

**Subject SA5 — Finance  
Specialist Applications**

**EXAMINERS' REPORT**

**April 2008**

**Introduction**

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The questions and comments are based around Core Reading as the interpretation of the syllabus to which the examiners are working. They have however given credit for any alternative approach or interpretation which they consider to be reasonable.

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**1** (i)

The commonly traded financial derivatives will be:

- Interest rate swaps – A party agrees to pay another party a fixed rate of interest periodically and based on a notional principal. In return the other party pays the first party a floating rate of interest based on the same notional principal. The majority of interest rate swaps trade on the rates of the major world economies.
- Currency swaps – For the most part currency swaps are based on swaps between the world's major currencies. Typically one party pays fixed and the other party pays floating interest rates. Principal is swapped at the outset and at the maturity of the swap. In the interim one party will pay fixed rate on the principal of its chosen currency and the other party will pay floating rate on the principal in its chosen currency.
- Interest rate and currency futures – A future is an agreement to buy or sell an asset on an agreed basis in the future. They are standardised agreements traded on an exchange. For example one party might agree to sell USD100 for GBP50 on June 30, 2008.
- Interest rate and currency forwards – Are futures contracts which are not traded on the exchange. They are traded over the counter. They can be much more varied in terms and conditions.
- Options – A party can buy or sell an option to buy or sell a future or forward at some time(s) in the future and/or to enter into a swap contract. These option contracts are used to create relatively exotic positions as well as simple caps and collars on interest rate exposures.

(ii)

ABC's counterparties will primarily be:

- The various clearing houses covering the various exchanges
- International banks – will trade the whole range of financial derivatives
- Regional banks – will primarily trade interest rate related derivatives as they would be less exposed to currency risks
- Large corporates – will trade interest rate related derivatives and potentially currency related derivatives if they trade with customers/suppliers in other countries
- Fund managers (including investment trusts and pension funds) – the type of derivatives traded will depend on the fund's objectives

ABC will trade on the world's exchanges including Euronext LIFFE and the Chicago Board of Trade. ABC will also trade directly with many counterparties i.e. over the counter.

(iii)

The counterparties will seek to manage their credit exposures by:

- Monitoring the credit rating of their counterparties as provided by external rating agencies and taking action to be less exposed to lower rated entities than to more highly rated entities.
- Conducting internal credit assessments on the major counterparties to check the external ratings.
- Monitoring the net exposure to a counterparty and ensuring that the contracts allow for the netting of amounts owing from amounts receivable in the event of a default (Offset).
- Where possible and depending on the price, seeking a counterparty to collateralise its obligations (with cash, letter of credit or other security).
- Setting gross and net exposure limits by counterparty and monitoring these to ensure they are not breached.
- Diversification of counterparty exposures to reduce the impact of a loss to manageable levels.
- Dealing on an exchange makes the AAA rated clearing house the credit counterparty. In addition the trades are largely collateralised.

(iv)

ABC would have decided to establish branch offices in these cities because:

- These cities would give a good spread of time zones meaning that one office would be expected to be open to trade at any point in a business day.
- Access to English speaking skill base.
- The countries have well developed and sophisticated regulation reducing operational risk.
- Political risk being the risk of being unable to expatriate moneys or otherwise lose investments is very low.
- The tax system is well developed and clear.
- Being local will improve relationships with local market counterparties.

(v)

The reasoning behind the calculations.

- ABC Ltd. is UK tax resident. The subsidiaries are not.
- ABC Ltd. is a 30% corporation tax payer.
- ABC Ltd. is deemed to be a financial trader and so all gains are treated as income and not capital.
- Tax treaties between UK-Australia and UK-Singapore means that ABC Ltd. will receive tax credits for both the corporation taxes paid in Australia and Singapore subject to a maximum of the UK rate and the withholding tax paid in Singapore.
- ABC Ltd. is not taxed on profits retained in the subsidiaries.
- ABC Ltd. is taxed on an accruals basis including income and realised gains. Unrealised gains on the derivatives book are not taxable.

- ABC Ltd. can offset the prior year's losses from its pre-tax profit prior to calculating its UK tax liability.

