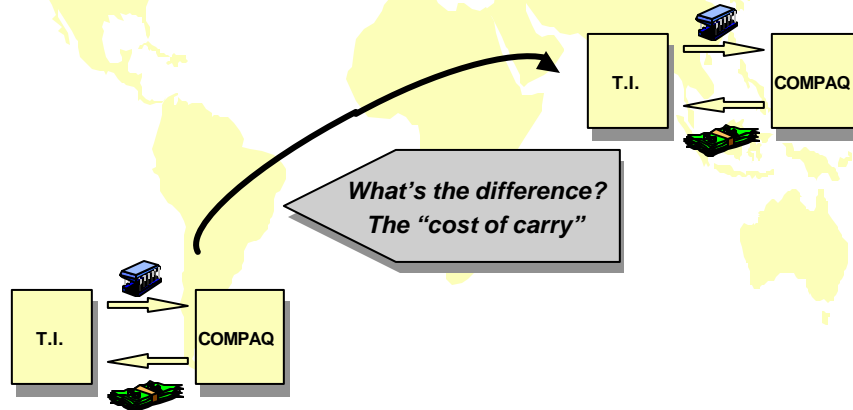


A Typical Derivative

- We agree today to pay a certain price for a commodity in the future

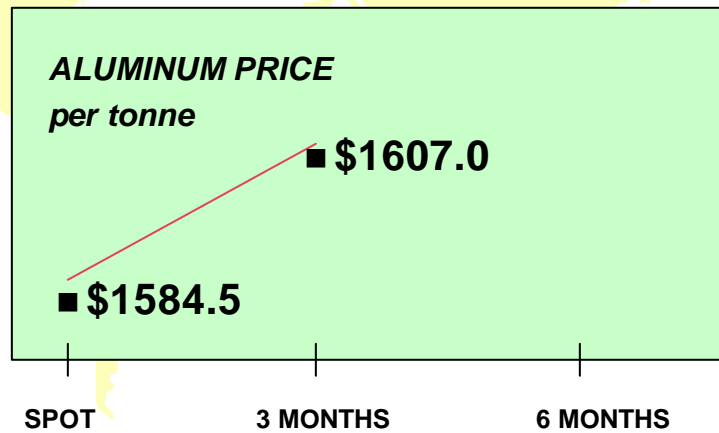


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Financial Risk Management 5

Commodities: Spot and Forward

How can Coke's canners cap their can costs?



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Financial Risk Management 6

Commodity Prices

Simple model of a commodity futures price based on the cost of carry:

$$F_t = S_0(1 + R_t + C_t)^t$$

F_t = Futures price for delivery t years from today

S_0 = Spot price today

R_t = Interest rate for t years

C_t = Non-interest costs of carry.

Fear and Backwardation

For some, a barrel of oil in the hand is worth two in the bush. This "premium for possession" factor is called *convenience yield*:

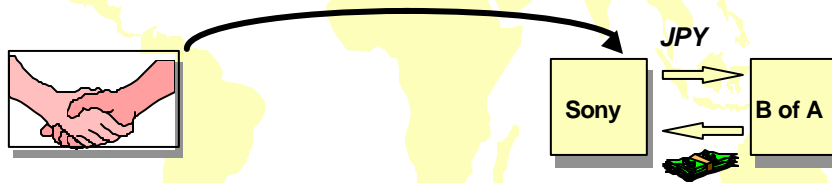
$$F_t = S_0(1 + R_t + C_t - CY)^t$$

where CY = Convenience yield, in percent per annum



A Typical Forward Exchange Contract

- We agree today to pay a certain price for a currency in the future



Foreign Exchange Quotations

Reuters : Quotes : CINY

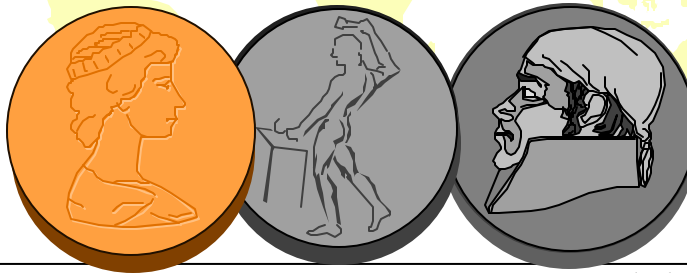
Function Edit Screens Format View Setup Help

0000	CITIBANK	NEW YORK	FOREIGN EXCHANGE - PAGE 1					CINY
			SPOT	1MO	3MO	6MO	12MO	
1615	DEM	152	40/50	31.8/5	94.5/94	193.5/2	397/394.0	
1615	CHF	125	40/50	45.5/45	129/128	254/252	509/504.0	
1618	FRF	516	00/30	91/89.5	269/265	531/526	1098/1083	
1618	NLG	170	93/03	39.4/1	118/7.5	239.5/8	475/472.0	
1618	BEF	31	37/40	6.9/6.6	20/19.3	40.5/39	83.0/80.0	
1619	ITL	1522	/1524	376/384	950/970	1640/70	2475/2525	
1618	JPY	111	35/45	52/51.7	151/0.5	288/287	572/569.0	
1626	CAD	136	17/22	17/16.5	56/54.5	107/104	192/187	
1619	GBP	156	45/55	6.3/6.1	11/10.5	16.5/15	31.5/27.5	
1651	XEU	124	99/09	RATES	AT	CLOSE	MONDAY	

