MACROECONOMICS

LECTURE 6

THE OPEN ECONOMY

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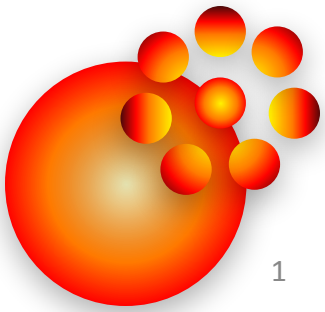


Outline

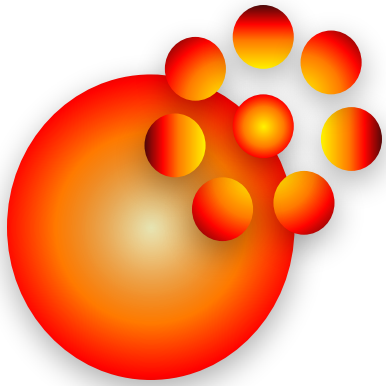
No nation was ever ruined by trade.
—Benjamin Franklin

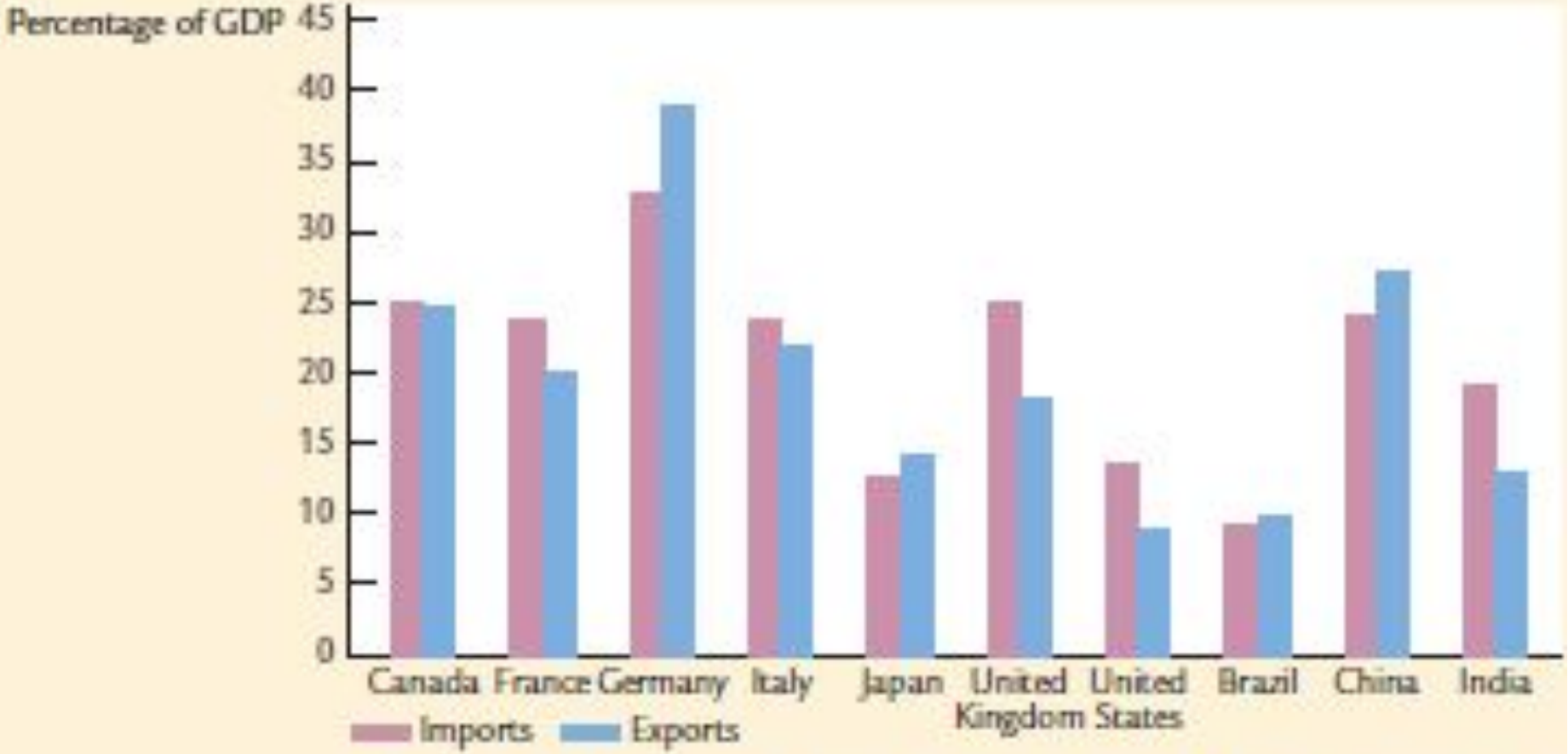
6-1 The International Flows of Capital and Goods

6-2 Saving and Investment in a Small Open Economy

6-3 Exchange Rates

6-4 Conclusion: The United States as a Large Open Economy





Imports and Exports as a Percentage of Output: 2010 While international trade is important for the United States, it is even more vital for other countries.

Source: International Monetary Fund.

6-1 The International Flows of Capital and Goods

- The Role of Net Exports
- International Capital Flows and the Trade Balance
- International Flows of Goods and Capital: An Example

- C^d, consumption of domestic (d) G&S,
- I^D, investment in d G&S,
- G^d, Gnt purchases of d G&S,
- X, exports of d G&S

$$Y = C^d + I^d + G^d + X.$$

Domestic spending on d G&S
Foreign spending on d G&S

$$C = C^d + C^f,$$
$$I = I^d + I^f,$$
$$G = G^d + G^f.$$

← Total domestic C, I, G

$$Y = (C - C^f) + (I - I^f) + (G - G^f) + X.$$

$$Y = C = I + G + X - (C^f + I^f + G^f)$$

$$IM = C^f + I^f + G^f$$

$$Y = C + I + G + X - IM$$

$$Y = C + I + G + NX.$$

← Net export

$$NX = Y - (C + I + G)$$

Net Exports = Output − Domestic Spending.

6-1 The International Flows of Capital and Goods

- The Role of Net Exports
- International Capital Flows and the Trade Balance
- International Flows of Goods and Capital: An Example

- If output exceeds domestic spending,
- we export the difference.
  - Net exports are positive.

- If output falls short of domestic spending,

6-1 The International Flows of Capital and Goods

- The Role of Net Exports
- International Capital Flows and the Trade Balance
- International Flows of Goods and Capital: An Example

$$Y = C + I + G + NX$$

$$Y - C - G = I + NX$$ National saving

$$S = I + NX$$ Trade balance

$$S - I = NX$$ Net foreign investment or net Capital outflow

S>*I*	Trade surplus
S=*I*	Balanced trade
S<*I*	Trade deficit

If the **net *S-I*** is negative,

- the economy is experiencing a capital inflow:
- ***I*** exceeds ***S***, and the economy is financing this extra ***I*** by borrowing from abroad.

Net *S-I* reflects the international flow of funds to finance capital accumulation.

6-1 The International Flows of Capital and Goods

- The Role of Net Exports
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- International Flows of Goods and Capital: An Example

International Flows of Goods and Capital: Summary

This table shows the three outcomes that an open economy can experience.

Trade Surplus	Balanced Trade	Trade Deficit
Exports > Imports	Exports = Imports	Exports < Imports
Net Exports > 0	Net Exports = 0	Net Exports < 0
$Y > C + I + G$	$Y = C + I + G$	$Y < C + I + G$
Saving > Investment	Saving = Investment	Saving < Investment
Net Capital Outflow > 0	Net Capital Outflow = 0	Net Capital Outflow < 0

The national income accounts identity shows that the international flow of FUNDS to finance capital accumulation and the international flow of G&S are two sides of the same coin.

