

Exchange Rate Determination

Chapter Objectives

- Explain how exchange rate movements are measured.
- Explain how the equilibrium exchange rate is determined.
- Examine factors that determine the equilibrium exchange rate.
- Explain the movement in cross exchange rates.
- Explain how financial institutions attempt to capitalize on anticipated exchange rate movements.

Measuring Exchange Rate Movements

Depreciation: decline in a currency's value

Appreciation: increase in a currency's value

Comparing foreign currency spot rates over two points in time, S (current value) and S_{t-1} (value from earlier period)

$$\text{Percent } \Delta \text{ in foreign currency value} = \frac{S - S_{t-1}}{S_{t-1}}$$

Exhibit 4.1 How Exchange Rate Movements and Volatility Are Measured

	VALUE OF CANADIAN DOLLAR (C\$)	MONTHLY % CHANGE IN C\$	VALUE OF EURO	MONTHLY % CHANGE IN EURO
Jan. 1	\$0.70	—	\$1.18	—
Feb. 1	\$0.71	+1.43%	\$1.16	−1.69%
March 1	\$0.70	−0.99%	\$1.15	−0.86%
April 1	\$0.70	−0.85%	\$1.12	−2.61%
May 1	\$0.69	−0.72%	\$1.11	−0.89%
June 1	\$0.70	+0.43%	\$1.14	+2.70%
July 1	\$0.69	−1.29%	\$1.17	+2.63%
Standard deviation of monthly changes		1.04%		2.31%

A positive percent change indicates that the currency has **appreciated**.

A negative percent change indicates that it has **depreciated**. (Exhibit 4.1)

Exchange Rate Equilibrium (1 of 2)

The **exchange rate** represents the price of a currency, or the rate at which one currency can be exchanged for another.

Demand for a currency increases when the value of the currency decreases, leading to a downward sloping demand schedule. (See Exhibit 4.2)

Supply of a currency for sale increases when the value of the currency increases, leading to an upward sloping supply schedule. (See Exhibit 4.3)

Equilibrium equates the quantity of pounds demanded with the supply of pounds for sale. (See Exhibit 4.4)

