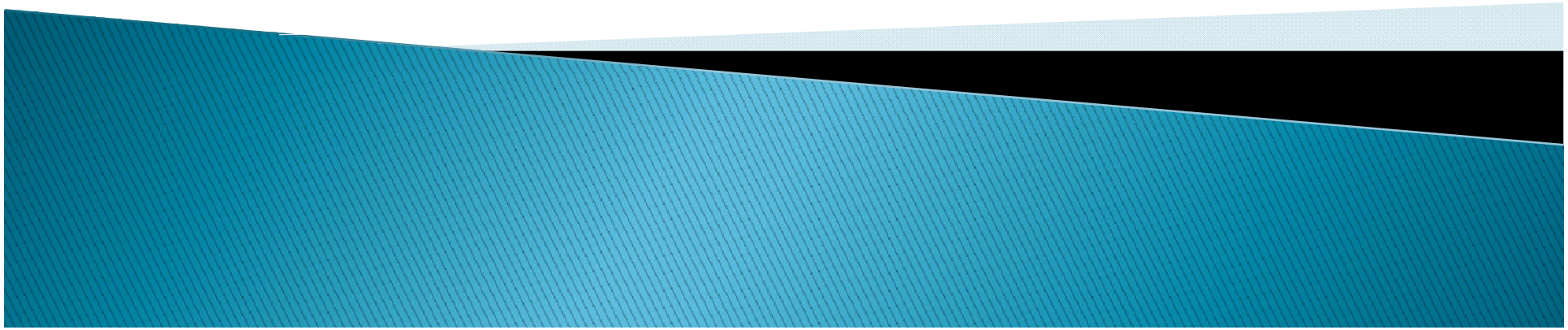
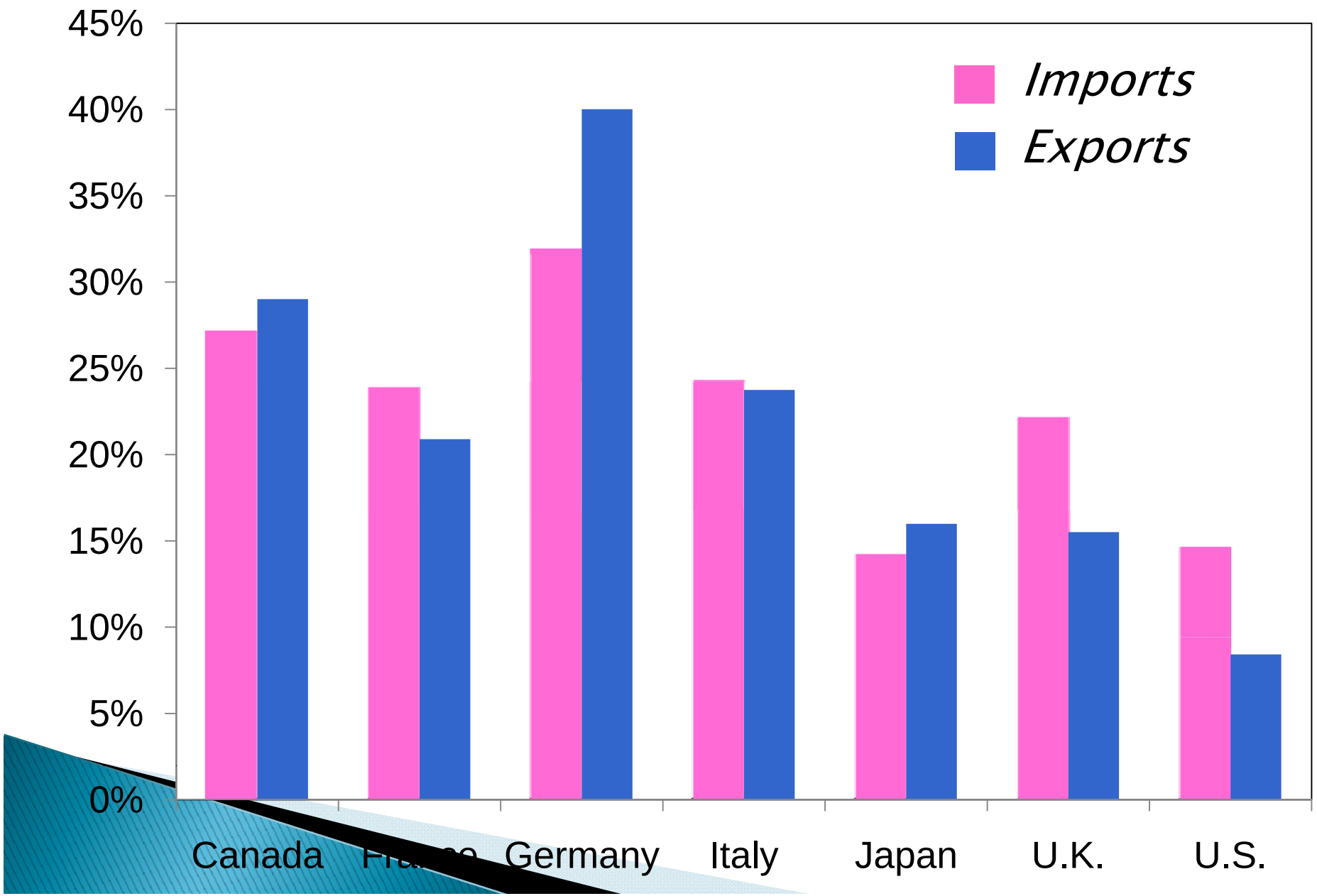
International Trade
College of International Studies
University of Tsukuba

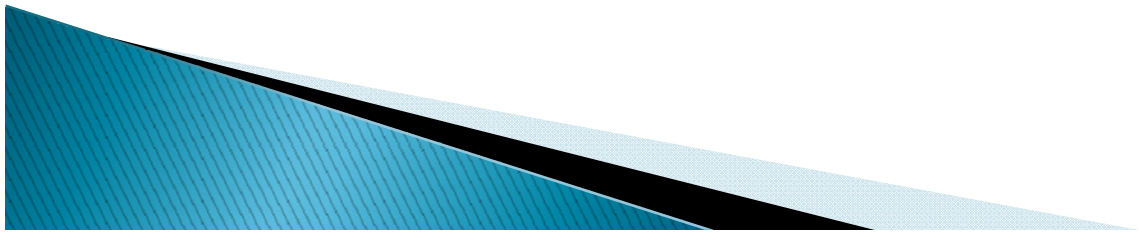


Imports and exports (% of GDP), 2007



In an open economy,

- spending need not equal output
- saving need not equal investment



Balance of Payments Accounts(kokusai shushi)

- A country's balance of payments accounts accounts for its payments to and its receipts from foreigners.
- An international transaction involves two parties, and each transaction enters the accounts twice: once as a credit (+) and once as a debit (−).

Balance of Payments Accounts (cont.)

- The balance of payments accounts are separated into 3 broad accounts:
  - **current account**: accounts for flows of goods and services (imports and exports)+income account.
  - **Capital accounts** for flows of financial assets (financial capital) and flows of special categories of assets (capital): typically nonmarket, non-produced, or intangible assets like debt forgiveness, copyrights and trademarks.

Example of Balance of Payments Accounting

- You import BMW car from Germany.
- With its income, BMW buy Japanese stock.

Car import (*current account, Japan. import*)	−$80
A sale of Japanese(*Capital account, stock sale sale*)	+$80

Example of Balance of Payments Accounting (cont.)

- You buy lunch in France and pay by credit card.
- French restaurant receives payment from your credit card company.

Meal purchase (*current account, Japan service import*)	−$30
Sale of credit card claim (*Capital account , Japanese asset sale*)	+$30

Example of Balance of Payments Accounting (cont.)

- You buy a share of BP.
- BP deposits the money in a Japanese bank.

Stock purchase (*Capital account, Japanese asset purchase*)	–$90
Bank deposit (*Capital, Japanese asset sale*)	+$90

Example of Balance of Payments Accounting (cont.)

- Japanese banks forgive a $50 M debt owed by the government of Argentina through debt restructuring.
- Japanese banks who hold the debt thereby reduce the debt by crediting Argentina's bank accounts.

Debt forgiveness (*capital account, Japanese transfer payment*)	–$50 M
Reduction in bank's claims (*capital Japanese asset sale*)	+$50 M

Example of Balance of Payments Accounting (cont.)

- Toyota sells a car to the US citizen. The US citizen pays the dollar to Toyota.
- Toyota bring its dollar to Japanese bank and exchange it with yen.
- Japanese bank bring its dollar to the central bank of Japan.
- Central bank of Japan exchange this dollar with yen with US Fedleral reserve bank.

Sale of Car (*Current account*, *Car sale*)	$50 M
A change of foreign reserve in the US federal serve()	-$50 M

How Do the Balance of Payments Accounts Balance?

- Due to the double entry of each transaction, the balance of payments accounts will balance by the following equation:

  current account +

  Capital account +

  Change of Foreign Reserve= 0

Balance of Payments Accounts

The 3 broad accounts are more finely divided:

- **Current account**: imports and exports
    1. merchandise (goods like DVDs) :trade account
    2. services (payments for legal services, shipping services, tourist meals, etc.)
    3. income receipts (interest and dividend payments, earnings of firms and workers operating in foreign countries) :income account

Balance of Payments Accounts (cont.)

- **Current account**:
- *In addition to the above items*
- *net unilateral transfers*
  - gifts (transfers) across countries that do not purchase a good or service nor serve as income for goods and services produced

Balance of Payments Accounts (cont.)

- **Capital account** the difference between sales of domestic assets to foreigners and purchases of foreign assets by domestic citizens.
- **Financial inflow**
  - Foreigners loan to domestic citizens by buying domestic assets.
  - Domestic assets sold to foreigners are a credit (+) because the domestic economy acquires money during the transaction.
- **Financial outflow**
  - Domestic citizens loan to foreigners by buying foreign assets.
  - Foreign assets purchased by domestic citizens are a debit (–) because the domestic economy gives up money during the transaction.

Balance of Payments Accounts (cont.)

- **Statistical discrepancy**
  - Data from a transaction may come from different sources that differ in coverage, accuracy, and timing.
  - The balance of payments accounts therefore seldom balance in practice.
  - The statistical discrepancy is the account added to or subtracted from the financial account to make it balance with the current account and capital account.

Balance of Payments Accounts (cont.)

- **Official (international) reserve assets**: foreign assets held by central banks to cushion against financial instability.
  - Assets include government bonds, currency, gold, and accounts at the International Monetary Fund.
  - Official reserve assets owned by (sold to) foreign central banks are a credit (+).b/c it export Japanese go bond to foreign countries. 外国の中央銀行に日本の国債や債権を輸出したと考えるため
  - Official reserve assets owned by (purchased by) the domestic central bank are a debit (–). b/c the central back imports foreign governmbet debt 中央銀行が外国の国債を輸入したと考えるため

Balance of Payments Accounts (cont.)

- Change of foreign reserve is called the **official settlements balance** or "balance of payments."
  - It is the sum of the current account, the capital account, and the statistical discrepancy.
  - A negative official settlements balance may indicate that a country
    - is depleting its official international reserve assets, or
    - may be incurring large debts to foreign central banks so that the domestic central bank can spend a lot to protect against financial instability.

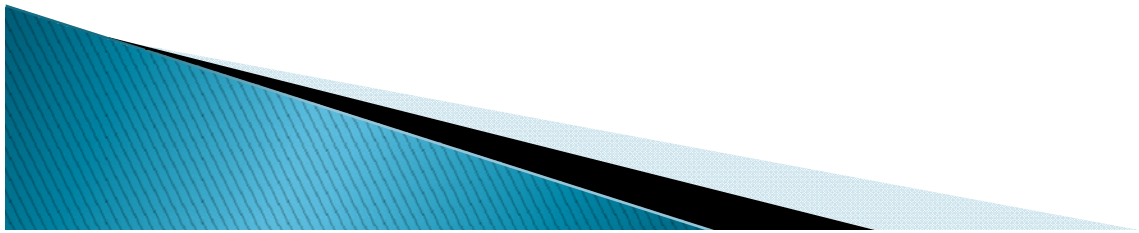
Japanese Foreign Reserve

(In millions of U.S. dollars)

End of year		Foregin Rserve					
		Gold and foreign exchange reserves					
			外貨 Foreign currency 1)	IMFリザーブポジション IMF reserve position 2)	SDR Special drawing rights of the IMF	金 Gold 3)	その他外貨準備 Other reserve assets
1990		77,053	69,488	3,317	3,042	1,206	-
1995		182,820	172,444	6,409	2,707	1,260	-
2000		361,638	347,212	5,253	2,436	6,737	-
2005		846,897	828,813	2,878	2,585	12,621	-
2009		1,049,397	996,552	4,313	20,968	27,161	403
2010		1,096,185	1,035,817	4,608	20,626	34,695	439
2011		1,295,841	1,220,785	17,181	19,745	37,666	464

Net Foreign Asset as a Share of GDP

Net foregin Asset as Percentage of GDP	
Japan	35.90%
Switzland	119.10%
Germany	8.90%
France	6.70%
Russia	0.70%
Itali	M6.7%
Canada	M12.9%
UK	M17.8%



Preliminaries

$$C = C^d + C^f$$

$$I = I^d + I^f$$

$$G = G^d + G^f$$

superscripts:

d = spending on domestic goods

f = spending on foreign goods

EX = exports = foreign spending on domestic goods

IM = imports = $C^f + I^f + G^f$ = spending on foreign goods

NX = net exports (*a.k.a.* the "trade balance") = *EX* – *IM=trade account(boueki shushi)*

