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# Open-Economy Macroeconomics: Basic Concepts

*Premium  
PowerPoint  
Slides by  
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*In this chapter,  
look for the answers to these questions:*

- How are international flows of goods and assets related?
- What's the difference between the real and nominal exchange rate?
- What is “purchasing-power parity,” and how does it explain nominal exchange rates?

# Closed vs. Open Economies

- A **closed economy** does not interact with other economies in the world.
- An **open economy** interacts freely with other economies around the world.

# The Flow of Goods & Services

- **Exports:**  
domestically-produced g&s sold abroad
- **Imports:**  
foreign-produced g&s sold domestically
- **Net exports (NX), aka the trade balance**  
= value of exports – value of imports  
= خالص صادرات یا تراز تجاری

# ACTIVE LEARNING 1

## Variables that affect NX

What do you think would happen to U.S. net exports if:

- A.** Canada experiences a recession (falling incomes, rising unemployment)
- B.** U.S. consumers decide to buy more products “Made in the U.S.A.”
- C.** Prices of goods produced in Mexico rise faster than prices of goods produced in the U.S.

# ACTIVE LEARNING 1

## Answers

**A.** Canada experiences a recession  
(falling incomes, rising unemployment)

**U.S. net exports would fall**

due to a fall in Canadian consumers' purchases  
of U.S. exports

**B.** U.S. consumers decide to be patriotic and  
buy more products "Made in the U.S.A."

**U.S. net exports would rise**

due to a fall in imports

# ACTIVE LEARNING 1

## Answers

**C.** Prices of Mexican goods rise faster than prices of U.S. goods

This makes U.S. goods more attractive relative to Mexico's goods.

Exports to Mexico increase,  
imports from Mexico decrease,  
so **U.S. net exports increase.**

# Variables that Influence Net Exports

- Consumers' preferences for foreign and domestic goods
- Prices of goods at home and abroad
- Incomes of consumers at home and abroad
- The exchange rates at which foreign currency trades for domestic currency
- Transportation costs
- Govt policies

