Subject SA5

CMP Upgrade 2014/15

This CMP Upgrade lists all significant changes to the Core Reading and the ActEd material since last year so that you can manually amend your 2014 study material to make it suitable for study for the 2015 exams. It includes replacement pages and additional pages where appropriate.

Alternatively, you can buy a full replacement set of up-to-date Course Notes at a significantly reduced price if you have previously bought the full price Course Notes in this subject. Please see our 2015 Student Brochure for more details.

This CMP Upgrade contains:

- all changes to the Syllabus objectives and Core Reading.
- changes to the ActEd Course Notes, Series X Assignments and Question and Answer Bank that will make them suitable for study for the 2015 exams.
1 Changes to the Syllabus objectives and Core Reading

1.1 Syllabus objectives

1.2 Core Reading

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

Chapter 0

Section 8.3

The preamble to the further reading section at the start of section 8 has been improved by the addition of the following paragraph...

All items are available from the libraries (e-mail: libraries@actuaries.org.uk). All papers from the British Actuarial Journal (BAJ) are available from the SA5 ‘Resources’, at:

http://www.actuaries.org.uk/students/pages/sa5-finance-specialist-applications

Staple Inn Actuarial Society (SIAS) papers may be located at:

http://www.sias.org.uk/siaspapers/listofpapers

Most items are available from the libraries (e-mail libraries@actuaries.org.uk).

... and the list of books and papers that are recommended in section 8.3 has been updated and now reads:

Books


Hedge funds and funds of hedge funds made simple. What a trustee needs to know. National Association of Pension Funds. NAPF, 2005. 20 pages.


Papers


**Chapter 1**

This chapter has been substantially updated and re-written. Replacement pages are attached to the end of this upgrade note.

**Chapter 3**

**Page 3**

The discussion of the inflation target has been updated. the sentence now reads:

**The CPI increased to 2.9% in December 2009 and remained above 2% until December 2013.**
Chapter 3

Page 3

There has been a new paragraph added immediately prior to self assessment question 3.3, which reads:

The MPC reduced the interest rate to 0.5% in March 2009 and it has remained at that level since then.

In August 2013, the newly appointed Governor of the Bank of England, Mark Carney, launched a policy of “forward guidance”. Under this the Bank will not raise interest rates above 0.5% or cut back on the quantitative easing programme until unemployment in the UK has fallen below 7%.

In February 2014 the Governor of the Bank of England issued further guidance on the setting of monetary policy once this unemployment threshold has been reached as follows:

- The MPC sets policy to achieve the 2% inflation target, and, subject to that, to support the Government’s economic policies, including those for growth and employment.
- Despite the sharp fall in unemployment, there remains scope to absorb spare capacity further before raising Bank Rate.
- When Bank Rate does begin to rise, the appropriate path so as to eliminate slack over the next two to three years and keep inflation close to the target is expected to be gradual.
- The actual path of Bank Rate over the next few years will, however, depend on economic developments.
- Even when the economy has returned to normal levels of capacity and inflation is close to the target, the appropriate level of Bank Rate is likely to be materially below the 5% level set on average by the Committee prior to the financial crisis.
- The MPC intends to maintain the stock of purchased assets at least until the first rise in Bank Rate.
- Monetary policy may have a role to play in mitigating risks to financial stability, but only as a last line of defence if those risks cannot be contained by the substantial range of policy actions available to the Financial Policy Committee and other regulatory authorities.
Chapter 4

Section 1.2

The table of tax allowances has been updated:

<table>
<thead>
<tr>
<th></th>
<th>2014 / 15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Personal</td>
</tr>
<tr>
<td>Basic allowances **</td>
<td>£10,000</td>
</tr>
<tr>
<td>Age 65 – 74</td>
<td>£10,500</td>
</tr>
<tr>
<td>Age 75 and over</td>
<td>£10,660</td>
</tr>
<tr>
<td>Income limit for age-related</td>
<td>£27,000</td>
</tr>
<tr>
<td>allowance</td>
<td></td>
</tr>
<tr>
<td>Blind person’s allowance</td>
<td>£2,230</td>
</tr>
</tbody>
</table>

and the table of tax rates in section 1.4 has been updated:

<table>
<thead>
<tr>
<th>Tax</th>
<th>Rate</th>
<th>Taxable income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting savings rate (*)</td>
<td>10%</td>
<td>£0 – £2,880</td>
</tr>
<tr>
<td>Basic rate</td>
<td>20%</td>
<td>£0 – £31,865</td>
</tr>
<tr>
<td>Higher rate</td>
<td>40%</td>
<td>£31,866 – £150,000</td>
</tr>
<tr>
<td>Additional rate</td>
<td>45%</td>
<td>over £150,000</td>
</tr>
</tbody>
</table>

Section 2

There has been a new paragraph inserted to explain the inheritance between partners:

Since October 2007, married couples and registered civil partners can effectively increase the threshold on their estate when the second partner dies to as much as £650,000. This involves transferring the unused inheritance tax threshold or “nil rate band” of the first partner to die to the second partner.
Section 3

In the section on corporation tax, the paragraph that used to read:

The main rate of CT is 23%. This is charged on the whole of profits where they exceed £1.5m (and in all cases for closed investment-holding companies). A small profits rate of 20% is charged on the first £300,000 of profits where profits are below £1.5m. There is marginal relief for profits between £300,000 and £1.5m.

now reads:

Indexation Allowance allows for the effect of inflation when calculating chargeable gains.

The main rate of Corporation Tax is 21%. This applies when profits (including ring fenced profits) are at a rate exceeding £1.5m or where there is no claim to another rate, or where another rate does not apply.

A small profits rate of 20% is charged on the first £300,000 of profits where profits are below £1.5m. There is a sliding scale known as marginal relief for profits between £300,000 and £1.5m.

From 1 April 2015 the small profits rate will be unified with the main rate, so there will only be one Corporation Tax rate for non-ring fenced profits of 20%.

The special rate for unit trusts and open ended investment companies is 20%.

For companies with ring-fenced profits (income and gains from oil extraction activities or oil rights in the UK and UK Continental Shelf) these rates differ. The small profits rate of tax on these profits is 19% and the ring-fenced fraction is 11/200. The main rate is 30%.

Section 4

The capital gains tax allowance has been updated to £11,000.
Chapter 6

Section 1.2

The first two paragraphs of this section which describes the PRA, now read:

The Prudential Regulation Authority (the PRA) is a subsidiary of the Bank of England and is responsible for the prudential regulation of all deposit-taking institutions, insurance providers and large investment firms.

These firms are referred to as PRA-authorised firms and also dual-regulated firms, as the FCA is their conduct regulator.

