

Chapter Organization



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Introduction



- Exchange rates are important because they enable us to translate different countries' prices into comparable terms.
- Exchange rates are determined in the same way as other asset prices.
- The general goal of this chapter is to show:
 - How exchange rates are determined
 - The role of exchange rates in international trade

Exchange Rates and International Transactions



- An exchange rate can be quoted in two ways:
 - Direct
 - The price of the foreign currency in terms of dollars
 - Indirect
 - The price of dollars in terms of the foreign currency

Exchange Rates and International Transactions



■ Domestic and Foreign Prices

- If we know the exchange rate between two countries' currencies, we can compute the price of one country's exports in terms of the other country's money.
 - Example: The dollar price of a £50 sweater with a dollar exchange rate of \$1.50 per pound is $(1.50 \text{ \$/£}) \times (\text{£}50) = \75 .

Exchange Rates and International Transactions



- Two types of changes in exchange rates:
 - **Depreciation of home country's currency**
 - A rise in the home currency prices of a foreign currency
 - It makes home goods cheaper for foreigners and foreign goods more expensive for domestic residents.
 - **Appreciation of home country's currency**
 - A fall in the home price of a foreign currency
 - It makes home goods more expensive for foreigners and foreign goods cheaper for domestic residents.

Exchange Rates and International Transactions



- Exchange Rates and Relative Prices
 - Import and export demands are influenced by relative prices.
 - Appreciation of a country's currency:
 - Raises the relative price of its exports
 - Lowers the relative price of its imports
 - Depreciation of a country's currency:
 - Lowers the relative price of its exports
 - Raises the relative price of its imports

Exchange Rates and International Transactions



Table 13-2: \$/£ Exchange Rates and the Relative Price of American Designer Jeans and British Sweaters

Exchange rate (\$/£)	1.25	1.50	1.75
Relative price (pairs of jeans/sweater)	1.39	1.67	1.94

Note: The above calculations assume unchanged money prices of \$45 per pair of jeans and £50 per sweater.

The Foreign Exchange Market



- Exchange rates are determined in the **foreign exchange market**.
 - The market in which international currency trades take place
- **The Actors**
 - The major participants in the foreign exchange market are:
 - Commercial banks
 - International corporations
 - Nonbank financial institutions
 - Central banks

Exchange Rates and International Transactions



- **Interbank trading**
 - Foreign currency trading among banks
 - It accounts for most of the activity in the foreign exchange market.

Exchange Rates and International Transactions



■ Characteristics of the Market

- The worldwide volume of foreign exchange trading is enormous, and it has ballooned in recent years.
- New technologies, such as Internet links, are used among the major foreign exchange trading centers (London, New York, Tokyo, Frankfurt, and Singapore).
- The integration of financial centers implies that there can be no significant **arbitrage**.
 - The process of buying a currency cheap and selling it dear.

Exchange Rates and International Transactions



- **Vehicle currency**
 - A currency that is widely used to denominate international contracts made by parties who do not reside in the country that issues the vehicle currency.
 - Example: In 2001, around 90% of transactions between banks involved exchanges of foreign currencies for U.S. dollars.

