

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2011 examinations

Subject SA5 — Finance Specialist Applications

Purpose of Examiners' Reports

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 who are 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. Although Examiners have access to the Core Reading, which is designed to interpret the syllabus, the Examiners are not required to examine the content of Core Reading. Notwithstanding that, the questions set, and the following comments, will generally be based on Core Reading.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report. Other valid approaches are always given appropriate credit; where there is a commonly used alternative approach, this is also noted in the report. For essay-style questions, and particularly the open-ended questions in the later subjects, this report contains all the points for which the Examiners awarded marks. This is much more than a model solution – it would be impossible to write down all the points in the report in the time allowed for the question.

T J Birse
Chairman of the Board of Examiners

December 2011

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 2011 paper

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) Off-balance-sheet activities are any activity that results in assets or liabilities of the company being held off of the balance sheet. For example, they will include transactions that may result in the acquisition of assets or liabilities at some future date under certain conditions.

The contracts are not recognised as assets or liabilities due to their contingent nature and are therefore not shown on the balance sheet.

A leasing transaction can provide a company with all or virtually all of the economic rights and obligations of ownership without requiring the asset to be held on balance sheet. A company can gain use of a new asset under a new lease or enter into a sale and leaseback arrangement for assets it already owns. Depending on the precise terms of the lease, the contingent nature of payments under the lease can mean that the liability for future rents (lease payments) is not capitalised on the company's balance sheet.

This is valid only if the lease is an operating lease and not a financial lease.

Securitisation being the sale of assets to a special purpose entity that issues securities to raise the moneys to enable the purchase of those same assets is another common way of transferring on balance sheet assets off balance sheet. The assets are properly off balance sheet if they have been sold. However in many securitisations the original seller of the assets remains to be economically involved in the ownership of the assets and it is only the contingent nature of the involvement which allows the assets to be transferred off balance sheet.

Companies sometimes create unconsolidated entities to hold assets and liabilities off balance sheet. The determination of whether the entity is on or off balance sheet is based on accounting requirements and not on economic ownership.

- (ii) An analyst will be concerned that the ratio of debt to equity will be misrepresented by examination of the balance sheet.

The analyst will be concerned that the balance sheet does not properly reflect the size of the company and does not give a true picture of the activities of the company.

The analyst will wish to make adjustments to the balance sheet to better reflect the true obligations of the company.

In order to make the adjustments the analyst will use the available information. The main source of information that should be examined will be the company accounts. In particular, accounting policy statements, summaries of contingent liabilities and leases provide a source of potential problem areas.

A further source is disclosures to shareholders about significant decisions on which they are required to vote, and shareholder meetings where questions can be put to the company.

(iii) Credit risk

Standby letters of credit providing guarantees, warranties or indemnities

Repurchase arrangements

Partly-paid bonds or notes where further calls can be made at the discretion of the issuer

Liquidity / funding risk

Commitments to clients to underwrite debt issuances

Guaranteed overdraft facilities that may be drawn upon or standby letters of credit written for clients

Interest rate risk / Foreign exchange risk

Derivative exposures such as swaps, options and forward arrangements

Operational risk

Other principle repayment risks associated with derivative transactions (excl. credit risk, interest rate risk, foreign exchange risk mentioned above and offset by any margining arrangements)

(iv) Controls that should be put in place:

Formal written policies setting exposure limits for each activity with a total exposure limit covering all activities

Exposure limits should be put in place for individual customers, traders, sectors, countries, currencies and markets

Implement proper record keeping and generate appropriate management information

Ensure proper segregation of functions

Regularly undertake an audit that the policies and procedures are being adopted

Implement comprehensive and tailored risk reporting (both with regard to the level of detail and the time frame) to all management levels to ensure that the other controls are being met and to highlight deficiencies in controls.

- (v) Under Basel 2, Pillar 1 includes an explicit charge for operational risk and therefore good controls will reduce this capital charge.

Under Pillar 2 the regulator will review the overall control framework when considering the need for capital add-ons. A strong framework will again reduce the need for capital.

