4.6.1 Financial Risks Arising from Ownership

Unit: Unit 1 – Treasury Strategy

Module: Module 4 – Financial risk

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Summary: Ownership risks comprise foreign exchange translation risk of the balance sheet and earnings, interest rate risk and margin risk. Counterparty credit risk is also included here because bank exposure is arguably its largest component.

Keywords: ownership risk, foreign exchange translation exposure, interest rate risk, margin risk, counterparty risk, floating rate, fixed rate, real interest rate, credit risk, settlement risk, replacement risk, credit default swap, index credit default swap

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Learning outcomes:

1. Ownership risks comprise FX translation exposure and interest rate risk.
2. Interest rate risk can be part of business risk.
3. Translation exposure can relate to earnings or the balance sheet.
4. Translation exposure is seen as non cash but can affect credit ratios.
5. Interest rate risk has many dimensions:
   a) changing costs of interest income or expense
   b) changing value of outstanding debt
   c) changing business environment
6. Margin risk arises from re-financing and bond issuance.
7. Counterparty risk arises on financial and non financial counterparties.
8. Counterparty risk has many facets.
9. The investor viewpoint needs to be considered as many risks are related to being in business, i.e. shareholder risk.
10. Foreign exchange translation exposure can affect credit ratios such as net worth, gearing, net debt / EBITDA, Interest cover, cash flow ratios and earnings.
11. Highly levered structured transactions can have high translation risk.
12. A typical response to translation risk is to finance foreign investments with the foreign currency of the investment, but setting the right debt level can be difficult.
13. Earnings translation risk is rarely hedged but the effects need to be understood for internal and external stakeholders.
14. There is no inherent rate in FX translation risk.
15. Interest rate risk can be complex for many reasons, for example:
    a) interest rates are an economic tool and so may affect business in strange ways, including sectoral, regional and leading and lagging effects
    b) floating rates are inherently cheaper
    c) inflation is a major component of interest rates
    d) the yield curve can show many different shifts
    e) opportunity risk is high in interest rate risk management
16. There is a deep interest rate derivatives market which can price risk well and offers risk transfer products.
17. Many forms make over simplistic responses to interest rate risk.
18. The response to interest rate risk must be seen from an overall strategic approach, with proper agreed objectives.
19. The response to interest rate risk will comprise a fixed interest / floating interest mix
20. An analysis of risk by real interest rates can be useful.
21. Margin risk is part of refinancing risk.
22. Margin risk is made up of market risk and firm risk.
23. There are several different approaches to the accounting rules.
24. Counterparty credit risk has many different facets:
    a) credit risk
    b) settlement risk
    c) replacement risk
25. Counterparty risk can be individual counterparties or classes thereof.
26. Ratings, credit default swap (CDS) prices are indicators of counterparty risk.
27. CDS and index trades are risk management tools for counterparty risk and margin risk.

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1 Introduction

We consider in this reading the financial risks associated with ownership. These are distinct from the risks of trading because colleagues interested in the underlying trade will not be able to throw any light onto these risks, so they have to be approached from the Centre. In the broadest sense they are:

- foreign exchange translation risk
- interest rate risk

So a commercial manager running a US based domestic business owned by a UK corporate will be interested to talk about his USD earnings but will have no view on how they become GBP earnings. The risk arises because of the ownership of this business. If the owner had been US based, there would be no such risk.

Similarly, the same commercial manager in the US is happy to be challenged to keep his capital employed at an optimum level but will have no view on the overall financial structure of the group. FX translation and interest rate risk arises at Group level rather than in the operating unit, because the owner of this business chooses to invest in the US and adopts a certain capital structure for that ownership.

Of course nothing is ever simple and there will be exceptions to this pure distinction, but it does not invalidate the analysis. The major exception, which is in interest rate risk, hinges around naturally geared businesses where asset finance is the main way to fund or where an interest rate might be a component of pricing in some way.

Example 1: Interest rate risk fundamental to underlying trade
Airlines lease (or buy) aircraft under complex lease arrangements, one element of the costs of which is the interest rate on the debt component of the lease. This interest rate feeds into operating costs making interest rate risk part of commercial risk.

Property companies, most transport companies and arguably utilities also fall into this category, as do businesses in the financial services sector.

Pension schemes also have interest rate risk but we will discuss this specific and important case elsewhere.

We also consider counterparty risk in this reading. This is at its most extreme in treasury management where often large amounts are placed at risk with financial institutions, either by way of deposit or derivatives or even through drawdown of revolving credit facilities and dependence on cash management systems and these uses of the sector are predominantly those of ownership. However, there is also counterparty credit risk in operations centring around customer receivables risk.

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2 Categorisation

As usual, it is helpful to categorise these risks:

Exhibit 1: Financial risks of ownership

Risk	Cause / Effect	Items affected
FX Translation exposure	Assets and liability values change with exchange rate changes	• Net worth • Leverage, gearing • Other credit metrics
FX Translation exposure	Income and expenditure values change with exchange rate changes	• Interest cover • Earnings / EPS • Net debt / EBITDA (combination of balance sheet / earnings) • Cash flow metrics (combination of balance sheet / earnings / cash flow)
Interest rate risk	Changing cost of interest expense or income	• Interest charge • Interest cover • Cash flow
Interest rate risk	Changing market values of debt outstanding, or assets owned	• Pension scheme assets and liabilities • Repayment of fixed rate debt • Earnings and associated metrics
Interest rate risk	Changing business environment as a result of changing interest rates leading to changing business performance	• Variability of earnings and cash flows • Product pricing
Margin risk	Risk on re-financing or bond issuance	• Interest charge • Interest cover • Cash flow
Counterparty risk	Financial counterparties	• Time deposits, account balances, CDs, etc. • Derivatives in the money to hedging party (i.e. oneself), including replacement risk • Obligations given to third parties, e.g. letters of credit / bank guarantees • Daylight risks on settlement • Dependence on systems, e.g. cash management structures • Undrawn obligations (term loans undrawn and RCFs)
Counterparty risk	Non financial counterparties	• Receivables risk (and potential long term loss of customer) • Supply risk (where supplier is difficult to replace)

3 Investor viewpoint

It is again useful to consider how investors might view actions taken by a firm with regard to these risks. Generally, these risks tend to be low impact in relation to the overall riskiness of a firm but we will see that this is not always the case, even for those firms with low financial risk.

