **Effectiveness of the swap and improvements**

Adding the swap improves considerably the interest rate ratio from 0.71 to 0.83, reducing the scheme's exposure to falling interest rates. [½]

There is still considerable exposure, which may require further swaps. [½]

It also introduces basis risk if the liabilities are not valued at swap rates, because changes in value of the assets and the liabilities may not be correlated with one another. [½]

The swap would introduce credit or counterparty risk with the bank ... [½]

... or with the central clearing bank if the swap is centrally cleared. [½]

Swap portfolios also require more monitoring and management, which introduces operational risk. [1]

Managing the collateral or margin account would also require expertise and would incur costs. [½]

Improvements

The swap duration could be increased to 20 years, or even 30 years to improve the ratio yet further. [1]

A portfolio of swaps of various durations could be designed to better match the spread of terms of the liabilities. [½]

This would reduce the risk that interest rates at longer (or shorter) terms change and affect the liabilities, but 10-year rates do not change in the same way. The swap value would not hedge the changes in the value of the liabilities. [1]

The swaps could be spread across multiple counterparties. [½]

Other solutions such as repo portfolios should be considered ... [½]

... or long positions on the long gilt futures contract. [½]

Alternatively, more simple solutions such as lengthening the bond portfolio duration, or switching corporate bonds into government bonds that can have much longer durations could be considered. [½]

[Maximum 5]

(viii) ***Discuss the exposure to inflation risk***

If 30% of the liabilities are inflation-linked, and we assume that the duration of those liabilities is similar to the average duration of the liabilities as a whole, then:

$$IE_{01} = \frac{\text{Net Present Value (NPV)} \times \text{inflation modified-duration}}{-10,000} = \frac{30\% \times 2,700m \times -25}{-10,000} = \text{£}2.025m \quad [1]$$

The inflation-modified duration would have a negative sign because $\frac{\partial P}{\partial e}$ is positive. [½]

IE01 for the assets would be zero for all corporate and government bonds ... [½]

... and for the index-linked bonds $\frac{800m \times -24}{-10,000} = \text{£}1.92m$... [1]

... which gives an inflation rate ratio of $\frac{\text{£}1.92m}{\text{£}2.025m} = 0.95$ [1]

This ignores the fact that the liabilities may be linked to different types of inflation (eg LPI, CPI, salary inflation) and may have been grouped together as 'inflation-linked' ... [½]

... whereas the index-linked bonds will be linked to only one form of inflation. [½]

It also ignores the fact that the liabilities may be spread by term in a different way to the index-linked bonds, creating a cross-hedging risk. [½]

[Maximum 4]

(ix) **Overseas index-linked bonds**

This part of the question is based around Subject SA6, September 2016, Question 4, although the question is slightly different and the solution has been adjusted to reflect this.

Benefits

Overseas inflation-linked bonds may offer a higher real yield (or at least not a negative one) ... [½]

... and offer diversification from exposure to the domestic government. [½]

Some overseas economies are growing strongly, and government revenue streams are more secure (at least the deficits are smaller, as is outstanding debt as a proportion of GDP). [½]

A great deal of inflation is 'global', in that it is related to commodity prices (eg oil and food), and global growth / recession. Overseas bonds would hedge this type of inflation well. [1]

Over the long term, countries that experience high inflation should experience currency weakness (and vice versa), so according to purchasing power parity, overseas index-linked bonds should be a good match for domestic inflation-linked liabilities. [½]

There may be an illiquidity premium in some markets, where bonds are less frequently traded. [½]

Drawbacks

Overseas bonds would be exposed to changes in the domestic currency ... [½]

... which would need to be hedged using futures, forwards or possibly currency swaps. [½]

They may also be less marketable, although many developed markets have quite high liquidity nowadays. [½]

Some overseas governments, especially in developing markets may have less developed controls on the economy, leading to the risk of catastrophic shocks to the markets and very high levels of volatility ... [½]

... or even government controls, write-offs and defaults, or taxes on overseas investors. [½]

Over the short term, there is little evidence that overseas index-linked bonds are a close match for domestic inflation-linked liabilities, so the balance sheet situation would be significantly worsened on a year to year basis. Shareholders may be concerned by this. [½]

It would be necessary to adjust the benchmark against which the manager is measured, and there may be other changes required to the SIP or manager mandates. [½]

[Maximum 6]

Solution X5.3

(i) **Information explanation**

5-year information ratio

The information ratio is defined as $\frac{\text{relative return}}{\text{relative risk}}$ [1]

where *relative return* means the annualised difference between the returns generated by the fund and the returns generated by the benchmark set by the trustee (usually the total return on a major index, less charges and taxes)

relative risk is the volatility of the relative return. [1]

The above returns and volatility of returns would be calculated using the 5-year performance statistics on an annualised basis. [1]

The ratio describes how much the fund managed to outperform the benchmark that it was set, but also distinguishes between those funds that achieved positive relative performance through accepting high risk and those that had normal levels of risk. [1]

Such funds would see their *relative risk* increase and hence their information ratio decrease. [½]

A figure of 0.7 would be considered quite good because it means that the manager has achieved a performance better than the benchmark, and done so with relatively little risk (relative to the benchmark). [1]

The previous year figure of –0.3 is poor as it implies an under-performance relative to the index. A negative number cannot be produced through negative relative risk as this has a minimum value of zero. [1]

Such a sharp improvement in the 5-year data suggests excellent relative performance in the last year (or indeed a very bad performance in the year that dropped out at the start of the period). It is necessary to know why the improvement was so sharp. [1]

Investment styles

A contrarian style means that the manager aims to buy equities that are currently 'out of favour' with the market. In general, these are companies whose shares have fallen considerably in recent times due to some financial or business problems. [1]

If these companies can find solutions to their problems, then they can survive and prosper. [½]

Any fund that has purchased the shares while they are out of favour should see a good performance as the shares become accepted by the market again. [1]

A value style is considered to be one where certain traditional measures of value are considered when buying a share. [½]

These are normally:

- price/earnings ratio (a low ratio indicates good value) [1]
- dividend yield (a high value indicates good value) [1]
- cashflow yield (a high ratio indicates good value) [½]
- price to book value (a low value indicates good value) [½]

Such investment ratios would be considered before buying a share.

[Maximum 9]

(ii) ***Growing funds under management***

Professional fund management involves a complex combination of experience, control and administration in order to take advantage of the views and expertise that the fund managers have. [1]

When a manager has relatively few funds under management, it is possible to handle each fund individually and allow it to benefit from the expertise available. [½]

However, when the number of funds grows, it is necessary to have systems that ensure that the same 'views' are expressed across all funds. [½]

Clearly small funds cannot have the same (large) number of holdings as large funds ... [½]

... so the views of the company need to be prioritised and only the top views applied to both the smaller and the larger funds. [½]

As the size of the funds under management grows, it becomes difficult to apply the same methodology to fund management as was applied when funds were small. [½]

The volume of shares that requires to be purchased can be so large that it can take days to reach the desired weightings, and days to reduce a holding. [½]

The initial purchases of shares for a new 'view' will have to be allocated to one fund or another and cannot be allocated pro rata to all funds, and it becomes difficult to determine a fair system to achieve this. [½]