



Macroeconomics

Open – Economy

Basic Concepts

Prof. Samuel Jung



*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?





Introduction

- One of the Ten Principles of Economics from Chapter 1:
Trade can make everyone better off.
- This chapter introduces basic concepts of international macroeconomics:
 - The trade balance (trade deficits, surpluses)
 - International flows of assets
 - 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





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 be patriotic and 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





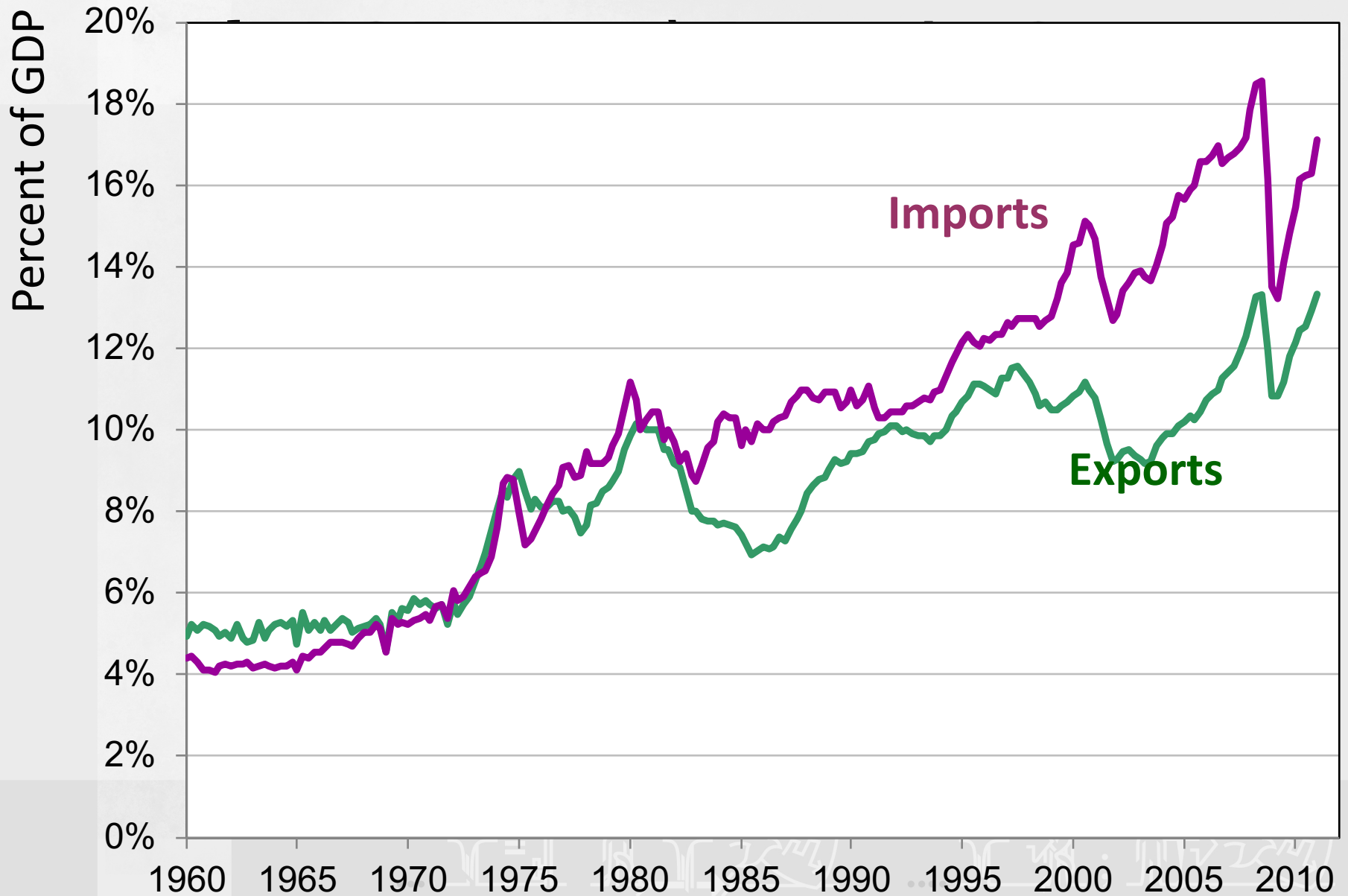
Trade Surpluses & Deficits

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 (NCO):**
domestic residents' purchases of foreign assets
minus
foreigners' purchases of domestic assets
- **NCO** is also called **net foreign investment**.