With regard to interest rate risk, investors will generally accept that interest does have to be paid on a firm's debt and assume that firms will not pay an interest charge more than necessary.

With regard to translation risk, a major part of the investment decision is whether investors seek risk from a geographically diverse source. If so, then exchange rate volatility is merely another aspect of that diversity and can in fact enhance a portfolio by introducing uncorrelated returns.

However, some of these risks impinge on liquidity risk and in that case, investors must expect that management will ensure that liquidity issues will not arise on the basis of movements in foreign exchange or interest rates alone.

The risks related to interest rates and exchange rates generally magnify as debt increases and so there is the special case of highly geared entities. Therefore, utilities, housing associations and property companies, transport and other capital-intensive firms as well as those seeking high financial risk, such as private equity, firms must take special care around interest rate risk.

Example 2: High interest rate risk
High Five Ltd is a highly geared leveraged buyout of a division from a conglomerate. Its lenders have insisted that while leverage (as measured by Net Debt / EBITDA) is above 4.5, then interest rate hedging must be in place so that the interest on 60% of gross debt is fixed.

Using the supply chain analysis seen when looking at financial risk in trading firms, we can think about where trading firms sit in the interest rate or foreign exchange risk management supply chain. Trading firms are generally at the end of such a supply chain, meaning that they cannot pass FX translation or interest rate risks on any further. Of course investors ultimately carry the risk and this gives a clue to one possible response, but investors are unlikely to seek the risks of consequential effects on liquidity.

4 Foreign exchange translation exposure

Do Exercise 4.6.2 as an introduction to this topic before reading further.

The traditional view of foreign exchange translation exposure is that it is a non-cash exposure which is really just an accounting issue, and that the risk actually lies with shareholders following their wish to invest in an international group. Accounting standards potentially

confuse the issue as they concentrate on the 'net investment hedge' where a firm borrows or enters into a derivative to hedge against movements in the value of the accounting net assets of the overseas entity. However, this is a hedge of accounting net worth, which arguably bears no relation to the economic risks / value in such investments. Credit ratios and cash flow metrics are not addressed at all. So accounting standards may give managers and investors a false sense of security, by conveying the perception that an overseas investment is 'hedged', when actually it may not be in economic terms.

4.1 Debt translation risk and credit measures

Hopefully Exercise 4.6.2 will have washed all these thoughts away, and shown that translation exposure can have real effects because of the way that it can affect credit ratios and cash flow measurement. All of the following measures and ratios can be affected by movements in exchange rates:

- net worth / enterprise value
- gearing
- net debt / EBITDA
- interest cover
- cash flow (and concomitant measures, e.g. cash flow / debt)

Some simple experimentation with the spreadsheet in the exercise will reveal that while some ratios can be held static, not all ratios can be and so choices need to be made in approaching translation risk.

It is certainly the case that the movement in exchange rates seen in the exercise was excessive, but that movement actually happened, and happened very quickly. A similar move also happened in 2016, of course, following the Brexit referendum. And while the example is unrealistic in that if say the change happens half way through a year, then the averaging effect will decrease its impact, but the message remains.

The exercise shows that, apart from the accounting headaches that normally accompany translation exposure, debt translation risk is all about liquidity.

4.1.1 Responses to debt translation risk

As we know from our approach to the risk management framework, we cannot plan a response to debt translation risk without putting it into the context of an overall financial strategy and an agreed approach to the measurement of risk.

We also bear in mind the formally described possible responses to risk, of:

- avoidance
- acceptance and retention
- acceptance and reduction
- acceptance and transfer

Example 3: High leverage and translation risk
City Escapes Inc is a tour operator, with businesses all over Europe and the US, which is owned by a private equity house and highly levered. The financial covenants on the debt are tight and tighten over time as the business generates cash and pays down debt (standard practice in PE-funded and highly leveraged firms). The financial covenants include Net debt / EBITDA and cash flow measures

The main concern for City Escapes with regard to translation risk is to ensure that the financial covenants are not breached by movements in foreign exchange rates alone. Accordingly, the measure for this risk revolves around the probability of breach in covenants.

Example 4: Company with high M & A transaction activity
Owners Everywhere (OE plc) is a conglomerate with a strong credit rating and no financial covenants in its debt instruments or facilities. It is active in acquisitions and disposals and currently has a programme of disposals to make in the United States, where it has made a strategic decision to reduce its exposure prior to expanding in the emerging markets. The disposals will be made in US Dollars and the acquisitions are likely to be in a mix of currencies, none of which really track the US Dollar.

The main concern for OE is to protect the value of its disposal programme and so the risk measurement is around the value of the US Dollar against a basket of currencies.

Despite the problems associated with financing business assets in their currency, in fact most responses are based around setting some level of debt finance by currency over the whole business. In aiming to reduce the risk as measured by an appropriate KPI or KCI, that level could be between 0% and 100% or even outside those ranges (i.e. more currency debt than currency assets, or conceivably holding currency cash as well as currency assets).

There are difficulties in setting levels of debt finance by currency. These broadly revolve around establishing the size of the asset by currency. If the asset is a business in its own right, should the size be the acquisition price, or the accounting carrying value, with or without goodwill, or the expected current valuation of the business, or do we base it on its cash generative ability or profit making ability? If the asset is part of a larger multi-national business, then again do we consider its carrying value or some other value? There is also the issue of having to create this debt and coordinate with other cash flow requirements. If investment is required in the region in future, that may in itself increase debt.

The limit often adopted here is what can be accommodated by accounting policy and some groups will only hedge up to a maximum of what can be allowed as a net investment hedge.

Let us return to Playwell Ltd, seen in Exercise 4.6.2. Management have decided that the risk of covenant default is the measure to be adopted in management of this risk and the response to the risk will be to adjust the level of debt by currency. On acquisition Playwell sell a further £35 million so that the debt is more evenly balanced between GBP and Euro.

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Exhibit 2: Balanced debt approach

	Playwell	Playhard Assets	Consolidate	Consolidate		Change
	£m	€m	1.50	1.10		
Assets net	90.00	100.00	156.67	180.91		15.5%
Debt	(25.00)	(38.50)	(50.67)	(60.00)		18.4%
Equity						
EBITDA	10.00	12.00	18.00	20.91		16.2%
Interest 7%	(1.75)	(2.70)	(3.55)	(4.20)		18.4%
	Earnings		14.45	16.71		15.6%
	Net worth		106.00	120.91		14.1%
	Gearing (debt /equity)		48%	50%		3.8%
	Net debt / EBITDA		2.81	2.87		1.9%
	Interest cover		5.08	4.98		-1.9%

Modelling the change to an exchange rate of 1.10 shows that while the earnings and net worth are more volatile, the major credit ratios have become very stable under exchange rate movements. This achieves the aim of risk management for Playwell. By applying implied volatility and some further modelling, Playwell could easily calculate a risk for covenant breach and plan to get this within an acceptable budget.

