CISI DIPLOMA

Summer 2010

CHIEF EXAMINER'S REPORT-
BONDS AND FIXED INTEREST MARKETS

General

18/26 (69%) candidates scored higher than 50 marks for which they should be congratulated. Three candidates scored more than 70-marks.

The five candidates who scored between 40 and 50-marks should, with some work be more successful should they decide to retake the examination.

It can be seen that the candidates were more confident with the essay questions than they were with the questions in Section A which were of a more technical nature:

	A	B	C
answers	26	26	26
marks	45	25	30
max	34.5	19.0	30.0
min	12.0	0.5	3.5
ave	25.9	9.9	18.7
std dev'n	5.4	5.3	5.0
ave as %	58%	40%	62%
std dev as %	12%	21%	17%

Many candidates found the Section B questions challenging with six candidates scoring less than five marks out of a possible twenty five marks.

Well done to the candidates who have been successful. Commiserations to the candidates who were close but not quite close enough. Specific comments are contained in the following pages.

Section A

Question 1

This question could have been answered much better! Most candidates understood that a falling pound would lead to higher import costs and better export performance but few mentioned the impact on inflation and fewer still on the impact of a weak pound on the sale of gilts. Nobody mentioned that a large percentage of FTSE 100 companies are international and earn income overseas and pay dividends in US Dollars.

Question 2

If candidates want to pursue a career in Fixed Income they should be able to calculate an annual effective rate from a set of four quarterly rates. Many candidates did not even manage the simple calculation of adding LIBOR and the credit spread together to get the quarterly return. Understanding of a compound interest calculation and interest factors is a must!

Question 3

This question showed a better average at 67%. Candidates could have scored a better mark had they understood the relationship between bond coupons, yields and prices!

1. If the coupon is greater than the yield-to-maturity the price is greater than par
2. If the coupon is equal to the yield-to-maturity the price is equal to par
3. If the coupon is less than the yield-to-maturity the price is less than par

Question 4

Candidates need a better understanding of the relationship between hedging default and credit spread risk, particularly in a UCITs compliant world where spread changes have to be recognised in fund NAV. Hedging default risk requires money at risk to be matched whilst hedging spread risk requires Credit Spread 01 to be matched. A few candidates recognised the maturity mismatch with the bond having a longer maturity than the CDS leaving an unmatched exposure of three years in five years time.

Question 5

This question was generally well answered but candidates should have a better understanding of how a convertible bond works, rather than that is simply a bond which is convertible into the equity of the issuing company.
In particular, candidates need a better understanding of the following points:
1. An issuer will call a bond to force conversion.
2. An investor will put the bond back to the issuer at (or close to) par if the value of the conversion rights is virtually zero. The issuer could then re-invest the proceeds in a straight bond at a higher return.

Question 6

DV01 converts the abstract concept of duration into a potential profit and loss, i.e. risk metric and needs to be understood. Many candidates were able to write down a version of the formula to calculate DV01 but, sadly too few were able to do the calculation!

- Macaulay Duration of a zero coupon bond equals it maturity in years
- Converting Macaulay to Modified = Macaulay Duration/ (1+ (YTM/Payments p.a.))
- DV01 = Nominal of bond x Dirty Price/100 X Modified Duration X 0.01%

Maturity	7	Years
YTM	3.50%	SA ACT/ACT
Nominal	$ 10,000,000.00	
Discount Factor	0.784364897	
Price of Zero	78.43648973	
Macaulay Duration	7	Years
Modified Duration	6.87960688	Years
DV01	$ 5,396.12	

Question 7

Riding the yield curve is a strategy employed by bond fund managers to allow them to benefit by buying slightly longer maturity bonds than they would ordinarily do. This much most of the candidates understood. They undertake this strategy when the curve is upward sloping and the manager expects no change in yields. The impact on the portfolio is to increase the yield and the duration relative to the benchmark and if the manager is correct provide outperformance (alpha). Very few candidates showed an understanding of why fund managers use this strategy.

Question 8

A simple question about the construction of a collar for which the following facts were being sought:

1. Limited risk, floored at 96.00. Limited reward, capped at 102.00.
2. Not a good risk:reward ratio, 3.93 downside risk and only 2.07 potential upside profit
3. Cost of the strategy is 16 basis points or 3.5 yield points

Most candidates understood and commented on Point 1. Nobody commented on point 2 and only a few candidates mentioned the yield cost of the strategy.

Question 9

Well answered with an average score of 90%

Question 10

Well answered with an average score of 77%

Section B

This section challenged most candidates and as a result generally lowered the marks for the examination and in some cases was the difference between a pass and a fail.