GDP = expenditure on domestically produced g & s

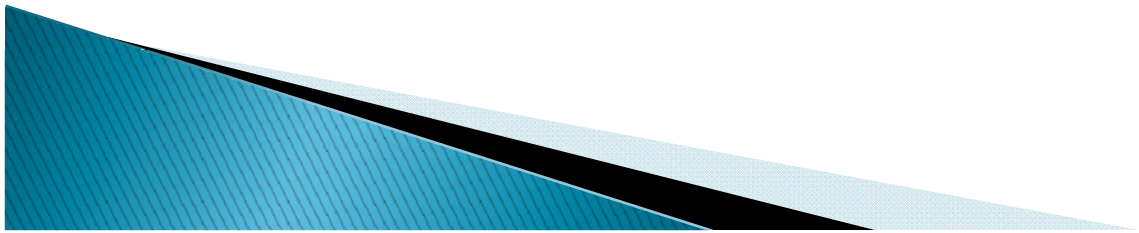
$$Y = C^d + I^d + G^d + EX$$

$$= (C - C^f) + (I - I^f) + (G - G^f) + EX$$

$$= C + I + G + EX - (C^f + I^f + G^f)$$

$$= C + I + G + EX - IM$$

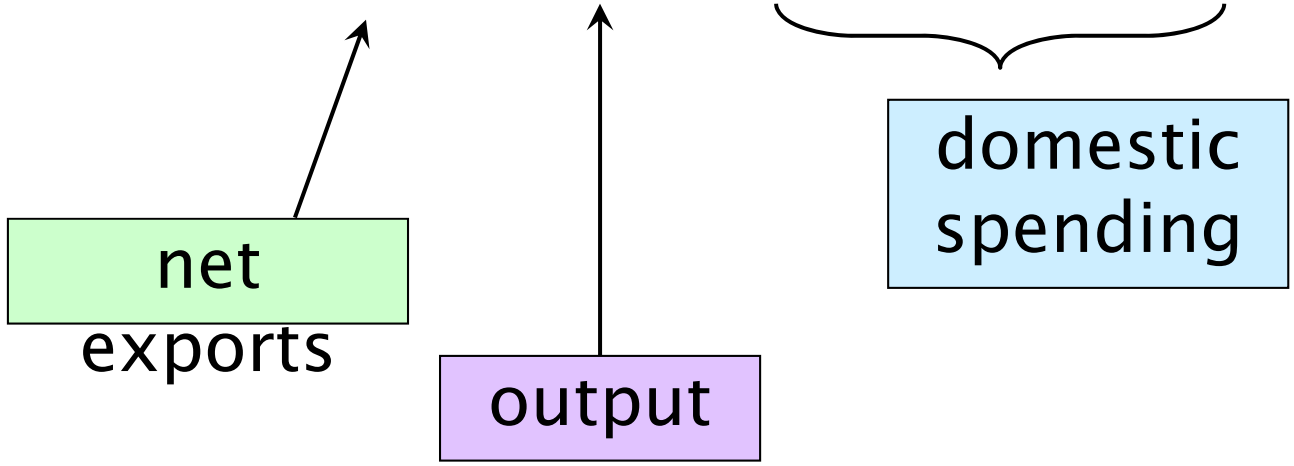
$$= C + I + G + NX$$



The national income identity in an open economy

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

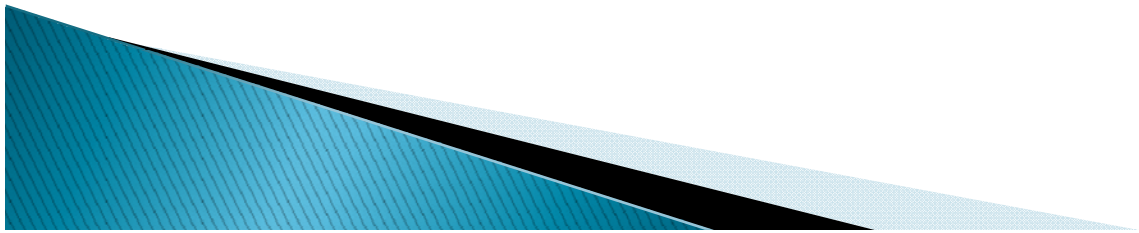
or, $$NX = Y - (C + I + G)$$



Trade Account

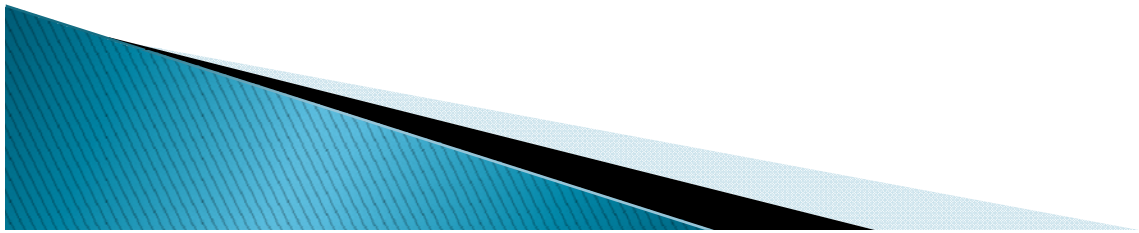
$$\textit{Trade account} = NX = EX - IM = Y - (C + I + G)$$

- **Trade account surplus:**
  output > spending and exports > imports
  Size of the trade surplus = NX
- **Trade account deficit:**
  spending > output and imports > exports
  Size of the trade deficit = $-NX$



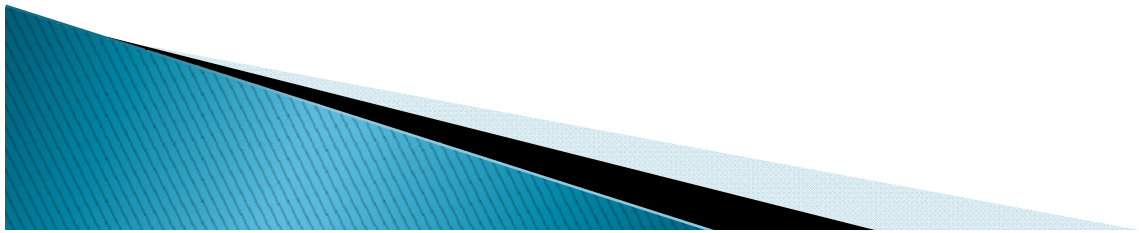
The relationship between Current Account and GNP

- GNP=GDP+ income earned by Japanese people in foreign countries –income earned by foreigners in Japan
- GNP=GDP+ income account
- GNP=C+I+G+NX+income account



Continued

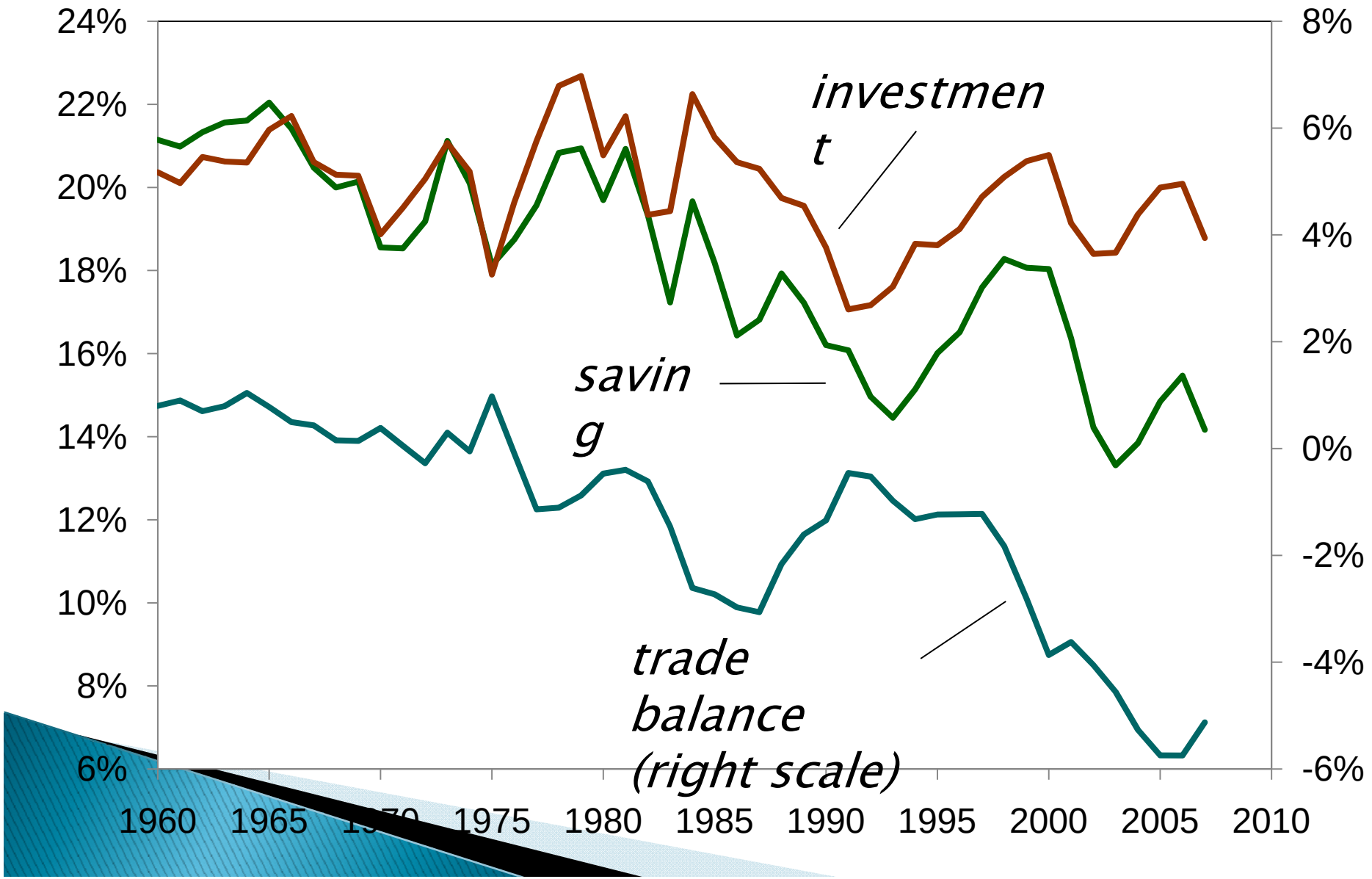
- But NX + income account is current account by definition
- GNP=C+I+G+CA
- GNP-C-G -I=CA
- GNP-T-C+T-G=CA
- S -I=CA



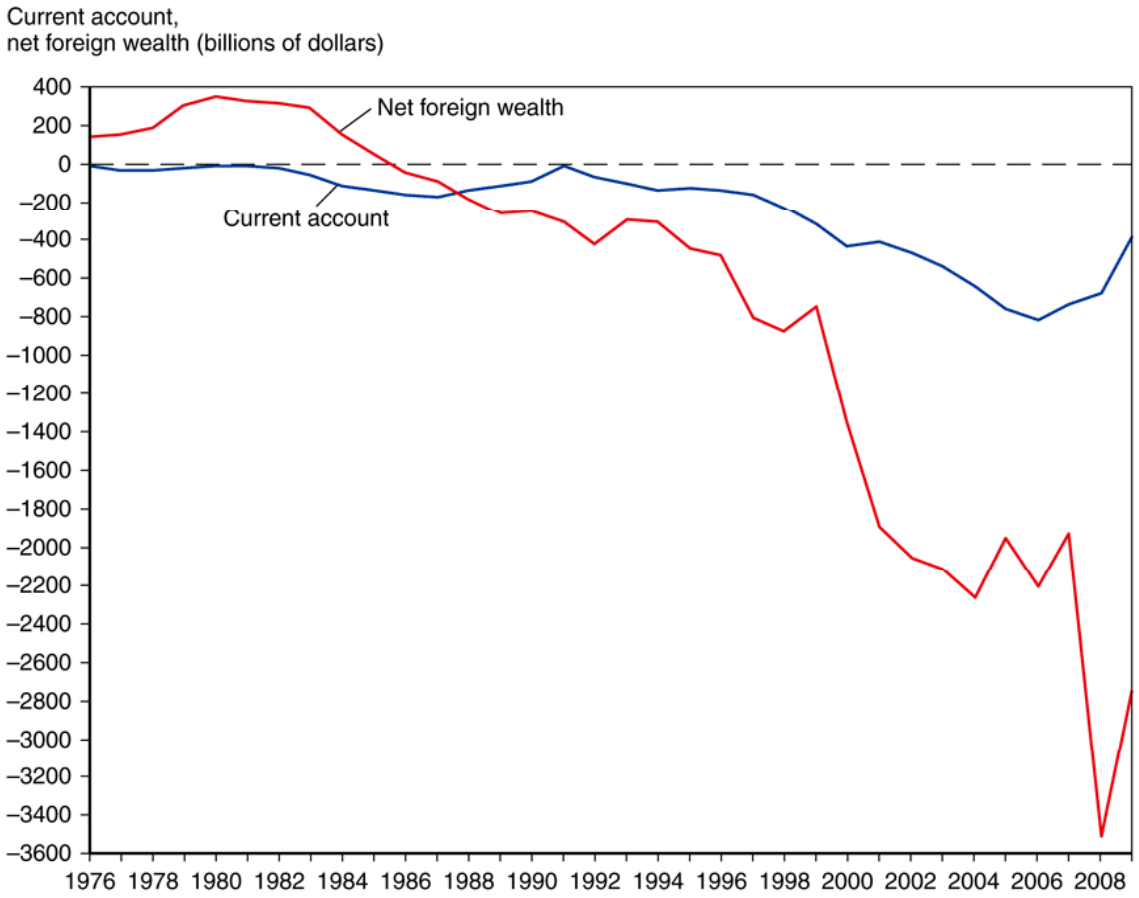
International capital flows

- **Net capital outflow**
  - = $S - I$
  - = net outflow of "loanable funds"
  - = net purchases of foreign assets
    - the country's purchases of foreign assets
      - minus foreign purchases of domestic assets
- When $S > I$, country is a net lender
- When $S < I$, country is a net borrower

Saving, investment, and the trade balance (percent of GDP) 1960–2007

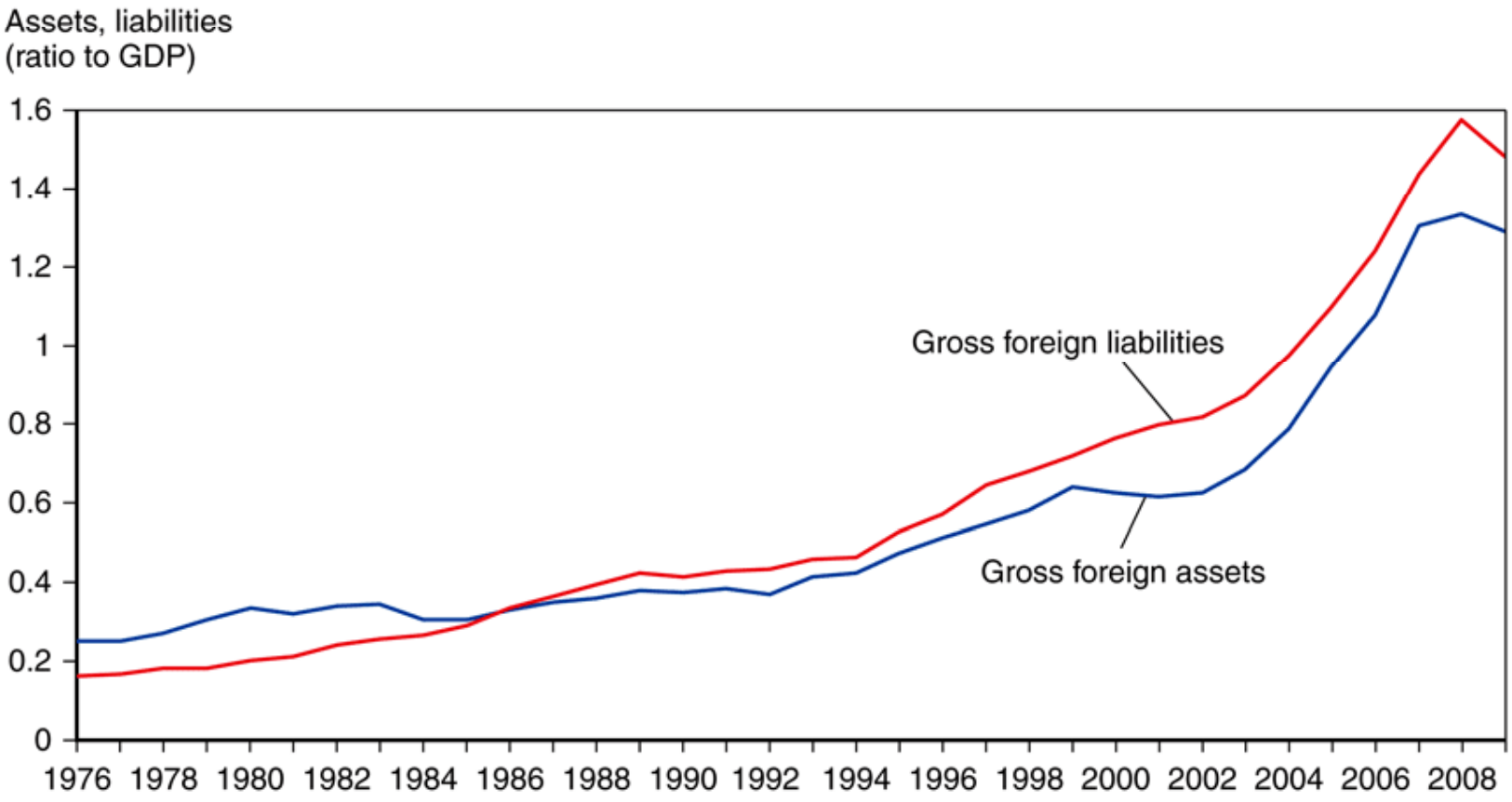


U.S. Current Account and Net Foreign Wealth, 1976–2009



Source: U.S. Department of Commerce, Bureau of Economic Analysis.

