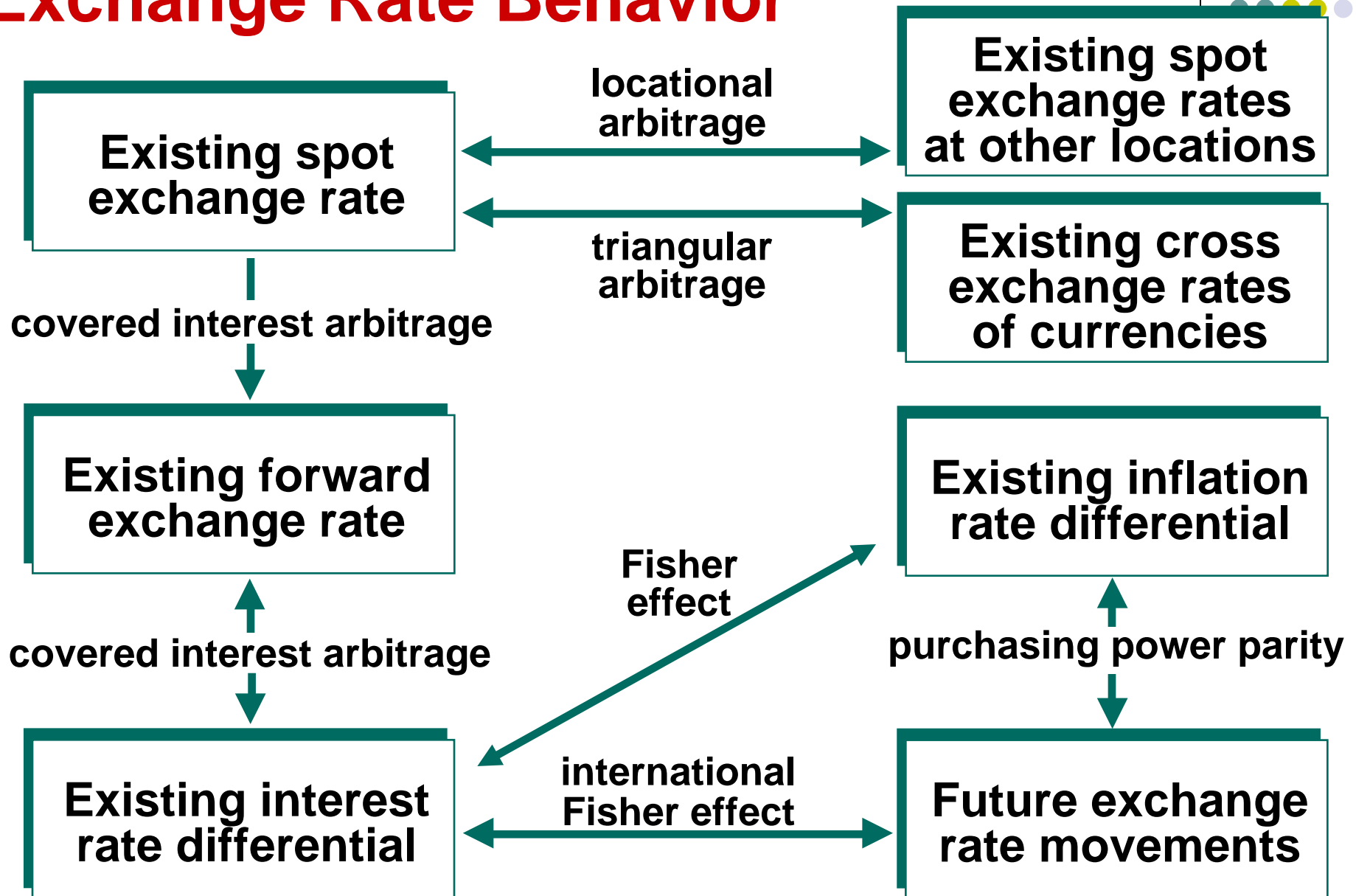




Governments and Exchange Rates

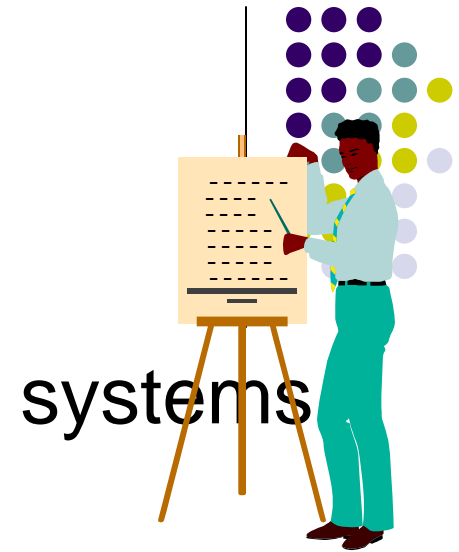


Exchange Rate Behavior



Chapter Objectives

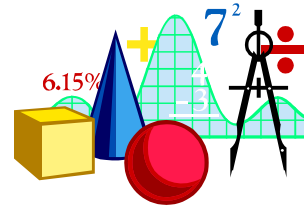
- To describe the exchange rate systems used by various governments;
- To explain how governments can use direct and indirect intervention to influence exchange rates; and
- To explain how government intervention in the foreign exchange market can affect economic conditions.



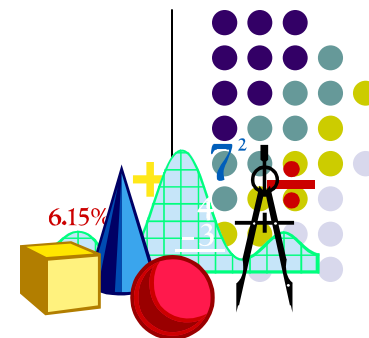


Exchange Rate Systems

- Exchange rate systems can be classified according to the degree to which the rates are controlled by the government:
 - fixed
 - freely floating
 - managed float
 - pegged



Fixed Exchange Rate System

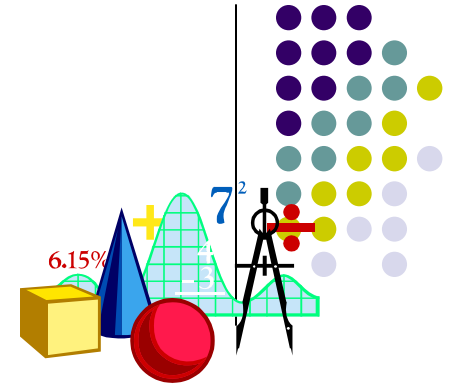


System: Rates are held constant or allowed to fluctuate within very narrow bands only.