The PRA has the following objectives in respect of insurance company supervision:

- promoting the safety and soundness of the companies that it supervises
- contributing to securing an appropriate degree of protection for those who are or may become policyholders.

A key feature of the PRA’s approach is risk-based supervision. The PRA assesses the risk that a particular firm, activity or issue poses to the PRA’s objectives and concentrates its supervisory effort on high-risk areas. It is not the PRA’s role to ensure that no insurance company fails.

Section 1.3

A new paragraph has been inserted at the start of this section:

The Financial Conduct Authority (the FCA) is responsible for regulation of conduct in financial markets (and the infrastructure that supports those markets) and the prudential regulation of financial services companies that do not fall under the scope of the PRA (e.g. insurance brokers and smaller investment firms).
Section 6.1

Some numbers have been updated in the paragraph that reads:

At the time of writing (April 2014), progress has been made on the first three Levels but these have not yet all been fully finalised and ratified. Agreement was reached on the Omnibus II text in (which updates the Level 1 measures originally set out in the 2009 Solvency II Directive) in late 2013 and it was finalised by the European Parliament in early 2014. This will be followed by approval of the Level 2 implementing measures and introduction of Level 3 guidance.

and the following paragraph has been deleted:

Development of the regime has been supported through a number of Quantitative Impact Studies (QIS) that insurance companies have been asked to complete, and through liaison with national supervisory bodies. EIOPA (the European Insurance and Occupational Pensions Authority, one of the EU's main financial supervisory bodies and which developed from the body previously known as CEIOPS) has provided technical advice and support to the European Commission for the development of the delegated acts under Level 2, and is responsible for producing some of the technical standards and the Level 3 additional guidance.

Section 6.3

The following paragraph has been deleted:

An illiquidity premium is defined as the additional compensation that investors gain by bearing the risk from holding an illiquid asset. The extent to which the risk-free discount rate used to discount technical provisions can include an allowance for the illiquidity premium remains under consideration, with a number of different possibilities having been suggested. Under QIS5 (a “field test” of the development of Solvency II, performed in 2010), insurance companies could allow for a specified proportion of the illiquidity premium, where the proportion varied depending on the extent to which the future liability cashflows were themselves illiquid. The final framework might instead adopt the use of “counter-cyclical premiums”, allowing firms to use a higher discount rate for liabilities only in terms of financial stress, as determined by EIOPA.

The concept of “matching adjustment” (originally “matching premiums”) has also been proposed for insurance companies with long-term predictable liabilities and “hold-to-maturity” assets which are expected to produce cashflows which match those of the liabilities. These aspects continue to be worked on, and more details are expected as the framework develops.
2 Changes to the ActEd Course Notes

Chapter 1

Section 3

This is a new section on “shadow banking”, and the ActEd material has been added to support the new Core Reading. The entire chapter has been added as replacement pages at the end of this upgrade note.

Chapter 2

Page 18

The example of a margin account has been reworded to make it clearer.

Example

An investor has 100 open buy contracts in the FTSE100 future, which were priced at the close of business the previous day at a price of 6,200. During the following day, the futures price rises to 6,250 at close of business. What is the change in the margin account balance, and would variation margin be paid or received at close of business?

The FTSE100 contract is defined as £10 per index point, and its tick is defined as 0.5. A movement of 50 points in the index would result in a profit of;

$$100 \times 50 \times £10 = £50,000$$

In this case, as the investor has positive exposure to the index and the index has risen, the profit would be paid into the investor’s margin account at the end of the day by the LCH. Whether a “variation margin” payment could be taken by the investor from the margin account into his/her private bank account would depend on the overall level of the margin account after the payment had been made. If the margin account has risen significantly above the initial margin level, then it is likely that a variation margin payment could be withdrawn from the margin account by the investor.

When investors make losses, which are deducted from the margin account, no variation margin payments into the margin account are required until the margin reaches the “maintenance” level. At this point a variation margin payment into the account is required to top it up to the initial margin level.
The tick value of the FTSE100 contract is the change in value of one contract if the futures price moves by one tick (namely 0.5 index points). Thus the tick value of the FTSE100 contract is $1 \times 0.5 \times £10 = £5$
3 Changes to the Q&A Bank

Q&A4

The last question in this Q&A Bank has been replaced. The new question reads:

Comment

This question is taken from Subject SA5 September 2013 to give an idea on the level of difficulty of questions set in this exam.

Question 4.15

XYZ Insurance is a small UK general insurance company. The firm has recently decided to sell credit default protection contracts that would pay out in the event of a specified entity defaulting on its debt payments.

(i) Describe the main factors that XYZ should assess when setting the premiums for credit default protection contracts. [5]

(ii) Discuss the main reasons why XYZ may want to transfer some of the credit default risk liabilities to other parties. [5]

XYZ is considering setting up a limited-life special purpose vehicle (SPV) to provide additional capital for writing credit default protection contracts. The SPV will collect ceded premiums from the credit default protection contracts underwritten by XYZ, and in return will pay out the specified default claims back to XYZ. The SPV’s capital structure will consist of both debt and equity layers.

(iii) Discuss the main SPV characteristics that should be considered in the design and set-up of this SPV. [15]

(iv) Describe the features that could be enhanced or included in this SPV to make it more attractive for institutional investors. [7]

(v) Discuss to what extent this SPV would be an appropriate investment for a UK pension scheme, including the risks arising. [6]

[Total in part 38]
The solution to this question is as follows:

**Solution 4.15**

**Comment**

The following solution comes from the Examiners’ Report, which stated that, with the exception of part (v), the question was not done well by candidates.

(i) **Main factors to assess**

Credit risk  in particular likely probability and magnitude of default of an individual contract.

The assessment must include an assessment of margin for error and exposed to risk.

Model risk

Systemic risk  the extent of likely correlation between contracts (particularly during a broad market stress event). The correlation of risk/return with XYZ Insurance’s other books of business is likely to be low (assuming they are all traditional general insurance (P&C) business).

Volatility  volatility of default experience and volatility of exposure (eg if collateral invested in risky assets)

Capital  the capital required to reserve against losses, how this will be funded, and how this will be invested

The cost of capital would be important. What is the required rate of return given other potential uses of capital, and the required (net of tax) profit margin?

Expenses  The expenses incurred in setting up, selling, managing, monitoring and administering the contracts.

Volume  Likely volume of business sold, and if say development costs will be amortised over time.

Competitive considerations – premium rates charged by other market participants.

Settlement  Whether the CDSs are settled on a cash basis or through physical settlement.
Contracts including term, timing of premium and claim payment, conditions to make a claim.

(ii) **Reasons to transfer the credit risk on to other parties**

Regulatory: the regulator may require high levels of solvency capital against this business or limit insurance companies’ exposure to financial credit risk.