U.S. Gross Foreign Assets and Liabilities, 1976–2009



Source: U.S. Department of Commerce, Bureau of Economic Analysis, June 2010.

U.S. Balance of Payments Accounts

- The U.S. has the most negative net foreign wealth in the world, and so is therefore the world's largest debtor nation.
- Its current account deficit in 2009 was $378 billion dollars, so that net foreign wealth continues to decrease.
- The value of foreign assets held by the U.S. has grown since 1980, but liabilities of the U.S. (debt held by foreigners) has grown faster.

U.S. Balance of Payments Accounts (cont.)

- About 70% of foreign assets held by the U.S. are denominated in foreign currencies and almost all of U.S. liabilities (debt) are denominated in dollars.
- Changes in the exchange rate influence value of net foreign wealth (gross foreign assets minus gross foreign liabilities).
  - Appreciation of the value of foreign currencies makes foreign assets held by the U.S. more valuable, but does not change the dollar value of dollar-denominated debt for the U.S.

U.S.: "The world's largest debtor nation"

- Every year since 1980s: huge trade deficits and
  net capital inflows, *i.e.* net borrowing from abroad
- As of 12/31/2008:
  - U.S. residents owned $19.9 trillion worth of foreign assets
  - Foreigners owned $23.4 trillion worth of U.S. assets
  - U.S. net indebtedness to rest of the world: $3.5 trillion--higher than any other country, hence U.S. is the "world's largest debtor nation"

Saving and investment in a small open economy

- An open-economy version of the loanable funds model from Chapter 3.
- Includes many of the same elements:
  - production function
  - consumption function
  - investment function
  - exogenous policy variables

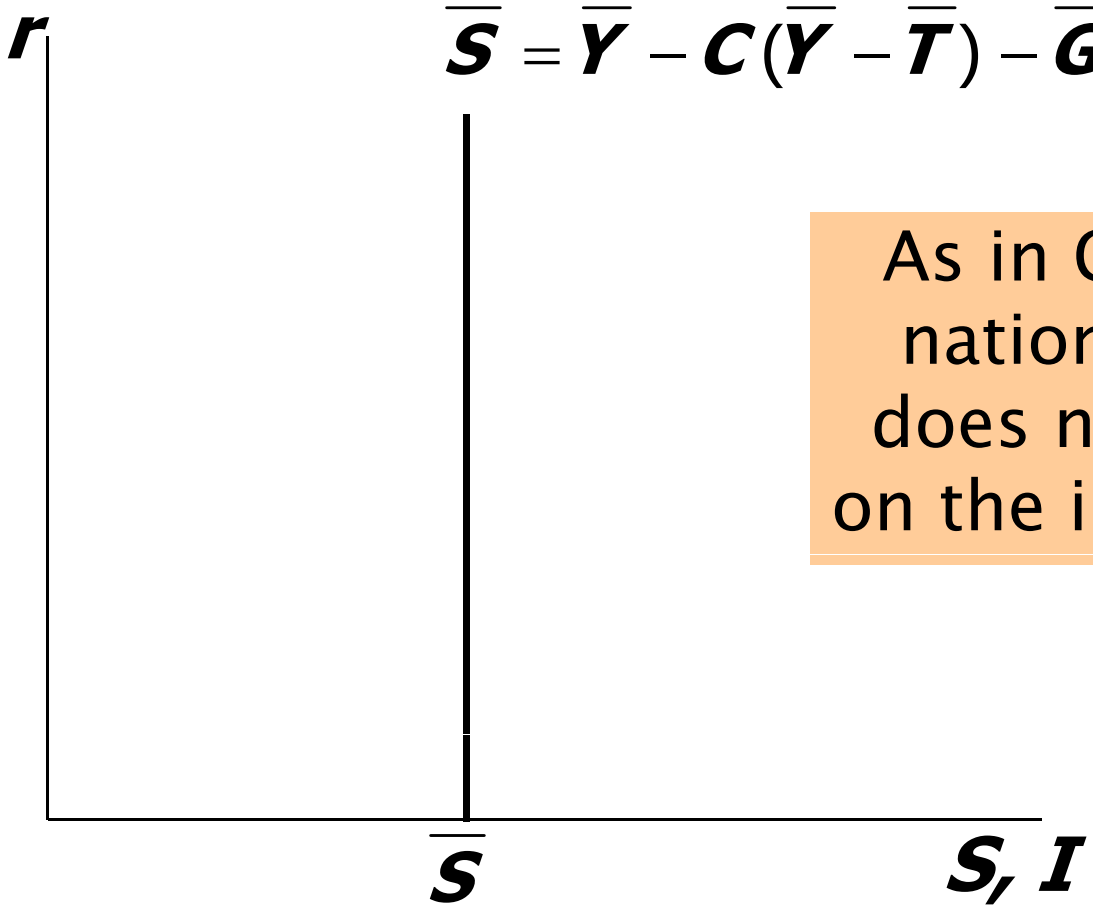
$$Y = \overline{Y} = F(\overline{K}, \overline{L})$$

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

$$I = I(r)$$

$$G = \overline{G}, \quad T = \overline{T}$$

National saving: The supply of loanable funds



As in Chapter 3, national saving does not depend on the interest rate

Assumptions about capital flows

a. domestic & foreign bonds are perfect substitutes (same risk, maturity, *etc.*)

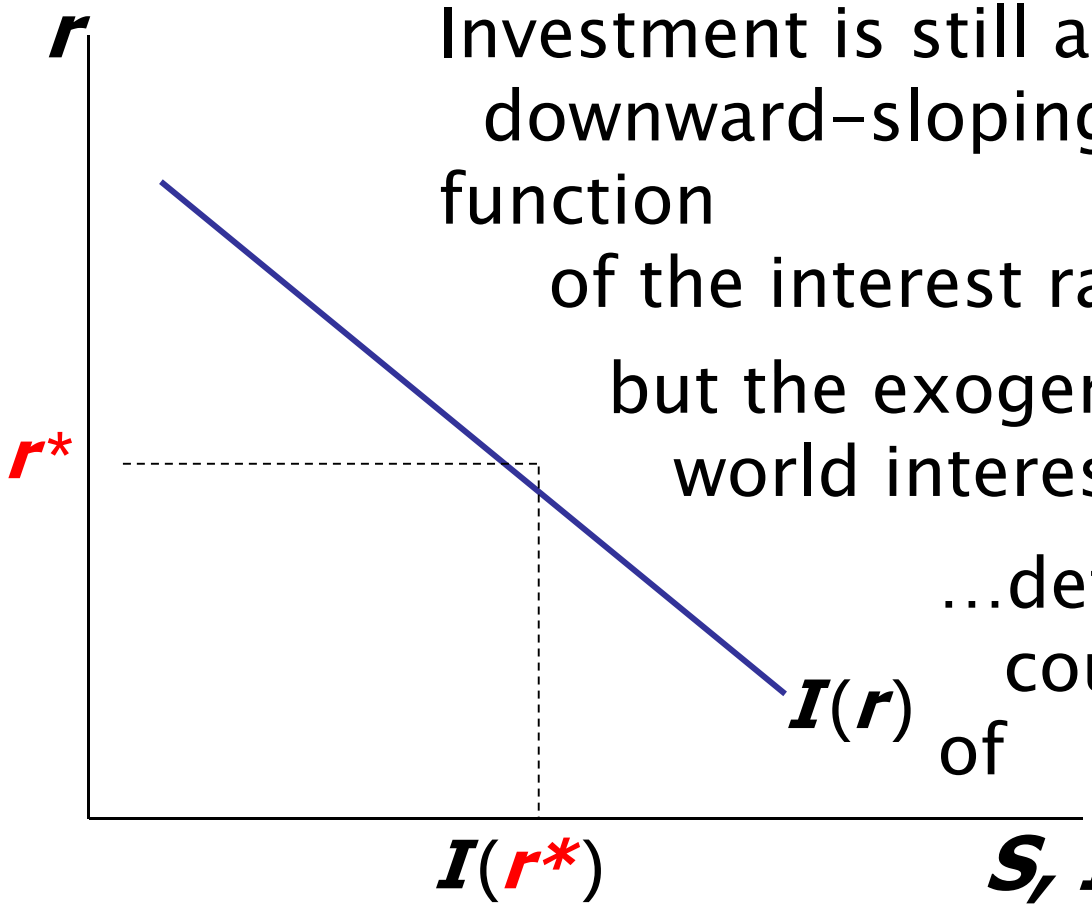
b. **perfect capital mobility**:
no restrictions on international trade in assets

c. economy is **small**:
cannot affect the world interest rate, denoted r^*

a & b imply $r = r^*$

c implies r^* is exogenous

Investment:
The demand for loanable funds



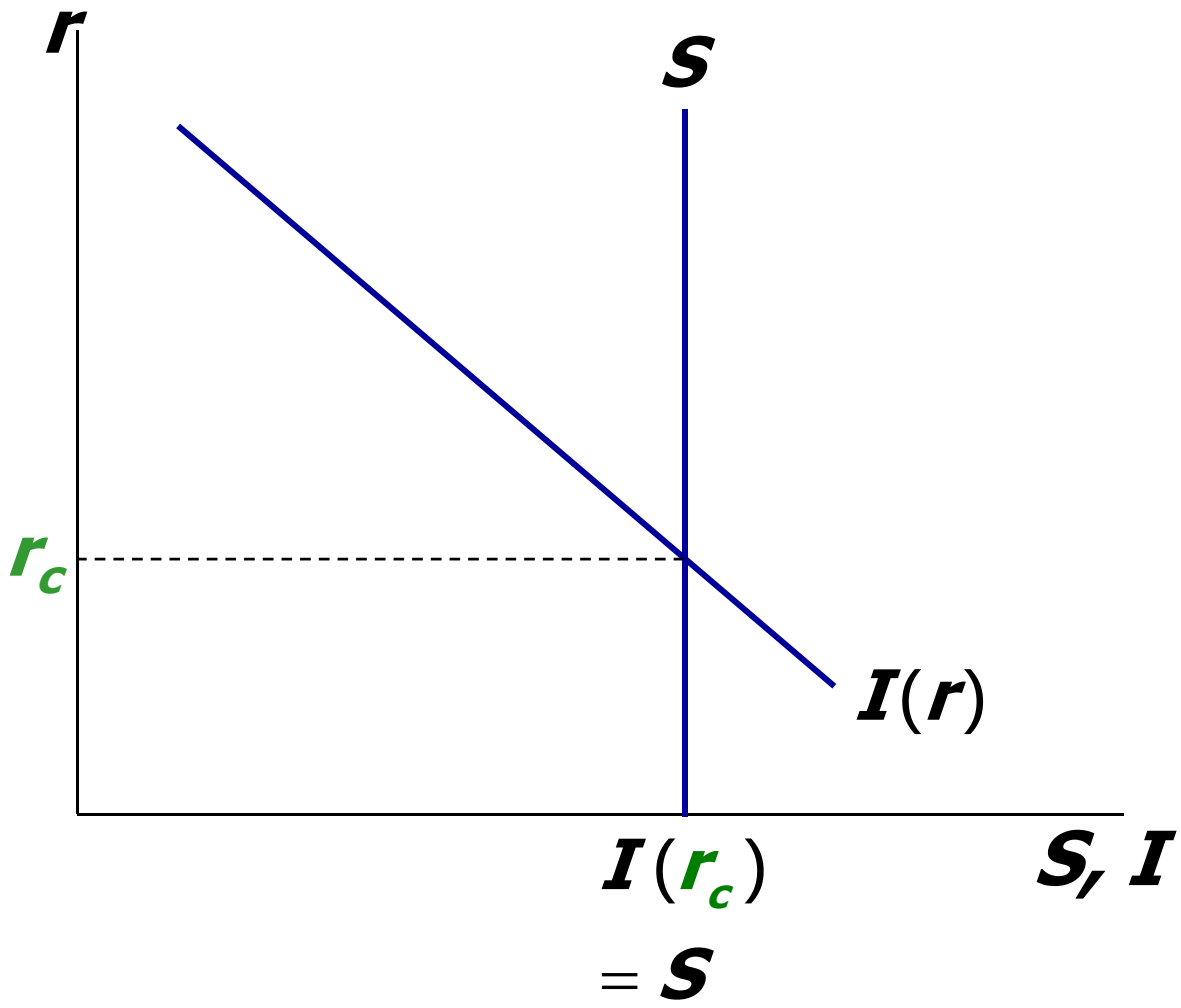
Investment is still a downward-sloping function of the interest rate,

but the exogenous world interest rate…

…determines the country's level of investment.