Examples: Bretton Woods era (1944-1971), Smithsonian Agreement (1971)

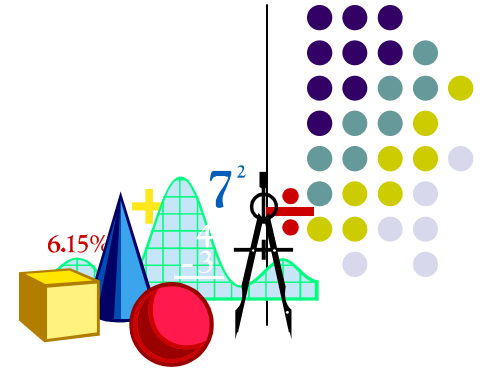
- ✓ MNCs know the future exchange rates.
- ✗ Governments can revalue their currencies.
- ✗ Each country is also vulnerable to the economic conditions in other countries.

Freely Floating Exchange Rate System



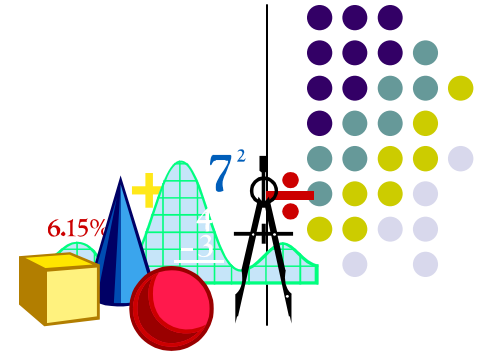
- System:** Rates are determined by market forces without governmental intervention.
- ✓ Each country is more insulated from the economic problems of other countries.
 - ✓ Central bank interventions just to control exchange rates are not needed.
 - ✓ Governments are not constrained by the need to maintain exchange rates when setting new policies.

Freely Floating Exchange Rate System



- ✓ Less capital flow restrictions are needed, thus enhancing market efficiency.
- ✗ MNCs may need to devote substantial resources to managing their exposure to exchange rate fluctuations.
- ✗ The country that initially experienced economic problems (such as high inflation, increased unemployment) may have its problems compounded.

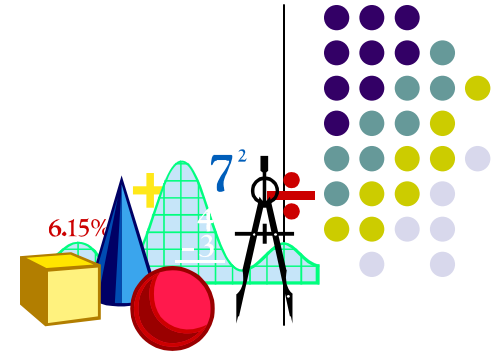
Managed Float Exchange Rate System



System: Exchange rates are allowed to move freely on a daily basis and no official boundaries exist. However, governments may intervene to prevent the rates from moving too much in a certain direction.

- ✘ A government may manipulate its exchange rates such that its own country benefits at the expense of other countries.

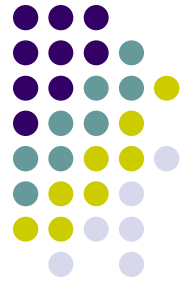
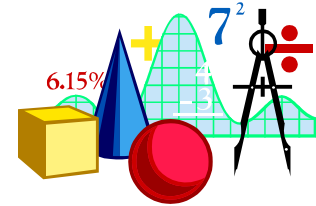
Pegged Exchange Rate System



System: The currency's value is pegged to a foreign currency or to some unit of account, and thus moves in line with that currency or unit against other currencies.

Examples: European Economic Community's *snake* arrangement (1972), European Monetary System's exchange rate mechanism (1979), Mexican peso's peg to the U.S. dollar (1994)

Currency Boards

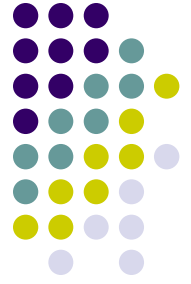
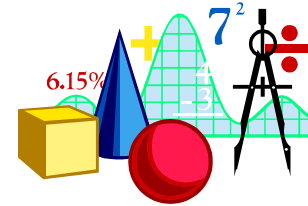


- A currency board is a system for pegging the value of the local currency to some other specified currency.

Examples: HK\$7.80 = US\$1 (since 1983),
8.75 El Salvador colons = US\$1 (2000)

- ✓ A board can stabilize a currency's value.
- ✗ It is effective only if investors believe that it will last.

Currency Boards

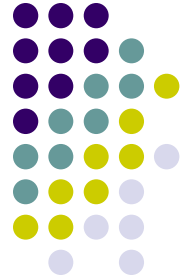


- ✘ Local interest rates must be aligned with the interest rates of the currency to which the local currency is tied.

Note: The local rates may include a risk premium.

- ✘ A currency that is pegged to another currency will have to move in tandem with that currency against all other currencies.

Dollarization



- **Dollarization** refers to the replacement of a foreign currency with U.S. dollars.
- Dollarization goes beyond a currency board, as the country no longer has a local currency.
- For example, Ecuador implemented dollarization in 2000.

