

12

Open-Economy Macroeconomics:
Basic Concepts

PRINCIPLES OF
MACROECONOMICS
FOURTH CANADIAN EDITION

N.GREGORY MANKIW
RONALD D.KNEEBONE
KENNETH J.McKENZIE
NICHOLAS ROWE

PowerPoint® Slides
by Ron Cronovich
Canadian adaptation by Marc Prud'Homme

© 2008 Nelson Education Ltd.

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?

© 2008 Nelson Education Ltd.

1

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

© 2008 Nelson Education Ltd.

2

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.
 - It buys and sells goods and services in world product markets.
 - It buys and sells capital assets in world financial markets.

© 2008 Nelson Education Ltd.

3

The Flow of Goods & Services

- **Exports:**
domestically-produced g&s sold abroad
- **Imports:**
foreign-produced g&s sold domestically
- **Net exports (NX)**
= value of exports – value of imports
- Another name for **NX**: the **trade balance**.

© 2008 Nelson Education Ltd.

4

ACTIVE LEARNING 1: Variables that affect NX

What do you think would happen to Canadian net exports if:

- A. The U.S. experiences a recession (falling incomes, rising unemployment)
- B. Canadian consumers decide to be patriotic and buy more products "Made in Canada"
- C. Prices of goods produced in Mexico rise faster than prices of goods produced in Canada.

5

ACTIVE LEARNING 1: Answers

- A. The U.S. experiences a recession
(falling incomes, rising unemployment)
Canadian net exports would fall
due to a fall in American consumers' purchases of
Canadian exports
- B. Canadian consumers decide to be patriotic and buy
more products "Made in Canada"
Canadian net exports would rise
due to a fall in imports

6

ACTIVE LEARNING 1: Answers

- C. Prices of Mexican goods rise faster than prices of
Canadian goods
This makes Canadian goods more attractive relative
to Mexico's goods.
Exports to Mexico increase,
imports from Mexico decrease,
so **Canadian net exports increase.**

7

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

8

Trade Surpluses & Deficits

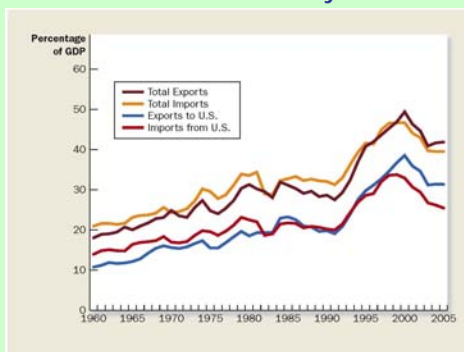
NX measures the imbalance in a country's trade in goods and services.

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

© 2008 Nelson Education Ltd.

9

FIGURE 12.1: The Internationalization of the Canadian Economy



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**.
 - When a Canadian resident buys stock in Telmex, the Mexican phone company, the purchase raises Canadian net capital outflow.
 - When a Japanese resident buys a bond issued by the Canadian government, the purchase reduces Canadian net capital outflow.

© 2008 Nelson Education Ltd.

11

The Flow of Capital

The flow of capital abroad takes two forms:

- **Foreign direct investment:**

If Tim Hortons opens a fast food outlet in Russia, that is an example of *foreign direct investment*

- **Foreign portfolio investment:**

If a Canadian buys stock in a Russian corporation, that is an example of *foreign portfolio investment*, supplying “loanable funds” to a foreign firm.

© 2008 Nelson Education Ltd.

12

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.

© 2008 Nelson Education Ltd.

13

Variables that Influence NCO

- real interest rates paid on foreign assets
- real interest rates paid on domestic assets
- perceived economic and political risks of holding assets abroad.
- govt policies affecting foreign ownership of domestic assets

© 2008 Nelson Education Ltd.

14

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 Canada,
 - Canadian exports and NX increase
 - the foreigner pays with currency or assets, so the Canadian acquires some foreign assets, causing NCO to rise.

© 2008 Nelson Education Ltd.

15

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 Canadian citizen buys foreign goods,
 - Canadian imports rise, NX falls
 - the Canadian buyer pays with Canadian dollars or assets, so the other country acquires Canadian assets, causing Canadian NCO to fall.

© 2008 Nelson Education Ltd.

16

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 $NCO < 0$.

© 2008 Nelson Education Ltd.

17

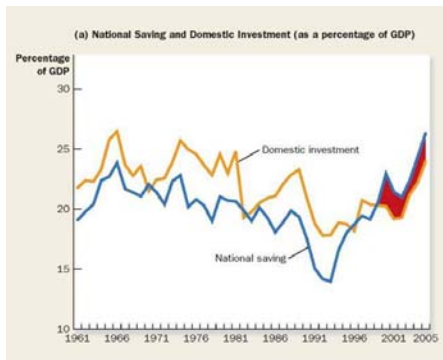
TABLE 12.1: International Flows of Goods and Capital-Summary

Trade Deficit	Balanced Trade	Trade Surplus
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

© 2008 Nelson Education Ltd.

