

ISSUES IN INTERNATIONAL FINANCE

Lecture 1 Introduction to the course Mechanics of the Foreign Exchange (FX) market Quotation of FX rates Currency arbitrage November & December 2018 Dr Kevin Campbell











SCHEDULE OF CLASSES

• Friday 30 November 2018:

11.30-15.00 room 307

• Monday 3 December 2018:

15.15-18.30 room 307

• Tuesday 4 December 2018:

13.30-16.45 room AULA WZ

• Wednesday 5 December 2018:

13.30-16.00 room 310 [including revision & assessment]

 Materials available at: http://wzr.pl/finprzed/index.php?str=252



WHY IS INTERNATIONAL FINANCE IMPORTANT?







ecom

AIRLINE FAILURES

- 28 August 2008: Zoom Airlines
- 12 September 2008 : XL Airways

The 2008 global financial crisis





2008 global financial crisis: impact



- Credit squeeze
- Illiquidity in the hedging market difficult to find a counterparty
- Adoption of unconventional monetary policy low/negative interest rates and quantitative easing
- The growth of "populism" Brexit, Trump …



WHY IS INTERNATIONAL FINANCE IMPORTANT?



Airlines find it difficult, and perhaps unwise, to hedge fuel prices





2008 global financial crisis: impact

The New York Eimes

Business

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION

Airlines find it difficult, and perhaps unwise, to hedge fuel prices

By John Bowker Published: Thursday, November 13, 2008

LONDON — Major European airlines are deciding not to seek new fuel hedging agreements for next year because the global credit crisis and the collapse of Lehman Brothers have raised the cost of such deals.

British Airways, Ryanair and Lufthansa have said their hedging deals will be significantly reduced in the new year, ceding the opportunity to lock in fuel prices that have fallen to 22-month lows.

Oil has come down from highs of \$147 a barrel in June to around \$55, leaving current airline hedging policies for the price of oil at around \$90 looking well out of date.

Analysts and airlines have said that it is far harder and more expensive to make new hedging deals with banks during the credit crisis, especially after the collapse of Lehman Brothers, a big player in the market.

SOURCE: http://www.nytimes.com/2008/11/13/business/worldbusiness/13iht-air.4.17803639.html



Benefits of studying International Finance

- Firms are affected by changes in exchange rates, inflation rates and interest rates - which are themselves inter-related
- In recent decades international financial flows have grown much faster than world GDP or world trade, reflecting the process of globalization
- Even firms with a domestic focus are affected by the global financial environment as they compete with firms that are internationally active
- The study of international finance provides an understanding of the ways that firms can manage the risks associated with operating internationally, including **foreign exchange risk**



THE FOREIGN EXCHANGE (FX) MARKET

- A 24 HOUR MARKET
- AN OTC MARKET
- AN INTER-BANK MARKET
- LONDON IS THE LARGEST CENTRESPOT AND FORWARD RATES



The Foreign Exchange (FX) market

The FX market is:

NIVERSITY of

- an **inter-bank** market, i.e. trading occurs between banks
- an over-the-counter (OTC) market, i.e. brokers and dealers negotiate directly with one another over telecommunication networks – there is no centralized exchange
- a mix of **voice** and **electronic** trade execution methods
- a 24 hour market, i.e. trading is conducted during normal business hours in different time zones – at any given time on a weekday, somewhere around the world, a bank is open and ready to trade FX
- a mix of **spot and forward markets:** immediate trades in the spot market and future trades in the forward market



FX voice vs electronic execution



Source: Michael Moore, Andreas and Vladyslav Sushko, 'Downsized FX markets: causes and implications', *BIS Quarterly Review*, December 2016. <u>https://www.bis.org/publ/qtrpdf/r_qt1612e.pdf</u>



TRADING HOURS OF THE WORLD'S MAJOR FINANCIAL CENTRES





THE FX MARKET

2018 Euromoney FX Rankings

Rank 2018 2017		Liquidity Provider	Market Share		
		Equility Frontier	2018*	2017	
1	2	JPMorgan	12.13%	10.34%	
2	3	UBS	8.25%	7.56%	
3	12	XTX Markets	7.36%	3.29%	
4	4	Bank of America Merrill Lynch	6.20%	6.73%	
5	1	Citi	6.16%	10.74%	
6	6	HSBC	5.58%	4.99%	
7	8	Goldman Sachs	5.53%	4.43%	
8	5	Deutsche Bank	5.41%	5.68%	
9	9	Standard Chartered	4.49%	4.26%	
10	11	State Street	4.37%	3.36%	