6-1 The International Flows of Capital and Goods

- The Role of Net Exports
- International Capital Flows and the Trade Balance
- International Flows of Goods and Capital: An Example

USA sells goods & Japan pays 5000 yen

- **5,000 yen in the US hands**

It is investment abroad

net capital outflow > 0,

Ex>Im, S>I

- **5000 yen spend for in Japan**

net capital outflow = 0,

Ex= Im, S=I

- **5000 yen in the US bank**

At the end , Ex – Im = ***S*** – I= NX

The Irrelevance of Bilateral Trade Balances

- A media report on a nation's trade balance with a specific other nation is called a **bilateral trade balance.**

For example,

- Suppose the world has three countries:
  1. The United States sells $100 billion in machine tools to Australia,
  2. Australia sells $100 billion in wheat to China, and
  3. China sells $100 billion in toys to the United States.

- In this case, $S<I,\ NX<0$
  - the United States has a bilateral trade **deficit** with China,
  - China has a bilateral trade **deficit** with Australia, and
  - Australia has a bilateral trade **deficit** with the United States.

$S=I,\ NX=0$

- But each of the three nations **has balanced trade overall** because it has exported and imported $100 billion in goods.

FAY

6-2 Saving and Investment in a Small Open Economy

- Capital Mobility and the World Interest Rate
- Why Assume a Small Open Economy?
- The Model
- How Policies Influence the Trade Balance
- Evaluating Economic Policy

- A **model of the international flows of capital and goods**.
- Because the NX = S-I, our model focuses on S&I.
- **CASE I**

Closed economy (CE)	Small **open economy** (SOE)
We do not assume that the ***r*** equilibrates ***S&I***	**It has perfect** capital mobility. We allow the economy to run 1. a **TD** and borrow from other countries or 2. a **TS** and lend to other countries. The ***r*** **does not** adjust to equilibrate ***S&I*** **What does determine** *the real interest rate?*

- **Small economy** is a small part of the world market and can have only a negligible effect on the world ***r***.

- **Perfect capital mobility** means that residents of the country have **full access to world financial markets.**
  - The **Gnt** does not **impede** international borrowing or lending.
  - → ***r*** in SOE = *the* ***world interest rate r****
    - $r = r^*$.

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- Residents of the SOE need never
  - **borrow** at any interest rate > *r*,*
    - ✔ *because they can **always get** a loan at r* from abroad.*
  - **lend** at any interest rate < *r**
    - ✔ *because they can **always earn** r* by lending abroad.*
- **The *r**determines the *r* in SOE.**
- **CASE II**

CE	SOE
The equilibrium of domestic ***S*** and domestic ***I*** determines the ***r.***	• The world economy is a ***CE***→ The **equilibrium of world *S* and world *I* determines** the world ***r.*** • SOE has a negligible effect on the r*, S* and I*. • SOE takes ***the r**** as **exogenously** given.

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Q: Is the US well described by the assumption of a SOE?	A: No, it is not. The U.S. real interest rate is not determined solely by world financial markets.
Q: So why are we assuming a SOE?	A: • to **develop understanding and intuition** for the macroeconomics of open economies. • to **simplify the analysis** greatly • **to help clarify our thinking.**
Q: Can we relax this assumption and make the model more realistic?	A: Yes, we can, and we will.

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Assamptions

- The economy's output ***Y*** is fixed by the factors of production and the production function.

$$\bar{Y} = \bar{Y} = F(\bar{K}, \bar{L})$$

- Consumption ***C*** *is positively related to disposable income* $Y - T$.

$$C = C(Y - T)$$

- Investment ***I*** *is negatively related to the real interest rate r.*

$$I = I(r)$$

- $NX = (Y - C - G) - I$
- $NX = S - I$

$$NX = [\bar{Y} - C(\bar{Y} - T) - G] - I(r^*)$$

$$= \bar{S} - I(r^*).$$

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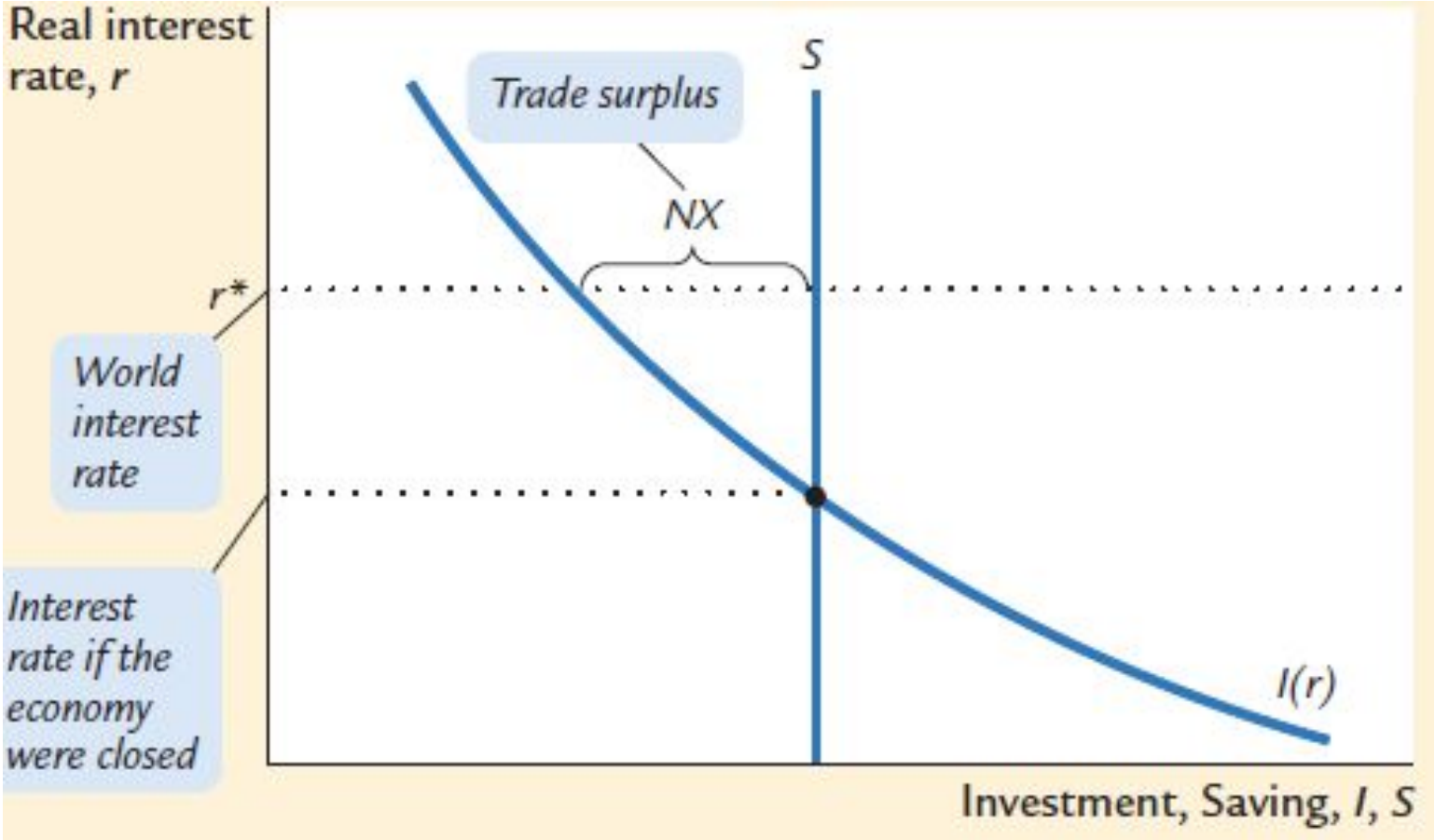

Saving and Investment in a Small Open Economy

In a **CE**, the ***r*** adjusts to equilibrate ***S*** and ***I***.

In a **SOE**, the ***r*** is determined in world financial markets.

The difference between ***S&I*** determines the trade balance.