- (vi) (a) The main risk is that the Fund is unable to re-borrow in the capital markets to fund the maturing short term securities. In this case the Fund will not be able to sell its corporate loan assets in time and will need to draw on the loan facility. This circumstance is most likely to result at a time when the riskiness of the underlying portfolio of corporate loans is relatively high meaning the bank will be lending to the Fund against relatively poor quality assets. The estimated cost of the risk to the bank will depend on the size of the loan facility relative to the total size of the fund and the credit ranking of the drawn bank loan versus the short term securities.
- (b) The bank might reduce the size of the Fund and/or the size of the loan facility. The bank could try to replace some or all of its loan facility with a third party loan facility.

The bank could improve the credit quality of the corporate loans in the Fund over time as the loans are replaced with new ones. This might make the loans more saleable and would also reduce the risk of loss if the bank needed to lend to the Fund.

The bank should ensure that its loans rank higher than the short term securities in credit standing.

The bank could see whether it was possible to remove the loan facility and still attract investors to the Fund.

A company's management is particularly incentivised to manage risks off of its balance sheet when its leverage is scrutinised (e.g.1 regulated banks and insurance companies, e.g.2 company's whose debt or other repayment ability is rated by external rating agencies) and/or when it is undertaking risks which are outside of the scope of the company's normal operations.

The management incentive comes from increased pay resulting from increased expected profits from excessive risk taking.

Question (vi) describes a generic structure for a typical bank conduit. In the past the sponsor bank's LOC provided the necessary liquidity support to make a structure based on short term lenders and longer term assets work. This said, the LOC was treated as off balance sheet for both the regulators and the rating agencies. Problems would arise for the bank if the short

term lenders decided to not roll-over their loans at the same time that the market value of the conduit's assets fell and there was a major contraction in the inter-bank lending market. As was seen in the credit crunch, these things can happen together.

2 (i) A Collateralised Mortgage Obligation is a securitised book of mortgage loans.

CMOs are pass-through securities meaning that, after agreed expenses, principal and interest receipts from the loan are passed through to the investors (holders of the CMO). The investors are grouped into different classes that receive payment in a pre-determined order. Some investors prefer more risk for more expected return and/or a shorter mean term duration. Separating the CMO into different classes is intended to attract a wider range of investors and to in turn reduce the overall costs to the issuer of securitising the mortgage loans.

CMOs are often over-collateralised, that is there are more than \$100 of principal mortgage loans supporting the \$100 of principal CMO. The amount of over-collateralisation is dependent on the issuer's view of the CMO investors' requirements.

The issuer will often invest in the riskiest part of the CMO because other investors may not want it and also because it shows the other CMO investors that the issuer has some faith in the performance of the underlying mortgage loans.

Except for the piece of the CMO retained by the issuer, the loan is removed from the balance sheet of the issuer since the payment of the loans is contingent on payment being received from the borrower.

- (ii) The key risk taken on is credit risk because the investor depends on the future cash flows (principal and interest) from the loans. The expected (loss) cost of credit risk is likely to be the largest relative risk for the classes of CMO investors accepting the most risk (and the highest coupon) but is likely to be a relatively small risk for the classes of CMO investors accepting the least risk i.e. those with the highest payment priority and the lowest coupon.

The determinants of the amount of credit risk will be:

- The level of the tranche (class) in which the investor has purchased assets;
- The creditworthiness of the underlying mortgages;
- The nature and level of any guarantees that apply to the security or any credit enhancements that have been granted.

Liquidity risk being the risk of being unable to sell the CMO at or near quoted market prices is usually determined by the size of the offering, the size of the overall market and the market on which the CMO is listed. The expected cost of liquidity risk will rise and fall over time as market conditions change.

Interest rate risk – Most CMOs will be fixed interest investments and hence the CMO investor will have the risk of not being to reinvest the receipts at the same or higher interest rates. This risk is usually determined by the mean term of the portfolio of underlying loans and the class (relative payment priority) of the CMO.

Economic conditions will change over time and will affect the ability of the original borrowers to repay their mortgages, the value of the assets supporting the mortgages and the credit risk associated with any third party guarantees. The expected cost of this risk increases as the mean term of the particular class of CMO increases (uncertainty increases). The expected cost of this risk is typically a multiple (or fraction) of the estimated expected cost of the present day credit risk (probability of default and loss given default) adjusted for the payment pattern to reflect the fact that loan repayments are received over time and as the future is unfolding.

