Modern alchemy?
Hedging swaps or FRAs

Mohammed Amin and Jeremy Rayner of PwC discuss how hedging strategies can be equivalent pre-tax while having very different results post-tax.

In recent years with the squeeze in the gilts market, the traditional upward sloping yield curve has given way to one that currently trends downwards. This impacts on whether to hedge a floating rate interest exposure with forward rate agreements (FRAs) or with an interest rate swap.

FRAs are priced from the yield curve. If you have a floating rate borrowing, you can synthetically convert it into a fixed rate borrowing by purchasing FRAs. What you then have is a borrowing whose interest costs are locked into the yield curve.

Table 1 and *Figure 1* show a hypothetical set of interest rates. With FRAs, these become the quarterly borrowing costs. The other way to hedge is an interest rate swap, paying fixed and receiving floating. One expects no economic difference in hedging an interest rate exposure with a swap or a series of FRAs. Otherwise, there would be the opportunity for risk-free profit by arbitraging between the two.

Costs with FRAs

Table 2 shows the interest costs where a £10,000 floating rate borrowing at Libor has been hedged for six years using either a series of quarterly FRAs or an interest rate swap. With FRAs the annual rate of interest, dictated by the above yield curve, increases in the first two years and then begins to fall back. In column two of the table the actual interest costs are discounted by the rate of interest implicit in the yield curve.

Costs with swap

In *Table 2* we have a fixed swap payment of £200.99 each quarter. As explained above, arbitrage should ensure that there is no economic difference in hedging using a series of FRAs

TABLE 1	Hypothetical interest rates		
Year	**Quarter**	**Annual Interest Rate**	**Quarterly rate**
2000	1	6.00%	1.500%
	2	7.00%	1.750%
	3	8.00%	2.000%
	4	9.00%	2.250%
2001	1	9.50%	2.375%
	2	9.75%	2.438%
	3	9.75%	2.438%
	4	9.75%	2.438%
2002	1	9.50%	2.375%
	2	9.25%	2.313%
	3	9.00%	2.250%
	4	8.75%	2.188%
2003	1	8.50%	2.125%
	2	8.25%	2.063%
	3	8.00%	2.000%
	4	7.75%	1.938%
2004	1	7.50%	1.875%
	2	7.25%	1.813%
	3	7.00%	1.750%
	4	6.75%	1.688%
2005	1	6.50%	1.625%
	2	6.25%	1.563%
	3	6.00%	1.500%
	4	5.75%	1.438%
2006	1	5.50%	1.375%

or a swap. Therefore, the net present value (calculated strictly using the yield curve) of the swap cash flows should equal the net present value of the FRA cashflows. In our example, the net present value of each is £3,762.94.
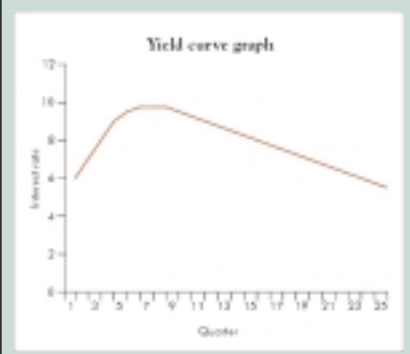
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FIGURE 1

Yield curve graph

Comparison

The FRAs and the swap cost the same in net present value terms. Both are fixed obligations. Accordingly, there should be little ground for preferring one to the other. The swap will be less work, as it requires one contract instead of 20 FRAs. However, this analysis ignores the tax relief for these payments.

Considering tax effects

Accounting and tax law is more simplistic than the 'real life' the treasurer deals with. It would be normal for the interest costs of FRAs and swaps to be recognised in the accounting period to which they relate.

There will, therefore, be a constant annual interest cost for the swap of £803.98. The annual interest cost for the FRAs will range between £612.50 and £968.75.

Because of the assumed yield curve, more interest is paid earlier and less later with FRAs.

A tax deduction for payments under FRAs or swaps will normally be given as they are recognised in the accounts. *Table 3* shows the annual pre-tax cash flows under the FRAs and swap together with the savings on quarterly tax payments under the new Corporation Tax Self Assessment (CTSA) rules. (The CTSA transitional phase-in and the 14-day lag between the quarter end and the tax payment date have been ignored for simplicity.)

The net present value of the pre-tax interest payments in *Table 2* was the same, but in *Table 3* there is a difference in the net present values of the tax savings.

We can see that the present value of the tax savings using FRAs is £8.64 higher than using a swap.

This is not a huge difference, but it illustrates the point. On a loan of, say,

TABLE 2

Interest costs pre-tax

Interest paid with FRAs	NPV at 1/1/2000 with FRAs	Interest paid with swap	NPV at 1/1/2000 with swap
£150.00	£147.78	£200.99	£198.02
£175.00	£169.45	£200.99	£194.62
£200.00	£189.86	£200.99	£190.80
£225.00	£208.89	£200.99	£186.60
£237.50	£215.38	£200.99	£182.27
£243.75	£215.79	£200.99	£177.94
£243.75	£210.65	£200.99	£173.70
£243.75	£205.64	£200.99	£169.57
£237.50	£195.72	£200.99	£165.64
£231.25	£186.26	£200.99	£161.89
£225.00	£177.24	£200.99	£158.33
£218.75	£168.63	£200.99	£154.94
£212.50	£160.40	£200.99	£151.72
£206.25	£152.54	£200.99	£148.65
£200.00	£145.02	£200.99	£145.74
£193.75	£137.81	£200.99	£142.97
£187.50	£130.91	£200.99	£140.33
£181.25	£124.30	£200.99	£137.84
£175.00	£117.95	£200.99	£135.47
£168.75	£111.85	£200.99	£133.22
£162.50	£105.98	£200.99	£131.09
£156.25	£100.34	£200.99	£129.07
£150.00	£94.90	£200.99	£127.16
£143.75	£89.66	£200.99	£125.36
£4,768.75	**£3,762.94**	**£4,823.87**	**£3,762.94**