Exhibit 4.2 Demand Schedule for British Pounds

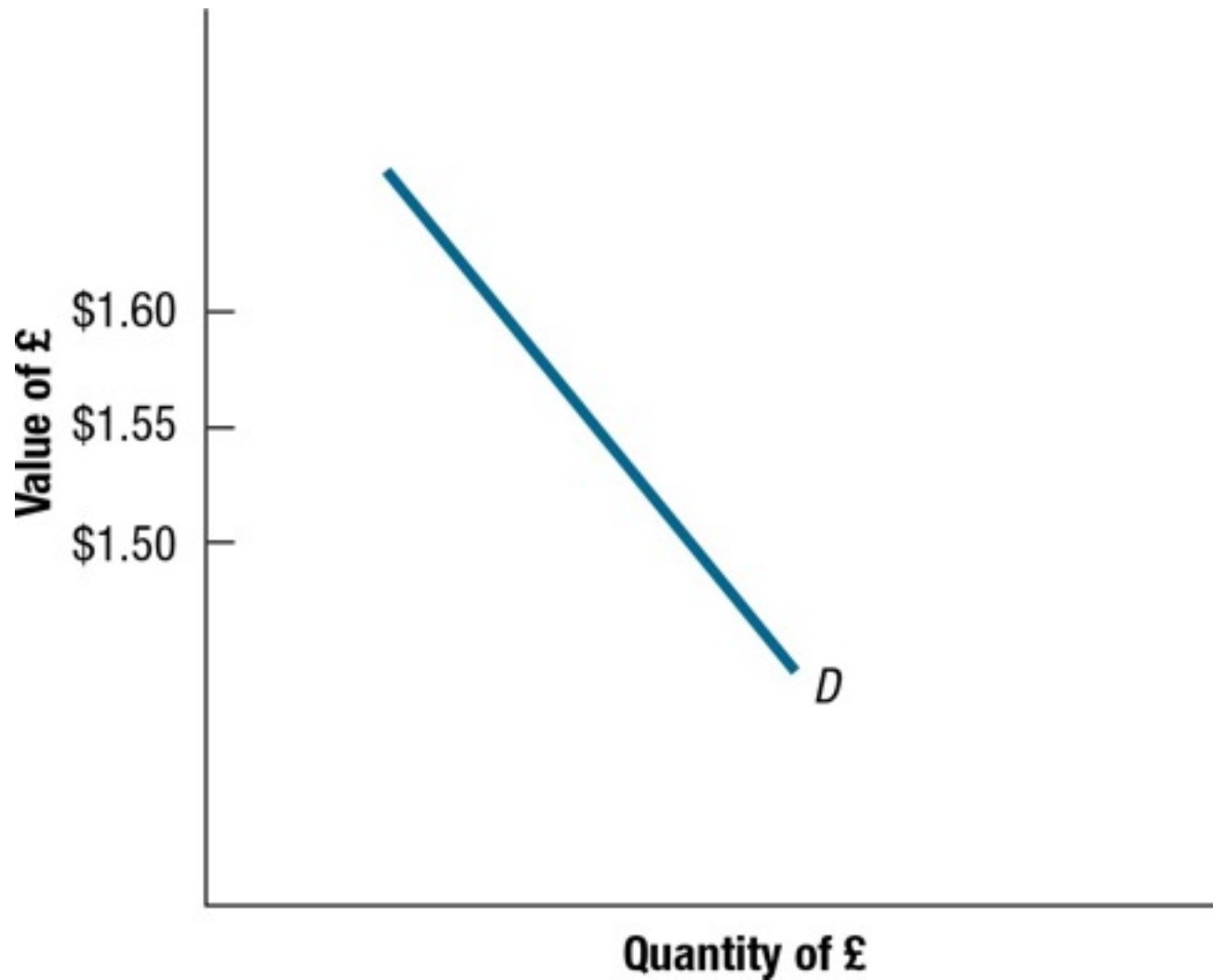


Exhibit 4.3 Supply Schedule