Here there is a **trade surplus**, because at the ***r****, ***S*** exceeds ***I***.

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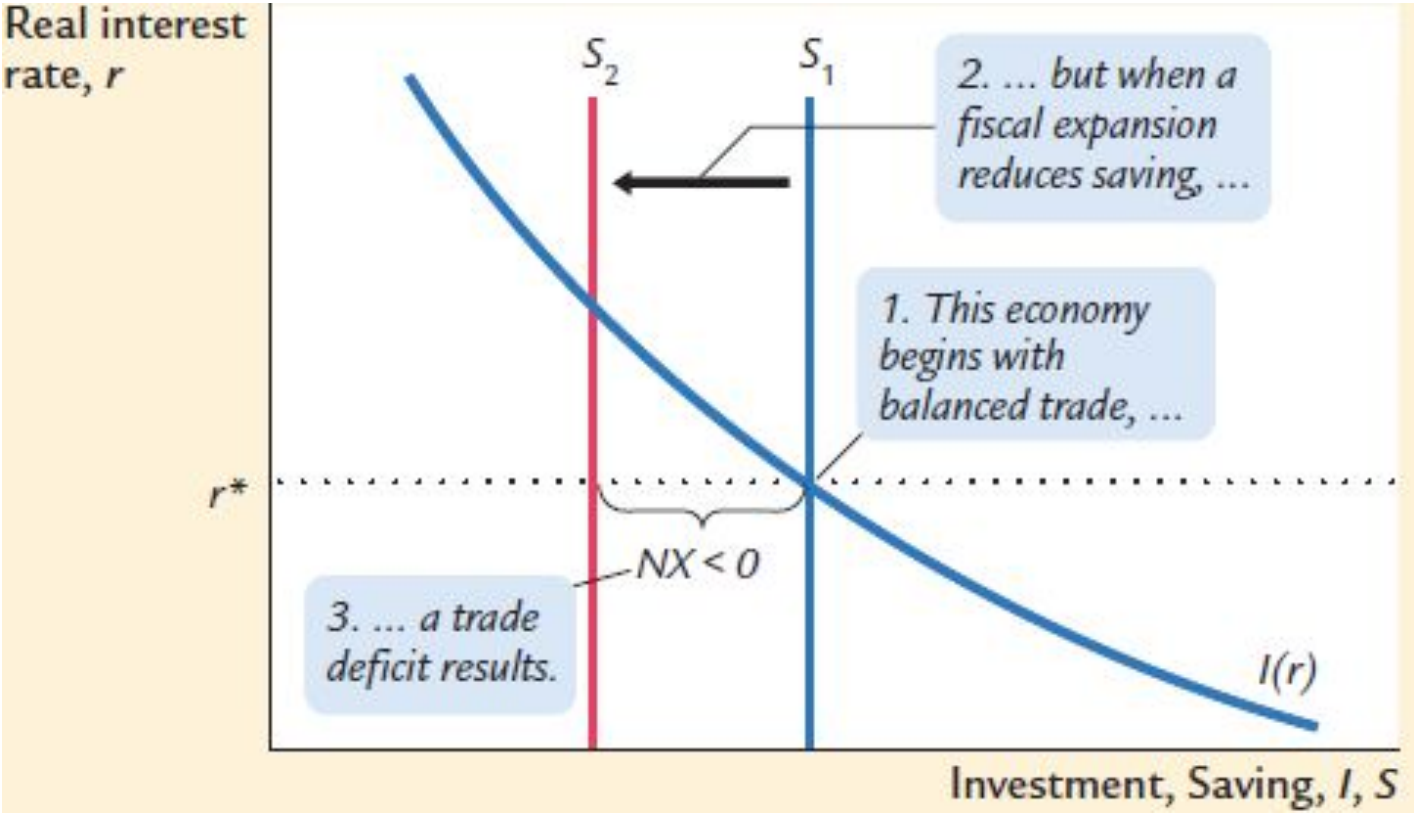

A Fiscal Expansion at Home in a Small Open Economy
An increase in **government purchases** or a reduction in taxes reduces **national saving** and thus shifts the saving schedule to the left, from S_1 to S_2.
The result is a **trade deficit**.

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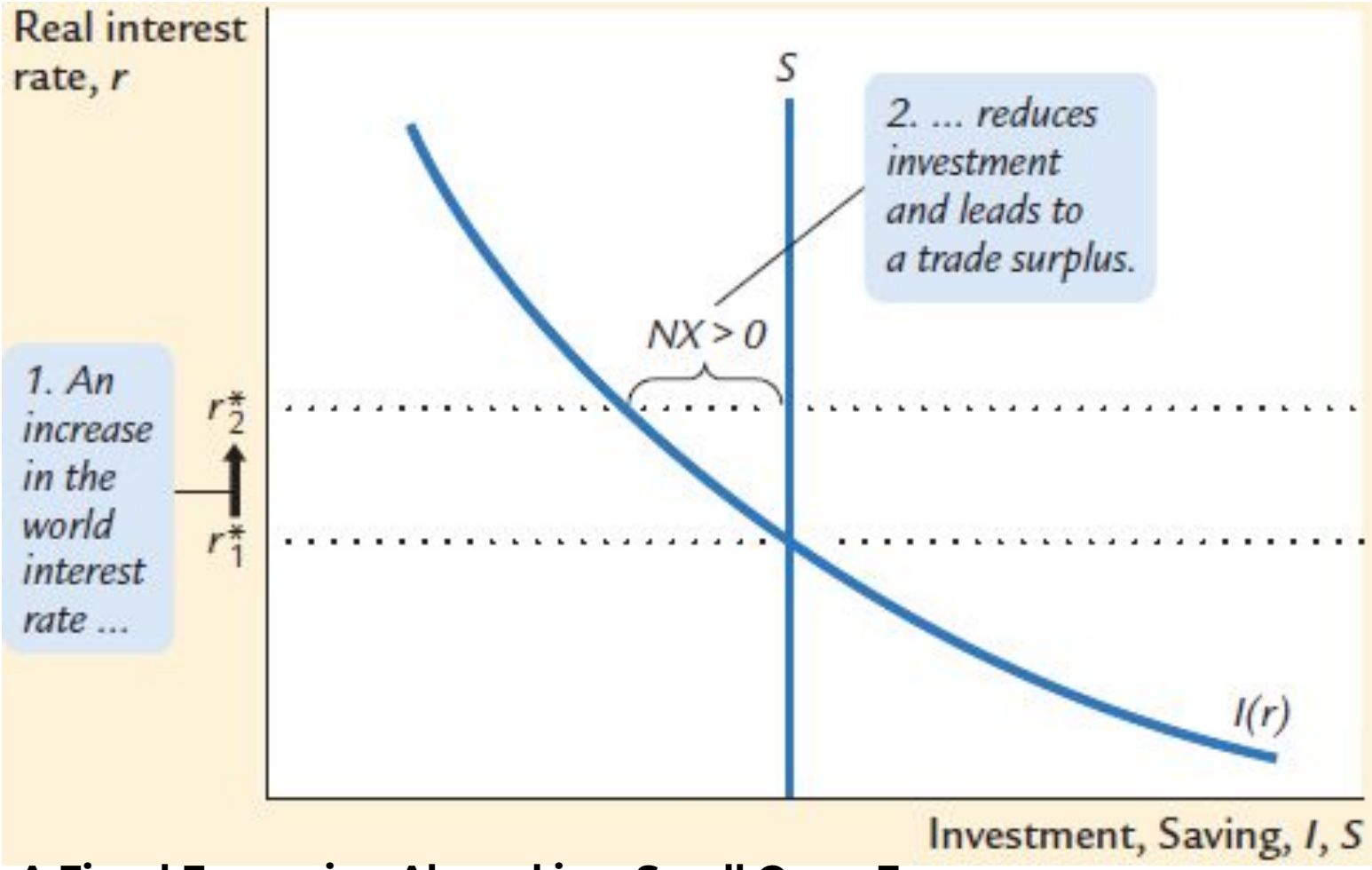

A Fiscal Expansion Abroad in a Small Open Economy

A fiscal expansion in a foreign economy large enough to influence world ***S&I*** raises the ***r**** from r_1* to r_2*.

