



Managing Global Financial Risk Using Currency Futures and Currency Options

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Corporate Risk Management

Corporate Risk	Financial Derivatives
Commodity Risk · Risk associated with movement in commodity prices · Operational risk	Commodity Price Derivatives · Ex-traded commodity futures · Ex-traded commodity options · Commodity swaps
Interest Rate Risk · Risk associated with movement in interest rates · Financing and Investment risk	Interest Rate Derivatives · Forward rate agreements · Ex-traded interest rate futures · Ex-traded interest rate options · Interest rate swaps · Over-the-counter (OTC) options
Foreign Exchange Risk · Risk associated with movement in foreign exchange (currency) rates · Operational, financing, & investment risk	Foreign Exchange Derivatives · Forward currency contracts · Ex-traded currency futures · Ex-traded currency options · OTC options · Currency swaps

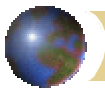


What Derivatives U.S. Corporations Use?

	BI 1989	Greenwich 1992	II 1992	Treasury 1993	JKF 1995
Foreign Ex. Derivatives					
Forward contracts	99%	91%	64%	70%	93%
Ex-traded futures/options	20	---	11	9	20/17
Currency swaps	64	51	---	6	53
OTC options	48	45	40	53	49
Interest Rate Derivatives					
Forward rate agreements (FRAs)	35	11	---	---	
Ex-traded futures/options	25	12	29	17	
Interest rate swaps	68	35	79	83	
OTC Options (caps, etc.)	43	19	14	16	
Commodity Price Deriv.					
Ex-traded futures/options		7	---	---	
Commodity swaps		6	15	10	
Equity Derivatives					
Ex-traded futures/options			10	3	
Equity swaps			5	6	

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Hedging w/ Currency Futures

	Cash Market Position	Futures Market Position
Now	Short	Long => BUY
Later	Long => BUY	Short => SELL
Net Position	Profit/Loss	Loss/Profit
Now	Long	Short => SELL
Later	Short => SELL	Long => BUY
Net position	Profit/Loss	Loss/Profit

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Case Study: Using Forward Prices to Reduce Capital Costs (1/5)

Hewlett Packard (HP)

Company:

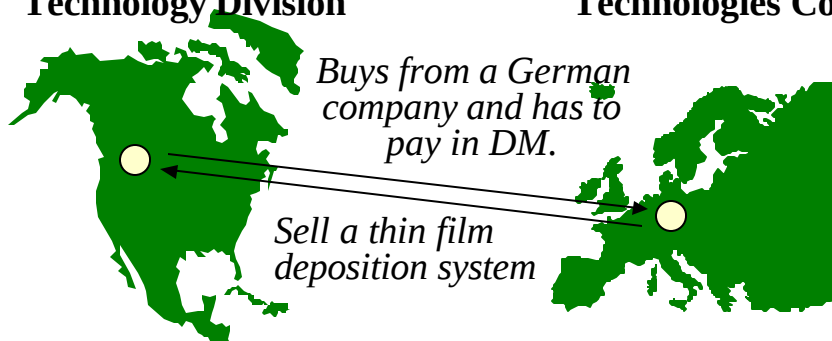
- Type: Multinational corporation
- Major Products: computer, computer system, printer, electronic & analytical instruments
- Employees: 96,200
- Annual Sales: \$28,000,000 from 65 countries
- Sales distribution: US (50.1%), Europe (28.7%), Asia, Canada, and Latin America (21.2%)



Case Study: Using Forward Prices to Reduce Capital Costs (2/5)

HP Microwave Technology Division

Leybold Technologies Co.



Quoted Prices in Purchasing Contract:

- German DM: DM1,314,720 in four installments; fixed price
- U.S. \$: \$792,000 (rate = DM1.660/\$); varies based on rate on payment date.