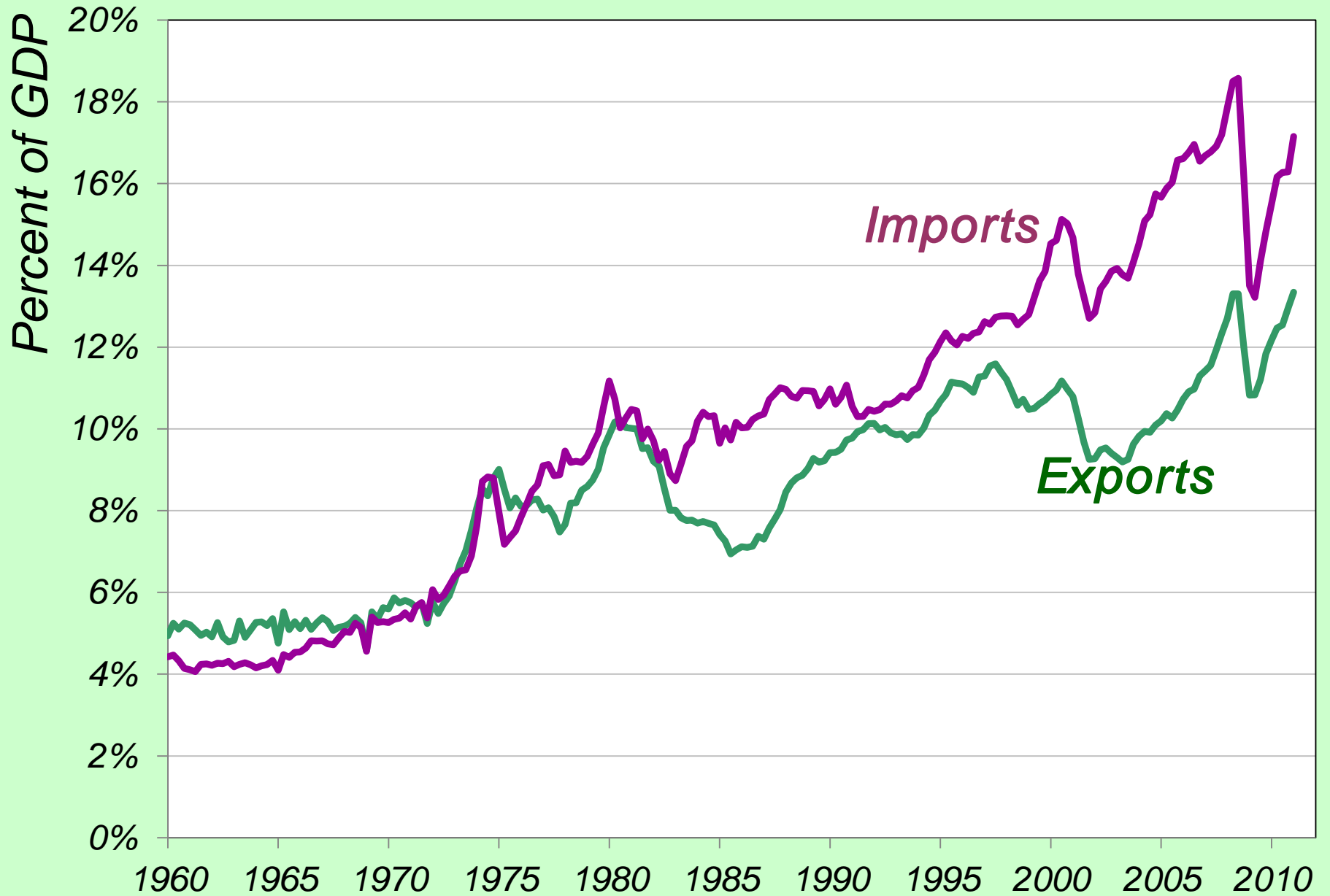


# Trade Surpluses & Deficits

$NX$  measures the imbalance in a country's trade in goods and services.

- **Trade deficit:**  
an excess of imports over exports
- **Trade surplus:**  
an excess of exports over imports
- **Balanced trade:**  
when exports = imports

# The U.S. Economy's Increasing Openness



# The Flow of Capital

- **Net capital outflow** (خالص جریان خروج سرمایه):  
domestic residents' purchases of foreign assets  
minus  
foreigners' purchases of domestic assets
- *NCO* is also called **net foreign investment** (سرمایه گذاری خالص خارجی).

# The Flow of Capital

The flow of capital abroad takes two forms:

- **Foreign direct investment:**

Domestic residents actively manage the foreign investment, e.g., McDonalds opens a fast-food outlet in Moscow.

- **Foreign portfolio investment:**

Domestic residents purchase foreign stocks or bonds, supplying “loanable funds” to a foreign firm.

# The Flow of Capital

*NCO* measures the imbalance in a country's trade in assets:

- When  $NCO > 0$ , “capital outflow”  
Domestic purchases of foreign assets exceed foreign purchases of domestic assets.
- When  $NCO < 0$ , “capital inflow”  
Foreign purchases of domestic assets exceed domestic purchases of foreign assets.

# متغیرهای مؤثر بر NCO

- نرخ بهره حقیقی که به دارایی یا سرمایه های خارجی پرداخت می شود.
- نرخ بهره حقیقی که به دارایی یا سرمایه های داخلی پرداخت می شود.
- مخاطرات مربوط به مالکیت دارایی های خارجی
- سیاست های دولتی مؤثر بر مالکیت خارجی دارایی های داخلی

# Balance of Payments Accounts (تراز پرداخت ها)

the record of a country's international transactions, consisting of the current account and the capital and financial account

## Current Account (حساب جاری)

- The **current account** measures a country's trade in currently produced goods and services, along with unilateral transfers between countries. For convenience we divide the current account into three separate components: (1) net exports of goods and services, (2) net income from abroad, and (3) net unilateral transfers.

## Capital and Financial Account (حساب سرمایه و مالی)

- the record of a country's international trade in existing assets, either real or financial.

