The Macroeconomics of Open Economies: Basic Concepts

(Chapter 31 in Mankiw and Taylor)
• Closed economy
  – Economy that does not interact with other economies in the world (RoW)

• Open economy
  – Economy that interacts freely with other economies around the world
    • International trade can make everyone better off, since it lets them specialise in producing those goods and services in which it has a comparative advantage
International Flow of Goods

- An open economy interacts with the RoW by buying and selling both *goods/services* and *capital assets* (stocks and bonds etc.)

- **Exports**
  - Goods & services
  - Produced domestically
  - Sold abroad

- **Imports**
  - Goods and services
  - Produced abroad
  - Sold domestically
International Flow of Goods

• Net exports
  – Value of a nation’s exports minus the value of its imports
  – Also called the trade balance

• Trade surplus
  – Excess of exports over imports

• Trade deficit
  – Excess of imports over exports

• Balanced trade
  – Exports equal imports
International Flow of Goods

- Factors that influence a country’s exports, imports and net exports:
  - Tastes of consumers for domestic & foreign goods
  - Prices of goods at home and abroad
  - Exchange rates
    - People use domestic currency to buy foreign currencies
  - Incomes of consumers at home and abroad
  - Cost of transporting goods from country to country
  - Government policies toward international trade
The increasing openness of the U.S. economy

- Increasing importance of international trade and finance
  - 1950s, imports and exports: 4-5% of GDP
  - Recent years:
    - Exports – increased more than twice
    - Imports – increased more than three times
    - Similar story for UK and indeed the world economy
The increasing openness of the U.S. economy

• Increase in international trade
  – Improvements in transportation
    • Bigger and faster ships; planes; better storage
  – Advances in telecommunications
  – Technological progress
  – Government’s trade policies
    • NAFTA
    • GATT
The internationalisation of the U.S. Economy

This figure shows exports and imports of the U.S. economy as a percentage of U.S. gross domestic product since 1950. The substantial increases over time show the increasing importance of international trade and finance.
International Flow of Capital

• Net capital outflow
  – Purchase of foreign assets by domestic residents minus the purchase of domestic assets by foreigners
  – Flow of capital takes two forms:
    • Foreign direct investment
      – You buy a BMW car factory
    • Foreign portfolio investment
      – You buy shares in BMW
International Flow of Capital

• Factors that influence net capital outflow:
  – Real interest rates paid on foreign assets
  – Real interest rates paid on domestic assets
  – Perceived economic and political risks of holding assets abroad
  – Government policies that affect foreign ownership of domestic assets
Net Exports = Net Capital Outflow

• Net exports (NX) or trade balance
  – Imbalance between a country’s exports and its imports of goods and services

• Net capital outflow (NCO)
  – Imbalance between
    • Amount of foreign assets bought by domestic residents
    • And the amount of domestic assets bought by foreigners

• Identity: NCO = NX
Net Exports = Net Capital Outflow

• When $NX > 0$ (trade surplus)
  – Selling more goods and services to foreigners than it is buying from them
  – From net sale of goods and services
    • Receives foreign currency
    • Buy foreign assets
    • Capital - flowing out of the country: $NCO > 0$
Net Exports = Net Capital Outflow

• When NX < 0 (trade deficit)
  – Buying more goods and services from foreigners
    • Than it is selling to them
  – The net purchase of goods and services
    • Needs financing
    • Selling assets abroad
    • Capital - flowing into the country: NCO < 0
Saving and investment

• A nation’s saving and investment are fundamental to its long run economic growth

• So let’s see how these variables are related to the international flow of goods and capital, as measured by net exports and net capital outflow
Some simple algebra

- Open economy: \( Y = C + I + G + NX \)
- National saving: \( S = Y - C - G \)
  - \( Y - C - G = I + NX \)
  - \( S = I + NX \)
- \( NX = NCO \)
  - \( S = I + NCO \)
- National saving = Domestic investment + Net capital outflow
  - i.e. when the UK saves a £ it can be used to accumulate capital at home or abroad
• **Trade surplus:** Exports > Imports
  • Net exports > 0
  • Y > Domestic spending (C+I+G)
  • S > I
  • NCO > 0
International Flows

• Trade deficit: Exports < Imports
  • Net exports < 0
  • Y < Domestic spending (C+I+G)
  • S < I
  • NCO < 0
International Flows

• Balanced trade: Exports = Imports
  • Net exports = 0
  • \( Y = \) Domestic spending (\( C+I+G \))
  • \( S = I \)
  • NCO = 0
### Table 1