Exchange Rate Arrangements



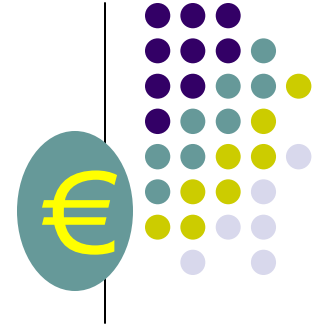
Floating Rate System:

Afghanistan	Hungary	Paraguay	Sweden
Argentina	India	Peru	Switzerland
Australia	Indonesia	Poland	Taiwan
Bolivia	Israel	Romania	Thailand
Brazil	Jamaica	Russia	United Kingdom
Canada	Japan	Singapore	Venezuela
Chile	Mexico	South Africa	
Euro countries	Norway	South Korea	

Pegged Rate System:

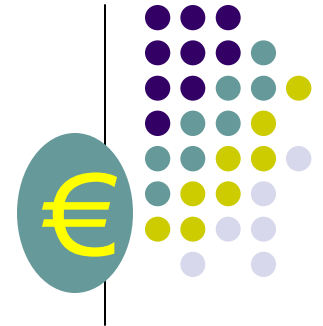
Bahamas	Bermuda	Hong Kong	} Pegged to U.S. dollar
Barbados	China	Saudi Arabia	

A Single European Currency



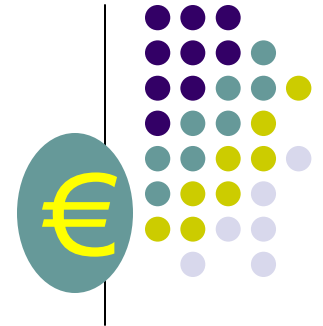
- The 1991 Maastricht treaty called for a single European currency – the **euro**.
- By June 2002, the national currencies of 12 European countries* had been withdrawn and replaced with the euro.
 - * **Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain**
- Since then, more European countries have adopted or are planning to adopt the euro.

A Single European Currency



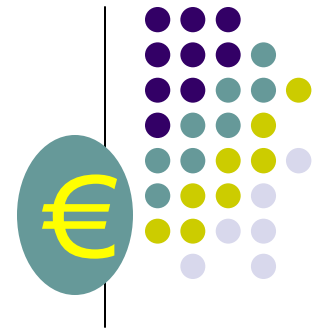
- The Frankfurt-based European Central Bank is responsible for setting European monetary policy, which is now consolidated because of the single money supply.
- Each participating country can still rely on its own fiscal policy (tax and government expenditure decisions) to help solve its local economic problems.

A Single European Currency



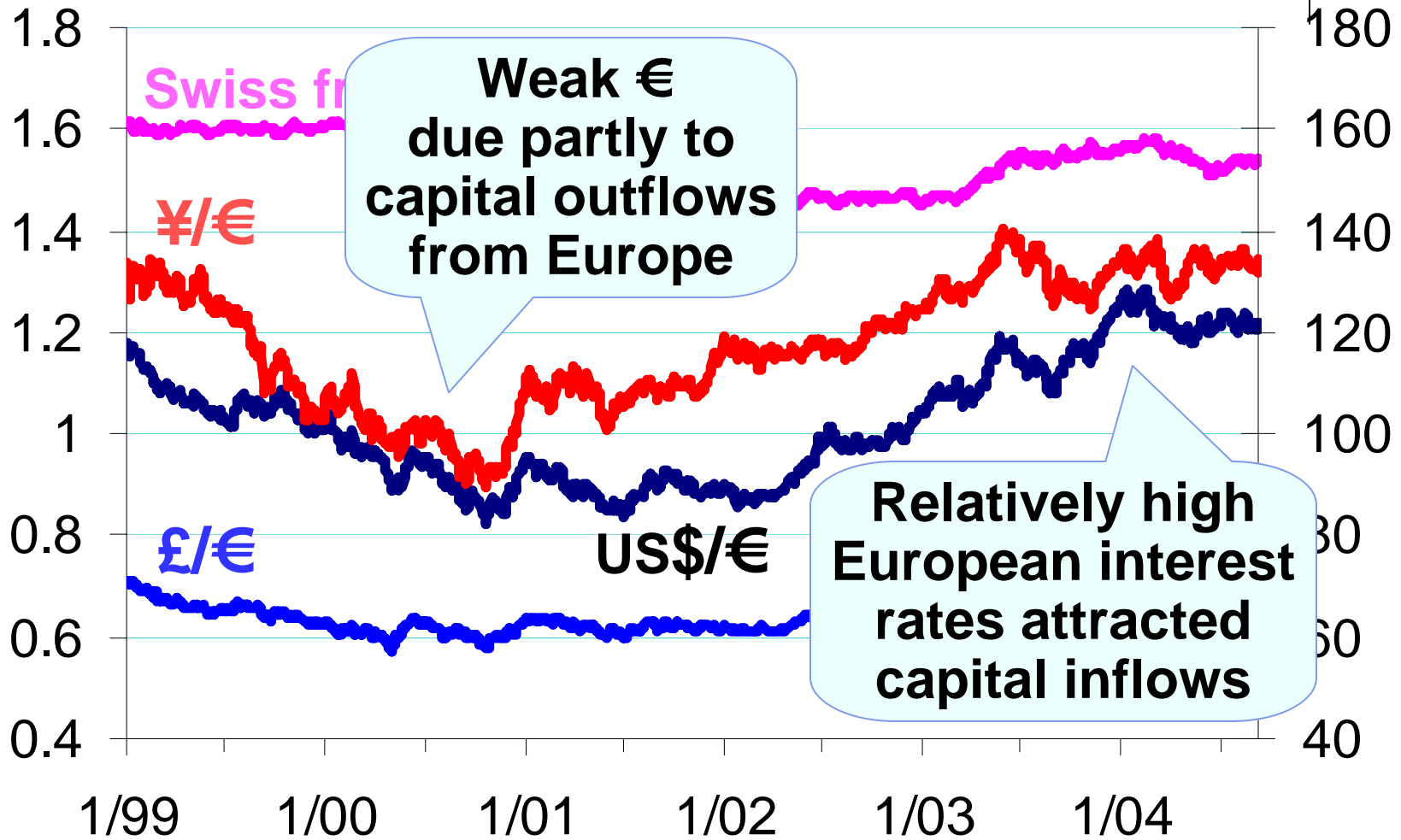
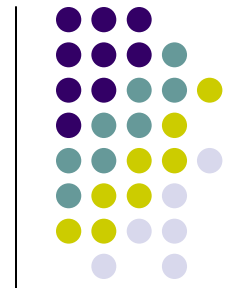
- Within the euro zone, there is neither exchange rate risk nor foreign exchange transaction cost.
- This means more comparable product pricing, and encourages more cross-border trade and capital flows.
- It will also be easier to conduct and compare valuations of firms across the participating European countries.