# The Equality of $NX$ and $NCO$

- An accounting identity:  $NCO = NX$ 
  - arises because every transaction that affects  $NX$  also affects  $NCO$  by the same amount (and vice versa)
- When a foreigner purchases a good from the U.S.,
  - U.S. exports and  $NX$  increase
  - the foreigner pays with currency or assets, so the U.S. acquires some foreign assets, causing  $NCO$  to rise.



# Why the Current Account Balance and the Capital and Financial Account Balance Sum to Zero

**Case 1: United States Imports \$75 Sweater from Britain;  
Britain Imports \$75 Computer Game from United States**

## **Current Account**

Exports	+\$75
Imports	-\$75
Current account balance, <i>CA</i>	<u>0</u>

## **Capital and Financial Account**

No transaction	
Capital and financial account balance, <i>KFA</i>	0
Sum of current and capital and financial account balances, <i>CA + KFA</i>	0

# Why the Current Account Balance and the Capital and Financial Account Balance Sum to Zero

**Case II: United States Imports \$75 Sweater from Britain;  
Britain Buys \$75 Bond from United States**

## **Current Account**

Imports	<u>-\$75</u>
Current account balance, <i>CA</i>	-\$75

## **Capital and Financial Account**

Financial inflow	<u>+\$75</u>
Capital and financial account balance, <i>KFA</i>	+\$75
Sum of current and capital and financial account balances, <i>CA + KFA</i>	0

# Why the Current Account Balance and the Capital and Financial Account Balance Sum to Zero

**Case III: United States Imports \$75 Sweater from Britain;  
Federal Reserve Sells \$75 of British Pounds to British Bank**

## **Current Account**

Imports	<u>-\$75</u>
Current account balance, <i>CA</i>	-\$75

## **Capital and Financial Account**

Financial inflow (reduction in U.S. official reserve assets)	<u>+\$75</u>
Capital and financial account balance, <i>KFA</i>	+\$75
Sum of current and capital and financial account balances, <i>CA + KFA</i>	0

## ■ مثال

■ فروش تعدادی هواپیمای بوئینگ تولیدی امریکا به ژاپن  
– افزایش خالص صادرات امریکا (افزایش NX)

- این های دریافتی به دو طریق قابلیت استفاده را دارد:
- (۱) اعطای این های ژاپنی توسط بوئینگ به صندوق سرمایه گذاری امریکایی که در نهایت صرف خرید سهام شرکت سونی می شود.
- این یعنی  
» افزایش NCO

- (۲) تعویض این در دست بوئینگ با دلار در دست مایکروسافت برای خرید رایانه از ژاپن
- این یعنی

– عدم تغییر NX و NOC

# Saving, Investment, and International Flows of Goods & Assets

$$Y = C + I + G + NX \quad \text{accounting identity}$$

$$Y - C - G = I + NX \quad \text{rearranging terms}$$

$$S = I + NX \quad \text{since } S = Y - C - G$$

$$S = I + NCO \quad \text{since } NX = NCO$$

- When  $S > I$ , the excess loanable funds flow abroad in the form of positive net capital outflow.
- When  $S < I$ , foreigners are financing some of the country's investment, and  $NCO < 0$ .

# Case Study: The U.S. Trade Deficit

- The U.S. trade deficit reached record levels in 2006 and remained high in 2007–2008.
- Recall,  $NX = S - I = NCO$ .  
A trade deficit means  $I > S$ ,  
so the nation borrows the difference  
from foreigners.
- In 2007, foreign purchases of U.S. assets exceeded U.S. purchases of foreign assets by \$775 million.
- Such deficits have been the norm since 1980...