**International Flows of Goods and Capital: Summary**

<table>
<thead>
<tr>
<th>Trade Deficit</th>
<th>Balanced Trade</th>
<th>Trade Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports &lt; Imports</td>
<td>Exports = Imports</td>
<td>Exports &gt; Imports</td>
</tr>
<tr>
<td>Net Exports &lt; 0</td>
<td>Net Exports = 0</td>
<td>Net Exports &gt; 0</td>
</tr>
<tr>
<td>$Y &lt; C + I + G$</td>
<td>$Y = C + I + G$</td>
<td>$Y &gt; C + I + G$</td>
</tr>
<tr>
<td>Saving &lt; Investment</td>
<td>Saving = Investment</td>
<td>Saving &gt; Investment</td>
</tr>
<tr>
<td>Net Capital Outflow &lt; 0</td>
<td>Net Capital Outflow = 0</td>
<td>Net Capital Outflow &gt; 0</td>
</tr>
</tbody>
</table>

This table shows the three possible outcomes for an open economy.
Is the U.S. trade deficit a national problem?

• In the past two decades the U.S.
  – Borrowed heavily in world financial markets
  – To finance large trade deficits
• Before 1980
  – National saving & domestic investment were close
  – Small net capital outflow
Is the U.S. trade deficit a national problem?

• After 1980
  – National saving - fell substantially below investment
  – Net capital outflow - a large negative number; i.e. a capital inflow
  – U.S. - going into (external) debt
Panel (a) shows national saving and domestic investment as a percentage of GDP. You can see from the figure that national saving has been lower since 1980 than it was before 1980. This fall in national saving has been reflected primarily in reduced net capital outflow rather than in reduced domestic investment.
Panel (b) shows net capital outflow as a percentage of GDP. You can see from the figure that national saving has been lower since 1980 than it was before 1980. This fall in national saving has been reflected primarily in reduced net capital outflow (i.e. capital inflow) rather than in reduced domestic investment.
Is the U.S. trade deficit a national problem?

• Trade deficit induced by a fall in saving
  – The nation is putting away less of its income to provide for its future
  – No reason to deplore the resulting trade deficits?
• Better to have foreigners invest in the U.S. economy than no one at all
Is the U.S. trade deficit a national problem?

• Trade deficit induced by an investment boom
  – Economy is borrowing from abroad to finance the purchase of new capital goods
  • For a good return on investment - the economy should be able to handle the debts that are being accumulated
  • For a lower return on investment - debts will look less desirable
Nominal Exchange Rates

• Nominal exchange rate
  – Rate at which a person can trade currency of one country for currency of another

• Appreciation (*strengthen*)
  – Increase in the value of a currency
  – As measured by the amount of foreign currency one unit of the domestic currency can buy
    • An appreciation means one can buy more foreign currency
    • N.B. can always express the exchange rate the other way round – i.e. as the domestic price of foreign exchange
Nominal Exchange Rates

• Depreciation (*weaken*)
  – Decrease in the value of a currency
  – As measured by the amount of foreign currency it can buy
  • A depreciation means one can buy less foreign currency
Real Exchange Rates

- Real exchange rate
  - This is the price at which a person can trade goods and services of one country, for goods and services of another:

\[
\text{Real exchange rate} = \frac{\text{Nominal exchange rate} \times \text{Domestic price}}{\text{Foreign price}}
\]

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Real Exchange Rates

- **Real exchange rate** = \( (e \times P) / P^* \)
  - Using price indexes
  - \( e \) – nominal exchange rate between the U.K. pound and foreign currencies
  - \( P \) – price index for U.K. basket
  - \( P^* \) – price index for foreign basket
Real Exchange Rates

• Depreciation (fall) in the U.K. real exchange rate
  – U.K. goods - cheaper relative to foreign goods
  – Consumers at home and abroad - buy more U.K. goods and fewer goods from other countries
    • Higher exports
    • Lower imports
    • Higher net exports
Real Exchange Rates

• An appreciation (rise) in the U.K. real exchange rate
  – U.K. goods - more expensive compared to foreign goods
  – Consumers at home and abroad - buy fewer U.K. goods and more goods from other countries
    • Lower exports
    • Higher imports
    • Lower net exports
Nominal exchange rates vary over time - Dollar price of £1
Why do nominal exchange rates vary as much as they apparently do?
Purchasing Power Parity

• Purchasing power parity, PPP
  – First (long run) theory of exchange rates
  – A unit of any given currency
    • Should be able to buy the same quantity of goods in all countries

• Basic logic of purchasing power parity
  – Based on the Law Of One Price (LOOP)
  – A good must sell for the same price in all locations
Purchasing Power Parity

• This is due to arbitrage
  – Take advantage of price differences for the same item in different markets

• And trade until there is
  – Equality or *parity* in prices

• Purchasing power
  – Value of money in terms of quantity of goods it can buy
Implications of PPP

- **If purchasing power of the pound**
  - Is always the same at home and abroad
  - Then the real exchange rate cannot change, since \( \frac{1}{P} = \frac{e}{P^*} \) or \( 1 = \frac{eP}{P^*} \) so that \( e = \frac{P^*}{P} \)
    - If a Big Mac costs £3 in the UK and $4 in the US then \( e = \frac{4}{3} = 1.3 \) dollars per pound

- **Theory of purchasing power parity**
  - Nominal exchange rate between the currencies of two countries reflects the (overall, aggregate) price levels in those countries
  - So when relative prices change, \( e \) must change
Implications of PPP (cont.)

