ISMA CENTRE - THE BUSINESS SCHOOL
OF THE FINANCIAL MARKETS

UNIVERSITY OF READING
ENGLAND

IFID Certificate Programme

Credit Analysis and Products

Answers to Exercises

Answers to Exercises

2. Corporate Credit Analysis

Question 1

Using the balance sheet below, calculate the values of the key balance sheet ratios introduced in this section. Assume an annual lease rental of 100, a capitalised lease multiple of 8 and an EBITDA of 600.

Assets		**Liabilities**	
Plant	1,000	Overdraft	500
Stock	1,000	Bonds	1,500
Cash	2,000	Equity	2,000
Total	**4,000**		**4,000**

a) Enter your answers below in the units specified, rounded to one decimal place.

Debt / Book capital (%)	50.0
Adjusted debt / Adjusted book capital (%)	58.3
Debt / EBITDA (multiple)	3.3

Explanation

Debt / Book capital (%)
= 2,000 / 4,000 x 100
= **50.0%**

Adjusted debt / Adjusted book capital (%)
= (2,000 + 800) / (4,000 + 800) x 100
= **58.3%**

Where capitalised leases
= 8 x 100
= 800

Debt / EBITDA (multiple)
= 2,000 / 600
= **3.3** times

Question 2

Using the income statement below, calculate the values of the interest cover ratios defined in this section.

Sales	1,000	
Cost of goods sold	(200)	
Gross profit		**800**
Administrative expenses	(100)	
EBITDAR		**700**
Operating lease rentals	(100)	
EBITDA		**600**
Depreciation	(100)	
Amortisation	(100)	
EBIT		**400**
Interest	(100)	
Pre-tax earnings		**300**

a) Enter your answers below in multiples, rounded to one decimal place.

Interest cover	4.0
EBITDA / Interest	6.0
EBITDAR/ Fixed charge	3.5

Explanation

Interest cover = 400 / 100
= **4.0**

EBITDA / Interest = 600 / 100
= **6.0**

EBITDAR/ Fixed charge = 700 / (100 + 100)
= **3.5**

Question 3

Situation:
Below are the key yearly financials for two independent companies.

	Company A	Company B
EBITDA	500	100
Interest	100	50
Debt	1,000	500
Equity	2,000	500
Bond yield (Treasury +)	100 bps	400 bps

Company A has agreed to acquire Company B for 1 x EBITDA and will continue to service its existing debt obligations.

In the questions below we explore the impact of this acquisition on the key credit ratios and cost of debt for the combined group.

a) Calculate the following financial ratios for each company before the acquisition. Enter your figures rounded to the nearest integer:

	Company A	Company B
Debt/ EBITDA (multiple)	2	5
EBITDA/ Interest (multiple)	5	2
Debt/ Book capitalisation (%)	33	50

Explanation

	Company A	Company B
Debt/ EBITDA	1,000 / 500 = **2**X	500 / 100 = **5**X
EBITDA/ Interest	500 / 100 = **5**X	100 / 50 = **2**X
Debt/ Book capitalisation	1,000 / (1,000 + 2,000) = **33**%	500 / (500 + 500) = **50**%

b) Calculate the same financial ratios for the combined group after the acquisition, assuming:

- No netting of each company's financial totals
- Company A pays for the acquisition by issuing new debt at 10% interest

	Group A+B
EBITDA	600
Interest	160
Debt	1600
Equity	2500
Debt/ EBITDA	2.7
EBITDA/ Interest	3.8
Debt/ Book capitalisation	39

Explanation

	Group A+B
EBITDA	(500 + 100) = **600**
Interest	(100 + 50 + 10[1]*) = **160**
Debt	(1,000 + 500 + 100) = **1,600**
Equity	(2,000 + 500) = **2,500**

Debt/ EBITDA	**2.7X**
EBITDA/ Interest	**3.8X**
Debt/ Book Capitalisation	**39%**

c) Below are the yield spreads over treasuries paid by A and B on their bonds, before the planned acquisition.

	Spread
Company A	100 bps
Company B	400 bps

Ignoring any non-financial factors, what in your opinion would be the appropriate yield spread for any new debt issued by the combined group?

- ☐ Less than 100 bps
- ☐ 100 bps – the same as A's, which will own B
- ☉ Between 100 and 400 bps
- ☐ More than 400 bps

Explanation
Between 100 and 400 bps

Of course, a proper assessment cannot be made without knowing what business these companies are in and what is the rationale for A' acquisition. For example, if B is A's only significant competitor in their industry then the assessment would be very different than if A+B still had to battle against strong competition in their sector.