Other things to note about responses here include:

- Credit ratios are a mix of snapshot (closing rate) and periodic (average rate) measures. Risk of breach can be reduced by negotiating the same approach for each part of a ratio in loan documentation (e.g. by measuring closing debt at average rates).
- We have talked about debt as the instrument of response, but debt can be synthetic. The key thing is to create a liability portfolio by currency, so that pure FX forward or cross currency swaps can create the synthetic instrument. Care needs to be taken for symmetric accounting treatment however, and because swaps require cash settlement on maturity or rollover, the liquidity implications need also to be considered.
- For low geared, or cash rich groups, this type of approach can still be taken. It is quite possible for a cash rich group to be long e.g. sterling and short e.g. US Dollars to achieve the desired aim.
- Inter-company debt can be a useful tool in some cases.
- In contrast to risks in trading, there is no intrinsic rate, because there is no buy / sell transaction. Perhaps an exchange rate on acquisition / financing arrangement has importance, but this is soon lost in the fog of history and the nearest we can get to one is last year's closing rate.
- In the absence of an intrinsic rate, the budget or plan will have assumed a set of exchange rates, but although they may be a useful benchmark, they may not be based in (current) economic reality.

To summarise then, of our possible responses, the following options are available in practice:

- Avoidance – if absolutely necessary, a firm can limit all its assets to one currency and operating in territories or industries where a single currency predominates. Examples

would be the Eurozone, and companies which trade exclusively in or between countries whose currencies are locked to e.g. the USD, such as Lebanon, Hong Kong, United Arab Emirates, Saudi Arabia.

- Acceptance and retention – always a possibility if currency fluctuations are expected to have low probability / low impact on KPIs at the required level of confidence. The risk is, as an ownership risk, for shareholders to worry about, as long as there are no immediate effects on other risks, notably liquidity risk.
- Acceptance and reduction – unlikely to be a viable approach. Currency fluctuations can't really be reduced by improved processes or controls.
- Acceptance and transfer – as discussed above, there are a variety of ways in which the risk can be transferred.

4.2 Earnings translation risk

The example in Exercise 4.6.2 should indicate that there is actually very little that can be done to reduce volatility of earnings arising from translation effects. This applies particularly to pre-interest earnings, i.e. those at operating level. At that stage this represents pure operating profits at differing exchange rates. It is quite possible to argue that that is the risk of a business with operations in different currency zones and investors must understand that.

Example 5: Translation risk

A Chief Executive of a UK firm has given the City a profit expectation which included, at the date of her comments, a $100 million of net earnings in the group's US subsidiary translated at GBP/USD = 1.75 (£57 million). Even if the subsidiary exceeds budget by 10% and produces $110 million, if the accounting average rate for the year is 1.98, reported earnings will only be £55 million. Unless shareholders are educated in risks such as this, the shortfall could well affect the firm's share price and its credibility in the market.

Moving to a post interest level, it is possible to construct an interest charge in each currency to offset earnings by having real or synthetic debt in that currency, but this is a very blunt tool. We expect that profits will exceed the interest charge but there may be no relationship between the underlying interest rate, the margin and business performance.

Moving again to a post-tax level and complications arise again, over different rates and issues such as thin capitalisation limits.

This translation risk can also apply within companies:

Example 6: Translation risk in internal expectation

A Divisional Chief Executive of a US subsidiary of a UK firm has given a commitment to a budgeted £57 million, being $100 million of net earnings in the US subsidiary translated at GBP/USD = 1.75. The division exceeds budget by 10% and produces $110 million, but the accounting average rate for the year is 1.98, and so the earnings contribution is only £55 million. Good performance has been seen as poor performance and this might affect capital allocation decisions adversely, whereas in fact this division should probably be supported.

This problem can become quite complex in large groups where divisions themselves comprise results over several different currencies and where drilling down into several layers might be required.

4.2.1 Responses to earnings translation risk

We bear in mind the formally described possible responses to risk, of:

- avoidance
- acceptance and retention
- acceptance and reduction
- acceptance and transfer

There is a different cultural approach to the problem of managing earnings translation risk. In the US, where quarterly earnings reports are required, there has been a tendency to hedge this type of exposure. Typical instruments used include Average Rate Options, Double Average Rate Options, Forwards and Vanilla Options. In Europe and elsewhere this risk is rarely hedged and so the main response is simply to explain it to investors, as shown in Example 7.

Example 7: Earnings translation explained

Kingspan Group plc give like for like numbers, corrected for (inter alia) exchange rate movements.

Some issues arise if risk transfer is considered:

- There is no intrinsic rate for earnings. The nearest guide is the rate at the last quarter, or last year or the current rate, but there is no underlying logic as to a rate to hedge against.
- Hedging instruments tend to be cash settled, whereas the cash flow on the underlying exposure may be indirect, delayed or absent altogether.
- There is potential for opportunity costs, especially on the cash implications of using risk transfer (derivatives).
- There can be accounting issues if the effect of the hedge cannot be applied in the correct part of the correct entity's income statement.
- It may be difficult or impossible to find a hedging instrument whose pricing matches the accounting price logic.

So, considering our choice of responses again we have:

- Avoidance – by trading in only one currency, or a group of currencies which are pegged together.
- Acceptance and retention – possible if the risk is low probability / low impact, and common in Europe or pass to shareholders
- Acceptance and reduction – likely impossible
- Acceptance and transfer – possible subject to the comments above, and common in the US.

5 Interest rate risk

We probably think we all understand interest rate risk, that if, as a borrower, interest rates rise, things are bad and if interest rates fall, things are good. And that if we think a bad thing may happen (the rate rises) then we should hedge against it.

Example 8: Interest rate sensitivity

Mawgar Inc has been in operation for two years. Its interest cover has been 3.0, which is not seen as a source of concern by lenders. Two years ago, Mawgar's treasurer chose floating rate debt, on the grounds that the one-year interest rate of 5% was not expected to change, and was 50 basis points lower than the fixed rate available for longer dated debt. But a year on, the Federal Reserve has lifted the official repo rate to combat an inflation threat. The cost of Mawgar's floating rate debt has increased to 6%. In the meantime, Mawgar's operating profit has stayed the same at $30m.

