Bond Pricing

- When a company issues a bond, they are borrowing money from investors
- A bond gives the investor the right to receive interest and a repayment from the company
- The return earned by the investor includes the interest paid on the bond (coupon rate)

BOND	
Term:	3 years
Nominal (Par) amount:	£100
Coupon rate:	5%
Redemption:	at par

Action	Year	£
Bond purchased by investor	0	(£100)
Interest paid by company	1	£5
Interest paid by company	2	£5
Interest paid & bond redeemed	3	£105
Return (RATE function)		**5%**

- If the amount the investor buys the bond for is different from the amount they are repaid, this difference will also form part of the investor's return:

BOND	
Term:	3 years
Nominal (Par) amount:	£100
Coupon rate:	5%
Redemption:	at par

Action	Year	£
Bond purchased by investor	0	(£90)
Interest paid by company	1	£5
Interest paid by company	2	£5
Interest paid & bond redeemed	3	£105
Return (RATE function)		**8.9%**

=RATE(3,5,-90,100)

- The return to the investor of 8.9% is made up of:
  - £5 interest payments and
  - £10 difference between price paid for the bond and amount company repays
- The two bonds pay the same amount of interest (coupon rate) and the same redemption amount, so investor's return is determined by how much they are willing to pay for the bond
- If we know the return that investors require (Gross Redemption Yield) and the interest and redemption amount of the bond, then we can calculate how much investors will pay for the bond
- This will tell us how many bonds the company needs to issue to raise a certain amount of finance

Example: Investors require a 10% return (Gross Redemption Yield):

BOND	
Term:	3 years
Nominal (Par) amount:	£100
Coupon rate:	5%
Redemption:	at par

Action	Year	£
Bond purchased by investor (PV function)	**0**	**(£87.57)**
Interest paid by company	1	£5
Interest paid by company	2	£5
Interest paid & bond redeemed	3	£105
Return required by investor		10%

=PV(10%,3,5,100)

- Each bond with a nominal amount of £100 will be issued to investors for £87.57
- These bonds are issued at 87.57% of their £100 nominal amount (issued at a discount)
- To raise £100k of finance, the company will need to issue 1,142 bonds (£100k/£87.57 per bond)
- The bonds will have a total nominal value of £100 x 1,142 = £114,200
- The cash interest paid will be £5,710 (114,200 @5%)

EXAM TECHNIQUE GUIDANCE

- To calculate how many bonds a company needs to issue to raise a certain amount of finance, need to know:
  - Bond term (period)
  - Coupon rate (interest)
  - Redemption amount
  - Return required by investors (%)
- To calculate the return required by investors:
  - Calculate the return on a similar bond for a similar company
- Always comment that the return required by investors will not be identical if:
  - The industry of the other company is different: business risk will be different
  - Gearing structure of the other company is different: financial risk will be different
  - The bond period is different

MASTER PLAN

TOPIC	CLASS	QUESTIONS	ICAEW Workbook
Bond Pricing	Bond Pricing	D22 Q2 81.6 StartUp S22 Q2 78.6-7 Fizzbuck S21 Q3 70.1c Eco Energy J18 Q2 Q52.1b Blackstar D16 Q2 Q34.1c Bristol Corporate Finance J16 Q2 Q28.4 Ross Travel S17 Q2 Q43.2 Ramsey Douglas Motors	Ch5.2.5-2.6

D22 = December 2022 exam questions; M22 = March 2022 exam questions
Questions are in the ICAEW Question Bank

Present Value of Cash Flows (SVA)				
	Year 1	**Year 2**	**Year 3**	
Sales	X	X	X	Relevant cash flows adjusted for inflation
Variable Costs (VC)	(X)	(X)	(X)	Relevant cash flows adjusted for inflation
Contribution	X	X	X	Contribution: Sales x Margin
Fixed Costs (FC)	(X)	(X)	(X)	Relevant cash flows adjusted for inflation
Net cashflows	X	X	X	
Tax	(X)	(X)	(X)	Corporation tax (CT) outflow
Asset purchase	(X)			Buy asset
Asset scrap				Sell asset
Capital Allowances (W)	X	X	X	CT saved
Working capital	(X)	(X)	(X)	Cash temporarily tied up in inventory/receivables
Cashflows	**X**	**X**	**X**	
PV of cashflows (Ex. perpetuity / terminal value)	X			Today's value of future cashflows (NPV function)
Perpetuity	X			Cashflow / (WACC% - growth %)
Terminal Value (TV)				Amount business will be sold for discounted to PV
Value of Short-Term Investments	X			Surplus cash/short-term investments
Value of Business	**X**			
Value of Debt	(X)			Market Value
Value of Equity	**X**			Divide by number of shares to get per share amount