Exchange Rates and International Transactions

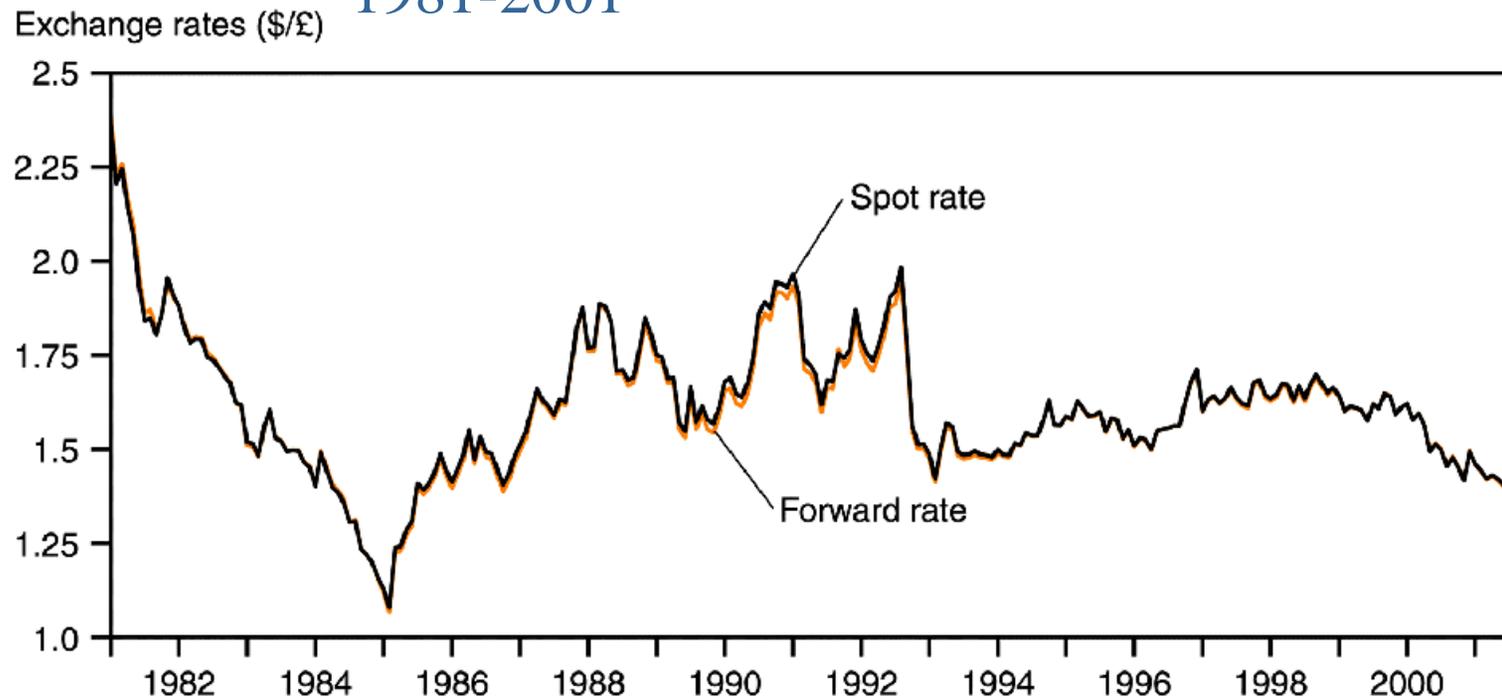


- **Spot Rates and Forward Rates**
 - **Spot exchange rates**
 - Apply to exchange currencies “on the spot”
 - **Forward exchange rates**
 - Apply to exchange currencies on some future date at a prenegotiated exchange rate
 - Forward and spot exchange rates, while not necessarily equal, do move closely together.

Exchange Rates and International Transactions



Figure 13-1: Dollar/Pound Spot and Forward Exchange Rates, 1981-2001



Spot and forward exchange rates tend to move in a highly correlated fashion.

Source: *Datastream*. Rates shown are 90-day forward exchange rates and spot exchange rates, at end of month.

Exchange Rates and International Transactions



- **Foreign Exchange Swaps**
 - Spot sales of a currency combined with a forward repurchase of the currency.
 - They make up a significant proportion of all foreign exchange trading.

Exchange Rates and International Transactions



■ Futures and Options

- Futures contract
 - The buyer buys a promise that a specified amount of foreign currency will be delivered on a specified date in the future.
- Foreign exchange option
 - The owner has the right to buy or sell a specified amount of foreign currency at a specified price at any time up to a specified expiration date.

The Demand for Foreign Currency Assets



- The demand for a foreign currency bank deposit is influenced by the same considerations that influence the demand for any other asset.
- **Assets and Asset Returns**
 - **Defining Asset Returns**
 - The percentage increase in value an asset offers over some time period.
 - **The Real Rate of Return**
 - The rate of return computed by measuring asset values in terms of some broad representative basket of products that savers regularly purchase.

