Chapter 6: Open Economy Macroeconomics

Key points:

- Know both sides of the trade balance - the current account and the capital account

- Know what determines the balance of trade

- Know difference btwn real and nominal exchange rates

- Know determinants of real and nominal exchange rates

Net Exports - the National Accounts Identity in an open economy:

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

- In Chap 3, we assumed imports=0, exports=0

    - All consumption and investment were domestic

- Now, let's be clear about domestic vs foreign produced goods/services:

    - $Y = C^d + I^d + G^d + \underbrace{EX}_{\text{exports}}$

        * The superscript d stands for domestic (e.g., C^d is consumption of domestically produced goods and services)

    - Total Spending on goods and services:
        * $C = C^d + C^f$
        * $I = I^d + I^f$
        * $G = G^d + G^f$

    - Put these in the National Accounts Identity:
        * $Y = (C - C^f) + (I - I^f) + (G - G^f) + EX$
        * $Y = C + I + G + EX - \underbrace{(C^f + I^f + G^f)}_{\text{imports}}$
        * $Y = C + I + G + \underbrace{EX - IM}_{NX}$
        * $Y = C + I + G + NX$

- Rearranging our new identity, we get:

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

    - Or: Net exports = output - domestic spending
        * If output is higher than spending, export the rest
        * If output is lower than spending, import the balance

- DRAW circular flow model for closed economy: w/ HH, firms, Gov't, Fin intermediary, note that arrows point in the direction that dollars flow

- DRAW circular flow model for open economy

    - Financial
        * Inflow: S
        * Outflow: $I+$ net capital outflow
        * Inflow = Outflow $\Rightarrow S = I+$ net captal outflow $\Rightarrow S - I =$net capital outflow
    - Rest of World (ROW)
        * Inflow: $IM+$ net capital outflow
        * Outflow: EX
        * Inflow = Outflow $\Rightarrow IM+$ net capital outflow $= EX \Rightarrow EX - IM =$ net capital outflow $\Rightarrow NX =$ net capital outflow
    - Putting it together
        * $S - I =$ net capital outflow $= NX$
        * $\Rightarrow \underbrace{S - I}_{\text{flow of assets}} = \underbrace{NX}_{\text{flow of output}}$
        * Must make a trade - not getting something for nothing
        * If $NX < 0$ (ie. imports > exports), then savings, less than investment - get a capital inflow that is making investments
        * What's happening is that country net borrower to consume - trading consumption now for consumption in the future
        * Countries with lower savings rates have higher trade deficits (e.g., US vs. Korea)

The Trade Balance:

- More with National Accts ID:

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

- $\underbrace{Y - C - G}_{\text{savings}} = I + NX$

- $S = I + NX$

- $S - I = NX$

- $NX =$ the trade balance

- $S - I =$ net capital outflow

    - If save more than invest in this country, that additional savings is invested overseas
    - it's net foreign investment
        * The country's purchase of foreign assets minus foreign purchases of domestic assets
        * $S > I \Rightarrow$ country is a net lender
        * $S < I \Rightarrow$ the country is a net borrower

- We say a country has a capital account surplus if it is a net borrower from abroad $(S < I)$

- By the accounting identify, it must be that $S - I = NX$ i.e., the trade balance = the net capital outflow = minus the capital account

- We call the trade balance the current account

- Therefore, the current account + the capital account = 0

- SHOW figure 6-6 on relation between current account and capital account

- we say:

  - the country runs a trade deficit if $NX < 0$ (in this case the country runs a capital account surplus)
  - the country runs a trade surplus if $NX > 0$ (in this case the country runs a capital account deficit)
  - there is balanced trade if $NX = 0$

- Example:

  - College student - works 10 hours a week, \$10/hr = \$400/month
  - Rent is \$400, food \$200, + books and tuition
  - here , $S < I$ - takes out student loan, runs trade deficit (consumes more than produces) - trades future consumption to do so (will have to pay back loan later) - but get net capital inflow not
  - net capital inflow balances with the next outflow from spending exceeding current income (production)

Savings and Investment In a Small Open Economy:

- Open: Trade with rest of world

- Small: Amount of trade has no impact on the world interest rate, r^* (i.e., r^* taken as given)

- As before (Chap 3):

  - $Y = \bar{Y} = F(\bar{K}, \bar{L})$
  - $C = C(Y - T)$
  - $I = I(r)$

- Now:

  - $NX = (Y - C - G) - I$
  - or $NX = S - I$

- $\Rightarrow$

  - $NX = [\bar{Y} - C(\bar{Y} - T) - G] - I(r^*)$
  - $\Rightarrow NX = \bar{S} - I$
  - or $NX = \bar{S} - I(r^*)$,
  - where r^* is the world interest rate
  - trade balance is determined by savings and investment at the world interest rate