Source: https://www.euromoney.com/article/b18f5s6kqtcr6m/euromoney-fx-survey-2018-press-release



THE FX MARKET

TIME-OF-DAY TURNOVER



Check out the FX market at <u>https://www.dailyfx.com/forex-rates</u>



FX MARKET: MAIN PARTICIPANTS

- Retail clients: businesses, international investors and multinational corporations who need FX for the purposes of operating their businesses
- □ *Commercial banks*: carry out buy/sell orders from their retail clients <u>and</u> buy/sell currencies on their own account so as to alter the structure of their assets and liabilities in different currencies
 - engage in both *speculation* and *arbitrage*
- □ *FX brokers*: agents who facilitate trading between commercial bank FX dealers, in return for a commission
- Central Banks: intervene to buy/sell domestic currency to influence its value



STRUCTURE OF THE FX MARKET





FX TURNOVER vs CAPITAL FLOWS



2 Gross daily capital flows are estimated by dividing the annual sum of inflows and outflows by 365.

3 Current, capital and financial flows for 2016 estimated by extrapolating the average annual growth for 2014 and 2015.

Source: Michael Moore, Andreas and Vladyslav Sushko, 'Downsized FX markets: causes and implications', *BIS Quarterly Review*, December 2016. <u>https://www.bis.org/publ/qtrpdf/r_qt1612e.pdf</u>



FX MARKET SCANDALS

- 2013 forex-rigging scandal
- Generated \$10bn in fines for six banks
- Problem? Traders colluded to manipulate a daily currency reference rate, or fix
- A fix is set at a specific time of day and is intended to express a representative rate of the market
- □ The most important and widely used reference rate in spot FX markets is the **London WMR 4pm Fix**
- It is produced and administered jointly by The World Markets Company and Thomson Reuters
- The service enables portfolio valuations to be compared with each other



FX MARKET SCANDALS



Source: I. W. Marsh, P. Panagiotou and R. Payne, The WMR Fix and its Impact on Currency Markets, Working Paper, September 29, 2017



FX GLOBAL CODE



FX GLOBAL CODE

A set of global principles of good practice in the foreign exchange market

Published in May 2017 and updated in August 2018

- Administered by the Global Foreign Exchange Committee (GFXC) – a body comprised of central banks and private sector participants
- The code establishes a set of 55 guidelines for good market practice
- Requires firms to sign a letter of commitment published on a web site or on a public register
- Signed by over 200 market participants



GLOBAL FX MARKET TURNOVER \$BN PER DAY (APRIL)



Source: **Triennial Central Bank Survey of foreign exchange and OTC derivatives markets in 2016**, Bank for International Settlements, September 2016 <u>http://www.bis.org/publ/rpfx16.htm</u>



FX MARKET TURNOVER: BIS SURVEY HIGHLIGHTS & bank for international settlements

- Trading in foreign exchange markets averaged \$5.1 trillion per day in April 2016. This is *down* from \$5.4 trillion in April 2013, a month which had seen heightened activity in Japanese yen against the background of monetary policy developments at that time.
- The US dollar remained the dominant vehicle currency, being on one side of 88% of all trades in April 2016. The euro, yen and Australian dollar all lost market share.
- In contrast, many emerging market currencies increased their share. The renminbi doubled its share, to 4%, to become the world's eighth most actively traded currency and the most actively traded emerging market currency, overtaking the Mexican peso.
- In April 2016, sales desks in five countries the United Kingdom, the United States, Singapore, Hong Kong SAR and Japan – intermediated 77% of foreign exchange trading, up from 75% in April 2013 and 71% in April 2010.