To evidence good risk management (through transfer of risk) under Solvency II.

Improve solvency capital funding ratio.

This book of business may be assessed to not be diverse enough and highly correlated to certain economic events. Hence XYZ may want to protect against extreme events by diversifying its book of business through transferring any concentrated risk exposures.

It may improve the insurance company’s own credit rating.

Profit considerations: the company may wish to write more risk and earn ceding commission, especially if the current economic climate is viewed to be a good environment currently to transfer risk at favourable rates.

XYZ’s may not have enough capital currently to write this line of business. The book may have become too big, or there may be limited existing capital etc.

(iii) **SPV characteristics**

<table>
<thead>
<tr>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>As with many SA5 question, it is worth taking a few minutes to work out exactly what the examiner is suggesting in the question. This is a large part of the question, and many ideas will be scoring only a half mark.</td>
</tr>
</tbody>
</table>

We are given the idea of an SPV which raises external capital from investors. This SPV then collects “ceded premiums” – namely the part of the premiums received by XYZ that have been “ceded” to the SPV. The SPV will then pay the default claims back to XYZ – so this vehicle is operating very like a reinsurance company. So we can think of the question as being about the desirable qualities (for both XYZ and for the investors) of a reinsurance company set up to cover this specific risk.

We are also told that it will issue debt and equity, so we can talk about the mix and the benefits and drawbacks of leverage. |
Examiners comment: Features should look to meet the needs of XYZ Insurance company, while at the same time remain attractive enough to be able to sell to outside investors.

Appealing to investors

Split between Equity/Debt and max leverage – this would influence the risk and return profile for the various equity and debt tranches.

Level of coupons on debt securities, ensuring that the debt security ranks above equity holders if the structure were to wind up.

Equity dividend payment policy, greater potential/levered participation in upside of any excess profits, though less secure than debt.

The composition of the target book of credit default protection contracts, including guidelines around concentration and other risk limits.

Form of risk transfer to the SPV – securitised (e.g. bond), insurance-linked swap, reinsurance contract, etc.

Retention and alignment of interest – to what extent do XYZ want to participate in the SPV and in which tranches.

Fair allocation policy – what procedures and mechanisms should be in place to ensure XYZ does not just fill the SPV with low quality / higher risk contracts and keep all the higher quality contracts for itself?

Who retains the tail risk (if any)?

SPV’s exposure to counterparty risk in the form of XYZ itself, the collateral manager, etc.

Need for a rating for the SPV debt tranches – requirements of investors, and rating agencies and likely costs.

Appealing to XYZ Insurance

Maximum/minimum size and total capacity of the SPV – is it large enough to be worthwhile for XYZ and small enough not to be too difficult to sell all the capacity at favourable terms.

Duration/term of SPV – what duration capital does XYZ require to write this business?
Ownership and voting rights of investors in the SPV – who controls the SPV and how would any disputes between the owners be resolved?

Appropriate termination features, including an ability to wind the vehicle up early should the need arise eg market environment no longer attractive.

Fees, including any set-up costs, ongoing, and winding-up expenses/management fees. What impact are these likely to have on the expected return delivered by the SPV, and would this still be acceptable to investors?

Extent of any ceding and profit commissions taken by XYZ Insurance and how do these compare to peers.

Capitalisation during ramp-up, including how capital is likely to be drawn down.

Collateral structure and permissible collateral investments, and specifying the currency of collateral.

Legal / regulatory (including domicile) considerations and the resulting impact on regulatory capital requirements, and compliance requirements and costs.

Tax considerations – how are premiums, yield on collateral, profits, dividends, coupon, and other distributions taxed in various potential domiciles?

The responsible for ongoing management of SPV – is it more cost effective to outsource, or are there specific regulatory requirements?

(iv) _Features that could be enhanced or included_

**Comment**

This question is asking “what features make a reinsurance SPV attractive to investors” and how can we enhance them. Many students would have thought about the methods of enhancing securitisation products, such as collateralisation, third-party guarantees, etc, but this is more like an insurance company than a securitisation. Although these ideas might work for the debt, we also need to think if the investors putting forward equity capital. What would make the equity and debt of a specialist reinsurance company attractive?
Increased retention (minimum co-investment levels) and clear alignment of interest mechanisms.

Making it tax-efficient, with low fees and expenses.

Committing to structuring a diversified portfolio of high quality risks

Clear risk limits. A good level of initial and on-going transparency and disclosure should be offered to investors.

Limited life of risks – no long-tailed liabilities should be taken on by the SPV.

Setting up independent management of SPV, ideally removing any counterparty risks.

Committing to high underwriting standards, and providing investors with detailed information on the minimum requirements for taking on risks.

Minimum return on equity (won’t write business with an expected profit below a certain limit).

Return to investors supplemented by XYZ if the SPV’s minimum return on equity is not met.

Specifying a reduced max loss. This could be through use of hedging – XYZ taking on the tail risk, or transferring it to someone else.

Payment of a regular dividend to equity holders.

Greater potential/levered participation in upside of any excess profits.

Attractive coupon levels for debt holders.

Providing additional security/collateral/guarantees.

Limit leverage levels (opposite to what might be attractive to equity holders) to reduce risk of the debt experiencing losses.

Obtain ratings for debt tranches in case this is a minimum requirement for investors to invest.

Making debt convertible to equity, or callable.
(v) **Appropriate for pension fund investors, including risks**

Pension scheme may view it as a good tactical/opportunistic investment if premiums are unusually attractive.

Correlation with other risks: Potentially higher risk if the SPV experience losses at a time when the scheme sponsor is in distress (due to difficult economic environment).

This is a risky investment – is the scheme looking to derisk in the near term?

Governance levels of pension fund trustees, do they understand what they are buying and able to monitor it?

Tax efficiency, would this count towards permissible assets, *etc.*

**Risks associated with the investment**

Credit risk – loss from default of underlying credit contracts in SPV

Credit risk – loss from default from SPV itself (due to SPV’s counterparty risk)

Collateral / Market risk – investment loss assuming collateral is invested in risky assets

Liquidity risk – not being able to sell the SPV at a reasonable price within a short timeframe

Currency risk – potential currency mismatch between SPV assets and the payouts and the scheme liabilities

Operational risk – risk of loss due to fraud, operational failures *etc.*

Monoline – limited life – hence market timing may be important.

Duration – extent of any potential duration mismatch
Changes to the X Assignments

X1 Questions X1.1, X1.2 and X1.3

These questions have been revised. Replacement pages are attached at the end of this upgrade note.