If the economy were closed…

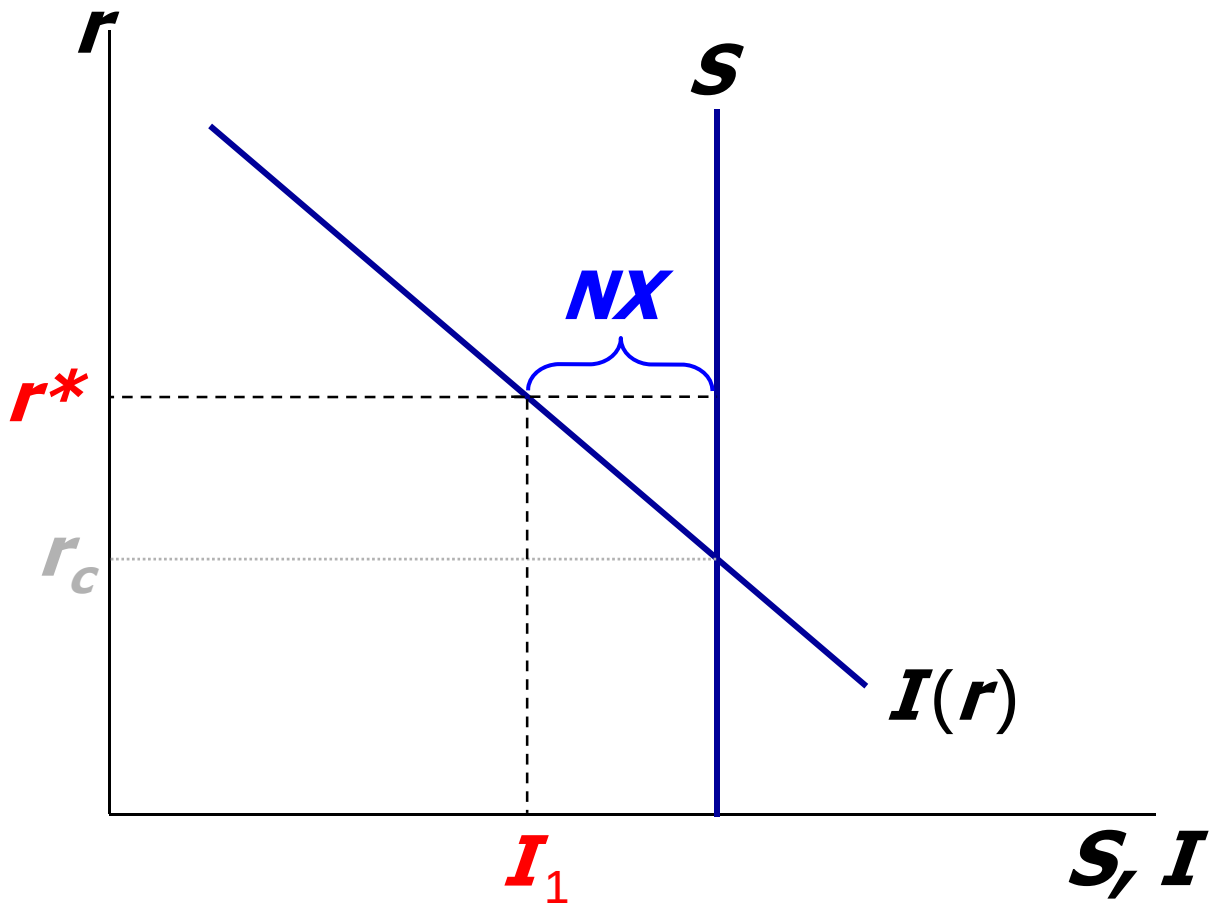
…the interest rate would adjust to equate investment and saving:



But in a small open economy…

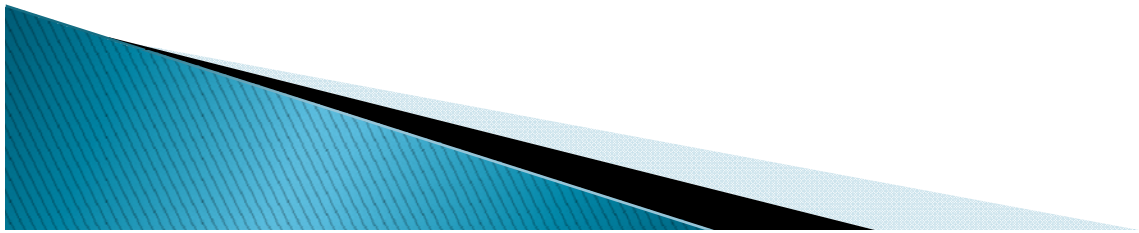
the exogenous world interest rate determines

…and the difference between saving and investment determines net capital outflow and net exports



Next, three experiments:

1. Fiscal policy at home
2. Fiscal policy abroad
3. An increase in investment demand (exercise)



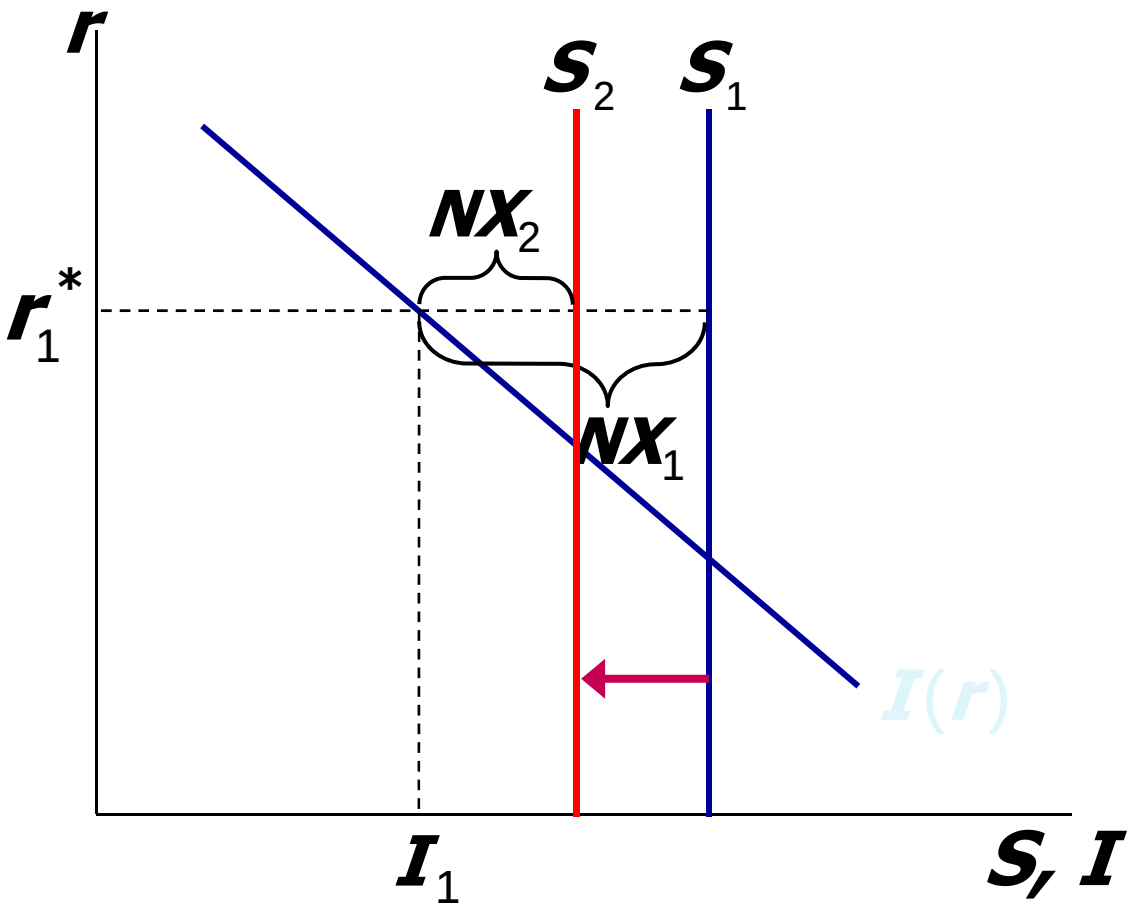
1. Fiscal policy at home

An increase in G or decrease in T reduces saving.

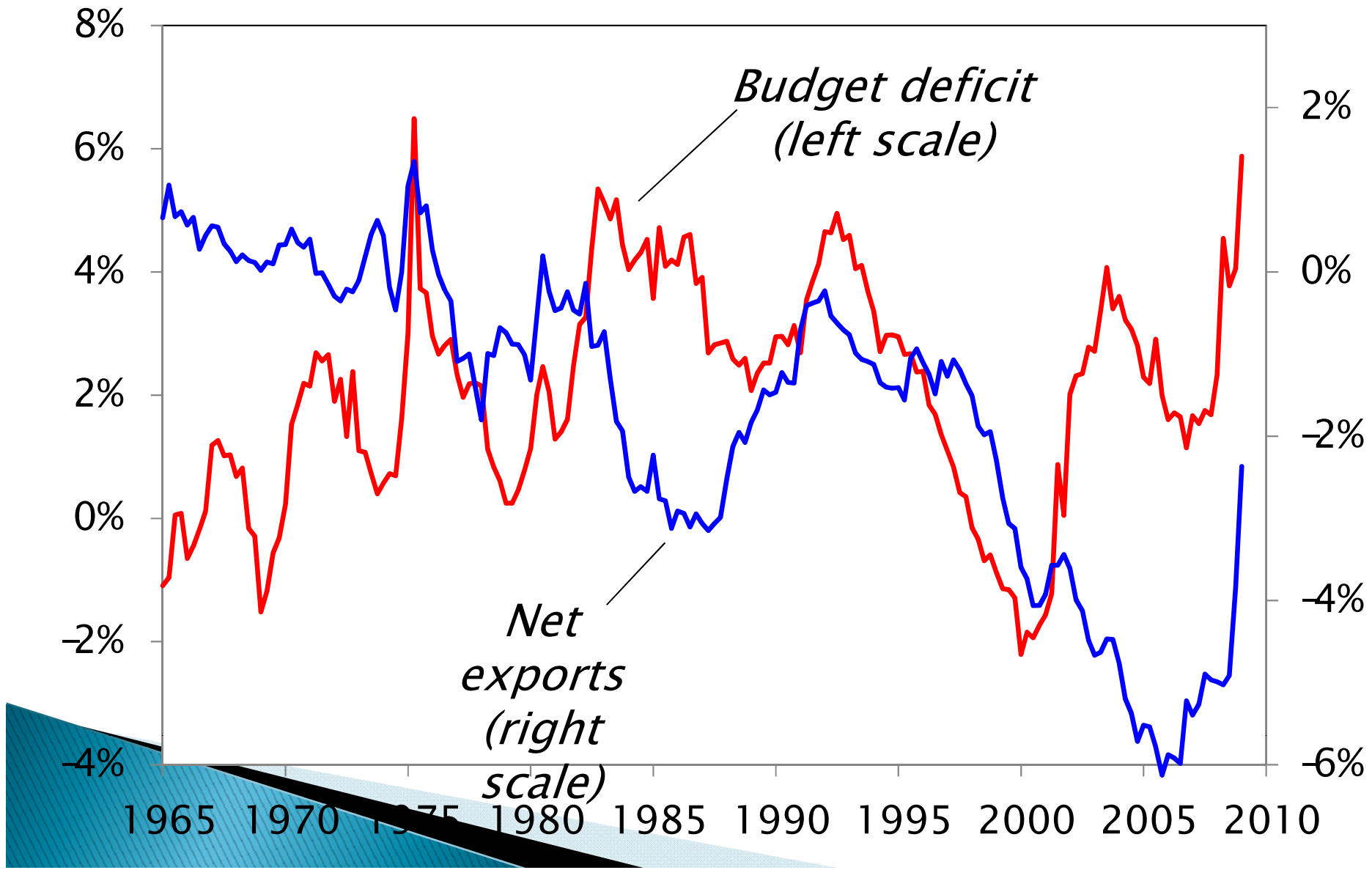
Results:

$$\Delta I = 0$$

$$\Delta NX = \Delta S < 0$$



NX and the federal budget deficit
(% of GDP), 1965–2009



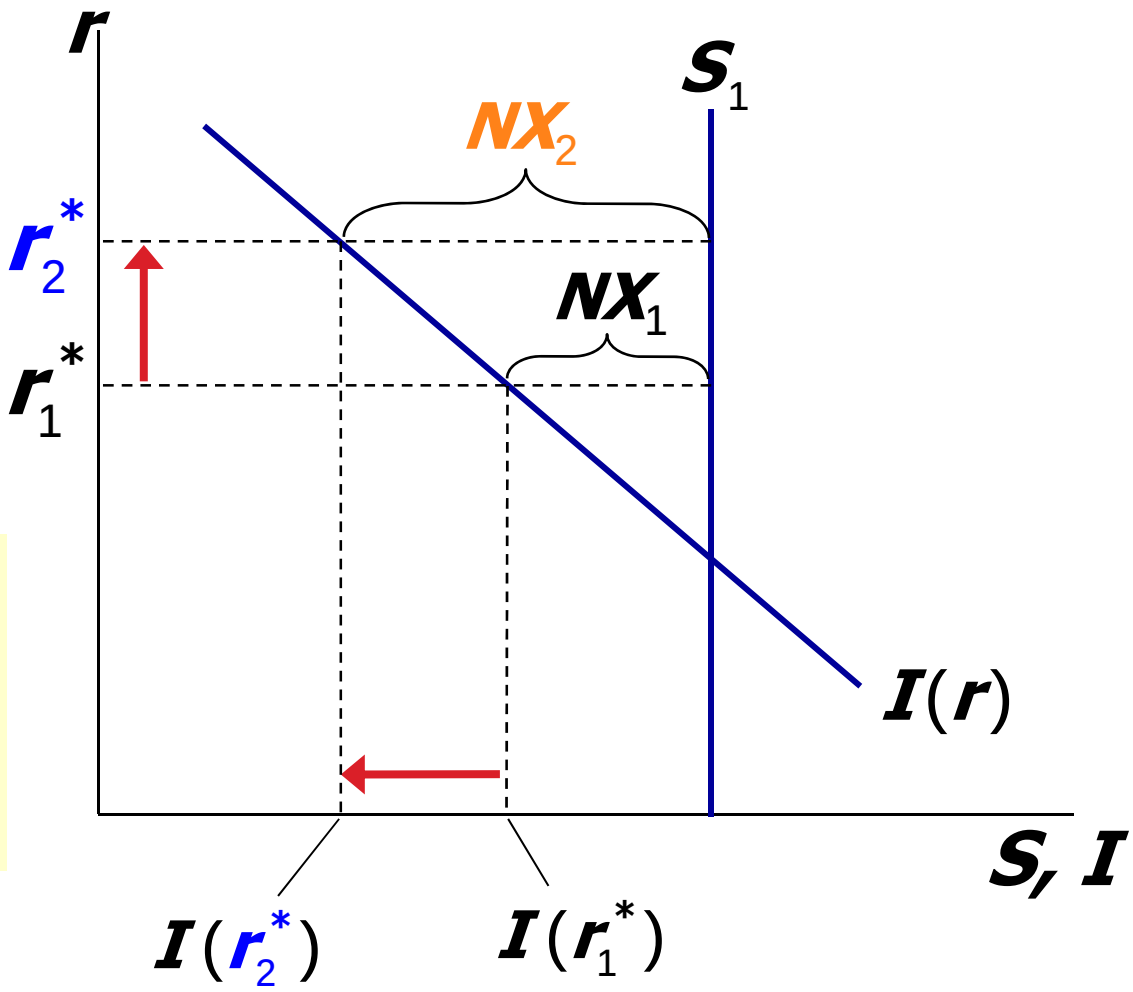
2. Fiscal policy abroad

Expansionary fiscal policy abroad raises the world interest rate.