Third party credit risks (disputes and defaults) – Third parties sometimes enhance the security of the loans by e.g. 1 guaranteeing the performance of some loans and/or e.g. 2 guaranteeing the value of the underlying mortgaged assets. The expected cost of the losses arising from these defaults and disputes is usually minimal and is determined by the terms of the guarantees, the credit rating of the third parties, the completeness and clarity of the contracts and an collateral requirements which may have been agreed.

Contractual Risks – The contract terms and conditions will cover the issues such as issuer default, how moneys received are held pending payment through to the CMO investors, how the administrators are paid and audited etc. Whilst the expected cost of these risks is usually relatively small, the risks are not zero. They are usually mitigated by, for example, ensuring that moneys received from the underlying loans are held in trust pending payment.

- (iii) Require that standardised expected cash flow information is provided in the prospectus.

Require that a rating is provided by a licensed ratings agency for the security being issued.

Require that the management of the company selling the CMO take legal responsibility that there is a reasonable expectation that the cash flows will be produced, allowing for any credit enhancements applicable to the security

Require that the seller must keep a certain proportion of each tranche of a securitisation so that they are also a participant in the risks.

Require that the issuer of the security must repurchase the security should any of the terms in the prospectus prove to be a misrepresentation.

Increase the time between applying for the securities issue and the listing to the market to give investors more time to conduct independent analysis without relying entirely on rating agencies.

Require disclosure of the full detail of the assets that are being securitised. In particular, the underwriting restrictions applied when the mortgages were sold and any deviations from those restrictions, the credit checks applied and how income to debt ratios were documented and verified.

Require that any other securitisation from the issuer that has been found to be misrepresented be reported in the security's prospectus.

Require the disclosure of a description of the underlying approach used to derive expected investment returns on asset pools.

- (iv) Treat any CMOs as inadmissible or only partly admissible (e.g. by limit) for solvency purposes. Very well capitalised insurers will not see this restraint as being very important but it will signal to all insurers that the regulator is not willing to accept the valuation placed on CMO investments.

Apply a restriction to the rating of an asset that an insurer can use to match policyholder liabilities. This requirement may catch some classes of CMO but will allow the insurers to continue to invest in well rated CMOs. The economic veracity of this requirement depends on the appropriateness of the credit ratings given to the various CMOs and on the procedures for selling CMOs in the event of a downgrade.

Require that CMOs can only be held where that have been purchased via a placement from the issuer and that they haven't been purchased in a secondary market. This requirement will simply reduce the size of the market of CMOs available for purchase. It will be effective to curtail investment but it is not particularly sensible as the secondary market may be much larger than the primary market and hence more attractively priced, the secondary market will allow insurers to buy CMOs at timing to suit them rather than the issuer and the secondary market depth will allow insurers to better choose the particular CMOs that they prefer the most.

Require that with any CMOs held the issuer has retained a minimum proportion of the assets being securitised. This requirement will presumably reduce the size of the market for investible CMOs but requiring the issuer to retain some assets is just one possible risk mitigant and often not a particularly important one. Further it will be impossible to monitor unless the issuer is contractually obliged to hold the investment for the full term without passing the risk on either legally or economically.

Require that any CMOs held have certain credit enhancements attached to them such as a cash collateral account or over-collateralisation. This requirement will presumably reduce the size of the market for investible CMOs but it is a fairly arbitrary way of doing so. For example, the insurer may be far better off holding a high ranking class of CMO which is very well rated and traded in the secondary markets than holding a low priority class of CMO in an over-collateralised CMO structure.

Increase the capital requirements for these securities by specifying a minimum level of market stress that should be applied when calculating risk-based capital. Insurers will be concerned about their economic capital and their risk adjusted return on capital. This requirement will highlight to insurers that the regulator believes that CMOs carry additional risks. In other words the CMO investment is fine so long as the additional expected returns support the additional capital which needs to be set aside against it.

This question was well answered by candidates who appeared to understand the role that CMOs and MBSs had had in the credit crunch. As was shown at the time, it was not well appreciated that there were a very wide range of different CMOs/MBSs with different terms and conditions and underlying risks. A single credit rating for a single tranche of a given CMO/MBS was simply not enough information on which to base an investment decision.

3 (i) Management is not incentivised to disgorge cash

Agency theory suggests that payouts to shareholders reduce the resources (power) under the manager's control.