Assume total debt of Mawgar is $200m. What is Mawgar's revised interest cover and how did the change impact on year 2 profit before tax (PBT)?

Solution

The table gives the relevant calculations.

Interest Rate	**Yr 1 5%**	**Yr 2 6%**	**Comments**
	$m	$m	
Operating profit	30	30	Same
Net interest expense	10	12	
Profit before tax (PBT)	20	18	
Face value debt	200	200	Same
Interest cover (ratio)	3.0	2.5	Equals operating profit/net interest expense
PBT % change		(10%)	

Therefore a 1% rise in interest rates has led to a 10% fall in PBT. The tax shield provided by debt will absorb some of this, but the bulk of the fall will be borne by shareholders. It also raises risk for Mawgar. By being a lower credit risk it is more susceptible to liquidity difficulties and further rises in rates will make things even worse.

Example 9: Bond issuance risk
Energy Experts Inc is an energy utility operating in the United States. It has a large debt portfolio and is a regular issuer of bonds. Its bonds are priced at a spread over treasuries. It is highly rated and this spread is quite low. Despite issuing fixed rate debt, Energy Experts still faces interest rate risk, as the (fixed) rate in the market varies every day.

Interest rate risk turns out to be quite a complex risk, and one of the more difficult to deal with philosophically, if not practically.

Some of the issues that need to be considered include:

- In its most simple form, interest rate risk is the risk of a change in the actual interest charge to the firm
- It is also a risk of the changing market value of debt, impacting the balance sheet and consequentially the income statement
- It has a huge impact on interest rate sensitive portfolios, such as pension schemes
- The business itself may behave differently under different interest rate scenarios, so looking at the interest charge separately from the business can lead to wrong decisions
- Governments manipulate interest rates for the benefit of the economy (or of politicians themselves), not corporates, but this may change the risk
- Rate changes may lead or lag effects on the economy or company
- Interest rates can be distorted by regional influences, sentiment or supply and demand (e.g. Euro zone where one interest rate is applied to economies in different economic cycles)
- Floating rates are usually cheaper than longer term fixed rates
- Studies show that staying floating is consistently cheaper than fixing (although over short periods this may of course not be the case, and may be disastrous)
- There is sensitivity to different parts of the yield curve, for example a utility will borrow over many terms from short term to 30 years and more. Pension schemes also have exposure over very wide terms.
- You cannot hedge forever
- You can only change interest rate risk, not eliminate it
- There is opportunity cost from fixing the cost if interest rates fall, and from staying floating if interest rates rise
- Inflation is a large part of the interest rate and in the long run many firms are broadly immune from inflationary risk as they can adjust selling prices. (Note however, that in some commoditised sectors, such as the automotive sector and IT, real terms selling prices tend to be driven down, although margins may be held)
- Yield curves can shift in many different ways, leading to unexpected effects
- However low you think interest rates are, they can usually go lower – in some cases actually below 0%. This is more prevalent and has even affected corporate bonds and in 2016 there almost does not seem a limit for the drop in rates.
- It might cost money to hold cash in bank current accounts as banks charge as they suffer negative rates on bank reserves. This may change behaviour, e.g. firms will rush to pay suppliers and customers may be discouraged from paying on time.

- However high you think interest rates are, they can usually go higher – particularly in hyperinflationary economies. In 1922 the German nominal interest rate was 5%. In January 1923 it was 19%, 30% in April, and 90% in September (still negligible in real terms), and by November 1923 it was 900%.
- Margins are a larger part of the interest charge than the underlying benchmark rate (in mid 2010s) and so arguably carry greater risk
- For firms which are cash rich or have large cash balances and perhaps fixed rate debt, the risk is reversed (low rates are bad news)
- Corporate planning rarely goes beyond 3 years and yet fixing of rates can go for decades
- Is there any evidence that investors care about the fixed / floating mix or indeed the interest charge? Perhaps operating profits are more important and investors simply accept that the interest charge is what it is?
- Can a treasurer be wrong in staying totally floating?
- In some sectors, such as transport and property, the interest component of asset purchases must ultimately be paid for by customers. This of course applies whenever debt is used but is so much more visible in these sectors.
- Highly levered enterprises have magnified exposure to interest rate risk
- Broadly, corporates are at the end of the interest rate supply chain, so they have limited ability to pass additional cost on.

It is worth summarising again the major dimensions of interest rate risk:

- changing cost of interest expense or income
- changing market values of debt outstanding, or assets owned
- changing business environment as a result of changing interest rates leading to changing business performance.

The business may be exposed to one or more of these related types of interest rate risk.

5.1 Measurement of interest rate risk

As we know from our approach to the risk management framework, we cannot plan a response to interest rate risk without putting it into the context of an overall financial strategy and an agreed approach to the measurement of risk.

Different firms will have different approaches to the measurement of risk or what is important to them. These might be:

- simple wish to minimise interest cost / maximise interest income
- concern over earnings, i.e. net of operating results and interest
- wish to maintain covenant ratios
- wish to maintain credit rating
- wish to retain flexibility to respond to situations

Example 10: Macrohard SA

Macrohard SA is a technology company with significant amounts of cash which are retained for strategic purposes and to keep financial flexibility for acquisitions and major investments.

It does not consider that its operating results are interest rate sensitive and so its major concern is to maximise yield on the cash pile (consistent with security and liquidity requirements). Its measure of risk is the variability of the return on the cash.

Example 11: Well Boiled Icicle plc (WBI)

WBI is an oil producer which is quite highly geared because its operations are cash generative. It considers that interest rates are correlated with the oil price because, if economic activity rises, the oil price rises and so generally do interest rates. There is a little concern over how the moves might lead and lag each other but fundamentally there is a higher level of operating income when interest rates (and inflation) are higher.

What is important to WBI is to maintain a strong credit rating with strong credit ratios. The variability of interest cover is the measure of risk used by WBI.

Example 12: Wiltshire Runaway Mine Train Inc

Wiltshire Runaway Inc is a conglomerate with investments in many different sectors and it requires financial flexibility to be able to make acquisitions with debt issuance at short notice. It does not wish to be constrained in how it changes its capital structure or funds itself, so it doesn't have derivatives in place or debt which might have to be redeemed at a premium. Its measure of risk is the cost of retiring all debt instruments to allow refinancing. It believes that acquisitions will be priced to exceed the minimum WACC (including cost of debt) at the time.

