SECURITIES & INVESTMENT INSTITUTE DIPLOMA

SUMMER 2008

CHIEF EXAMINER'S REPORT - FINANCIAL DERIVATIVES

The pass rate for the summer 2008 examination was 49%, only slightly up on the 43% recorded for the winter 2007 examination. Again many candidates had clearly not prepared adequately for the examination, with eleven candidates scoring less than 40 marks. As I mentioned in my last Report, I cannot understand why this type of candidate does not simply review previous papers, and assess whether they have a reasonable chance of passing, before deciding to take the examination. I also stress again the importance of candidates' making sure they can answer the Section A questions. The average section A score of passing candidates was 16 marks – that of failing candidates was 7 marks. I believe that difference speaks for itself. It is crucially important for candidates to practice Section A questions, and assure themselves that they can answer the various common types of questions.

The same dichotomy again applies in Section B. The average passing score was 13 marks per Section B question : the average failing score was 6.6 marks. Candidates must practice Section B questions, and make sure they can answer satisfactorily the majority of questions on previous papers. By contrast, the improvement in Section C marks for both passing and failing Candidates continued in Summer 2008.

All the Section A questions in Summer 2008 were relatively straightforward. Question 1 required the candidates to ratio the 1-year and 18-month discount factors to determine the 1-year/18-month forward rate. Quite a few candidates then forgot to turn this into an annual rate. Other candidates forgot that the payoff on an FRA at the beginning of the interest rate period has to be discounted – in this case at the forward rate. Question 2 required candidates to combine the market risk of the portfolio with the non-systematic or specific risk of the portfolio to determine the total risk.

$$(\text{BETA})^2(\text{MARKET RISK})^2 + (\text{SPECIFIC RISK})^2 = (\text{TOTAL RISK})^2$$

$$(\text{TOTAL RISK})^2 = (1.15)^2(20)^2 + (12)^2 = 673$$

$$\text{TOTAL RISK} = 25.94$$

Then the VAR at a one-sided 95% confidence interval is 1.65 standard deviations.

$$\%\ \text{VAR} = \frac{0.2594}{\sqrt{26}}\left(1.65\right) = 0.08394$$

$$\text{VAR} = £50{,}000{,}000\ (0.08394) = £4{,}197.000$$

Question 3 simply required the estimation of the average delta over a 50 point interval.

$$\text{AVERAGE DELTA} = \frac{-0.35 + \left(-0.35 + \left(0.002\right)\left(50\right)\right)}{2}$$

$$= -0.30$$

So the loss will be (-0.30)(50) (£250) = -£3750

Full marks were also awarded to those candidates who used a Taylor expansion. I was surprised that nearly half the candidates proved incapable of answering this question correctly.

Question 4 involved a very simple use of the binomial mode. Again a substantial minority of candidates were incapable of this – this seems to me extraordinary. Finally question 5 simply required knowledge of two equations.

$$\left(\text{BASKET VOLATILITY}\right)^2 = W_1^2\,\sigma_1^2 + W_2^2\,\sigma_2^2 + 2W_1\,W_2\,\sigma_1\,\sigma_2\,\rho_{12}$$

Where W_1 and W_2 are the basket weights

σ_1 and σ_2 are the individual volatilities

ρ_{12} = correlation between asset 1 and asset 2

$$\left(\text{EXCHANGE VOLATILITY}\right)^2 = \sigma_1^2 + \sigma_2^2 - 2\sigma_1\,\sigma_2\,\rho_{12}$$

I note that the description of the correlation as 0.40% was slightly ambivalent, so I awarded full marks whether the assumed correlation coefficient was 0.4 or 0.004.

In Section B, Questions 6, 7 and 10 proved by far the most popular, with relatively few candidates attempting the other three – indeed only two candidates attempted Question 9, which was actually a very simple question. Question 6, involved a rather straightforward application of the Black-Scholes, and was answered satisfactorily by most candidates. It required candidates to know that $N(d_2)$ is the probability of exercise in a Black-Scholes, world, and how to calculate the price and delta of an option on an index with a continuous yield. Most candidates were familiar with put-call parity, although the subtleties of the phi and rho relationships were beyond many candidates. Equally Question 7 was an easy application of futures hedging, and most candidates got high marks on parts (a) and (b). Quite a number of candidates, however, could not calculate VAR, and the level of analysis in part (d) was disappointing.

Question 8 was only attempted by six candidates with middling results. Some candidates did not seem to know the valuation formula for a digital option, nor how to integrate the results with the issuer's and bank's requirements. More familiarity with digital option pricing and hedging is recommended. As I have mentioned, I cannot understand why only two candidates attempted Question 9. It did not need any complex calculations, since all the option prices were provided, simply an analysis of a zero cost collar and an interpolated hedge. Question 10 was again straightforward. All that was required was an estimation of the cash flows for the purchase of the bond and the interest rate swap. The resultant spread could then be converted into the other currency via a basis swap. Part (b) simply required an illustration of the principles of pyramid hedging applied to cash flows. Again very few candidates attempted Question 11. I would expect most candidates to be familiar with lognormal versus normal interest rate assumptions in swaption valuation, the role of volatility skews and smiles, and the relationship between asset swaps and CDOs.

Question 12 was by far the most popular question in Section C. However, many candidates simply regurgitated all they remembered about credit derivatives and CDOs, without getting to grips with the central issue. Namely what are the differences between conventional and synthetic CDOs, and did they increase credit risks dramatically. Nine candidates attempted Question 13, but several did not understand what jump-diffusion processes involve, and even fewer understood the pricing and risk management implications. Candidates should try to expand their knowledge of the range of alternative derivatives models. Only five candidates attempted Question 14, but four of the answers were good and interesting. Such candidates showed initiative in attempting a somewhat out of the ordinary question. Eight candidates attempted Question 15, but unfortunately most of the answers discussed the straightforward use of derivatives by pension funds, as opposed to answering the question actually asked.