Case Study: Using Forward Prices to Reduce Capital Costs (3/5)

Sales and Capital Budget of Microwave Technology Division, HP

	1990	1992
Annual Sales	\$15,000,000	\$23,000,000
Capital Budget (equipment only)	\$10,000,000 (\$2,500,000)	\$22,000,000 (\$7,500,000)

Foreign Sources of Equipment Purchases by MT Division

Country	Amount	Percentage (%)
Japan	\$4,500,000	60.0
Germany	1,200,000	16.0
Austria	1,000,000	13.3
England	800,000	10.7
Total	\$7,500,000	100.0%

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Case Study: Using Forward Prices to Reduce Capital Costs (4/5)

Payment Schedule:

7/90	9/90	12/90	3/91	5/91
0	2 month	5 month	8 month	10 month
DM	262,944 (20%)	262,944 (20%)	591,624 (45%)	197,208 (15%)

Hedging Through Forward Contracts:

Payment rate	DM1.66/\$				→
Payment in \$	158,400	158,400	356,400	118,800	
					Total: \$792,000
Actual rate	1.5701	1.4982	1.6122	1.7199	
\$ Equivalent	167,470	175,507	366,967	114,663	
					Total: \$825,407
Profit (loss)	\$9,070	\$17,107	\$10,567	(\$4,137)	

Net Profit = \$32,607; 4.1% of total purchase amount

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Case Study: Using Forward Prices to Reduce Capital Costs (5/5)

Strategy/Action:

Examining the forward rates of DM against US dollar over the future payment dates, HP concluded that DM would strengthen against US dollar over this period. Based on this expectation, HP made forward contracts with its bank to purchase DM at the rate of DM1.660/\$ (the rate available on May 1990) on payment dates. By doing this, HP:

- *Was able to maintain the desired dollar cost regardless of the dollar/DM movement;*
- *Was able to eliminate currency risk for the Germany supplier.*

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Currency Futures versus Currency Options

Currency Futures	Currency Options
Obligation to buy/sell FC	Right to buy/sell FC
No premium payable	Premium payable
Only one forward rate for a particular delivery date	Wide range of strike prices
Fixed delivery date of currency	Flexible delivery date (can buy longer-maturity one)
Eliminates upside potential & downside risk	Unlimited profit potential & limited downside risk

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Hedging w/ Currency Options

Future FC Position	When Short Position in FC is Expected	When Long Position in FC is Expected
Future FC Flow	FC to be paid at future date	FC to be received at future date
Type of Firm	Importer of raw materials	Exporter of finished goods
Purpose of Hedging	To limit loss from possible FC ↑	To limit loss from possible FC ↓
Hedging Strategy	Buy Call Option	Buy Put Option

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Usefulness of Currency Options

Currency options are especially useful when:

- ✦ FC cash flows are contingent that cannot be hedged with forward contracts.
 - Example) acceptance of a bid
- ✦ The quantity of FC to be received or paid out is uncertain.
 - Uncertain FC accounts receivables
 - Uncertain FC accounts payables

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General Rules

General Rules on Using Currency Options versus Currency Futures

- When the quantity of FC cash outflow is known, buy currency forward; when unknown, buy a currency call option.
- When the quantity of a FC cash inflow is known, sell currency forward; when unknown, buy a currency put option.
- When quantity of a FC cash flow is partially known and partially uncertain, use a forward to hedge the known portion and a currency option to hedge the maximum value of the uncertain remainder.



Case Study: Using Currency Options to Hedge FX Risk of Uncertain Payables (1/3)

Cadbury Schweppes (CS)

Company:

- Type: British multinational corporation
- Major Products: soft drink (55%) and candy (45%)
- Employees: 39,066
- Annual Sales: \$5,730,000,000
- Operations: Markets in more than 170 countries - Britain (43%); Europe (20%); North America (17%); Asia (14%).



Case Study: Using Currency Options to Hedge FX Risk of Uncertain Payables (2/3)

Situation:

- ✦ The price of CS's key product input, cocoa, is quoted in sterling, but is really a dollar-based product.
=> As the value of the dollar changes, the sterling price of cocoa changes as well.
- ✦ The objective of CS's foreign exchange strategy is to eliminate the currency element in the decision to purchase the commodity, thus leaving the company's purchasing managers able to concentrate on fundamentals.
- ✦ This task is complicated by the fact that the company's projections of its future purchases is highly uncertain.



