INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2012 examinations

Subject SA5 – Finance
Specialist Applications

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

D C Bowie
Chairman of the Board of Examiners

December 2012

General comments on Subject SA5

The SA5 exam generally requires bullet point form or short form essay style answers that apply general principles to directly address specific circumstances. The answers given below are just one possible set of acceptable answers. Candidates are awarded marks for all reasonable answers including different but still reasonable numerical solutions. Marks are awarded for working in the case of numerical answers.

Comments on the September 2012 paper

As with several past papers, one of the questions focussed on one or more aspects of major and relatively recent events which had been widely discussed in newspapers, magazines and other literature. Candidates that read the financial press are more likely to have thought more deeply about much of the content of the SA5 syllabus. These candidates will find some questions much easier to answer.

The SA subjects are the last subjects in the sequence of formal actuarial exams. Candidates taking SA5 are expected to have at least a basic knowledge of how businesses such as banks, life insurance and general insurance companies function.

Well-prepared candidates scored acceptably well across the whole paper. The comments that follow the questions concentrate on areas where candidates could have improved their performance.

1 (i) The UK Government sets an inflation target (confirmed in each Budget statement).

The Bank of England has responsibility for setting short-term interest rates to achieve that target.

The operational target for monetary policy of 2% is based on the 12-month increase in Consumer Price Index (CPI).

If inflation moves away from the target by more than 1% in either direction, the Governor of the Bank of England is require to write to the Chancellor of the Exchequer explaining:

- The reasons why inflation has moved away from the target by more than 1%
- The policy action which the Bank is taking to deal with it
- The period within which inflation is expected to return to the target
- How this approach meets the Government's policy objectives

The Bank also publishes a quarterly Inflation Report, which provides a detailed analysis of inflation and gives an assessment for prospects for inflation relative to the inflation target.

The report sets out and justifies the Bank's analysis of the economy and explains how the Bank intends to meet the inflation target and support the Government's economic policy.

(ii) Quantitative easing (QE) is a type of monetary policy where a central bank buys financial assets to inject a pre-determined quantity of money into the economy.

A central bank implements quantitative easing by purchasing financial assets from banks and other private sector businesses with new electronically created money.

(iii) QE is an unconventional monetary policy used by central banks to stimulate the national economy when conventional monetary policy has become ineffective.

As such QE is used to support the Government's economic policy, including its objectives for managing the risk of deteriorating economic growth and the resulting increasing levels of unemployment.

This action increases the excess reserves of the banks, and also raises the prices of the financial assets bought, which lowers their yield.
The objective is to inject money in the market so there is a credit expansion and with it, an expansion in consumer spending, production and other economic activity.

Injecting money should reduce the value of the currency relative to other currencies and hence make exports cheaper. This may further stimulate the economy.

The lower value of the currency may also make it relatively cheaper for the government to repay its debt.

Expansionary monetary policy typically involves the central bank buying short-term government bonds in order to lower short-term market interest rates (using a combination of standing lending facilities and open market operations).

However, when short-term interest rates are either at, or close to, zero, normal monetary policy can no longer lower interest rates.

The goal of this policy is to increase the money supply rather than to decrease the interest rate, which cannot be decreased further. This is often considered a "last resort" to stimulate the economy.

QE may be used by the monetary authorities to further stimulate the economy by purchasing assets of longer maturity than only short-term government bonds, and thereby lowering longer-term interest rates further out on the yield curve.

QE can also be used to help ensure inflation does not fall below target and manage the risk of deflation.

(iv) Risks include the policy being more effective than intended in acting against deflation, and thereby causing higher inflation, above the intended inflation target.

Risk of the policy not being effective enough, particularly if the increased supply of liquidity does not flow through the economy, for example if banks do not loan out the money.

Some commentators believe that QE can also represent a moral hazard, as it can be seen as bailing-out financial institutions that were mismanaged.

Limitations include that fact that QE, and monetary policy in general, can only be carried out if the central bank controls to some extent, the currency used. The central banks of countries in the Eurozone, for example, cannot unilaterally expand their money supply, and thus cannot employ quantitative easing.

QE may not be enough in cases where there is a severe decline in the confidence in financial markets, and the ability of central banks and governments to manage a significant financial crisis.

