I.   Introduction
      A.   *While Mankiw develops his analysis of the trade balance and exchange rate determination separately, I find that it is easier to look at them at the same time and that is what we do in class.*
            1.   *The changes in the trade balances are easier to understand if we observe the changes in the exchange rate.*
      B.   As foreign trade has increased, the interdependence of countries has also increased.
      C.   *Think in terms of a small open economy.*
      D.   Accounting identities reveal a key insight: The flow of goods and services across national borders is closely related to the flow of funds to finance capital accumulation.
      E.   **Figure 8-1: Imports and exports as a percentage of output: 1997, p. 194.**

II.   The International Flows of Capital and Goods.
      A.   In an open economy, a country's spending in any given year does not have to equal its output of goods and services.
      B.   The role of net exports.
            1.   A country's output consist of expenditures on:
                  a. C^d,
                  b. I^d,
                  c. G^d, and
                  d.   EX.
            2.   This can be restated as Y= C + I + G + NX.
                  a.   NX = EX - IM
            3.   **Net exports (NX or trade balance)**: Exports minus imports.
                  a.   NX = Y - (C+ I + G)
                  b.   Net Exports = Output - Domestic Spending
            4.   If output exceeds domestic spending, we export the difference: net exports are positive.
            5.   If output falls short of domestic spending, we import the difference: net exports are negative.
      C.   Net foreign investment and the trade balance.
            1.   This is a very simple but powerful relationship.
            2.   **Net foreign investment (S - I)**: The excess of domestic saving over domestic investment.
                  a.   S - I = NX
                  b.   Net foreign investment = the trade balance, which is the same as
                        (1)   Capital Account = - Current Account
                  c.   The national income accounts identity shows that the international flow of funds to finance capital accumulation and the international

flow of goods and services are two sides of the same coin.
  d.   Capital flows can take many forms such as investments in equity markets as well as in real assets.

III.   Saving and Investment in a Small Open Economy.
  A.   *In effect, all countries including the US are small.*
  B.   **World interest rate:** The real interest rate prevailing in world financial markets.
      1.   Obviously, it is based on global supply and demand.
      2.   It applies for small open economies.
      3.   r = r*
          a.   *While the real rate is a constant, market rates will vary based on inflationary expectations, taxes and risks in the individual countries.*
          b.   *This is often ignored in many media discussions of capital markets.*
  C.   The model of a small open economy has three key assumptions:
      1.   The output of the economy Y is fixed by the factors of production and the production function.
          a.   Y= F(K,L)
      2.   Consumption C is positively related to disposable income Y - T.
          a.   C=C(Y-T)
      3.   Investment is negatively related to the real interest rate r.
          a.   I= I(r)
      4.   Therefore, the trade balance is determined by the difference between saving and investment at the world interest rate.
          a.   NX = S - I(r*)
      5.   **Figure 8-2: Saving and investment in a small open economy, p. 200.**
  D.   How policies influence the trade balance.
      1.   Fiscal policy at home.
          a.   Starting from balanced trade, a change in fiscal policy that reduces national saving leads to a trade deficit.
          b.   **Figure 8-3: A fiscal expansion at home in a small open economy, p. 201.**
      2.   **Case-study: The twin deficits, p. 201**
          a.   **Figure 8-4: Saving, investment, the trade balance, and the budget deficit: the U.S. experience, p. 202.**
              (1)   *This is an important example.*
      3.   Fiscal policy abroad.
          a.   An increase in the world interest rate due to a fiscal expansion abroad leads to a trade surplus.
          b.   **Figure 8-5: A fiscal expansion in a small open economy, p. 203.**
      4.   Shifts in investment demand.

    a. An outward shift in the investment schedule causes a trade deficit.

    b. **Figure 8-6: A shift in the investment schedule in a small open economy, p. 204.**

  E. Evaluating economic policy.

    1. The central message of our model of the open economy is that the flow of goods and services measured the trade balance is inextricably connected to the flow of funds for capital accumulation measured by net foreign investment.

    2. A trade deficit is not a problem itself, but perhaps a symptom of a problem.

IV. Exchange Rates.

  A. Nominal and real exchange rates.

    1. **The nominal exchange rate**: The relative price of the currency of two countries.

    2. **The real exchange rate**: The relative price of the goods of two countries.

     a. It is sometimes called the terms of trade.

  B. **FY1: How newspapers report the exchange rate, p. 207.**

    1. **Real exchange rate= nominal ex. rate times the ratio of price levels**

     a. $\varepsilon = e \times (P/P^*)$

      (1) ε in the real exchange rate

      (2) e is the nominal exchange rate

      (3) P = domestic prices

      (4) P^* = foreign prices

     b. If the real exchange rate is high, foreign goods are relatively cheap and domestic goods are relatively expensive.

     c. If the real exchange rate is low, foreign goods are relatively expensive and domestic goods are relatively cheap.

  C. The real exchange rate and the trade balance.

    1. **Figure 8-7: Net exports and the real exchange rate, p. 208.**

     a. The response to a change in the real exchange rate can be slow.

  D. The determinants of the real exchange rate.

    1. We find that two forces determine the real exchange rate:

     a. The real exchange rate is related to net exports.

     b. The trade balance must equal net foreign investment.