# International Flows of Goods and Capital: Summary

## Trade Deficit

Exports < Imports

Net Exports < 0

$Y < C + I + G$

Saving < Investment

Net Capital Outflow < 0

## Balanced Trade

Exports = Imports

Net Exports = 0

$Y = C + I + G$

Saving = Investment

Net Capital Outflow = 0

## Trade Surplus

Exports > Imports

Net Exports > 0

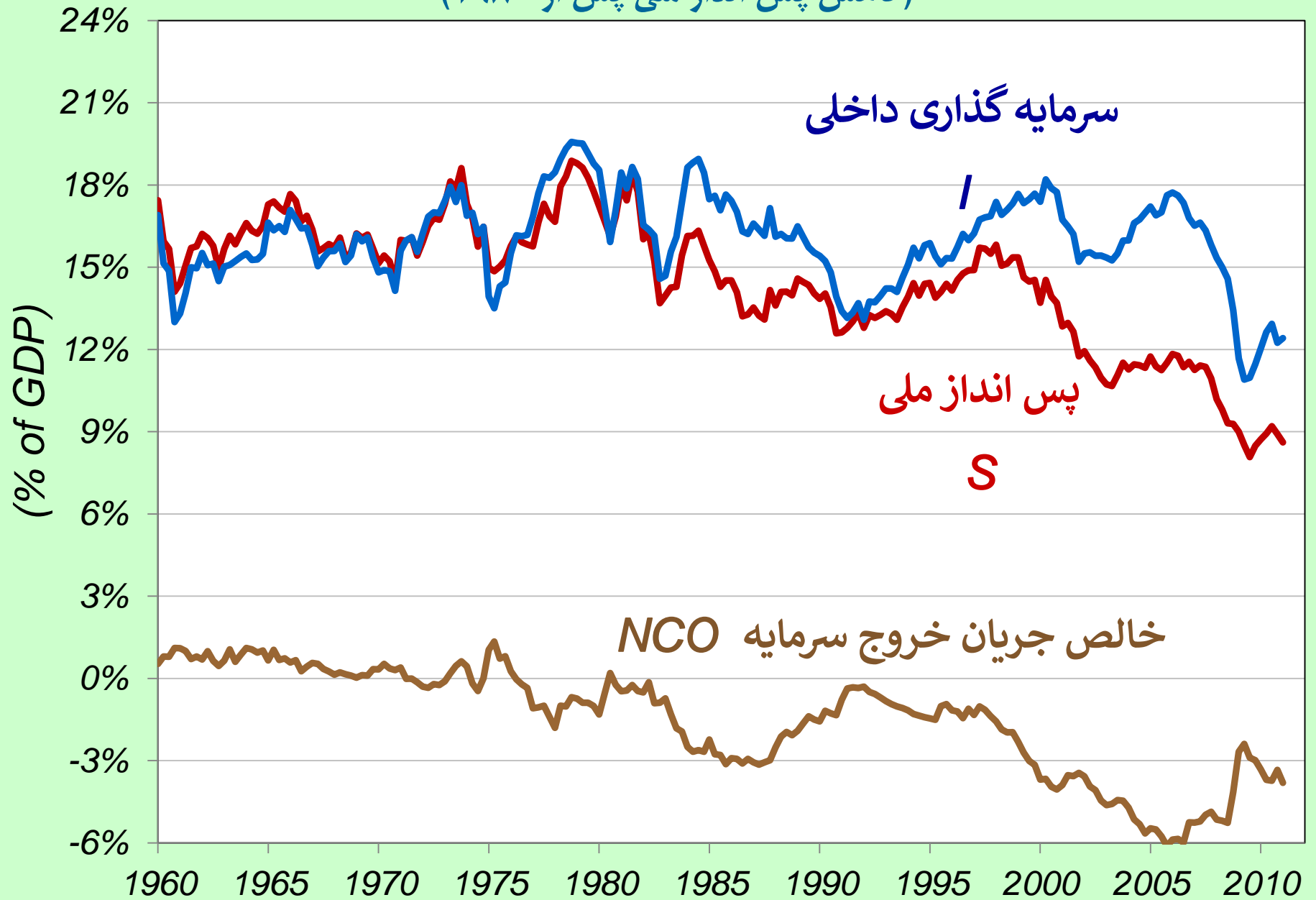
$Y > C + I + G$

Saving > Investment

Net Capital Outflow > 0

# U.S. Saving, Investment, and NCO, 1950–2011

(کاهش پس انداز ملی پس از ۱۹۸۰)





