

Spotlight Quiz

Derivatives and Risk

The definition of a derivative, drawn from the ACT glossary, is “a derivative instrument (or contract) is one whose value and other characteristics are derived from those of another asset or instrument.” This ‘other asset or instrument’ is normally a conventional asset such as a barrel of oil or an ordinary share. The price of the derivative is determined by (or derived from) the price of the underlying asset, hence the term.

The term tends to be used to refer to the newer financial instruments although most of the financial instruments that we think of tend to fall into the strict definition of a derivative. So foreign exchange forward, as an example, would be a derivative as well as the structured option products that sound more exotic.

There are two broad groups of derivative instruments: fixing instruments and option instruments. The groups are fairly self explanatory: the fixing instruments allow the user to exchange an unknown future value (say for an exchange rate or interest rate) for a known future value. This is sometimes described as removing risk in that uncertainty is replaced by certainty. Unfortunately that is not the whole story.

The other group of instruments is categorised by optionality: the ability to walk away from the ‘contract’ if you prefer to do so – in other words if it is not to your advantage; you have the right but not the obligation.

Question 1

You have a currency transaction exposure on a HKD invoice that your UK-based company has just issued. When issued the exchange rate was GBP/HKD 12.6330-65 but you fear that the rate may move against you, to yield less GBP for the HKD invoiced. Your response to this risk is to use a forward contract to fix a rate of GBP/HKD 12.6550-95.

Which of the following describes the impact that the use of the forward contract has on your currency risk?

- (a) The risk is removed entirely
- (b) The risk is transformed from a cash risk to an opportunity risk
- (c) The risk is transformed from a transaction risk to a translation risk
- (d) The risk is transformed from a transaction risk to an economic risk
- (e) Don't know

Answer

The right answer is (b) the risk is transformed from a cash risk to an opportunity risk.

Before the action if the rate moved in your favour you gained; if the rate moved against you then you lost. Now, whatever the outturn rate you know exactly what your result will be. To that extent there is no risk at all. However, there is still an opportunity risk because you are obliged to complete the forward contract, you cannot argue that you would be better off walking away – that is not a possible alternative. So, having entered the forward contract you know what the outcome will be, but you cannot know whether the known outcome is better or worse than the rate that will be

available in the future. To that extent there is still an opportunity risk: you might enter the contract and regret it or you might not enter the contract and regret that.

One company that famously did enter into a large volume of forward currency transactions was South African Airways. Watching the ZAR weaken against the USD they became more and more concerned that their USD costs were escalating alarmingly. Finally they hedged those USD costs using forward contracts; effectively those costs could not increase further due to exchange effects. With hindsight it is easy to see that soon after that the ZAR suddenly regained its strength and they were left committed to USD expenses at a much higher exchange rate; they were committed at roughly ZAR 10.5 to the USD when the market rate was around 7.00. The end result was a loss of ZAR5.4bn and the resignations of the CFO and the CEO, all of which was attributed to 'foreign exchange derivatives'.

We have seen that hedging with 'fixing' instruments can turn out to appear right or wrong or, perhaps more accurately, advantageous or disadvantageous. So should we always use fixing instruments or never use fixing instruments?

Question 2

You are arranging a refinancing for all of your company's borrowings. You have thought hard about how this should be done and you are quite sure about the maturity profile that you want and the other criteria except for the interest rate basis. You have commissioned a consultant's report that confirms that your EBITDA is quite closely correlated with the interest environment so that your EBITDA is high when rates are high and vice versa. However, you have been reliably advised that in the next six months rates are likely to rise.

Which interest rate would you choose for all of your borrowings?

- (a) All fixed for one year, then floating rate
- (b) All floating rate
- (c) All floating rate for one year and then fixed
- (d) All fixed rate
- (e) Don't know

Answer

The right answer is (b) all floating rate

This may be contentious(!). The practical answer for many treasurers will be either (a) or (d). This is because, in making the decision, objectives are mixed. Is the question about risk management or is it about making opportunist gains from our understanding of the direction of interest rates? When we decide on the maturity structure we are mainly considering risk management. When we decide on terms and conditions we are mainly considering risk management. The same is true for other criteria, except for the interest rate basis. Surely we should separate out the decision on risk management and the decision on interest rate speculation. If we want to manage risk we can do that effectively by selecting the interest rate basis that best matches the variability of our ability to service debt, i.e. our EBITDA. If we want to speculate on the future direction of interest rates then there are many other ways for us to do that, most of them more efficient than linking all of our debt to an unsuitable interest rate basis. Most of them involve lower costs of being wrong too.