of British Pounds for Sale

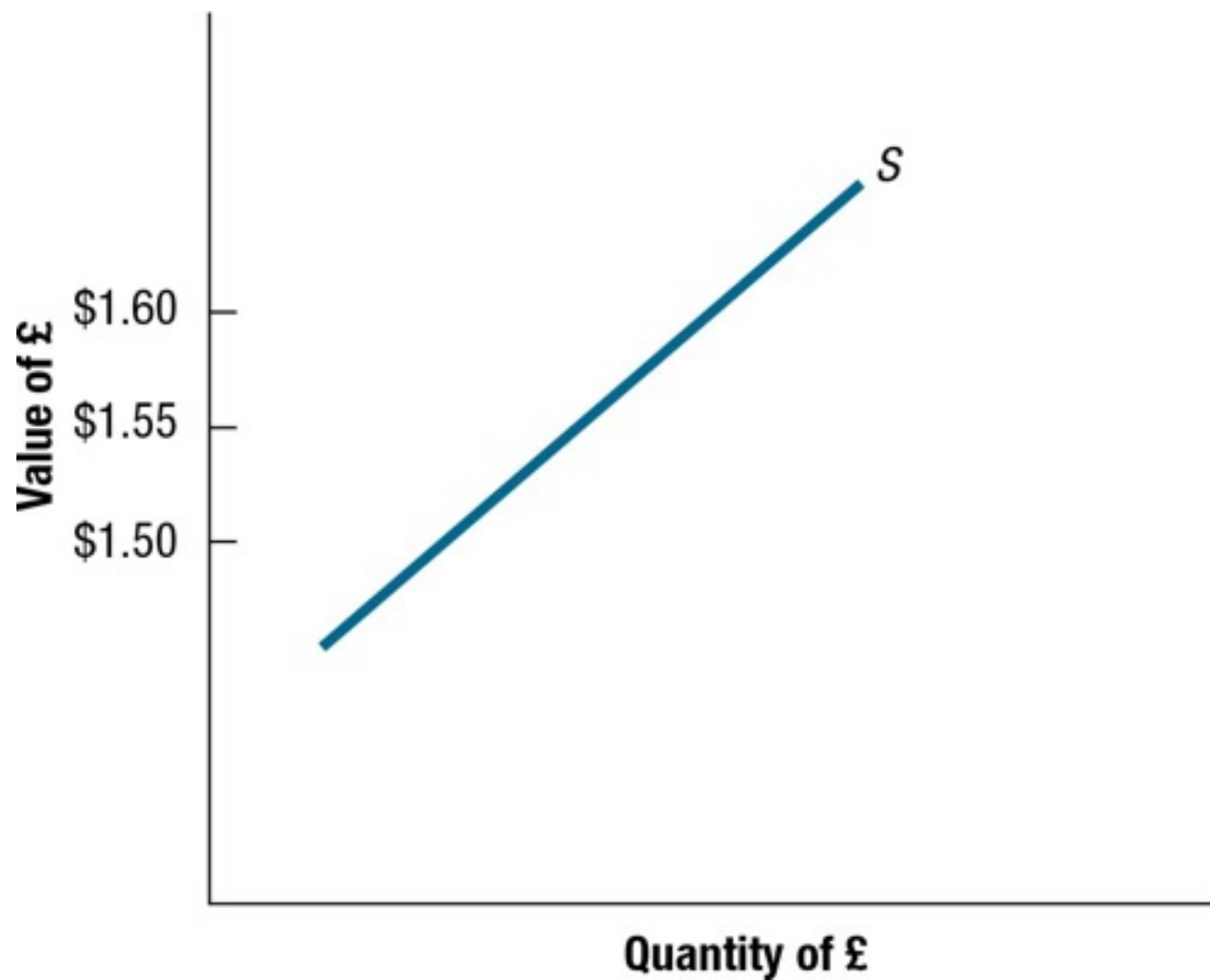
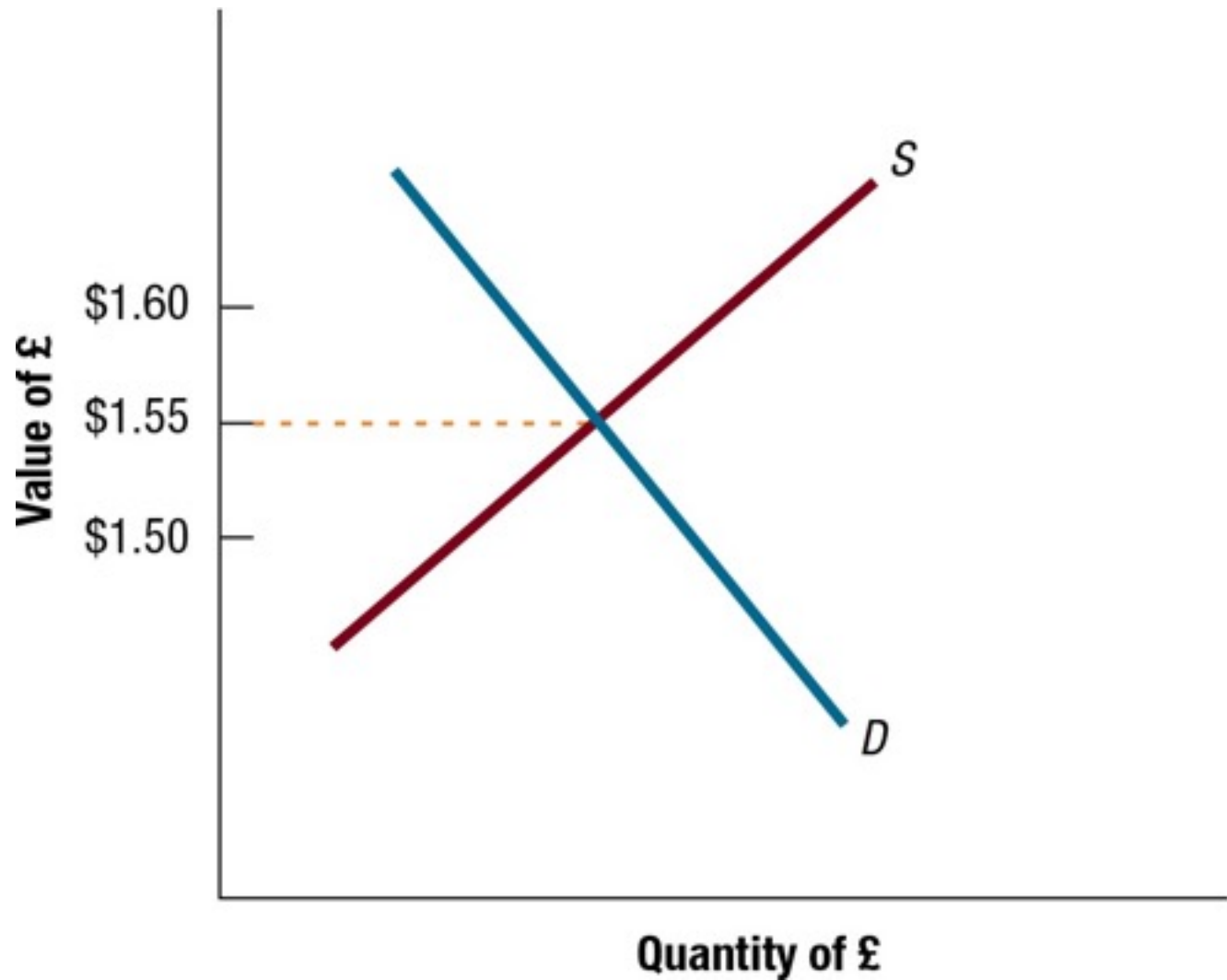