Corporation tax before foreign tax offsets =  $0.3 * (90 - 25) = 19.5\text{m}$

Australian corporation tax credit =  $10 * (1/0.7 - 1) = 4.285$

Singapore corporation tax credit =  $5 * (1/0.9 - 1) = 0.555$

Singapore withholding tax credit =  $5 * 0.15 = 0.75$

UK 2007 tax charge =  $19.5 - 4.285 - 0.555 - 0.75 = \text{£}13.91\text{m}$

(vi)

### **FSA Regulation Requirements**

- Specific functions must be performed by Registered Individuals. Registered Individuals must be pre-approved by the FSA and must have demonstrated knowledge, honesty and integrity.
- Systems
- Compliance officer, compliance manual
- Money laundering check procedures in place including training for staff
- Record keeping
- Inspections from the FSA
- The FSA requires that audited accounts be filed annually.
- The FSA requires regular reporting of financial condition.

These requirements help to force ABC to place appropriate persons in responsible positions, keep appropriate records, to work within legal and regulatory requirements and to regularly monitor the financial position of ABC through reporting and audit.

### **Corporate Governance**

- The establishment of a Remuneration Committee to approve the remuneration package of senior personnel
- The establishment of an Audit Committee to monitor the record keeping and audit of the company
- The establishment of Internal Control procedures
- The inclusion of non-executive directors on the board to help to ensure that internal controls are in place and being followed.

Compliance with these reviews helps to force ABC to reduce operational risk.

(vii)

Using the dynamic financial analysis framework it is reasonable to construct a simulation model which identifies the various risks including event risks facing ABC and attaches either a given probability of the risk occurring (frequency) and the loss incurred (severity) or a probability distribution of each of the frequency and severity.

The main output of the model will be the Value at Risk (VaR) at a given level of confidence taking into account the interaction of all of the identified risks together.

The model forecast period is likely to be either one or three years depending on how the results of the model are being used within ABC.

ABC's VaR will be greatly reduced by the diversification benefits of trading a portfolio of different financial derivatives with different counterparties both on exchange and over the counter all of the world. Its diversification will be by product, term, counterparty and location.

Many of the trades will not be completely correlated with, or independent from, many of the other trades. For example, the interest rates of different countries are often strongly positively correlated. Correlation can be very difficult to estimate. Historic observed correlations may not be a good guide to the future. Further, the estimation process will be much harder as the number of potentially correlated risks increases.

ABC is likely an active trader in financial derivatives. As such the risk aggregation model will need to be capable of being run weekly and perhaps daily or even intra-daily depending on how its results are to be used. Hence it will be necessary to create a bespoke risk database from the other group databases. The other databases would need to automatically feed data into the risk database including automatic data scrubbing and translation.

Due to the very high volume of individual trades, it is likely that the model input would be based on grouped trades. For example, fixed rate positions in standard interest rate swaps might all be grouped together.

In addition to the simulation approach it will be necessary to estimate the aggregation of risks using stress testing.

(viii)

In order to regain its AA rating ABC could:

- Raise new capital
- Reduce the quantified risk of its net trading book. For example exposed limits could be reduced and/or the usage of collateral could be increased. Shortening the term structure usually reduces risk as does reducing the amount of exotic derivatives.
- As an alternative to raising capital immediately ABC could raise it over time by retaining profit i.e. paying a reduced dividend.
- Raise subordinated debt, a portion of which is likely to be treated as capital by the rating agency.
- Reduce the size of the net trading book by securitising some of the trades into the capital market.

2 (i)

**Advantages of bank finance versus capital market finance**

- The development of a relationship between the company and the bank which can bring about stability of finance costs, known depth of access and flexibility to change terms.
- Costs of finance can be lowered by companies that use the bank for other services (e.g. paying fees for managing bond issuances).
- Advice on finance due to a regular contact with the bank.
- No need for credit rating agency involvement in management time.

**Disadvantages of bank finance versus capital market finance**

- The restrictions imposed by banks can be far more penal than those demanded by capital market investors.
- Generally, the term of debt available for bank finance is significantly shorter than capital markets.
- The relationship between capital market investors is generally more “arms length” than banks, freeing up management time.

(ii)

Mezzanine finance is a form of long-term finance which fills a gap between the company's relatively lower-risk senior secured bank loans and relatively higher-risk equity. Structurally, mezzanine usually takes the form of a non-amortising long-term (8 to 10 year) loan, subordinated to senior secured bank loans but usually including cross-default provisions and a second charge over the borrower's assets.