Spot Forward points

Policies and Exchange Rate Regimes

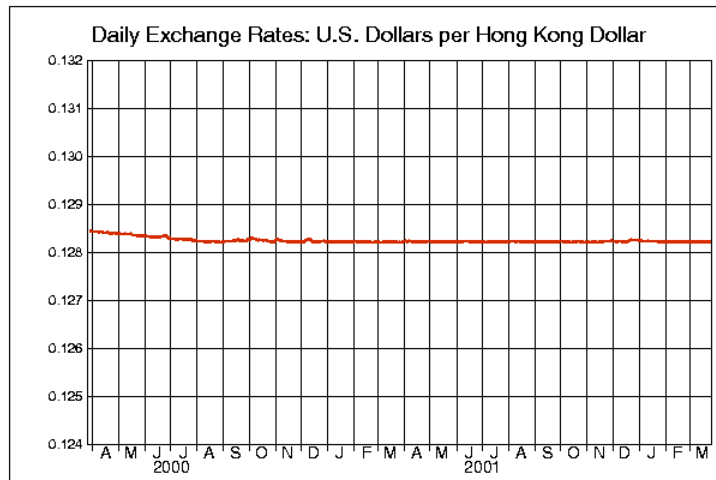
- Exchange rate systems--fixed vs floating
- Managed floating
- EMU-type currency blocs
- De facto blocs--the dollar



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Financial Risk Management 11

Hong Kong Dollar

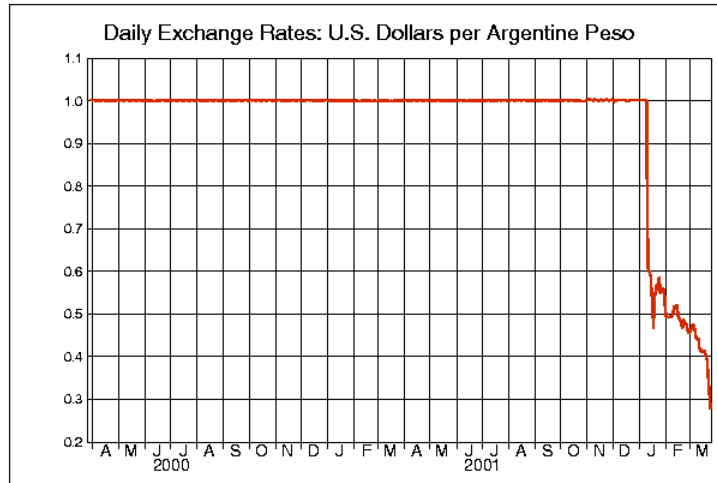


Source: pacific.commerce.ubc.ca/xr

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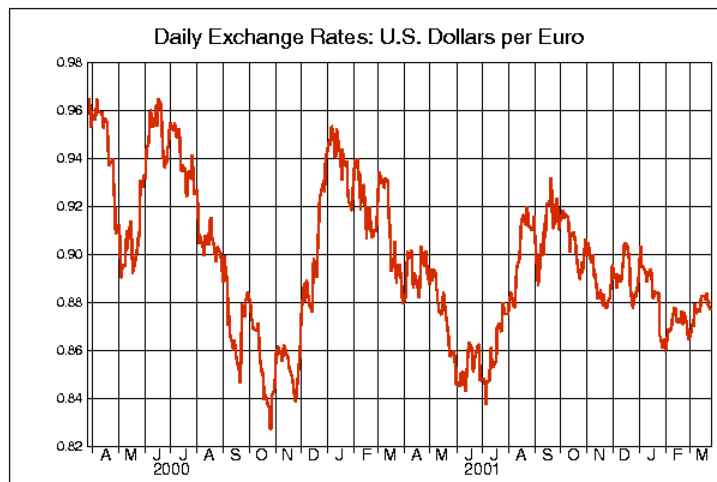
Financial Risk Management 12