# The Nominal Exchange Rate

- **Nominal exchange rate:** the rate at which one country's currency trades for another
- We express all exchange rates as foreign currency per unit of domestic currency.
- Some exchange rates as of 20 May 2011, all per US\$

Canadian dollar: 0.97

Euro: 0.71

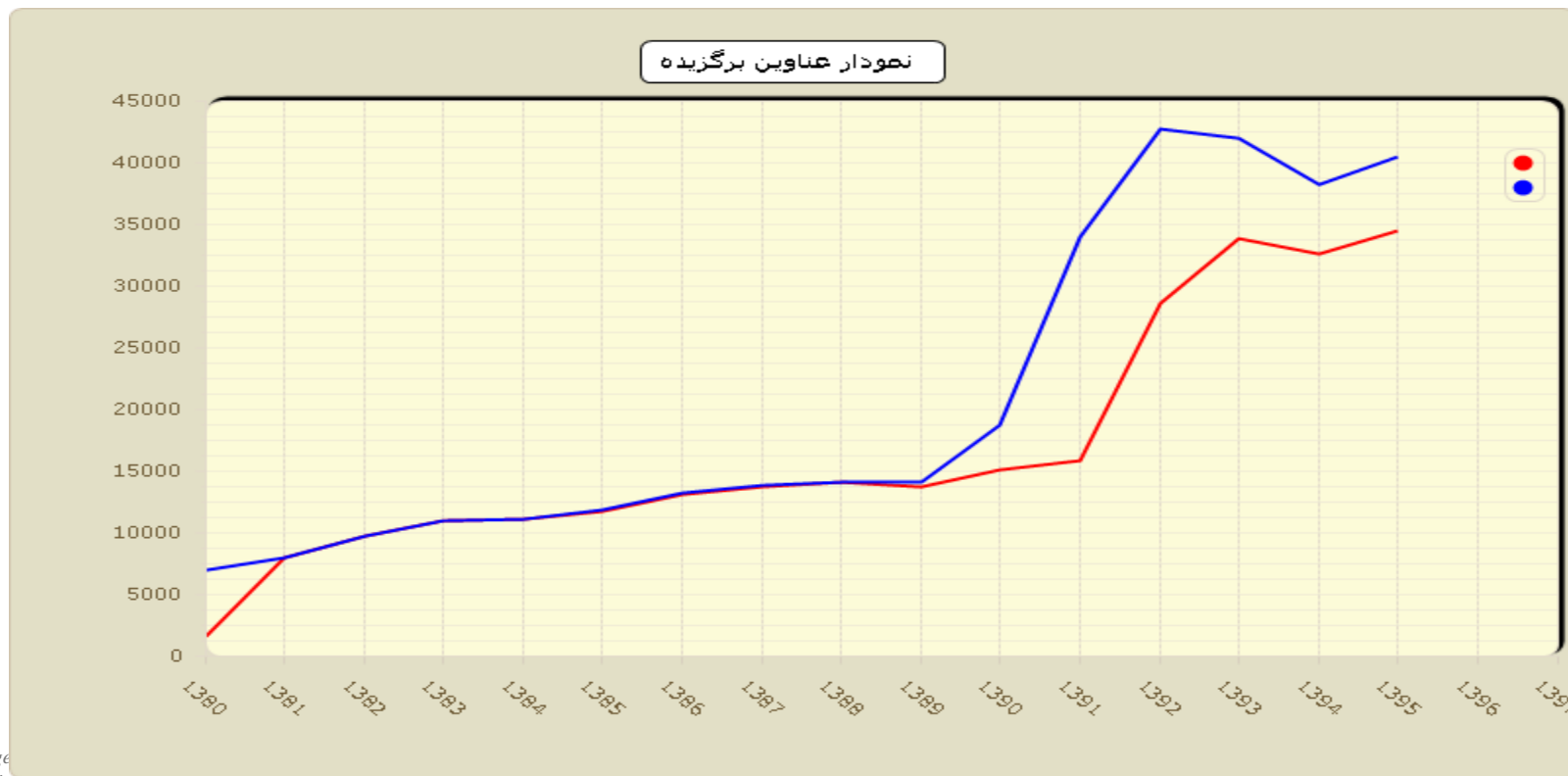
Japanese yen: 81.67

Mexican peso: 11.65

# نرخ بازار غیررسمی و رسمی

نرخ برابری یورو با ریال در بازار غیر رسمی ارز در این قسمت قابل مشاهده است. لازم به ذکر است که نرخ ارز در بازار غیر رسمی، بر اساس نمونه گیری اداره آمار اقتصادی از این بازار در ساعات ۱۱ هر روز محاسبه می شود.

نرخ برابری رسمی یورو که بانک مرکزی بر اساس آن درآمدها ارزی دولت و حسابهای ارزی خود (به یورو) را تسعیر می کند، درج شده است. اطلاعات مربوط به نرخ رسمی یورو از سال ۱۳۸۱ در این قسمت قابل مشاهده است. لازم به ذکر است که پس از تأسیس بازار بین بانکی تهران، از نرخ تعادلی این بازار به عنوان نرخ رسمی استفاده می شود.