Example 13: Euro Chemicals SA

Euro Chemicals SA is a mainly bank debt financed speciality chemicals manufacturer with a highly geared operational process. It has fairly tight bank covenants, including interest cover. It considers that its operating performance is linked to the level of interest rates. Its measure of risk is the probability of breach of the interest cover covenant over the next three years.

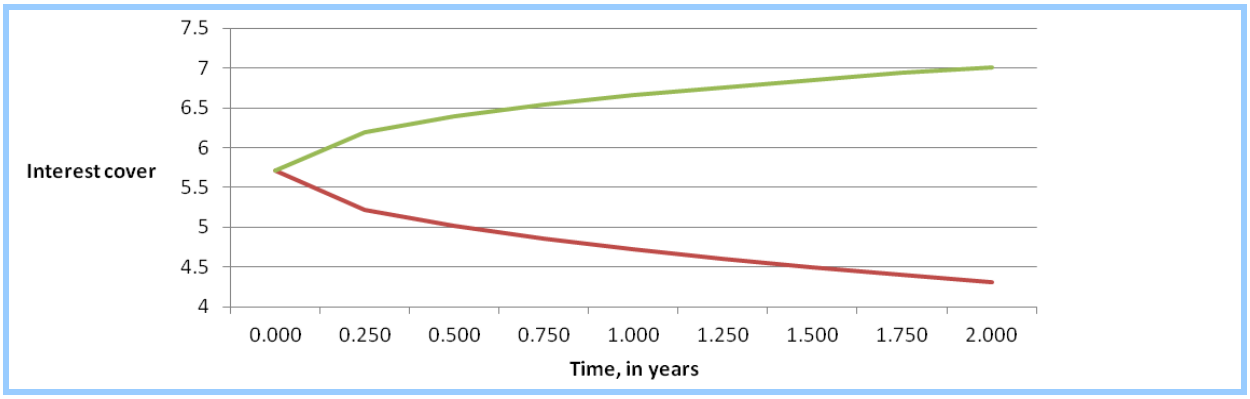
A classic way to measure interest rate risk is to use an implied volatility approach priced from the options market, where certain outcomes of interest rates can be modelled.

Example 14: Evaluation of interest rate risk

AAB is a firm with the following operating characteristics:

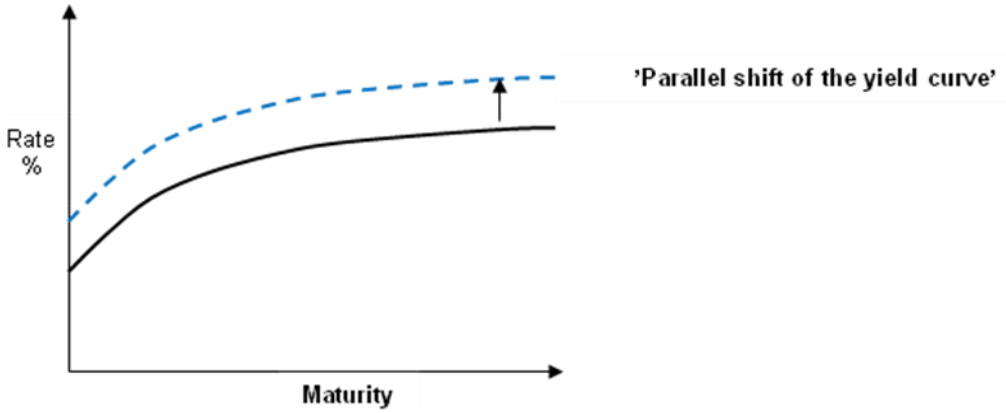
Debt	200, all floating
EBITDA	40
LIBOR	1.5%
Margin	2.0%
LIBOR volatility	20% over all maturities

The graph shows the outcomes for interest cover over the next two years with the lines at 2 standard deviations, covering about 95% of all occurrences



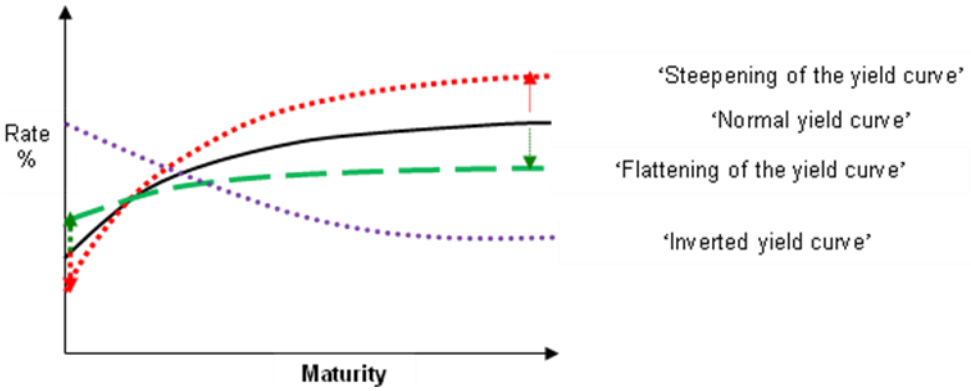
We generally talk about interest rate risk in terms of a 'parallel' shift of the yield curve.

Exhibit 3: A parallel shift of the yield curve



Such a parallel shift is implied within phrases such as PV01, which represents the present value of a 1 basis point shift in the yield curve across the whole range of that yield curve, for debt or investments (i.e. a simple sensitivity test). However in many respects this is a very artificial look at the problem; as such a shift is extremely unlikely. Exhibit 4 shows some of the movements that can occur in the yield curve.

Exhibit 4: Possible moves in the yield curve



Interest rate risk therefore becomes a very difficult risk to model, bearing in mind:

- variety of possible yield curve shifts
- speed of yield curve shifts
- possible links to business performance

- possible government / central bank interference in interest rates
- existence of current interest periods in loans (for the term of any current loan drawdown, the interest rate is effectively fixed even if the facility is at floating rate)
- margin changes on refinancing
- effect of upfront fees

5.2 Response to interest rate risk

We bear in mind the formally described possible responses to risk, of:

- avoidance
- acceptance and retention
- acceptance and reduction
- acceptance and transfer

The response to interest rate risk is almost always around the fixed / floating mix. It is possible to choose almost any ratio of fixed / floating and because it is possible to simultaneously borrow and deposit, the range is not restricted between 0 and 100%. Furthermore, derivatives make it quite possible to go outside this range.