However, just looking at the financial ratios alone, it is clear that the net position for the group is weaker than for A on its own.

[1] Cost of funding the purchase of B at a price of 100 @ 10% interest

3. Credit Ratings

Question 1

Below are two companies with their own corporate ratings.

a) Complete the table below, showing the rating of their senior and subordinated bonds:

	Company X	Company Y
Corporate credit rating	A	A+
Senior bond rating	A	A+
Subordinated bond rating	A-	A

Explanation

	Company X	Company Y
Corporate credit rating	A	A+
Senior bond rating	**A**	**A+**
Subordinated bond rating	**A-**	**A**

b) Assume the following:

Default probabilities:
A+ rated company 0.2%
A rated company 0.3%
A- rated company 0.5%

Recovery values:
Senior debt 70%
Subordinated debt 30%

Expected loss = Default probability x (1 – Recovery value)

Calculate below the expected losses on the bonds rated in the previous question. Enter your answer in percentages rounded to 2 decimal places

	Company X	Company Y
Corporate credit rating	A	A+
Senior bond	0.09	0.06
Subordinated bond	0.21	0.14

Explanation

	Company X	**Company Y**
Corporate credit rating	A	A+
Senior bond losses	0.003 x (1 – 0.70) = 0.0009 or **0.09%**	0.002 x (1 – 0.70) = 0.0006 or **0.06%**
Subordinated bond losses	0.003 x (1 – 0.30) = 0.0021 or **0.21%**	0.002 x (1 – 0.30) = 0.0014 or **0.14%**

Notice how the expected losses on the two A rated bonds issued by two companies with different corporate credit ratings are not the same!

5. Asset-backed Securities

Question 1

Which of the following characterise a pass-through ABS?

a) Recourse to the originator is:

- ☐ Full
- ☉ Limited or none

Explanation
limited or none

b) Maturity of the security is:

- ☐ Uncertain
- ☉ Certain

Explanation
certain

c) Credit rating is based on:

- ☉ Quality of the asset pool
- ☐ Originator's balance sheet

Explanation
quality of the asset pool

Question 2

The Household Mortgage Corporation (HMC) is a UK lender owned by a consortium of banks and insurance companies. In the late 1980s HMC securitised a pool of floating rate mortgages by issuing a 5-year straight sterling Eurobond.

a) Which (one or more) of the following risks did the issuer have to manage in this case?

- ☐ Credit risk
- ☐ Currency risk
- ☑ Interest rate risk
- ☑ Prepayment risk

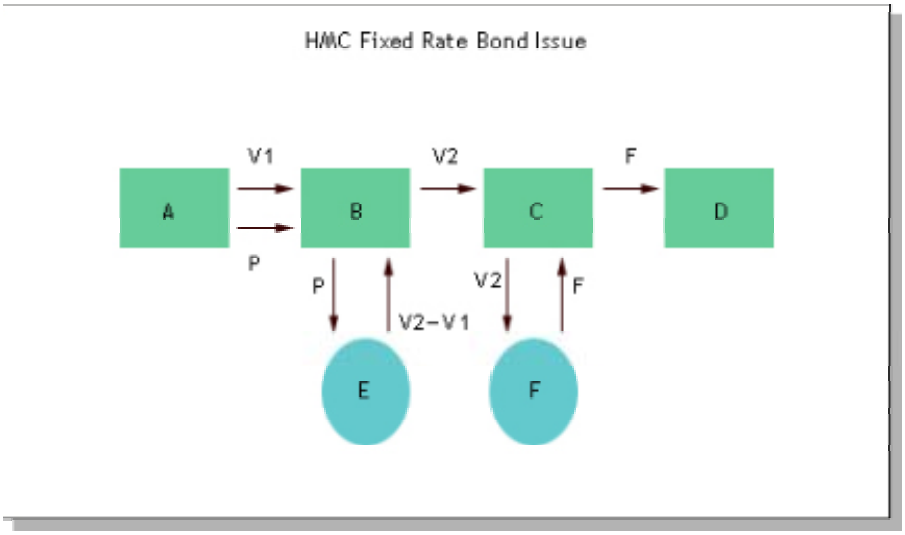
Explanation
Interest rate risk:

- Between the rate on the underlying mortgages and LIBOR (**basis risk**)
- Between LIBOR and the fixed rate on the bond

Prepayment risk:
The Eurobond had a certain bullet maturity, whereas the mortgages allow the borrowers to repay early

b) To manage the payment mismatches between the bond and the underlying mortgages HMC structured the deal as follows:

1. HMC sold the underlying assets to a special purpose vehicle, SPV1
2. SPV1 issued FRNs indexed on sterling LIBOR and entered into a guaranteed interest contract (which included a maturity guarantee) with an insurance company
3. The FRNs were purchased by another vehicle, SPV2
4. SPV2 used the FRNs as collateral to back the straight Eurobond issue and entered into a fixed-against-floating interest rate swap with another bank



Key:
P = Principal repayments
V1 = Interest on the mortgages
V2 = Interest on the FRN
F = Coupons on the straight bond

Identify the parties (A-F) represented in the figure above by completing the following table.

Party Name	**Code**
Obligors	A
GIC and maturity guarantee	E
SPV1	B
Investors	D
SPV2	C
Swap	F

Explanation

Party Name	**Code**
Obligors	A
GIC and maturity guarantee	E
SPV1	B
Investors	D
SPV2	C
Swap	F

6. Credit Derivatives

Theoretically, the CDS premium should reflect the LIBOR spread on an equivalent ASW.

In practice CDS premiums can deviate from asset swap spreads because legally and in terms of their balance sheet impact the two instruments are clearly not identical. These differences give rise to a **default swap basis** between CDS premiums and ASW spreads, which many institutions (especially hedge funds) nowadays actively trade.

Default swap basis = CDS premium – ASW spread

Below is a list of the key factors that analysts have identified as possible reasons why the default swap basis may not be zero (in addition to temporary supply/demand imbalances in either market).

1. Repo cost of funding the ASW < LIBOR

As we illustrated in the previous section, investors in asset swapped bonds may fund themselves at the repo rate, which is typically below LIBOR. This is especially so for investors who hedge against credit risk by shorting the reference securities on an ASW, rather than buying protection via a CDS, if the securities in question are trading on special.

2. Dirty price of reference asset > 100

In a credit event, most standard CDS contracts pay out par against delivery of the defaulted security but for the ASW investor, the risk on a bond is its dirty price [2], not par. Therefore, an investor buying standard CDS protection on a bond that trades above par needs to enter into a CDS contract for a larger notional amount than the face value of the reference bond.

3. Protection buyer must pay premium accrued on CDS up to the date of credit default

Most standard CDS contracts require the protection buyer to pay the accrued CDS premium right up to the credit event, whereas the investor in a defaulting bond typically loses out any accrued interest on the bond, as issuers in a corporate liquidation case rarely compensate investors for any coupons owed.

4. ASW spread may be negative but CDS premium >= 0

Given that the interest rate swap market is dominated by A or AA rated banks, the swap curve typically trades at a comparable spread over treasuries. Therefore, an ASW on a reference bond with a rating of AA or better can easily yield a spread below LIBOR, but of course no CDS protection seller will be willing to receive a negative premium (i.e. pay the premium) in order to protect the buyer against credit risk – no matter how highly rated the reference name is!

5. The buyer of protection on a CDS typically owns a delivery option

In a physically settled CDS (the majority of contracts) the protection buyer typically has a range of possible bonds and/or loans that are deliverable against a payment of par, whereas this option is not present in an asset swap which is normally structured on a specific security.

The protection buyer therefore has an incentive to deliver to the protection seller those deliverable obligations of the reference entity that trade at the lowest possible market price following a credit event, and this exposes the seller to an additional risk.

This risk was starkly illustrated in 2001 in the so-called **Conseco affair**, in which the US insurer Conseco successfully negotiated the restructuring of part of its debt, giving the affected creditors adequate compensation for the new terms, but the event had a negative market impact on the rest of Conseco's debt (which was not restructured) and this triggered substantial claims against CDS contracts written by third parties on all of Conseco's debt.

To avoid a repetition of the Conseco affair the new ISDA documentation has significantly tightened the definition of a credit event so as to mirror as closely as possible a real event of default on a bond or a loan. In particular, the new documentation has removed corporate debt restructuring agreements from the list of possible credit event triggers.

a) Explain the impact of each of the factors above on the default swap basis, other things being equal, by entering either 'Y' or 'N' in the appropriate column on the table below next to each factor. Where you feel that the impact of a given factor may be ambiguous, enter 'Y' in both columns.