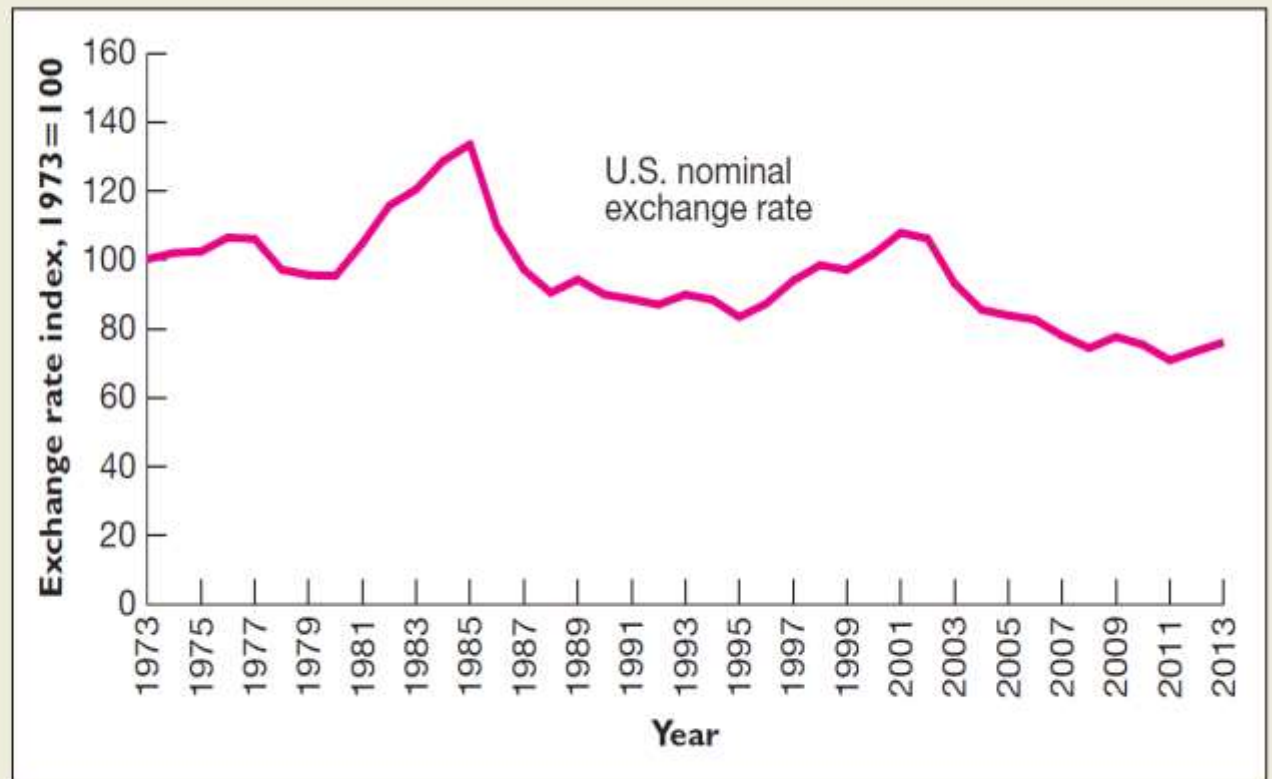


# شاخص نرخ ارز

**FIGURE 15.1**

**The U.S. Nominal Exchange Rate, 1973–2013.**

This figure shows the value of the dollar as an average of its values against other major currencies, relative to a base value of 100 in 1973.



SOURCE: Federal Reserve Bank of St. Louis, FRED database, <http://research.stlouisfed.org/fred2>.

# Appreciation and Depreciation

- **Appreciation** (or “strengthening”):  
an increase in the value of a currency  
as measured by the amount of foreign currency it  
can buy
- **Depreciation** (or “weakening”):  
a decrease in the value of a currency  
as measured by the amount of foreign currency it  
can buy
- Examples: During 2007, the U.S. dollar...
  - depreciated 9.5% against the Euro
  - appreciated 1.5% against the S. Korean Won

# Appreciation and Depreciation

- **Appreciation** is sometimes understood to be a sign of national strength. It is certainly a sign that a nation's currency has increasing value to foreigners. However, this means that the nation will have greater difficulty selling its goods and services to foreigners.

# Appreciation and Depreciation

- **Depreciation** is sometimes understood to be a sign of national weakness. It is certainly a sign that a nation's currency has decreasing value to foreigners. However, this means that the nation will have greater ease in selling its goods and services to foreigners.

# The Real Exchange Rate

- **Real exchange rate:** the rate at which the g&s of one country trade for the g&s of another

- Real exchange rate = 
$$\frac{e \times P}{P^*}$$

where

$P$  = domestic price

$P^*$  = foreign price (in foreign currency)

$e$  = nominal exchange rate, i.e., foreign currency per unit of domestic currency

# Example With One Good

- A Big Mac costs \$2.50 in U.S., 400 yen in Japan
- $e = 120$  yen per \$
- $e \times P =$  price in yen of a U.S. Big Mac  
= (120 yen per \$)  $\times$  (\$2.50 per Big Mac)  
= 300 yen per U.S. Big Mac
- Compute the real exchange rate:

$$\frac{e \times P}{P^*} = \frac{300 \text{ yen per U.S. Big Mac}}{400 \text{ yen per Japanese Big Mac}}$$
$$= 0.75 \text{ Japanese Big Macs per U.S. Big Mac}$$



# Appreciation and Depreciation again

- The nominal exchange rate can appreciate or depreciate. This is what is normally meant when appreciation or depreciation is discussed.
- The real exchange rate can appreciate or depreciate too. This may be even more important, because the real exchange rate determines how many domestic goods must be traded for a foreign good.

# The Real Exchange Rate With Many Goods

$P$  = U.S. price level, e.g., Consumer Price Index,  
measures the price of a basket of goods