(v) By selling shorter dated gilts (e.g. maturities less than 3 years) in sufficient size, and using the proceeds to purchase longer dated gilts in the open market (e.g. with maturities of 6 to 50 years), longer-dated yields are likely to come down (as a result of increased demand) without the need for monetary authorities to create new money.

(vi) (a) If short-term interest rates are already close to zero, and the liquidity created by QE is not feeding through the system (e.g. because banks are not lending), QE becomes less effective, and the central bank may need to resort to other forms of intervention. Reducing longer dated yields is likely to reduce the cost of long-term financing and encourage capital investments, and as result promote economic growth.

Having lower expected interest rates for a longer period is also likely to weaken the local currency (GBP), all else being equal, which in turn could stimulate export growth.

Such an announcement may also influence stock markets, depending what market expectations have been priced in.

(b) This is an attempt to do what Quantitative Easing (QE) tries to do, without printing more money and expanding the Bank of England's balance sheet and therefore avoid the inflationary pressure that QE brings.

However, the maturity profile of the current gilt market may make this process more difficult to implement, or may mean that the impact of gilt sales and purchases takes longer to have the desired effect on the economy.

The liquidity provided by QE is likely to reach banks more quickly in the case of a liquidity or banking crisis.

Traditional QE cannot increase yields at certain parts of the yield curve (as it does not involve selling gilts).

(vii)

- Setting minimum liquid reserve ratios
- Setting interest ceilings for bank deposits
- Issuing directives regarding the types of lending to be undertaken
- Sharing its assessment of the current economic environment, providing guidance on how it expects this to develop and its likely intentions in the near term

(viii) The impact of any reduction in interest rates partly depends on (a) the size and speed of the reduction and (b) to what extent is was expected and already priced in by the markets and businesses.

A major direct effect of lower interest rates for the personal sector is likely to arise via the decrease in mortgage loan interest payments.

Consumers' expenditure may also be encouraged by lower rates on credit facilities.

Lower rates of interest may also encourage lower levels of consumer saving.

The impact on the business sector is likely to be beneficial since capital investment and economic growth prospects are likely to increase.

This is due to the decreased opportunity cost of committing funds for investment and the lower cost of borrowing.

Also, the increase in anticipated levels of economic activity will increase the viability of capital investment projects.

Lower expected interest rates generally lead to a weaker domestic currency.

The effect on the current account will depend on the extent to which exchange rates alter. If exchange rates weaken, then this is likely to lead to an increase in exports and a decrease in imports, but the ultimate effects on the current account will depend on the elasticities of demand for traded goods and services.

Lower levels of interest payments on outstanding debt will increase corporate profitability.

All of these features are likely to result in improved employment prospects and a higher rate of improvement in living standards.

As regards the balance of payments, a decrease in domestic interest rates is likely result in an outflow of foreign investment funds and may also discourage the repatriation of domestic funds held overseas. Thus, there is likely to be downward pressure on the domestic currency's exchange rate

The effects on the other elements of the capital account will depend on investors' expectations of domestic growth prospects. If it believed that domestic economic activity is likely to improve, then there may be increased inward flows of direct capital investment.

(ix)

- Clear and precise objectives – the primary objective of monetary policy is to deliver price stability, followed by a symmetrical inflation target where outcomes below the target is treated as seriously as those above, so that monetary policy also supports the government's objective of high and stable levels of employment

- Full operational independence for the MPC in setting interest rates to meet the government's inflation target

- Openness, transparency and accountability, which are enhanced through the publication of MPC member's voting records, prompt publication of the minutes of monthly MPC meetings and publication of the Bank of England's quarterly Inflation Report

- Credibility and flexibility. The MPC has discretion to decide how and when to react to events, within the constraints of the inflation target and the open letter system

These arrangements have removed the risk that short-term political factors could influence monetary policy and ensured that interest rates are set in a forward-looking manner to meet the government's symmetrical inflation target.

(x)

- Rating agencies are specialised independent entities focussed on the provision of high quality, objective credit analysis.
- Impartiality and integrity are the foundations upon which their credibility and market acceptance are built
- Rating agencies exist to assess the relative quality of tradable bonds
- Rating agencies provide a variety of ratings for a particular entity's obligations
- They may also rate the entity itself as well as governments
- Separate ratings are often produced to indicate short-term and long-term financial strength
- Rating agencies will supplement analysis with reviews of the sector and market prospects
- Rating agencies provide an essential input to the management of fixed interest portfolios as well as the process of raising new finance

(xi) Sovereign risk covers several areas:

- The risk that a central bank will impose foreign exchange regulations that will reduce or negate the value of FX contracts.
- The risk of government default on a loan made to it or guaranteed by it.
- The additional risks inherent in dealing with entities in another country.

