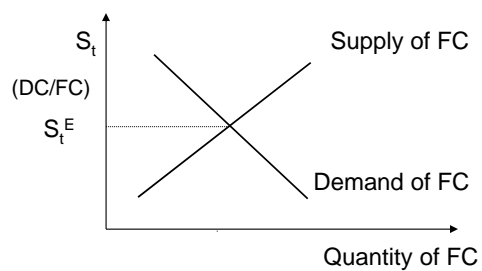


# FX DETERMINATION

## Supply and Demand determine $S_t$



- **Q: What moves Supply & Demand?**
  - International Investing: Foreign Investors investing in the US  
US Investors investing abroad
  - International Trade: Exports/Imports
  - International Tourism
  - Central Banks.

• **Balance of Payments**

At the national accounts level, these activities are reflected in the Balance of Payments (BOP):

$$\text{BOP} = \text{Current Account (CA)} + \text{Capital Account (KA)}$$

CA = Net Exports of goods and services (main component) + Net Investment Income + Net Transfers

KA = Financial capital inflows – Financial capital outflows

The  $\text{BOP} = 0 \Rightarrow$  The CA is financed by the KA.

• **Economic Variables (“Fundamentals”) Affecting the BOP (S&D)**

- interest rates ( $i_{\text{USD}} - i_{\text{FC}}$ )
- inflation rates ( $I_{\text{USD}} - I_{\text{FC}}$ )
- income growth rates ( $y_{\text{USD}} - y_{\text{FC}}$ )
- others: tariffs, quotas, other trade barriers, expectations, taxes, tastes, expected returns in financial assets/real estate, technology, etc.

$\Rightarrow$  Changes in the fundamentals will affect  $S_t$ .

• **A Word about Models**

In the economy variables are interrelated. We use *models* to simplify the interactions and focus on the main impact, say money markets, goods markets. These models that focus on the equilibrium in only one market, say the goods market, are called *partial equilibrium models*.

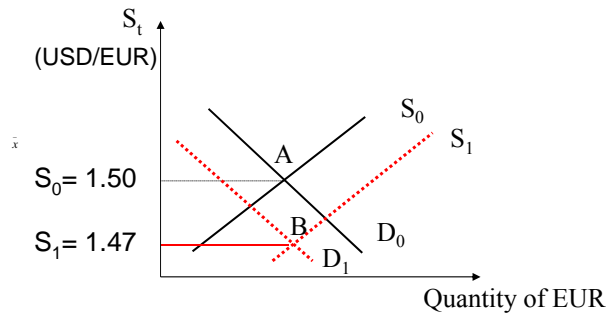
There are also *general equilibrium models*, where we study equilibrium in all markets, say the goods market, the money market, and the BOP.

### Example 1: Changes in the interest rate differential

The U.S. Fed increases interest rates ( $i_{USD} \uparrow \Rightarrow (i_{USD} - i_{EUR}) \uparrow$ )

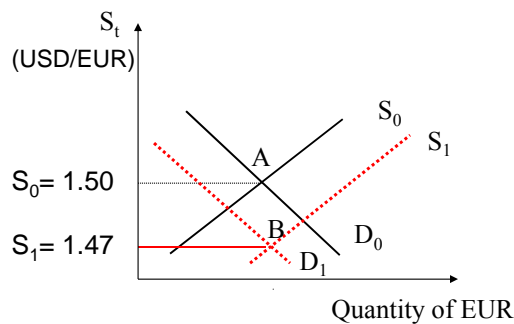
Two effects:

- European residents buy more U.S. T-bills (Supply of EUR  $\uparrow$ )
  - U.S. residents buy less European T-bills (Demand for EUR  $\downarrow$ )
- $\Rightarrow$  both Supply and Demand curves shift.



- European residents buy more U.S. T-bills (Supply  $\uparrow$ )
- U.S. residents buy less European T-bills (Demand  $\downarrow$ )

### Example 1 (continuation): Effect on $S_t$ : $(i_{USD} - i_{EUR}) \uparrow \Rightarrow S_t ?$



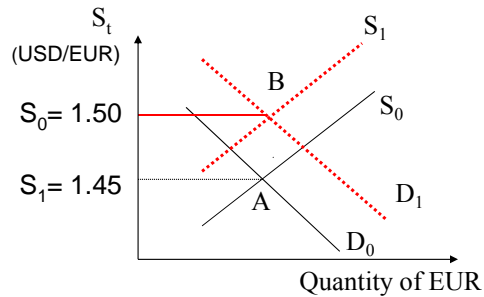
- European residents buy more U.S. T-bills (Supply  $\uparrow$ )
  - U.S. residents buy less European T-bills (Demand  $\downarrow$ )
- $S_t$  moves from A to B
    - $\Rightarrow$  The EUR becomes less expensive in terms of USD.
    - $\Rightarrow$  We say: "the EUR depreciates against the USD". ¶