The Demand for Foreign Currency Assets



- Risk and Liquidity
 - Savers care about two main characteristics of an asset other than its return:
 - Risk
 - The variability it contributes to savers' wealth
 - Liquidity
 - The ease with which it can be sold or exchanged for goods

The Demand for Foreign Currency Assets



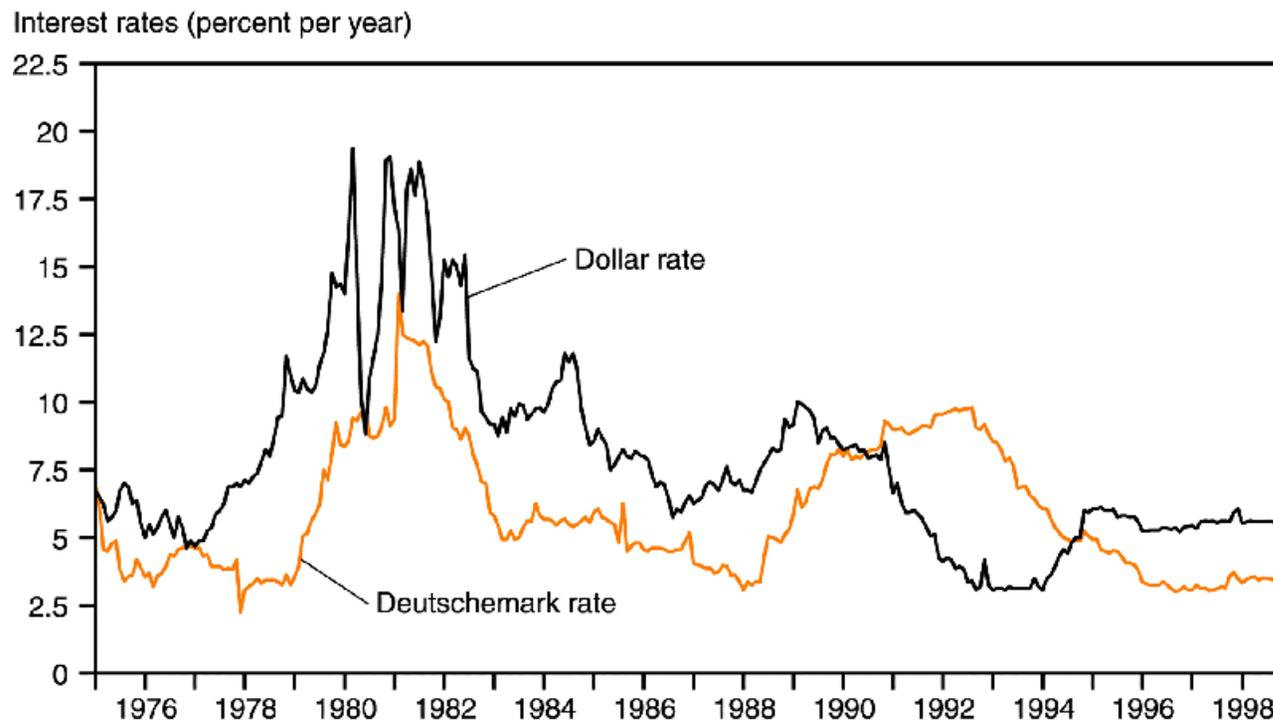
■ Interest Rates

- Market participants need two pieces of information in order to compare returns on different deposits:
 - How the money values of the deposits will change
 - How exchange rates will change
- A currency's **interest rate** is the amount of that currency an individual can earn by lending a unit of the currency for a year.
 - Example: At a dollar interest rate of 10% per year, the lender of \$1 receives \$1.10 at the end of the year.

The Demand for Foreign Currency Assets



Figure 13-2: Interest Rates on Dollar and Deutschemark Deposits, 1975-1998



Since dollar and DM interest rates are not measured in comparable terms, they can move quite differently over time.

Source: Datastream. Three-month interest rates are shown.

The Demand for Foreign Currency Assets



■ Exchange Rates and Asset Returns

- The returns on deposits traded in the foreign exchange market depend on interest rates and expected exchange rate changes.
- In order to decide whether to buy a euro or a dollar deposit, one must calculate the dollar return on a euro deposit.

The Demand for Foreign Currency Assets



■ A Simple Rule

- The dollar rate of return on euro deposits is approximately the euro interest rate plus the **rate of depreciation** of the dollar against the euro.
 - The rate of depreciation of the dollar against the euro is the percentage increase in the dollar/euro exchange rate over a year.