    2. **Figure 8-8: How the real exchange rate is determined, p. 209.**

     a. The downward sloping line, NX, represents the net demand for dollars coming from foreigners who want dollars to buy our goods.

      (1) Think of it as a net demand for a country's currency.

     b. The net foreign investment curve (S - I) is vertical because it is not influenced by the exchange rate.

      (1) Think of it as a net supply of a country's currency.

          c.   At the equilibrium real exchange rate, the supply of dollars available for net foreign investment balanced the demand for dollars by foreign buying our net exports.

    E.   How policies influence the real exchange rate.

        1.   Fiscal policy at home.

            a.   An increase in G leads to a reduction in S and a higher real exchange rate.

            b.   **Figure 8-9: The impact of expansionary fiscal policy at home on the real exchange rate, p. 210.**

        2.   Fiscal policy abroad.

            a.   An increase in the world interest rate leads to a reduction in I and an increase in NFI, so that the exchange rate falls.

            b.   **Figure 8-10: The impact of expansionary fiscal policy abroad on the real exchange rate, p. 211.**

        3.   Shifts in investment demand.

            a.   An increase in investment demand, reduces NFI driving up the exchange rate.

            b.   **Figure 8-11: The impact of an increase in investment demand on the real exchange rate, p. 212**.

    F.   The effects of trade policies.

        1.   This is a good example of how a good understanding of macroeconomics leads to different conclusions that you usually observe in the newspapers.

        2.   Protectionist trade policies do not affect the trade balance, although they affect the exchange rate.

        3.   **Figure 8-12: The impact of protectionist trade policies on the real exchange rate, p. 213.**

    G.   The determinants of the nominal exchange rate.

        1.   %change in e= %change in ε + ($\eth$*-$\eth$)

            a. $\eth$* = foreign inflation

            b. $\eth$ = domestic inflation

        2.   If a country has a high rate of inflation relative to the US, a dollar will buy an increasing amount of the foreign currency over time.

        3.   If a country has a low rate of inflation relative to the US, a dollar will buy a decreasing amount of the foreign currency over time.

        4.   **Case-study: Inflation and nominal exchange rates, p. 215.**

            a.   **Figure 8-13: Inflation differentials and the exchange rate, p. 215.**

    H.   The special case of purchasing-power parity.

        1.   **Purchasing-power parity**: It states that if international arbitrage is possible, then a dollar must have the same purchasing power in every country.

                a.   *It is based on the law of one price.*
                b.   *Essentially, the real exchange rate is a constant.*
                c.   *This is a long run outcome.*
                d.   It has two important implications:
                        (1)   Since the net exports schedule is flat, changes in saving and investment do not influence the real or nominal exchange rates.
                        (2)   Since the real exchange rate is fixed, all changes in the nominal exchange rate result for changes in price levels.
                e.   It is not a perfect description of the world because
                        (1)   many goods are not easily trade and
                        (2)   others are not perfect substitutes.
        2.   **Figure 8-14: Purchasing power parity, p. 217.**
        3.   **Case-study: The Big Mac around the world, p. 218.**
                a.   **Table 8-1: Big Mac prices and the exchange rate: An application of Purchasing power parity, p. 219.**

V.   The United States as a Large Open Economy.
     A.   Mankiw feels that the US is somewhere between a small open economy and a closed economy.
     B.   *I see it as still being a small open economy.*

VI.   Summary.

VII.   Appendix: The Large Open Economy
     A.   *It is not important to understand this appendix.*
     B.   Net Foreign Investment
        1.   NFI = NFI(r).
        2.   **Figure 8-15: How Net Foreign Investment Depends on the Interest Rate, p. 225.**
        3.   **Figure 8-16: Two special cases, p. 225.**
        4.   The US interest rate is not fixed at the world level because
                a.   the US is large enough to influence world financial markets and
                b.   capital is not perfectly mobile.
        5.   Except for this new NFI function, the model of the large open economy resembles the model of the small open economy.
     C.   The Model
        1.   To understand how the large open economy works, we need to consider two key markets:
                a.   the market for loanable funds and
                        (1)   **Figure 8-17: The Market for Loanable Funds in the**

Large Open Economy, p. 227.
(2) S = I(r) + NFI(r).
b.   the market for foreign exchange.
(1) **Figure 8-18: The Market for Foreign Exchange in the Large Open Economy, p. 227.**
(2) NX (î) = NFI
D. Policies in the Large Open Economy
1. Three diagrams are needed for this analysis:
a. the equilibrium in the market for loanable duns,
b. the relationship between the equilibrium interest rate and net foreign investment and
c. the equilibrium in the market for foreign.
d. **Figure 8-19: The Equilibrium in the Large Open Economy, p. 228.**
2. Fiscal Policy at Home
a. **Figure 8-20: A Reduction in National Saving in the Large Open Economy, p. 229.**
3. Shifts in Investment Demand
a. **Figure 8-21: An Increase in Investment Demand in the Large Open Economy, p. 230.**
4. Trade Policies
a. **Figure 8-22: An Import Restriction in the Large Open Economy, p. 231.**
5. Shifts in New Foreign Investment
a. **Figure 8-23: A Fall in New Foreign Investment in the Large Open Economy, p. 232.**