18

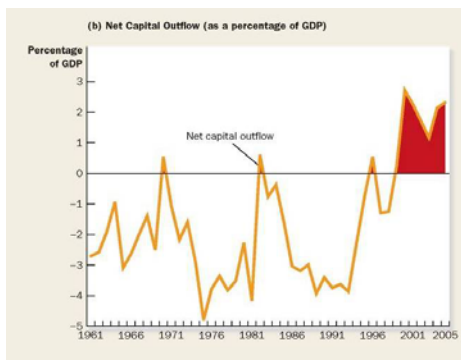
FIGURE 12.2: National Saving and Domestic Investment



© 2008 Nelson Education Ltd.

19

FIGURE 12.2: Net Capital Outflow



© 2008 Nelson Education Ltd.

20

THE PRICES FOR INTERNATIONAL TRANSACTIONS: REAL AND NOMINAL EXCHANGE RATES

- International transactions are influenced by international prices.
- The two most important international prices are the nominal exchange rate and the real exchange rate.

© 2008 Nelson Education Ltd.

21

The Nominal Exchange Rate

- The *nominal exchange rate*
 - is the rate at which a person can trade the currency of one country for the currency of another.
 - is expressed in two ways:
 - in units of foreign currency per one Canadian dollar, and
 - in units of Canadian dollars per one unit of the foreign currency.
- In our examples, the nominal exchange rate is expressed as units of the foreign currency per Canadian dollar (e.g., 80 yen per dollar)

© 2008 Nelson Education Ltd.

22

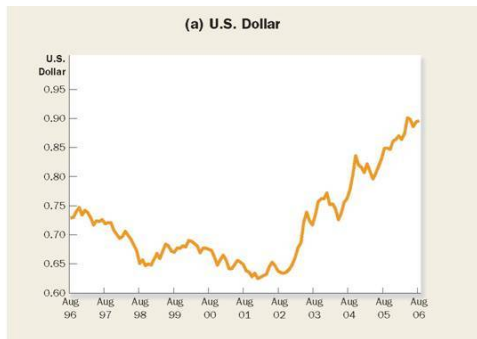
Appreciation and Depreciation

- **Appreciation** (or "strengthening"):
an increase in the value of a currency as measured by the amount of foreign currency it can buy
 - If a dollar buys more foreign currency, there is an appreciation of the dollar.
- **Depreciation** (or "weakening"):
a decrease in the value of a currency as measured by the amount of foreign currency it can buy
 - If a dollar buys less foreign currency, there is a depreciation of the dollar

© 2008 Nelson Education Ltd.

23

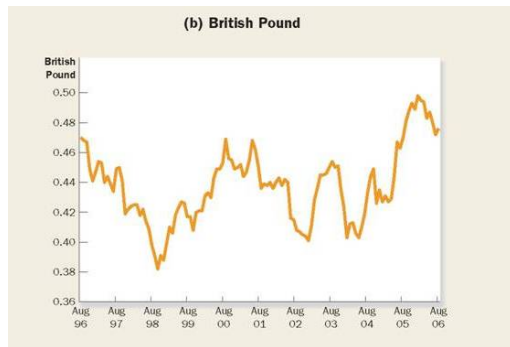
FIGURE 12.3: The Value of the Canadian Dollar



© 2008 Nelson Education Ltd.

24

FIGURE 12.3: The Value of the Canadian Dollar



© 2008 Nelson Education Ltd.

25

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

© 2008 Nelson Education Ltd.

26

Example With One Good

- A Big Mac costs \$2.50 but 400 yen in Japan
- $e = 120$ yen per \$
- $e \times P =$ price in yen of a Canadian Big Mac
 $= (120 \text{ yen per } \$) \times (\$2.50 \text{ per Big Mac})$
 $= 300 \text{ yen per Canadian Big Mac}$
- Compute the real exchange rate:

$$\frac{e \times P}{P^*} = \frac{300 \text{ yen per CDN Big Mac}}{400 \text{ yen per Japanese Big Mac}}$$

$$= 0.75 \text{ Japanese Big Macs per CDA Big Mac}$$

© 2008 Nelson Education Ltd.

27

Interpreting the Real Exchange Rate

"The real exchange rate =
0.75 Japanese Big Macs per CDA Big Mac"

- This does not mean a Japanese citizen literally exchanges Japanese burgers for Canadian ones.
- Correct interpretation:
 To buy a Big Mac in Canada,
 a Japanese citizen must sacrifice
 an amount that could purchase
 0.75 Big Macs in Japan.

© 2008 Nelson Education Ltd.

28

ACTIVE LEARNING 2: Compute a real exchange rate

$e = 10$ pesos per \$
 price of Tall Starbucks Latte
 $P = \$3$ in CDA, $P^* = 24$ pesos in Mexico

- What is the price of a Canadian latte measured in pesos?
- Calculate the real exchange rate, measured as Mexican lattes per Canadian latte.

