



Lecture 1: Introduction & Exchange Rate Conventions

Reading: Eun & Resnick Ch. 5 (10th ed.)

Characteristics of FX Markets

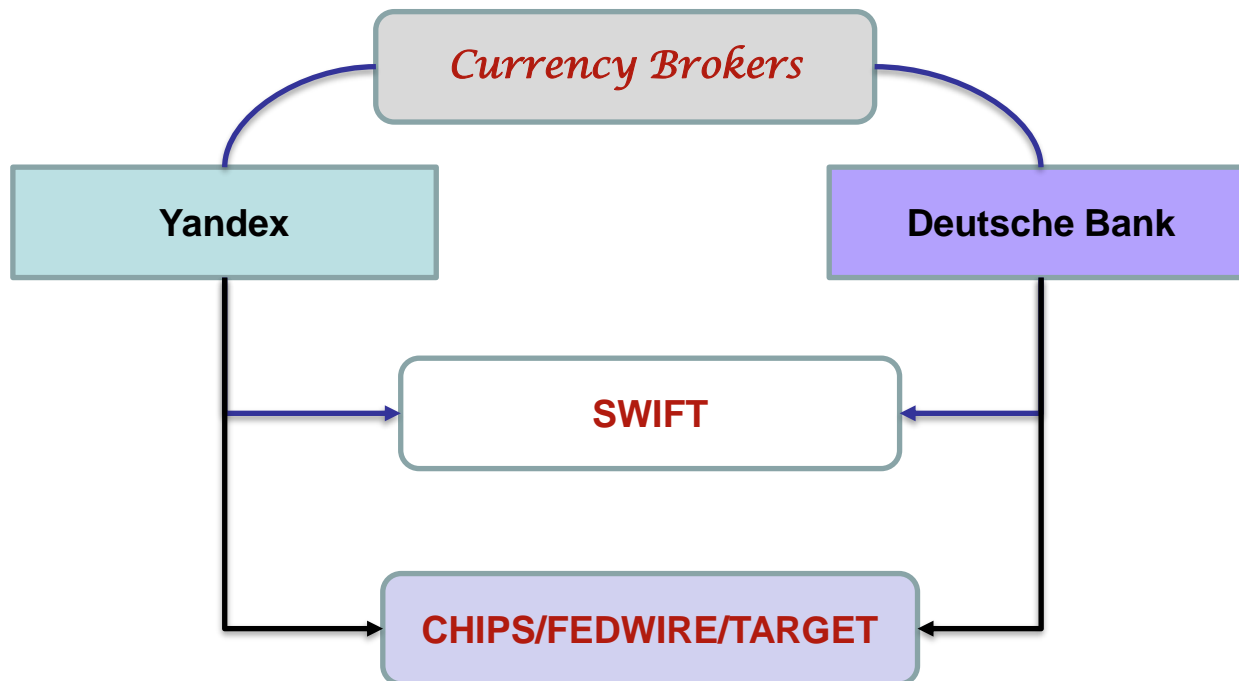
- Largest of all financial markets with average ***daily*** turnover of over \$8.5 Trillion! Spot transactions - \$2 trillion; FX swaps dominate.
- 64% of all foreign exchange transactions involves cross-border counterparties
- Only $\approx 6\%$ of daily spot transactions involve non-financial customers.
- US dollar involved in one-side of 85% of all trades, a slight decline from the 2019 survey; Euro is at 31%.
- Australian \$ is the 5th most heavily traded currency
- Loosely organised in two tiers: wholesale & retail

Characteristics of Wholesale Markets

- Not an organized exchange
 - No fixed opening hours, centralized clearing mechanism, standardized contracts, etc.
- Extremely deep and liquid market
- Participants in the market:
 - International banks
 - Bank customers engaged in commercial and Investment transactions
 - Non-bank dealers
 - FX brokers
 - Central banks
- Settlement of transactions – No real money changes hands
 - The role of SWIFT

Communication Systems

- The Russia-Ukraine war has brought the *Society of Worldwide Interbank Financial Telecommunications* (**SWIFT**) to prominence.
- What does SWIFT do that makes them important?



Exchange Rate

- A foreign exchange rate is the *price* of one currency expressed in terms of another currency.
- A foreign exchange quotation (or quote) is a statement of willingness to buy or sell at an announced rate.