Perpetuity: Constant cash flow which is assumed to last forever e.g. £100k pa forever

$$\text{Perpetuity} = \frac{\text{Cash Flow}}{\text{Return \% - Growth \%}}$$

- Formula assumes first cash flow is at T1 (in one year's time)
- Delayed perpetuities need to be discounted to PV

Net Cashflows can be estimated as:

- Profit before tax and interest
- Add: non-cash expenses (depreciation and impairments, other accruals)
- Deduct: tax, capex and working capital

Foreign Exchange Risk

- A business could be exposed to foreign exchange risk:
  - Future payments in a foreign currency to international suppliers **(transaction risk)**
  - Future receipts in a foreign currency from international customers **(transaction risk)**
  - Loss of international competitiveness due to exchange rates moving unfavourably causing cost of inputs to increase, value of revenues to fall **(economic risk)**
  - International operations lose value when translated back to company's reporting currency for financial statements **(translation risk)**

Foreign Currency Basics

- The bank will have a buy and a sell rate. The bank makes it profit by buying and selling at different rates so the **customer (the company)** will always get the **least favourable rate**

Exchange rate ($/£) 1.30 - 1.50		
If buying $10k dollars	£7,692	£6,667
Use the least favourable (costs us more)	**£7,692**	
If selling $10k dollars	£7,692	£6,667
Use the least favourable (we receive less)		**£6,667**

- This is the spot rate: the rate available to buy and sell currency now
- If a company needs to pay a supplier in a foreign currency in the future, there is a risk that the foreign currency will strengthen so that payment costs more in the company's home currency
- If a company will receive payment in a foreign currency in the future, there is a risk that the foreign currency will weaken so that the receipt is less in the company's home currency
- Currencies are expressed relative to one another:
  - if a currency strengthens (appreciates) then the other currency is weakening (depreciating)
  - if you are buying a currency, you are selling another currency

Futures

- Standardised contracts to buy or sell a notional amount of foreign currency
- Futures contract priced at foreign currency to £ rate e.g. $1.35/£1
- Futures market will move in line with actual (spot) market:
    - $ strengthens ($1.35 to $1.21): futures price will also strengthen ($1.35 to $1.21)
    - Note that futures price may not be the same as spot price

Example:

- Company that needs to buy $ will sell £ futures (selling £ futures is the same as buying $)

Scenario 1:

- Spot exchange rates and futures rates move to $1.21 so company will pay more £ when buying the $ to pay the supplier
- They will make a gain of $0.14 on the futures (sold at $1.35, bought at $1.21)
- The futures gain will offset their increased cost of buying $ to pay the supplier

Scenario 2:

- Spot exchange rates and futures rates move to $1.51 so they will pay less £ when buying the $ to pay the supplier
- They will make a loss of $0.16 on the futures (sold at $1.35, bought at $1.51)
- The futures loss will offset their reduced cost of buying $ to pay the supplier

Step 1. What is our exchange rate risk so should we buy or sell futures?

- Company that needs to buy $ will sell £ futures now (selling £ futures = buying $)
- Company that needs to sell $ will buy £ futures now (buying £ futures = selling $)

Step 2. Calculate number of contracts needed to offset actual payment

$$\text{Number of futures contracts} = \frac{\text{Foreign currency payment (e.g. \$1m)}}{\text{Futures rate (e.g. \$1.35)}} = \text{£ equivalent} \quad \frac{\text{£ equivalent}}{\text{Contract size (e.g. £62.5k)}}$$

Step 3. Calculate gain/loss on futures

Gain/loss per $ movement x number of contracts x contract size

- The gain /loss is calculated in $ so needs to be converted in £ at spot rate

Step 4. Calculate actual £ payment/receipt in the spot market

Step 5. Calculate net amount

- The gain/loss on the futures will offset the actual payment/receipt

Advantages	Disadvantages
Secondary market for futures	Can't benefit from upside risk
Low transactions costs	Not available in every currency
Don't need to know exact date of payment or receipt	Standardised futures contracts so can't hedge exact amount
	Futures movement may not be the same as actual market (basis risk)