



MGEA06 Final Notes

Week 2:

- $LFPR = \frac{LF}{AP} \times 100\%$
- $ur = \frac{\# \text{ unemployed}}{LF} \times 100\%$
- $er = \frac{\# \text{ employed}}{AP} \times 100\%$
- $NRU = \frac{\text{Level of frictional unemployment} + \text{Level of structural unemployment}}{LF} \times 100\%$
- Inflation refers to a rise in the overall price level.
- Inflation rate, $\pi_t = \frac{\text{Price level in year } t - \text{Price level in year } t-1}{\text{Price level in year } t-1} \times 100\%$
- Costs of (expected) inflation:
 - Shoe-leather costs
 - Menu costs
 - Unit of account costs
- Cost of unexpected inflation
 - Arbitrary redistribution of wealth
- $\text{Real Income} = \frac{\text{nominal income}}{CPI} \times 100$
- Nominal Interest Rate = Real Interest Rate + Deflation Rate
- Expected real interest (r^e) = Nominal interest rate - Expected inflation (π^e)
- Actual/realized real interest = Nominal interest rate - Actual inflation
- $GDP \text{ Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$
- Value-added = Revenue - Cost of Intermediate Goods and Services

Week 3:

- Rule of 70: $\# \text{ of years for a variable to double} = \frac{70}{\text{Annual growth rate of variable}}$
 - ie. if annual rate of 2%, then # years to double = $70/2 = 35$ years
- $AP_L = \frac{\text{real GDP}}{\# \text{ of workers}}$
 - can be affected by physical capital, human capital, production technology
- $MP_k = \frac{dy}{dk}$
- $MP_L = \frac{dy}{dL}$

- Growth accounting equation: $\frac{\Delta y}{y} = \frac{\Delta A}{A} + \alpha(\frac{\Delta k}{k}) + (1 - \alpha)(\frac{\Delta h}{h})$
- $y = \frac{Y}{L} = Af(k, h)$

Week 4:

- $PV = \text{today's value} + \frac{\text{value at year 1}}{(1+i)^1} + \frac{\text{value at year 2}}{(1+i)^2} + \dots + \frac{\text{value at year } n}{(1+i)^n}$
- Net Present Value (NPV) of a project = PV of the returns generated - PV of the costs incurred
- $\text{yield}(i) > \text{coupon rate}$
- Domestic Supply of Loanable Funds:
 - $S_{\text{National}} = Y - C - G = S_{\text{private}} + S_{\text{public}} (= GBB)$
 - $S_{\text{private}} = Y - T + TR - C$
 - $S_{\text{public}} = T - TR - G$
 - Supply of funds = Demand for funds ($D_F = S_F$)
 - Investment = National Savings

Week 5:

- Assumptions of Income-Expenditure Model
 - Price is fixed and producers are willing supply additional output at a fixed price
 - Interest rate is held fixed
 - Government spending, taxes and transfers are given
 - Exports and imports are given
- $AE_{\text{planned}} = C + I_{\text{planned}} + G + X - IM$
 - $C = AC + MPC \times YD$
- $AE_{\text{planned}} = AE_0 + MPC \times Y$
- Actual Expenditure: $Y = C + (I_{\text{planned}} + I_{\text{unplanned}}) + G + X - IM$
- $Y = AE_{\text{planned}} + I_{\text{unplanned}}$
- Equilibrium in the income-expenditure model:
 - Actual expenditure = Planned Expenditure
 - $GDP = Y = AE_{\text{planned}}$
- $\Delta Y^* = \Delta AE_0 \times M = \Delta AE_0 \times \frac{1}{1-MPC}$

Week 6:

- Δ in AE_0 will shift the AD curve
- The aggregate supply (AS) curve represents the quantity of output that producers are willing to supply at each aggregate price level.
- Long-run level of output: $Y_P = Y_{FE} = A \times F(K, L, H)$
- SR equilibrium: AD intersects SRAS
- LR equilibrium: AD, SRAS, and LRAS intersect at the same point.
- Output gap: $\left(\frac{Y_{SR} - Y_{FE}}{Y_{FE}}\right) \times 100\%$

Week 7:

- Demand shocks: shifts of the AD curve Δ in AE_0
- Supply shocks:
 - Shifts of the SRAS curve
 - a negative SRAS shock will lead to stagflation
 - Simultaneous shifts of SRAS & LRAS curves
- AS-AD model: $AE_{planned} = AE_0 - P + MPC \times Y$

Week 8:

- fiscal policy refers to the government's choice regarding levels of spending, taxes, and transfers.
- three components of fiscal policy are:
 - Government spending on final goods & services: G
 - Taxes: $T = T_0 + t \times Y$
 - t is the average tax rate
 - T_0 is the lump sum taxes
 - Government transfers: $TR = TR_0 - tr \times Y$
 - tr is the transfer benefit reduction rate
- Income-expenditure model with fiscal policy:
 - $AE_{planned} = C + I_{planned} + G + X - IM$
 - $Y^* = AE_0 \times \left(\frac{1}{1 - MPC(1 - t - tr)}\right)$, note that $\left(\frac{1}{1 - MPC(1 - t - tr)}\right)$ is the multiplier.
 - where $AE_0 = AC + AI + G + X_0 - IM_0 + MPC \times TR_0 - MPC \times T_0 - di$
- THE IE MODEL
 - Step 1: get YD as a function of Y

$$YD = Y - T + TR$$

- Step 2: get C as a function of Y
 - Sub $YD(Y)$ into $C(YD)$
- Step 3: derive the $AE_{planned}$ equation:

$$AE_{planned} = C + I_{planned} + G + X - IM$$

$$AE_{planned} = AE_o + MPC(1 - t - tr)Y$$

- Step 4: Solve for Y by setting $Y = AE_{planned}$
- $GBB = T - TR - G = (T_0 - TR_0 - G) + (t + tr) \times Y$
- Since the budget balance changes automatically when output changes, part of the budget balance is **ENDOGENOUS**.
 - **Structural deficit**: the government runs a budget deficit even $Y = Y_{FE}$
 - **Cyclical deficit**: the government runs occasional budget deficit when the economy is in a recession, which is normal.
- Persistent budget deficits lead to accumulation of national debt
- debt-to-GDP ratio can be used to assess the burden of national debt:

$$Debt - to - GDP\ ratio_t = \frac{National\ Debt_t}{GDP_t}$$

- **Discretionary fiscal policy**: a deliberate change in fiscal policy
- **Automatic stabilizer**: part of fiscal policy that changes wherever output changes (change in business cycle)

Week 9:

- money performs the following functions:
 - Medium of exchange: to facilitate the exchange of good & services
 - Store of value: to transfer purchasing power from present to the future
 - Unit of account: to set prices & make economic decisions
- Reserve ratio (rr): $rr = \frac{Bank\ reserves}{Deposits}$, $1 > rr > 0$
- (Maximum) amount of deposits that can be supported: $DD = \frac{1}{rr} \times reserves$
- $MS = CC + DD$

Week 10:

- Demand for money (MD): curve shows the relationship between the quantity of money demanded and the interest rate (opportunity cost of holding money)
- Changes in money demand and/or money supply will cause interest rate to change
- THE IE MODEL with Monetary Policy
 - Step 1: set YD as a function of Y: $(YD = Y - T + TR)$
 - Step 2: set the consumption function as a function of Y: $C = AC + MPC \times YD$
 - Step 3: set the $AE_{planned}$ as a function of Y: $AE_{planned} = AE_0 + MPC(1 - t - tr)Y$
 - Step 4: set the equilibrium level of output: $Y^* = AE_{planned}$
- Quantity equation shows the relationship between nominal GDP and the amount of money exchanged.
 - Money Supply (M) x Velocity of Money (V) = Price (P) x Real GDP (Y)
- Money is neutral in the LR.

Week 11:

International Flow of Funds

- Assume: Net exports (NX) = net foreign investments (NFI)
- Supply of loanable funds: $SF = S_{National} = S_{private} + S_{public}$
- Demand for loanable funds: $DF = I(i)$
- $S_{National} = I + NFI \rightarrow NFI = S_{National} - I = SF - DF$
- Equilibrium in the loanable funds market (w/ the International Flow of Funds)
 - Sum of all countries' net exports is zero: $NX_H + NX_F = 0$
 - Sum of all countries' international flows of capital is zero: $NFI_H + NFI_F = 0$
 - Domestic interest (i_H) = Foreign interest (i_F) = world interest (i_W)
 - Equilibrium levels: $SF = DF$
- The balance of payments (BOP) accounts records a country's international transactions with the rest of the world.
- BOP identity: $CA + FA = 0$, where CA is the current account & FA is the financial account
- Foreign Exchange Market:
 - demand for domestic currency, D_{DC} , comes from **exports** of goods, services, and assets.

$$D_{DC} = \text{Exports of goods/services} + \text{Purchase of domestic assets by foreigners}$$
 - supply of domestic currency, S_{DC} , comes from **imports** of goods, services, and assets.

$$S_{DC} = \text{Imports of goods/services} + \text{Purchase of foreign assets by domestic residents}$$

Week 12:

- 2 major types of exchange rate regimes:
 - **floating/flexible exchange rate**: exchange rate is determined by the market forces
 - **fixed exchange rate**: exchange rate is held fixed at a pre-specified level

	Monetary policy	Fiscal policy
Flexible exchange rate	Effective	Less effective
Fixed change rate	Ineffective	Effective

- Recall:

$$AE_{planned} = C + I_{planned} + G + X - IM$$

Additional Formulas

- $Debt_0 + G + TR - T = Debt_1$
- $Balance = X - IM + Inc_{\leftarrow} - Inc_{\rightarrow} + NUT$
- Financial Account Balance: $FA = -(Balance)$