Results:

$$\Delta I < 0$$

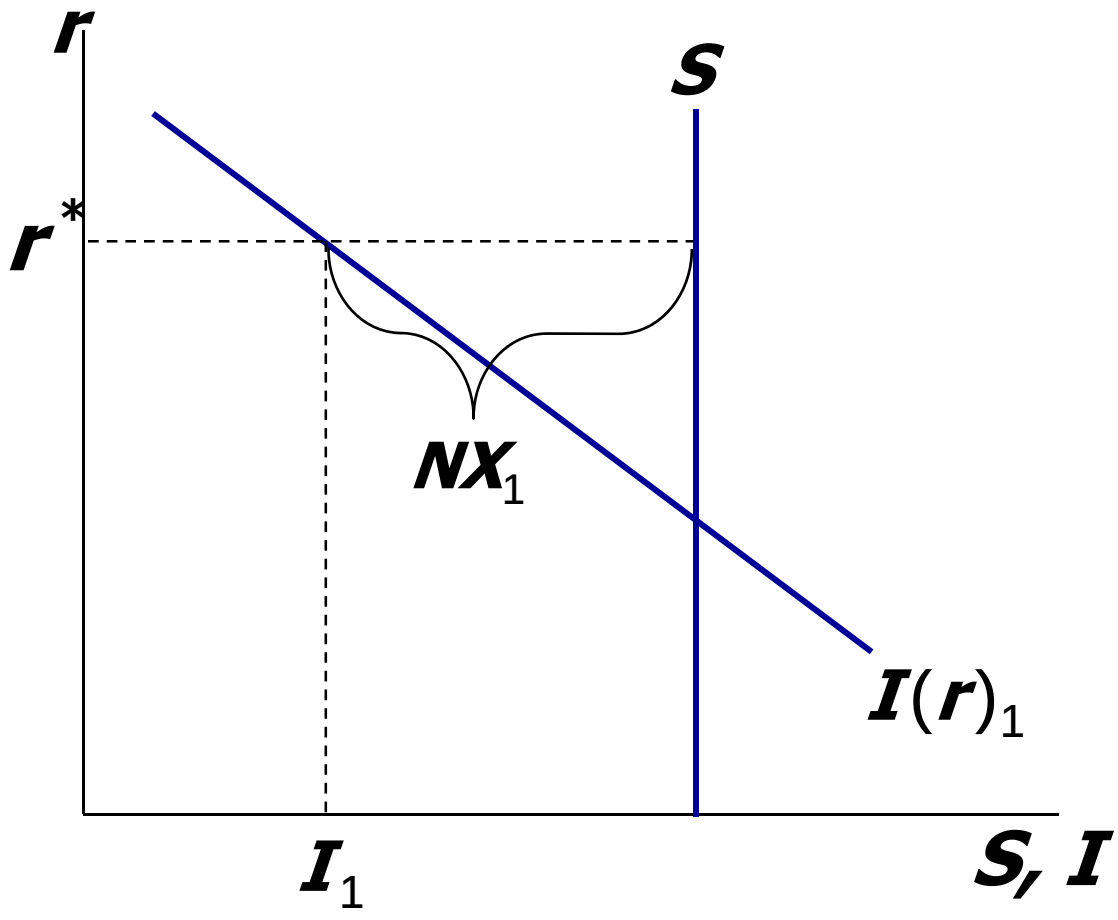
$$\Delta NX = -\Delta I > 0$$



NOW YOU TRY:

3. An increase in investment demand

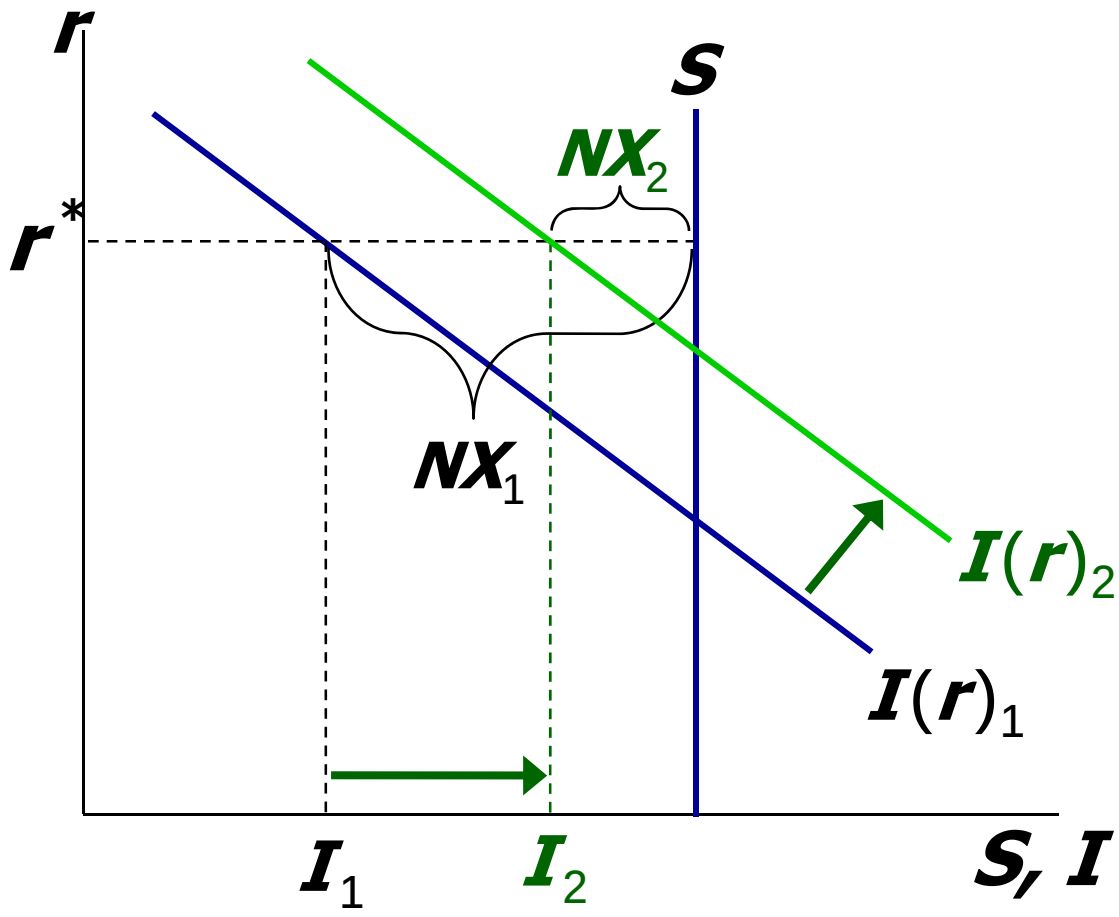
Use the model to determine the impact of an increase in investment demand on *NX*, *S*, *I*, and net capital outflow.



ANSWERS:

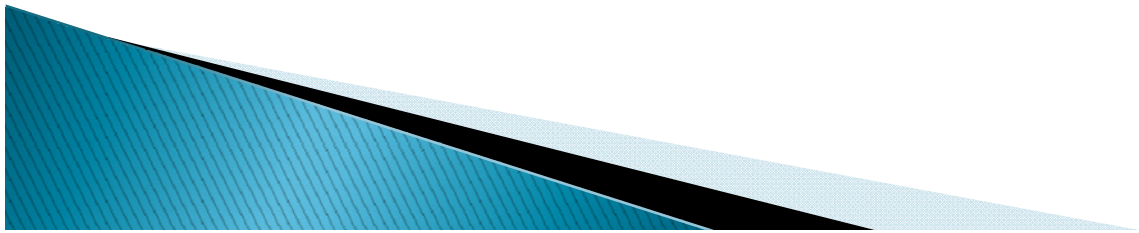
3. An increase in investment demand

$\Delta I > 0$,
$\Delta S = 0$,
net capital outflow and NX fall by the amount ΔI



The nominal exchange rate

e = nominal exchange rate,
the relative price of
domestic currency
in terms of foreign currency
(*e.g.* Yen per Dollar)



A few exchange rates, as of 10/04/2013

country	*exchange rate*
Euro area	0.733861 Euro/$
Indonesia	11220.599999 Rupiahs/$
Japan	97.081618 Yen/$
Mexico	13.159746 Pesos/$
Russia	32.091889 Rubles/$
South Africa	10.013388 Rand/$
U.K.	0.618347 Pounds/$

The real exchange rate

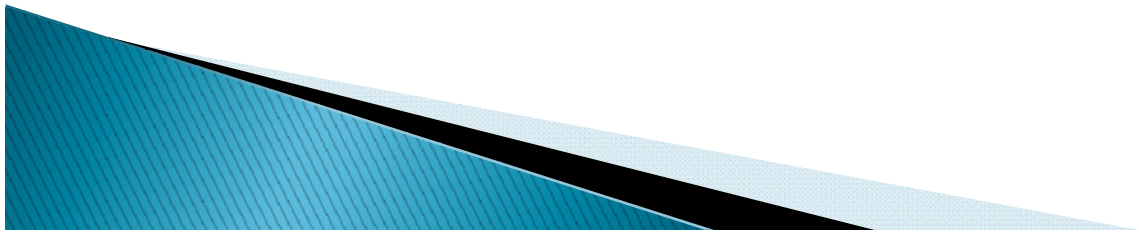
ε

the lowercase Greek letter epsilon

= real exchange rate,
the relative price of
domestic goods
in terms of foreign goods
(*e.g.* Japanese Big Macs per U.S. Big Mac)

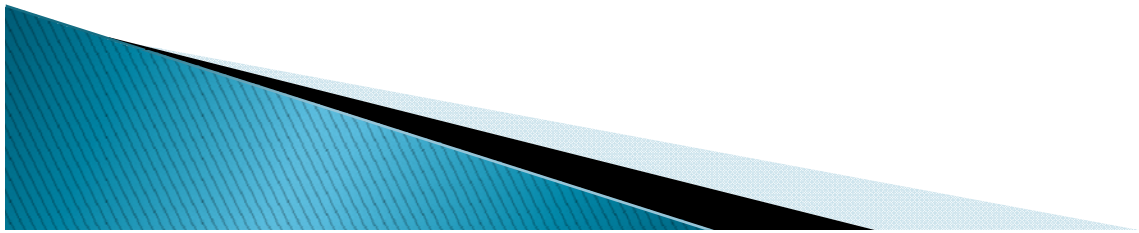
Understanding the units of ϵ

- Epsilon=e*P/P*
- Where p is the dometric price
- e is the value of one yen in terms of dollar
- P* is the price of US goods in terms of dollar
- Thus
- Epsilon measures the relative price of Japanese goods to the price of US goods.



Epsilon and NX

- When epsilon is high
- Japanese goods is relatively high
- A large import and small export
- When epsilon is small
- Japanese goods is relative cheap
- US goods is more expensive
- Less import and more export
- NX is a decreasing function of epsilon



~ McZample ~

- one good: Big Mac
- price in Japan:
  $P^* = 200$ Yen
- price in USA:
  $P = \$2.50$
- nominal exchange rate
  $e = 120$ Yen/\$

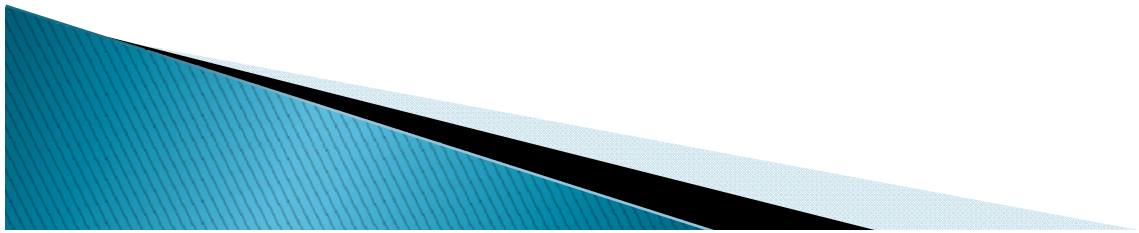
$$\varepsilon = \frac{e \times P}{P^*}$$

$$= \frac{120 \times \$2.50}{200 \text{ Yen}} = 1.5$$

To buy a U.S. Big Mac, someone from Japan would have to pay an amount that could buy 1.5 Japanese Big Macs.

ϵ in the real world & our model

- In the real world:
  We can think of ϵ as the relative price of a basket of domestic goods in terms of a basket of foreign goods
- In our macro model:
  There's just one good, "output."
  So ϵ is the relative price of one country's output in terms of the other country's output

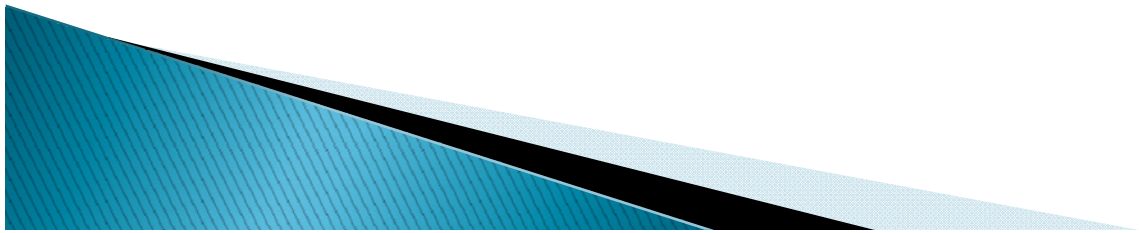


How *NX* depends on ϵ

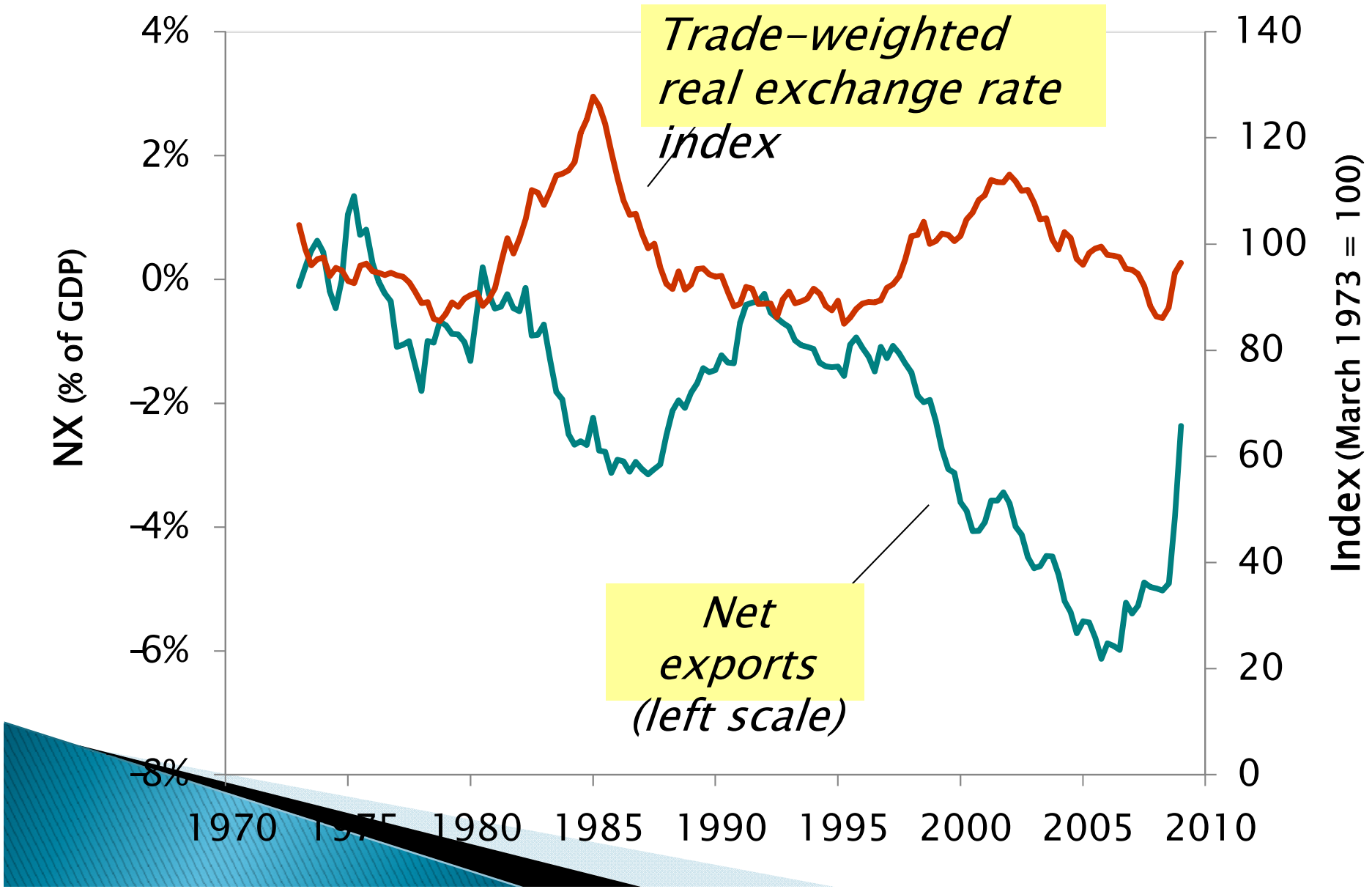
$\uparrow \epsilon \Rightarrow$ U.S. goods become more expensive relative to foreign goods