The idea of fixing instruments versus 'option' instruments is a convenient split for thinking about the difference between risk reduction and speculation. Just to be clear, risk reduction is the process of reducing volatility of earnings as a result of changes in rates. Speculation is creating, or increasing, exposure in anticipation of increasing earnings as a result of changes in rates. It is really quite

tempting to think of fixing instruments as giving certainty with the potential for a rather illusory 'opportunity' loss whereas option instruments give cover against downside risks while avoiding the potential for missing out on the upside risks. The best of both worlds. Indeed they might be the best of both worlds, depending on the premium cost. Before pursuing the importance of premium in making the decision about whether to use options, it is worth thinking about the nature of an option.

Question 3

You are about to choose between two investments.

Investment 1 has two possible outcomes:

lose 1 (probability 80%) or gain 4 (probability 20%)

Investment 2 has two possible outcomes:

lose 2 (probability 20%) or gain 3 (probability 80%)

Which would you choose, investment 1 or investment 2? Investment 1 has an expected value = 0; investment 2 has an expected value = 2, so logically you should select investment 2. But that logic ignores the dire consequences of losing 2. Maybe if that happens your firm goes bust!

What if we could change Investment 2 to:

Gain 1 (probability 20%) or gain 3 (probability 80%)

And the cost of transforming Investment 2 was a flat cost of 0.75 so that the *net* position would be:

Either Gain 0.25 (probability 20%) or gain 2.25 (probability 80%)

Most of us would choose investment 2!

In this example, which of the following describes the flat fee of 0.75?

- (a) A fixed upfront fee that is dangerous for the company
- (b) A unwarranted increase in the investment
- (c) An option premium
- (d) An unethical transformation of the potential outcomes
- (e) Don't know

Answer

The right answer is (c) an option premium.

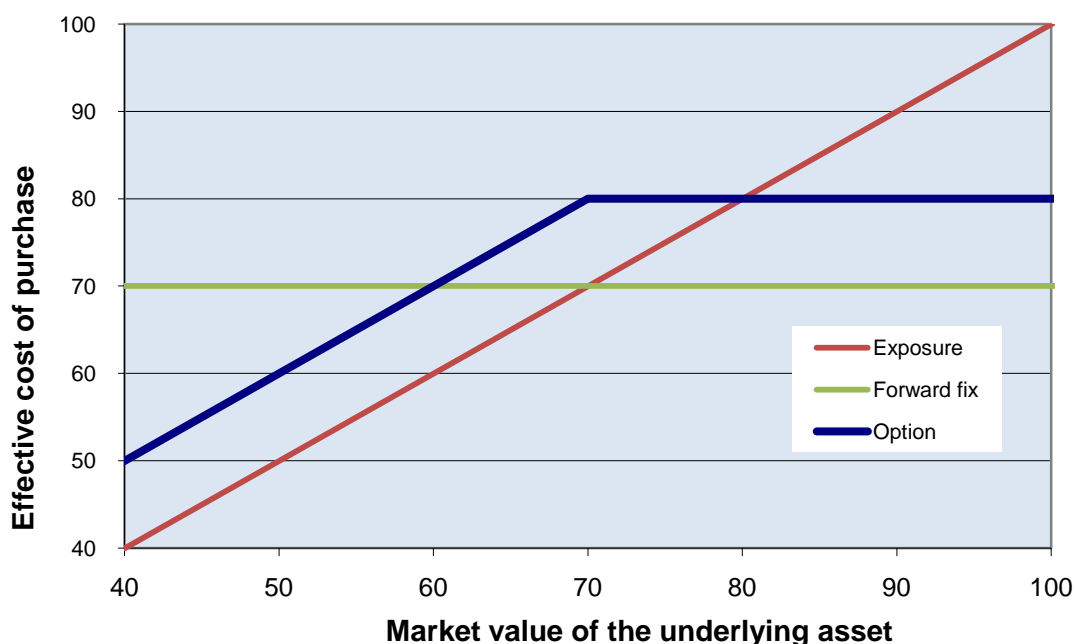
Payment of this initial fee has allowed the investor to gain from any upside but avoided the catastrophic consequences of the downside. As users of options will realise, the size of the initial premium is dependent on how much of the upside you want to retain and how catastrophic the downside that you want to avoid.