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.





Variables that Influence NCO

- Real interest rates paid on foreign assets
- Real interest rates paid on domestic assets
- Perceived risks of holding foreign assets
- Govt policies affecting foreign ownership of domestic assets






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.





Saving, Investment, and International Flows of Goods & Assets

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

accounting identity

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

rearranging terms

$$S = I + NX$$

since $S = Y - C - G$

$$S = I + NCO$$

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 $NCO < 0$.



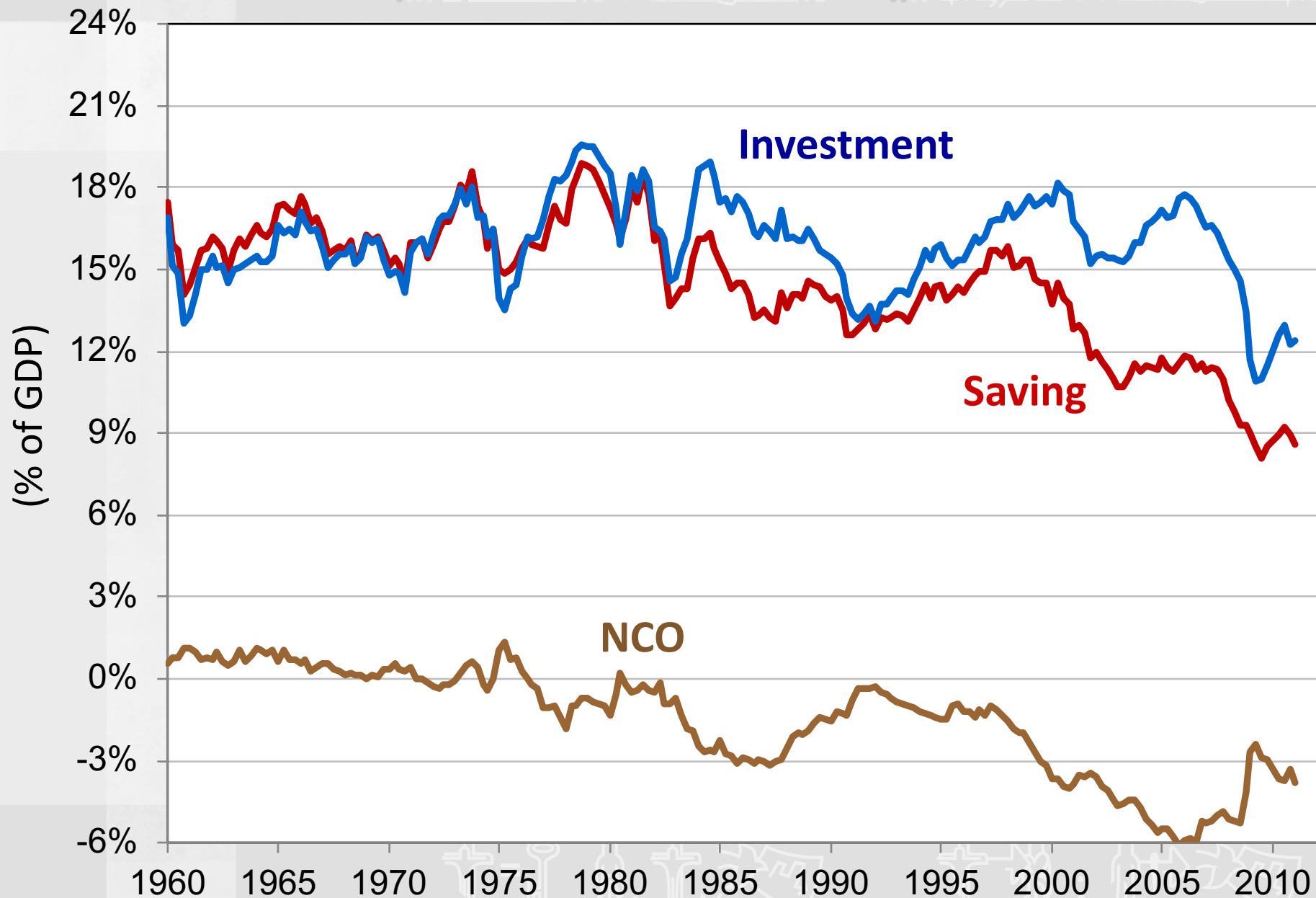


Case Study: The U.S. Trade Deficit

- 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...



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





Case Study: The U.S. Trade Deficit

Why U.S. saving has been less than investment:

- In the 1980s and early 2000s, huge govt budget deficits and low private saving depressed national saving.
- In the 1990s, national saving increased as the economy grew, but domestic investment increased even faster due to the information technology boom.





Case Study: The U.S. Trade Deficit

- Is the U.S. trade deficit a problem?
 - The extra capital stock from the '90s investment boom may well yield large returns.
 - The fall in saving of the '80s and '00s, while not desirable, at least did not depress domestic investment, since firms could borrow from abroad.
- A country, like a person, can go into debt for good reasons or bad ones.
A trade deficit is not necessarily a problem, but might be a symptom of a problem.





Case Study: The U.S. Trade Deficit

as of 12-31-2009

People abroad owned \$21.1 trillion in U.S. assets.

U.S. residents owned \$18.4 trillion in foreign assets.

U.S.' net indebtedness to other countries = \$2.7 trillion.

Higher than every other country's net indebtedness:

U.S. is “the world’s biggest debtor nation.”

So far, the U.S. earns higher interest rates on foreign assets than it pays on its debts to foreigners.

But if U.S. debt continues to grow, foreigners may demand higher interest rates, and servicing the debt would become a drain on U.S. income.





Case Study: The U.S. Trade Deficit

U.S. is “the world’s biggest debtor nation.”

- This is a dumb thing to say
- These debts are not held by the government
- They are held by individuals and companies who acquired them freely and are enjoying, at least temporarily, the benefits of having the ability to spend more than they would have earned themselves





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





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** Japanese Big Macs per U.S. Big Mac



Interpreting the Real Exchange Rate

“The real exchange rate =
0.75 Japanese Big Macs per U.S. Big Mac”

Correct interpretation:

To buy a Big Mac in the U.S.,
a Japanese citizen must sacrifice
an amount that could purchase
0.75 Big Macs in Japan.





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. However, we almost never talk about this out loud.





ACTIVE LEARNING 2

Compute a real exchange rate

$e = 10$ pesos per \$

price of a tall Starbucks Latte

$P = \$3$ in U.S., $P^* = 24$ pesos in Mexico

- A.** What is the price of a U.S. latte measured in pesos?
- B.** Calculate the real exchange rate, measured as Mexican lattes per U.S. latte.





ACTIVE LEARNING 2 (CLICKER QUESTION !!!)

Compute a real exchange rate

$e = 10$ pesos per \$

price of a tall Starbucks Latte

$P = \$3$ in U.S., $P^* = 24$ pesos in Mexico

What is the price of a U.S. latte measured in pesos?

- A. 3
- B. 30
- C. 24
- D. 10





ACTIVE LEARNING **2** (ANOTHER CLICKER QUESTION!)

Compute a real exchange rate

$e = 10$ pesos per \$

price of a tall Starbucks Latte

$P = \$3$ in U.S., $P^* = 24$ pesos in Mexico

Calculate the real exchange rate, measured as Mexican lattes per U.S. latte.