Exhibit 4.4 Equilibrium Exchange Rate Determination



Exchange Rate Equilibrium (2 of 2)

Change in the Equilibrium Exchange Rate

- **Increase in demand schedule:** Banks will increase the exchange to the level at which the amount demanded is equal to the amount supplied in the foreign exchange market.
- **Decrease in demand schedule:** Banks will reduce the exchange to the level at which the amount demanded is equal to the amount supplied in the foreign exchange market.
- **Increase in supply schedule:** Banks will reduce the exchange to the level at which the amount demanded is equal to the amount supplied in the foreign exchange market.
- **Decrease in supply schedule:** Banks will increase the exchange to the level at which the amount demanded is equal to the amount supplied in the foreign exchange market.

Factors That Influence Exchange Rates (1 of 5)

The equilibrium exchange rate will change over time as supply and demand schedules change.

$$e = f(\Delta INF, \Delta INT, \Delta INC, \Delta GC, \Delta EXP)$$

where

e = percentage change in the spot rate

ΔINF = change in the differential between U.S. inflation
and the foreign country's inflation

ΔINT = change in the differential between the U.S. interest rate
and the foreign country's interest rate

ΔINC = change in the differential between the U.S. income level
and the foreign country's income level

ΔGC = change in government controls

ΔEXP = change in expectations of future exchange rates

Factors That Influence Exchange Rates (2 of 5)

Relative Inflation Rates: Increase in U.S. inflation

- Leads to increase in U.S. demand for foreign goods,
- an increase in U.S. demand for foreign currency
- and an increase in the exchange rate for the foreign currency. (See Exhibit 4.5)

Relative Interest Rates: Increase in U.S. rates leads

- to increase in demand for U.S. deposits and
- a decrease in demand for foreign deposits
- leading to an increase in demand for dollars and an increased exchange rate for the dollar. (See Exhibit 4.6)
- Real Interest Rate - Fisher Effect
- A country with a higher interest rate, will normally have a higher inflation rate

Real interest rate $\cong$ Nominal interest rate – Inflation rate

Exhibit 4.5 Impact of Rising U.S. Inflation on the Equilibrium Value of the British Pound