The higher ***r**** reduces ***I*** in this **SOE**, causing a trade surplus.

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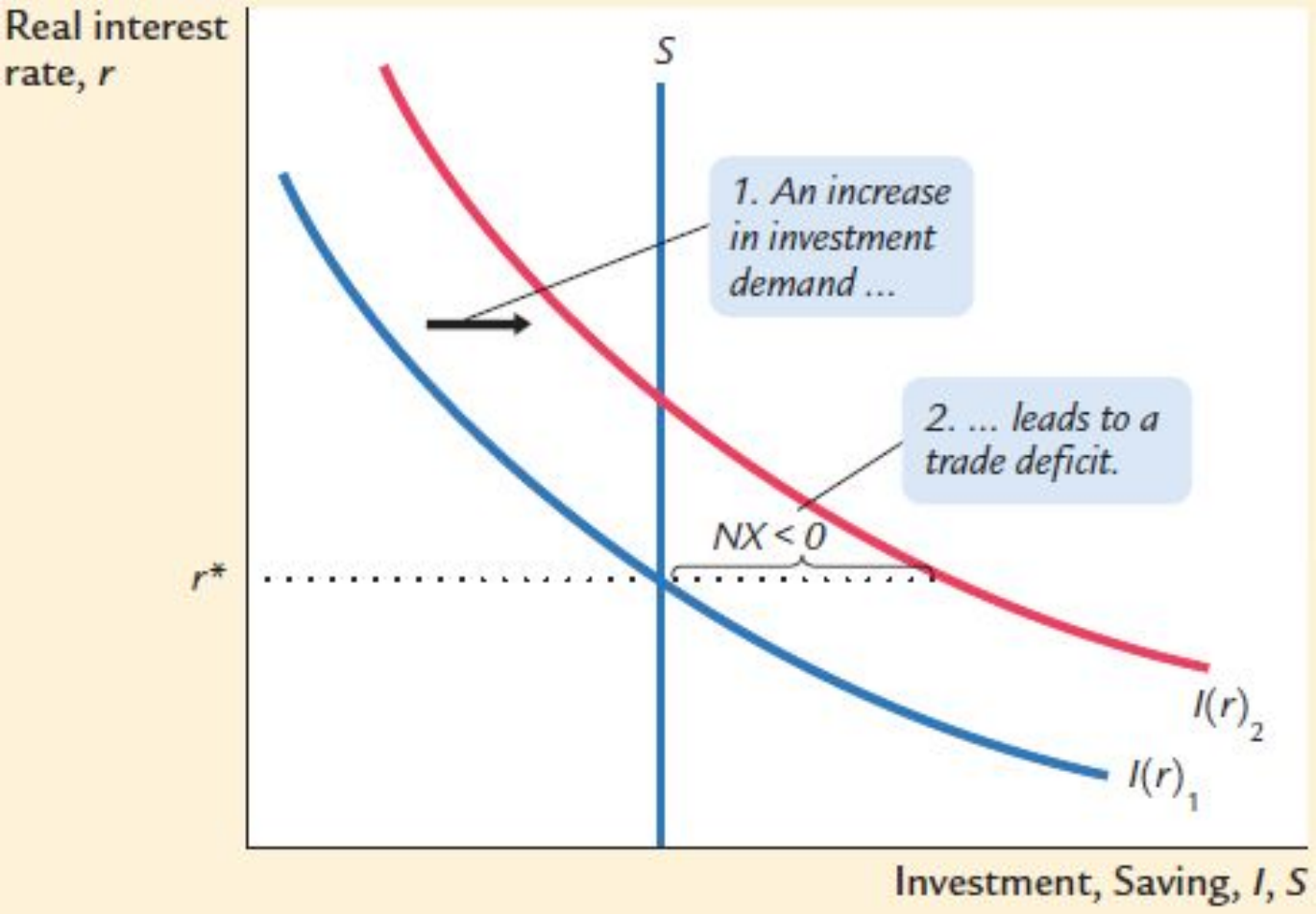

A Shift in the Investment Schedule in a Small Open Economy

An outward shift in the ***I*** schedule from $I(r)_1$ to $I(r)_2$ increases the amount of ***I*** at the r^*.

As a result, ***I*** now exceeds ***S***, which means the economy is borrowing from abroad and running a trade deficit.

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- The model of the OE shows that
  - the flow of **G&S** is connected to
  - the international flow of **funds**.
  - ***Policies – S ↓, I ↑ → TD***
  - ***Policies – S ↑, I ↓ → TS***

Positive analysis	Normative analysis
YES Show how policy can impact on flows of funds and G&S	NO not told us whether these policies are desirable

- Evaluating economic policies and their impact on the open economy is a frequent topic of debate among economists and policymakers.

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TD – is it a problem?

1. not as a problem in itself, but perhaps as a symptom of a problem.
   could be a reflection of low saving.
   In a CE, low ***S*** leads to low ***I*** & a smaller future capital stock.
   In an OE, low ***S*** leads to a **TD** and a growing foreign debt.

   In both cases, high current consumption leads to lower future ***C***, implying that future generations bear the burden of low national ***S***.
2. a sign of economic development.
   For example, South Korea ran large trade deficits throughout the 1970s, and it became one of the success stories of economic growth.
   One must look at the underlying causes of the international flows

The U.S. Trade Deficit

Case Study

Why Doesn't Capital Flow to Poor Countries?

Case Study

6-3 Exchange Rates

- **Nominal and Real Exchange Rates**
- The Real Exchange Rate and the Trade Balance
- The Determinants of the Real Exchange Rate
- How Policies Influence the Real Exchange Rate
- The Effects of Trade Policies
- The Determinants of the Nominal Exchange Rate

- **The nominal exchange rate is the relative price of the currencies of two countries.**
- **For example,**
- if the exchange rate between $ and YEN is 80 yen per dollar, then
  - A Japanese who wants to obtain $ would pay 80 yen for each dollar he bought.
  - An American who wants to obtain YEN would get 80 yen for each $ he paid.
- When people refer to "the exchange rate'' between two countries, they usually mean the nominal exchange rate

- **The real exchange rate is the relative price of the goods of two countries.**
  - It is the rate at which we **can trade the goods** of one country for the goods of another.
  - It is sometimes called the **terms of trade.**

6-3 Exchange Rates

$$\text{Real Exchange Rate} = \frac{(80\ \text{Yen/Dollar}) \times (25{,}000\ \text{Dollars/American Car})}{(4{,}000{,}000\ \text{Yen/Japanese Car})}$$

$$= 0.5\ \frac{\text{Japanese Car}}{\text{American Car}}.$$

At these prices and this exchange rate, we obtain one-half of a Japanese car per American car. More generally, we can write this calculation as

$$\text{Real Exchange Rate} = \frac{\text{Nominal Exchange Rate} \times \text{Price of Domestic Good}}{\text{Price of Foreign Good}}.$$

Nominal and Real Exchange Rates

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- The Determ

6-3 Exchange Rates

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$$\begin{array}{lcll} \text{Real Exchange Rate} & = & \text{Nominal Exchange Rate} & \times \text{ Ratio of Price Levels} \\ \epsilon & = & e & \times (P/P^*). \end{array}$$

- **If the ϵ is high,**
  - **foreign goods are relatively cheap, and**
  - **domestic goods are relatively expensive.**
- **If the ϵ is low,**
  - **foreign goods are relatively expensive,**
  - **and domestic goods are relatively cheap.**