Argentine Peso



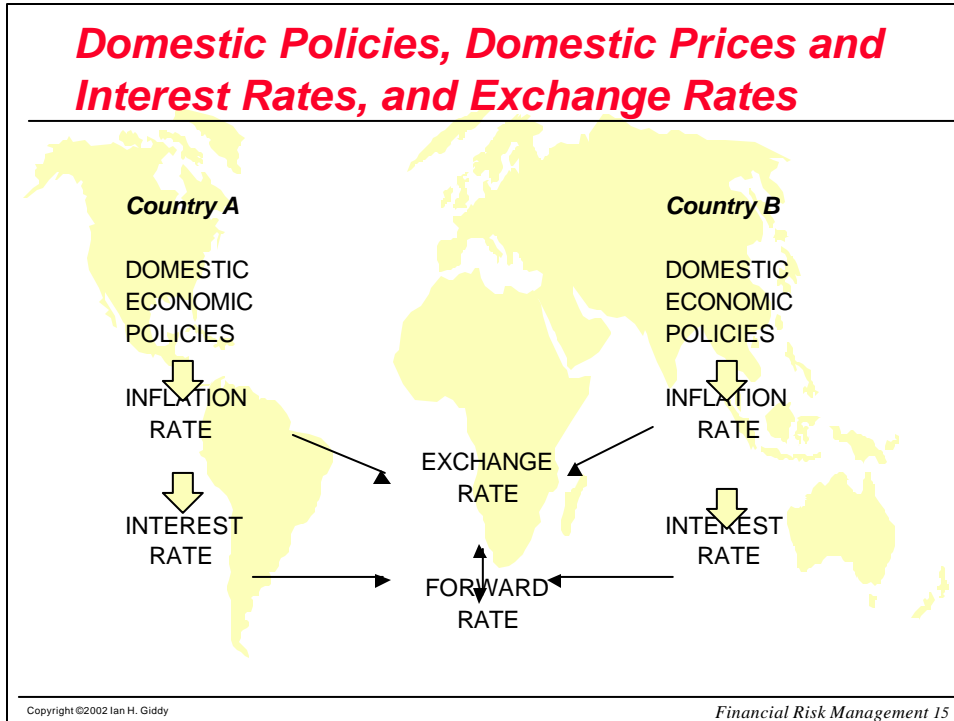
Source: pacific.commerce.ubc.ca/xr

Euro



Source: pacific.commerce.ubc.ca/xr

Domestic Policies, Domestic Prices and Interest Rates, and Exchange Rates



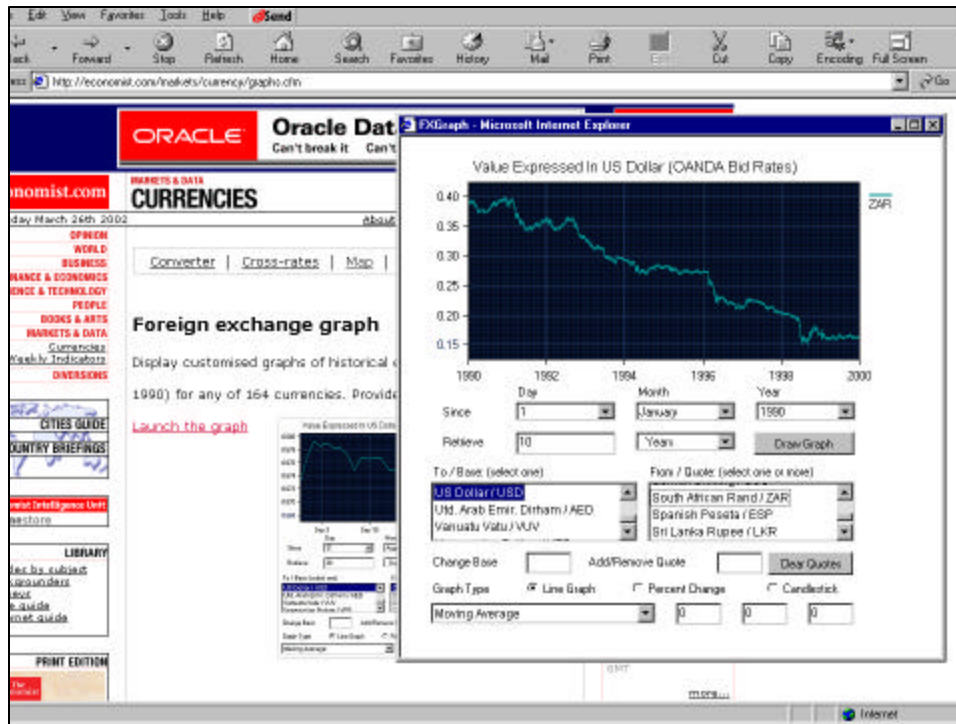
MacParity

The hamburger standard						
	Big Mac prices		Implied PPP* of the dollar	Actual \$ exchange rate 17/04/01	Under(-)/over(+) valuation against the dollar, %	
	in local currency	in dollars				
United States†	\$2.54	2.54	-	-	-	
Argentina	Peso2.50	2.50	0.98	1.00	-2	
Australia	A\$3.00	1.52	1.18	1.98	-40	
Brazil	Real3.60	1.64	1.42	2.19	-35	
Britain	£1.99	2.85	1.28†	1.43†	12	
Canada	C\$3.33	2.14	1.31	1.56	-16	
Chile	Peso1260	2.10	496	601	-17	
China	Yuan9.90	1.20	3.90	8.28	-53	
Czech Rep	Koruna56.00	1.43	22.0	39.0	-44	
Denmark	DKr24.75	2.93	9.74	8.46	15	
Euro area		2.57	2.27	0.99‡	0.88‡	-11
France	Ffr18.5	2.49	7.28	7.44	-2	
Germany	DM5.10	2.30	2.01	2.22	-9	
Italy	Lire4300	1.96	1693	2195	-23	
Spain	Pta395	2.09	156	189	-18	
Hong Kong	HK\$10.70	1.37	4.21	7.80	-46	
Hungary	Forint399	1.32	157	303	-48	
Indonesia	Rupiah14700	1.35	5787	10855	-47	
Japan	¥294	2.38	116	124	-6	
Malaysia	M\$4.52	1.19	1.78	3.80	-53	
Mexico	Peso21.9	2.36	8.62	9.29	-7	
New Zealand	NZ\$3.60	1.46	1.42	2.47	-43	
Philippines	Peso59.00	1.17	23.2	50.3	-54	
Poland	Zloty5.90	1.46	2.32	4.03	-42	
Russia	Rouble35.00	1.21	13.8	28.9	-52	
Singapore	S\$3.30	1.82	1.30	1.81	-28	
South Africa	Rand9.70	1.19	3.82	8.13	-53	
South Korea	Won3000	2.27	1181	1325	-11	
Sweden	SKr24.0	2.33	9.45	10.28	-8	
Switzerland	Sfr6.30	3.65	2.48	1.73	44	
Taiwan	NT\$70.0	2.13	27.6	32.9	-16	
Thailand	Baht55.0	1.21	21.7	45.5	-52	