**Intuition check:** The U.S. Fed decreases interest rates ( $i_{USD} \downarrow$ )

$$\Rightarrow (i_{USD} - i_{EUR}) \downarrow$$

- European residents buy less U.S. T-bills (Supply of EUR  $\downarrow$ )

- U.S. residents buy more European T-bills (Demand for EUR  $\uparrow$ )



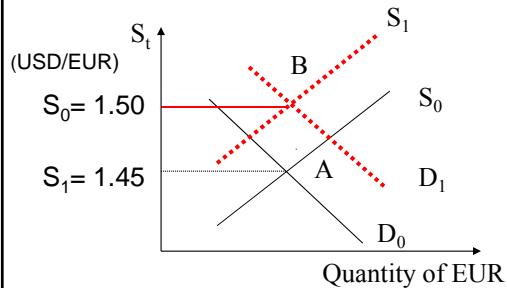
- $S_t$  moves from A to B
  - $\Rightarrow$  The EUR becomes more expensive in terms of USD.
  - $\Rightarrow$  We say: “the EUR appreciates against the USD”. ¶

**Example 2: Changes in the inflation rate differential**

U.S. inflation increases ( $I_{USD}$ )  $\Rightarrow (I_{USD} - I_{EUR}) \uparrow$

Foreigners want to buy less U.S. goods (Supply  $\downarrow$ )

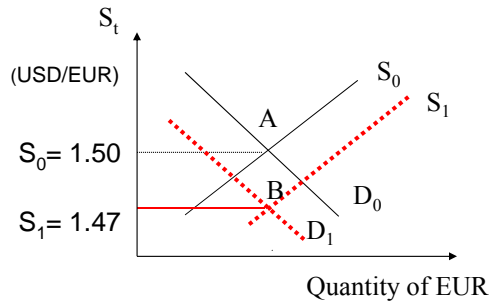
Americans want to buy more European goods (Demand  $\uparrow$ )



- $S_t$  moves from A to B
  - $\Rightarrow$  The EUR becomes more expensive in terms of USD. ¶

Intuition check: U.S. inflation decreases relative to European inflation

$$(I_{\text{USD}} - I_{\text{EUR}}) \downarrow \Rightarrow S_t ?$$



- European residents buy more U.S. goods (Supply of EUR  $\uparrow$ )
- U.S. residents buy less European goods (Demand for EUR  $\downarrow$ )

$S_t$  moves from A to B  
 $\Rightarrow$  The EUR becomes cheaper in terms of USD.

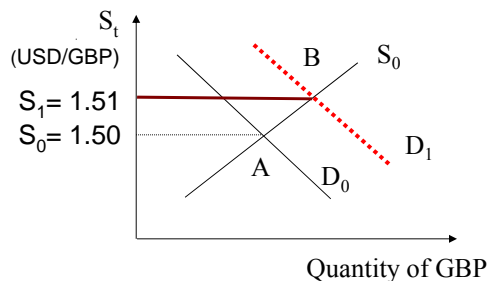
**Example 3: Changes in income growth rates**

$(y_{\text{US}} - y_{\text{UK}}) \uparrow$ . Suppose  $Y_{\text{US}} \uparrow$  (&  $Y_{\text{UK}}$  remains the same).

When  $Y_{\text{US}} \uparrow$  we tend to increase all our demands: we demand more of everything (domestic goods, foreign goods, investments, money, etc.).

Q: Which market has the bigger impact on S&D (and, thus, on  $S_t$ ?)

3.1 BT Approach: Trade Flows are the main factors influencing S&D.



We buy more of everything, among them UK imports  
 $\Rightarrow S_t$  moves from A to B (The GBP appreciates against the

### Example 3: Changes in income growth rates

3.2 Monetary Approach: Money Markets are the main factors.

$S_t$  is determined in equilibrium by relative money demand and money supply between the two currencies involved.