$\Rightarrow \downarrow EX, \uparrow IM$

$\Rightarrow \downarrow NX$



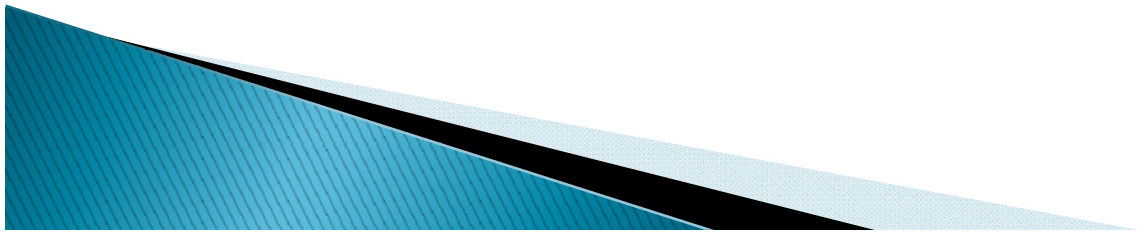
U.S. net exports and the real exchange rate, 1973–2009



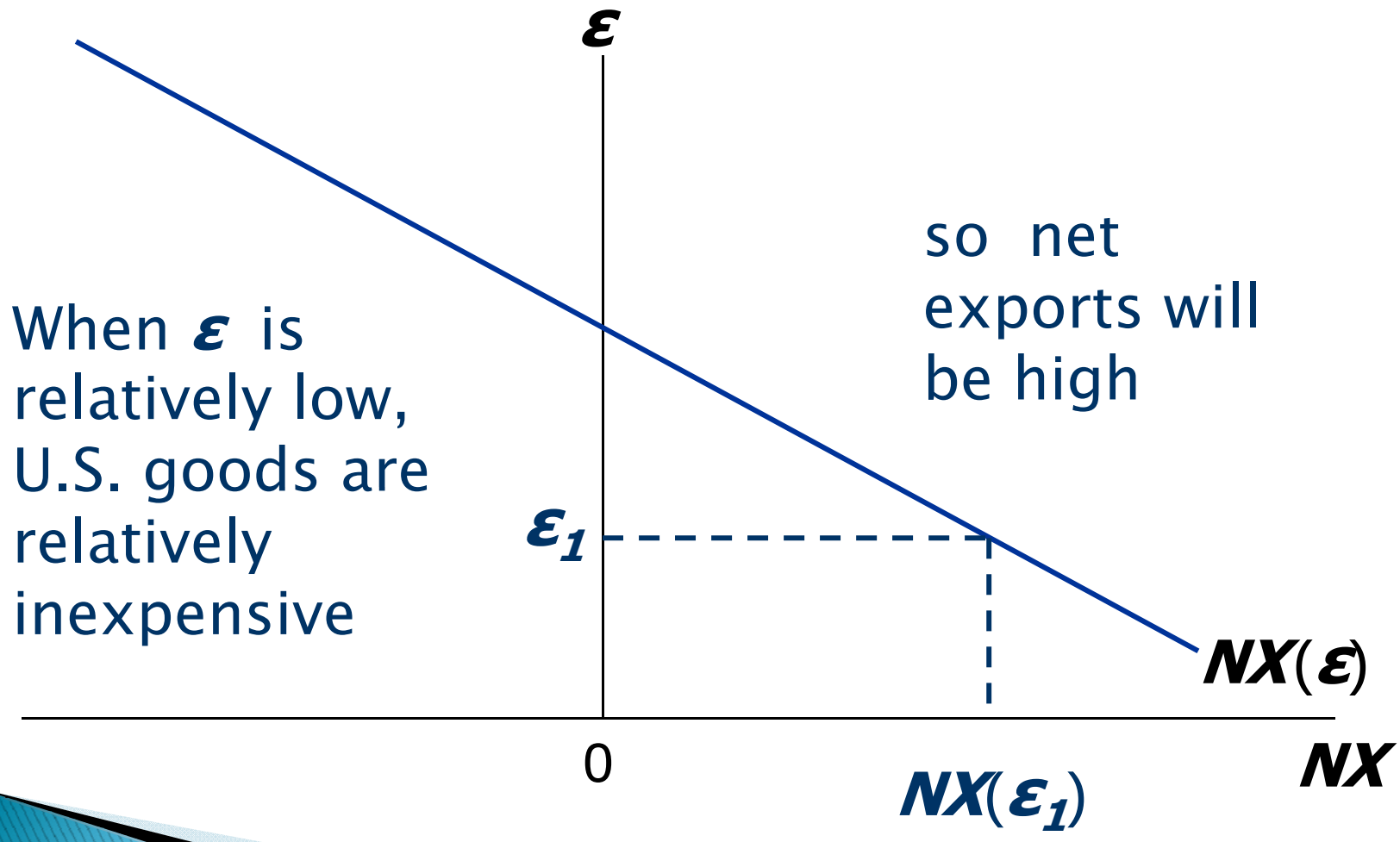
The net exports function

- The net exports function reflects this inverse relationship between NX and ε:

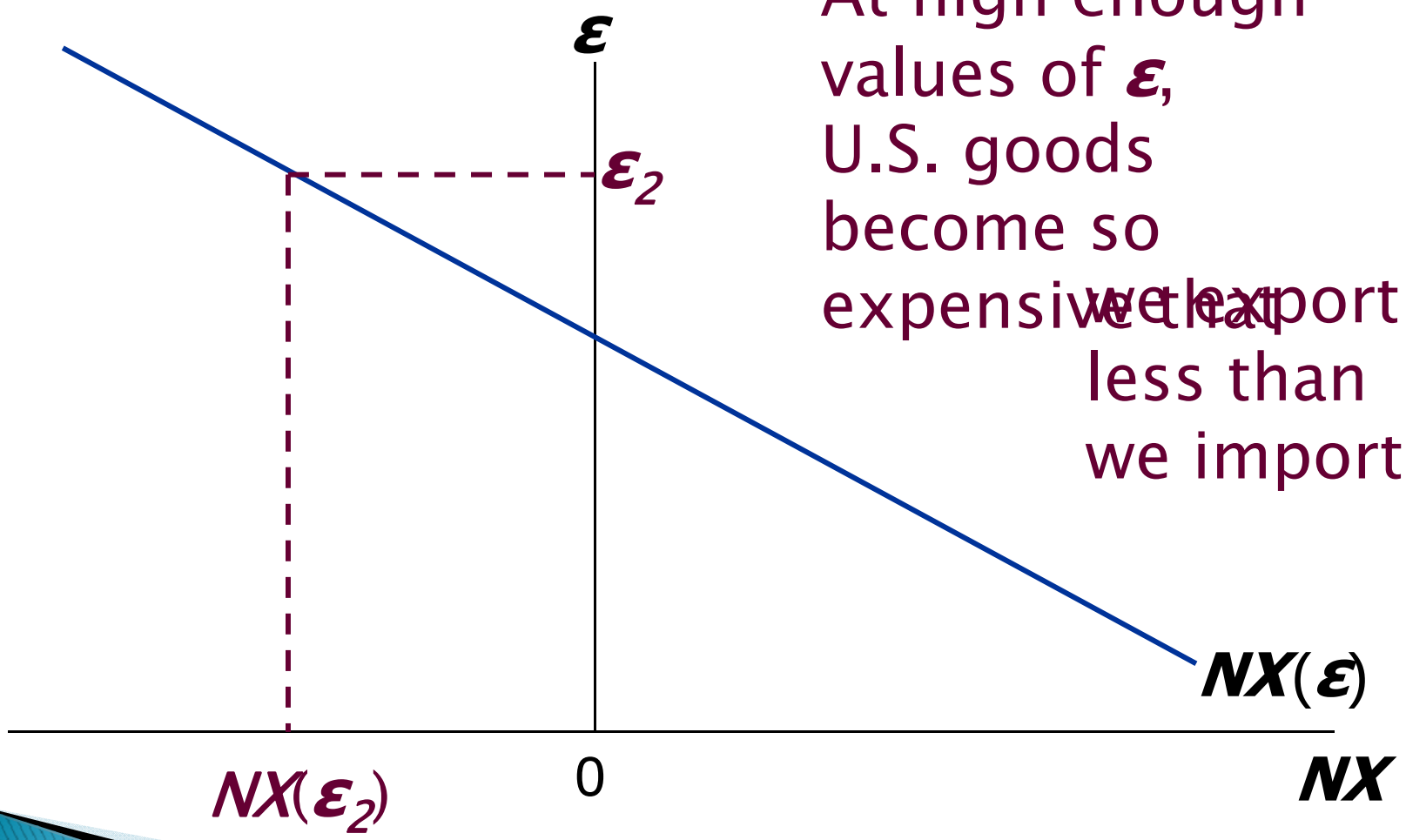
$$NX = NX(\varepsilon)$$



The *NX* curve for the Japan



The *NX* curve for the U.S.



At high enough values of ε, U.S. goods become so expensive that we export less than we import

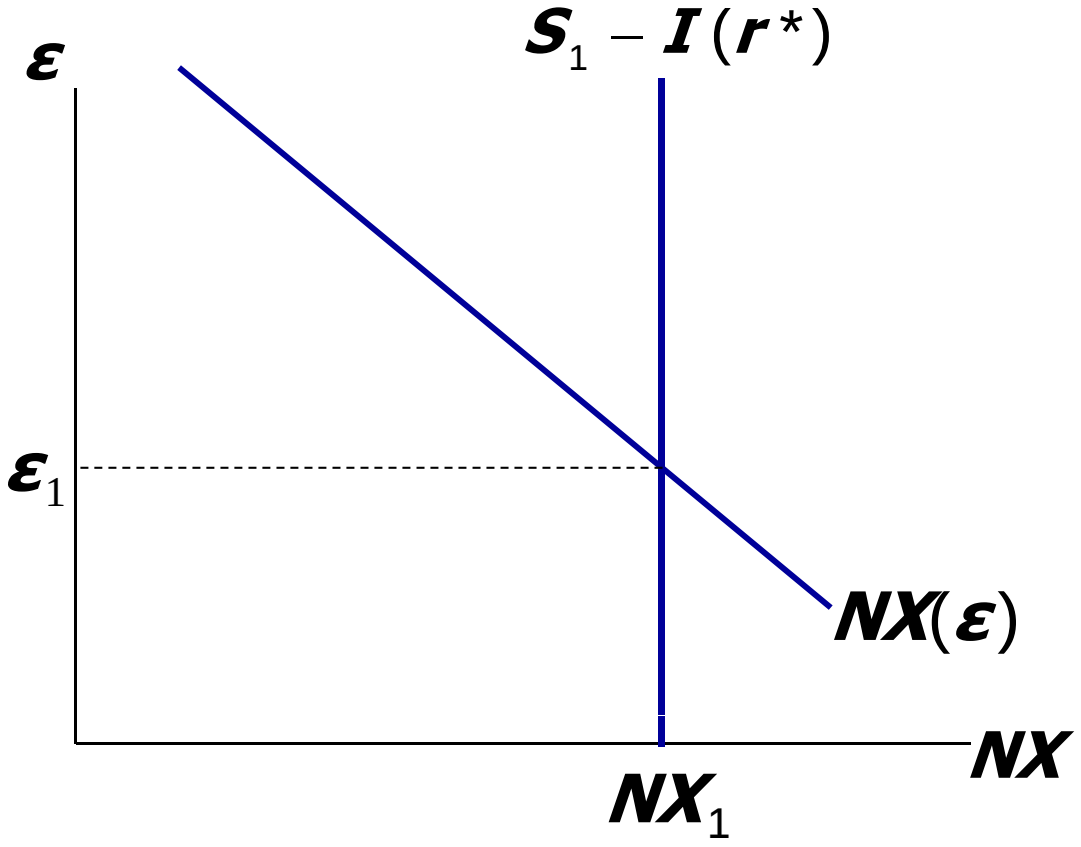
How ϵ is determined

- The accounting identity says $NX = S - I$
- We saw earlier how $S - I$ is determined:
  - S depends on domestic factors (output, fiscal policy variables, *etc*)
  - I is determined by the world interest rate r^*
- So, ε must adjust to ensure

$$NX(\varepsilon) = \overline{S} - I(r^*)$$

How ϵ is determined

Neither ***S*** nor ***I*** depend on ε, so the net capital outflow curve is vertical.

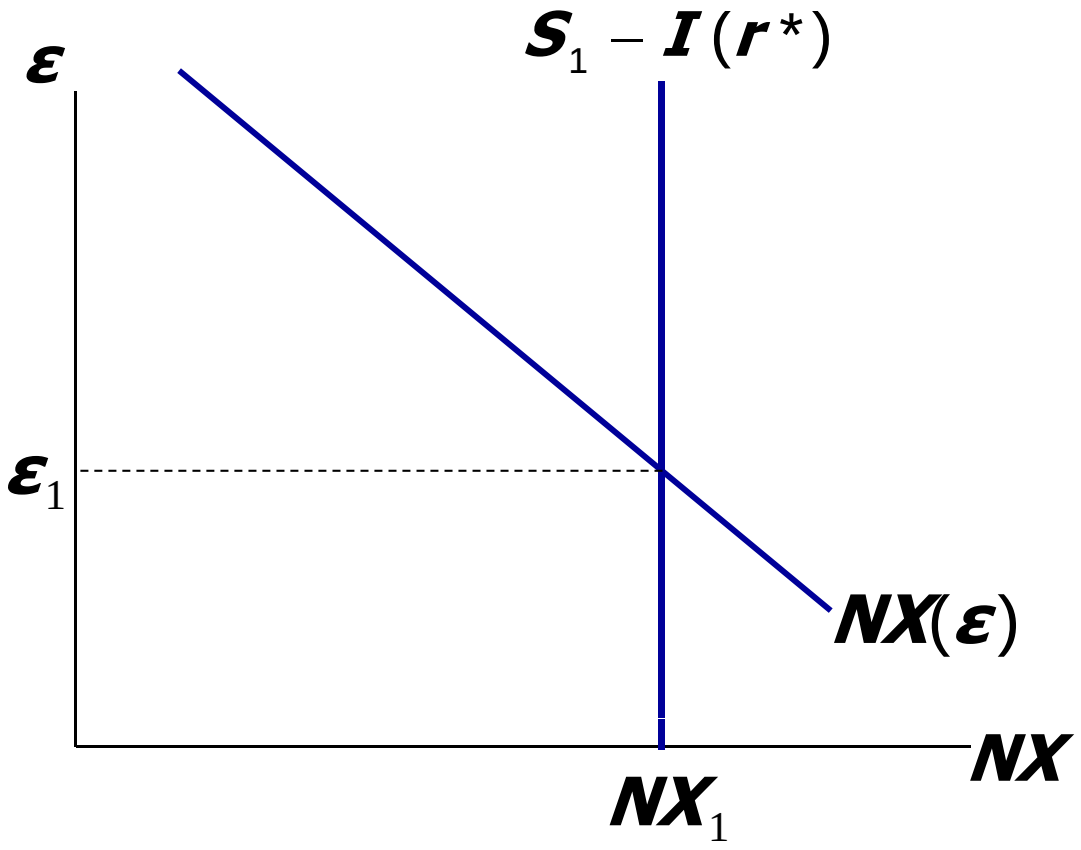


ε adjusts to equate *NX* with net capital outflow, ***S*** – ***I***.