Example 15: Outside range interest rate risk management

Specularum Inc is a US based manufacturer with the following debt portfolio:

	USD million	
Bond debt	400	Fixed interest rate
Bank debt	200	Floating interest rate
(Less) Cash	(100)	Floating interest rate
Net debt	500	

In addition to the debt portfolio it has an interest rate floating to fixed rate swap in place for USD 200 million. It therefore has the following fixed / floating ratios:

On gross debt	100% fixed
On net debt	120% fixed

Therefore, Specularum, despite being a net borrower will gain if interest rates rise (i.e. show a lower interest charge than at the present rate) and lose if interest rates fall (i.e. show a higher interest charge than at the present rate).

Note in Example 15 that one needs to be careful with the concept of gain or loss in this context. There is no natural intrinsic interest rate that can be used to model interest rate risk. This, of course, contrasts with a commercial transaction where a quote or price list will make some assumption about an exchange rate or commodity price. Therefore gain or loss loses meaning in interest rate risk management and the comparison rate must be chosen carefully.

We could also consider whether we think that Specularum is speculating by its actions. If it has no immediate plans for its cash, it probably is. Further analysis is probably needed around

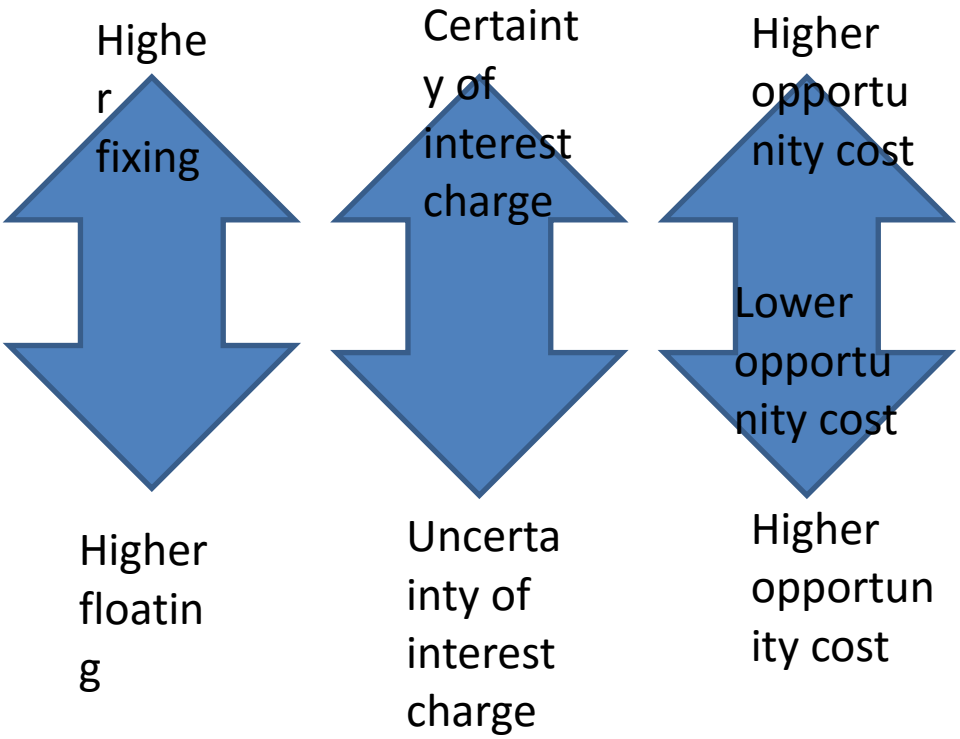
the term of fixing and the business and financial strategy.

Example 16: Fixed / floating mix at National Grid plc
The Risk Management Framework

- Treasury set an individual benchmark for both our GBP and USD portfolios
- Ignore management of all index linked debt (Matching reasons) and all US OpCo debt (Regulatory reasons)
- The Finance Committee own the STRATEGIC position and set a benchmark of, say, all debt is notionally 50% fixed

Example 16 shows that National Grid has chosen a 50% / 50% fixed / floating ratio as a strategic approach. This is a combination of 'acceptance and retain' and 'acceptance and transfer'. The effect of any particular approach to the mix of fixed / floating ratio is shown in the following diagram.

Exhibit 5: Fixed / floating interest rate dynamics



If we put to one side that the business might perform differently as interest rates change, then Exhibit 5 illustrates the effects of different levels of fixing. Broadly a high level of fixing leads to a high level of certainty of the interest charge and consequently a higher level of certainty to any measures driven from the interest charge, such as interest cover and its derivations, such as fixed charge cover etc. A low level of fixing, or higher floating, leads to uncertainty over the interest charge and more uncertainty with regard to the credit measures of interest cover etc. However, a higher level of either fixing or floating leads to a higher opportunity cost, depending on how rates move. Thus, for a borrower, a high level of fixed rate finance gives a high opportunity cost if rates fall. A high level of floating rate finance gives a high opportunity cost if rates rise. Therefore, the lowest opportunity cost arises when fixed rate debt and floating

rate debt are broadly equal.

Of course the above diagram can be used to illustrate risks such as FX and commodity risk as well.
This may explain why many firms choose to respond to interest rate risk with a 50 / 50 fixed / floating risk, basically ensuring that the actual opportunity cost will be as small as possible[1]. The other major approach is to have a high level of fixing to achieve certainty of the interest charge, and hence covenant performance etc. This is most often found in highly levered structures where interest rate risk is at its highest.