The Demand for Foreign Currency Assets



- The expected rate of return difference between dollar and euro deposits is:

$$R_{\$} - [R_{\text{€}} + (E_{\$/\text{€}}^e - E_{\$/\text{€}}) / E_{\$/\text{€}}] = R_{\$} - R_{\text{€}} - (E_{\$/\text{€}}^e - E_{\$/\text{€}}) / E_{\$/\text{€}} \quad (13-1)$$

where:

$R_{\$}$ = interest rate on one-year dollar deposits

$R_{\text{€}}$ = today's interest rate on one-year euro deposits

$E_{\$/\text{€}}$ = today's dollar/euro exchange rate (number of dollars per euro)

$E_{\$/\text{€}}^e$ = dollar/euro exchange rate (number of dollars per euro) expected to prevail a year from today

The Demand for Foreign Currency Assets



- When the difference in Equation (13-1) is positive, dollar deposits yield the higher expected rate of return. When it is negative, euro deposits yield the higher expected rate of return.

The Demand for Foreign Currency Assets



Table 13-3: Comparing Dollar Rates of Return on Dollar and Euro Deposits

Case	Dollar Interest Rate $R_{\$}$	Euro Interest Rate $R_{\text{€}}$	Expected Rate of Dollar Depreciation against Euro $\frac{E_{\$/\text{€}}^e - E_{\$/\text{€}}}{E_{\$/\text{€}}}$	Rate of Return Difference between Dollar and Euro Deposits $R_{\$} - R_{\text{€}} - \frac{(E_{\$/\text{€}}^e - E_{\$/\text{€}})}{E_{\$/\text{€}}}$
1	0.10	0.06	0.00	0.04
2	0.10	0.06	0.04	0.00
3	0.10	0.06	0.08	-0.04
4	0.10	0.12	-0.04	0.02

The Demand for Foreign Currency Assets



- Return, Risk, and Liquidity in the Foreign Exchange Market
 - The demand for foreign currency assets depends not only on returns but on risk and liquidity.
 - There is no consensus among economists about the importance of risk in the foreign exchange market.
 - Most of the market participants that are influenced by liquidity factors are involved in international trade.
 - Payments connected with international trade make up a very small fraction of total foreign exchange transactions.
 - Therefore, we ignore the risk and liquidity motives for holding foreign currencies.

Equilibrium in the Foreign Exchange Market



- **Interest Parity: The Basic Equilibrium Condition**
 - The foreign exchange market is in equilibrium when deposits of all currencies offer the same expected rate of return.
 - **Interest parity condition**
 - The expected returns on deposits of any two currencies are equal when measured in the same currency.
 - It implies that potential holders of foreign currency deposits view them all as equally desirable assets.
 - The expected rates of return are equal when:

$$R_{\$} = R_{\text{€}} + (E^e_{\$/\text{€}} - E_{\$/\text{€}}) / E_{\$/\text{€}} \quad (13-2)$$

Equilibrium in the Foreign Exchange Market



- How Changes in the Current Exchange Rate Affect Expected Returns
 - Depreciation of a country's currency today lowers the expected domestic currency return on foreign currency deposits.
 - Appreciation of the domestic currency today raises the domestic currency return expected of foreign currency deposits.