6-3 Exchange Rates

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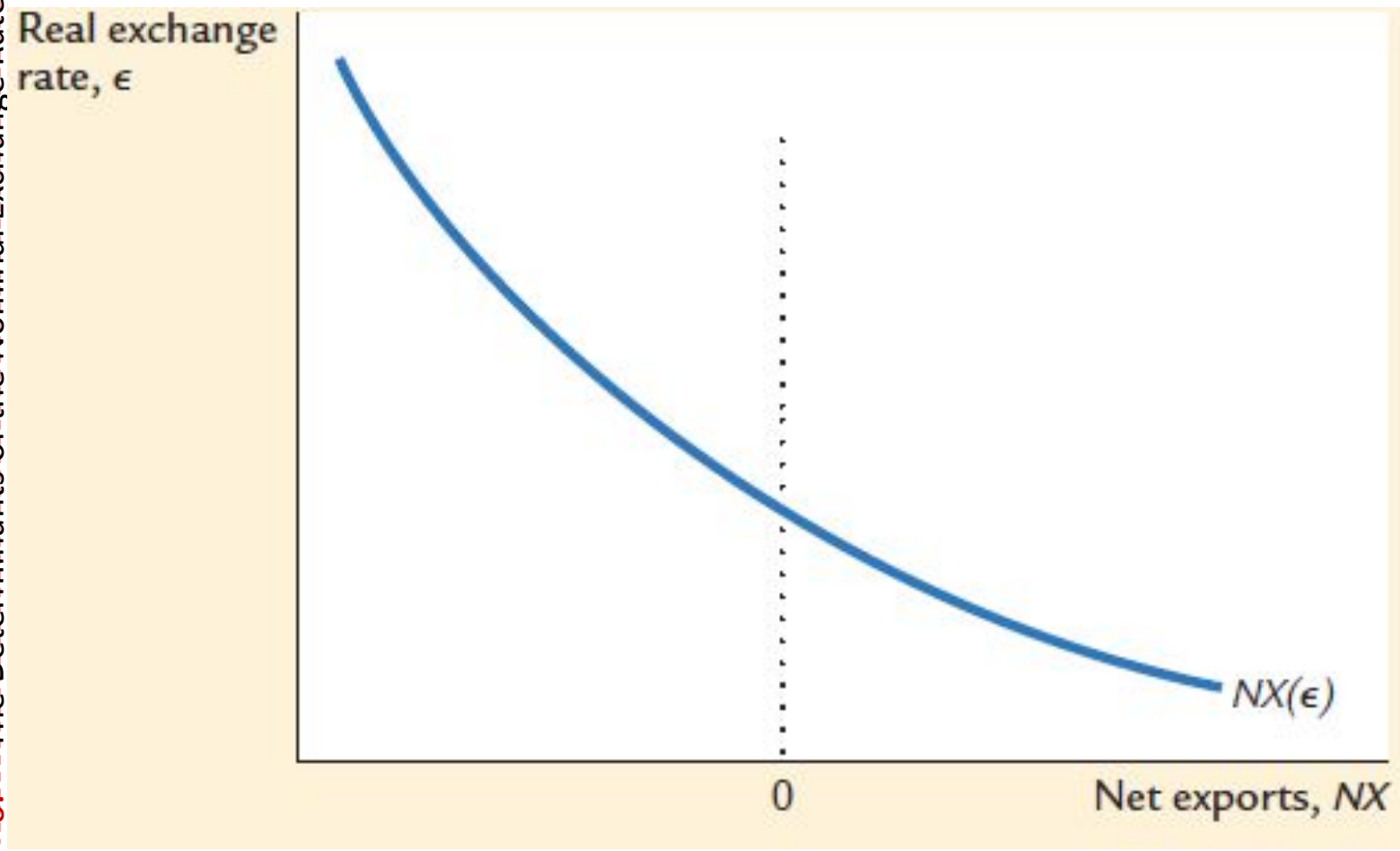
Net Exports and the Real Exchange Rate

The figure shows the relationship between the ϵ and NX:
the lower the ϵ, the less expensive are d.goods relative to f.goods, and thus the greater are our NX.
Note that a portion of the horizontal axis measures negative values of *NX*:
because Im can exceed Ex, NX can be less than 0.



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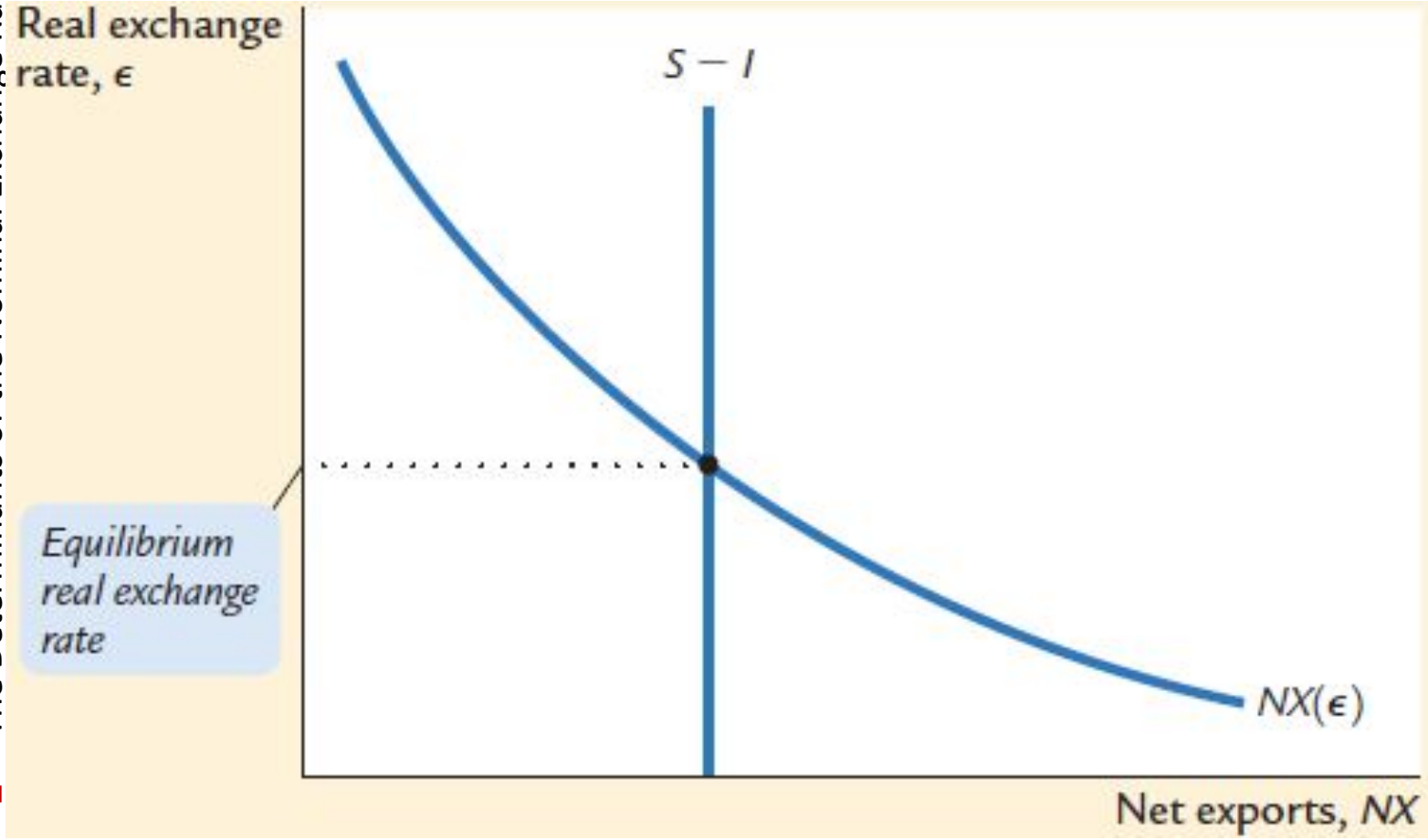
How the Real Exchange Rate Is Determined

The ϵ is determined by the intersection of the vertical line representing S – I and the down ward sloping NX schedule.