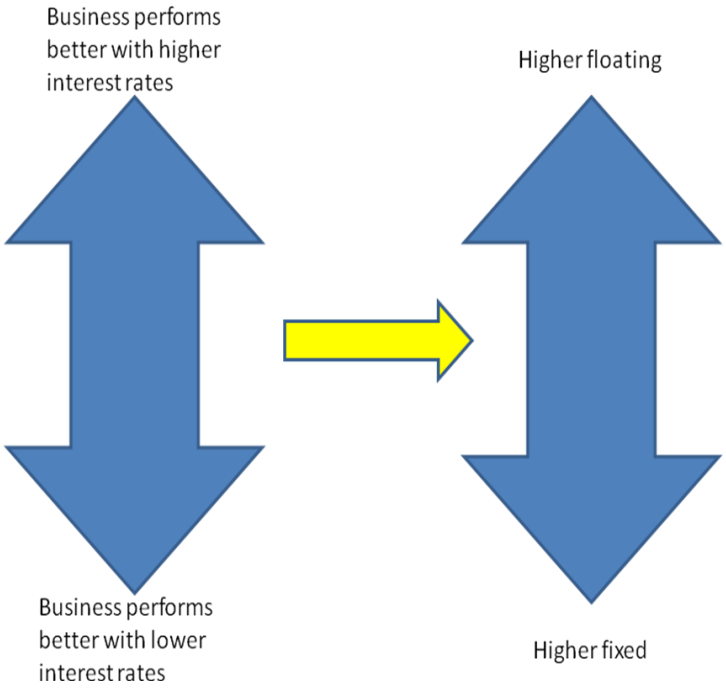
Very often, however, there is little explanation attached to any setting of this ratio. Best practice will be to establish an objective, KPI or KCI through a risk framework approach and the setting of a risk appetite and budget. A better approach to interest rate risk management could, if credit ratios or covenants were important, be based around an objective such as the following:

> The fixed / floating ratio shall be set, and varied if necessary, so that the chance of a breach of the interest cover covenant within the next two years is no more than 1 in 20.

Clearly the ratio should be varied according to market movements in rates and their volatility. In this case, the risk appetite has been set around liquidity risk, in that a covenant failure could risk breach of loan agreements. A different approach might be needed if the risk framework indicated that another type of risk was important.

We should now consider the situation where the operating performance of the firm is related in some way to interest rates. If that is the case then a different approach may well be required, especially where the risk is large.

Exhibit 6: Interest rate dynamics where business has duration



In Exhibit 6, if business performance is positively correlated with interest rates, then if it fixes rates and interest rates fall, then the business will not only perform less well, but also be committed to paying a higher (fixed) interest charge. Conversely, if a business performs inversely with interest rates, if rates fall the business will do better, and the enhanced performance will compensate for any higher (fixed) interest charge.

So Exhibit 6 shows what should be a natural response to this situation, but this does depend on what is important to the firm. If the credit ratios such as interest cover are a major importance, then this approach is valid. If the firm simply wants to minimise the interest charge then a different approach may be more appropriate.

It is also worth thinking about what happens in the long run with regard to interest rate hedging. There is no intrinsic interest rate in a business model[2] and so no natural rate at which to set a hedge. Corporates are essentially at the end of the food chain. However, we tend to think in terms of nominal rates in this context. If we switch to thinking about real interest rates, then there might be something closer to an inherent rate.

Exhibit 7: Real interest rates[3]

There is a much greater consistency in the real rate then the nominal rate and this could perhaps be considered for the long run. Generally, firms can put up their prices in accordance with inflation, which is a key determinant of interest rates and so, in the long run, perhaps interest rate risk is relatively low.

Despite this many firms issue very long dated bonds at fixed coupons, but equally many firms also issue debt where the coupon is linked to real rates. Read 4.6.1a for a further look at inflation linked bonds.

[2] Again, transport and property assets may have an intrinsic interest rate which has been used to price products such as airline ticket prices and property rentals.

[3] http://www.economicshelp.org/blog/1485/interest-rates/historical-real-interest-rate/

5.3 Ways to manage the fixed / floating ratio

Bond debt is classically at a fixed rate and bank finance is classically at a floating rate, which is the first start. Any adjustment beyond this is usually carried out with derivatives, typically interest rate swaps. It must be borne in mind, however, that the term of bond finance is usually chosen according to the funding demands of a company rather than its interest rate profile. Therefore, some juggling of fixing term might be undertaken with derivatives. However, longer term derivatives are among the most difficult to arrange because of credit / capital requirements and are probably becoming less popular.

Firms wishing to take steps to minimise the interest charge might be interested in products such as options, in the form of caps or floors, and interest rate collars have some followers as well. Banks have, of course, developed all sorts of products for those treasurers who may have a view of markets, but treasurers must be very careful to be able to answer the following questions:

- Is this speculation?
- Does my view involve the conclusion that markets have got it wrong, and how is that conclusion justified?

In the shorter term, FRAs and futures are products available to treasurers to manage their interest rate risk.

So, considering our choice of responses again we have:

- Avoidance – by definition, it is impossible to avoid interest rate risk.
- Acceptance and retention – possible if the risk is low probability / low impact.
- Acceptance and reduction – likely impossible.
- Acceptance and transfer – possible and widely practiced subject to the comments above.

6 Margin risk

The cost of debt is made up of the underlying / benchmark rate, such as LIBOR, EURIBOR, Treasuries, Bunds or gilts etc., together with a margin which is decided on issuance of the debt. The margin is either built into the all-in price for a fixed rate bond or as a margin over the underlying rate. So a bank committed deal will be priced at e.g. LIBOR + 150bp and there might be a commitment fee of 75bp on the undrawn facility amount, although there are several different models for charging.

Interest rate risk management is traditionally totally focused on the underlying rate, so we become concerned with the risk of movements in LIBOR or gilts etc. as the fundamental root of interest rate risk.

Derivatives used to manage interest rate risk are almost exclusively designed for managing this underlying risk, e.g. interest rate swaps driven off LIBOR, Treasury locks driven off treasuries etc.

However, the risk of movements in margin now comprise a large part of the risk, and specifically part of re-financing risk, as margins are set only at the outset of the loan. Treasurers who have 'grown up' in pre financial crisis times are used to a rough idea of loan costs as made up of 5% underlying plus 1% margin (in very rough terms for an average larger firm). Post financial crisis this might have become 0.5% underlying plus 2% margin (again in very round terms). As the dust has settled in the mid-2010s this has become 0.5% underlying plus 0.5% margin again. There is more risk in the margin than in the underlying rate.

Margin risk is made up of:

- margins applying to the market or sector as a whole
- margins applying to the individual firm

6.1 Margins applying to the whole market or sector

A firm raising debt is always subject to this risk and has essentially no control over it. It is rare for a corporate to attempt to manage this risk and it is usually therefore accepted. The only way to avoid the risk is never to borrow money, which is of course a perfectly acceptable approach. There are few instruments available to manage this risk, the nearest being products priced off CDS indices, which can be bought and sold. It is not appropriate to consider these products in any depth here.