Case Study: Using Currency Options to Hedge FX Risk of Uncertain Payables (3/3)

Strategy/Action:

- ✦ CS has turned to currency options.
- ✦ After netting its total exposure, the company covers with forward contracts base amount of exposed, known payables.
- ✦ It covers the remaining, uncertain, portion with dollar-put-options up to its maximum amounts.
- ✦ In this strategy, the put options act as an insurance policy.



Case Study: Using Currency Options as a Competitive Tool (1/7)

Allied Signal, Inc. (AS)

Company:

- ✿ Type: N.J.-based U.S. multinational corporation
- ✿ Major Products: aerospace (38%), automotive (38%), engineered materials (24%).
- ✿ Employees: 86,400
- ✿ Annual Sales: \$11,827,000,000
- ✿ Operations: U.S. (78%); Europe (16%); Canada (2%).



Case Study: Using Currency Options as a Competitive Tool (2/7)

Situation:

- ✿ Was submitting an overseas bid to sell scientific equipment to a Scandinavian firm for \$20 million.
- ✿ Payments to be made in unequal disbursements at six irregularly spaced dates over two years.
- ✿ The principal competitor was a French firm.
- ✿ Had superior technology and lower cost, but was concerned about presenting a bid denominated only in U.S. dollars, since the French firm's bid was in Norwegian kroner.
- ✿ Hence, AS was confronted with:
 - (1) a high degree of uncertainty about success of the bid,
 - (2) a need to establish costs and revenues in local currency.



Case Study: Using Currency Options as a Competitive Tool (3/7)

Strategy/Action:

- AS bought from its bank a multiple option facility: a two-year American-style call option on the dollar, with puts against each of the four non-dollar currencies--deutsche marks, French francs, Finnish markka, or Norwegian kroner.
=> Through this option contract, the Scandinavian customer could choose its preferred currency of payment on each successive payment date.



Case Study: Using Currency Options as a Competitive Tool (4/7)

Strategy/Action:

- The strike prices for the options were set at the spot levels when the deal was struck (1.7 deutsche marks, 5.7 French francs, 6.5 Finnish markka, and 4.0 Norwegian kroner).
=> These strike levels give the Scandinavian customer a ceiling on the amount of foreign currency it will have to pay at any time, while guaranteeing that the U.S. firm will always receive the full dollar price.



Case Study: Using Currency Options as a Competitive Tool (5/7)

Strategy/Outcome:

On the first payment date of \$2.5 million, there would be two scenarios:

- Scenario I: *The dollar had weakened so that spot rates on the payment date were below the strike prices for the non-dollar currencies:*
 - ❖ The customer decided to make the first payment in DM at a prevailing market rate of DM1.5/\$.
 - ❖ The customer pays DM3.75 million to AS, which, in turn, sells the DM in the spot market and pockets \$2.5 million.
 - ❖ AS does not need to exercise its put option.



Case Study: Using Currency Options as a Competitive Tool (6/7)

Strategy/Outcome:

- Scenario II: *Instead, the dollar had strengthened to, say, DM 2.0/\$.*
 - ❖ At the spot rate, the customer would have paid DM 5 million to cover its obligation.
 - ❖ With the option in place, however, the customer pays only the ceiling amount of DM 4.25 million.
 - ❖ AS, in turn, exercises its put option at the strike price of DM 1.7/dollar to get full \$2.5 million.



Case Study: Using Currency Options as a Competitive Tool (7/7)

Strategy/Outcome:

- ✿ The total cost to AS was about \$400,000, which was passed on to the customer in the total purchase price.
- ✿ The strike levels represent the worst-case scenarios for the customer, the maximum amount in any particular currency.
=> gives the customer the ability to compare these worst-case scenarios with the terms of other competing offers denominated in the same foreign currency.
- ✿ By offering its customer five different currencies in which to pay, AS gave the customer the opportunity to reduce its costs by paying a lower price if one currency depreciated relative to the Norwegian kroner. => An edge over the French firm that allowed payment in only one currency.