It is not unusual for compensation packages to incentivise management to increase the resources under their control, and grow the firm beyond its optimal size

Hence they are likely to invest cash proceeds at below the cost of capital or waste it on organisational inefficiencies.

Lack of competition means there is less pressure on management to increase efficiency to enhance the firm's probability of survival.

Market disciplinary forces are also often weaker in activities that involve substantial economic rent.

This problem is particularly severe for firms generating large free cashflows but which have low growth prospects.

Management may be concerned about the foreseeable economic outlook for the firm and the industry and hence are reluctant to take risks and prefer to build up cash as a precaution.

Management may be building up a war chest of cash to use in a future acquisition.

Regulation can sometimes force companies to hold capital which is excess to their economic needs.

- (ii) Produce cashflow budgets and stress test these budgets in order to better estimate the cash needs of the company and the debt the company should be able to support.

This analysis needs to take into capital requirements of the regulators and rating agencies if any.

Estimate the amount of surplus cash in the company both before debt is raised and after debt is raised.

Consider the potential uses for the estimated spare cash including mergers and acquisitions, capital projects, company expansion. If no realistic near term options are envisaged then management should consider giving surplus cash back to shareholders.

Depending on which is most efficient, return cash before or after raising debt to increase the leverage in the company to the level supported by the cashflow projections.

This may also include the firm going private or a leveraged buyout (LBO) transaction.

The threat of failure to make debt service payments is a motivating force to make an organisation more efficient.

Studies of stock price changes at announcements of transactions which change capital structure show that most leverage increasing transactions result in significant increases in share prices and vice versa.

Given the lack of competition and potentially weaker market disciplinary forces, there should be more emphasis on the monitoring by the firm's internal control systems.

Align management compensation with company efficiency measures

Ensure good corporate governance practices are followed.

(iii) While the suggestion is consistent with the traditional approach to Corporate Finance that would imply companies should be more debt financed given the low cost of debt, there are several issues with the extreme case where the firm is entirely debt financed, namely:

- The suggested approach ignores the impact that gearing has on both the cost of borrowing and the required rate of equity return.
- Low levels of gearing have little impact on borrowing costs or equity, however both increase sharply at high gearing levels.
- Higher levels of gearing increase both the probability and the magnitude of future financial distress costs.

For example, the probability that the company will be unable to meet its debt repayments and/or financial covenants will increase. The chance of the

debtholders taking over and replacing management increases. The chance of bankruptcy increases.

Hence, highly geared companies have much less time to adapt to change (e.g. economic, competition) than lower geared companies. Also, management will have less spare income to use to making the necessary business changes.

In adverse times a highly geared company can sometimes raise additional equity capital to allow it to trade through the difficult conditions. The new equity is likely to be very expensive compared with the old equity. In the case of little or no equity at all the banks are much more likely to take over and break up the company.

Bankruptcy normally involves the breakup of the company and the debtholders, equity holders and employees will all likely suffer loss. Hence, an otherwise good and profitable company may fail solely due to it being too highly geared to trade through changes.

Higher levels of gearing will result in increased cost of debt per unit and this will erode the increased tax benefits from higher levels of debt finance.

Highly geared capital structures are less appropriate for firms with volatile earnings or those with lots of risky or intangible assets.

Having no equity holders, means the firm is owned by the debt holders, which means company management will likely be less incentivised to grow future profits, and likely to focus more on just meeting debt repayments and keeping bondholders happy.

With no direct or indirect equity participation, company management's interests may be less aligned with that of the company they manage, and the firm may find it difficult to attract and retain talented management.

Financing that requires no equity may not be available or possible. For example, there may be a need to meet minimum regulatory capital requirements. Also a highly leveraged structure is likely to involve increased scrutiny by regulators and other stakeholders or progressively higher levels of intervention.

The debt is likely to have a fixed term, meaning there will be uncertainty and risks associated with the period when the debt matures or needs to be rolled over.

Having no equity may not be possible in a traditional company legal structure and may require the setting up of a special purpose vehicle for example.

It may not be possible to buy out all of the current equity holders.

- (iv) Choosing high risk investments and projects that benefit shareholders at the expense of bond holders

Exiting promising lines of business or liquidating the entire firm

Producing goods/services of inferior quality

Providing a less safe work environment for employees

Cutting back on Research & Development, advertising and promotional expenditure and maintenance of working or human capital.