Equilibrium in the Foreign Exchange Market



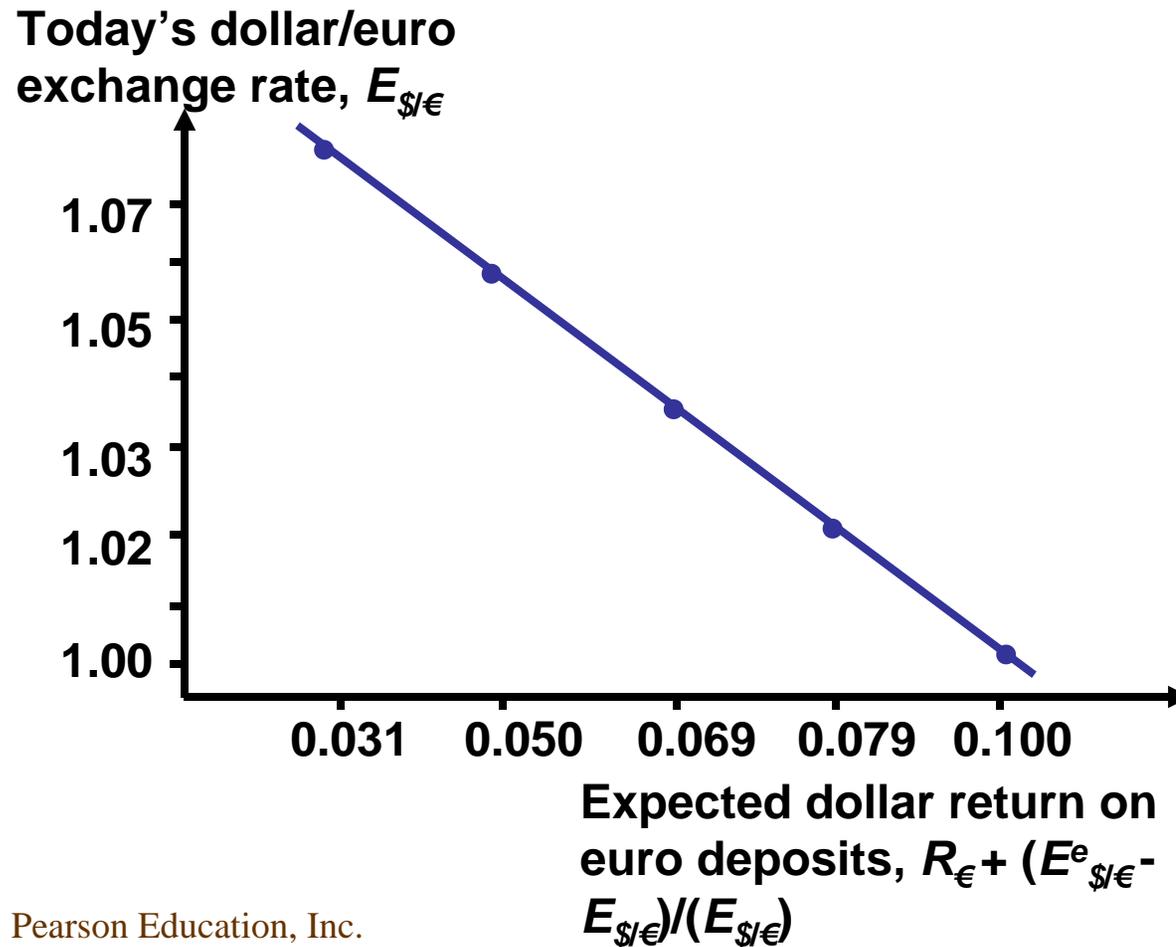
Table 13-4: Today's Dollar/Euro Exchange Rate and the Expected Dollar Return on Euro Deposits When $E_{\$/\epsilon}^e = \1.05 per Euro

Today's Dollar/Euro Exchange Rate $E_{\$/\epsilon}$	Interest Rate on Euro Deposits R_{ϵ}	Expected Dollar Depreciation Rate against Euro $\frac{1.05 - E_{\$/\epsilon}}{E_{\$/\epsilon}}$	Expected Dollar Return on Euro Deposits $R_{\epsilon} + \frac{1.05 - E_{\$/\epsilon}}{E_{\$/\epsilon}}$
1.07	0.05	-0.019	0.031
1.05	0.05	0.00	0.05
1.03	0.05	0.019	0.069
1.02	0.05	0.029	0.079
1.00	0.05	0.05	0.10

Equilibrium in the Foreign Exchange Market



Figure 13-3: The Relation Between the Current Dollar/Euro Exchange Rate and the Expected Dollar Return on Euro Deposits