More specifically related to the servicing of debt, the rating agency would need to consider:

- Efficiency of the fiscal and monetary decision making process
- Amount and maturity profile of Sovereign debt outstanding
- Ability to service near-term and longer-term debt obligations
- Outlook for the government's current account deficit/surplus
- Outlook for GDP growth

Thus it is necessary for a rating agency to consider:

- Political risk, including exchange controls and other restrictions on the repatriation/remittance of profits, capital or other payments.
- Social and economic stability.

- Trading practices, customs and ethics.
- Restrictions on foreign ownership and / or management.

In particular, the risks of adverse changes in the factors below need to be considered:

- taxation
- quotas, tariffs and other trade barriers
- employment legislation and controls
- currency exchange controls / inconvertibility
- control of interest rates
- grants and subsidies
- licences and monopolies
- environmental / health and safety
- nationalisation / expropriation
- restitution

The rating agency may use certain proxies for the above factors such as GDP per capita.
Consideration may need to extend to supra-national governments (such as the EU), government agencies and regulatory bodies.

Part (i) –Many candidates scored full or near full marks for this question.

Part (ii) – Many candidates scored full or near full marks for this question.

Part (iii) – Many candidates were not able to explain why QE is used despite knowing what it was.

Part (iv) – Many candidates mentioned inflation and the risk that the banks might not use the increased liquidity to lend to its customers.

Part (v) – Many candidates were not aware of this type of market intervention despite it being widely reported in the financial press.

Part (vi) – This question was not well answered as many candidates did not answer the preceding question and amongst those that did the majority had apparently not considered prior to the exam why the BOE (and the US Fed) would do such a thing.

Part (vii) – Many candidates scored full or near full marks for this question.

Part (viii) – Many candidates scored near full marks for this question.

Part (ix) – This question was not well answered by many. It was a book work question. Many candidates misread the question and a more generic question about government policy.

Part (x) – This question was well answered by many.

Part (xi) – This question was well answered by many.

2 (i) The new structure is advice orientated rather than product focussed.

Front Room – Client advisers will be located in major centres around the globe. They will report to team leaders who will report to the Global head of financial products.

Client advisers will be well trained and experienced with the range of debt products and hedging products already available around the globe. They will regularly communicate with each other to share new experiences.

Client advisers will develop the proposed debt or hedging product with the customer.

Specialists – Client advisers will have direct access to specialists including economists, market and sector specialists, tax, regulatory, accountants and financial modellers. The specialists will have their own reporting line through to the Global Head.

Product Teams – Client advisers will approach the various product teams as needed. The product teams will help to refine the proposed product and estimate its deliverability and price. Once the product has been agreed with the customer the product teams will be responsible for placing it with investors or markets. The product teams will have their own reporting lines through to the Global Head.

The product teams are likely to be centralised in areas near to the investors and markets.

The product team will have direct access to investor relations personnel and market traders.

(ii) Product Focus – The bank's marketing approach could have been product focussed in the past. The marketing personnel would simply advise the customers of the various products and the customers would be expected to choose the products themselves.

History – The bank might have grown at least part through acquisition. The various departments may not have been integrated.

Internal Politics – Product teams will want to sell their products even if the customer might be better off with another team's product. The product teams will want direct access to the customers.

Geography – In the past it would have been difficult to unify teams across the globe. Relatively recent developments in information technology have made unification across the globe practical.

Market Restrictions – Some governments have been more restrictive with cross border trading in the past.

Investors and Markets – There is a wider range of investors and markets willing to invest in increasingly bespoke investments in order to access higher relative returns and diversification benefits.

(iii) Expectation management – some things may not be deliverable

The time and expense of the consulting work and the extra time to see if there is a market for bespoke product may not be recovered from the customer and increased sales.