Threaten to default on the debt or actually default on the debt for the purpose of restructuring the debt at the expense of the current shareholders.

- (v) (a) For a corporate governance policy to be consistent with best practice, it would need to include the following features:

- At least half the board should comprise of independent, non-executive directors
- Non-executive directors should serve for only 2 three-year terms to maintain independence
- A non-executive director with a term longer than three years should be subject to annual re-election.
- The same individual should not exercise the roles of Chairman and Chief Executive
- The company's Chief Executive should not go on to be the Chairman of the same company

Ensure clear guidance on internal controls, working of audit committees, as well as clear guidance for the Chairman and non-executive directors should be in place.

The principal duties of the remuneration committee and nomination committees should also be clear and unbiased.

Independent non-executive directors should have appropriate experience, be provided with sufficiently detailed company information and be capable of providing challenge to management.

- (b) The features above should promote unbiased monitoring and accountability of company management, which should minimise management actions that conflict with the interests of the other stakeholders.

Clear procedures and controls along with clear guidance should reduce management's ability to independently and deliberately make changes

that conflict with the firm's long-term strategy (e.g. taking on projects that are too risky, making large cuts to R&D, health and safety, and producing poor quality goods).

In addition, having experienced and suitably qualified independent directors should ensure some level of challenge to management decisions.

Having a good and well-functioning remuneration committee should help ensure that management is not incentivised to take unnecessary risks or become too focused on short-term financial results. Instead remuneration could be structured to improve alignment with shareholders and potentially bond holders.

Having a good audit committee etc should provide the board access to detailed, accurate and timely information that should enable them to assess and monitor management recommendations (e.g. to close certain lines of business, default on debt in order to restructure it etc.).

(vi) Bankruptcy costs – direct: court, legal and administrative fees

Bankruptcy costs – indirect:

- costs of attracting and retaining staff, customers, suppliers
- extra costs of management

A further potential cost issue is that a “firesale” of assets will often be controlled by senior lenders (who have no incentive to maximise returns for the shareholders).

These are all examples of the *agency costs* of borrowing. In particular, the existing lenders will be motivated to limit borrowing to “safe” debt levels, and will introduce restrictive terms into lending agreements to avoid additional risk of default. Costs incurred as a result of lender action include monitoring and reporting costs, and also the opportunity cost of ventures foregone.

- (vii) (a) Buy CDS protection on the company's debt if you believe the market's assessment of default risk is too optimistic
- (b) Buy and hold securities in the firm's capital structure that is trading at too large a discount given its likely pay-off profile
- (c) Buy parts of the capital structure and actively influence and participate with other stakeholders to restructure the capital structure to unlock value without assuming control of the firm
- (d) Buy enough of the relevant controlling securities to gain control of the company and actively manage the financial and potential operational restructuring of the firm

- (e) Capital structure arbitrage (buying undervalued parts of the capital structure and selling overvalued parts of the capital structure)
 - (f) Provide an unsecured loan to the company directly to help them deal with near-term obligations (rescue finance). The loan is likely to have a high coupon, and may include gaining an equity stake in the firm.
 - (g) Provide a secured loan (debtor in possession financing) to provide the company with working capital while they are in bankruptcy. This loan will typically be more senior than other outstanding debt.
 - (h) Buy the post re-organisation equity in the firm if the pricing underestimates the firm's recovery potential as it emerges out of bankruptcy.
- (viii) Making a mistake in estimating and assessing the potential costs involved and the ultimate enterprise value of the firm

The firm taking longer to restructure or the investment taking longer to be realised than expected, hence reducing the rate of return

Market or macro risks where the economic environment deteriorates rapidly while the firm is still in a vulnerable state

Idiosyncratic investment specific risks such as not being aware of important restrictions in debt holder agreements, legal risks around interpretation of local legislation and likely outcomes of bankruptcy courts, company fraud, etc.

This question contained a significant amount of bookwork including the questions relating to corporate governance and potential conflicts of interest in times of financial distress.

Several candidates would have scored additional marks for questions (i) to (v) inclusive if they had made their answers less generic and more directly relevant to the specific characteristics of Easy Going.

Questions (vii) and (viii) were reasonably well answered by many candidates.

END OF EXAMINERS' REPORT