X2 Question X2.1

The solution to part (iv) has been re-worded to make it clearer. It now reads as follows:

Defeasance is primarily a method of reducing balance sheet gearing, as it transfers debt to a separate bankruptcy-remote entity. \[1\]

Companies that have high levels of gearing which is concerning investors and lenders, and restricting corporate activity might consider defeasance to improve the balance sheet. \[\frac{1}{2}\]

If interest rates have risen since the bond was issued, and hence the price of the bond fallen, it may be cheaper to buy a portfolio of government bonds to match the outstanding payments than it is to redeem the bond at par (or at par plus an incentive margin). So the relative cost of defeasance might also be a reason to defease rather than redeem. \[1\]

[Maximum 2]

X4 Question X4.1

Part (i) of this question has been shortened from 16 marks to 9. A new part examining Solvency II has been added to the question. Replacement pages have been attached to the end of this upgrade document.
Other tuition services

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

3.1 Study material

We offer the following study material in Subject SA5:

- Mock Exam
- Additional Mock Pack.

For further details on ActEd’s study materials, please refer to the 2015 Student Brochure, which is available from the ActEd website at www.ActEd.co.uk.

3.2 Tutorials

We offer the following tutorials in Subject SA5:

- a set of Regular Tutorials (lasting three full days)
- a Block Tutorial (lasting three full days)

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.

3.3 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 2015 Student Brochure, which is available from the ActEd website at www.ActEd.co.uk.
3.4 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 (e.g. 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 SA5@bpp.com or by fax to 01235 550085.
# Chapter 1

## Economies and markets

### Syllabus objectives

(a) Demonstrate a knowledge and understanding of the financial markets with particular reference to the needs of a United Kingdom user.

(i) Outline the main features of the capital markets in the United Kingdom, and other developed and emerging markets.

(iii) Outline the main features of the structures of the economies of the United Kingdom, and other developed and emerging markets.

## 0 Introduction

At this stage in your studies you should keep abreast of changes in global economies and be able to discuss economic matters. In the run up to the SA5 exam you should keep an eye on the FT to keep tabs on market forecasts and corporate activity in the major markets described in this chapter. Of particular interest will be:

- growth and inflation estimates
- budget and current account deficits and surpluses
- corporate profitability
- corporate activity in the sense of mergers, acquisitions, privatisations, etc.
- tax changes and trends
- international events such as EU agreements, WTO free trade agreements, etc.

In the past, the finer details contained in this chapter have not been examined. However, a thorough knowledge of economic events, government action on the economy, and banking sector intervention has been required.
We have not added much in the way of ActEd material to this chapter as it changes on a continuous basis with the changing economic environment. It is more important to keep up to date with the general political and economic events in the national press than it is to memorise the path of interest rates or the behaviour of financial markets as described in the early part of this chapter. However, it does indicate the sorts of things that students need to keep an eye on as they approach the exam.
1 Major markets – UK

1.1 The UK economy

The UK Government's economic strategy has six main elements:

- maintaining macroeconomic stability
- meeting the productivity challenge
- increasing employment opportunity for all
- building a fairer society
- delivering high-quality public services
- protecting the environment

The UK economy is the world's seventh largest (after the USA, China, Japan, Germany France and Brazil) measured by nominal Gross Domestic Product (GDP) and eighth largest (after USA, China, India, Japan, Germany, Russia and Brazil) measured by Purchasing Power Parity (PPP).

The UK economy grew by 3% in 2004, but for 2005 it fell to 1.8%. Growth increased to about 2.5% for 2006 and 2.6% for 2007. Between the start of the recession in 2008 and the end of 2009, the economy shrank by 4.9%; this makes it the longest recession since records began. The economy then grew by 1.5% over 2010 and 0.8% over 2011. Growth fell back to 0.2% in 2012, but increased to 0.7% in 2013.

Consumer price inflation at 31 December 2010 was 3.7%; it increased to 4.2% in December 2011. It fell back to 2.7% at 31 December 2012 and then to 2% at 31 December 2013.

The retail price index at 31 December 2008 was at an annual rate of 0.9% it became negative for the first time since 1960 when it fell to –0.4% in March 2009 but rose to 2.4% by 31 December 2009 and rose further to 4.8% at 31 December 2010 and it was still at 4.8% in December 2011. It fell back to 3.0% at 31 December 2012 and further to 2.7% at 31 December 2013.

In 2003 the base rate was reduced twice, then increased once and increased four times in 2004 to give a base rate of 4.75% at the end of 2004. During 2005 base rates were cut to 4.5% and then raised twice during 2006 to end at 5.0%. During 2007, rates were raised three times before being cut once to end the year at 5.5%. During 2008, rates were cut five times to end the year at 2.0%. There were three further cuts in 2009 bringing the rate down to 0.5%. The rate remains at this level (as at April 2014).
The UK had a current account deficit of £22.4 billion in the fourth quarter of 2013. The UK is highly dependent on foreign trade. It must import almost all its copper, ferrous metals, lead, zinc, rubber, and raw cotton and about one-third of its food. The UK exports manufactured items such as telecommunications equipment, cars, automatic data processing equipment, medicinal and pharmaceutical products and aircraft. Its main trading partners are the European Union, the USA, China and Japan.

In December 2013, the employment rate in the UK for those aged 16 to 64 was 72.0%. There were 30.09 million people in employment aged 16 and over. The unemployment rate was 7.4% of the economically active population. There were 2.39 million unemployed people. The inactivity rate for those aged from 16 to 64 was 22.1% and there were 8.92 million economically inactive people aged from 16 to 64.

1.2 The banking sector

The Bank of England is the UK’s central bank and is responsible for promoting and maintaining a stable and efficient monetary and financial framework. In pursuing this goal, it has three main purposes:

- maintaining the integrity and value of the currency
- maintaining the stability of the financial system
- seeking to ensure the effectiveness of the financial services sector.

The Bank's monetary policy objective is to deliver price stability (defined by the Government's inflation target) and, subject to that, to support the Government's economic policy, including its growth and employment objectives. The Bank's Monetary Policy Committee has responsibility for meeting this target and for setting interest rates.

Currently the Bank’s target is to maintain the rate of increase of the Consumer Price Index within plus or minus 1% of 2% pa.

Much more on the Bank of England’s objectives, as well as those of the Monetary Policy Committee, and how those objectives are attained, is covered in Chapter 3.

Banks are supervised by the PRA (Prudential Regulatory Authority). Again, you will learn much more detail on this in later chapters, particularly Chapters 5 and 6.

They are required to meet minimum standards on the integrity and competence of directors and management, the adequacy of capital and cash flow, and the systems and controls to deal with the risks which they experience.
1.3 **The insurance sector**

The insurance sector is supervised by the PRA. Its prime focus is on insurers maintaining financial resources sufficient to meet their responsibilities to policyholders, including their ability to absorb any market falls that may occur.