At this intersection:

the quantity of $s supplied for the flow of capital abroad **=**
the quantity of $s demanded for the NX of G&S.



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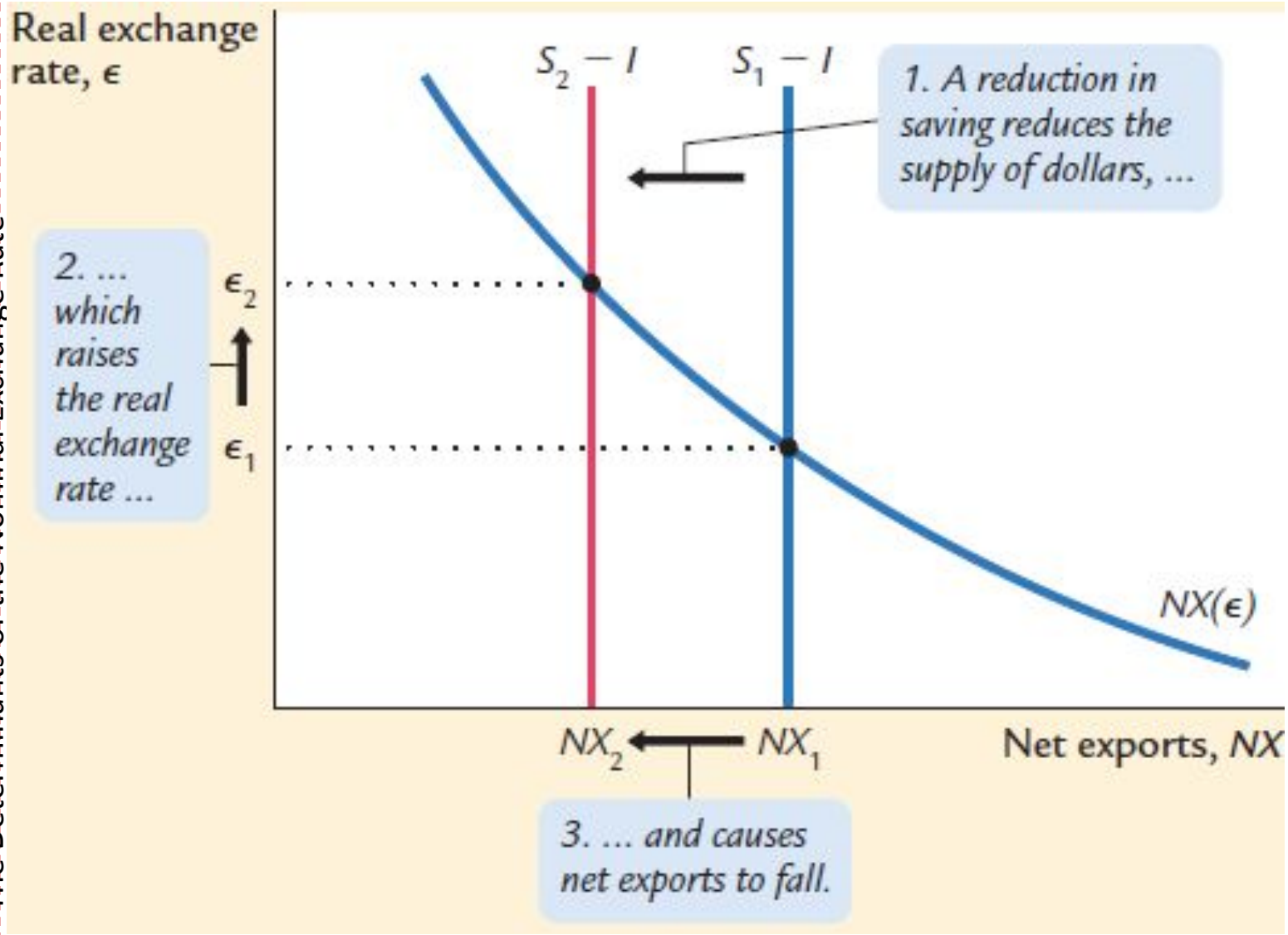

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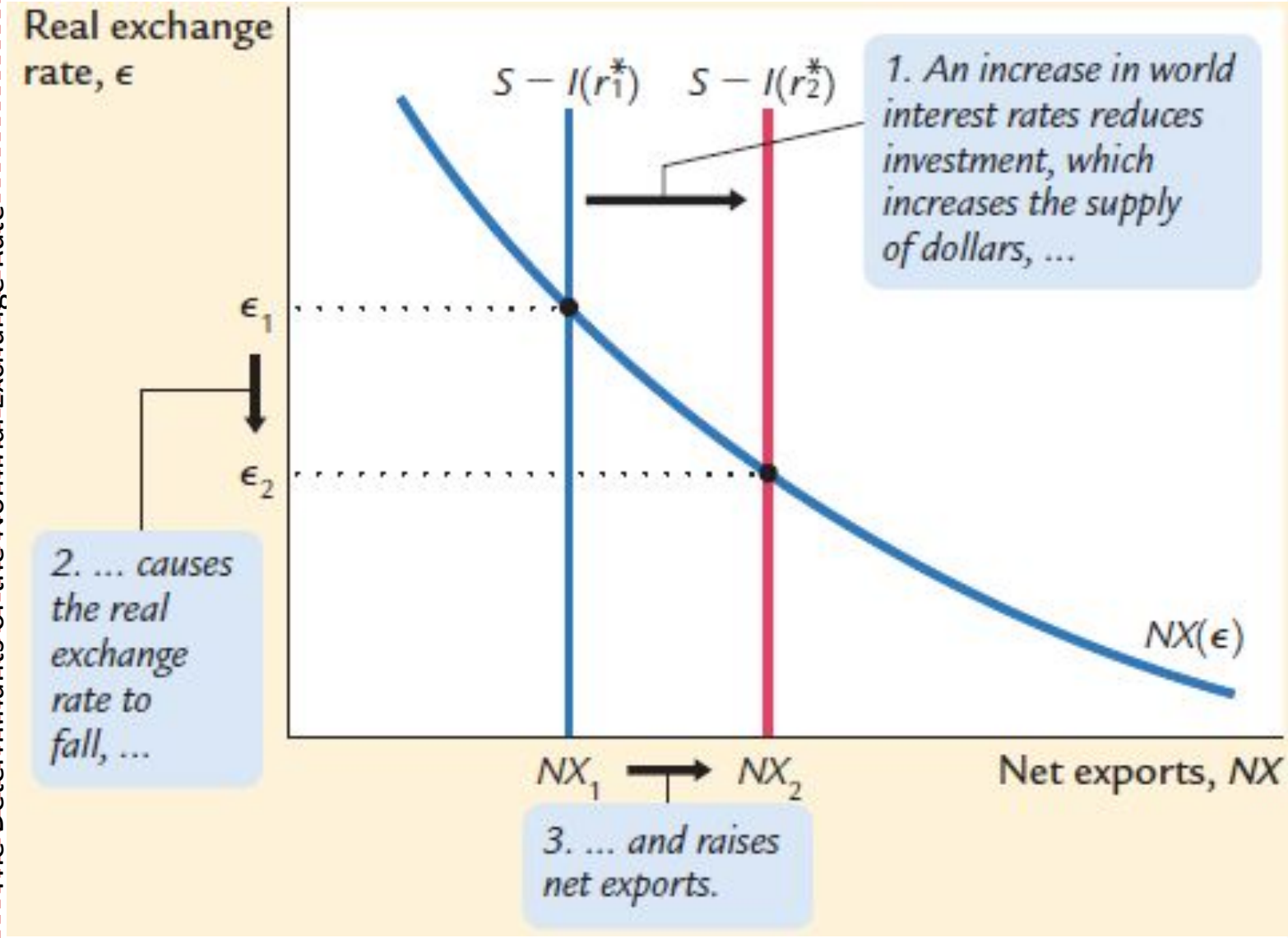