Source: economist.com

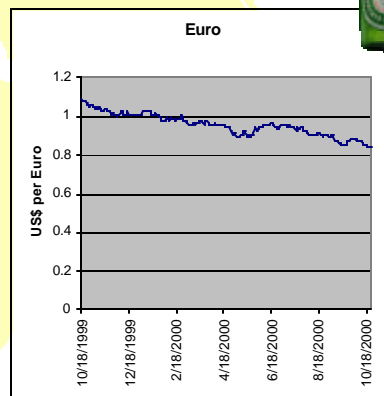
†Average of New York, Chicago, San Francisco and Atlanta ‡Dollars per pound §Dollars per euro
Source: McDonald's, The Economist

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Heineken and the Euro

- How was the Dutch company Heineken affected by the fall in the Euro in 1999-2000?
- Look at
 - ◆ The Euro
 - ◆ The company's sales
 - ◆ The company's production



Heineken and the Euro



- How was the Dutch company Heineken affected by the fall of the Euro in 1999-2000?

Location	Fixed Assets		Sales	
The Netherl	2,341	15%	1,063	15%
Rest of Eu	8,874	57%	4,027	57%
Western H	1,972	13%	895	13%
Africa	685	4%	311	4%
Asia Pacif	1,613	10%	732	10%
	1548500%	100%	7,028	100%

Data: 1999 figures, millions of Euro

Source: <http://www.heineken.nl>

- Look at
 - ◆ The Euro
 - ◆ The company's sales
 - ◆ The company's production

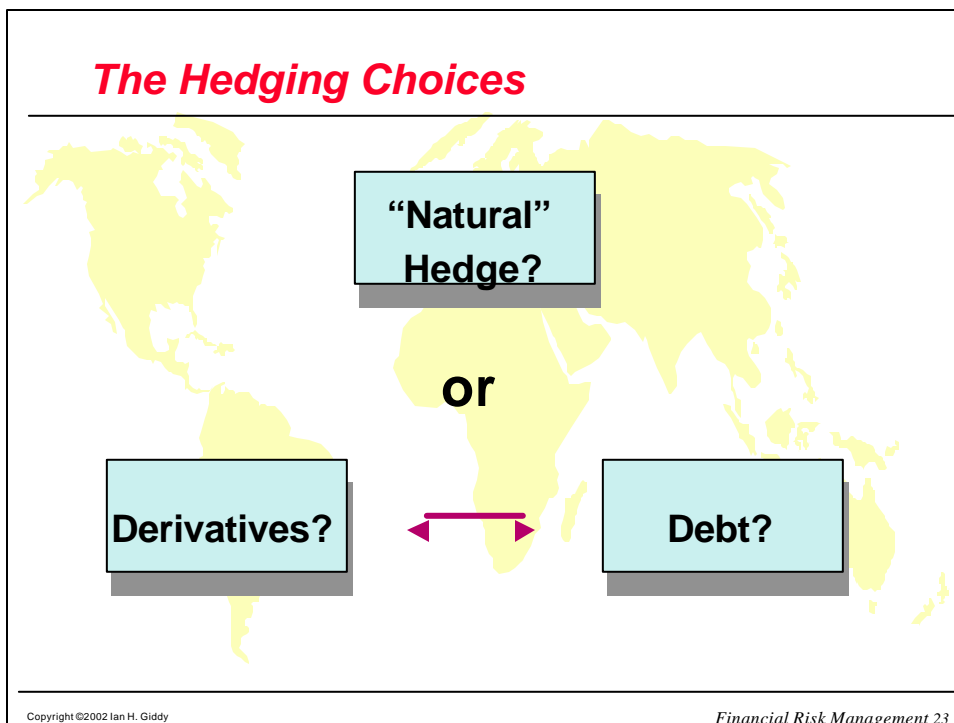
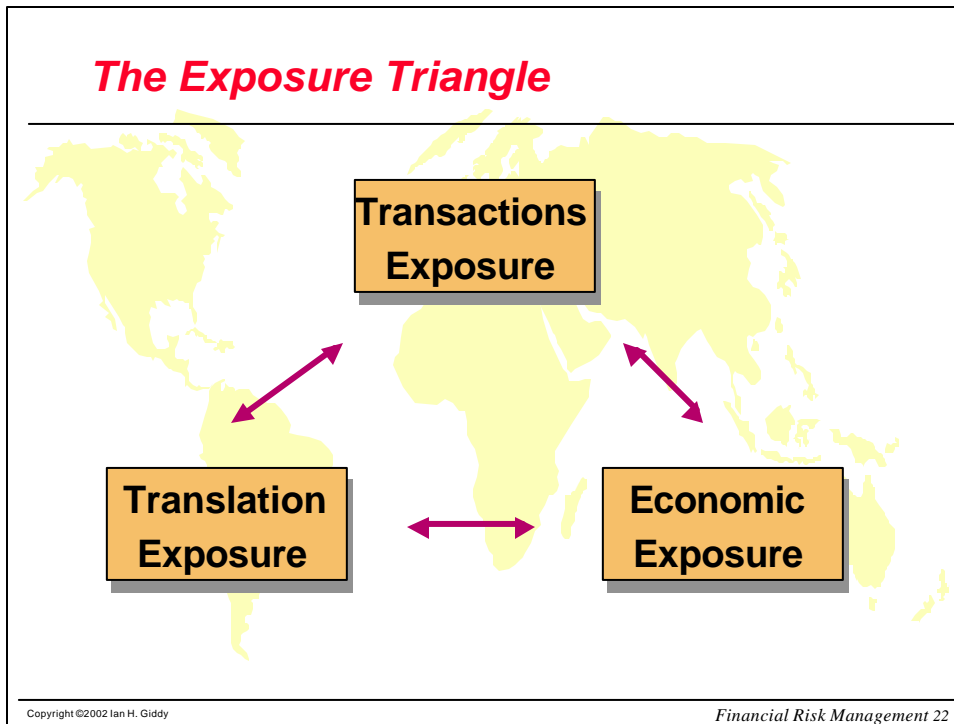
Heineken and the Euro