The London Insurance Market (London Market) is a distinct part of the UK insurance and reinsurance industry. It is the main centre for world reinsurance business and for energy, marine, aviation, satellite and other forms of transport insurance. It comprises insurers, reinsurers, Lloyd’s syndicates, Protection and Indemnity Clubs (mutual insurers for ship owners) and brokers.

1.4 **Investment**

The UK has considerable expertise in fund management, which involves managing funds on behalf of investors, or advising them how best to invest their money. The main institutional groups are long term insurance funds, general insurance funds, self-administered pension funds, investment trusts and unit trusts.
2 Major overseas markets

Students are expected to use the Economist ‘World in 2014’ Report to appreciate the key characteristics of the capital markets and economies in these regions. Knowledge of the detailed information is not required.

*The World in 2014 Report is published by the Economist Intelligence Unit and is available via the SA5 Learning Portal.*

Relevant articles include those on key economies, including USA, China, Russia, Latin America.

Relevant statistics include those relating to individual countries and regions, including Europe.

*Country Reports published and updated by the Economist Intelligence Unit on the USA, Japan, Germany and France are also available via the SA5 Learning Portal.*

Students are expected to use the Reports to appreciate the key characteristics of the capital markets and economies in these regions.
3 Shadow banks

3.1 What are shadow banks?

Shadow banks are non-bank financial intermediaries providing services similar to those offered by traditional commercial banks. They include entities such as:

- hedge funds
- money market funds
- structured investment vehicles
- credit investment funds
- exchange-traded funds
- private equity funds
- credit insurance providers
- securitisation
- finance companies.

“Shadow banking” is the provision of services by non-banks, that would otherwise be provided by the banking sector. Rather than placing funds on deposit, private investors and commercial entities can buy money market pooled funds, or market-neutral hedge funds for example. The returns may be better than those offered by banks. Rather than raising money from banks in the form of a secured loan, it may be better to approach a private equity fund manager to get equity or mezzanine debt finance, which may have lower rates of interest and fewer restrictions for the company. An alternative is to securitise an asset that the company owns to raise debt rather than approach a bank. Similar services exist for getting credit insurance and import/export guarantees. It is even possible to hedge future costs in foreign currencies by investing in ETFs that mirror that currency, rather than use a bank’s foreign currency department to buy forwards.

Shadow banks operate worldwide and provide a more direct link between providers and users of capital and than traditional banks who charge fees for intermediating. The services they offer including matching lenders and borrowers and providing investment advice. The matching of lenders and borrowers can be both direct and indirect through fund structures.
3.2 **What are the benefits and drawbacks?**

Shadow banks are usually subject to much less regulation than commercial banks. This enables them to offer similar products more cost effectively and to bring new products to market faster.

They can also offer products that are not typically available in the traditional banking market.

They offer a vast array of investment funds using many products to increase returns, lower correlations and reduce relative risk. The products can include debt leverage, derivatives, swaps, commodities, specialist investment products.

They can offer customers securitization – to create safe assets and collateral intermediation – to help reduce counterparty risks and facilitate secured transactions.

Shadow Banks operate with relatively much lower reporting requirements and hence much less transparency than traditional banks. This enables them to take advantage of technical expertise (proprietary strategies) for longer. It also enables them to claim that their superior abilities are down to expertise and not the result of undisclosed risk taking.

Shadow banks provide outside stakeholders with relatively little information. The lack of information means that outsiders cannot assess the risks that shadow banks are running to produce their returns.

**Question 1.1**

What lessons can be learned from the collapse of Bernie Madoff’s fund in 2008 with respect to shadow banking?

3.3 **What are the risks?**

The risks arising from the operation of shadow banks include:

- **leverage.** As they do not have to keep the levels of capital relative to financial exposure, they tend to leverage, and are more exposed to booms and busts. The relative out-performance in boom times is advertised to clients as being superior rather than the result of leverage. This leads to more money moving to shadow banks and exacerbates any future financial crisis.
increased systemic risk which in turn increases the risk of future financial crises being worse than they would otherwise have been. This is because the shadow banks operate with similar levels of excess leverage and are exposed to similar external risks.

Systemic risk here means a risk that the entire financial system can end up in difficulty, often due to the “domino” effect from one bankrupt institution affecting another and so on.

liquidity risk as there is no access to central banks as the lenders of last resort.

3.4 Government attitude

Governments allow shadow banks operate in their country as if they did not the shadow banks would go elsewhere costing jobs, tax receipts and prosperity. Shadow banks increase liquidity in the economy. If shadow banks were not allowed to operate legally in a country then:

- the financial system will lose at least some entrepreneurs and innovators
- investors would still find ways to use shadow banks overseas but at much increased risk
- the government will be unable to impose any level of scrutiny or operating standards on shadow banks
- the country may experience capital outflows.

Question 1.2

What could governments do to better regulate the shadow banking institutions?
This page has been left blank so that you can keep the chapter summaries together for revision purposes.
Chapter 1 summary

The UK market

The UK Government’s economic strategy has six main elements:
1. maintaining macroeconomic stability
2. meeting the productivity challenge
3. increasing employment opportunity for all
4. building a fairer society
5. delivering high-quality public services
6. protecting the environment.

Up until the credit crunch, the UK economy had performed relatively well over the previous 10 years in terms of economic growth, low inflation and low unemployment. Much of this may have been caused by the debt bubble that was gaining momentum at the time, and the impact it had on banking sector growth and employment. However, since 2008 there has been a lot of uncertainty about excessive borrowing, higher unemployment and economic recession. The government’s (and Central Bank’s) quantitative easing (QE) strategy along with the policy of ultra-low interest rates may stoke inflationary pressures in the future.

The government is forecast to borrow around £110 billion in 2014 to fund its deficit. Outstanding government debt is rising sharply, and is predicted to continue to rise until 2018 at the earliest.

The insurance market has been affected by low interest rates and increased regulation on a global basis.

In the UK market, equity yields are around 3.5%, bond yields (longer-term) are around 3.6% and base rates are 0.5% (May 2014).

Overseas markets

The main overseas centres of interest are the

- US
- Japan
- Germany
- France.
For each, we need to know a little about the condition of the economy, the budget deficit situation, the performance of the equity markets and the level of interest rates. It is usually not necessary to know the detail, but a high-level understanding of what is being discussed in the press is important for Subject SA5.

**Shadow banks**

These are financial firms or pooled funds that operate outside the traditional banking regulatory framework, but provide services that would otherwise be provided by commercial banks, such as:

- raising debt finance for companies
- investing funds for companies and wealthy investors
- managing foreign exchange and credit exposure for companies.