- A. 1
- B. 1.25
- C. 1.50
- D. 1.75



ACTIVE LEARNING 2

Answers

$e = 10$ pesos per \$

price of a tall Starbucks Latte

$P = \$3$ in U.S., $P^* = 24$ pesos in Mexico

A. What is the price of a U.S. latte in pesos?

$$\begin{aligned} e \times P &= (10 \text{ pesos per } \$) \times (3 \$ \text{ per U.S. latte}) \\ &= 30 \text{ pesos per U.S. latte} \end{aligned}$$

B. Calculate the real exchange rate.

$$\begin{aligned} \frac{e \times P}{P^*} &= \frac{30 \text{ pesos per U.S. latte}}{24 \text{ pesos per Mexican latte}} \\ &= 1.25 \text{ Mexican lattes per U.S. latte} \end{aligned}$$



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.





The Law of One Price (LOOP)

Law of one price: the notion that a good should sell for the same price in all markets

- Suppose coffee sells for \$4/pound in Seattle and \$5/pound in Boston, and can be costless transported.
- There is an opportunity for **arbitrage**, making a quick profit by buying coffee in Seattle and selling it in Boston.
- Such arbitrage drives up the price in Seattle and drives down the price in Boston, until the two prices are equal.





Purchasing-Power Parity (PPP)

- **Purchasing-power parity:**
a theory of exchange rates whereby a unit of any currency should be able to buy the same quantity of goods in all countries
- based on the law of one price
- PPP implies that nominal exchange rates adjust to equalize the price of a basket of goods across countries



Purchasing-Power Parity (PPP)

- Example: The “basket” contains a Big Mac.

P = price of U.S. Big Mac (in dollars)

P^* = price of Japanese Big Mac (in yen)

e = exchange rate, yen per dollar

- According to PPP,

$$e \times P = P^*$$

price of U.S.
Big Mac, in yen

price of Japanese
Big Mac, in yen

- Solve for e :

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

PPP and Its Implications

- PPP implies that the nominal exchange rate between two countries should equal the ratio of price levels.

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

- If the two countries have different inflation rates, then e will change over time:
 - If inflation is higher in Mexico than in the U.S., then P^* rises faster than P , so e rises—
the dollar appreciates against the peso.
 - If inflation is higher in the U.S. than in Japan, then P rises faster than P^* , so e falls—
the dollar depreciates against the yen.



Limitations of PPP Theory

Two reasons why exchange rates do not always adjust to equalize prices across countries:

- Many goods cannot easily be traded
 - Examples: haircuts, going to the movies
 - Price differences on such goods cannot be arbitrated away
- Foreign, domestic goods not perfect substitutes
 - E.g., some U.S. consumers prefer Toyotas over Chevys, or vice versa
 - Price differences reflect taste differences