Question 11 for 11 marks required candidates to understand the relationship between the gilt and repo markets, how a GEMM hedges its inventory and how the profit and loss is calculated.

a) Called for the calculation of a hedge ratio between a long and a short position and then converting the hedge ratio to an amount of nominal for the short position. It should have been an easy calculation, the answer is:
   - DV01 of bond to be hedged x nominal / DV01 of hedge bond
b) Required candidates to choose which strategy would have been more profitable, shorting the 5-year or 10-year maturity as a hedge. To complete this calculation one simply needed to be able to calculate the expected profit on the short positions. This is done by multiplying the DV01 of each bond by the expected yield curve change. Most candidates were able to arrive at the correct answer, although not by completing the calculations.
c) This question follows on from b) above and requires the calculation of the net profit and loss from the long inventory and the short hedge position.
d) The final part of this question the candidates were required to calculate the net cost of repo for the hedged inventory. Sadly the knowledge of how to do this calculation was poor.

25 March 2010 Coupon	Redemption Date	Yield to redemption	Dirty Price	Modified Duration	DV of .01% per £1m nominal	
3.25%	07 December 2011	1.16%	£ 103.51890	1.65	£	170.81
2.75%	22 January 2015	2.96%	£ 99.07572	4.47	£	442.87
4.50%	07 March 2019	4.05%	£ 103.34102	7.33	£	757.49
Inventory Long Position	£ 100,000,000.00	3.25%	07 December 2011			

Question a)		Hedge Ratio	Amount of Hedge	Hedge Amount	
	i.	£170.81/£442.87 = 0.385689	=0.385689 x £100m	£ 38,568,880.26	(1 mark)
	ii.	£170.81/£757.49 = 0.225495	=0.225495 x £100m	£ 22,549,472.60	(1 mark)

Question b)	DV01	Yield Change in basis points	Nominal	Profit	
5 year maturity	£ 442.87	24	£ 38,568,880.26	£ 409,944.00	
10 year maturity	£ 757.49	30	£ 22,549,472.60	£ 512,430.00	
	Hedging with the 10 year maturity gilt would have been more profitable				(2 marks)

Question c)

	DV01	Yield Change in basis points	Nominal	Profit or Loss	
i.					
Inventory	£ 170.81	20	£ 100,000,000.00	-£ 341,620.00	
Hedge	£ 442.87	24	£ 38,568,880.26	£ 409,944.00	
				£ 68,324.00	(2 marks)

	DV01	Yield Change in basis points	Nominal	Profit or Loss	
ii.					
Inventory	£ 170.81	20.00	£ 100,000,000.00	-£ 341,620.00	
Hedge	£ 757.49	30	£ 22,549,472.60	£ 512,430.00	
				£ 170,810.00	(2 marks)

Question d)	Repo money amount	Repo rate	Term in days	Repo Interest	
Inventory	£ 103,518,898.64	0.58%	7	-£ 11,514.70	
Hedge	£ 38,212,397.14	0.51%	7	£ 3,737.49	
				-£ 7,777.22	(3 marks)

One candidate did score full marks, for which congratulations. One candidate scored no points. The low average score of 45% coupled with the high STD of 30% tells the story of this question. This subject is important because of the increase of gilt issuance that will take place between 2010 and 2014 and the increasingly important role that the GEMMs will play in this process. It is important for candidates to understand the role of the GEMMs and how they interface with the repo market, finance their inventories using repo and borrow bonds to short using reverse repo.

Question 12 for a total of fourteen marks dealt with credit risk and asset allocation in a SIPP.

I was particularly disappointed with the responses to this question. This question requires a level of understanding that any investor facing individual needs to understand. Whilst the question required some thought a solution could be found!

a) Required candidates to describe what would happen to the value of the corporate bonds if credit spreads were to widen and how this could be measured. Most candidates said that the price of the bonds would fall and several said that this could be measured using credit spread sensitivity (CS01). The ranking for credit spread sensitivity threw up some strange answers and although some candidates mentioned duration they completely failed to apply the concept to changing credit spreads when ranking the bonds for credit spread sensitivity.

The price of each bond would fall if credit spreads widen. This can be measured in two ways: 1. Percentage change in the bond price for every 0.01% increase in the spread 2. Spread sensitivity CS01	% change in price due to spread changes	CS01 per £200,000 nominal
Bond 1	Least sensitive	0.0147%	£ 29.33
Bond 2	2nd least	0.0216%	£ 43.19
Bond 3	3rd least	0.0339%	£ 67.82
Bond 4	4th least	0.0379%	£ 75.90
Bond 5	Most	0.0803%	£ 160.60

b) The question asked "Which, if any of the bonds would you consider speculative with regard to the borrower's ability to repay?"
    I was looking for an understanding of the difference between rating agencies definitions of investment grade and non investment grade paper. I didn't find it! Bonds 1 and 2 are non-investment grade and therefore speculative as to the issuers ability to repay as defined by the rating agencies

c) Required the candidates to be able to calculate a portfolio return. Most showed that they could do this, at least in theory, if all of the bonds were fixed coupon. However, include an FRN and most candidates were flummoxed. First principal of valuations of FRNs is to use the forward LIBORs which were included in the question.