FX MARKET TURNOVER BY MAIN TRADING NATIONS (\$BN PER DAY)



Source: **Triennial Central Bank Survey of foreign exchange and OTC derivatives markets in 2016**, Bank for International Settlements, September 2016 <u>http://www.bis.org/publ/rpfx16.htm</u>



CURRENCY DISTRIBUTION OF FX MARKET TURNOVER IN 2016

% SHARE OF AVERAGE DAILY TURNOVER IN APRIL



Note: Because two currencies are involved in every transaction, the sum of the % shares of individual currencies totals 200%

Source: Triennial Central Bank Survey of foreign exchange and OTC derivatives markets in 2016, Bank for International Settlements, September 2016 http://www.bis.org/publ/rpfx16.htm



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ISO Currency codes

- The International Organization for Standardization (ISO) publishes a list of three letter currency codes, known as the ISO 4217 code list.
- They are typically composed of a country's two-character Internet country code plus a third character denoting the currency unit.
- These codes are also used by the Swift message system and so are also known as Swift codes
- EXAMPLE: the Polish Zloty code (PLN) is made up of Poland's Internet code ("PL") plus a currency designator ("N").

- USD US Dollar
- 🖾 EUR Euro
- 🚟 GBP British Pound
- INR Indian Rupee
- 🔠 AUD Australian Dollar
- CAD Canadian Dollar
- SGD Singapore Dollar
- CHF Swiss Franc
- MYR Malaysian Ringgit
- JPY Japanese Yen
- CNY Chinese Yuan Renminbi



Transactions in the FX Market

- Transactions can be executed on a spot or forward basis
- Spot transactions require almost <u>immediate</u> delivery of FX
- Forward transactions require <u>future</u> delivery of FX
- Value date: the date of settlement of a FX transaction
 - Spot market 2 business days after the day the trade is agreed
 - Forward market 2nd business day after the even-month anniversary of the trade
- Dealers may also provide short-dated transactions if needed
 - 'Tod' value transactions same-day settlement
 - 'Tom' value transactions settlement tomorrow



Types of forward contract

- An outright forward transaction (usually just called a "forward") requires delivery at a future date of a specified amount of one currency for a specified amount of another currency
 - The exchange rate is established at the time of the agreement, but payment and delivery are not required until maturity
- A swap transaction is the simultaneous purchase and sale of a given amount of foreign exchange where the buying and selling are separated in time
 - Both purchase and sale are conducted with the same counterparty
 - Some different types of swaps are:
 - spot against forward
 - forward-forward



Transactions in the FX Market

Value date: the date of settlement of a FX transaction

- *Spot market* two business days after the day when the trade is agreed
- *Forward market* second business day after the evenmonth anniversary of the trade
- > Typical forward maturities: 1, 3, 6, 9, 12 months
 - Other maturities are possible

For some currencies there is no forward market



Currency breakdown of turnover in the domestic foreign exchange market in April 2013 and April 2016 (%)



https://www.nbp.pl/en/systemfinansowy/poland2016.pdf



FX QUOTATIONS

DIRECT AND INDIRECT QUOTES

- Indirect Quote: 1 unit of home currency = n units of foreign currency
- Direct Quote: 1 unit of foreign currency = n units of home currency

CROSS RATE

• An exchange rate between two currencies, calculated from their common relationships with a third currency



FX QUOTATIONS

- Note that the direct and indirect quotes are reciprocals of each other
 - an *indirect* quote from the viewpoint of the one country is the *direct* quote from the viewpoint of another country
- Therefore care must be taken when talking about increases/decreases in exchange rates
- Most inter-bank quotations are stated in *direct* terms
- Important exceptions: UK pound, euro



FT.com October 25 2013

1	Direct an		Direct quotes for £								
	EXCHA Oct 25	ANG		DSS DKr	RATES Euro	S _Y	NKr	SKr	SFr	£	\$
	Canada	C\$	1	5.177	0.694	93.20	5.641	6.060	0.856	0.592	0.957
	Denmark	DKr	1.932	10	1.341	180.0	10.90	11.71	1.654	1.144	1.849
	Euro	Euro	1.441	7.459	1	134.3	8.128	8.731	1.233	0.853	1.379
	Japan	Y	1.073	5.555	0.745	100	6.053	6.502	0.919	0.635	1.027
	Norway	NKr	1.773	9.177	1.230	165.2	10	10.74	1.518	1.050	1.697
	Sweden	SKr	1.650	8.543	1.145	153.8	9.309	10	1.413	0.977	1.580
Tudinaet	Switzerland	SFr	1.168	6.047	0.811	108.9	6.590	7.079	1	0.692	1.118
quotes for £	UK	£	1.689	8.742	1.172	157.4	9.526	10.23	1.446	1 (1.617
	USA	\$	1.044	5.407	0.725	97.34	5.892	6.329	0.894	0.619	1

Danish Kroner, Norwegian Kroner And Swedish Kroner per 10; Yen per 100Source: FT derived from WM Reuters.