- How was the Dutch



- L
- production



Domestic and Eurocurrency Rates

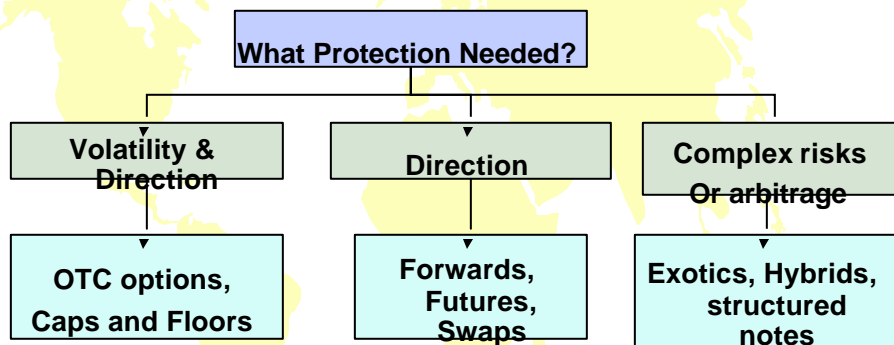
Country	Over night	Day	Change week	Month	One month	Three months	Six months	One year
US\$ Libor*	1.78875	-0.027	-0.111	0.004	1.9	2.03	2.34	3.0275
Euro Libor*	3.23375	0.223	-0.032	0.093	3.35	3.4	3.53875	3.90025
» Libor*	4.66938	0.597	0.577	-0.025	4.1325	4.18813	4.39625	4.88063
Swiss Fr Libor*	1.6	-0.023	0.183	-0.025	1.65667	1.71667	1.875	2.27833
Yen Libor*	0.05	-	-	-	0.1075	0.105	0.10563	0.11188
US\$ CDs	-	-	-	-	1.86	1.96	2.28	2.24
Euro CDs	3.325	0.335	0.085	0.025	3.36	3.425	3.585	3.935

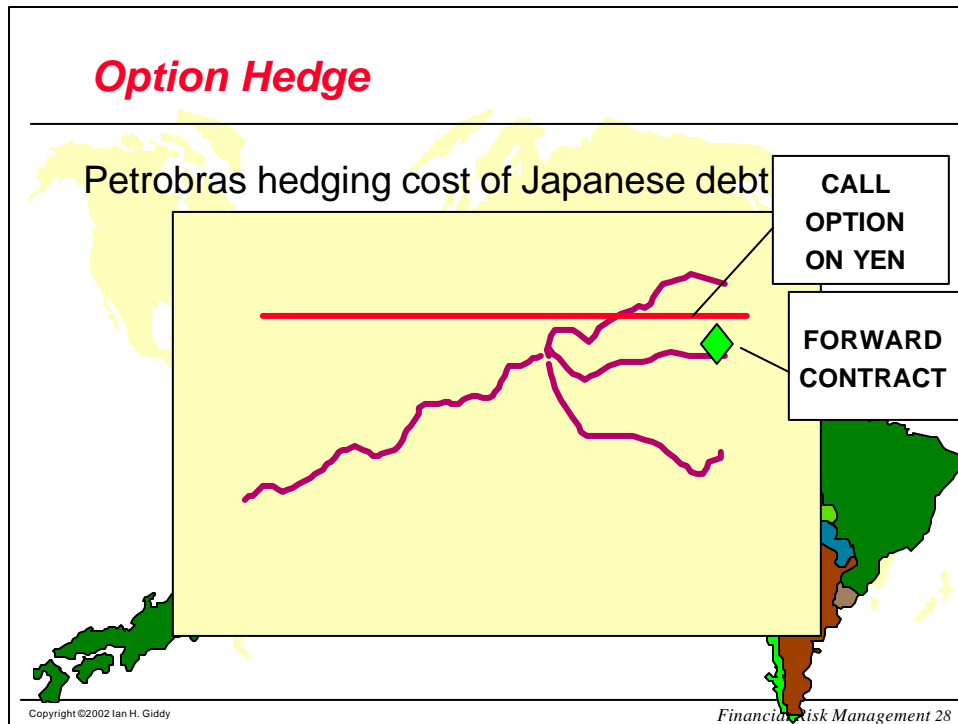
Source: ft.com

ft.com

- Markets Home
- Bonds
- Data Links – Money Rates

What Hedging Instruments?