$P^*$  = foreign price level

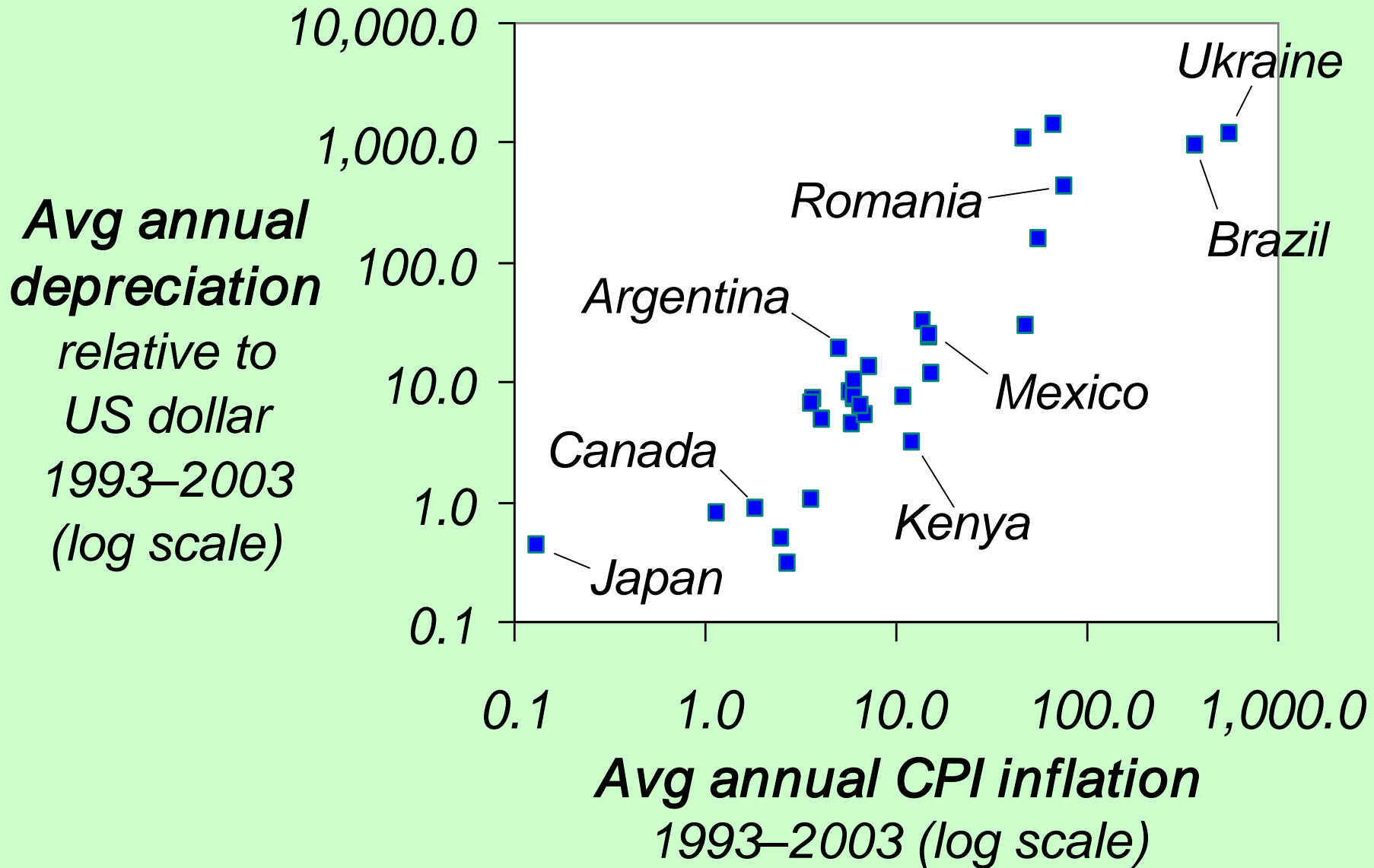
Real exchange rate

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

= price of a domestic basket of goods relative to  
price of a foreign basket of goods

- If U.S. real exchange rate appreciates,  
U.S. goods become more expensive relative to  
foreign goods.

# Inflation & Depreciation in a Cross-Section of 31 Countries



# SUMMARY

- Net exports equal exports minus imports.  
Net capital outflow equals domestic residents' purchases of foreign assets minus foreigners' purchases of domestic assets.
- Every international transaction involves the exchange of an asset for a good or service, so net exports equal net capital outflow.

# SUMMARY

- Saving can be used to finance domestic investment or to buy assets abroad. Thus, saving equals domestic investment plus net capital outflow.
- The nominal exchange rate is the relative price of the currency of two countries.
- The real exchange rate is the relative price of the goods and services of the two countries.

# SUMMARY

- According to the theory of purchasing-power parity, a unit of any country's currency should be able to buy the same quantity of goods in all countries.
- This theory implies that the nominal exchange rate between two countries should equal the ratio of the price levels in the two countries.
- It also implies that countries with high inflation should have depreciating currencies.