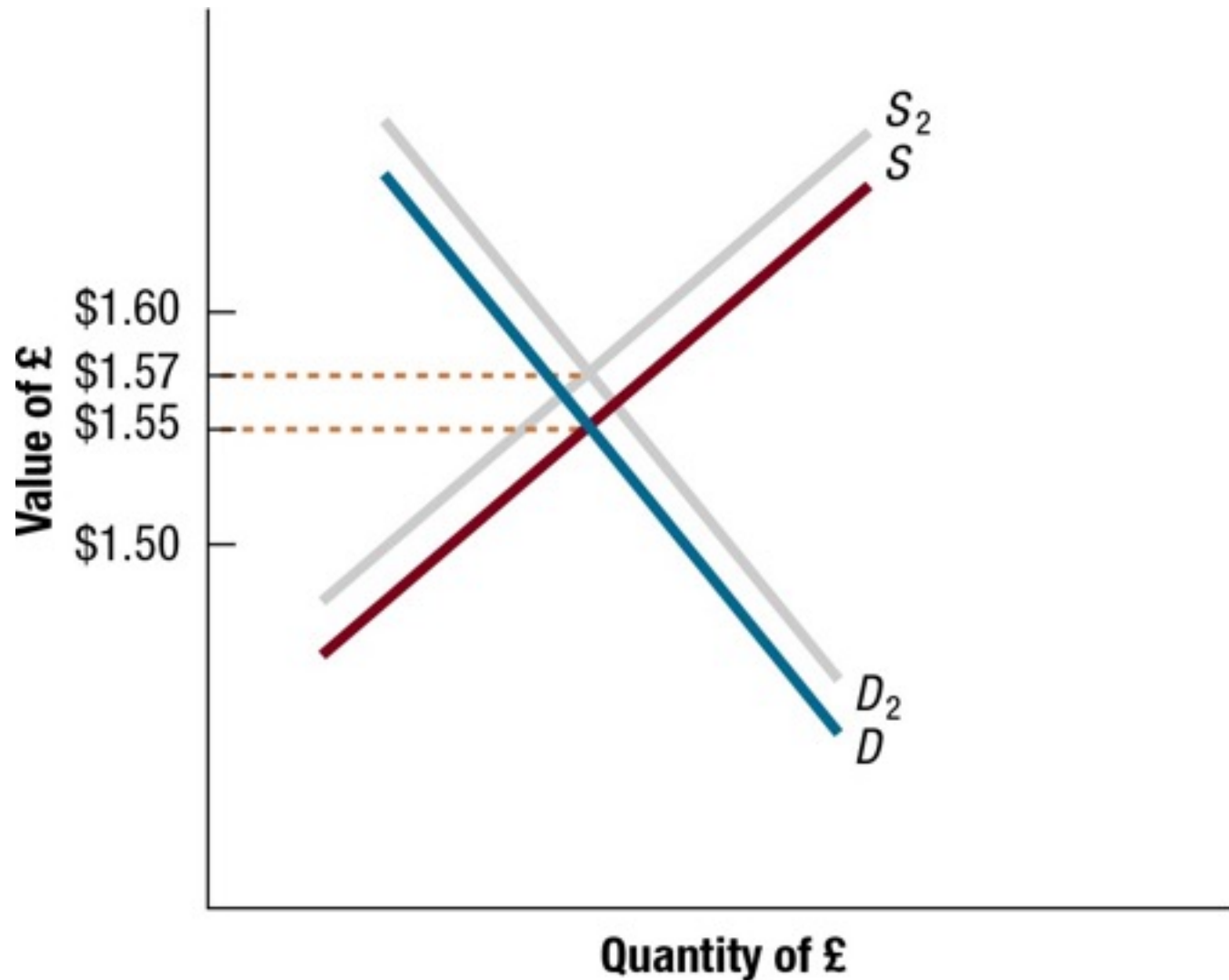
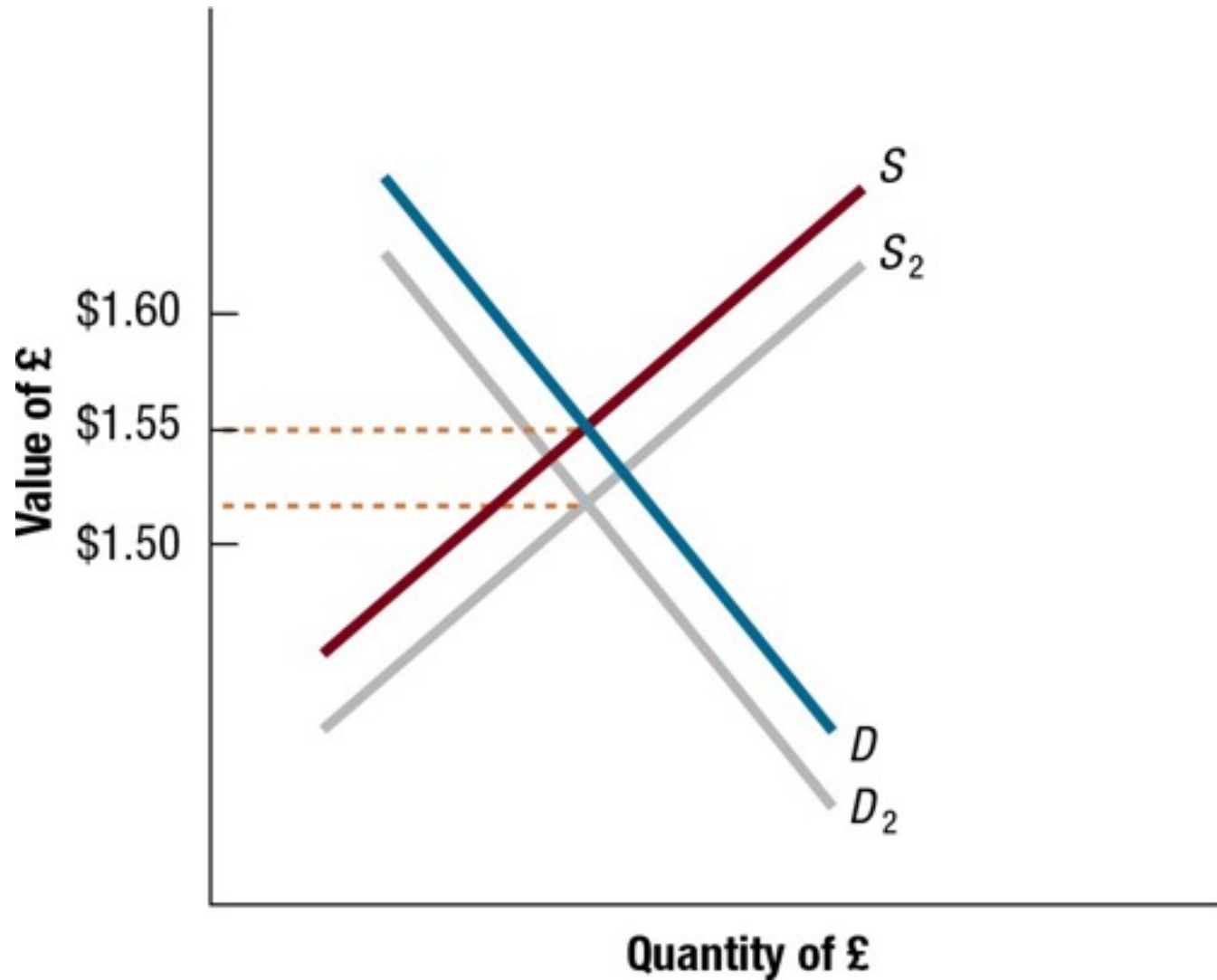