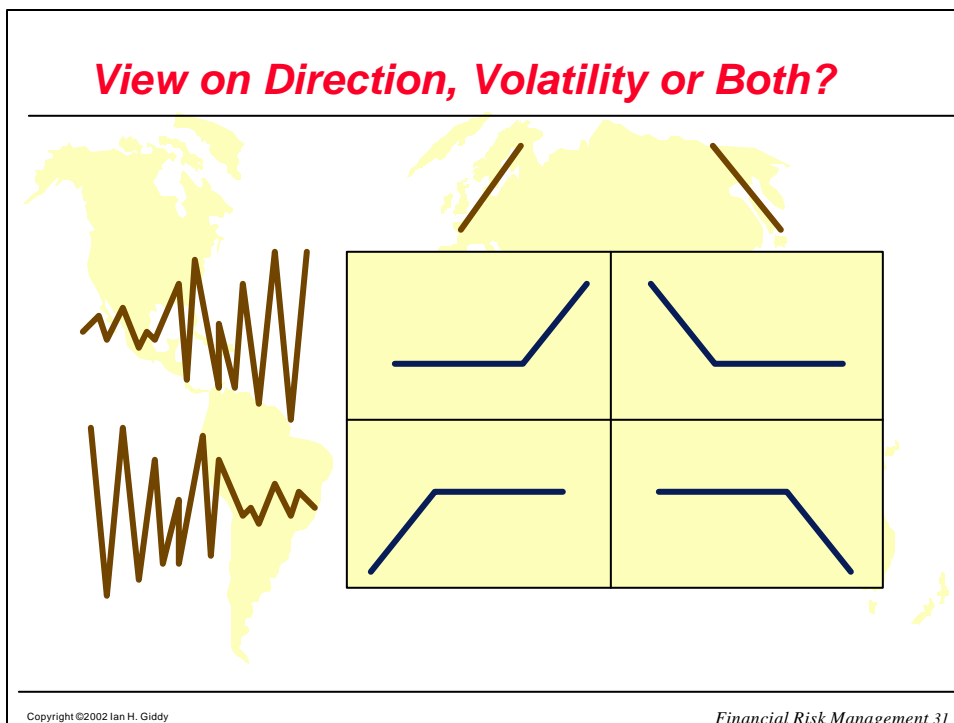
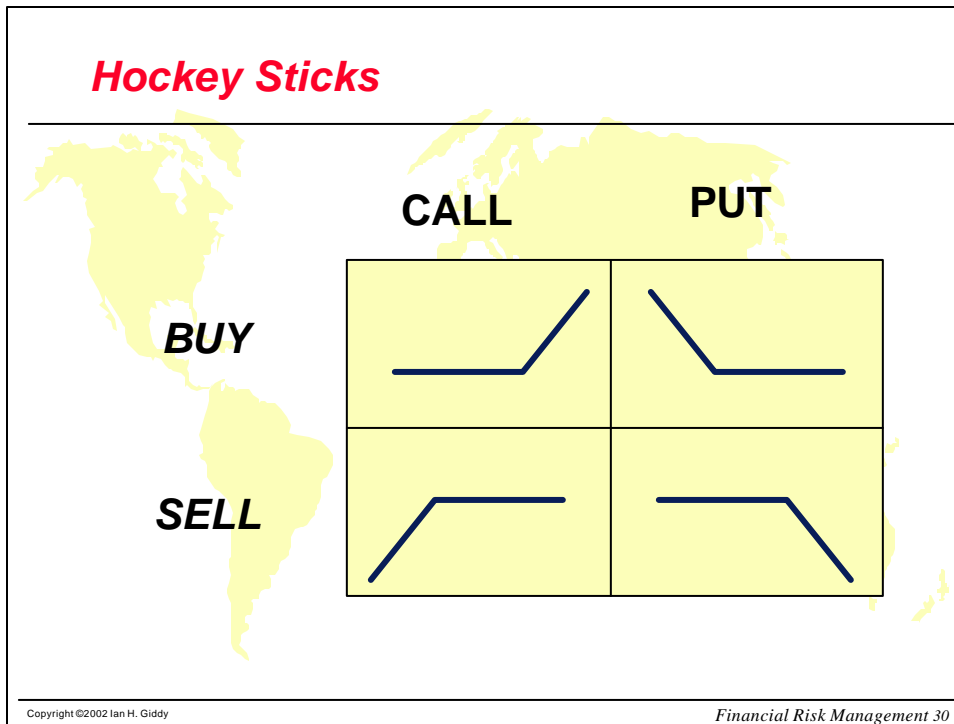
Option Hedge

Questions about options:

- When should companies use them?
- Which options?
- How much do they cost?
- Are they worth paying for?