	YTM	1st year yield
Bond 1	2.69%	
Bond 2	4.10%	
Bond 3		1.3443%
Bond 4	4.04%	
Bond 5	4.65%	
1st year yield		3.3649%

d) The question asks how the return on an FRN can be "locked in". The answer is to sell a strip of FRAs or receive fixed on an interest rate swap. This question was well answered.

Rates for Bond 3

Rate	Credit Spread	Total Return	Days	IF
0.52%	0.65%	1.17%	91	1.002917
0.66%	0.65%	1.31%	91	1.003266
0.72%	0.65%	1.37%	92	1.0034532
0.85%	0.65%	1.50%	91	1.0037397
		Compound 1-year IF		1.0134
		Implied 1-year return		1.3443%

The investor could sell Forward Rate Agreements (FRAs) to secure the returns for each period. On the fixing date the investor would make or receive a payment of the present value of the difference between the FRA rate and LIBOR, the FRN would be fixed at the LIBOR rate. This process will cause surpluses over the FRA rate to be paid away by the investor, whilst deficits will be paid to the investor. This process means that the investor is locking in the interest rate return component at the FRA rates. The credit spread is fixed.

e) Tricky but with some thought the investors return can be achieved using the first two bonds. Very few candidates managed to give the expected return from these two bonds. Using the first two bonds would give a non-investment grade portfolio; this could have been explained better.

It is possible to achieve the required outcome using Bonds 1 and 2. The ratio of bonds required to yield 3.25% with the lowest default risk is:

	YTM	Allocation	Product
Bond 1	2.69%	60%	1.62163%
Bond 2	4.10%	40%	1.62837%
Portfolio	3.25000%	100%	

Alternatively an equal weight of bonds would yield 3.395%. The significant pitfall is that this portfolio is a very low grade portfolio and significantly increases default risk.

f)   This part of the question gave candidates the opportunity to show that they understood the practicalities of asset allocation to meet a customer's objectives. Some candidates had a good grasp of the subject whilst others were woefully lacking of knowledge. I was not looking for a specific allocation, rather an understanding of the subject and the ability to give a reasoned response. Some work is needed here!

A traditional asset allocation would call for a diversified portfolio. Given that the investor is seeking to produce a partially self liquidating portfolio the first two bonds need to be included. The third bond has a low yield but a reasonable spread for a AAA rated security. It has the advantages that it will benefit from rising interest rates and increase the credit quality of the portfolio. Bonds four and five have a longer maturity and reasonable yields. Perhaps the spread on Bond 5 is a little low given that the bond has a nine year maturity and the issuer is only an A-grade. However, Tesco is a well known and managed company in the retail sector and should continue to benefit as the global economy improves.
It is not possible to optimise the portfolio manually, however an equal weighting of all bonds would seem to provide the following advantages:

- Bonds 1 and 2 provide a reasonable return for the next two years and upon maturity create the cash to make the tax free payment. Short maturities will reduce volatility caused by increases in interest rates and credit spreads although the investor should be advised of the potential default risk.

- Bond 3 has low interest rate sensitivity and will benefit from an upward movement in interest rates. This bond does have spread risk and would suffer if the UK housing market falters. It currently provides a reasonable credit spread and a high rating which presumably has been reaffirmed post credit crisis.

- Bonds 4 and 5 add yield to the portfolio, especially if interest rates remain low for a long period of time.

Section C

Question 13   Answered by 19 candidates for an average mark of 8.74

This was a popular question which was attempted by 19 of the 26 candidates sitting the examination. Most candidates were aware of the role of the DMO in raising finance by issuing gilts on behalf of the Government. However, not many candidates were able to describe how the process works and with whom the DMO interacts. This question could have been answered much better.

Question 14   Answered by 11 candidates for an average mark of 7.68

Those candidates that attempted this question could have gone into a lot more detail on how the investor might choose between repayment in US Dollars or sterling and why. Too many candidates that attempted this question did not have a clear idea of the mechanics of a dual currency bond.

Question 15   Answered by 7 candidates for an average mark of 11.14

This question is very topical and both the CDS market and the ABS Market have undergone significant changes as a result of the events of the last two years. Although the question was only attempted by seven candidates the results were generally good as can be seen from the average score of 11.14

Question 16   Answered by 14 candidates for an average mark of 11.11

This required candidates to discuss how global trade and capital imbalances might impact upon bond and FX markets and the US Dollar as the world's reserve currency. A popular question with fourteen candidates giving a good account of themselves.