Companies include:

- hedge funds
- money market funds
- structured investment vehicles
- credit investment funds
- exchange-traded funds
- private equity funds
- credit insurance providers
- securitisation
- finance companies.

The main advantages of shadow banks is that the lack of regulation allows them to provide services at lower cost and therefore offer better terms to the customer. They add liquidity to the system and increase competition in the commercial banking market. However they expose the country to a systemic risk because they are more highly leveraged, less transparent and do not have any support from central banks or compensation funds that may exist elsewhere.
Chapter 1 Solutions

Solution 1.1

The Madoff fund was an example of a pooled fund which offered attractive rates to savers and a seemingly low level of risk. It operated outside the traditional regulatory environment, which allowed the manager of the fund to operate a Ponzi scheme that went undetected for more than a decade. The level of transparency of the fund was very low and most investors invested on trust and based on past performance statistics.

Many investors lost a great deal of money when the fraud was finally uncovered, but there was little if any, compensation or investors.

Many believe that the regulators should have uncovered the fraud much earlier, but because it operated outside the normal environment, it was harder for regulators to get access to the information that they required.

If large numbers of situations such as this were to arise in a short period, it would present a real systemic challenge to the authorities.

Solution 1.2

It could extend the banking regulation to a wider range of institutions, forcing them all to hold the regulatory capital levels that commercial banks have to hold.

It could separate the business segments, in the same way as the investment banking and retail banking sections of commercial banks were segregated. This might prevent the problems of one part of the business bringing down the other divisions and perhaps the whole institution.

It could increase disclosure requirements and accountancy standards for a wide range of shadow banking activities.

It could increase the requirements on financial advisors when recommending products that are in the shadow banking environment. For example, the government could perhaps force a more detailed investigation of the individual’s knowledge and wealth and risk appetite, and make sure that they are aware of the lack of central bank support.

They could encourage a voluntary scheme between shadow banking institutions. This might be weak enough to prevent the institutions simply moving offshore, but at the same time strong enough to encourage a higher standard of activity.
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General comment

The Subject SA5 exam will consist up to four longer questions, which should be answered in a period of 3 hours. Although the later assignments reflect this structure, Assignments X1 to X4 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.

Question X1.1

A general insurance company and a life insurance company, which each hold the following securities (the life insurance company holds the securities in its BLAGAB fund):

- a 7% unsecured loan stock 2024 issued by ABC plc which currently has a market price of 100 and,
- 5.5% preference shares in ABC plc maturing in 2024, which are currently priced at 100.

(i) Describe in detail how each of these institutions would be taxed on their holdings, including net redemption yields, if the securities were purchased and then subsequently sold. [4]

(ii) List the other issues that the companies should consider before making further investments in one or other of these securities. [2]

[Total 6]

Question X1.2

(i) Define monetary policy. [1]

(ii) Describe the ways in which a central bank can control the money supply. [7]

(iii) Explain why monetary policy is not always successful in achieving inflation rate targets. [2]

[Total 10]
Question X1.3

(i) (a) Describe the tax that a UK higher-rate taxpayer would pay if he were to buy a property, rent it out for one year and sell it for a profit at the end of the year. 

(b) How would his tax liability differ if he were to buy and hold an equity portfolio over the same period? 

(ii) (a) A UK Treasury Bill with an expiry date 70 days from today is standing in the market at a rate of discount of 7% pa. If an investor invests £1,000 in the bill, how much will he/she receive when the bond matures? You should assume that income for the investor is taxed at the rate of 20%, and that any taxable gains are taxed at the rate of 18%)

You may assume that the price of a Treasury Bill is determined from its discount rate using the formula:

\[ d = \frac{100 - P}{100} \times \frac{365}{70} \] where \( d \) is the discount rate and \( P \) is the price. 

(b) The investor also invests £1,000 in Psycho Systems, a rapidly-growing company which pays no dividends. The shares were purchased by the investor at a price of £4 per share on 1 January 2005. Immediately following this purchase, Psycho Systems had a one-for-two rights issue at £2 per share and the investor took up his/her shares. Psycho Systems also had a one-for-three scrip issue in 2006. The investor sold the shares on 1 January 2010 at a price of £5 per share. Calculate the annualised return on the investment allowing for tax payable as mentioned above in (ii)(a), but ignoring indexation on gains. 

[Total 11]

Question X1.4

(i) Give brief descriptions of the economies and stock markets of the following countries:

(a) the United States of America

(b) Japan

(c) France. 

[12]
Assignment X1 Solutions

Solution X1.1

(i) How each institution would be taxed

The general insurance company is taxed as a trader in securities. As such all income and capital gains (without indexation) will be charged corporation tax at 21%. [½]

The life insurance company (BLAGAB) is taxed on an “I–E” basis at the basic rate of income tax. [½]

Neither company will pay further tax on franked investment income. [½]

General insurance company

The unsecured loan stock will offer a net redemption yield of $7\% \times 0.79 = 5.53\%$ [½]

The preference share will offer a net redemption yield of 5.5% at the current market price because no further tax is paid on this income. [½]

If the securities were sold before redemption and realised a capital gain or loss:

• the general insurance company would pay corporation tax on the gain/loss on the preference share, but nothing on the loan stock. [½]

Life insurance company

The BLAGAB is taxed at the basic rate of income tax. The loan stock will offer a net redemption yield of $7\% \times 0.80 = 5.6\%$ [½]

The preference share will offer a net redemption yield of 5.5%. [½]

If the securities were sold before redemption and realised a capital gain or loss:

• the life insurance company would pay capital gains tax at 18% on any gains/losses after indexation allowance on the preference share, but it would pay nothing on the loan stock. [½]

[Maximum 4]
(ii) **Other issues**

The preference share will rank lower in the event of a winding up. Therefore the risk is greater and there should be a corresponding increase in yield to reflect this. \[1\]

The preference share may offer voting rights in certain circumstances, namely if the dividend is passed or if the rights of the preference shareholders are being altered. \[\frac{1}{2}\]

The marketability of both holdings may be an issue. \[\frac{1}{2}\]

[Total 2]

**Solution X1.2**

(i) **Monetary policy**

Monetary policy is the control of some measure of the money supply and/or the level and structure of interest rates. \[1\]

(ii) **Central bank control of the money supply**

A central bank can intervene in the money markets to control the money supply using open market operations. \[1\]

These involve the central bank buying (selling) bills back from (to) the banks and other investors in the money markets thereby increasing (reducing) the amount of money in the banking sector allowing (forcing) the banks to expand (contract) the money supply. \[1\]

The central bank can also use non-market (direct) controls such as:

- **setting minimum liquid reserve ratios** \[\frac{1}{2}\]

  Banks expand the money supply through lending. \[\frac{1}{2}\]