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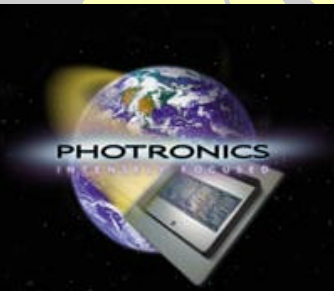
**Managing Financial Risk:
Case Study**

Prof. Ian Giddy
New York University

Case Study: Photronics



A world map with the United States and Europe highlighted in yellow. A double-headed arrow connects a green cross in the US to a green cross in Europe. The word "PHOTOMASKS" is written above the arrow, and "US DOLLARS" is written below it.



The Photronics logo features a globe with a photomask in front of it. The word "PHOTRONICS" is written across the globe.

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Case Study: Photronics

Photronics is the world's leading and fastest growing manufacturer of photomasks. Photomasks are high precision quartz plates that contain microscopic images of electronic circuits. A key element and enabling technology in the manufacture of semiconductors, photomasks are used to transfer circuit patterns onto semiconductor wafers during the fabrication of integrated circuits. They are produced in accordance with circuit designs provided by customers at strategically located manufacturing facilities in North America, Europe and Asia.

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Financial Risk Management 34

Photronics' International Business

"The globalization of the semiconductor industry has created significant growth opportunities beyond Photronics' core market in North America. Customers operating manufacturing facilities in Asia and Europe, as well as North America, are streamlining their equipment and materials procurement processes, relying on fewer and more capable suppliers.

"Photronics has made excellent progress in expanding its presence around the world both by acquisitions and by the construction of new facilities. During the year, new facilities were quickly brought to full production in Manchester, England, and Austin, Texas, while additional technological capability was installed in Singapore. These advanced capabilities have elevated our strategic supplier status with many significant customers who are now benefiting from our balanced approach to international expansion and technology investments.

"In Asia, our Singapore facility is benefiting from our customers' utilization of wafer foundries, reflecting the increasing trend of semiconductor manufacturers moving toward a fabless business model. We believe that the number of companies utilizing foundries will increase as they focus on their core strengths—designing semiconductors and product marketing. Such a business model transfers the risk associated with investing capital in production assets, giving the now "fabless" semiconductor company additional flexibility during down cycles, like the one affecting the semiconductor industry today."

From 1998 Annual Report

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Financial Risk Management 35

Case Study: Photronics

- The company and its currency exposure
- Income, cash flow and translation effects
- The economic risks



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Financial Risk Management 36

Photronics

	1996	1997	1998	1999	2000	2001
Income Statement						
Sales \$M	193	235	269	277	321	381
Operating Income \$M	29	48	45	27	21	---
Income Tax \$M	15	19	16	8	5	---
Net Income \$M	26	31	27	14	10	---
Cash Flow Statement						
Operating Cash Flow	60	65	50	101	---	---
- Capital Spending	---	---	---	---	---	---
= Free Cash Flow	---	---	---	---	---	---
Balance Sheet Breakdown						
Assets						
Cash	25.2	4.4	---	---	---	---
Other Current Assets	114.2	19.9	---	---	---	---
Long-Term Assets	435.7	75.8	---	---	---	---
Total	575.1	100.0				
Liabilities and Equity						
Current Liabilities	60.0	10.4	---	---	---	---
Long-Term Liabilities	231.1	40.2	---	---	---	---
Shareholders' Equity	284.0	49.4	---	---	---	---
Total	575.1	100.0				

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Photronics

Quarterly Income

	07.00	10.00	01.01	04.01
Sales	85.6	75.7	78.6	100.6
Current \$Mll	18.25	22.99	35.78	31.71
% Change From Year Earlier				

Regional/Region Data

Region	% of Sales			% of Profits		
	1998	1999	2000	1998	1999	2000
United States	79.2	78.0	72.5	81.3	82.8	84.2
Europe	14.6	17.5	17.9	10.5	12.8	14.4
Asia	6.2	4.6	9.7	7.6	---	15.4

What hedging policy?

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Photronics: Translation Exposure