Case Study: Using Currency Options to Manage Double-Faced FX Risk (1/7)

Pan-Asian Electronics (PAE)

Company:

- ✿ Type: Singapore-based computer manufacturer
- ✿ Major Products: notebook computer
- ✿ Annual Sales: \$240,000,000
(\$20 million/month)
- ✿ Operations: Exports mainly to U.S.



Case Study: Using Currency Options to Manage Double-Faced FX Risk (2/7)

Situation:

- ❁ PAE uses advanced components imported from Japan to manufacture computers sold in the U.S. market.
- ❁ Hence, like other numerous Southeast Asian companies which rely on Japanese producers and American consumers, PAE holds dollar assets and yen obligations.
- ❁ At the beginning of January, 1995, the US dollar was about to resume its prolonged depreciation against the yen; on January 2, the dollar/yen spot rate stood at 100.15.



Case Study: Using Currency Options to Manage Double-Faced FX Risk (3/7)

Strategy/Action:

- ❁ To set up a dollar/yen hedge that would ensure PAE's ability to make affordable purchases should the dollar collapse, PAE bought a dozen at-the-money European US-dollar-put/Japanese-yen-call options, one of which would expire at the end of each month over the course of a year.
- ❁ In doing so, PAE obtained the right to sell US\$20 million and buy Y2.003 billion at the end of each month, assuming that the dollar was worth no more than Y100.15--the price of the options--at the time each option expired.



Case Study: Using Currency Options to Manage Double-Faced FX Risk (4/7)

Strategy/Outcome:

There could be two scenarios based on the dollar/yen exchange rate at the end of each month.

- ❖ Scenario I: *The dollar defied expectations and appreciated against the yen.*
 - ❖ In this scenario, PAE could buy the yen at the much favorable rate in the spot market, and lose only the premium paid to purchase the options.
 - ❖ Hence, the cost savings through the yen purchase in the spot market offsets the option premium.



Case Study: Using Currency Options to Manage Double-Faced FX Risk (5/7)

Strategy/Outcome:

- ❖ Scenario II: *The dollar behaved as predicted and plummeted against the yen through the first half of 1995.*
 - => The dollar/yen spot rate closed March at 86.57, down 10.14 yen from the previous month and off 13.58 yen from the 100.15 rate at which PAE purchased the options in early January.



Case Study: Using Currency Options to Manage Double-Faced FX Risk (6/7)

Strategy/Outcome:

i) If there were no hedging:

- ❖ With monthly cash flows of \$20 million, PAE could obtain Y1,731.4 million at the March spot rate of Y86.57/\$.
- ❖ Compared to Y2,003 million based on January's spot rate, PAE's currency exposure could have cost the company Y271.60 million, or \$2,711,932, on its Japanese imports.



Case Study: Using Currency Options to Manage Double-Faced FX Risk (7/7)

Strategy/Outcome:

ii) Owing to the hedging strategy:

- ❖ PAE exercised the options on expiration and secured an exchange rate of Y100.15/\$.
- ❖ The steep fall of the dollar meant that PAE's March options were deep in-the-money.
- ❖ A potential loss of \$2,711,932 was reduced by more than 75% to an actual loss of only \$383,424 (the cost of options).



Advantages of Currency Options

- The most that can ever be lost is the price paid for the option, but there's unlimited profit potential.
- Options are highly flexible tools for designing hedges or targeting investment objectives.
 - ▣ Easy to buy the protection you need and sell off coverage you do not need.
 - ▣ Hedging with options can be reconfigured if information about the size or timing of the underlying exposure changes or if changes in the company's risk management policy require more or less coverage.
- Possible for a simultaneous buy and sell of options (e.g., spread, collar).