  Imposing minimum liquid reserve ratios that the banks are required to hold restricts their ability to expand the money supply by restricting the money multiplier. \[1\]

- **setting interest rate ceilings for bank deposits** \[\frac{1}{2}\]

  Setting an interest rate ceiling for bank deposits restricts the ability of the banks to compete for investors’ money thereby reducing the amount of money coming into the banking system and so reducing the expansion of the money supply through bank lending. \[1\]
• issuing directives regarding the types of lending to be undertaken [½]

Here the central bank restricts the expansion of the money supply by directly restricting lending, eg by imposing controls on credit. [1]

Quantitative easing is a method by which a Central Bank increases the amount of money in issue directly from its own balance sheet, and uses it to buy assets such as government bonds. [1]

[Maximum 7]

(iii) Limitations of monetary policy in controlling inflation

Limitations of monetary policy in controlling inflation include:

• Monetary policy works indirectly – the central bank cannot directly control the target economic variable (inflation), it can only control other variables which then influence the target variable (eg money supply, interest rates). [1]

• The extent to which the policy is successful depends on how the market participants respond to the central bank’s actions. The central bank cannot predict the reactions of market participants with complete certainty. [1]

[Total 2]

Solution X1.3

(i)(a) Taxation of a property investment

On buying the property, the investor would have to pay stamp duty. The amount is a proportion of the purchase price and would be as follows:

<table>
<thead>
<tr>
<th>Value of property</th>
<th>% duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to £125,000</td>
<td>0%</td>
</tr>
<tr>
<td>£125,001 – £250,000</td>
<td>1%</td>
</tr>
<tr>
<td>£250,001 – £500,000</td>
<td>3%</td>
</tr>
<tr>
<td>£500,001 – £1m</td>
<td>4%</td>
</tr>
<tr>
<td>£1m – £2m</td>
<td>5%</td>
</tr>
<tr>
<td>over £2m</td>
<td>7%     [1½]</td>
</tr>
</tbody>
</table>

Any rental income received from the investment would be taxed at the marginal rate of tax, which for that investor would be 40%. [½]
On sale of the property, the investor would realise a gain, which would be subject to capital gains tax at 28%. He would be allowed to reduce the gain by the amount of any unutilised capital gains allowance before calculating the tax liability. [1]

[Total 3]

(i)(b) **Taxation of equity investment**

On purchase of an equity portfolio, the stamp duty payable is 0.5% whatever the size of the investment. [1]

Income from the equity portfolio would be paid as franked income (ie after it has been subject to corporation tax in hands of the company). The investor would receive a tax credit for 10% of the gross dividend (the *gross dividend* = \( \frac{\text{net dividend}}{0.9} \)) which he would not be able to reclaim. He would, however, have to pay additional tax equivalent to 22.5% of the gross dividend amount because he is a higher rate taxpayer. [1]

Capital gains on sale of the portfolio would be subject to capital gains tax in the same way as the property. [1]

[Total 3]

(ii)(a) **Treasury Bill**

We first have to calculate the current price of the bill in order to find the capital gain (which will be treated for tax purposes as *income*).

Using the formula \( d = \frac{100 - P}{100} \times \frac{365}{70} \) where \( d \) is the discount rate, we can calculate

\[
P = 98.658
\]

[1]

The investor will therefore receive £1,000 \( \times \frac{100}{98.658} \) = £1,013.61 at maturity. [½]

As all gains on T bills and zero coupon bonds are taxed as unfranked income, this would be taxed at the rate of 20%. The tax liability will be £2.72 leaving the investor with £1,010.89 after tax. [½]

[Total 2]
(ii)(b) **Investing in shares**

We need to adjust the market price for the effect of the issues. Firstly, the effective purchase price adjusted for the effect of the rights issue is

\[
\frac{2 \times £4 + £2}{3} = £3.33
\]

Adjusting the purchase price for the scrip issue gives

\[
\frac{£3.33 \times 3}{4} = £2.50
\]

So the investor doubled his/her money over the period (£2.50 to £5 per share). However, the investor must pay tax on any taxable capital gains tax.

He/she will therefore pay capital gains tax at 18% on a gain of £2,500 – £1,250, ie £225

He/she will therefore receive £2,275 after allowance for tax (but ignoring indexation).

The annualised return on a £1,250 investment over 5 years is therefore 12.7% pa

**Solution X1.4**

(i) **Descriptions of economies**

**Comment**

The Core Reading for Chapter 1 states that students should read the World in 2014 report and other documents to stay in touch with developments on global economics. The marking schedule for a question such as this would be very open, allowing marks for any sensible comments. The selection of comments below are only a selection of those that can score marks.
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**Question X4.1**

You are the financial analyst for a large retail banking & insurance company that operates in four major sectors:

1. the retail banking, mortgage lending market
2. the investment banking and corporate lending market
3. life insurance and endowments market
4. immediate annuity business.

The company’s management has asked you to investigate a method for determining the appropriate amount of economic capital the bank should have and also how that capital should be allocated to the four underlying divisions.

(i) Describe how this could be achieved using top-down approach and discuss any problems that you might encounter and any failings that the methods might have. [9]

(ii) Explain how a bottom-up approach might differ from the methods in part (i) and how it could be used to calculate an appropriate capital allocation for each division, and for the company as a whole. [5]

(iii) How might you calculate a risk-adjusted return for each division based on the capital requirement calculated in part (ii)? [3]

(iv) What are the advantages to the bank of having a sophisticated risk-based capital model in place to measure the economic capital? [6]

The immediate annuity division matches its liabilities using UK government securities and swaps to achieve an accurate duration match.

(v) Describe the risks that the division is exposed to that are measured under the Solvency II Standard Formula, and describe how the division would measure and aggregate the risks. [7]

[Total 30]
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Assignment X4 Solutions

Solution X4.1

(i) Top-down approach

Total amount of capital required

It would be possible to design a model of the company’s overall profits in the coming year using forecasts, estimates and basing those estimates on historical profit trends. \([\frac{1}{2}]\)

The model should incorporate revenue, fixed and variable costs, taxation and hence net profits. \([\frac{1}{2}]\)

It would also be possible to develop a model of the volatility of profits – again using historical volatility as a guide. \([\frac{1}{2}]\)

Using this information, it would then be necessary to estimate the volatility of profits on a “one standard deviation” basis – ie the change in net profits if profits deviate from the mean by one standard deviation. \([\frac{1}{2}]\)

This would be defined as the “earnings at risk” (EAR). \([\frac{1}{2}]\)

The required capital can be calculated from the EAR using the risk-free rate via the following formula:

\[
Risk \ capital = \frac{earnings \ at \ risk}{risk-free \ rate} \quad [1]
\]