29

ACTIVE LEARNING 2:

Answers

$e = 10$ pesos per \$

price of Tall Starbucks Latte

$P = \$3$ in Canada, $P^* = 24$ pesos in Mexico

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

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

B. Calculate the real exchange rate.

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

30

The Real Exchange Rate With Many Goods

P = CDA price level, e.g., Consumer Price Index, which 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

- An appreciation of the CDA real exchange rate means CDA goods are becoming more expensive relative to foreign goods.

© 2008 Nelson Education Ltd.

31

A FIRST THEORY OF EXCHANGE-RATE DETERMINATION: PURCHASING-POWER PARITY

- The *purchasing-power parity*
 - is the simplest and most widely accepted theory explaining the variation of currency exchange rates.
 - is a theory of exchange rates whereby a unit of any given currency should be able to buy the same quantity of goods in all countries.

© 2008 Nelson Education Ltd.

32

The Basic Logic of Purchasing-Power Parity

- According to the purchasing-power parity theory, a unit of any given currency should be able to buy the same quantity of goods in all countries.
- The theory is based on a principle called *the law of one price*.
 - According to the law of one price, a good must sell for the same price in all locations.

© 2008 Nelson Education Ltd.

33

The Law of One Price

- **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 costlessly 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.

© 2008 Nelson Education Ltd.

34

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
- implies that nominal exchange rates adjust to equalize the price of a basket of goods across countries

© 2008 Nelson Education Ltd.

35

Purchasing-Power Parity (PPP)

- Example: The "basket" contains a Big Mac.
 P = price of Canadian 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 CDA Big Mac, in yen

price of Japanese Big Mac, in yen

- Solve for e :

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

© 2008 Nelson Education Ltd.

36

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 Canada., then P^* rises faster than P , so e rises – the dollar appreciates against the peso.
 - If inflation is higher in the Canada than in Japan, then P rises faster than P^* , so e falls – the dollar depreciates against the yen.

© 2008 Nelson Education Ltd.

37

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 Canadian consumers prefer Toyotas over Chevys, or vice versa
 - Price differences reflect taste differences

© 2008 Nelson Education Ltd.

38

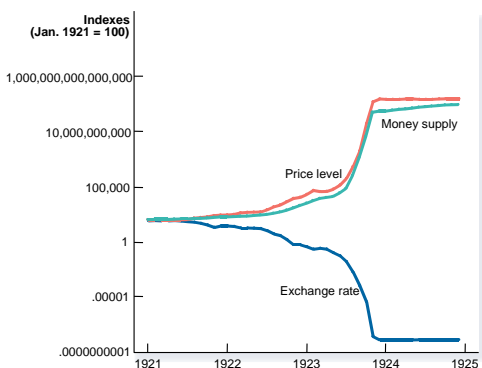
Limitations of PPP Theory

- 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).

© 2008 Nelson Education Ltd.

39

FIGURE 12.4: Money, Prices, and the Nominal Exchange Rate during the German Hyperinflation



ACTIVE LEARNING 3: 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. $Y < C + I + G$
2. A Ford Escape SUV sells for \$24,000 in Canada and 720,000 rubles in Russia.
 If purchasing-power parity holds, what is the nominal exchange rate (rubles per dollar)?

41

ACTIVE LEARNING 3: Answers

1. Which of the following statements about a country with a trade deficit is not true?

C. investment < saving is not true.

A trade deficit means $NX < 0$.

Since $NX = S - I$,
a trade deficit implies $I > S$.

42

ACTIVE LEARNING 3: Answers

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

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

$P^* = 720,000$ rubles

$P = \$24,000$

$e = P^*/P = 720000/24000 = 30$ rubles per dollar

43

INTEREST RATE DETERMINATION IN A SMALL OPEN ECONOMY WITH PERFECT CAPITAL MOBILITY

- Why do interest rates in Canada and the U.S. tend to move up and down together?
- Modify the description of the market for loanable funds in a small open economy with perfect capital mobility

A Small Open Economy with Perfect Capital Mobility

- 'Small' means a small part of the world economy
- Canada is an economy with perfect capital mobility because
 - Canadians have full access to world financial markets,
 - and the rest of the world has full access to the Canadian financial market
- This means that the real interest rate in Canada should equal the real interest rate prevailing in the world

$$r = r^w$$

© 2008 Nelson Education Ltd.

45

Perfect Capital Mobility

- The theory that the real interest rate in Canada should equal that in the rest of the world is known as *interest rate parity*

© 2008 Nelson Education Ltd.

46

Limitations to Interest Rate Parity

- Real interest rate in Canada is not always equal to the real interest rate in the rest of the world for two reasons:
 - Financial assets carry with them the possibility of default
 - Financial assets offered for sale in different

© 2008 Nelson Education Ltd.

47

CHAPTER 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.
- Saving can be used to finance domestic investment or to buy assets abroad. Thus, saving equals domestic investment plus net capital outflow.

© 2008 Nelson Education Ltd.

48

CHAPTER SUMMARY

- 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.

© 2008 Nelson Education Ltd.

49

CHAPTER 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.

© 2008 Nelson Education Ltd.

50

End: Chapter 12

© 2008 Nelson Education Ltd.

51