Interpretation: supply and demand in the foreign exchange market

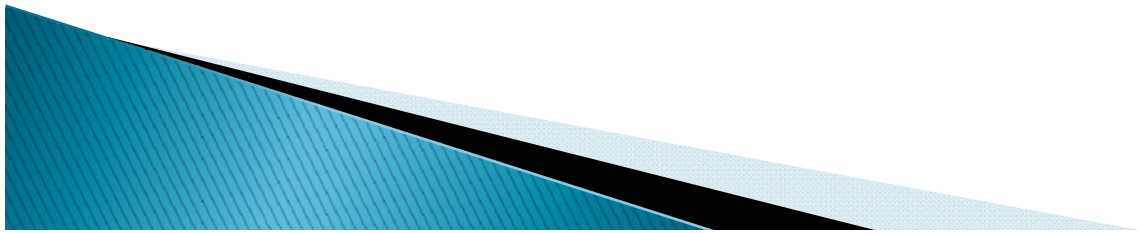
demand:
Foreigners need dollars to buy U.S. net exports.

supply:
Net capital outflow ($S - I$) is the supply of dollars to be invested abroad.



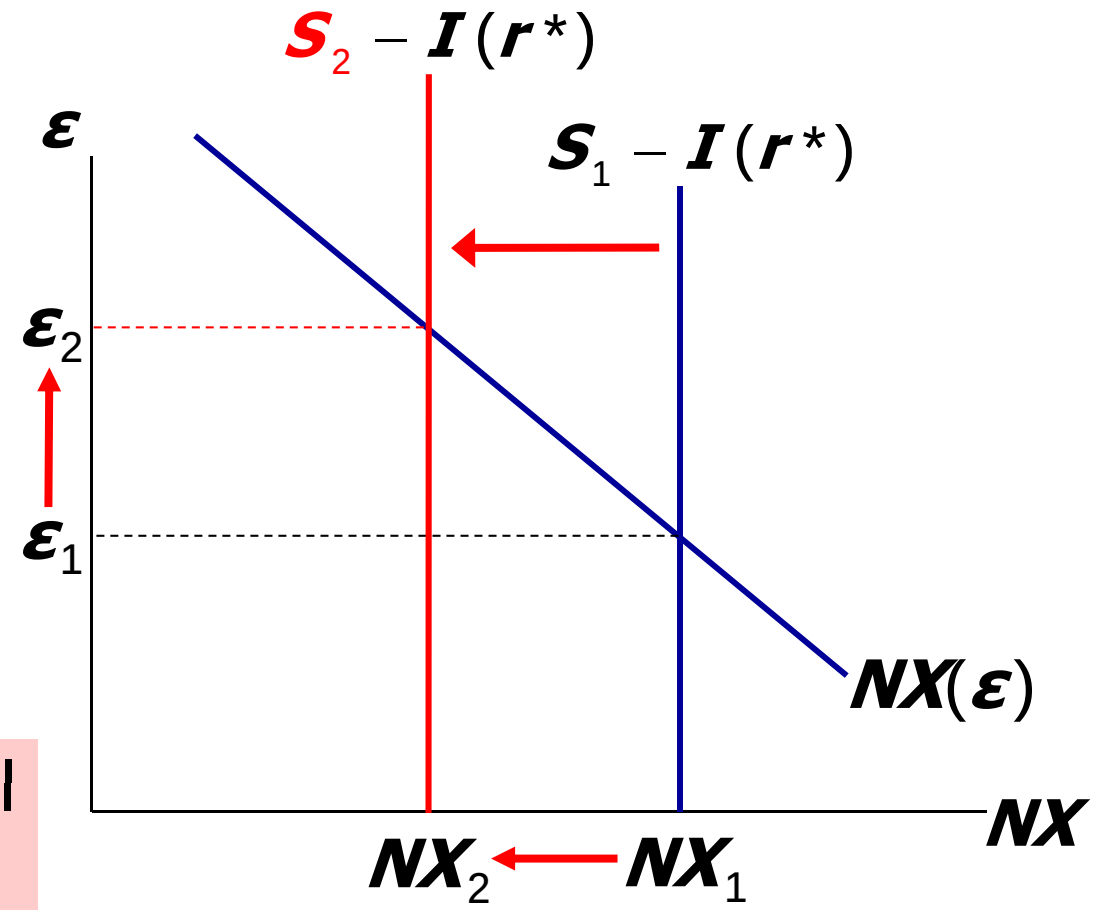
Next, four experiments:

1. Fiscal policy at home
2. Fiscal policy abroad
3. An increase in investment demand (exercise)
4. Trade policy to restrict imports



1. Fiscal policy at home

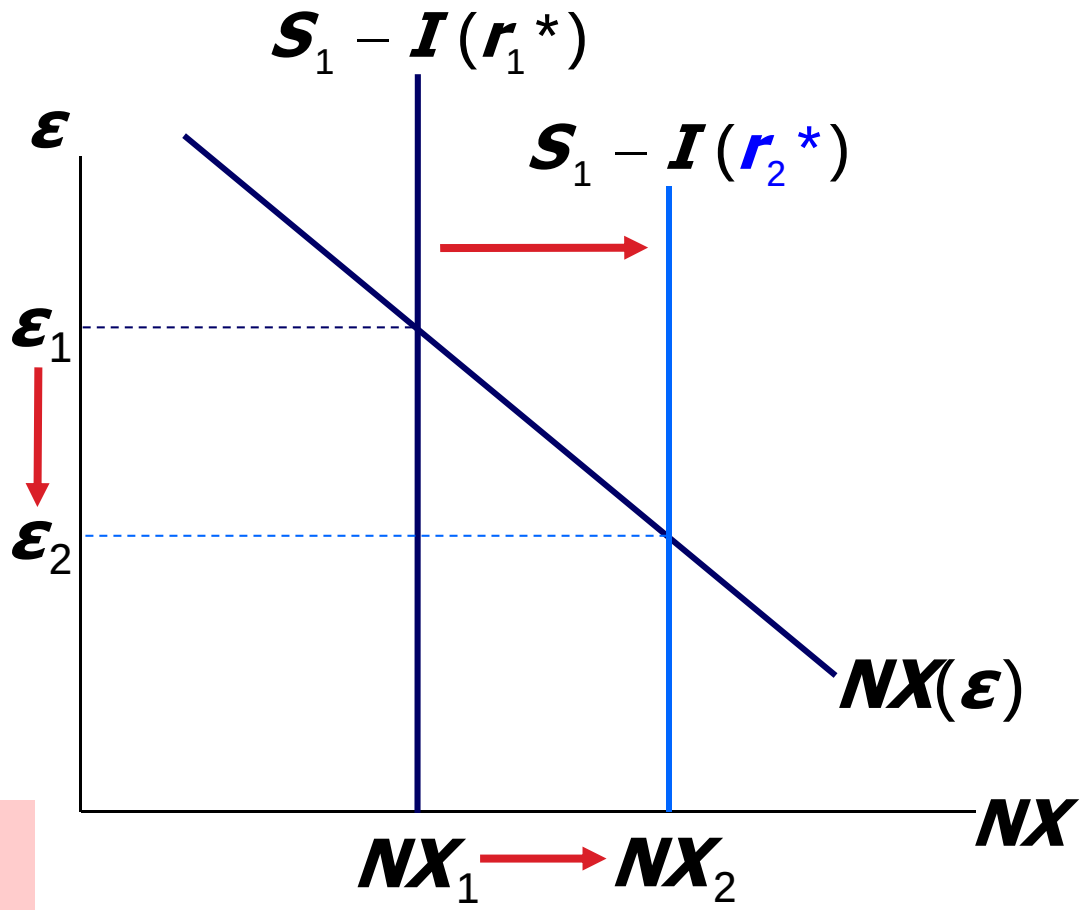
A fiscal expansion reduces national saving, net capital outflow, and the supply of dollars in the foreign exchange market…



…causing the real exchange rate to rise and *NX* to fall.

2. Fiscal policy abroad

An increase in r^* reduces investment, increasing net capital outflow and the supply of dollars in the foreign exchange market…

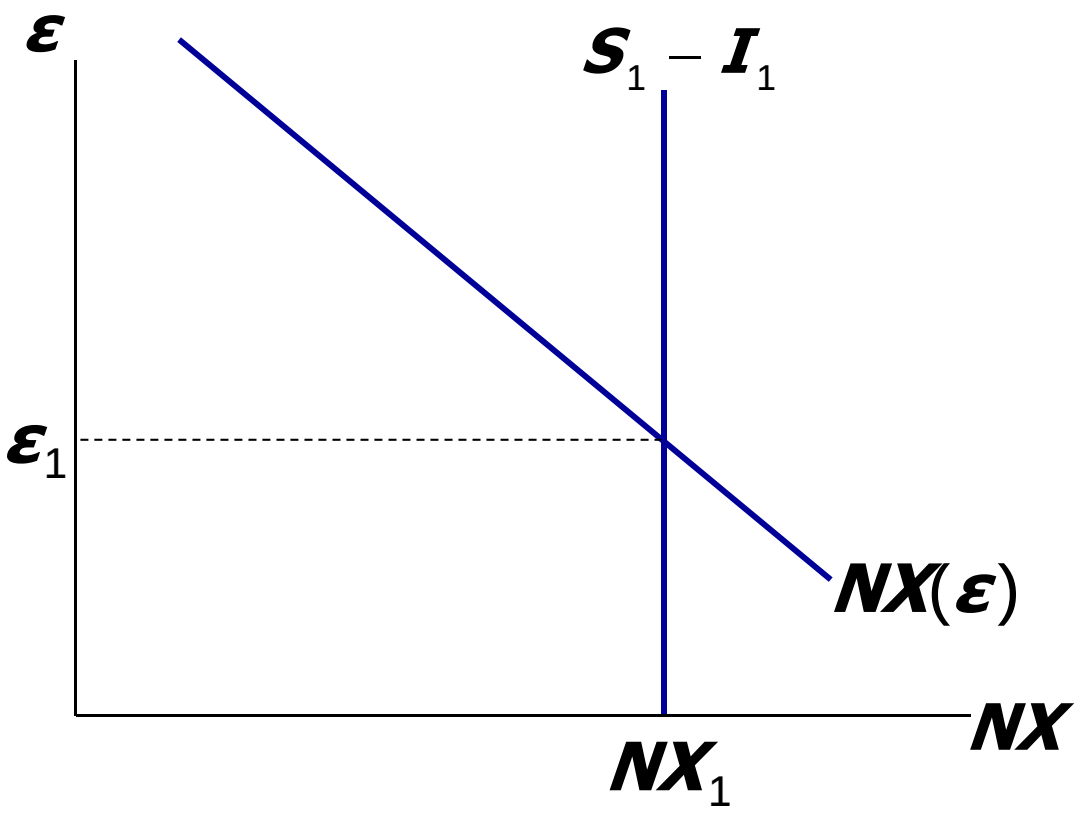


…causing the real exchange rate to fall and NX to rise.

NOW YOU TRY:

3. Increase in investment demand

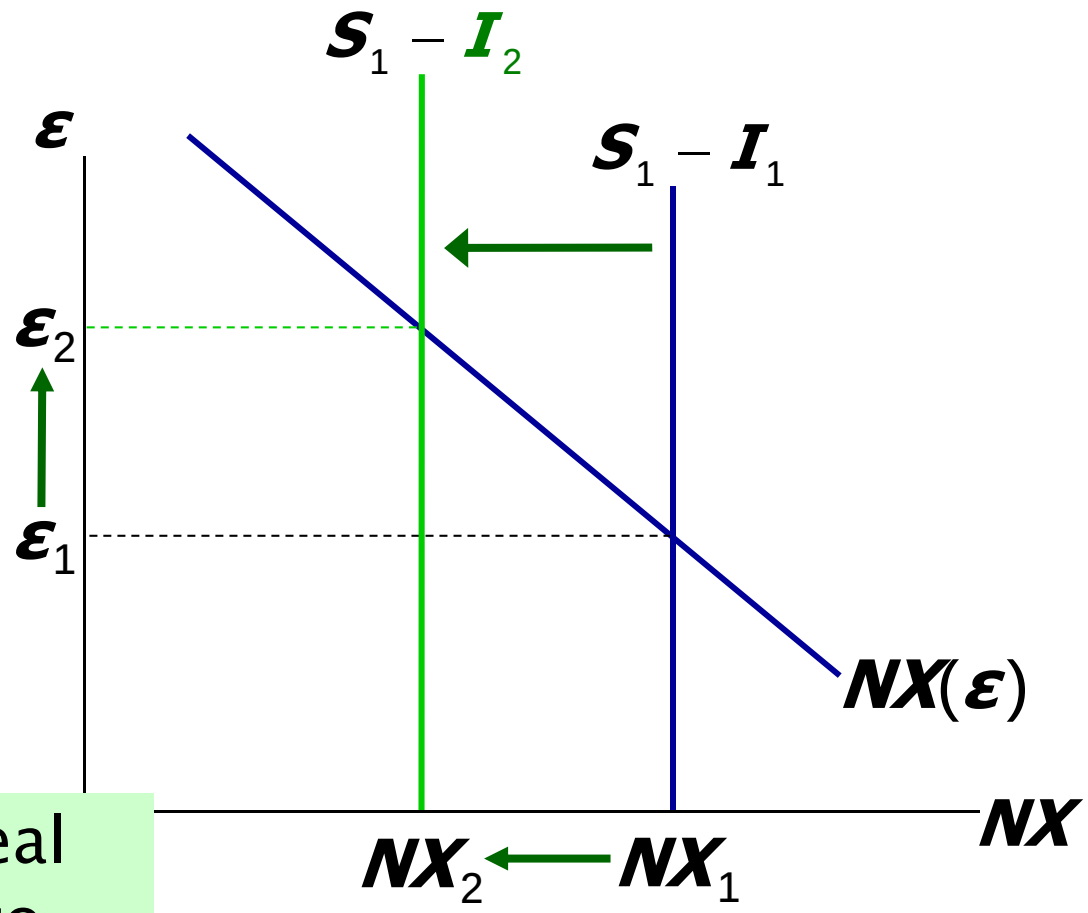
Determine the impact of an increase in investment demand on net exports, net capital outflow, and the real exchange rate



ANSWERS:

3. Increase in investment demand

An increase in investment reduces net capital outflow and the supply of dollars in the foreign exchange market



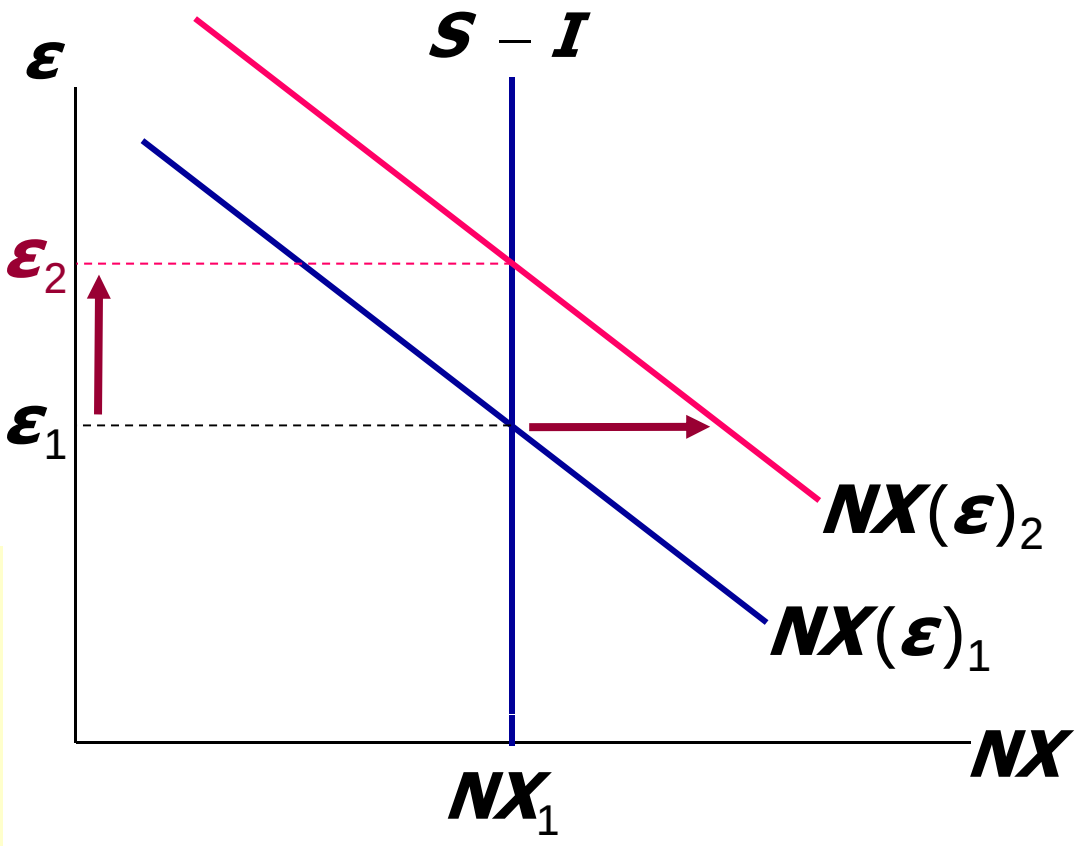
...causing the real exchange rate to rise and *NX* to fall.

