International trade

Current Account Balance (CAB)

- $X - M$ is Net Factor Income from Abroad (NFIA)
- $B^f_t$ = Net international investment

\[ Y + r \frac{B^f_{t-1}}{P} = C_t + I_t + G_t + \frac{B^f_t - B^f_{t-1}}{P} \]

\[ \frac{B^f_t - B^f_{t-1}}{P} = Y + r \frac{B^f_{t-1}}{P} - \delta K - (C + G) - (I - \delta K) \]

- Current Account Balance = Net Saving – Net Investment
- Current Account Balance = $B^f_t - B^f_{t-1} \frac{P}{P}$
- Net Saving : $Y + r \frac{B^f_{t-1}}{P} - \delta K - (C + G)$
  - Depends on the permanence of income shocks.
  - If a shock is permanent, saving does NOT change.
- Net Investment : $(I - \delta K)$
  - Depends on $MPK$
  - If $MPK$ increases then $I^d$ shifts to the right.
- Trade balance : $Y - (C + I + G)$

The effect of a positive shock to $MPK$, (Does not affect productivity of capital)

- Small open economy
  - $Y^S$ shifts to the right
  - $CAB \uparrow$
- large open economy
  - $Y^S$ shifts to the right
  - World interest rate, $r^\ast$, decreases
  - $CAB \uparrow$ but is offset by $r^\ast$

Terms of Trade

- Nominal CAB = $P^f Y + r B^f_{t-1} - P (C + I + G)$
- Real CAB = $\frac{P^f}{P^*} Y + r \frac{B^f_{t-1}}{P^*} - (C + I + G)$
Suppose: $\frac{P_j}{P_i} \uparrow$ permanently

- $MPK \uparrow \Rightarrow I \uparrow$
- Income $\uparrow \Rightarrow C \uparrow$ approximatly same amount
- $\Rightarrow S$ is unchanged
- Net effect: $(S - I) \downarrow$ and $CAB \downarrow$

**Law of one price**

- Assumptions:
  - No transportation cost and trade barrier
  - Identical tradable goods
  - Goods in every places should have a same prices (If not?)

**Purchasing Power Parity**

Each dollar has the same purchasing power for buying goods in every countries.

- $\$1$ can be exchanged to $e^i$ unit of country i’s currency and buy $\frac{e^j}{P_i}$ units of goods.
- The purchasing power of one dollar in country i is $\frac{e^i}{P_i}$ units of goods.
- Arbitrage condition implies

$$\frac{e^i}{P_i} = \frac{e^j}{P_j}$$

or

$$\frac{e^i}{e^j} = \frac{P_i}{P_j}$$

**Purchasing Power Parity in Relative form**

$$\frac{\Delta e^j}{e^j} - \frac{\Delta e^i}{e^i} = \frac{\Delta P_j}{P_j} - \frac{\Delta P_i}{P_i}$$

**Interest Rate Parity**

Each dollar has the same returns in every countries.

- $\$1$ can be exchanged to $e^i_t$ unit of country i’s currency
- buy bonds to receive $e^i_t (1 + R^i)$ units of country i’s currency.
- Sell bonds and exchange money to $\frac{e^i_t (1 + R^i)}{e^i_{t+1}}$ U.S. dollar
- Arbitrage condition implies

$$\frac{e^i_t (1 + R^i)}{e^i_{t+1}} = \frac{e^i_t (1 + R^i)}{e^i_{t+1}}$$
• Combine Purchasing Power Parity and Interest Rate Parity,

\[ R_i - \pi_i = R_j - \pi_i \]

\[ r_i = r_j \]

**Fixed Exchange Rate**

• \( e^i = \pi \)

• Money market : \( \frac{M^i}{\pi} = L^d(Y, R, ...) \)

• PPP : \( P^i = e \cdot P = \pi \cdot P \)

• Result
  - A small country must have a same inflation rate as a world inflation rate.
  - Monetary policy is not independent

• Impossible trinity
  - A fixed exchange rate
  - Free capital movement (absence of capital controls)
  - An independent monetary policy

**Price stickiness**

• Price-misperception Model
  - \( P^e \neq P \)
  - \( \frac{W}{P^e} = \frac{W}{P} \cdot \frac{P}{P^e} \)
  - \( L^*(\frac{W}{P^e}) \uparrow \Rightarrow Y \uparrow \)

• Keynesian Model
  - Nominal wage is sticky : \( W = \bar{W} \)
  - \( P \uparrow \Rightarrow \frac{W}{P} \downarrow \Rightarrow L^* \uparrow \Rightarrow Y \uparrow \)

**Exercise**

1. If the British pound appreciates from $0.50 per pound to $0.75 per pound, the U.S. dollar depreciates from ________ per dollar to ________ per dollar.

2. According to the law of one price, if the price of Colombian coffee is 100 Colombian pesos per pound and the price of Brazilian coffee is 4 Brazilian reals per pound, then the exchange rate between the Colombian peso and the Brazilian reals is: ________
3. The ________ states: if two countries produce an identical good, the price of the good should be the same throughout the world no matter which country produces it. The ________ states that exchange rates between any two currencies will adjust to reflect changes in the price levels of the two countries. The condition that states that the domestic interest rate equals the foreign interest rate minus the expected appreciation of the domestic currency is called ________.

4. In the long run, a rise in a country’s price level (relative to the foreign price level) causes its currency to ________, while a fall in the country’s relative price level causes its currency to ________.

5. If the 2005 inflation rate in Canada is 4 percent, and the inflation rate in Mexico is 2 percent, then the theory of purchasing power parity predicts that, during 2005, the value of the Canadian dollar in terms of Mexican pesos will ________.

6. With a 10 percent interest rate on dollar deposits, and an expected appreciation of 7 percent over the coming year, the expected return on dollar deposits in terms of the foreign currency is ________.

7. According to the interest parity condition, if the domestic interest rate is 10 percent and the foreign interest rate is 12 percent, then the expected ________ of the foreign currency must be ________ percent.