Mezzanine finance is a more expensive form of financing than secured debt or senior debt. The company may be able to obtain cheaper finance if it has enough assets to collateralise the debt.

Mezzanine loans are typically structured to include three components of return:

- cash coupon (usually floating rate)
- repayment premium (or “roll-up”) – effectively an accumulation of deferred interest
- equity warrants (or “kicker”). These are often referred to as PIK (“payments in kind”)

(iii)

The company's equity holders will need to accept that they will now also rank behind the mezzanine debt holders when it comes to having a claim on company assets. The transaction also increases the gearing of the company's balance sheet, and hence increases the risk of the equity tranche.

Given the acquisition would be a “long-term” asset, it is appropriate to finance the acquisition with long-term debt (the company currently has no long-term debt on its balance sheet). However, mezzanine investors will normally seek a clear exit opportunity after about 3 years – this may be too short term for the company and may require them to restructure their debt at uncertain terms in the future.

The equity holders of the company may not want to dilute their ownership stake in the company, in which case the equity warrants won't be appropriate.

(iv)

The problem is to estimate both the future income *and* the range of prices it is worth offering to the existing owners of the firm. It is therefore necessary to establish, from the existing owners' perspective, alternative values such as the value of continued operation or selling out to a third party.

Problems encountered may include:

- valuing excess assets, or the cost of additional required investment
- valuing multiple activities undertaken
- valuation of goodwill
- existing contractual arrangements
- problems of staff relationships (and redundancies)
- outstanding financial obligations, minority interests
- unlisted hence little public data available

(v)

- Effectively an arbitrage trade that exploits the relative mispricing of credit between the cash corporate bond and the CDS
- Convergence trade that can be held to maturity
- Provides positive carry
- Assumes no credit risk
- Requires simultaneous execution of the cash bond and the CDS to minimise risk
- Small spread – likely to require leverage to earn an acceptable return on capital

(vi)

Method 1: Use Value at Risk (VaR) to assess required level of capital needed to withstand possible losses over a specified time interval with a pre-determined confidence interval.

VaR can be calculated using the Variance / covariance, Historical Simulation or Monte Carlo simulation methods. Four problem areas are:

- Holding periods – the trade (e.g. CDS) may not be liquid in times of stress
- Non-linear payoff profiles

- correlations (between the CDS and the corporate bond)
- observation periods not being representative of future experience

Method 2: Earnings at Risk (EAR). Under this approach, a suitable target Return on Capital (RoC) is first established (for example by using Capital Asset Pricing theory). A model is constructed, based on the trade's costs and possible pay-offs, and hence, net profit. This is used to determine the mean gross investment required to generate the desired net profit. In addition, the historical profit volatility can be applied to this model to determine the "Earnings at Risk" – the standard deviation of the net profits as generated by the model. From this can be determined the required level of risk capital – the capital needed to ensure that the probable level of volatility is offset by risk-free earnings, since:

Risk capital = Earnings at risk / Risk-free rate.

(vii)

Spread between Repo and Swap = 70 bps

Net spread after paying for CDS = 15 bps

Total capital required = 4% (haircut) + 1% (risk capital) = 5%

Return on capital = LIBOR + (15 bps / 5%) = LIBOR + 3%

(viii)

Expect outperformance in widening credit markets as the CDS should widen more than the cash bond.

(ix)

- (a) Credit rating is a combination of objective measures and a subjective or judgmental process, since the rating agencies rely as much on the assessment of a company's management as they do on published (and unpublished) financial reports and analyses. In effect, ratings are judgements about a firm's financial and business *prospects* i.e. not just their current position. Rating agencies will therefore supplement analysis with reviews of market and sector prospects and with company visits and discussions with managers as they aim to reflect the probability of default, not just in the short term but over longer periods.
- (b) Relying on a rating that is (a) subjective (b) only shows long term (and not also short term) financial strength (c) based on historic information or potentially out of date information would not be prudent.

- (c) It is possible for the trading desk to perform their own credit research and replace the rating agency's subjective assessments with more objective, formula-driven, models, for example using option pricing theory. This approach is likely to be difficult. A more relevant time frame (more short term) needs to be considered. The desk may also be able to find a traded derivative based on the credit profile of the counterparty and use this forward looking market estimate of the credit risk to supplement their analysis.

**END OF EXAMINERS' REPORT**