A Single European Currency

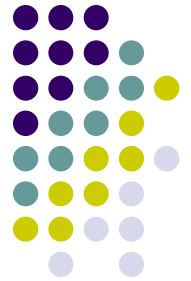


- The interest rates offered on government securities will have to be similar across the participating European countries.
- Stock and bond prices will also be more comparable and there should be more cross-border investing.
- However, non-European investors may not achieve as much diversification as in the past.

Status Report on the Euro



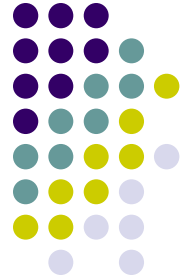
Government Intervention



- Each country has a central bank that may intervene in the foreign exchange market to control its currency's value.
- A central bank may also attempt to control the money supply growth in its country.
- In the United States, the Federal Reserve System (Fed) is the central bank.

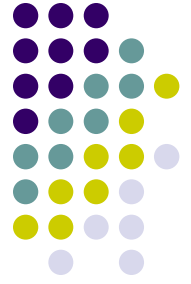


Government Intervention



- Central banks manage exchange rates
 - to smooth exchange rate movements,
 - to establish implicit exchange rate boundaries, and
 - to respond to temporary disturbances.
- Often, intervention is overwhelmed by market forces. However, currency movements may be even more volatile in the absence of intervention.

Government Intervention

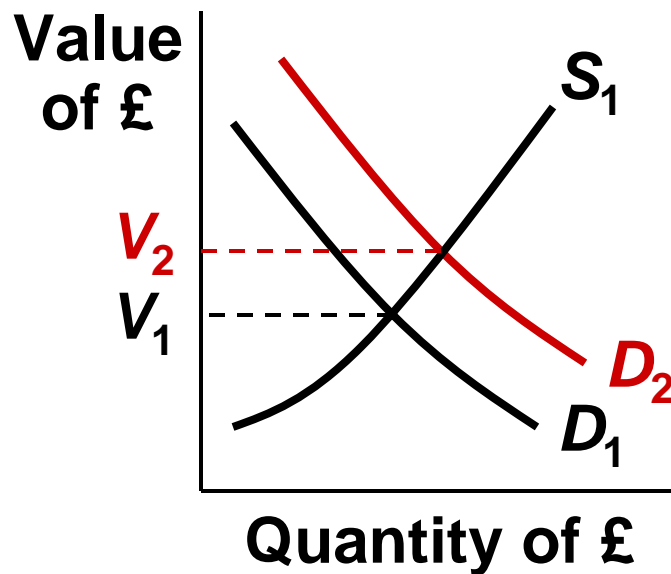


- **Direct intervention** refers to the exchange of currencies that the central bank holds as reserves for other currencies in the foreign exchange market.
- Direct intervention is usually most effective when there is a coordinated effort among central banks and when the central banks have high levels of reserves that they can use.

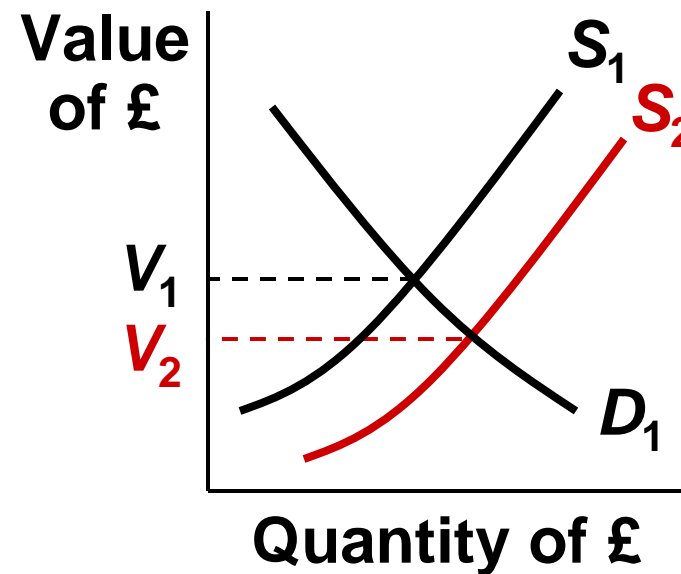


Effects of Direct Central Bank Intervention in the Foreign Exchange Market

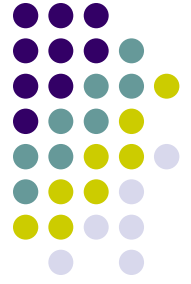
Fed exchanges \$ for £
to strengthen the £