USDCHF ↑ .8506 -.0002 At 10:30 Op .8508 Hi .8512 Lo .8506 Close .8508 Value 01/16/24

USDCHF BGN Currency 98) Calendar

Security Description

USDCHF Spot Exchange Rate - Price of 1 USD in CHF

More Currencies and Sources | FXDS »

- 1) Currency Details
- 2) Trading Activity
- 3) IMF Report
- 4) Related Instruments

The Swiss franc is the official currency of Switzerland. The US dollar is the official currency of the United States of America.

Currency Info

Type	Cross Rate	Hours	09:00-08:59
Settle Date	01/16/24	Day Count	ACT/360
Settles	T+2		

FIGI BBG0013HFN45



USDCHF ↓ .8506 -.0002 At 10:32 Op .8508 Hi .8512 Lo .8506 Close .8508 Value 01/16/24

USDCHF Currency Settings

All Quotes

USD-CHF X-RATE

Quote | RFQ »
Trade Affirmation | CNF »
More Currencies and Sources | FXDS »

- ☒ Center BBO
- ☐ More Curves

01/11/24 ⏮ ⏪ ⏩ ⏭ ⏹ Live

Contributor View • Best Bid/Ask View

Sources All

Forward Points BGN

Source	Firm Name	Bid / Ask	Time	Tenor	Bid / Ask	Time
BGN	Bloomberg BGN	0.8505 / 0.8507	10:32	101 TOD	4.147 / 4.474	10:31
BGNE	BGN Executable	0.85051 / 0.85075	10:32	102 ON	-1.009 / -0.769	10:31
	BGN Executable 2M-5M	0.85051 / 0.85075	10:32	103 TOM	3.378 / 3.465	10:31
	BGN Executable 5M-10M	0.85047 / 0.85078	10:32	104 TN	-3.464 / -3.378	10:31
	BGN Executable 10M-20M	0.85043 / 0.85084	10:32	105 SN	-1.001 / -0.765	10:31
	BGN Executable 20M-30M	0.85034 / 0.85093	10:32	106 1W	-6.27 / -6.08	10:32
	BGN Executable 30M+	0.85001 / 0.85128	10:32	107 2W	-12.50 / -12.23	10:32
CMPN	Composite(NY)	0.8505 / 0.8507	10:32	108 3W	-18.78 / -18.38	10:32
BFIX	Bloomberg Fixing	0.85050 / 0.85080	10:30	109 1M	-27.72 / -27.24	10:32
LAST	Last Update	0.8505 / 0.8507	10:32	110 2M	-55.14 / -54.42	10:32
BLC	Bloomberg (Calc)	0.8505 / 0.8507	10:32	111 MAR	-65.98 / -65.20	10:32
BPFX	BNP Paribas FX	0.8504 / 0.8508	10:32	112 BAPR	-68.89 / -67.88	10:32
CAFS	Crown Agents Bk	0.8501 / 0.8512	10:32	113 3M	-80.98 / -80.04	10:32
CBAX	CBA Bank	0.8506 / 0.8506	10:32	Realized Vol BGN		
CCBX	China Construction Bank H...	0.8506 / 0.8507	10:32	Tenor	Bid / Ask	Time
CIFE	CIBC FX	0.8505 / 0.8507	10:32	201 1H	3.4909 / 3.4909	10:32
CIFX	Citi FX	0.8505 / 0.8507	10:32	202 24H	4.8480 / 4.8480	10:30
COBA	Commerzbank FX	0.8506 / 0.8507	10:32	203 1W	7.3128 / 7.3128	10:30
FMD	Fenics MD	0.8505 / 0.8508	10:32	204 2W	9.4775 / 9.4775	10:30
HSLX	HSBC UK Streaming	0.8506 / 0.8507	10:32	205 3W	8.9991 / 8.9991	10:30
ICFX	Icap FX Global	0.85050 / 0.85080	10:32	206 1M	9.0941 / 9.0941	10:30
ICPL	ICAP PLC	0.8505 / 0.8508	10:32	207 2M	8.4766 / 8.4766	10:30
MSST	MS FX	0.8505 / 0.8507	10:32	208 3M	7.9174 / 7.9174	10:30
NFXL	NOMURA FX	0.8506 / 0.8507	10:32	209 4M	7.9191 / 7.9191	10:30
RBCF	RBC FX	0.8506 / 0.8507	10:32	210 5M	7.5989 / 7.5989	10:30
SBCZ	UBS Zurich	0.8502 / 0.8507	10:32	211 6M	7.7405 / 7.7405	10:30
TFEX	24 Exchange	0.8506 / 0.8507	10:32	212 9M	7.7120 / 7.7120	10:30
TPSF	TP FX	0.8504 / 0.8508	10:32	213 1Y	8.1651 / 8.1651	10:30