The training and maintenance of the consulting team

Internal politics with the product areas

Difficulty in managing the unified division

Customer relations risk if the advice is poor and the products are not deliverable

(iv) <u>A large international conglomerate seeking to centralise its disparate debt at its various subsidiaries</u>

- Must repay current debt in part or whole. May be prohibitively expensive in part. Consider defeasance or a stepped roll out to centralisation.
- Tax will have a different impact on the debt across the world and may favour issuing in one jurisdiction or another.
- Foreign exchange. The eventual product may need to allow for multiple currencies assuming the operating companies are in multiple currencies.
- Potential credit rating. It is possible that an operating company may have a better rating than the parent. There may be different credit ratings across the group. There may be a case for intra group guarantees.
- Term. Term structure will depend on many things including the life of the assets supporting the debt and the price term structure in the market.
- Repayment structure (long term leverage ratios, don't want all debt maturing at same time)
- Interest – fixed or floating
- Different subs have different income profiles, risks and rewards. Country, industry outlook.
- Group and subsidiary leverage
- Any regulated entities
- Syndicated loan or bond issue with FX and interest rate swaps.
- Allow for margin calls on the swaps.
- Relatively few contracts
- Offer issue to replacing banks
- The above are first principles.

- A suggested product could be a series of debt issues listed on a major exchange by the group holding company with the proceeds being used to replace the debt in the various operating companies as and when it is possible to do so. The debt issues would likely need to be supplemented with interest rate swaps and FX swaps to tailor the debt raised to better suit the individual needs of the given operating companies.

<u>A large grain producer seeking to raise new debt to replace aging equipment and to purchase new farms</u>

- The debt structure to buy new equipment is likely to be quite different from the debt structure used to buy new farms
- May be scope for making future income of existing farms more certain using Commodities forwards futures
- May be scope for making future income from new purchases more certain using futures and forwards and then securitising them or at least pledging them to the debt lender.
- Need to consider FX if the farms are spread across countries
- The producer might want to have guaranteed financing to buy new things quickly. This is likely to be relatively expensive and include commitment fees
- The equipment might be leased depending on the company's own tax position
- The term of the equipment debt is likely to be shorter than say a mortgage for the new farms
- Consider the most appropriate terms for the equipment lease. Debt. Does it include maintenance, service, insurance. Who is taking the residual risk.
- May get the debt for the equipment from the seller or manufacturer of the equipment.
- For the new farms the company needs to consider whether separate debt should be raised for each farm or whether a single consolidate group borrowing is more cost effective and flexible.
- The above are first principles.

- Depending on the available market terms it is likely that the equipment would be replaced with a package of leases designed to suit the equipment. The money to fund new purchases could be in the shape of a committed facility designed to guarantee that moneys would be available. As purchases are made the facility would be replaced with more permanent debt designed to fit the needs of the actual new farm.

<u>A small and underdeveloped country's government seeking to raise debt to explore for oil</u>

- Other income (tax, tourism, exports)
- Companies usually explore for oil not governments. Get company involvement, sponsorship, guarantees
- Corporate structure. Unfettered drilling rights. Govt gtee.
- Secured with other assets
- Specialist skills, JV
- Term
- Currency

- Oil price futures
- Foreign currency. Oil is a US dollar product and it might suit the lenders to lend in USD.
- The repayment structure might be flexible to allow for the time it would take to discover the oil and start production.

- Not likely to suit a debt issue. More likely a private high yield issue arranged by the bank with the bank keeping a small amount for its own book.

Part (i) – Many candidates had not considered prior to the exam how banks might structure themselves. The core reading describes many aspects of worldwide banking including the products, capital requirements, regulation, corporate governance and the industry's relative size and importance to the world's economies. Candidates are expected to have some basic understanding of how banks and non-bank financial institutions structure themselves.

Part (ii) – This question was well answered by many of those candidates who made a reasonable attempt at the preceding question.

Part (iii) – This question was reasonably well answered by many of those candidates who made a good attempt at the preceding questions.

Part (iv) – This question was not well answered by most. The question had two main components, namely, a list of the key features of any financial product and how these terms or features should be determined in the given scenario. SA5 candidates are expected to be able to strip a wide variety of different financial product down to its key features (terms and conditions).

3 (i) Government policy impacts home ownership indirectly in the UK. The government policies include prices and incomes policy, labour policy and social policy. The government targets GDP growth and retail prices inflation in the range of 2% to 4% per annum. These policies are helpful to keep people safe and employed, incomes slowly increasing and interest rates relatively low. These features create favourable conditions for home ownership as homes are relatively very expensive, loans are needed over the long term to buy them and they often represent the owner's largest asset as well as being a significant part of the standard of living.