This means that the company will hold sufficient capital such that a one standard deviation swing in profits would be compensated for provided the company earns the risk-free rate on its capital. \([\frac{1}{2}]\)

In the banking world, most banks have sufficient capital to withstand a swing in profits equivalent to the one-sided 95% confidence interval – ie 1.645 standard deviations. \([\frac{1}{2}]\)

Allocation of capital between the divisions

The method above can be carried out for each of the four underlying businesses as well as the overall company. \([\frac{1}{2}]\)
It will then be necessary to allow for the impact of diversification between the four businesses. As calculated, the total of the capital required for the four businesses will exceed the total capital required for the company as a whole. [1]

To allow for this we need to calculate the correlation of each business with the total (possibly using historical internal accounting information for each division) and multiply the resulting capital for the division by this correlation factor (or multiply the earnings at risk by the factor at the outset). This is termed the “marginal” capital for the division. [1]

The risk-adjusted performance of each business can subsequently be assessed by calculating its return on allocated risk capital. [½]

Problems and failings

When modelling future profits from the divisions, a profit distribution will need to be fitted. This will often be the normal distribution. However, the actual distribution of results may be very different from this, and the type of distribution chosen can have a large effect on the tail. [½]

For example, credit risk losses in the banking division typically result in a long lower tail for the distribution of profits. [½]

The level of confidence chosen is subjective and often arbitrary. [½]

Correlation between the four divisions is very difficult to calculate and highly dependent on the period chosen. However, the correlation has a large effect on the resulting capital requirement. [½]

Each time the business mix between the divisions changes, the capital requirement will change, making it hard to keep ahead of the business. [½]

The marginal capital for a division may turn out to be negative if the business improves the diversification of the company as a whole (ie EAR for the company without a division is greater than EAR for the company including the division). [½]

(ii) Bottom-up approach

This method relies on a sophisticated VaR model that analyses each individual asset and liability that the divisions own (or owe). Models would be required to model every risk, including market risk, credit risk, currency risk, life (mortality) risk and even operational risk. [1]
These risks would be added together to find an overall VaR risk for each division of the company. [1]

Some correlation data between risk categories is required to add them together using perhaps a correlation matrix or a copula approach. [1]

It is necessary for the above (as it was in the top-down method) to determine a level of confidence and a time interval over which the analysis is to apply. The VaR will typically be based on a more severe confidence interval such as 99% or 99.5% over 10 days, because the capital of the company will be set at the level such that it can withstand this level of loss (ie all the company’s capital will be lost if the unlikely event occurs). [1]

The capital required for the company as a whole can be calculated by summing across the divisions, but again, the correlations between divisions need to be incorporated. [1]

(iii) **Risk-adjusted return**

If we consider this VaR to be the necessary amount of capital for each division, then we can define the risk-adjusted return on capital to be:

\[
RAROC = \frac{(\text{Revenues} - \text{costs} - \"expected\" \text{ losses})}{\text{VaR}}
\]

where “expected” losses are the anticipated ordinary trading losses from the division which need to be diverted from revenue in order to establish a reserve for such losses. [2]

VaR therefore represents the capital needed to cushion the business against unexpected losses (often credit losses), operating risks and market risks [1]

(iv) **Advantages of having a sophisticated risk-based capital allocation system**

The performance of each division can subsequently be assessed by calculating its return on allocated risk capital. [1]

Poorly performing businesses can be targeted for improvement or sold off to other parties (that might be able to generate a higher return on capital due to larger market penetration or more efficient systems). [1]
Sophisticated models can generate capital requirements consistently for products that require capital and finance (such as bank loans) and for those that expose the company to risk without requiring finance (for example swaps and derivative positions). Broad-brush methods such as applying a fixed capital requirement to the nominal value of the asset (for example the Basel I approach) do not cope well with off-balance-sheet instruments that require no finance. [2]

A company can assess the wasted capital that it holds to satisfy regulatory requirements. The cost of such wasted capital could be estimated as:

\[(\text{regulatory capital} - \text{economic capital}) \times \text{WACC}\]  

\[(\text{Markers, also accept } (\text{regulatory capital} - \text{economic capital}) \times (\text{WACC} - \text{Risk-free}))\]  

If a company has a sufficiently sophisticated model that passes regulatory scrutiny, then this model can be used to calculate regulatory capital requirements. This can allow the company to reduce the regulatory capital required, and so increase the return to shareholders. [1]

[Total 6]

(v) Description, measurement and aggregation of risks under Solvency II

**Standard Formula**

*Description and measurement of risks*

The interest rate risk is captured under the “market risk” category of Solvency II, and this will be relatively small due to the matching activity. [½]

Solvency II will also capture life (mortality) risk, which is the risk of increased longevity leading to increased payments under the annuities. [½]

For the market and insurance risk modules, each individual stress is performed separately according to detailed rules. The calibration and application of each stress is specified within the standard formula, eg –25% stress to property values, immediate and permanent 15% increase in mortality rates. [1]

Credit risk is captured under a separate category and would be small for UK government bonds due to the high credit rating ... [½]

... but some counterparty risk would be captured as a result of the swap portfolio. [½]

The company is exposed to expense risk for running the business. [½]
This is the risk that the company’s expenses outpace the assumption of inflation, leading to losses. [½]

The company will also assess its operational risk. The operational risk module is relatively simple, being based on percentages of earned premiums and technical provisions. [½]

The resultant operational capital amount is added to the Basic SCR, with no recognition of any partial correlation or diversification effects with other risks. [½]

The SCR for each individual risk is then determined as the difference between the net asset value (for practical purposes this can be taken as assets less best estimate liabilities) in the unstressed balance sheet and the net asset value in the stressed balance sheet. [1]

Aggregation

These individual risk capital amounts are then combined across the risks within the module, using a specified correlation matrix and matrix multiplication. [1]

Having obtained the SCR for each module, a further specified correlation matrix is used to combine them to give the Basic SCR (BSCR). Aggregation is therefore performed at different levels. [1]

The resultant operational capital amount is added to the BSCR, with no recognition of any partial correlation or diversification effects with other risks. [½] [Maximum 7]

Solution X4.2

(i)(a) Strip financing

Strip financing is where investors hold equal proportions of risky non-equity finance (such as mezzanine finance) and equity shares. This limits the scope for conflicts between equity holders and debt holders in the running of the company [1]

(i)(b) Mezzanine finance

This is a form of long-term debt capital which is unsecured and often subordinate to senior secured debt. It has a regular coupon, but it may also have additional sources of return – for example rolled-up interest and/or an equity kicker. It is often provided to companies that are past the stage at which they are entirely reliant on bank debt, but not yet at the stage where they can go to the quoted security markets. [1]
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