Fed exchanges £ for \$
to weaken the £

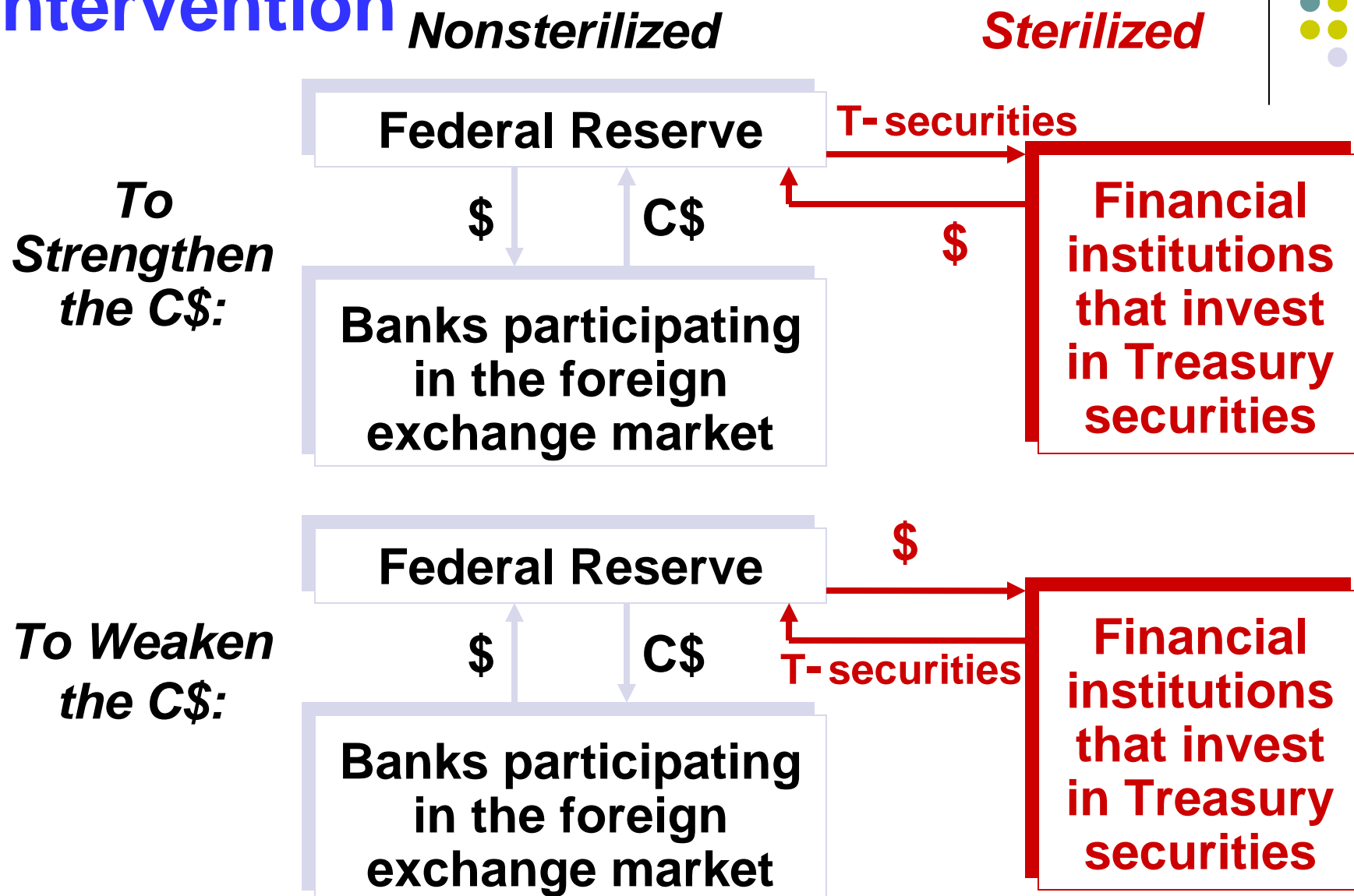


Government Intervention

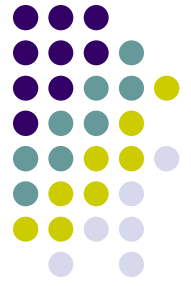


- When a central bank intervenes in the foreign exchange market without adjusting for the change in money supply, it is said to engage in **nonsterilized intervention**.
- In a **sterilized intervention**, the central bank simultaneously engages in offsetting transactions in the Treasury securities markets to maintain the money supply.

Nonsterilized versus Sterilized Intervention

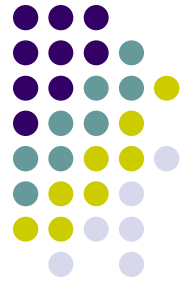


Government Intervention



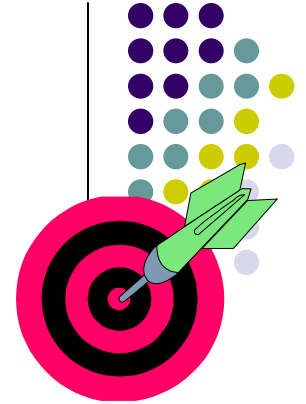
- Some speculators attempt to determine when the central bank is intervening directly, and the extent of the intervention, in order to capitalize on the anticipated results of the intervention effort.
- Central banks can also engage in **indirect intervention** by influencing the factors* that determine the value of a currency.
 - * Inflation, interest rates, income level, government controls, expectations

Government Intervention



- For example, the Fed may attempt to increase interest rates (and hence boost the dollar's value) by reducing the U.S. money supply.
- Some governments have also used foreign exchange controls (such as restrictions on currency exchange) as a form of indirect intervention.

Exchange Rate Target Zones



- **Target zones** have been suggested for reducing exchange rate volatility.
⇒ An initial exchange rate will be established with specific boundaries. Ideally, the rates will be able to adjust to economic factors without causing fear in financial markets and wide swings in international trade.
- ✎ The actual result may be a system no different from that which exists today.