Direct quote for £ against US 1 = 1/1.617 = £0.619/

Indirect quote for £ against US \$, ie £1=\$1.617

SOURCE: http://markets.ft.com/research/Markets/Currencies



FT.com October 25 2013



Source: Reuters. Short term rates are call for the US Dollar and Yen, others: two day's notice.

SOURCE: http://markets.ft.com/research/Markets/Currencies



FT.com October 25 2013

POUND SPOT FORWARD AGAINST THE POUND

		Closing	Change	Bid/offer	Day	's mid	One n	nonth	Three	month	Oney	/ear	Bank of
Oct 25		mid-point	on day	spread	High	Low	Rate	%PA	Rate	%PA	Rate	%PA	Eng. Index
Europe													
Czech Rep.	(Koruna)	30.1431	0.0231	181 - 681	30.2820	30.0540	30.1309	0.5	30.1021	0.5	29.9701	0.6	-
Denmark	(Danish Krone)	8.7417	0.0057	395 - 439	8.7701	8.7270	8.7374	0.6	8.7290	0.6	8.6970	0.5	-
Hungary	(Forint)	342.938	0.2184	684-191	344.320	341.760	343.603	-2.3	344.653	-2.0	349.509	-1.9	-
Norway	(Nor. Krone)	9.5256	-0.0084	210-301	9.5732	9.5111	9.5340	-1.1	9.5516	-1.1	9.6298	-1.1	101.7
Poland	(Zloty)	4.9001	0.0061	977-024	4.9259	4.8866	4.9083	-2.0	4.9236	-1.9	4.9918	-1.8	-
Russia	(Rouble)	51.3537	0.1350	296 - 778	51.5390	51.2084	51.6161	-6.1	52.0990	-5.7	54.2114	-5.3	-
Sweden	(Krona)	10.2324	-0.0545	283-365	10.3132	10.2104	10.2375	-0.6	10.2472	-0.6	10.2939	-0.6	87.8
Switzerland	d (Fr)	1.4455	0.0039	449-461	1.4499	1.4425	1.4448	0.6	1.4433	0.6	1.4356	0.7	144.9
Turkey	(New Lira)	3.2008	0.0051	998-018	3.2248	3.1937	3.2170	-6.0	3.2462	-5.6	3.3908	-5.6	-
UK	(£)	1.0000	-	-	-	-	-	-	-	-	-	-	82.4
Euro	(Euro)	1.1720	0.0008	717 - 723	1.1758	1.1703	1.1716	0.4	1.1710	0.3	1.1682	0.3	97.0
SDR	-	1.0449	0.0002	-	-	-	-	-	-	-	-	-	-
Americas													
Argentina	(Peso)	9.5039	0.0202	004 - 074	9.5323	9.4848	10.0697	-67.4	11.0259	-55.2	14.6286	35.0	-
Brazil	(Real)	3.5300	-0.0253	284 - 315	3.5790	3.5262	3.5561	-8.8	3.6031	-8.1	3.8378	-8.0	-
Canada	(Canadian \$)	1.6885	0.0021	880-890	1.6957	1.6860	1.6894	-0.6	1.6911	-0.6	1.6990	-0.6	108.6
Mexico	(Mexican Peso)	20.7948	-0.2063	893-003	21.0928	20.7355	20.8410	-2.7	20.9239	-2.5	21.3069	-2.4	-
Peru	(New Sol)	4.4571	-0.0137	540-602	-	-	4.4705	-3.6	4.4918	-3.1	4.5964	-3.0	-
USA	(US \$)	1.6167	-	164-169	1.6246	1.6149	1.6162	0.3	1.6154	0.3	1.6119	0.3	84.5
Pacific/M	iddle East/Afri	ca			-								
Australia	(A\$)	1.6864	0.0009	857-871	1.6930	1.6821	1.6894	-2.1	1.6954	-2.1	1.7224	-2.1	104.5
Hong Kong	(HK \$)	12.5355	8000.0	331-378	12.5952	12.5205	12.5314	0.4	12.5233	0.4	12.4902	0.4	-
India	(Indian Rupee)	99.5776	0.2870	541-010	100.267	99.1900	100.312	-8.8	101.709	-8.4	106.882	-6.8	-
Indonesia	(Rupiah)	17807.4	-226.331	656-824	18066.4	17689.5	17897.5	-6.0	18076.8	-6.0	18988.3	-6.2	-
Iran	(Rial)	40122.2	-69.5100	333 -	40330.7	40089.9	-	-	-	-	-	-	-
Israel	(Shekel)	5.7011	0.0035	973-049	5.7340	5.6821	5.7030	-0.4	5.7049	-0.3	5.7077	-0.1	-
Japan	(Yen)	157.365	-0.0566	308 - 421	157.960	157.070	157.302	0.5	157.153	0.5	156.415	0.6	143.3
Kuwait	(Kuwaiti Dinar)	0.4556	-	553 - 558	0.4576	0.4546	0.4558	-0.6	0.4561	-0.5	0.4570	-0.3	-
Malaysia	(Ringgit)	5.1034	-0.0061	997 - 070	5.1247	5.0748	5.1135	-2.4	5.1304	-2.1	5.2004	-1.9	-
New Zealan	nd (NZ\$)	1.9492	0.0113	484 - 500	1.9554	1.9358	1.9527	-2.2	1.9602	-2.2	1.9984	-2.5	118.7
Philippines	(Peso)	69.5887	-0.0728	618 - 156	69.9553	69.5134	69.4501	2.4	69.4238	0.9	69.4653	0.2	-
Saudi Arabi	ia (Riyal)	6.0631	-	620 - 642	6.0927	6.0564	6.0617	0.3	6.0588	0.3	6.0477	0.3	-
Singapore	(\$)	1.9991	-0.0006	982 - 999	2.0100	1.9959	1.9985	0.3	1.9974	0.3	1.9915	0.4	-
South Afric	a (Rand)	15.8775	0.0934	669 - 881	15.9471	15.7079	15.9441	-5.0	16.0843	-5.1	16.7006	-4.9	-
Korea Sout	h (Won)	1716.72	1.3742	613 - 731	1726.19	1715.43	1719.77	-2.1	1725.78	-2.1	1741.67	-1.4	-
Taiwan	(\$)	47.5101	-0.0113	995 - 207	47.7327	47.4693	47.4514	1.5	47.3568	1.3	46.9388	1.2	-
Thailand	(Baht)	50.2617	-0.0889	377 - 856	50.5680	50.1490	50.3477	-2.1	50.5045	-1.9	51.1459	-1.7	-
UAE	(Dirham)	5.9380	-	367 - 392	5.9670	5.9312	5.9362	0.4	5.9331	0.3	5.9197	0.3	-