The premium is payable up front, but the effect is to change the potential outcomes. The choice between the two investment alternatives now looks clear cut, by all criteria investment 2 is the better alternative.

The difference between the option and the 'fixing' alternative is that a conventional 'fixing' instrument gives a symmetrical outcome whereas the option gives an asymmetrical outcome. A foreign exchange forward fixes the rate so that we forego benefits but avoid unpleasant outcomes – the 'good' outcomes are theoretically equal and opposite to the 'bad' outcomes. Options can change that – at a price.

This can be shown diagrammatically as follows:

Outcomes from an exposure hedged with an option or a forward fix



Assume the exposure is the cost of purchasing a raw material whose price varies. A fixing instrument (the horizontal line) gives a constant cost regardless of the price of the underlying. This is fine if the price of the underlying increases but not so good if the price falls. The option allows us to benefit from the fall in price while getting some protection if the price of the underlying increases.

If we knew for certain that the future price was going to increase we would use a forward fix – that gives the lowest effective cost. If we knew for certain that the price was going to fall, we would leave the exposure unhedged because that gives the lowest cost under those circumstances. But – and the “but” is pretty enormous – we *don't* know for sure. The option gives the second best outcome, i.e. the second lowest cost, under most circumstances. The exception is when the underlying price doesn't change by much. That central area is where the option gives the worst result. The extent of that area is dependent on the premium charged (the difference between the exposure line and the option line). In turn that is dependent on the strike price chosen and the volatility of the underlying asset – amongst other factors.

Question 4

You are concerned about costs for a particular commodity over the next few months because they represent a large proportion of your overall costs. You have already taken hedging action over immediate purchases and are now thinking about future purchases for the next 18 months. Which of the following is your best course of action?

- (a) Fix today's price using a forward contract
- (b) Buy an at-the-money call option for a premium of 3% of today's price
- (c) Buy a just out-of-the-money call option for 2% of today's price
- (d) Leave the exposure – the market decides prices and values
- (e) Don't know

Answer

The right answer is (c) Buy a just out-of-the-money call option for 2% of today's price

The key to the question is the timescale, and therefore the size of the potential exposure. The situation is just like the South African Airways example in that the exposure is a large proportion of our costs over the next 18 months. If we chose (a), the forward fix and we were wrong (i.e. prices fall) then our costs would be higher than they need to be, possibly by a large amount. What is the potential competitive impact of that? Certainly we would be at a disadvantage to competitors who did not do the same. If we chose (d), again we could be expensively wrong but, if all competitors did the same then we would be equally competitive or uncompetitive – could we pass the costs on to customers without a major problem? Are we sure that other competitors are doing the same? We are lead to believe that many markets are like this, for example we accept (albeit reluctantly) surcharges on air flights when fuel is expensive.

We are left with the choice between an at-the-money or an out-of-the-money option: if we are buying downside protection and are concerned to avoid falling into that central area where the option is the worst choice, then we should go for the out-of-the-money option. It gives the lower cost and the smallest chance of being very wrong. But – it does have a cost!

Derivative instruments, being largely over the counter (OTC), can be constructed to match a corporate's precise requirements. This has been very valuable in that amounts and timings can be tailored to the requirement. It also means that payoffs can be tailored to precisely what is required. In principle this is 'a good thing'. A doubt surfaces, though, over the distinction between a derivative to reduce risk and a derivative to gain from an expected market change. As we saw when choosing to be fixed or floating rate, there is a great temptation to choose a method of "hedging" that generates a benefit if we call the rate changes correctly. In turn, it's a small step to designing an instrument that will generate that payoff for any market "view". Unfortunately such instruments are not one-way bets, as we saw during recent years and many times over the last few decades – Long Term Capital Management onwards has shown that there is a downside to taking market positions.

One problem that has surfaced as a significant issue is the scale of counterparty risk. Most derivatives are contracts between two parties. As such, if one party stands to gain from the contract at expiry then the other party must lose. Typically, the corporate buyer sees a relatively simple situation of a small loss (for example the option premium) or a gain that might be sizeable. For the option writer though the situation is more complex. In essence it is the opposite of the corporate buyer's perspective; a small receipt or a loss that might be sizeable – a harder situation to manage profitably! As corporate buyers we have tended to assume that the writer is either managing this situation to deal with the risk or, failing that, large enough to absorb the risk and still provide our payout. Again, recent years have shown that this can no longer be taken for granted.