Some Terminology

- **Spot Rate:** The exchange rate at which trades are executed immediately in the interbank market. About a third of all FX trading is done in this market.
- **Value Date** for a spot transaction is the date on which parties receive the funds they have purchased – e.g., in trades involving USD, settlement occurs two business days after the deal.
- Foreign currency dealers provide two quotes:
 - Bid Price:** Price at which the dealer is willing to **buy** a currency from you (i.e., client)
 - Ask Price:** Price at which the dealer is willing to **sell** a currency to you (i.e., client)
- It is always the case that the Ask Price > Bid Price. The difference is the Bid-Ask spread
- The less traded and more volatile a currency, the greater is the spread.

Bid-Ask Prices

➤ Consider the quote:



- ❖ $[\text{USDCHF}]_{\text{bid}} = 0.8505$ – the rate at which the bank will **buy** USD (base currency) in exchange for CHF.
- ❖ $[\text{USDCHF}]_{\text{ask}} = 0.8507$ – the rate at which the bank will **sell** USD (base currency) for CHF.

Explanation: There are two currencies involved in an exchange rate pair – one is the base currency and the other is the quote currency.

The Bloomberg quote, despite how it looks on the Bloomberg screen, is an indirect quote from the US perspective (i.e., European terms). It is the rate at which the dealer is willing to **buy** USD (gives customer Swiss Francs) at the low rate and **sell** USD (receives Swiss Francs from customer) at the high rate.

Other Forex Market Conventions

- In the *wholesale market*, for a currency pair, there is a **base** currency (the first currency in the pair), and **quote** currency (the second). This is what Bloomberg uses.
- Other quotations used in business include
 - ❖ **Direct Quote:** Home currency per unit of foreign currency (FC)
 - ❖ **Indirect Quote:** Foreign currency (FC) per unit of Home currency
 - ❖ **American & European** terms are *direct* and *indirect* quotes relative to the US dollar (USD). The quote in the previous slide is in European terms.
- ❑ Note that in **all** cases, the reciprocal of a direct quote is an indirect quote and vice-versa.

AUDCHF

AUDCHF ↑ .5699 - .0001 

At 10:38 Op .5701 Hi .5703 Lo .5698 Close .5701 Value 01/16/24

AUDCHF Curncy

Settings

AUD-CHF X-RATE

Quote | RFQ »

Trade Affirmation | CNF »

More Currencies and Sources | FXDS »

☒ Center BBO

☐ More Curves

01/11/24   Live

Contributors View

Best Bid/Ask View

Sources All

Forward Points

BGN

Source	Firm Name	Bid / Ask	Time	Tenor	Bid / Ask	Time
BGN	Bloomberg BGN	0.5699 / 0.5700	10:38	101 TOD	1.7600 / 2.2300	10:38
BGNE	BGN Executable	0.56987 / 0.57000	10:38	102 ON	-0.58 / -0.25	10:38
	BGN Executable 1M-5M	0.56987 / 0.57000	10:38	103 TOM	1.5100 / 1.6500	10:38
	BGN Executable 5M-10M	0.56985 / 0.57005	10:38	104 TN	-1.65 / -1.51	10:38
	BGN Executable 10M-25M	0.56979 / 0.57010	10:38	105 SN	-0.51 / -0.31	10:38
	BGN Executable 25M+	0.56945 / 0.57037	10:38	106 1W	-3.01 / -2.73	10:38
CMPN	Composite(NY)	0.5699 / 0.5700	10:38	107 2W	-5.94 / -5.55	10:38
BFIX	Bloomberg Fixing	0.5698 / 0.5702	10:30	108 3W	-8.92 / -8.39	10:38
LAST	Last Update	0.5699 / 0.5700	10:38	109 1M	-13.13 / -12.62	10:38
BPFX	BNP Paribas FX	0.5698 / 0.5701	10:38	110 2M	-26.23 / -25.51	10:38
CBAX	CBA Bank	0.5699 / 0.5700	10:38	111 3M	-38.98 / -38.09	10:38
CIFE	CIBC FX	0.5698 / 0.5700	10:38	112 4M	-52.18 / -50.85	10:38
CIFX	Citi FX	0.5699 / 0.5700	10:38	113 5M	-66.36 / -64.57	10:38
COBA	Commerzbank FX	0.5699 / 0.5700	10:38	Realized Vol		BGN
ICFX	Icap FX Global	0.5698 / 0.5701	10:38	Tenor		Bid / Ask
ICPL	ICAP PLC	0.5698 / 0.5701	10:38	201 24H	4.7096 / 4.7096	10:30
RBCF	RBC FX	0.5699 / 0.5700	10:38	202 1H	5.0664 / 5.0664	10:38
TPSF	TP FX	0.5694 / 0.5704	10:38	203 1W	6.5797 / 6.5797	10:30
LMAX	LMAX Exchange	0.56990 / 0.56998	10:23	204 2W	8.6808 / 8.6808	10:30
BHFX	BHF Bank FXGO	0.5695 / 0.5696	01/10	205 3W	8.2769 / 8.2769	10:30
SWXC	Swiss Exchange	0.5698 / 0.5708	01/10	206 1M	9.0487 / 9.0487	10:30
ZKB	ZKB, Zurich	0.5700 / 0.5701	01/10	207 2M	8.4862 / 8.4862	10:30
				208 3M	8.3233 / 8.3233	10:30
				209 4M	8.1800 / 8.1800	10:30
				210 5M	8.1213 / 8.1213	10:30
				211 6M	8.2444 / 8.2444	10:30
				212 9M	8.4156 / 8.4156	10:30
				213 1Y	8.8619 / 8.8619	10:30