Euro Locking Rates: Austrian Schilling 13.7603, Belgium/Luxembourg Franc 40.3399, Cyprus 0.585274, Finnish Markka 5.94572, French Franc 6.55957, German Mark 1.95583, Greek Drachma 340.75, Irish Punt 0.787564, Italian Lira 1936.27, Malta 0.4293, Netherlands Guilder 2.20371, Portuguese Escudo 200.482, Slovakian Koruna 30.1260, Slovenia Tolar 239.64, Spanish Peseta 166.386. Bid/offer spreads in the Pound Spot table show only the last three decimal places Bid, offer, Mid spot rates and forward rates are derived from the WM/REUTERS CLOSING SPOT and FORWARD RATE services. Some values are rounded by the F.T.



SOURCE: http://markets.ft.com/research/Markets/Currencies

Extract from FT.com Spot value of Pound

Currency	Bid	Offer	Spread
Euro	1.1717	' - 1.1723	6 pips
Can \$	1.6880	0 - 1.6890	10 pips
US \$	1.6164	- 1.6169	5 pips
	Pip = "pe	rcentage in po	 int" = 0.0001



GUIDELINES FOR BUYING & SELLING FX

- Always think in terms of what the bank does and the variable currency
 - The bank seLLs variable currency Low on the Left
 - The bank BUYs variable currency HIgh on the Right

The bank "sells low (hello) and buys high (Bye-Bye)"