4. Trade policy to restrict imports

At any given value of ε, an import quota

$\Rightarrow \downarrow IM \Rightarrow \uparrow NX$

$\Rightarrow$ demand for dollars shifts right



Trade policy doesn't affect S or I, so capital flows and the supply of dollars remain fixed.

4. Trade policy to restrict imports

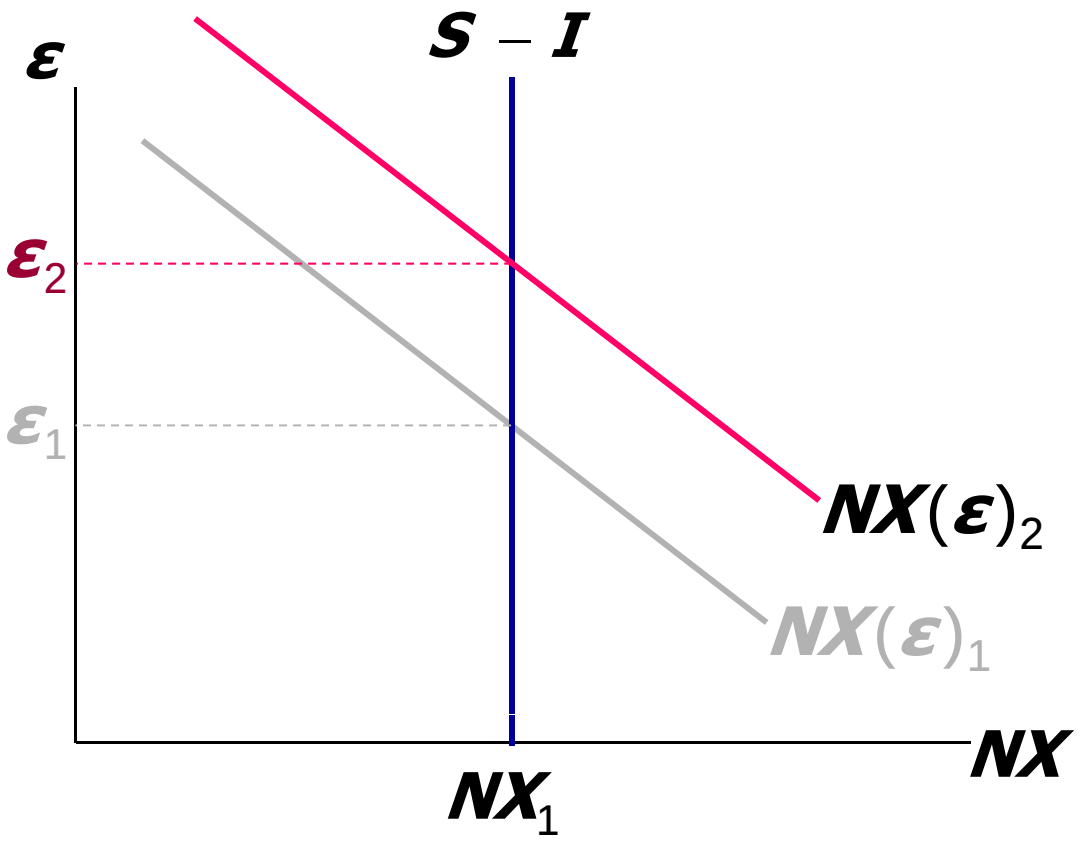
Results:

$\Delta\varepsilon > 0$
(demand increase)

$\Delta NX = 0$
(supply fixed)

$\Delta IM < 0$
(policy)

$\Delta EX < 0$
(rise in ε)



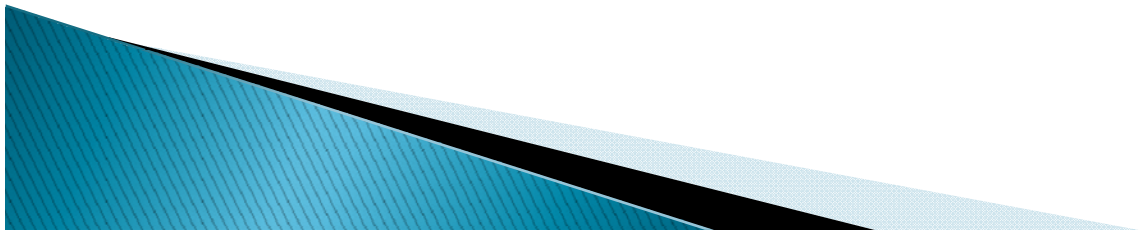
The determinants of the nominal exchange rate

- Start with the expression for the real exchange rate:

$$\varepsilon = \frac{e \times P}{P^*}$$

  - Solve for the nominal exchange rate:

$$e = \varepsilon \times \frac{P^*}{P}$$



The determinants of the nominal exchange rate

- So e depends on the real exchange rate and the price levels at home and abroad…

…and we know how each of them is determined:

$$\frac{M^*}{P^*} = L^*(r^* + \pi^*, Y^*)$$

$$e = \varepsilon \times \frac{P^*}{P}$$

$$NX(\varepsilon) = \overline{S} - I(r^*)$$

$$\frac{M}{P} = L(r^* + \pi, Y)$$

The determinants of the nominal exchange rate

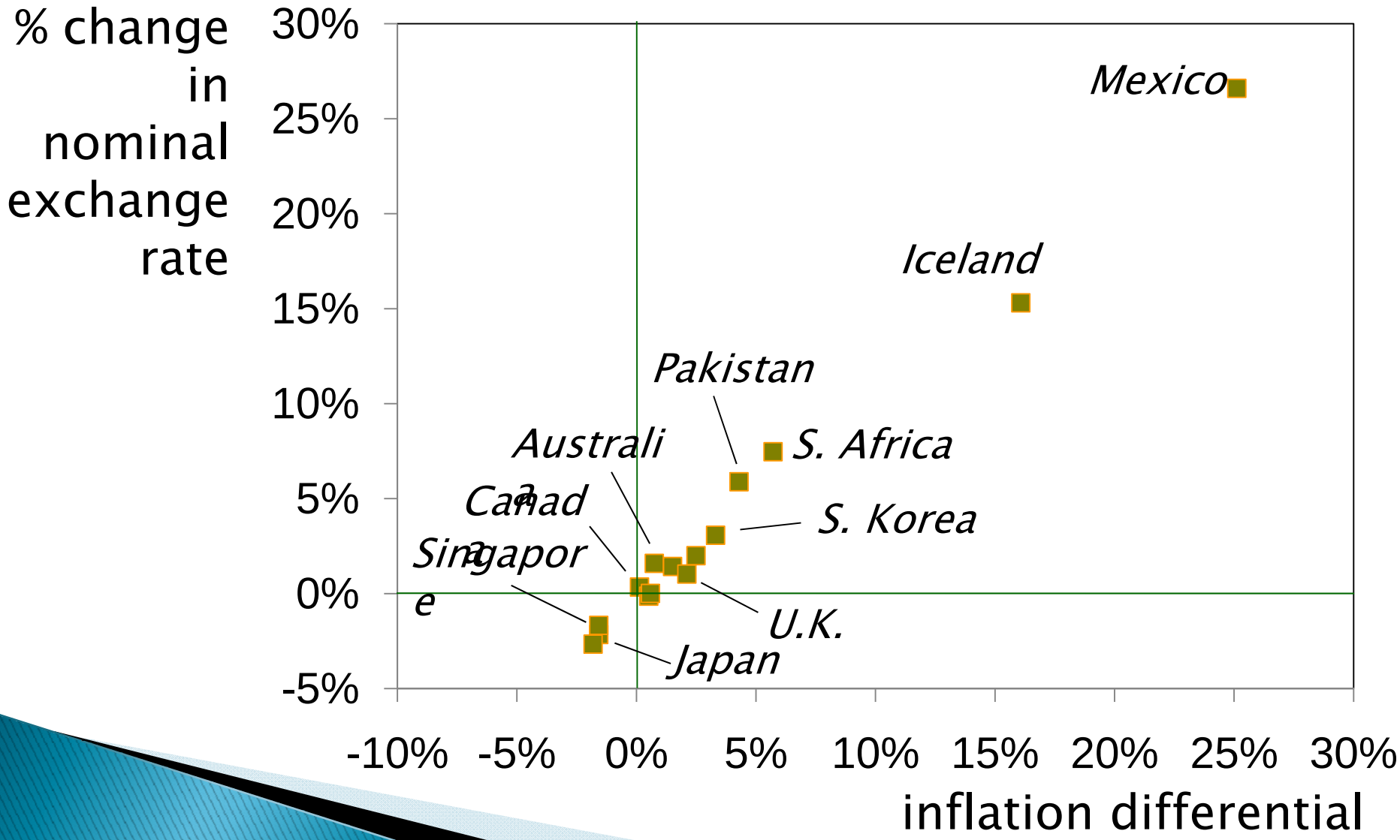
$$e = \varepsilon \times \frac{P^*}{P}$$

- Rewrite this equation in growth rates (*see "arithmetic tricks for working with percentage changes," Chap 2*):

$$\frac{\Delta e}{e} = \frac{\Delta \varepsilon}{\varepsilon} + \frac{\Delta P^*}{P^*} - \frac{\Delta P}{P} = \frac{\Delta \varepsilon}{\varepsilon} + \pi^* - \pi$$

  - For a given value of ε, the growth rate of e equals the difference between foreign and domestic inflation rates.

Inflation differentials and nominal exchange rates for a cross section of countries



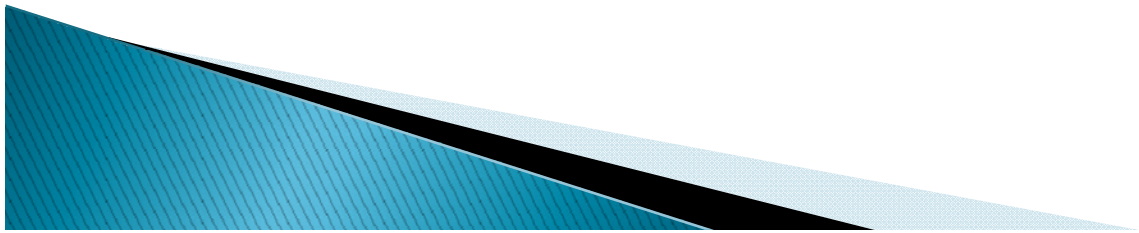
Purchasing Power Parity (PPP)

Two definitions:

- A doctrine that states that goods must sell at the same (currency-adjusted) price in all countries.
- The nominal exchange rate adjusts to equalize the cost of a basket of goods across countries.

Reasoning:

- arbitrage, the law of one price



Purchasing Power Parity (PPP)

- PPP: $e \times P = P^*$

Cost of a basket of foreign goods, in foreign currency.

Cost of a basket of domestic goods, in foreign currency.

Cost of a basket of domestic goods, in domestic currency.

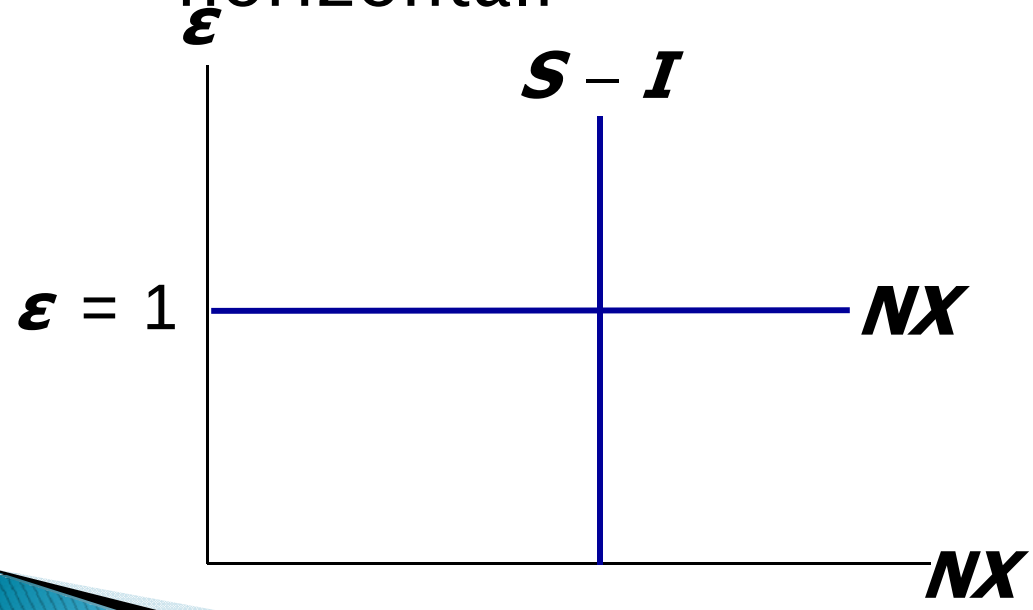
  - Solve for e: $e = P^*/P$
  - PPP implies that the nominal exchange rate between two countries equals the ratio of the countries' price levels.

Purchasing Power Parity (PPP)

- If $e = P^*/P$,

  then $$\varepsilon = e \times \frac{P}{P^*} = \frac{P^*}{P} \times \frac{P}{P^*} = 1$$

  and the *NX* curve is horizontal:



Under PPP, changes in ($S - I$) have no impact on ε or e.

Does PPP hold in the real world?

No, for two reasons:

1. International arbitrage not possible.
   - nontraded goods
   - transportation costs
2. Different countries' goods not perfect substitutes.

Yet, PPP is a useful theory:

- It's simple & intuitive.
- In the real world, nominal exchange rates tend toward their PPP values over the long run.