• We have seen (in lecture 10) that the price level in any country adjusts to bring the quantity of money supplied and demanded into balance

• Because the nominal ER depends on the price level, it also depends on the money supply and demand in each country

• So, when a country prints money its exchange rate should depreciate
  – So the depreciation of the £ against the $ that we saw should reflect higher inflation in the UK
Nominal exchange rate during a hyperinflation

• Natural experiment – hyperinflation
  – High inflation
  – Arises when a government prints money to pay for large amounts of government spending

• German hyperinflation, early 1920s
  – Money supply, price level, nominal exchange rate
    • Move closely together
Nominal exchange rate during a hyperinflation

- German hyperinflation, early 1920s
  - Money supply - starts growing quickly
    - Price level – starts growing
    - Depreciation
  - Money supply - stabilises
    - Price level – stabilises
    - Exchange rate – stabilises
Nominal exchange rate during a hyperinflation

• Quantity theory of money
  – Explains how the money supply affects price level

• Purchasing power parity
  – Explains how price level affects nominal exchange rate
Money, Prices, and the Nominal Exchange Rate during the German Hyperinflation

This figure shows the money supply, the price level, and the exchange rate (measured as U.S. cents per mark) for the German hyperinflation from January 1921 to December 1924. Notice how similarly these three variables move. When the quantity of money started growing quickly, the price level followed, and the mark depreciated relative to the dollar. When the German central bank stabilised the money supply, the price level and exchange rate stabilised as well.
Limitations of PPP

• Theory of purchasing power parity
  – Does not always hold in practice, except perhaps in the long run
  – Evidenced by the fact that the real ER is not constant over time

1. Many goods (e.g. services like haircuts) are not easily traded

2. Even tradable goods are not always perfect substitutes
   • When they are produced in different countries
   • No opportunity for profitable arbitrage
   • Transactions costs inhibit profitable arbitrage
Limitations of PPP

• Purchasing power parity
  – Not a perfect theory of exchange-rate determination
  – Real exchange rates fluctuate over time

• Large & persistent movements in nominal exchange rates
  – Typically reflect changes in price levels at home and abroad
The Big Mac Index: from Fun guide to whether currencies are at their “correct” level


In the “long run”, exchange rates should move towards the rate that equalises the prices of Big Macs around the world

According to purchasing power parity

- Cost of “Big Mac” should be the same in both countries
- Predicted exchange rate = Price in foreign country (in foreign currency) divided by price in U.S.
<table>
<thead>
<tr>
<th>Country</th>
<th>Big Mac Price in Local Currency</th>
<th>Big Mac Price in US dollars</th>
<th>Implied PPP rate + Today’s Exchange Rate 1 USD =</th>
<th>Over(+) / Under(-) Valuation against the USD, % ++</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$4.07</td>
<td>4.0700</td>
<td>---</td>
<td>1.0000</td>
</tr>
<tr>
<td>Argentina</td>
<td>Peso 20.0</td>
<td>4.6113</td>
<td>4.92</td>
<td>4.3372</td>
</tr>
<tr>
<td>Australia</td>
<td>A$ 4.56</td>
<td>4.8780</td>
<td>1.12</td>
<td>0.9348</td>
</tr>
<tr>
<td>Brazil</td>
<td>Real 9.50</td>
<td>5.4724</td>
<td>2.34</td>
<td>1.7360</td>
</tr>
<tr>
<td>Britain</td>
<td>£ 2.39</td>
<td>3.7846</td>
<td>0.59</td>
<td>0.6315</td>
</tr>
<tr>
<td>Canada</td>
<td>C$ 4.73</td>
<td>4.7677</td>
<td>1.16</td>
<td>0.9921</td>
</tr>
<tr>
<td>Chile</td>
<td>Peso 1850</td>
<td>3.8027</td>
<td>455</td>
<td>486.500</td>
</tr>
<tr>
<td>China</td>
<td>Yuan 14.7</td>
<td>2.3288</td>
<td>3.60</td>
<td>6.3123</td>
</tr>
</tbody>
</table>

- At market exchange rates, a burger is 43% cheaper in China than in America
  - i.e. the raw Big Mac index suggests that the yuan is 43% undervalued against the dollar

- But cheap burgers in China do not prove that the yuan is undervalued. Average prices should be lower in poor countries than in rich ones because labour costs are lower...