AUDCHF

For you to attempt later!

- Consider the cross-rate quote*:

 AUDCHF 0.5699 – 0.5700
Base Currency Quote Currency

- ❖ **Cross-rate** is an exchange rate that does NOT involve the USD
- ❖ Explain the following quotes:
 - $[\text{AUDCHF}]_{\text{bid}} = 0.5699$
 - $[\text{AUDCHF}]_{\text{ask}} = 0.5700$
- ❖ From the AUD perspective, what type of a quote is this?
- ❖ What would the quotes look like from CHF perspective?

NB.: Explain these bid and ask prices on your own!!

Bid-Ask Quotations

- ❖ Bid and Ask prices mixed with alternative quotations methods can lead to confusion. Try to remember:
 - The dealer buys the denominator (or base) currency at the **BID** [*client **buys** the **numerator** (or quote) currency at the **bid***]
 - The dealer sells the denominator (base) currency at the **ASK** [*client **sells** the **numerator** (or quote) currency at the **ask***]
- ❖ When all else fails, remember that the commercial client always, **ALWAYS** gets the worse end of the deal!!!

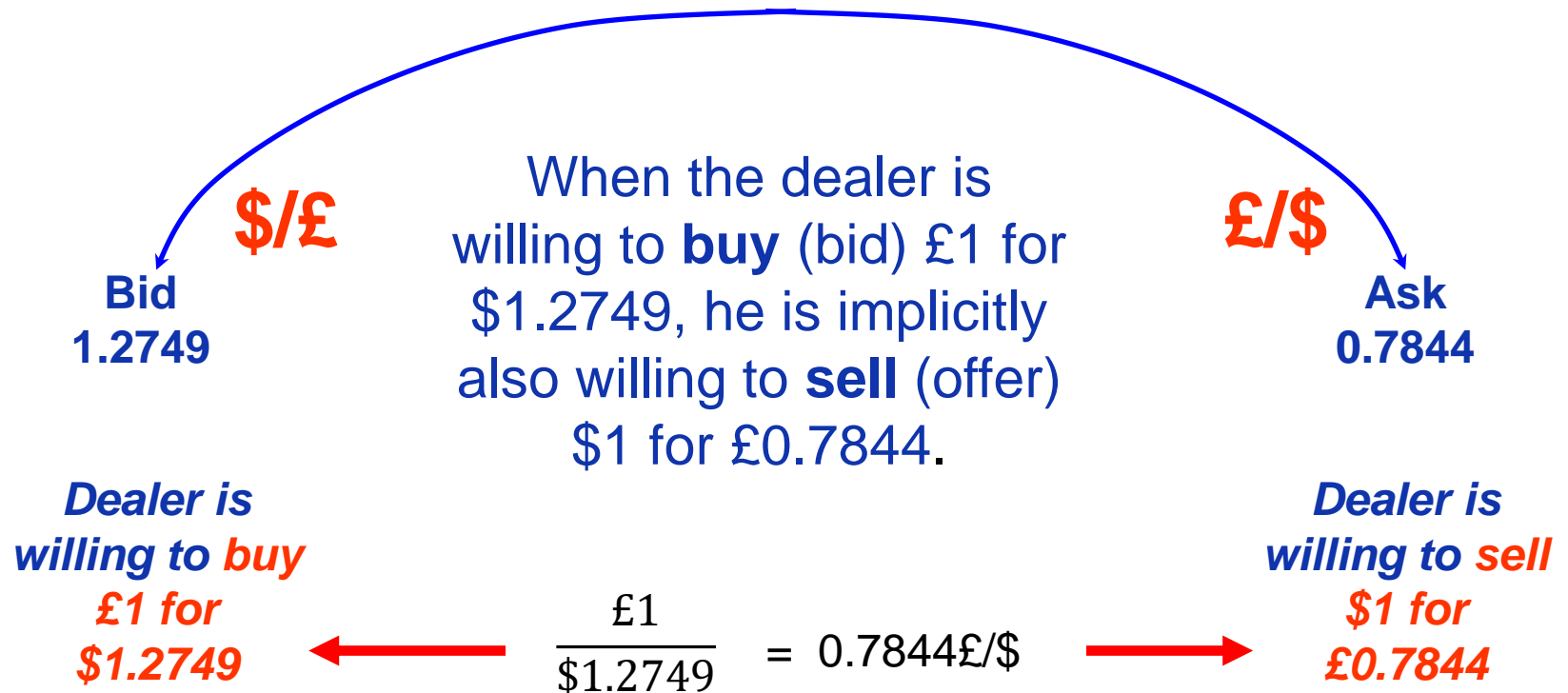
Another Example*

❖ American terms (e.g., British Pound)

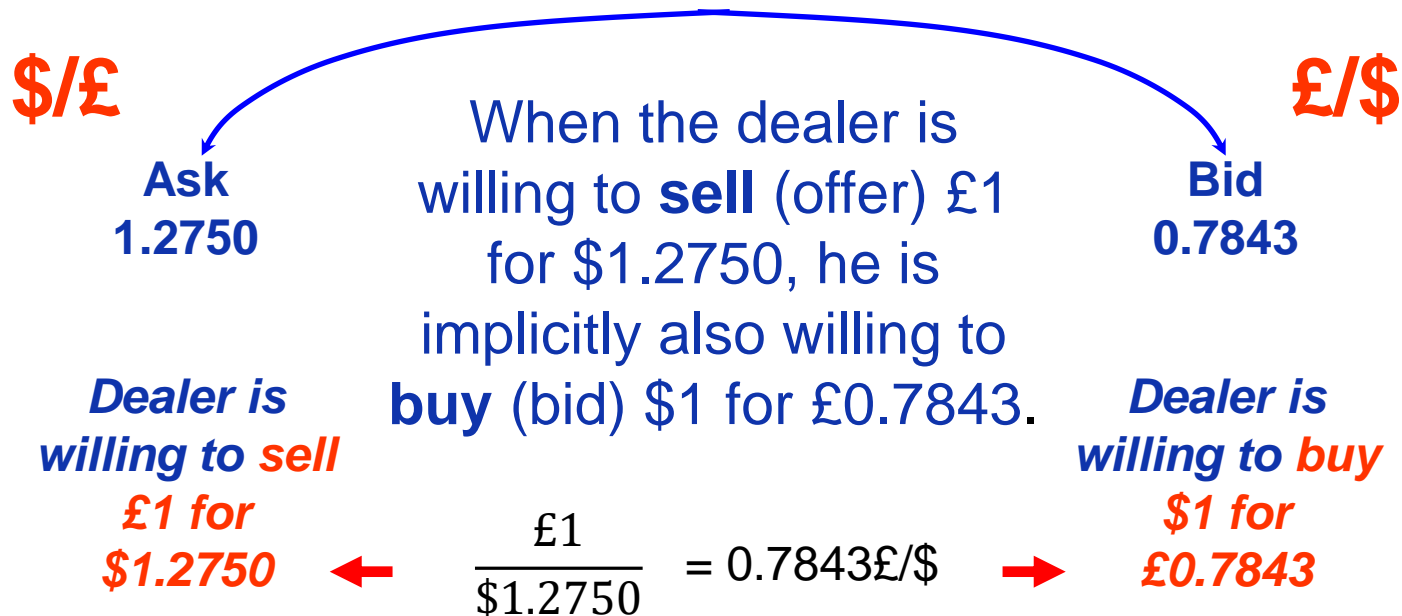
	Bid	Offer (Ask)
\$/£	1.2749	1.2750

- ⊕ **Bid:** Dealer buys £ for \$ at the Bid, Client sells £ for \$ (i.e., dealer will buy £1,000,000 for \$1,274,900)
- ⊕ **Ask:** Dealer sells £ for \$ at the Ask, Client buys £ for \$ (i.e., dealer will sell £1,000,000 for \$1,275,000)