6.2 Margins applying to the individual firm

A firm raising debt is always subject to this risk and in theory should have total control over it. It can choose its own financial strategy to lead to a particular credit risk profile. In particular it can choose whether to have high or low financial risk. With low financial risk, the margin can be expected to be stable, whereas with high financial risk, the margin is high anyway, but is more likely to increase further if trading conditions change adversely. This approach is partially addressed with the concept of 'margin grids' in loan agreements, where the margin varies according to financial performance. This does allow some certainty to the borrower under differing circumstances.

Margin may well be determined by sector, giving overlap to the risk seen in section 6.1. For example, Housing Associations may well have a standard margin adopted by lenders which applies however well they are financed (as long as they are not excessively risky).

Again, sectoral index CDS products may be used to give some protection in this area but it is also possible to carry out a 'self-referenced' CDS trade which in theory could be a perfect hedge for the risk, although like any market, a CDS in one borrower can be subject to illiquidity and large market swings. However, for many borrowers, the market in its own CDS will either not exist, or be too small to allow such self-referenced trades.

7 Accounting and tax

In risk management the issue of accounting will raise its head at some stage in the conversation. When considering some hedge proposal (hopefully as part of a risk management framework where risk is properly measured and budgeted etc.) the question of accounting is almost inevitably raised.

Reasons include:

- Management need to know how the proposed transaction will 'look' to investors, in particular, what will be the effect on headline measures such as EPS?
- Accounting affects the market's and covenants' perception of the company's creditworthiness.
- Dividends are limited by accounting distributable reserves.
- Accounting profit is the main input for tax.

A *very* brief guide to current disclosure and accounting requirements for financial instruments is set out in reading 4.7.1.

A key decision in the risk management process is whether to measure risk impact on an accounting measure such as EPS or gearing, or on a cash (and hence economic value) measure.

Accounting is most important when managing the financial risks of ownership. With financial risks of trading, the use of risk transfer instruments is undertaken over relatively short periods and a year or maybe two is a horizon for many firms. The risk may be small in relation to the whole firm. In ownership risks, however, the whole of the financing of the firm is under review and so the risk will almost inevitably be large compared to the firm.

There are several different approaches that can be taken to accounting issues and the problem usually arises where it is felt by management that the accounting portrayal differs from the underlying economic reality. The approaches follow broadly the following lines:

- Hedging is only undertaken if the accounting treatment of the instruments and risks together does not lead to 'distortions' in the financial statements.
- Hedging is undertaken on economic grounds alone and:
    - the accounting treatment is accepted and explained to investors where necessary
    - the 'three column' approach of presentation is adopted
- Hedging is undertaken only up to limits of net investment hedging as allowed by accounting treatment, see Example 17.

Example 17: Net investment hedging
Pineapple plc operates multi-nationally and frequently changes its business structure. Pineapple owns a business (Pineapple Harvesters Inc) operating in the US with a net book value of USD 500 million. It decides that Pineapple Harvesters no longer forms a part of its portfolio and decides to dispose of it. It is expected that the proceeds will reach USD 1,000 million. It decides to hedge up to USD 500 million only as that is the limit allowed for net investment hedging by accounting standards.

8 Counterparty credit risk

Counterparty risk is the risk that a party to a contract fails to perform its contractual obligations. Counterparty risk therefore includes the following:

- Credit risk; the risk of outright default such as when a customer fails to pay for goods and services, or when a bank fails to deliver following a drawdown notice for revolving credit facilities.
- Settlement risk; the risk that the counterparty fails or does not 'complete' part way through a transaction, for instance a supplier failing to provide goods of the right quality.
- Replacement risk: the risk of having to pay more to rearrange finance if rates have changed since entering into a deal that a counterparty reneges on, for instance if a counterparty fails to honour a swap contract.

Counterparty risk is strictly expressed in terms of single counterparties, however risk managers also apply the concept to classes of counterparty. Thus a risk manager may wish to limit exposure to the airline sector, regardless of individual credit quality. Another example would be if an investor excluded all investments which were sub investment grade. Such limits may be applied in addition to individual, per institution, limits. In this way credit risk will become a form of market risk, as for example all sub investment grade bonds do trade together to some extent, regardless of the individual credit risks around each bond.

Some risk managers also extend the concept of "non-performance" beyond legal obligations to moral obligations, such as those expressed in letters of comfort[4].

Counterparty risk may be insignificant for a business with a large number of relatively small trading and financial partners where the exposure to any one of them will be small in relation to the firm. However, most firms have a small number of key suppliers (including banks) or customers, and if one of these failed to perform its contractual obligations it could have a significant effect on the firm's business.

In order to assess the potential impact of the risk, the treasurer should again consider what aspects of the firm's performance are important, and the extent to which the firm's performance relies on counterparties to perform. For instance:

- High volume customers, who contribute materially to the profit of the firm.
- Suppliers of essential goods and services to the firm.
- Counterparties (including banks, customers, and suppliers) with whom the firm has placed deposits of money or goods.
- Counterparties such as banks with whom the firm enters into derivative transactions. (Note that commercial agreements which include fixed pricing or optionality fall into this category.)
- Bank counterparties who will provide borrowed funds following a drawdown notice for a revolving credit facility, extending to other products such as letters of credit and bank guarantees etc.
- Counterparties such as banks who provide cash management services.
- The time over which services are provided – the longer the timescale, the greater the risk (mirroring the borrowing scenarios seen earlier).

[4] A letter of comfort is a written assurance, often issued by a parent company in respect of a subsidiary, which is intended to offer 'comfort' to a counterparty as to the subsidiary's ability or willingness to perform its contractual obligations.

It is usually the case that for normal trading firms, counterparty risk is always a downside risk and never an opportunity - customers will not pay, banks fail, in each case causing a loss. A typical response to counterparty risk is to reduce it, by restricting trade credit, or limiting deposit size with any one bank. It is, however, possible to seek protection in other ways. Some insurance firms regularly provide credit insurance, typically to cover trade credit, or receivables. There are also markets in counterparty risk, namely:

- Bond markets
- Credit default swaps (CDS)

Bond markets give an indication of the risk applying to participants who have issued bonds and CDS markets allow counterparty risk to be directly traded. Using these markets does allow upside to be gained with regard to counterparty risk but it is unusual for non-financial firms to trade in these markets. However, pension schemes would be an example of how trading firms may seek upside in counterparty risk, by investing in corporate bonds, for example.

We have two items in further reading on counterparty risk, 4.6.1b and 4.6.1c.