Key basis risk factor	Default swap basis > 0	Default swap basis < 0
1.	y	n
2.	n	y
3.	n	y
4.	y	n
5.	y	n
6.	n	y
7.	y	y

Explanation

Key basis Risk factor	Default swap basis > 0	Default swap basis < 0
1.	Yes	No
2.	No	Yes
3.	No	Yes
4.	Yes	No
5.	Yes	No
6.	No	Yes
7.	Yes	Yes

Notes

1. **Repo cost of funding the ASW < LIBOR**
   As we indicated in the previous section:

   CDS premium ≈ (L – R) + (Y – S)

   Therefore, other things being equal if L > R CDS premium > ASW spread (Y – S).

2. **Dirty price of reference asset > 100**
   As we show in the diagramme on the previous section, an ASW investor has a credit risk of (DP – RV) on the underlying bond, whereas she receives only (100 – RV) if a credit event is triggered. Therefore, if DP > 100 the ASW investor who protects against credit risk using a CDS looses out and for this reason will pay a lower CDS premium than the ASW spread on the bond.

3. **Protection buyer must pay premium accrued on CDS up to the date of credit default**
   This creates an additional cost for the ASW investor seeking to protect credit risk with a CDS, hence an incentive to pay a lower CDS premium rate.

4. **ASW spread may be negative but CDS premium ≥ 0**
   This imposes a positive default swap basis on highly rated references entities.

[2] Labelled **DP** in the figure on the previous section.

5. **The buyer of protection on a CDS typically owns a delivery option**
   Typically the protection buyer is allowed to deliver any one of a number of debt instruments issued by the reference name. As with any option, the holder of the option has to pay a premium and in this case it's the protection buyer.

6. **The protection seller in a CDS has less counterparty risk than the investor in an ASW**
   Since the protection seller on the CDS has zero counterparty risk, whereas the ASW investor has some, this factor tends to make the CDS premium smaller relative to the ASW spread – i.e. it reduces the default basis.

7. **Profit on ASW position may be realised with more certainty than on equivalent CDS position**
   The impact of this is not obvious, because although there is a risk of not being able to realise the profit on a CDS position there is also a chance of not having to realise a potential loss on such a position.

Question 2

Which of the following statements do you think is/are true, all other things being equal?

a)

- ☑ Premium on a FTD CDS **≥** premium on any CDS written on any single name in that basket
- ☑ Premium on a FTD CDS **≤** sum of premiums on portfolio of single-named CDSs
- ☑ The higher the default correlation between the different reference names, the lower is the premium on a FTD CDS
- ☑ Premium on a STD CDS **≤** premium on a FTD CDS
- ☑ The higher the default correlation between the different reference names, the higher is the premium on a STD CDS

Explanation
They are all true!

1. **Premium on a FTD CDS ≥ highest premium payable on a CDS written on any single name in that basket**
   The risk of any one of a portfolio of names defaulting cannot be less than that on the reference entity in the portfolio with the highest risk.

2. **Premium on a FTD CDS ≤ sum of premiums on portfolio of single-named CDSs**
   A FTD CDS entitles the protection buyer to only one termination payment, on whichever name defaults first, whereas the termination payment on any single-name CDS does not prevent payments being made on CDSs written on the other names.

3. **The higher the default correlation between the reference names, the lower is the premium on a FTD CDS**
   The higher the correlation, the greater is the chance that when one of the reference names defaults they all will and therefore the more the premium of the FTD CDS will approach the premium on the most expensive single-name CDS (i.e. premium of the FTD CDS converges down to its lowest boundary, as described in statement 1, above).

   Conversely, the lower the correlation, the greater the chance that any reference name in the portfolio may default, so the higher the cost of the FTD CDS.

4. **Premium on a STD CDS ≤ premium on a FTD CDS**
   The chance of two names defaulting simultaneously is smaller than that of just one name defaulting.

5. **The higher the default correlation between the reference names, the higher is the premium on a STD CDS**
   The higher the default correlation, the greater is the chance that when one of the reference names defaults so will the others and therefore the higher the chance that the CDS will have to pay. In the limit, if there is perfect correlation then the premium on the STD is the same as that on the most expensive single-name CDSs.

   Notice how correlation has the opposite effect on the pricing of a STD CDS as it does on a FTD CDS (statement 3, above)