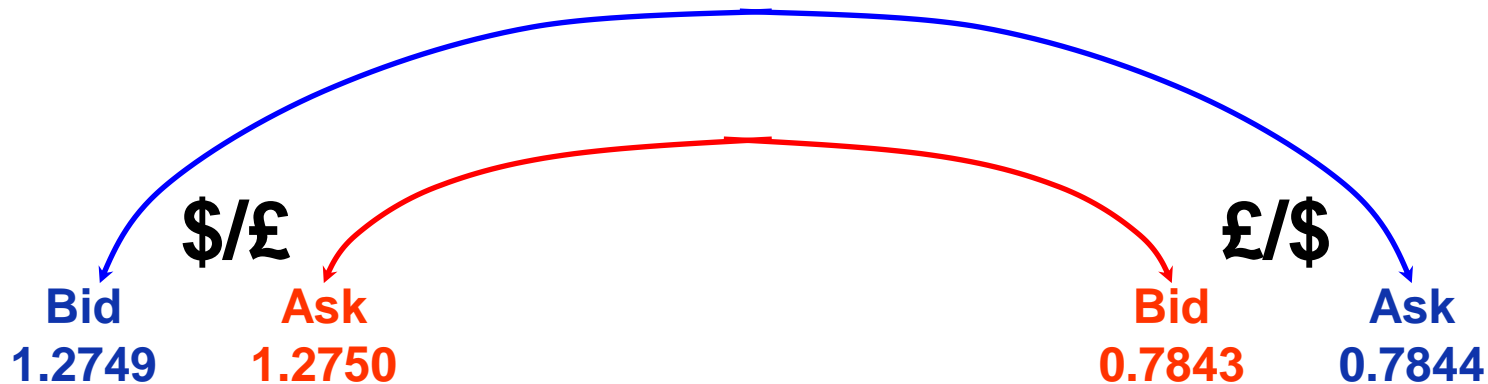
Bid-Ask Example



Bid-Ask Example (2)



Bid-Ask Prices: A Summary



- ⊕ A direct bid is the reciprocal of an indirect ask.
- ⊕ A direct ask is the reciprocal of an indirect bid.

Bid-Ask Spread

- The difference between the *bid* and *ask* prices is the **bid-ask spread**. It represents a “round-trip” transaction and is the cost of entering into the transaction.
- Consider the quote of **CHF 0.5699 – 0.5700/AUD**

$$\% \text{ spread} = \frac{\overbrace{(Ask - Bid)}^{\text{spread}}}{Ask} \times 100$$

$$\begin{aligned} \% \text{ spread} &= \frac{(0.5700 - 0.5699)}{0.5700} \times 100 \\ &= 0.01754\% \text{ (or 1.75 basis points)} \end{aligned}$$