Equilibrium in the Foreign Exchange Market

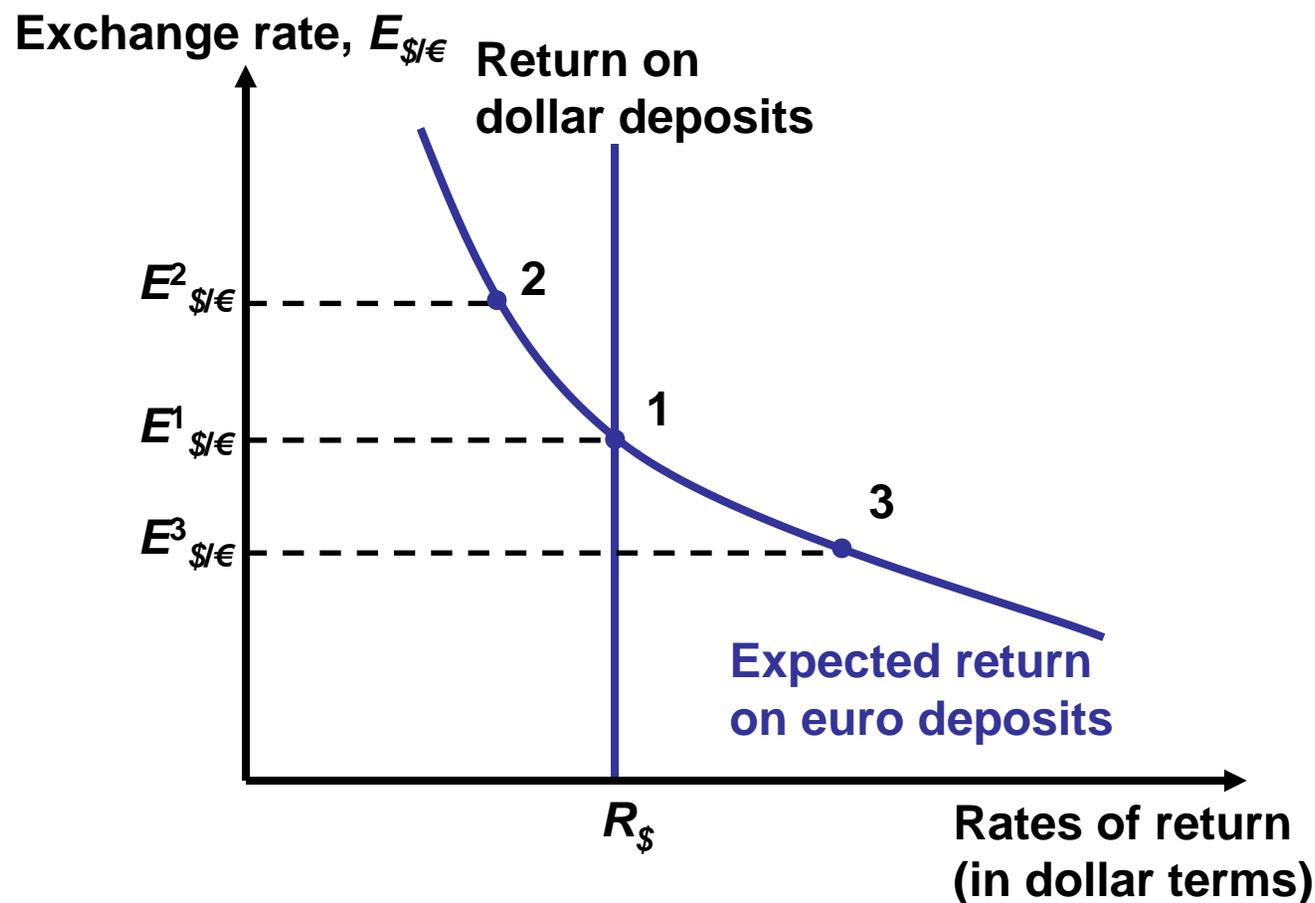


- The Equilibrium Exchange Rate
 - Exchange rates always adjust to maintain interest parity.
 - Assume that the dollar interest rate $R_{\$}$, the euro interest rate $R_{\text{€}}$ and the expected future dollar/euro exchange rate $E^e_{\$/\text{€}}$ are all given.

