



**CHIEF EXAMINER' S REPORT**

**FINANCIAL DERIVATIVES SUMMER 2009**

I must first apologise on behalf of the Securities Institute for the unfortunate incident, where one of the questions (No 9) required the analysis of May and June FTSE-100 options, but only data on the May options had been supplied. Although I was obviously not responsible for this error, I can reassure candidates who did attempt Question 9, that I marked their attempts in what I regard as a reasonable manner, and that in no case did their score on Question 9 make a difference to their passing or failing the paper.

Apart from this incident, I think the paper was fairly representative of those of recent examinations, so I was disappointed that the pass rate fell from 36% for the Winter 2008 examination to only 32%. However, only 22 candidates took the examination this time. Unfortunately the number of candidates attempting the Financial Derivatives paper seems to be in steady decline. Nevertheless, it would still appear that many candidates simply do not prepare for the paper adequately, and hence have no chance of passing from the start. I will never understand why candidates are so incapable of learning from past papers. In my view, anyone who carefully reviews the previous four examination papers and makes sure he or she can answer satisfactorily all the Section A questions, and a majority of the Section B and Section C questions, should have no difficulty in passing the examination.

Once again, in this examination, the importance of a good score on Section A manifested itself. The passing candidates had an average score of 13.9 marks on Section A, whereas the failing candidates had an average score of 10.3 marks. Moreover, this latter average was biased upwards by one failing candidate who scored 20 marks on Section A. However, this illustrated another common failing – an inability on the part of some candidates to satisfactorily allocate time between different parts of the examination. The person who scored 20 on Section A only attempted three questions in Sections B and C, and in fact only half answered one of those. It is very important for candidates to ensure that they are being marked out of 100 rather than out of 80 or less.

I would not regard any of the Section A questions as being other than standard. Question 1 was a normal calculation of the arbitrage bounds for a short-term interest rate contract, which involved calculating the bid and ask rates for three months in three months time from the 3-month and 6-month bid – ask rates provided, and then determining the associated futures prices. The candidates needed to remember that the arbitrage boundaries would be  $[100 - 3/6 \text{ BID}]$  and  $[100 - 3/6 \text{ ASK} - 0.10$

NORMAL BID / ASK SPREAD]. The second question was a simple basis question. The candidates should know that the gross basis for the bond contract is simply

$$\text{GROSS BASIS} = \text{CHEAPEST TO DELIVER PRICE} - \left[ \frac{\text{CTD}}{\text{PRICE FACTOR}} \times \frac{\text{FUTURES}}{\text{PRICE}} \right]$$

To calculate the net basis, one simply calculates the cash flow in on 30/4/09 including accrued interest, and the cash position on 30/9/09, remembering the payment of coupon on 15/5/09, which is assumed to be reinvested at 0.20% till 30/9/09. The difference is the net basis. For Question 3, candidates needed to convert the annual volatility to fortnightly by dividing by  $\sqrt{26}$ , and remember then a one-sided 95% confidence interval is 1.65 standard deviation. Question 4 was a simple forward swap calculation using the discount factors provided, but only around a third or less of candidates managed to get full marks. Question 5 was answered badly by most candidates, with nobody securing the full four marks. While most candidates recognised that the first statement was incorrect, given the dual role of the interest rate in determining the forward and discounting the expected value, hardly anyone recognised the fact that

$$\text{FORWARD DRIFT} = \text{INTEREST RATE} - \text{YIELD}$$

$$\text{OPTION EMBEDDED DRIFT} = \text{INTEREST RATE} - \text{YIELD} - \frac{(\text{VOLATILITY}^2)}{2}$$

In Section B, Questions 6, 8 and 11 proved the most popular, with only two candidates attempting questions 7 and 10. The number answering Question 9 was presumably affected by the error regarding the provision of June option data. Question 6 was a very straightforward Treasury Bond hedging question, so I was surprised at how bad many of the answers were. Ten candidates attempted this question and managed an average score of 6.1 marks out of 20. This is horrendous for such a question, given that a hedging question of this type appears on virtually every paper, whether the underlying be short-term interest rates, equities or bonds. Every candidate should be able to calculate a T-Bond portfolio hedge, assess the locked-in value, and determine why the hedge has not worked successfully. In this case, the hedge actually resulted in a much higher portfolio value than expected because the gross CTD basis at the time of the lifting of the hedge was very different to that predicted by interpolation, and because the spread between September and December contracts had moved in a peculiar way.

It was surprising that so few candidates answered Question 7, since all the topics should have been familiar to anyone with a reasonable knowledge of derivatives. In (a) I would have looked for a discussion of the costs of stock borrowing, the extent of access to short sale proceeds, and the implications for the cost of hedging. Points to mention in (b) could have been the impossibility of different rates all being lognormally distributed, the role of constant interest rate assumptions, and the forward/interest rate assumption in FX models. For (c) it would be sufficient to define local as opposed to general volatility, discuss jumps and liquidity holes near barriers, and skew and smile implications. Question 8 was a very straightforward

cash bucketing and pyramid hedging question, and was answered quite well by the candidates who attempted it. Question 9 was the one I have discussed earlier.

Again it was a little disappointing that so few answered Question 10. Many candidates seem to freeze when they see a question involving a structured product. However, in this case all that was required was the valuation of a standard call option by Black-Scholes, and the valuation of a standard exchange option using the Margrabe formula. Every candidate should have been able to do such calculations, as well as be aware of the difficulties of hedging correlation risks. Question 11 was also very standard, involving the valuation of a call option using a 3-step binomial, and then the study of a delta hedge through the three periods. However, although there were some very good answers, there were also some very poor ones. Far too many candidates still didn't seem aware of the normal up and down steps in the standard binomial model, nor how to work out the up and down probabilities. Many candidates also seemed incapable of following through the buying and selling of the index, and the associated borrowing or investment, in the delta hedge. This is a question which is worth future candidates working through carefully and making sure they can do all the calculations.

In Section C, Questions 13 and 15 proved the popular ones, with Questions 12 and 14 being virtually ignored. Question 12, where it was answered, was answered dreadfully. Given the discussion in the media about credit default derivatives, the difficulties of valuing them, and the drawbacks of the infamous Gaussian Copula, I find this very surprising. I actually expected this to be the most popular question as opposed to one of the least. I looked for reference to probability approaches, default probabilities, the stability of recovery rates, the importance of correlations, Gaussian Copula models, liquidity risks etc. By contrast, Question 13 was popular, answered by over 50% of the candidates, and some very good answers were presented. There was, however, a tendency to write down everything a candidate knew about Stress Testing and Value at Risk, without really addressing the weaknesses of the latter in crisis conditions. Only one candidate answered Question 14, relatively well as it happened. Maybe hedging the weather is still a step too far for derivatives players. Finally Question 15 was also popular, although less well answered on average than Question 13. Here I would have looked for discussion of whether credit derivatives are homogenous enough in their current form for exchange trading, and how candidates thought central clearing would have influenced the events of 2007 – 2008.