Tax – CGT exemption for the main residence. Stamp duty on a sliding scale paid on home purchases. Rental income is taxable and mortgage interest tax deductible for rental property.
Financial Regulation – mortgages are regulated under the FSMA.

(ii) Direct financing are usually mortgages. The house is pledged as security for the loan. The mortgagor remains ultimately responsible to repay the loan for most mortgages. There are a wide range of mortgages. For example, relatively short term interest only repayments with a 100% balloon repayment at the end. The interest rate can be fixed, variable or tracking some other published interest rate. Many mortgages are principal and interest repayment mortgages with initial terms of say 25 years and where the interest rate is variable at the discretion of the lender.

Other variations are endowment mortgages where there used to be tax benefits in using the principal element of the mortgage repayments to pay premiums under an endowment policy and the lump sum of the endowment was meant to repay the mortgage.

Other acceptable answers are mortgages linked to current accounts. Buy to let mortgages etc.

Direct financing also includes lifetime mortgages being mortgages that roll up with accrued interest until the death or departure of the home owner. The home owner does not remain ultimately responsible for the repayment of the mortgage.

Direct financing also includes home reversions where the lender takes an equity share of the home.

Indirectly banks and non-bank financial institutions have used mortgage backed securities to parcel up mortgages to secure capital market debt. If they did not do this then the banks would typically use their deposits to fund the mortgages. This is how building societies started.

(iii)

- The contracts will use the standard ISDA documentation wording
- Futures contracts are not bespoke, they may have a range of terms of say 3 months, 6 months and 12 months. Cash settled. Payments based on change in house price index. Similar to other index based financial futures.
- Futures contracts will have margin calls as necessary to collateralise unrealised losses and potential losses
- Futures have a fixed unit size and they are traded in multiples of this
- Forwards contracts can be bespoke and particularly regarding term, which specific house price index, the contract size and whether there are any margin calls or other collateral.

(iv) Home owners – Ignoring the basis risk, those seeking to sell their home could lock in the price by selling a future and those looking to buy could lock in a price by buying a future.

Banks – banks could use the futures or forwards to design new deposit product or mortgage product using the movement in the HPI.

Speculators – would see it as a new and diversifying investment opportunity.

Professional investors – would see it as a way of generating a synthetic investment in residential homes. They could buy the future and hold cash.

(v) Savings accounts paying interest tied to the HPI. This might suit people saving for a home. The bank buys futures to hedge against the exposure to HPI.

Mortgages that charge HPI rather than interest. The mortgagor could believe that if his repayments are increasing then so is the value of his house. The bank could sell futures to hedge the HPI risk.

(vi) The biggest problem for the home owners is the basis risk. The HPI is not necessarily keeping a good track of the home owner's house value. Basis risk is not likely to be a problem for speculators, banks and investors as they are not likely to be using the derivative to hedge home prices.

The trading might be very thin or non-existent. This might make it impossible for the speculators, banks and investors to get a sufficiently large holding to make the investment worthwhile. Also the users will want to know they can trade in the future when they want to. This can be a problem in small niche markets.

In this light most derivatives markets depend on hedgers. There are few obvious hedgers and not enough to sustain the market.

The calculation of the index may not be entirely independent and the users will be concerned about the risk of market manipulation.

(vii) Not likely to be successful. The basis risk on the index is likely to be too high. The index calculation is not entirely independent and may stop or change. There are few clear hedgers and probably not a big area for speculators. Trades are likely to be too small and sporadic to justify the product.

Institutional investors tend to invest in specific allocations i.e. Funds with a specific goal. There are few if any institutional investors with an allocation to residential homes.

Part (i) – This question was well answered by many.
Part (ii) – This question was well answered by many.
Part (iii) – This question was well answered by many.
Part (iv) – This question was well answered by many.
Part (v) – Many candidates described one product and not at least two products.

Part (vi) – This question was well answered by many. Most candidates mentioned the index calculation problem and the liquidity issues. The biggest issue for the product is the basis risk for hedgers.

Part (vii) – This question was well answered by many. Several candidates lost a mark for failing to state whether the product would be successful or not.

END OF EXAMINERS' REPORT