Each currency is just another asset, whose yield is given by  $i_{DC}$  &  $i_{FC}$ .

$$\Rightarrow S_t = f(i_{DC}, i_{FC}, Y_{DC}, Y_{FC}, \text{Supply of money (FC \& DC)})$$

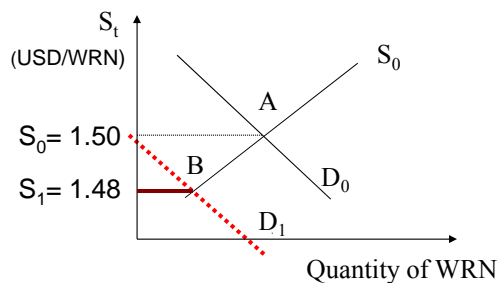
MA:  $Y_{US} \uparrow \Rightarrow$  More US demand of everything, among them domestic money (USD). Demand for US money increases  $\Rightarrow i_{USD} \uparrow \Rightarrow (i_{USD} - i_{GBP}) \uparrow$  (capital flows move in favor to the U.S.)  $\Rightarrow S_t \downarrow$

**Remark:** Financial variables, like  $i$  and  $S_t$ , adjust very quickly to changes. It takes times for companies to adjust trade flows.

$\Rightarrow$  The MA is the usual story reported by the press.

### Example 4: Changes in other factors: Tariffs

U.S. government imposes tariffs on Korean steel. Assume no trade wars.



- U.S. residents buy less Korean goods (Demand for WRN  $\downarrow$ )
- No movement on U.S. exports to Korea (Supply unchanged)

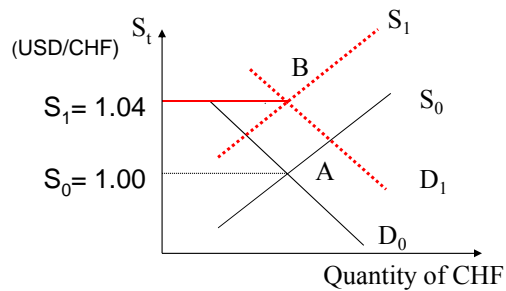
$S_t$  moves from A to B

$\Rightarrow$  The WRN becomes cheaper in terms of USD.

### Example 5: Changes in other factors: Uncertainty

Uncertainty (political, social, war, terrorism threats, etc) increase. Suppose Switzerland is considered a safe haven.

- Foreign residents bring less CHF to the U.S. (Supply of CHF ↓)
- U.S. residents buy more CHF (Demand for CHF ↑)

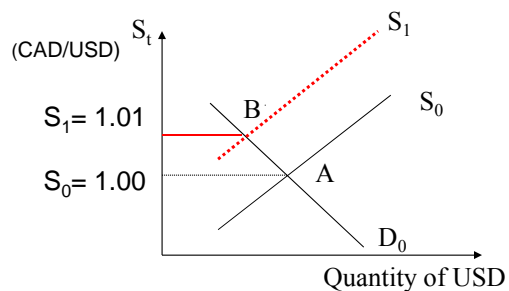


- $S_t$  moves from A to B  
⇒ The CHF becomes more expensive in terms of USD. ¶

### Example 6: Changes in export prices

The price of oil decreases significantly.

- Canadian oil exports are worth less USD. (Supply of USD ↓)
- There may be a secondary effect –Canadian may be able to buy less imports. (Demand for USD may go down)



- $S_t$  moves from A to B  
⇒ The USD becomes more expensive in terms of CAD. ¶

### Example 7: The Role of Expectations

Suppose that because of a rumor people expect the GBP to depreciate. Then, it may be optimal to sell GBP, regardless of the truth behind the rumor/expectation.

The GBP can depreciate in a hurry (think of the Keynesian beauty contest). Expectations matter.



“Professional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the fancy of the other competitors, all of whom are looking at the problem from the same point of view.”

#### • Remark

◊ *Interactions among variables*: So far, we have assumed that only one variable changes (the *ceteris paribus* assumption). But, in economics, variables are interrelated. For example:

Higher  $I \Rightarrow$  higher  $i$ ;

Restrictions to trade affect income,

When we are drawing the S&D curves, we need to make assumptions about which curve moves more (the dominant one).

◊ *No dynamics*: In all the S&D graphs above, we presented two situations: initial equilibrium (with  $S_0$ ) and final equilibrium (with  $S_1$ ).

We have paid no attention to the adjustment process –i.e., how  $S_t$  moves from  $S_0$  to  $S_1$ .



• **Exchange Rates Move a Lot**

The Federal Reserve constructs an index to reflect the value of the USD against a basket of currencies (TWC). The basket includes the EUR (58%), the JPY (14%), the GBP (12%), the CAD (9%), the SEK (4%), and the CHF (4%). It is quoted in TWC/USD terms.