TABLE 3

Tax relief for interest costs

Year	Quarter	Annual expense with FRAs	Quarterly tax relief @30%	NPV of FRAs tax savings	Annual expense with swap	Quarterly tax relief @30%	NPV of swap tax savings
2000	1						
	2		£56.25	£54.47		£60.30	£58.39
	3		£56.25	£53.40		£60.30	£57.24
	4	£750.00	£56.25	£52.22	£803.98	£60.30	£55.98
2001	1		£56.25	£51.01		£60.30	£54.68
	2		£72.66	£64.32		£60.30	£53.38
	3		£72.66	£62.79		£60.30	£52.11
	4	£968.75	£72.66	£61.30	£803.98	£60.30	£50.87
2002	1		£72.66	£59.87		£60.30	£49.69
	2		£68.44	£55.12		£60.30	£48.57
	3		£68.44	£53.91		£60.30	£47.50
	4	£912.50	£68.44	£52.76	£803.98	£60.30	£46.48
2003	1		£68.44	£51.66		£60.30	£45.52
	2		£60.94	£45.07		£60.30	£44.60
	3		£60.94	£44.18		£60.30	£43.72
	4	£812.50	£60.94	£43.34	£803.98	£60.30	£42.89
2004	1		£60.94	£42.55		£60.30	£42.10
	2		£53.44	£36.65		£60.30	£41.35
	3		£53.44	£36.02		£60.30	£40.64
	4	£712.50	£53.44	£35.42	£803.98	£60.30	£39.97
2005	1		£53.44	£34.85		£60.30	£39.33
	2		£45.94	£29.50		£60.30	£38.72
	3		£45.94	£29.06		£60.30	£38.15
	4	£612.50	£45.94	£28.65	£803.98	£60.30	£37.61
2006	1		£45.94	£28.26		£60.30	£37.10
		£4,768.75	**£1,384.69**	**£1,078.12**	**£4,823.87**	**£1,386.86**	**£1,069.48**

£100m, a well-organised corporate could readily manage the administration of 20 FRA contracts, compared with one swap, and come out ahead.

Questions raised

Having done the above calculations, a number of questions occurred to us:

(1) Is it real? – *Table 1* above has been constructed to resemble the present yield curve, and the swap rate used in *Table 2* of 8.0398% calculated to equate the FRAs and the swap on a pre

tax basis.

The available screen quoted FRA and swap prices did not provide us with sufficient real data to test. Unfortunately, the FRA prices did not go out far enough to enable meaningful comparison with a swap covering several years. However, it is possible to arrange tailored FRAs with settlement dates starting further in the future than those quoted on the screens. To price such FRAs, a bank would work from the quoted swap rates in a way similar to the approach in the tables above. Accordingly, we would expect real life, pre-tax, to be consistent with theoretical expectations.

(2) Does the accounting work like this? – The loan hedged with FRAs resembles a borrowing at pre-set 'stepped' interest rates. Financial Reporting Standard 4 (FRS4) requires the financing cost of a stepped interest loan to be 'spread' to give a constant periodic rate of return. This would weight the borrowing costs towards the latter years, negating the tax benefit. However, FRS4 should not preclude the company from respecting the separate nature of the floating rate borrowing and the FRAs. If necessary, the FRAs could be executed by a different group company.

(3) EPS Impact? – The profit and loss account figures will be worse in the earlier years for FRAs, as the interest cost will be greater than with a swap. (In later years, the relationship reverses.) Does this matter?

The answer to this merits several arti-

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cles! However, it will depend upon the specific company and its investors. Most institutional investors now recognise that the value of a company lies in its ability to generate cash.

Less weight is given to traditional indicators of value such as earnings per share (EPS). However, many finance directors still attach more importance to EPS.

The answer is to ensure that the accounts explain clearly the hedging policy followed and why it is to be preferred even though EPS are worse.

(4) Market changes? – What happens if the yield curve changes after the hedges have been taken out? Both the FRA and the swap routes mean that the company has a series of fixed obligations.

However, the net present values of the future obligations at any point in time will depend on the shape of the yield curve at that time.

In reality, one would explore flexing

the current yield curve to see how the net present values of each hedging strategy change before deciding on a hedging programme.

(5) Tax avoidance? – Is it acceptable that hedging in one way rather than another gives a more beneficial tax result, or is this unacceptable tax avoidance?

If the exposure is hedged on market terms with third parties then we believe this is unlikely to be challenged successfully by the Inland Revenue.

Tax law should not force a company to undertake a commercial transaction (hedging the floating rate borrowing) in a way that causes it to pay more tax than another route.

The new alchemy
Medieval alchemists sought to turn lead into gold, but failed.

The modern treasurer has a far better chance of adding value to his company by transmuting one strategy into another. In the increasingly complex world of derivatives and tax, the trick is knowing how. The above illustration shows how opportunities can lurk in any situation, no matter how seemingly simple. ■

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