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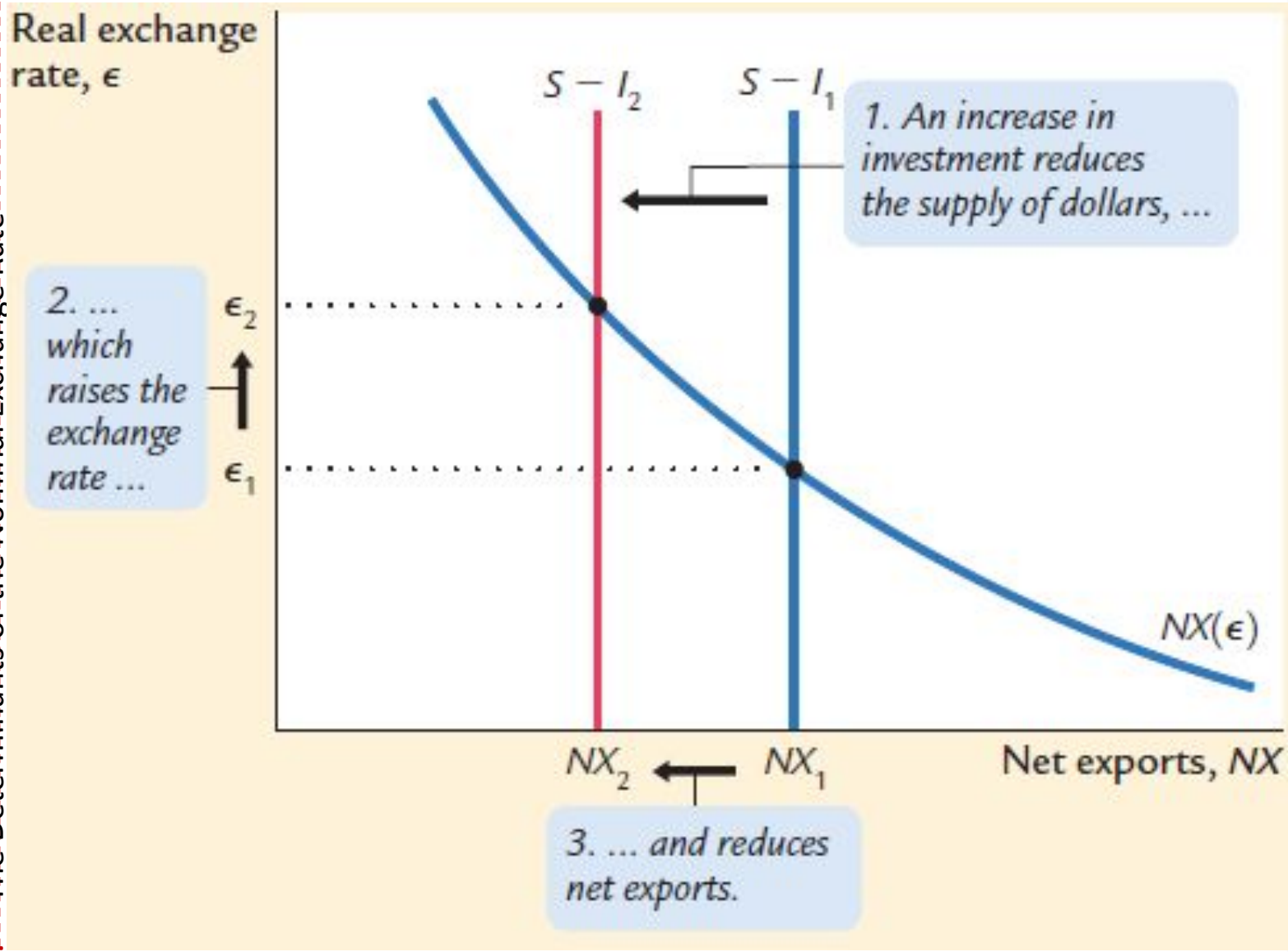

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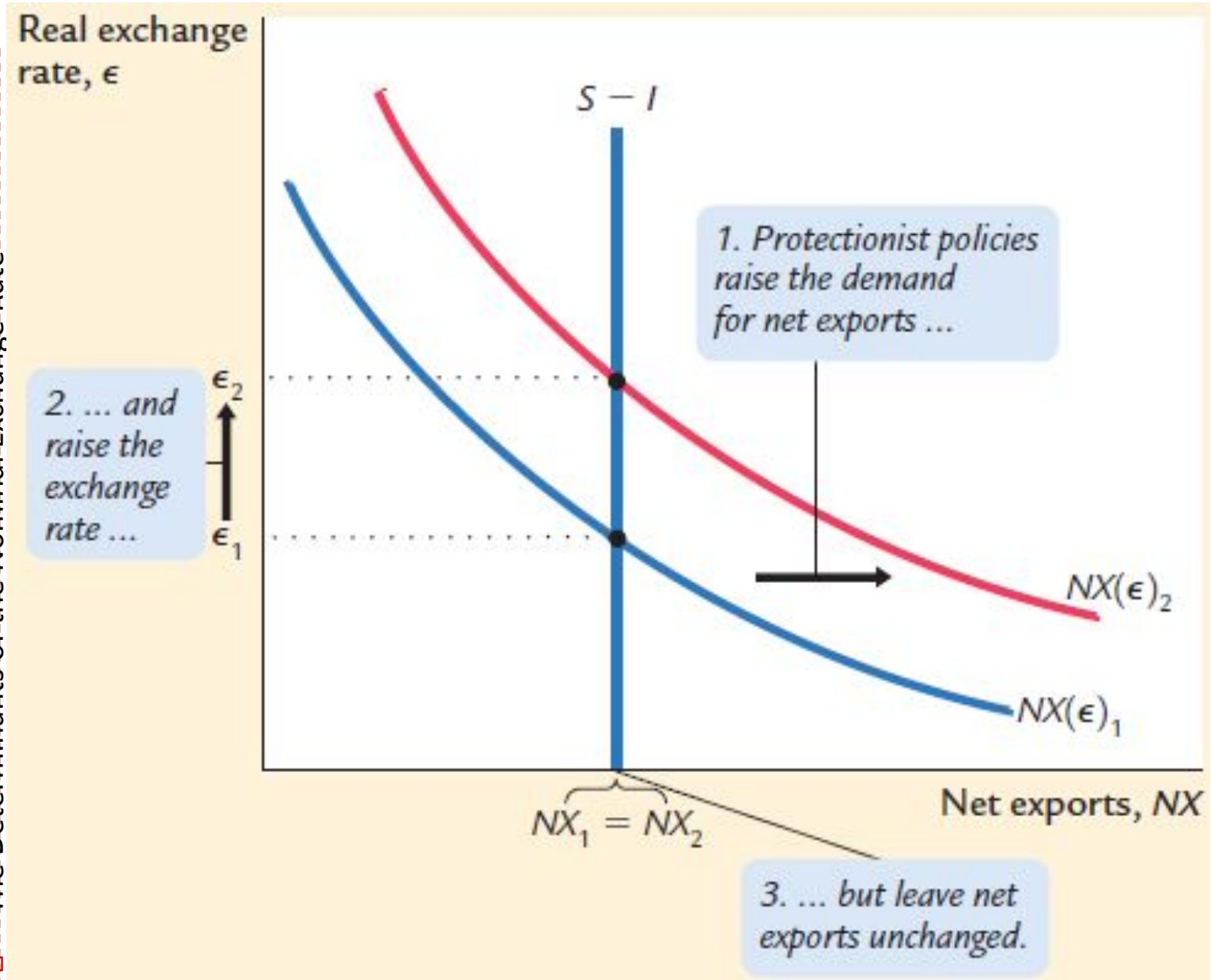