Triangular Arbitrage

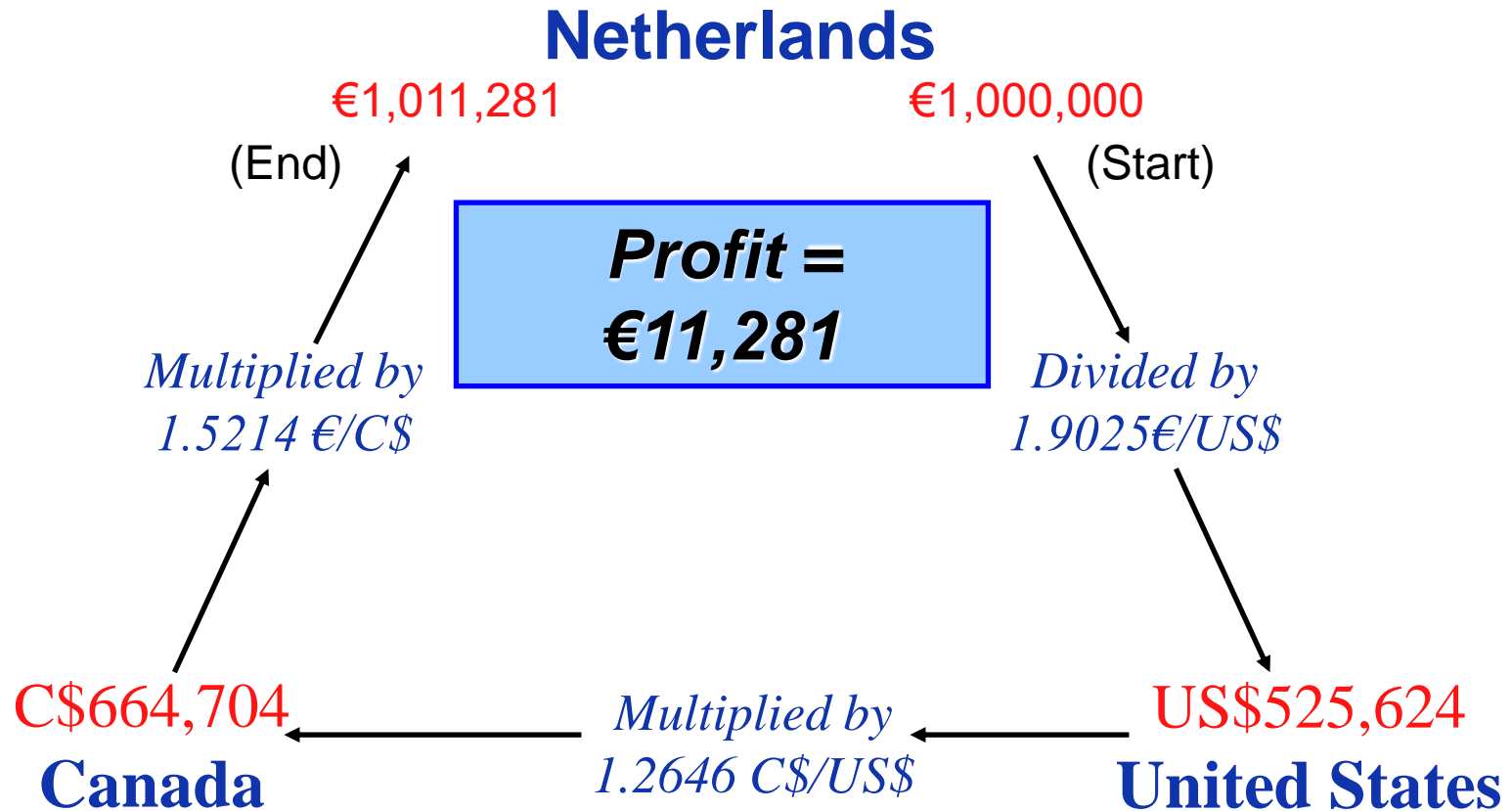
- **Cross rates** can be used to check on opportunities for intermarket arbitrage. Suppose the following exchange rates are available:

Bank of America:	Euro(€) per U.S.\$	€ 1.9025/U.S.\$
Dominion Bank:	Canadian dollar per U.S.\$	C\$1.2646/U.S.\$
ABN Amro:	Euro (€) per Canadian \$	€1.5214/C\$

- The **synthetic cross rate** between Euros and Canadian dollars is:

*You get more €
from ABN AMRO*

Triangular Arbitrage (2)



Try this one on your own

- Find the arbitrage opportunity here if you start with €10,000,000:

Citibank: \$1.7395/£ or £0.5749/\$

Barclays Bank: €0.8408/\$ or \$1.1893/€

(Actual) Cross-rate:

Dresdner Bank: €1.4381/£ or £0.6954/€

- *Hint: You should get a profit of €170,722.*
- *We revisit this example in the tutorial.*

Forward Contracts

- Forward transactions require delivery **at a future date** of a specified amount of one currency for a specified amount of another currency.
- This is a rate that is agreed upon today but settled further into the future.
- Forward contracts are traded on the inter-bank market. They can be tailored for
 - contract sizes
 - currency
 - delivery dates

Ways to quote Forward Rates

- There are three ways to express forward rates:
 - Via points to be added or subtracted from spot rate [known as **swap points**]
 - Outright quotes
 - As an annualized percentage forward premium or discount

Forward Quotes: Swap Rates

- Among themselves, foreign exchange traders usually quote forward rates in terms of points, also referred to as “forward points” *or* “swap rates” (see previous slide).
- A point (*pip*) is the last digit of a quotation
 - A point (*pip*) is equal to 0.0001 ($1/100^{\text{th}}$ of 1%) for most currencies.
 - The Japanese yen is the exception. It is quoted only to two decimal places; A *point*, in this case, is 1/100.