Equilibrium in the Foreign Exchange Market



Figure 13-4: Determination of the Equilibrium Dollar/Euro Exchange Rate



Interest Rates, Expectations, and Equilibrium

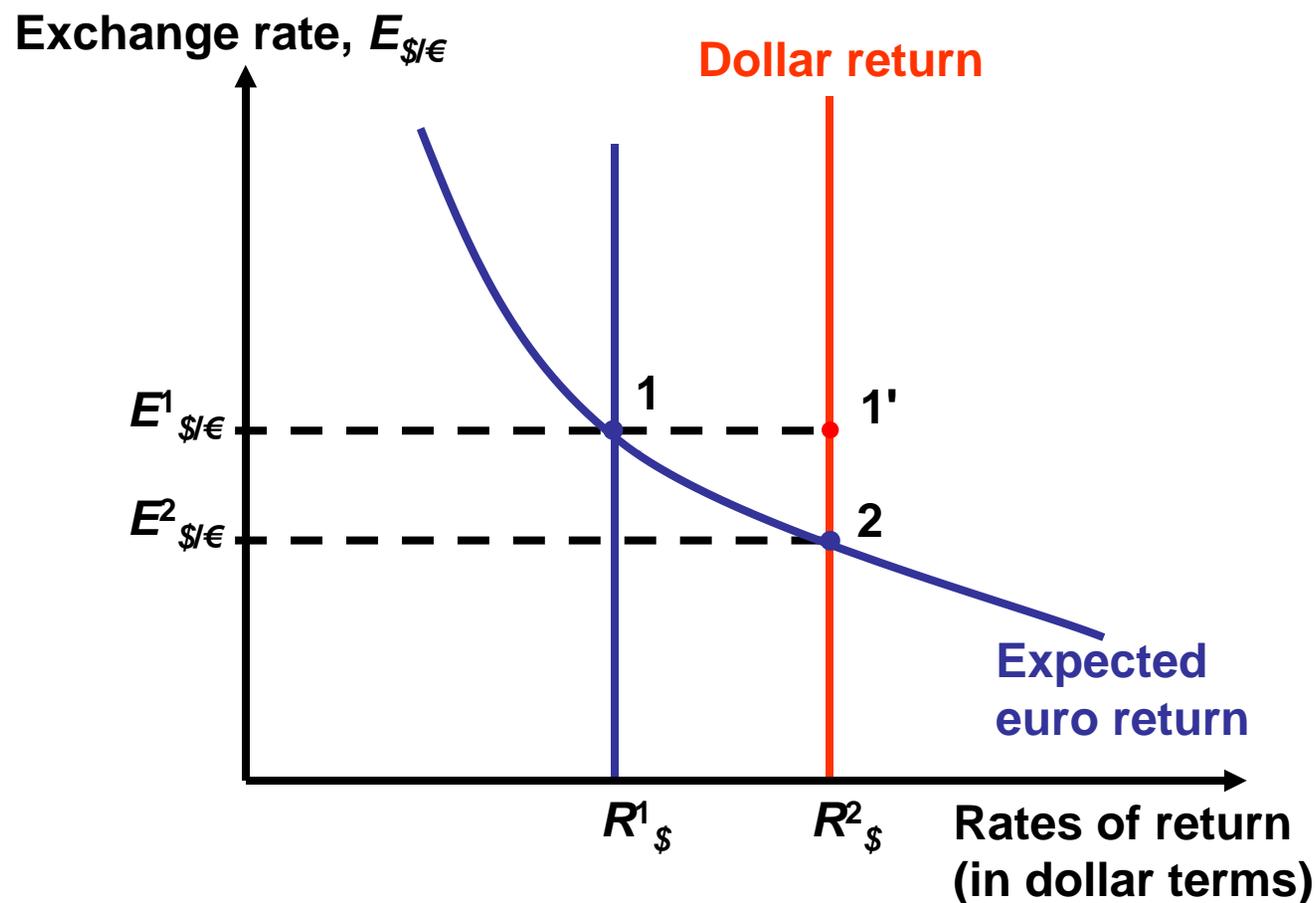


- The Effect of Changing Interest Rates on the Current Exchange Rate
 - An increase in the interest rate paid on deposits of a currency causes that currency to appreciate against foreign currencies.
 - A rise in dollar interest rates causes the dollar to appreciate against the euro.
 - A rise in euro interest rates causes the dollar to depreciate against the euro.