EXAMPLE from FT.com Spot value of pound against the US dollar

Bid Ask

- \$/£ 1.6164 69
- The number of variable US dollars (term currency) per fixed pound (base currency)
- A *direct* quote for the US dollar
- Bank sells \$ (buys £)
 Bank buys \$ (sells £)
 - £1 = \$1.6164
- Client buys \$ (sells £)

£1 = \$1.6169

Client sells \$ (buys £)

Bid - Offer Spreads



Bid/Ask percentage spread = (Ask - Bid) / Ask = (1.6169 - 1.6164) / 1.6169 = 0.031%



FX JARGON

Written \$/£ 1.4850-1.4860	Written Shorthand 1.4850-60	Spoken Shorthand Fifty, sixty
A\$/\$ 2.0590-2.0600	2.0590-00	Ninety, figure
Yen/\$ 154.00-154.15	154.00-15	Figure, fifteen
SwFr/\$ 1.6595-1.6605	1.6595-05	Ninety-five, o five
\$/£ 1.4800 -1.4900	1.4800-00	"Spell out in full"



MORE FX JARGON

- Cable, sterling, pound alternative names for the GBP
- Greenback, buck nicknames for the U.S. dollar
- **Swissie** nickname for the Swiss franc
- Aussie nickname for the Australian dollar
- Kiwi nickname for the New Zealand dollar
- **Loonie, the little dollar** nicknames for the Canadian dollar
- **Figure** FX term for a round number, like 1.4800
- Yard a billion units, as in "I sold a couple of yards of sterling"



TYPICAL FX TRADING SCREEN

https://fxdem	o.currenex.	net - Curn	enex - Mic	rosoft Inte	rnet Explo	rer		_		-			Connorded	. 8
	DAR	Partial Fill	GTC - D	emoFeedC.	. v Stand	lard	-							
Spot ESP Market	Qne-Click	Treding												
EURUSO 1 31	1.31		GRP.USC	1.91	1.91	_	USDUPY	104	104		GB	P/USD BUY 23	km GBP @ 1.9130	GTC
1.01											13	2m of 23m @	VWAP 1.9128	00
	07	li an	100	00	04	12 2	manufa II	70			BOT	3m	1.9128 DF01	-
22 1 20	21	1 5	10	22	24	1 3	10 1	13	14	1 1 5	BOT	3m	1 9128 DF01	
Set 1m Set 2n	Buy Im	Buy 2m	Sel ter	Set 2n	Buy ten	Buy 12m	Set to 1	Sell 2n	E Buy te	Buy 2m	Fill F	ternainder Do	ne Partial	lose
2.144	Court BEC	- coy an		3 Mary C	and BES	Dog Tall	Loca ton 1	2141	a Crust DEC		EUP	USD BUY 44	Im EUR @ 1.3130	GTC
00 1 00	y operato	orma	00 1	2-1107 3	PARTS	OFFER.		2.474	1 opus Per a	- offer	4	Im of 44m @	WWAP 1 3130	00
DO EUR	44m	OFFER	200	GBP	2.9m	OFFER	00	USD	2.0	n CFFER	BOT	4m	1.3130 DF01	-
Oty Cpty Bid	oner e	ety Gty	oty c	pty Bid	Offer Cp	y oty	aty Cp	ty flid	Offer	cpty Oty	BOT	10m	1.3130 DF06	
7 DF08 26	27 0	101 5	3 0	F05 22	24 DF0	1 3	10 DF	06 73	14	0000 5		Do	ne ICI	lose
10 DF05 26	20 0	100 10	1 0	F00 22	25 000		7 00	00 74	75	0000 10				
7 0508 26	20 0	F08 7	4 0	F08 20	26 050		4 DF	10 74	75	DE04 10	GB	VUSD BUY 11	m GBP @ 1.9130	GIC
10 0504 25	29 04	10 5		F04 20	27 DE		- 5 DE	74	75	DE10 5	23	3m of 23m @	VWAP 1.9128	57
10 0.00 20	11						125		11		BOT	1m	1.9130 DF06	-
USDICHE 1.17	1.17		EUR/JPY	137.	137.		EURICHE	1.54	1.54		BOT	400	1.9130 DF08	
												Do	ne de	ose
E IT AG	10	1 40	10 11	47	40	1 6	101	20	20	1 5	USC	JUST SELL 22	tm USD @ 104.72 (GTC
3 40	40	1 10	10 1	41	40	1 3	10	20	64	1 3	22	2m of 22m @	VWAP 104.720	00
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FORWARD DISCOUNTS & PREMIUMS