Methods of dealing with these counterparty risks, particularly over the long term, have included the idea of introducing regulations to permit only exchange traded instruments. This has been discussed at length and to an extent is being implemented by the US and EU regulators. Essentially the use of exchange traded instruments to the exclusion of OTC would effectively eliminate counterparty risk. The counterparty would always be the exchange and it would cover its risk by always insisting on margin calls to cover loss positions. The exchange itself would never be 'at risk' because if the margin was not forthcoming the position would be closed out. In this way the corporate buyer would never be exposed to a defaulting counterparty. Disadvantages include all the things that have made OTC instruments so successful in recent times: individual tailoring on size, timing and other factors that might be critical for the particular circumstances. Exchange traded instruments must, by definition, be standardised, i.e. not tailored.

Question 5

Your company has won a contract relating to a project in Sweden. The contract requires an investment in SEK for the duration of the project, 7 years, and is expected to generate a regular income. At the end of this period you expect to be able to withdraw your investment at cost and close the project.

Which of the following would you advise as a risk management action?

- (a) Borrow SEK in Sweden and pay a high risk premium because you are unknown in the market
- (b) Borrow in your home market, convert the funds to SEK at spot and then in 7 years time exchange back to domestic currency, again at spot.
- (c) Borrow in your home market, enter a currency swap for the 7-year period. At expiry funds will be returned in your domestic currency
- (d) Borrow in your home market, exchange the funds to SEK at spot and at the same time enter a term foreign exchange forward contract for return of the funds to domestic currency in 7 years time
- (e) Don't know

Answer

The right answer is (c) Borrow in your home market, enter a currency swap for the 7-year period. At expiry funds will be returned in your domestic currency

Answer (a) is clearly not optimal as you pay more than needed in risk premium for the borrowing. Answer (b) i clearly exposes the company to a very significant exchange risk over an extended period. In this context the length of time greatly increases the risk to which the company is exposed. Answer (d) is theoretically as good as answer (c) in that both are really different forms of the same thing. However, the swap is relatively easily marketable whereas the term forward contract is likely to be less marketable and therefore harder for the counterparty to manage, making it more expensive.

The company with the overseas project could always just accept the exposure to the exchange rate. If the company had 1,000 projects, the chances are that a good proportion of them would benefit from the exposure and good proportion would lose out. The problem here is that there aren't many projects so we can't think in statistical terms. The outcome of the single project might be disastrous and mean that we could never enter another similar contract.

The exchange rate could move dramatically in our favour or against us. If we have used a currency swap, then as long as the counterparty does not fail we will be immunised from exchange rate movements. But we don't know how significant that counterparty risk is. It might be tempting to argue that we can analyse bank counterparties – but for a 7-year risk that is perhaps not realistic. Of course, the counterparty will want some protection against their risk too. One way of dealing with this counterparty risk is to use the terms and conditions of the swap – so that the risk is quantified at regular intervals and dealt with before the scale of the exposure becomes unmanageable for either party. The term for this is a credit support annex to the standard ISDA agreement.

Question 6

Your company wishes to enter a 7-year interest rate swap to pay fixed rate and receive floating rate. The swap is intended only as a risk management tool. Your relationship investment bank has offered an acceptable swap rate but has required the inclusion of a credit support annex. This would require the annual valuation of the swap and the cash settlement of the net position on each valuation.

Which of the following describes your risk position?

- (a) You are mostly protected against counterparty risk and your risk management is fully effective.
- (b) You are mostly exposed to counterparty risk and your risk management is fully effective
- (c) You are mostly exposed to counterparty risk and your risk management is largely ineffective
- (d) You are mostly protected against counterparty risk but your risk management is largely ineffective
- (e) Don't know

Answer

The right answer is (d) You are mostly protected against counterparty risk but your risk management is largely ineffective.

The intention of the swap, when used for risk management is to transform cashflows from being related to fixed rate to being related to floating rate. Having to cash settle any value differences every year will restore the link that you are trying to get rid of. If each party is assured of neither gaining nor losing from the swap, then the point of the swap disappears.

It seems that risk management is not straightforward!