- DRAW loanable funds market for open economy - vert axis is interest rate, horiz is save, invest.. save is vertical line, invest is downward sloping function of interest rate. r* determines invest - diff between I and S is NX

  - Note that I(r) downward sloping - $\frac{\partial I(r^*)}{\partial r^*} < 0$
  - if $S > I$, lend abroad
  - if $S < I$, borrow from abroad

Things that change the balance of trade:

- Fiscal policy at home

  - Increase budget deficit (either by $\uparrow G$ or $\downarrow T$ and G fixed)
    * $S \downarrow$
    * $\Rightarrow NX = S - I \downarrow$
    * DRAW loanable funds mkt. Shift S to left as decline. See effect on NX decline
    * Savings falls, but no change in investment $\Rightarrow$ must borrow from abroad, use borrowed money to finance investments
    * Went from balanced trade to trade deficit

- Fiscal policy abroad

  - e.g., Increase budget deficit in large country (either by $\uparrow G$ or $\downarrow T$ and G fixed) $\Rightarrow r^* \uparrow$
    * DRAW loanable funds mkt. Move along I as interest rate changes. See how net exports increases because savings fixed, but invest fall (make up for and thus don't have to import as much)

- Shift in investment demand

  - e.g., Tax cut makes investment more attractive
    * DRAW loanable funds mkt. Shift out in I(r) curve. Menas more invest as given int rate. Means fall in NX (S-I falls)
    * Shift interest rate curve outward (investment more productive), means a fall in NX
    * Savings fixed, now more invest $\Rightarrow S - I \downarrow$

<u>Is a trade deficit bad?</u>:

- SHOW graph of US trade deficit...

- Yes

  - Have big debt to pay back - so lower future consumption
  - Symptom of low savings - also will result in low future consumption
  - Political economy - belief that lender has more power (economist don't talk too much about, but most public focuses on this)

- No

  - Get consumption now
  - Sign of a strong economy - other's lending to you because believe you will have resources to pay off later

<u>Exchange Rates</u>:

- Nominal Exchange Rate

  - the relative price of currency in two countries
  - denote by e
  - e.g., $e = \frac{\#\$}{¥}$ or $= \frac{\#\$}{€}$

- Real Exchange Rate

- the relative price of goods in two countries
- called the "terms of trade"
- denote by ϵ
- $\epsilon = \frac{\#\text{ Japanese Cars}}{\text{American car}}$ or $= \frac{\#\text{ Units foreign GDP}}{\text{unit of domestic GDP}}$
- $\epsilon = e \times \frac{P}{P^*}$, where:
  * P = price level domestically
  * P^* = price level in foreign country
  * e.g. Big Mac. $P^* = 200$ ¥, $P = \$2.50$, $e = 100$ ¥/\$
  * $\epsilon = e \times \frac{P}{P^*} = 100 \times \frac{2.50}{200} = 1.25$
  * Have to give up 1.25 Big Macs in Japan to buy one in the U.S. - these are the terms of trade - the rate at which trade Japanese output for US output
  * Note how units workout ϵ (units of goods in country A/unit of gods in country B) $= e$ (units of currency in country A/unit of currency in country B) $\times$ price level in country B/price level in country A (this means #units currency per good in B/ # units currency per good in A)
  * So have $\epsilon = \frac{\#¥}{\$} \times \frac{\frac{\#\$}{\text{US good}}}{\frac{\#¥}{J good}} = \frac{\#¥}{\$} \times \frac{\#\$}{\text{US good}} \times \frac{J \text{ good}}{\#¥} = \frac{\#J \text{ good}}{\text{US good}}$
  * # ¥cancel out, \$ cancel out. Get # J goods in numerator, US good in denominator

The Real Exchange Rate and the trade balance:

- Propose that $NX = NX(\epsilon)$

  - remember that ϵ is the relative price of domestic to foreign consumption, so this makes sense

- DRAW $NX(\epsilon)$. ϵ on vertical axis, NX is downward sloping function. Draw gotten line up from zero

- A lower exchange rate means that domestic goods are less expensive relative to foreign goods

- Thus: $\epsilon \downarrow \Rightarrow IM \downarrow, EX \uparrow \Rightarrow NX \uparrow$ as $\epsilon \downarrow$

- i.e., $\frac{\partial NX(\epsilon)}{\partial \epsilon} < 0$

What determines the Real Exchange Rate?:

- 2 factors:

  1. NX increase as ϵ falls
  2. S & I fixed at a given world interest rate
     - $S - I$ determines the supply of dollars to foreigners (if $S > I$ more dollars, if $S < I$ less dollars)
     - Foreigners demand dollars so they can purchase US goods

- In eq'm, $S - I = NX$ (recall the the current account equals the negative of the capital account (or net capital outflows)

