

Options

taking the fear out of FX

Reports of large losses resulting from foreign-currency borrowing should not obscure the fact that, properly managed with options, foreign-exchange loans can be a very effective form of finance. It may be thought that hedging with options is too expensive to be worthwhile. Joseph Winsen illustrates in this paper that in the worst case — a weakening of the Australian dollar — the maximum cost of funds can be less than one-quarter of 1 per cent over domestic rates. Further, no matter how the \$A behaves, the \$A interest payments will be substantially less than with a domestic loan.



Hedging a foreign-currency loan for the entire term of the loan with forward contracts has the effect of “bringing the loan onshore” — that is, the resulting cashflows will be essentially similar to those resulting from a domestic loan. The cost of such hedging will completely offset any advantage arising from lower foreign interest rates — the borrowing will not be vulnerable to exchange-rate movements and there will be no net exchange losses or gains.

However, hedging the foreign-exchange (FX) liability with “at-the-money spot” (ATMS) currency options will ensure that there are no exchange losses while allowing the possibility of exchange gains. An ATMS call option on FX creates the right (but not the obligation) to purchase FX at the spot exchange rate which existed at the time the option was purchased. ATMS currency options are thus potentially a more valuable method of hedging and so will cost more than hedging with forward contracts. The extra cost is the price of retaining the possibility of benefiting from exchange gains.

If no exchange gains eventuate, the net cost or “internal rate of return”

(IRR) of a foreign-currency loan hedged with options will exceed the cost of a domestic loan. This “worst case” (no exchange gains) outcome must be weighed against the possibility of a dramatically lower IRR associated with significant exchange gains. If only part of the exposure is hedged (for example, principal only, with interest payments unhedged), then it is not possible to specify a “worst case” outcome, since losses on the unhedged portion are open-ended.

Since currency options must usually be paid for “up front”, it will normally be necessary to increase the initial borrowing to cover such outlays.

To illustrate the IRR calculations involved, consider the following loan circumstances (establishment and other fees are ignored):

- three-year \$US loan with semi-annual interest-only repayments (each of the six repayments will be hedged with a separate option);
- \$A5 million required (spot \$A1 = \$US0.75);
- \$US fixed interest on three-year loan 5.25 per cent per annum (\$A three-year fixed interest 9.25 per cent p.a.);
- ATMS \$US European call option

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costs as per cent of exposure (approximate market quotes February 1992)

Year	Cost
0.5	3.50
1.0	5.25
1.5	6.50
2.0	7.50
2.5	8.25
3.0	9.50

The \$A cost of an option is obtained by multiplying the \$US payment by these cost percentages and then dividing by 0.75.

To cover the up-front cost of the options, it will be necessary to borrow \$A5,590,535.22 or \$US4,192,901.42 with interest payments of \$US110,063.66 every six months. As shown in Table 1, \$A590,535.22 will be used to buy the required options.

In one view, the total option costs of \$A590,535.22 amount to 11.81 per cent of the required loan of \$A5 million; this may suggest to some that FX options are too expensive as a hedging device. Such a conclusion would be premature, as will be illustrated.

Maximum cost of funds

The worst possible outcome would arise when all of the options should be exercised; that is, when the exchange rate at the date of each \$US payment is less than \$A1 = \$US0.75. Table 2 displays the resulting \$A cashflows. That is, for a *worst* case outcome equivalent to an extra 0.12 per cent p.a. over the cost of domestic borrowing, the possibility of a lower cost of funds has been retained (note that the IRR is actually a semi-annual 4.685 per cent). This 0.12 per cent p.a. measures the effective cost of purchasing the options, rather than the 11.81 per cent cost noted above.

Note that:

- a fixed, rather than variable, FX loan is used so that the amount of future FX interest is certain (ie, the amount to hedge is known in advance);
- the bulk of the cost of protection is for the principal repayment; and
- the \$A cashflows for interest payments are *at worst* payable at a rate of 5.87 per cent p.a. (2.935 per cent every six months) of the net proceeds of the loan; the IRR calculation "averages" this rate with the 11.81 per cent rate inherent in the principal repayment.

Table 1

Term (years)	\$US payment	\$A option cost
0.5	110,063.66	5,136.30
1.0	110,063.66	7,704.46
1.5	110,063.66	9,538.85
2.0	110,063.66	11,006.37
2.5	110,063.66	12,107.00
3.0	4,302,965.08	545,042.24
Total \$A cost of options		590,535.22

Table 2

Time of cashflow (year)	\$A net cashflow
0	+5,000,000.00
0.5	- 146,751.55
1.0	- 146,751.55
1.5	- 146,751.55
2.0	- 146,751.55
2.5	- 146,751.55
3.0	-5,737,286.77
IRR	9.37% p.a.

The saving each six months is \$5m*(0.0925/2) less \$146,751.55, or \$84,498.45.

Minimum cost of funds

Favourable outcomes will arise if the exchange rate at any payment date exceeds \$A1 = \$US0.75. At each payment date the then current exchange rate must be compared with the initial spot rate of \$A1 = \$US0.75. If the \$A at a payment date is worth more, then the option maturing at that date is not exercised and the more favourable market spot exchange rate on that date is used; but if the \$A is worth less than \$US0.75, then the option is exercised and its rate is used. Tables 3, 4 and 5 illustrate such favourable outcomes.

The IRR associated with any pattern of future exchange rates can be readily calculated. Clearly, a lower cost

of funds results from an appreciating \$A. If such appreciation were certain, the best thing to do would be to borrow FX unhedged rather than spend money on options, even though the option costs do not increase the cost of funds (IRR) dramatically. But \$A appreciation can never be certain and the purchase of FX options provides insurance against a depreciating \$A.

Conclusion

The illustrative analysis in this article is only indicative of the results which can be obtained. The key factor in the results is the set of option prices; timing can be crucial as option prices sometimes ease to reflect quiet periods in currency markets.

Perhaps the borrowers in the best position to implement the loan struc-

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Table 3

At each payment date \$A1 = \$US0.85

Time of cashflow (year)	\$A net cashflow
0	+ 5,000,000.00
0.5	- 129,486.66
1.0	- 129,486.66
1.5	- 129,486.66
2.0	- 129,486.66
2.5	- 129,486.66
3.0	- 5,062,311.86
IRR	4.76% p.a.