Exhibit 4.6 Impact of Rising U.S. Interest Rates on the Equilibrium Value of the British Pound



Factors That Influence Exchange Rates (3 of 5)

Relative Income Levels: Increase in U.S. income leads to an increase in U.S. demand for foreign goods, an increased demand for foreign currency relative to the dollar, and an increase in the exchange rate for the foreign currency. (See Exhibit 4.7)

Government Controls via:

- Imposing foreign exchange barriers
- Imposing foreign trade barriers
- Intervening in foreign exchange markets
- Affecting macro variables such as inflation, interest rates, and income levels

Factors That Influence Exchange Rates (4 of 5)

Expectations:

- **Impact of favorable expectations:** If investors expect interest rates in one country to rise, they may invest in that country, leading to a rise in the demand for foreign currency and an increase in the exchange rate for foreign currency.
- **Impact of unfavorable expectations:** Speculators can place downward pressure on a currency when they expect it to depreciate.
- **Impact of signals on currency speculation:** Speculators may overreact to signals, causing currency to be temporarily overvalued or undervalued.

Factors that Influence Exchange Rates (5 of 5)

Interaction of Factors: Some factors place upward pressure while other factors place downward pressure. (See Exhibit 4.8)

Influence of Factors across Multiple Currency Markets: common for European currencies to move in the same direction against the dollar.

Influence of Liquidity on Exchange Rate adjustment: If a currency's spot market is liquid then its exchange rate will not be highly sensitive to a single large purchase or sale.

Exhibit 4.8 Summary of How Factors Affect Exchange Rates



Financial Factors



Movements in Cross Exchange Rates (1 of 2)

If currencies A and B move in same direction, there is no change in the cross exchange rate.

When currency A appreciates against the dollar by a greater (smaller) degree than currency B, then currency A appreciates (depreciates) against B.