Intervention as a Policy Tool



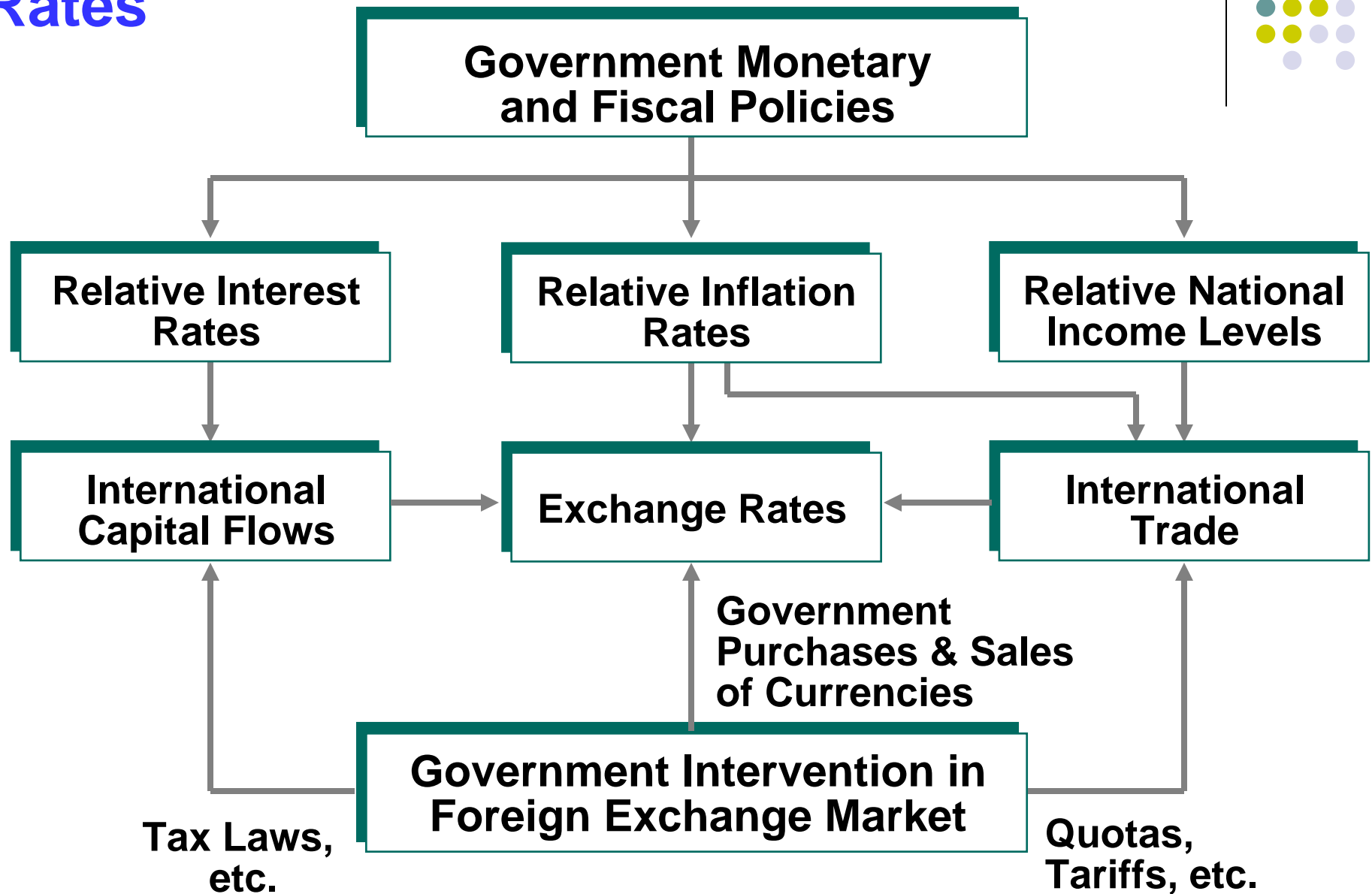
- Like tax laws and the money supply, the exchange rate is a tool that a government can use to achieve its desired economic objectives.
- A weak home currency can stimulate foreign demand for products, and hence reduce unemployment at home. However, it can also lead to higher inflation.

Intervention as a Policy Tool



- A strong currency may cure high inflation, since it intensifies foreign competition and forces domestic producers to refrain from increasing prices. However, it may also lead to higher unemployment.

Impact of Government Actions on Exchange Rates





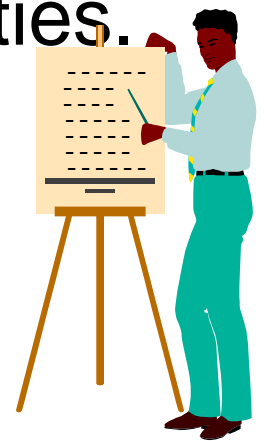
Interest Rate Parity and International Arbitrage



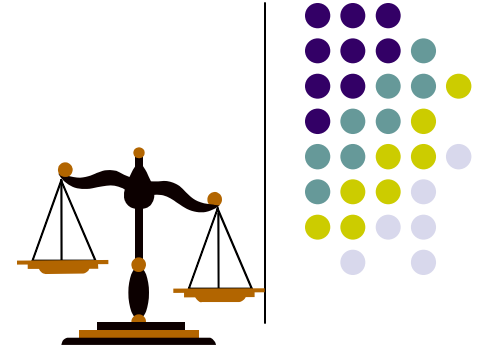
Chapter Objectives



- To explain the conditions that will result in various forms of international arbitrage, along with the realignments that will occur in response; and
- To explain the concept of interest rate parity, and how it prevents arbitrage opportunities.

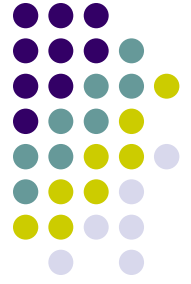


International Arbitrage



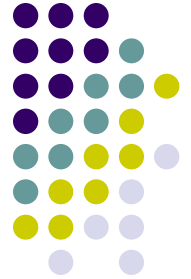
- **Arbitrage** can be loosely defined as capitalizing on a discrepancy in quoted prices to make a riskless profit.
- The effect of arbitrage on demand and supply is to cause prices to realign, such that no further risk-free profits can be made.

International Arbitrage



- As applied to foreign exchange and international money markets, arbitrage takes three common forms:
 - **locational arbitrage**
 - **triangular arbitrage**
 - **covered interest arbitrage**

Locational Arbitrage



- **Locational arbitrage** is possible when a bank's buying price (bid price) is higher than another bank's selling price (ask price) for the same currency.

Example

<i>Bank C</i>	Bid	Ask	<i>Bank D</i>	Bid	Ask
<u>NZ\$</u>	\$.635	\$.640	<u>NZ\$</u>	\$.645	\$.650

Buy NZ\$ from Bank C @ \$.640, and sell it to Bank D @ \$.645. Profit = \$.005/NZ\$.