Interest Rates, Expectations, and Equilibrium



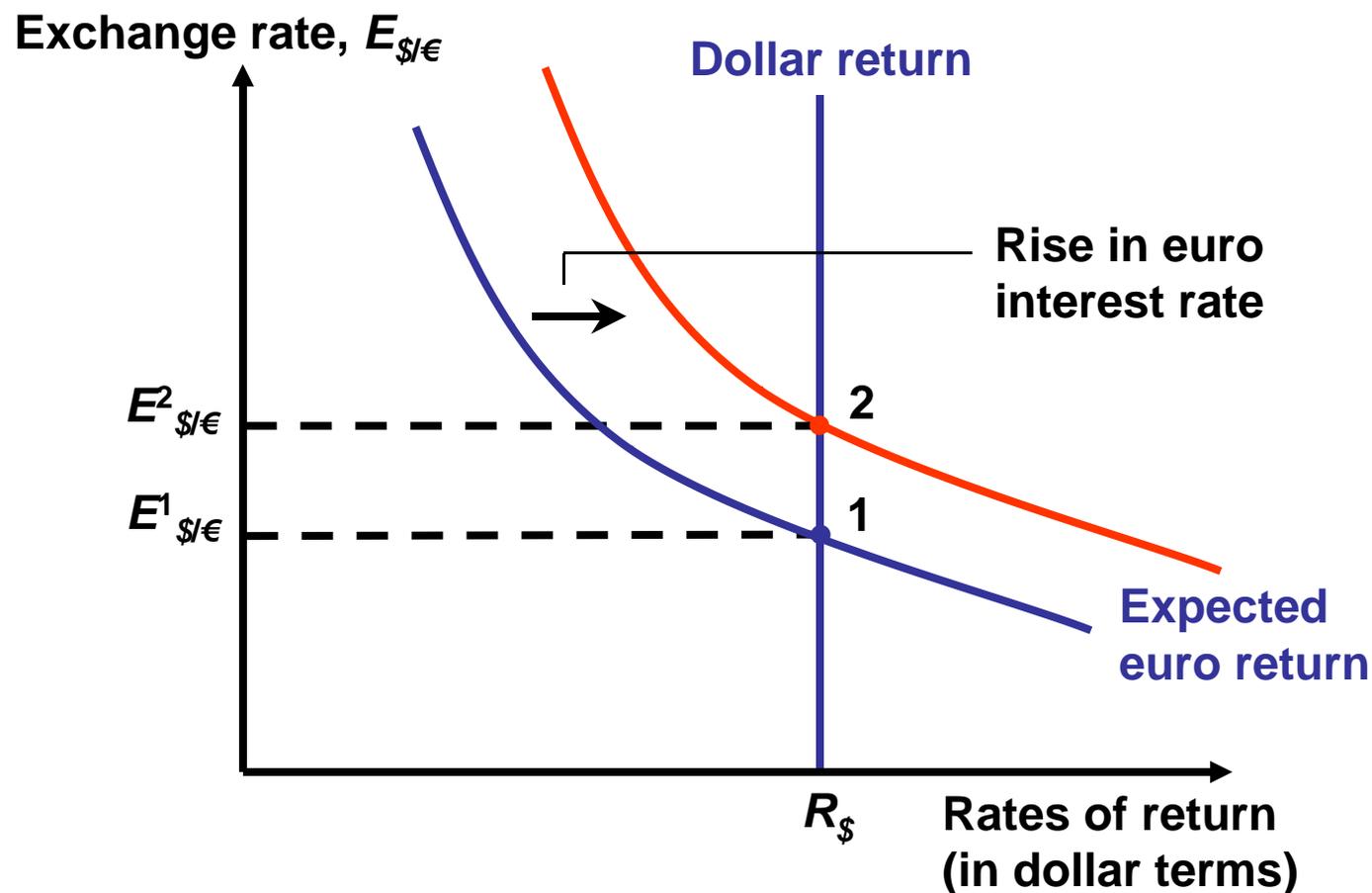
Figure 13-5: Effect of a Rise in the Dollar Interest Rate



Interest Rates, Expectations, and Equilibrium



Figure 13-6: Effect of a Rise in the Euro Interest Rate



Interest Rates, Expectations, and Equilibrium



- The Effect of Changing Expectations on the Current Exchange Rate
 - A rise in the expected future exchange rate causes a rise in the current exchange rate.
 - A fall in the expected future exchange rate causes a fall in the current exchange rate.

Summary



- Exchange rates play a role in spending decisions because they enable us to translate different countries' prices into comparable terms.
- A depreciation (appreciation) of a country's currency against foreign currencies makes its exports cheaper (more expensive) and its imports more expensive (cheaper).
- Exchange rates are determined in the foreign exchange market.

Summary



- An important category of foreign exchange trading is forward trading.
- The exchange rate is most appropriately thought of as being an asset price itself.
- The returns on deposits traded in the foreign exchange market depend on interest rates and expected exchange rate changes.

Summary



- Equilibrium in the foreign exchange market requires interest parity.
 - For given interest rates and a given expectation of the future exchange rate, the interest parity condition tells us the current equilibrium exchange rate.
- A rise in dollar (euro) interest rates causes the dollar to appreciate (depreciate) against the euro.
- Today's exchange rate is altered by changes in its expected future level.

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