Forward Quotes: Swap Rates (2)

- If $F > S$ then the currency *in the denominator (base currency)* is trading at a premium
 - **E.g.** One AUD buys more USD in the forward market than the in the spot market
 - If ascending between bid/offer forward points then forward price will be higher than the current spot price
- If $F < S$ then the currency *in the denominator (base currency)* is trading at a discount*
 - **E.g.** One AUD buys less USD in the forward market than the in the spot market
 - If descending between bid/offer forward points then forward price will be lower than the current spot price
- If $F = S$ then market is relatively flat

Swap Rates: An Example

- A forward quotation expressed in points is **not** a foreign exchange rate as such.
- Rather, it is the difference between the forward rate and the spot rate.

AUDCHF

	Bid	Offer
Spot	0.5699	0.5700

Points Quotations:

One week forward	3.01-2.73	} If Bid Pts > Ask Pts forward discount → Subtract from spot
One month forward	13.13-12.62	
Five months forward	66.36-64.57	

Note: Bloomberg flags forward points of the currency trading at a discount with a negative sign. For the purposes of this example, I have removed the sign to reflect the way quotes are provided when one does **NOT** have access to a Bloomberg terminal.

Swap Rates: The Calcs (1)

- When the **Bid Points > Ask Points**, you **subtract** the points from the **spot rate** to get the outright forward quote:

AUDCHF

	Bid	Ask
$F_{1\text{ wk}}$	$0.5699 - 0.000301 = 0.56960$	$0.5700 - 0.000273 = 0.56973$
$F_{1\text{ mo}}$	$0.5699 - 0.001313 = 0.56859$	$0.5700 - 0.001262 = 0.56874$
$F_{5\text{ mo}}$	$0.5699 - 0.006636 = 0.56326$	$0.5700 - 0.006457 = 0.56354$

These are the outright
forward quotes



Swap Rates: The Calcs (2)

- On the other hand, if the **Bid Points < Ask Points**, there is a forward premium, and you **add** the points to the **spot rate** to get the outright forward quote:

AUDUSD

	Bid	Offer
Spot	0.6699	0.6700

Points Quotations:

One week forward	1.42-1.57
One month forward	6.45-6.64
Three month forward	18.12-18.45

If Bid Pts < Ask Pts
→ Add to spot

NB.: Try to do this calculation on your own!!

Forward Premium/Discount

- Forward premium (discount) exists when a currency purchases more (less) of the 2nd currency in the future than it does presently.

$$p = \left(\frac{\textit{Forward} - \textit{Spot}}{\textit{Spot}} \right) \times \left(\frac{360}{N} \right)$$

Note:

$p > (<) 0$ is the annualized percentage premium (discount) of the denominator currency

N – maturity of the forward contract (*or number of days forward*)

% change in exchange rates

- The Australian dollar was quoted at CHF 0.9489/AUD in January 2013, while in January 2024, it was quoted at CHF 0.5701/AUD*.
 - At t-1 (Jan 2013): CHF 0.9489/AUD
 - At t (Jan 2024): CHF 0.5701/AUD.

What is the appreciation/depreciation of the AUD?

* Closing price from slide #11.

% change in exchange rates

- Thus, the appreciation/depreciation of the \$, relative to the CHF from $t-1$ to t is:

$$R_{t-1,t} = \frac{S_t - S_{t-1}}{S_{t-1}} = \frac{0.5701 - 0.9489}{0.9489} = -39.9199\%$$

Thus, the \$ has depreciated relative to the CHF by approx. 39.92%

Question for you to try later:

By how much has the CHF appreciated?

Glossary

- ❖ Spot rate – The current market price of one currency in terms of another.
- ❖ Direct quote – domestic currency per unit of foreign currency (AUD/CHF).
- ❖ Indirect quote – foreign currency per unit of domestic currency (CHF/AUD).
- ❖ American terms – Direct quote from the perspective of the US dollar.
- ❖ European terms – Indirect quote from the perspective of the US dollar.
- ❖ Bid (Ask) rate – Rate at which the bank is willing to buy (sell) the currency in the denominator.