Triangular Arbitrage



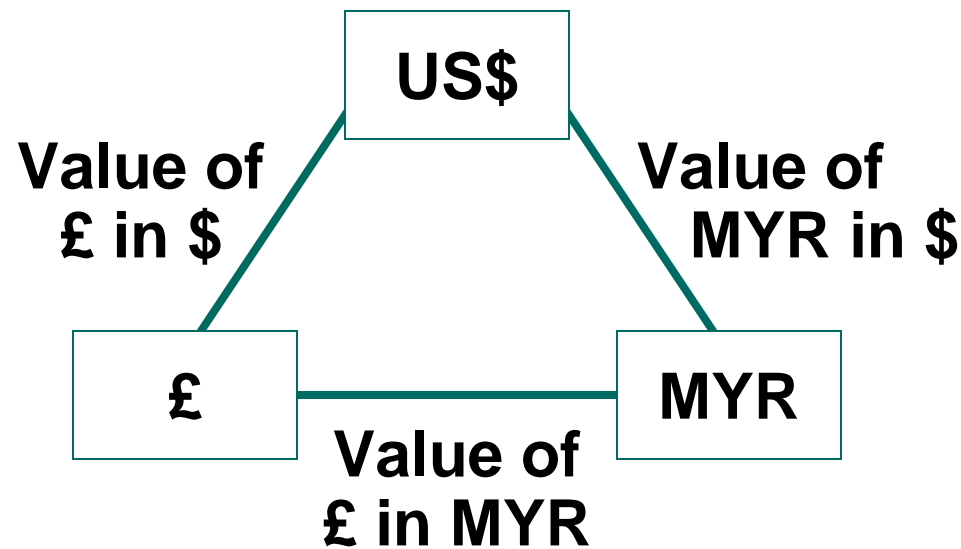
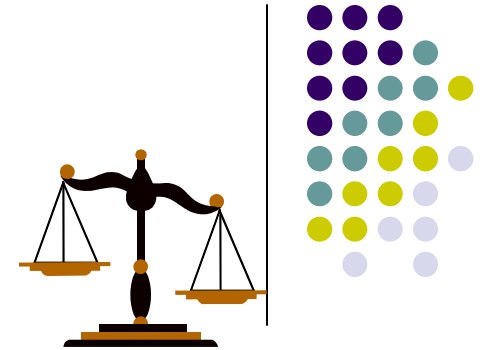
- **Triangular arbitrage** is possible when a cross exchange rate quote differs from the rate calculated from spot rate quotes.

<u>Example</u>	<u>Bid</u>	<u>Ask</u>
British pound (£)	\$1.60	\$1.61
Malaysian ringgit (MYR)	\$.200	\$.202
British pound (£)	MYR8.10	MYR8.20

$$\text{MYR}8.10/\text{£} \times \text{\$.200}/\text{MYR} = \text{\$}1.62/\text{£}$$

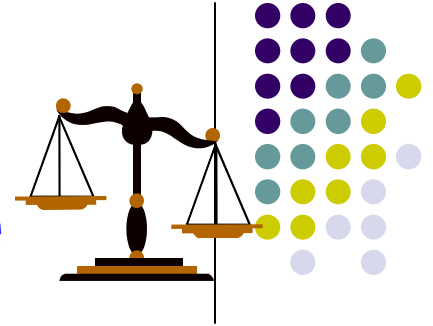
Buy £ @ \$1.61, convert @ MYR8.10/£, then sell MYR @ \$.200. Profit = \$.01/£.

Triangular Arbitrage



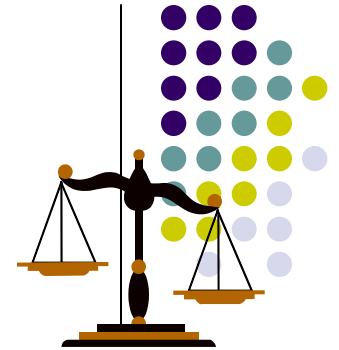
- When the actual and calculated cross exchange rates differ, triangular arbitrage will force them back into equilibrium.

Covered Interest Arbitrage



- **Covered interest arbitrage** is the process of capitalizing on the interest rate differential between two countries while covering for exchange rate risk.
- Covered interest arbitrage tends to force a relationship between forward rate premiums and interest rate differentials.

Covered Interest Arbitrage



Example

£ spot rate = 90-day forward rate = \$1.60

U.S. 90-day interest rate = 2%

U.K. 90-day interest rate = 4%

Borrow \$ at 3%, or use existing funds which are earning interest at 2%.

Convert \$ to £ at \$1.60/£ and engage in a 90-day forward contract to sell £ at \$1.60/£. Lend £ at 4%.

Note: Profits are not achieved

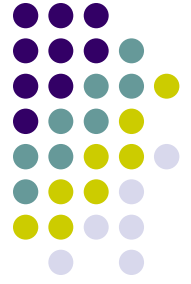
Comparing Arbitrage Strategies



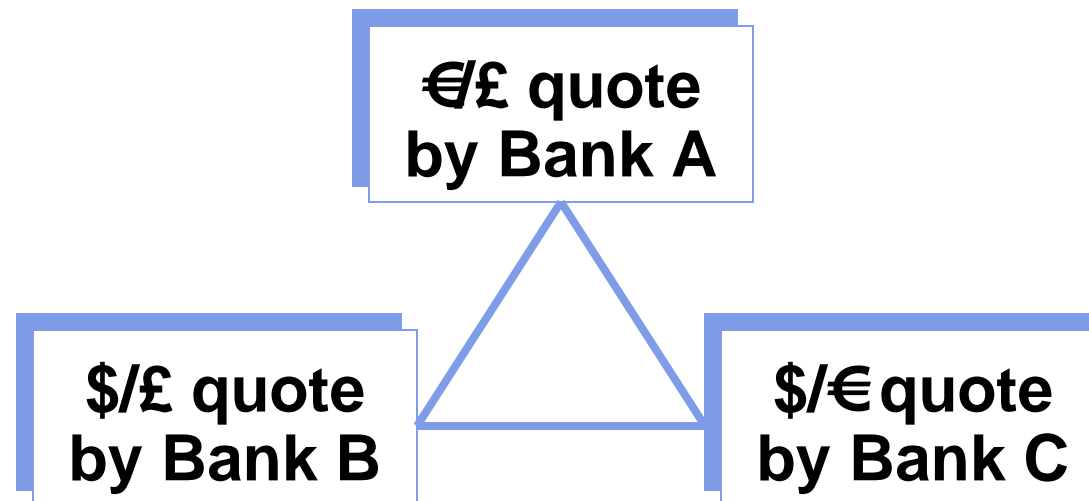
Locational Arbitrage . Capitalizes on discrepancies in exchange rates across locations.