- The market eq'm determines ϵ

- DRAW foreign exchange market: vertical S-I curve, downward sloping NX curve. Intersection determines ϵ

  - At eq'm exchange rate, the supply of dollars available from net capital outflows = the demand for dollars by those who buy the net exports

Policies that affect the Real Exchange Rate:

- Fiscal policy at home:

    - $\uparrow G$ (or $\downarrow T$ w/ G fixed) $\Rightarrow S \downarrow \Rightarrow (S - I) \downarrow$
    - DRAW foreign exchange market. Show S-I shift to the left as $G \uparrow$
        * $\epsilon \uparrow$ to balance lower supply of dollars to invest abroad with the unchanged demand for dollars to buy US goods
        * US goods relatively more expensive after the fall in $S \Rightarrow$ less exports, more imports, both of which mean $NX \downarrow$

- Fiscal policy abroad:

    - $\uparrow G$ abroad $\Rightarrow \downarrow S$ abroad $\Rightarrow \uparrow r^* \Rightarrow \downarrow I(r^*)$
    - DRAW foreign exchange market. Show S-I shift out as I falls...
        * increasing world interest rates reduced investment demand (b/c it's more costly to borrow)
        * $\Rightarrow$ increase supply of dollars to lend abroad (b/c savings not affected)
        * $\Rightarrow$ exchange rate falls
        * $\Rightarrow$ increase in NX (exports $\uparrow$, imports $\downarrow$)

- Shift in investment demand (e.g. from a tax cut):

    - $I \uparrow \Rightarrow S - I \downarrow$ (reducing supply of dollars to invest abroad)
    - DRAW foreign exchange market with a shift to the left in S-I
        * $\Rightarrow \epsilon \uparrow$
        * $\Rightarrow$ exports $\downarrow$, imports $\uparrow \Rightarrow NX \downarrow$

- Trade policies:

    - Tariff or quota on imports - goal of these policies are to reduce imports, usually to help domestic producers
    - DRAW foreign exchange market with a shift up in the NX(e) curve
        * $\Rightarrow \epsilon \uparrow$
        * The Δ in the exchange rate perfectly compensates for the trade policy
        * No change in the trade deficit
        * Why is this?
        * $\rightarrow$ Supply and demand for dollars must still be equal
        * $\rightarrow\rightarrow$ Supply, $S - I$ didn't change
        * $\rightarrow\rightarrow$ Policy changes demand for imports
        * $\rightarrow\rightarrow$ Prices (the exchange rate) move to hold eq'm in the market
        * $\rightarrow\rightarrow$ Price of domestic goods (relative to foreign goods) risers - lowering exports to balance the lower imports from the policy
        * End result is not range in the trade deficit, but likely welfare losses as both imports and exports fall

Determinants of the Nominal Exchange Rate:

- Start with equation for real exchange rate:

- $\epsilon = e \times \frac{P}{P^*} \Rightarrow e = \epsilon \times \frac{P^*}{P}$

  - $\frac{\partial e}{\partial P^*} > 0, \ \frac{\partial e}{\partial P} < 0, \ \frac{\partial e}{\partial \epsilon} > 0,$

- Put this equation in percent changes:

  - $\%\Delta e = \%\Delta\epsilon + \underbrace{\%\Delta P^*}_{\text{inflation abroad, } \pi^*} - \underbrace{\%\Delta P}_{\pi}$

  - $\Rightarrow \%\Delta e = \%\Delta\epsilon + (\pi^* - \pi)$

    * If lower inflation domestically than in foreign country, the nominal exchange rate will increase
    * e.g. if Mexico has a higher inflation rate than the US, then the # of pesos per dollar will increase

- SHOW graph 6.XX that shows scatter plot of e and inflation

The Law of One Price:

- Idea: Similar goods cost the same anywhere

- Caveats:

  - Applies only to tradable goods
  - Can still have differences that equal transactions costs (e.g. shipping cost + tariffs)

- General idea: arbitrage opportunities are exhausted

  - e.g., jeans in NYC and Paris
  - DRAW NYC and Paris markets next to each other. Diff prices for jeans. More expensive in paris. So buy in NYC and shift demand curve out (price rises there) and sell in Paris (so supply shifts out and prices fall there). Can do this until price the same. (less caveats).

- Law of one price applied: Purchasing Power Parity: if arbitrage possible, one $ will buy the same amount of goods anywhere

  - PPP gives cost of same basket of goods in one country relative to cost in another (like real exchange rate, but not...)
  - PPP can be used to predict long run trend of exchange rates
  - e.g. if PPP > 1, expect the real (and thus nominal) rates to fall as prices adjust across countries
  - In practice, the PPP$\neq$ because of short run fluctuations and barriers/costs to trade
  - PPP adjustments are used to compare income/wealth across countries

- Explain Big Mac Index????