- Forward rates are often quoted in terms of *discounts* and *premiums* relative to the spot rate
- A currency stands at a *discount* when it is *less* valuable in the forward market vis-à-vis the spot market
- A currency stands at a *premium* when it is *more* valuable in the forward market vis-à-vis the spot market



FORWARD DISCOUNTS & PREMIUMS

THE "OUTRIGHT FORWARD" RATE

= THE SPOT RATE

MINUS FORWARD PREMIUM

OR

PLUS FORWARD **DISCOUNT**



EXAMPLE FROM FT

FORWARD RATES & SPOT RATES

\$ spot 1.6167=> Premium (05) \$ 1m fwd 1.6162



THE ADDIS RULE

- To obtain the <u>outright</u> forward quotation from the spot quotation we must <u>subtract</u> premiums and <u>add discounts</u>
- Hence we obtain the "A.D.D.I.S" rule



CARE WITH ADDIS (1)

- One way to check the calculation is to remember that the bid-ask spread on the *forward* quote should always be *wider* than the bid-ask spread on the *spot* quote
 - **BID > ASK**: *deduct* forward points to get the outright forward rate
 - **BID < ASK**: *add* forward points to get the outright forward rate



CARE WITH ADDIS (2)

- Care must be taken to note the units of the forward discount/premium quotation
- In many cases, the forward dis/pm is quoted as 100th's of a unit (*ie* the use of a "c" to denote cents)
- For some other currencies, such as the Yen, this is not the case



FORWARD QUOTATION IN PERCENTAGE TERMS

- Forward quotations may also be expressed as a percent-per-annum deviation from the spot rate
- This facilitates the comparison of premiums/discounts in the forward market with interest rate differentials



FORWARD QUOTATION IN PERCENTAGE TERMS

For currency quoted DIRECTLY (*ie* US dollar)

$$\frac{F-S}{S}x\frac{12}{n}x100$$

where n = no. of months in forward contract

• pm on \$ = $[(1.6162 - 1.6167) / 1.6167] \times 1200$

= -0.3% pa

- The negative value in the calculation above indicates that the fewer \$s are needed to obtain pounds forward
- The positive value reported in the FT.com table reflects the fact that the \$
 stands at a forward *premium* relative to the £
 - i.e. because fewer \$s are needed to obtain the £ forward, the \$ is more valuable for forward delivery (it stands at a premium relative to the pound)



CURRENCY ARBITRAGE

BANK 1: £1 = \$2.00 Indirect quote for £
BANK 2: \$1 = £0.50 Direct quote for £
BANK 2: \$1 = £0.51



ARBITRAGE PROCESS

BANK 1

Exchange £100 for 100 x \$2 = \$200 BANK 2

Exchange \$200 for 200 x £0.51 = £102

Arbitrage profit = 2%

ie £2 per £100 traded



TRIANGULAR CURRENCY ARBITRAGE

New York: £ 0.666/\$
London: € 4/£
Frankfurt: \$ 0.50/€



TRIANGULAR ARBITRAGE



ARBITRAGE PROCESS

- New York: change dollars into pounds
 - \$1 will buy £0.666
- London: use pounds to buy euros
 - £0.666 will buy 0.666 x 4 = € 2.661
- Frankfurt: convert euros back into dollars
 - € 2.661 will buy 2.664 x 0.50 = \$1.332
- Thus, profit per dollar traded = \$0.332 (assuming no transaction costs)



NO ARBITRAGE CONDITION

- (£/\$) (€ /£) (\$/ €) = 1.000
 ie Exchange rates are "*consistent*"
- ORIGINAL EXCHANGE RATES
 (0.666) (4.00) (0.50) = 1.332
- CONSISTENT EXCHANGE RATES
 (0.658) (2.985) (0.5092) = 1.000



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A note about interest rates

- Interest rates are expressed on an annual basis
- Interest rates must be scaled down for periods less than one year
- It is common to assume that there are 360 banking days in a year

EXAMPLE

- Interest rate is 8% per annum
- Holding period is 10 days
- 10 day interest rate = 10/360 x 8% = 0.22%





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