Comparing Arbitrage Strategies



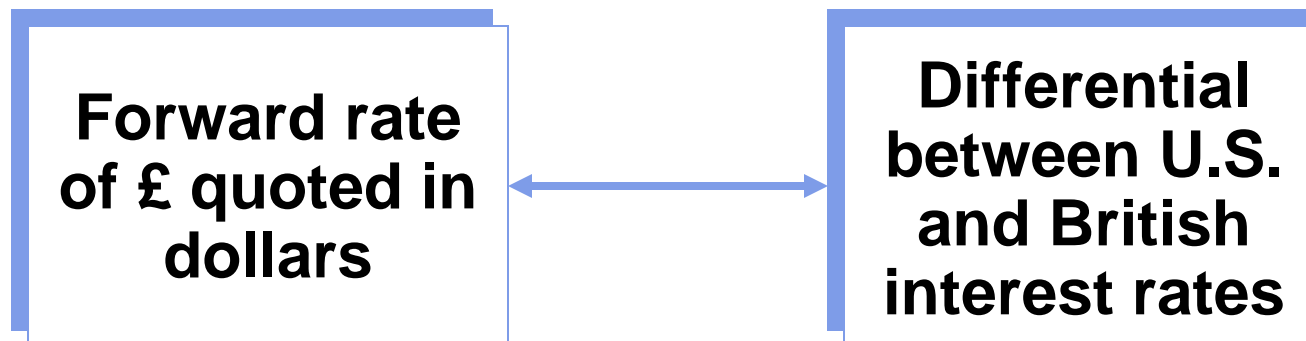
Triangular Arbitrage . Capitalizes on discrepancies in cross exchange rates.



Comparing Arbitrage Strategies



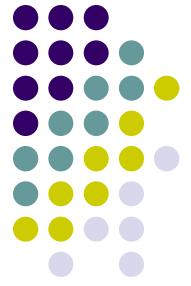
Covered Interest Arbitrage : Capitalizes on discrepancies between the forward rate and the interest rate differential.



Comparing Arbitrage Strategies



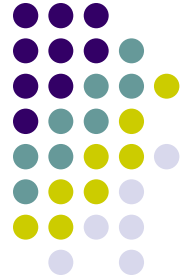
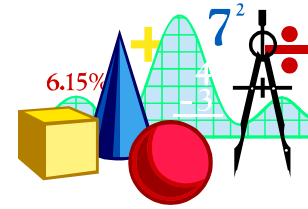
- Any discrepancy will trigger arbitrage, which will then eliminate the discrepancy, thus making the foreign exchange market more orderly.



Interest Rate Parity (IRP)

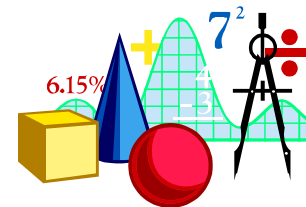
- As a result of market forces, the forward rate differs from the spot rate by an amount that sufficiently offsets the interest rate differential between two currencies.
- Then, covered interest arbitrage is no longer feasible, and the equilibrium state achieved is referred to as **interest rate parity (IRP)**.

Derivation of IRP



- When IRP exists, the rate of return achieved from covered interest arbitrage should equal the rate of return available in the home country.
- End-value of a \$1 investment in covered interest arbitrage $= (1/S) \times (1+i_F) \times F$
 $= (1/S) \times (1+i_F) \times [S \times (1+p)]$
 $= (1+i_F) \times (1+p)$
where p is the forward premium.

Derivation of IRP



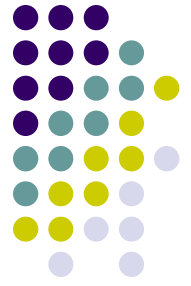
- End-value of a \$1 investment in the home country = $1 + i_H$
- Equating the two and rearranging terms:

$$p = \frac{(1+i_H)}{(1+i_F)} - 1$$

i.e.

$$\text{forward premium} = \frac{(1 + \text{home interest rate})}{(1 + \text{foreign interest rate})} - 1$$

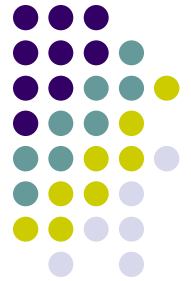
Determining Forward Premiums



Example

- Suppose 6-month $i_{\text{peso}} = 6\%$, $i_{\$} = 5\%$.
- From the U.S. investor's perspective,
forward premium = $1.05/1.06 - 1 \approx -.0094$
- If $S = \$.10/\text{peso}$, then
6-month forward rate = $S \times (1 + p)$
 $\approx .10 \times (1 - .0094)$
 $\approx \$.09906/\text{peso}$

Determining Forward Premiums



- The IRP relationship can be rewritten as follows:

$$\frac{F - S}{S} = \frac{S(1+p) - S}{S} = p = \frac{(1+i_H)}{(1+i_F)} - 1 = \frac{(i_H - i_F)}{(1+i_F)}$$

- The approximated form, $p \approx i_H - i_F$, provides a reasonable estimate when the interest rate differential is small.



Test for the Existence of IRP

- To test whether IRP exists, collect actual interest rate differentials and forward premiums for various currencies, and plot them on a graph.
- IRP holds when covered interest arbitrage is not possible or worthwhile.



Interpretation of IRP

- When IRP exists, it does not mean that both local and foreign investors will earn the same returns.
- What it means is that investors cannot use covered interest arbitrage to achieve higher returns than those achievable in their respective home countries.



Does IRP Hold?

- Various empirical studies indicate that IRP generally holds.
- While there are deviations from IRP, they are often not large enough to make covered interest arbitrage worthwhile.
- This is due to the characteristics of foreign investments, such as transaction costs, political risk, and differential tax laws.

Considerations When Assessing IRP



Political Risk

- A crisis in a country could cause its government to restrict any exchange of the local currency for other currencies.
- Investors may also perceive a higher default risk on foreign investments.

Differential Tax Laws

- If tax laws vary, after-tax returns should be considered instead of before-tax returns.