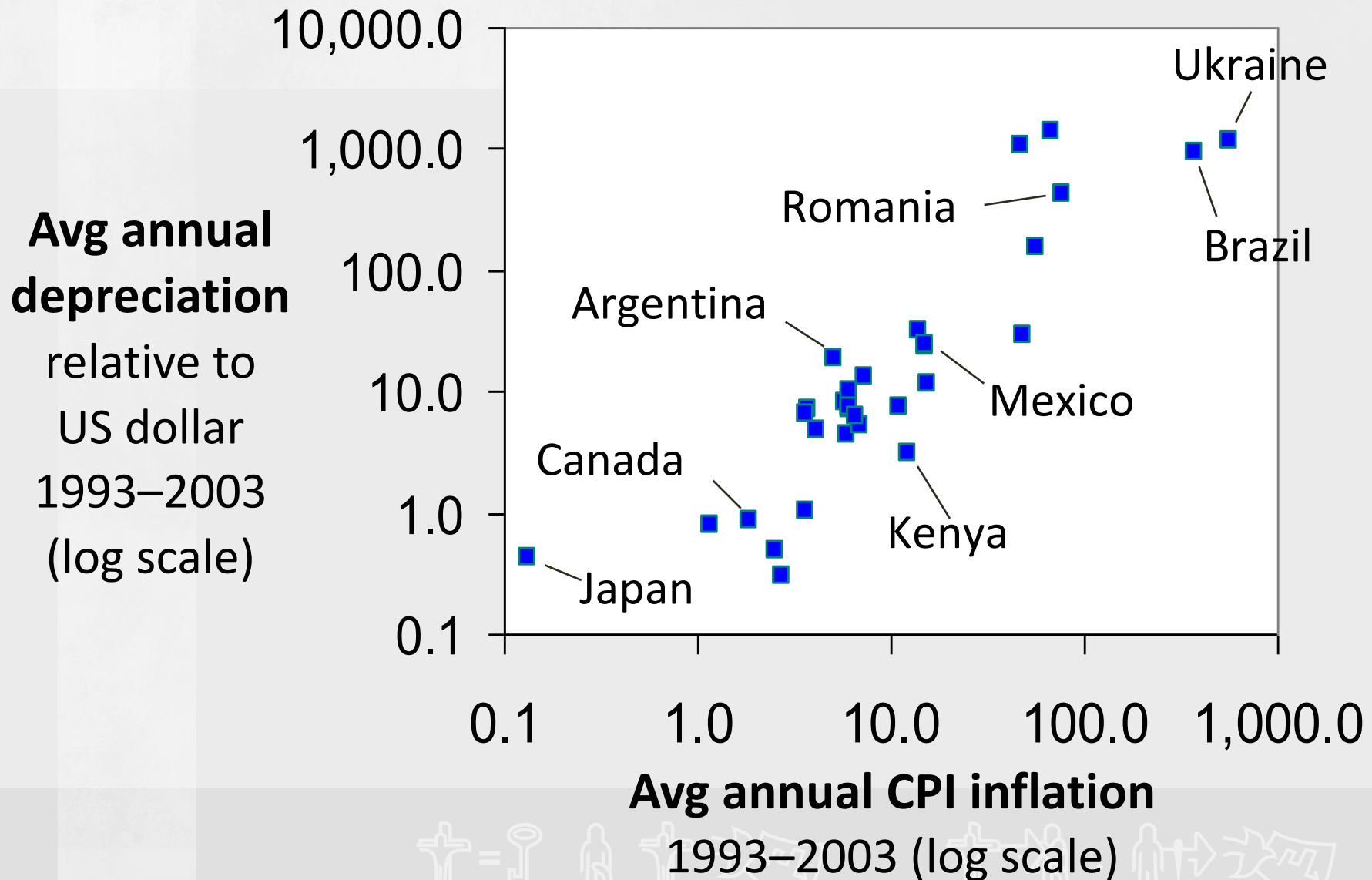


Limitations of PPP Theory

- Nonetheless, PPP works well in many cases, especially as an explanation of long-run trends.
- For example, PPP implies:
the greater a country's inflation rate,
the faster its currency should depreciate
(relative to a low-inflation country like the US).
- The data support this prediction...



Inflation & Depreciation in a Cross-Section of 31 Countries





ACTIVE LEARNING 3

(WHO IS READY FOR A CLICKER QUESTION?)

Chapter review questions

1. Which of the following statements about a country with a trade deficit is not true?
 - A. Exports < imports
 - B. Net capital outflow < 0
 - C. Investment < saving
 - D. $Y < C + I + G$





ACTIVE LEARNING 3

Chapter review questions

2. A Ford Escape SUV sells for \$24,000 in the U.S. and 720,000 rubles in Russia.

If purchasing-power parity holds, what is the nominal exchange rate (rubles per dollar)?

- A. 24,000
- B. 24
- C. 3
- D. 30



1. Which of the following statements about a country with a trade deficit is not true?
- A. Exports < imports
 - B. Net capital outflow < 0
 - C. Investment < saving *not true*
 - D. $Y < C + I + G$

A trade deficit means $NX < 0$.

Since $NX = S - I$,

a trade deficit implies $I > S$.



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.