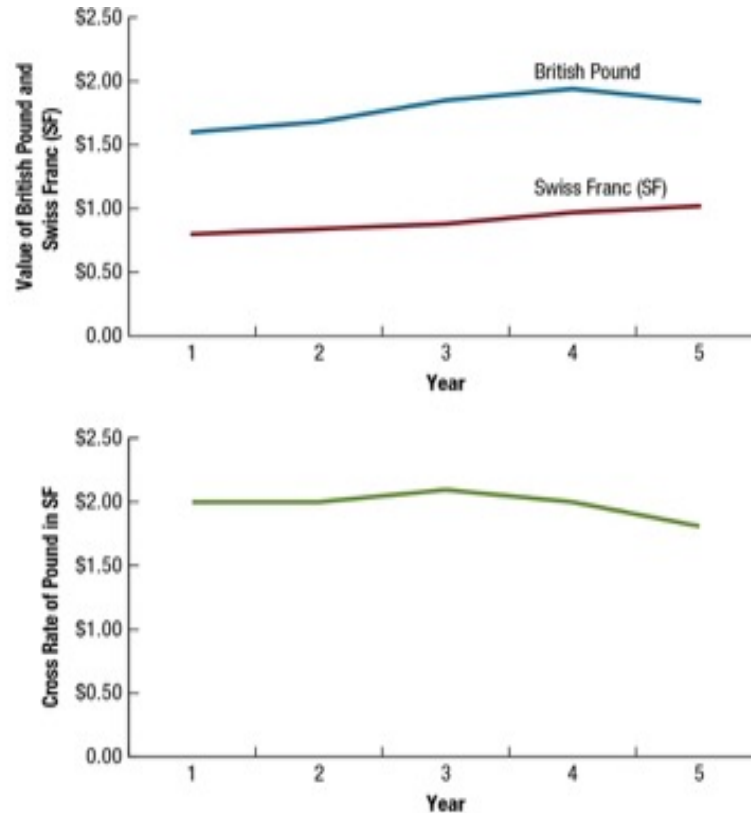
When currency A appreciates (depreciates) against the dollar, while currency B is unchanged against the dollar, currency A appreciates (depreciates) against currency B by the same degree as it appreciates (depreciates) against the dollar.

Movements in Cross Exchange Rates (2 of 2)

Explaining Movements in Cross Exchange Rate.

- Changes are affected in the same way as types of forces explained earlier for those that affect demand and supply conditions between two currencies.

Exhibit 4.9 Example of How Forces Affect the Cross Exchange Rate



BEGINNING OF YEAR	VALUE OF BRITISH POUND	VALUE OF SWISS FRANC (SF)	% ANNUAL CHANGE IN POUND	% ANNUAL CHANGE IN SF	CROSS RATE OF POUND IN SF
1	\$1.60	\$0.80	—	—	$1.60/0.80 = 2.0$
2	\$1.68	\$0.84	5%	5%	$1.68/0.84 = 2.0$
3	\$1.848	\$0.882	10%	5%	$1.848/0.882 = 2.095$
4	\$1.9404	\$0.9702	5%	10%	$1.9404/0.9702 = 2.0$
5	\$1.84338	\$1.01871	-5%	5%	$1.84338/1.01871 = 1.81$

Capitalizing on Expected Exchange Rate Movements (1 of 2)

Institutional speculation based on expected appreciation: When financial institutions believe that a currency is valued lower than it should be in the foreign exchange market, they may invest in that currency before it appreciates.

Institutional speculation based on expected depreciation: If financial institutions believe that a currency is valued higher than it should be in the foreign exchange market, they may borrow funds in that currency and convert it to their local currency now before the currency's value declines to its proper level.

Speculation by individuals: Individuals can speculate in foreign currencies.

The “Carry Trade” – Where investors attempt to capitalize on the differential in interest rates between two countries.

- **Impact of appreciation in the investment currency:** Increased trade volume can have a major influence on exchange rate movements over a short period.
- **Risk of the Carry Trade:** Exchange rates may move opposite to what the investors expected.

SUMMARY

- Exchange rate movements are commonly measured by the percentage change in their values over a specified period, such as a month or a year.
- MNCs closely monitor exchange rate movements over the period in which they have cash flows denominated in the foreign currencies of concern.
- The equilibrium exchange rate between two currencies at any time is based on the demand and supply conditions.
- Changes in the demand for a currency or the supply of a currency for sale will affect the equilibrium exchange rate.

SUMMARY continued

- There are distinct international trade and financial flows between every pair of countries.
- These flows dictate the unique supply and demand conditions for the currencies of the two countries, which affect the equilibrium cross exchange rate between their currencies.
- Financial institutions can attempt to benefit from the expected appreciation of a currency by purchasing that currency.
- Analogously, they can benefit from expected depreciation of a currency by borrowing that currency and exchanging it for their home currency.