	December 31, 1999	December 31, 2000
Assets		
Current assets		
Cash and cash equivalents	\$ 22,841	\$ 27,840
Short-term investments	7,802	28,189
Accounts receivable (less allowance for doubtful accounts of \$231 in 1999 and 1997)	11,818	14,553
Inventory	19,801	11,800
Deferred income taxes	3,803	6,704
Other current assets	4,887	3,276
Total current assets	81,052	136,392
Property, plant and equipment	283,781	309,813
Intangible assets (less accumulated amortization of \$4,009 in 1999 and \$4,048 in 1997)	26,304	6,218
Goodwill	6,790	18,420
Other assets	3,800	3,653
	321,726	338,312
Liabilities and Shareholders' Equity		
Current liabilities		
Current portion of long-term debt	\$ 3,676	\$ 3,371
Accounts payable	34,421	34,071
Accrued salaries and wages	4,178	7,401
Accrued interest payable	3,874	3,741
Other accrued liabilities	18,163	9,474
Income taxes payable	---	9,453
Total current liabilities	64,312	67,451
Long-term debt	184,250	186,024
Deferred income taxes	10,222	40,508
Other liabilities	3,132	4,964
Total liabilities	261,916	298,947
Commitments and contingencies		
Shareholders' equity:		
Preferred stock, \$0.1 per share, 2,000,000 shares authorized, none issued and outstanding	---	---
Common stock, \$0.1 per share, 75,000,000 shares authorized, 24,354,130 shares issued and outstanding in 1999; 24,338,976 shares issued and outstanding in 2000	242	241
Additional paid-in capital	83,871	81,239
Retained earnings	128,881	99,489
Unrealized gain on investments	5,185	4,281
Foreign currency translation adjustment	(4,508)	(7,884)
Deferred compensation on restricted stock	(518)	(348)
Total shareholders' equity	159,810	146,301
	\$321,726	\$338,312

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Translation Policy

The Company's subsidiaries in Europe and Singapore maintain their accounts in their respective local currencies. Assets and liabilities of such subsidiaries are translated to U.S. dollars at year-end exchange rates. Income and expenses are translated at average rates of exchange prevailing during the year. Foreign currency translation adjustments are accumulated in a separate component of shareholders' equity. The effects of changes in exchange rates on foreign currency transactions are included in income.

Economic Exposure

- Economic exposure is how the firm's revenues and costs will respond to exchange rate changes.
 - ◆ *Example: Even though Intel invoices German customers in marks, its future revenues may be unaffected by fluctuations in the mark if the currency of determination of prices in the semiconductor business is the dollar or even the yen.*
- The currency of determination is the currency in which most of the competition prices similar products.

Translation vs Economic Exposure

Accounting exposure

- Exposure = "Exposed" assets - "exposed" liabilities

Economic exposure

- Exposure = How will an unanticipated exchange rate change affect the cash flows of the firm?
 - ◆ Domestic sales
 - ◆ Exports
 - ◆ Domestic costs
 - ◆ Import costs

Photronics: Economic Exposure

■ A/R
■ INVENTORY
■ PLANT



PHOTO-MASKS

SOLD IN UK
INVOICED IN GBP

GBP?

SOLD IN
WORLDWIDE MARKET

USD?

DETERMINED BY
COMPETITION

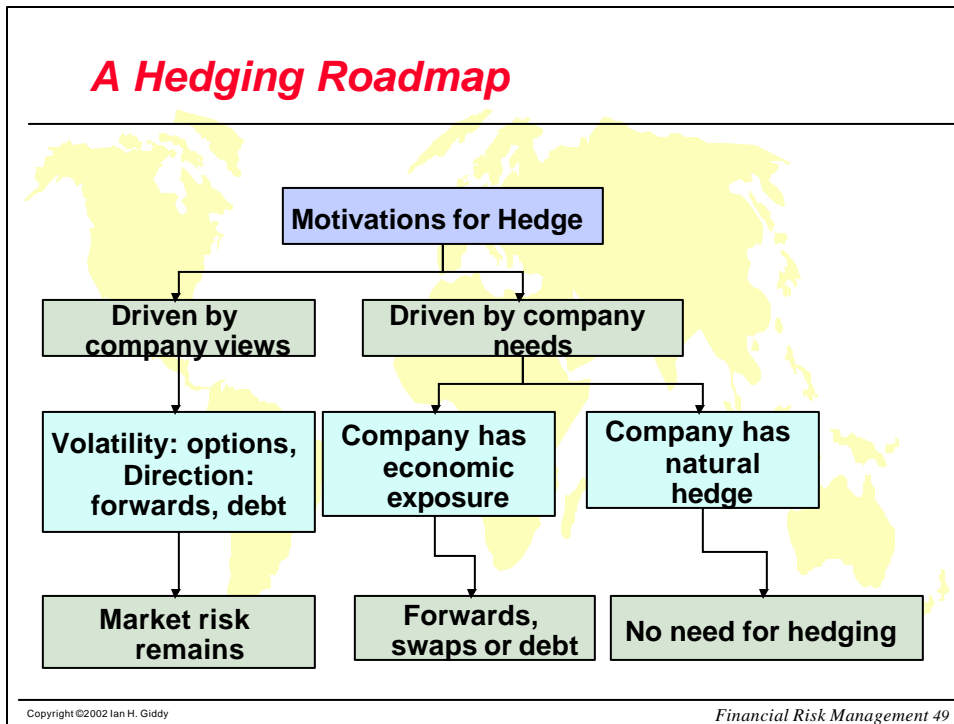
JPY?

What Should Photonics Do?

- Hedge, or suffer translation gains & losses?
- How can its exposure be gauged?
- What does FAS 133 imply for a company like this?
- *What tools should be used?*

What Kind of Debt? Some Considerations

- Fixed/floating:
 - ◆ How certain are the cash flows? Are operating profits linked to interest rates or inflation?
- Currency:
 - ◆ Consider currency of the assets: currency of denomination vs. currency of location vs. currency of determination.
- Maturity or availability:
 - ◆ Are the assets short term or long term? Should the firm assume ease of refinancing, or buy an option on access to financing?



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