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- **The Determinants of the Nominal Exchange Rate**

$$\begin{matrix}\text{Real} \\ \text{Exchange} \\ \text{Rate}\end{matrix} = \begin{matrix}\text{Nominal} \\ \text{Exchange} \\ \text{Rate}\end{matrix} \times \begin{matrix}\text{Ratio of} \\ \text{Price} \\ \text{Levels}\end{matrix}$$

$$\epsilon = e \times (P/P^*).$$

We can write the nominal exchange rate as

$$e = \epsilon \times (P^*/P).$$

$$\%\ \text{Change in } e = \%\ \text{Change in } \epsilon + \%\ \text{Change in } P^* - \%\ \text{Change in } P.$$

$$\begin{matrix}\%\ \text{Change in } e \\ \text{Percentage Change in} \\ \text{Nominal Exchange Rate}\end{matrix} = \begin{matrix}\%\ \text{Change in } \epsilon \\ \text{Percentage Change in} \\ \text{Real Exchange Rate}\end{matrix} + \begin{matrix}(\pi^* - \pi) \\ \text{Difference in} \\ \text{Inflation Rates.}\end{matrix}$$

If a country has a high rate of inflation relative to the United States, a dollar will buy an increasing amount of the foreign currency over time. If a country has a low rate of inflation relative to the US, a dollar will buy a decreasing amount of the foreign currency over time.

This analysis shows how monetary policy affects the nominal exchange rate. Just as growth in the amount of money raises the price of goods

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- **The Determinants of the Nominal Exchange Rate**

- **If a country has a high rate** of π
  - relative to the United States,
    - **a dollar will buy an increasing**

amount of the foreign currency over time.

- **If a country has a low rate** of π
  - relative to the US,
    - **a dollar will buy a decreasing**

amount of the foreign currency over time.

This analysis shows how monetary policy affects the nominal exchange rate.

Just as **growth in the amount of money** raises the **price of goods** measured in terms of money, it also tends to raise **the price of foreign currencies** measured in terms of the domestic currency.

The Special Case of Purchasing-Power Parity

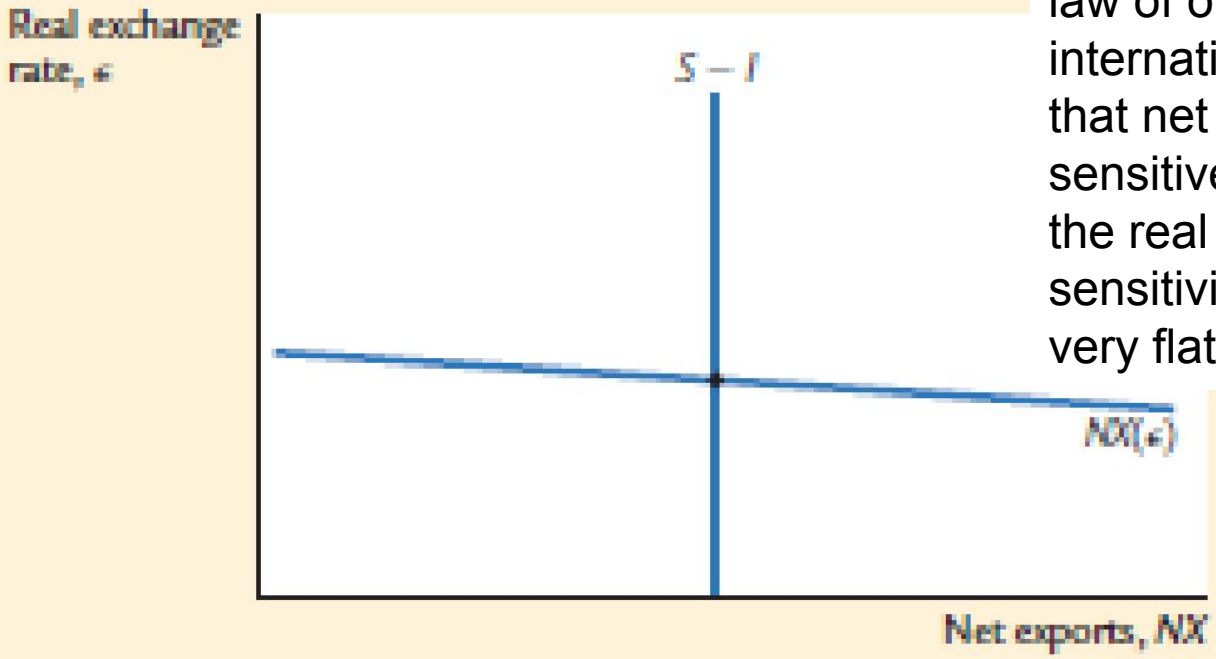
1. **The law of one price applied to the international marketplace is called purchasing- power parity.**

2. **It states that if international arbitrage is possible, then a dollar (or any other currency) must have the same purchasing power in every country.**

3. **If a dollar could buy more wheat domestically than abroad, there would be opportunities to profit by buying wheat domestically and selling it abroad.**
4. **Profit-seeking arbitrageurs would drive up the domestic price of wheat relative to the foreign price.**
5. A small decrease in the price of domestic goods relative to foreign goods—that is, a small decrease in the real exchange rate—causes arbitrageurs to buy goods domestically and sell them abroad.

The Special Case of Purchasing-Power Parity

FIGURE 6-14



Purchasing-Power Parity The law of one price applied to the international marketplace suggests that net exports are highly sensitive to small movements in the real exchange rate. This high sensitivity is reflected here with a very flat net-exports schedule.

PPP has two important implications.

- First, because the net-exports schedule is flat, changes in saving or investment do not influence the real or nominal exchange rate.
- Second, because the real exchange rate is fixed, all changes in the nominal exchange rate result from changes in price levels.

PPP does not provide a completely accurate description of the world

- Many goods are not easily traded.
- Tradable goods are not always perfect substitutes.

The Big Mac Around the World

Case Study

TABLE 6-2

Big Mac Prices and the Exchange Rate: An Application of Purchasing-Power Parity

Country	Currency	Price of a Big Mac	Exchange rate (per U.S. dollar)	
			Predicted	Actual
Indonesia	Rupiah	22534.00	5537	8523.0
Colombia	Peso	8400.00	2064	1771.0
South Korea	Won	3700.00	909	1056.0
Chile	Peso	1850.00	455	463.0
Hungary	Forint	760.00	187	188.0
Japan	Yen	320.00	78.6	78.4
Pakistan	Rupee	205.00	50.4	86.3
Philippines	Peso	118.00	29.0	42.0
India	Rupee	84.00	20.6	44.4
Russia	Rouble	75.00	18.4	27.8
Taiwan	NT Dollar	75.00	18.4	28.8
Thailand	Baht	70.00	17.2	29.8
Czech Republic	Koruna	69.30	17.0	17.0
Sweden	Krona	48.40	11.9	6.3
Norway	Kroner	45.00	11.1	5.4

6-4 Conclusion: The United States as a Large Open Economy

1. In this chapter we have seen how a **SOE** works.
   a. We have examined the determinants of the international flow of funds for capital accumulation and the international flow of goods and services.
   b. We have also examined the determinants of a country's real and nominal exchange rates.
2. Our analysis shows how various policies—monetary policies, fiscal policies, and trade policies—affect the trade balance and the exchange rate.
3. The economy we have studied is "small" in the sense that its interest rate is fixed by world financial markets.
   a. That is, we have assumed that this economy does not affect the world interest rate and that the economy can borrow and lend at the world interest rate in unlimited amounts.
   b. This assumption contrasts with the assumption we made when we studied the closed economy in Chapter 3.
4. In the **closed economy,** the domestic interest rate equilibrates domestic saving and domestic investment, implying that policies that influence saving or investment alter the equilibrium interest rate.

THANKS !