Eco 10350 Principles of Macro

Lecture 7

Note: we will be covering material from OpenStax textbook Appendix B, "The Expenditure-Output Model"

Aggregate Demand and Aggregate Supply

- Why does the economy go along fine until suddenly boom! recession hits? Did economy suddenly get less productive? Sure there are always movements that some products sell well and others flop but why a sudden transition to a macro-wide flop?
- According to the so-called "Say's Law," supply creates its own demand
 - Every business decision means transfers of funds to potential consumers
 - Henry Ford (a terrible human in many ways!) paid his workers enough that they could buy cars
 - Suggests that recession and depression are impossible! OK maybe in longrun ... ?
- Money breaks this down economies that make substantial use of money & finance can face times when people don't want to spend money, usually because they're uncertain about the future
- Aggregate Demand is also important

Aggregate Supply

- AS links real GDP with Price level
- Price level is the index of prices (not inflation)
- As price level rises (but input prices stay), firms will produce more
- Slope changes as bottlenecks get more important

Ρ

- Depends on how close economy is to potential output where unemployment is low
- Can even be above potential in shortrun (ie we draw "potential" as a line but it's actually more of a zone)
- As usual, distinguish shifts along the curve from shifts of the curve



Aggregate Demand

- AD links real GDP with Price level
- Price level is the index of prices (not inflation)
- As price level rises (but input prices stay), people buy less
- Aggretate Expenditure, AE is C + I + G + (X M) so the increase/decrease can come from any of those segments
- Slope is steep since these changes are relatively small:
 - Wealth effect means higher prices make saving less valuable
 - Interest rates may be higher at higher price levels
 - Exports might be lower if domestic prices higher
- As usual, distinguish shifts along the curve from shifts of the curve – monetary & fiscal policy shift the whole curve





Together: AS & AD

- Intersection of curves shows shortrun equilibrium
- Not necessarily near or at potential
- Distance from potential is cyclical unemployment
- Distinguish Short Run Aggregate Supply SRAS from Long Run Aggregate Supply LRAS

Ρ

Rename "Potential GDP" as LRAS



Productivity growth in AS & AD

Ρ

- Productivity growth shifts LRAS and SRAS
 - When compounded over a long time, productivity growth is most important in explaining the "wealth of nations"
 - Equilibrium real GDP rises and price level falls



real GDP

Input Price Shocks in AS & AD

Ρ

- Large rise in price of important input shifts SRAS left (eg oil price shock)
- Equilibrium real GDP falls and price level rises



What shifts AD?

- AE is C + I + G + (X M)
- Consumer confidence can shift C
 - People more willing to buy a variety of products
 - esp durables or housing
 - Interest rates are really important in housing
 - Consumer spending depends on Disposable Income Income after Taxes
 - (but what changes consumer confidence?)
- Business confidence can shift I
 - Firms more willing to make investments in future production
 - Interest rates are really important in business investment

- Shifts in exchange rates, tariffs, or conditions abroad can change X, M
- For US, M changes often reflect luxury goods
- Government Fiscal Policy can change G or T (T impacts Disposable Income so Consumption)
- Government Monetary Policy can change interest rates

Shifts of AD

Ρ

- AD shifts to right if any of C + I + G + (X M) rise
- Equilibrium real GDP rises and price level rises
- Vice Versa if AD shifts to the left (any of C + I + G + (X – M) fall)



More detail on components of AD

- Consumption determined by
 - Disposable Income most households are paycheck-topaycheck
 - Expected Future Income might change consumption to anticipate
 - Wealth/Credit wealth, availability of credit can buffer
- Locally approximated as linear function of Disposable Income,
 - C = a + b(Y − T) + e
 - a and b are parameters; e is error so other stuff
 - o < b ≤ 1 this is MPC Marginal Propensity to Consume
- Investment
 - Firms estimate future rate of profit from an investment
 - Compare with borrowing cost (interest rate)

- Government Spending
 - Somewhat counter-cyclical
- Exports
 - Depend on Exchange Rates
 - Depend on macro conditions in rest of world
 - Currently Japan is facing near-zero GDP growth
 - Europe is slowing
 - China slowing
- Imports
 - Depend on Exchange Rates
 - Depend on consumption patterns in US

Expenditure-Output Model

- C = a + b(Y − T)
- | = |_o
- for now let G = T = X = M = o just for simplicity
- Y = C + I
- $Y = [a + bY] + I_0$
- $Y bY = a + I_0$
- $Y = \left(\frac{1}{1-b}\right)(a+I_0)$
- So note that $\frac{\Delta Y}{\Delta I} = \left(\frac{1}{1-b}\right)$ -- this is the Multiplier

- $\left(\frac{1}{1-b}\right)$ the Multiplier
- If b = 0.8 then Multiplier is 5
- Common to hear discussions of Multiplier in policy discussions, eg why Amazon in Queens might have been good or why public funding of sports teams
- An increase in investment raises somebody's income (eg firm pays a programmer to update software) and that somebody spends her new income, which raises somebody else's income, etc etc etc ...
- Algebra just expresses this convergent series

Expenditure-Output Model

C = a + bY

- I = I_o
- Graph this with AE on vertical and Y on horizontal

AE

- Y is production; AE is spending
- 45-degree line shows where AE=Y, equilibrium
- Note that small changes in I make larger changes in equilibriumY=AE -- by Multiplier
- As MPC, represented by b, becomes larger, the AE gets steeper and multiplier gets larger



Expenditure-Output Model

- Usually begin by assuming that I and G and X are exogenous
- "exogenous" determined outside the model, not endogenous within the model
- I depends on business confidence in economy and interest rates
- G depends on politicians' policies
- X depends on world economy
- Taxes are a bit more complicated
- On previous graph, note that Potential GDP doesn't enter it's a point of information but not equilibrium
- Equilibrium not necessarily related to potential GDP (in shortrun)

Taxes – Marginal vs Average

- As AOC recently demonstrated, lots of people muddle Marginal vs Average Tax Rates
- For example, suppose a very simple tax system where people with income ≤ 1,000,000 have marginal rate of 30% while marginal rate becomes 70% for income over 1,000,000
- So a lucky person with income of 1,000,000 pays 300,000 in taxes. What happens if she gets \$1 more income?
- Tax on that last (marginal) dollar is 70% so pays 300,000 + 0.70 in taxes on 1,000,001 income
- NOT jump to 700,000.70!
- Marginal tax rate is $\Delta T/\Delta Y$; Average is T/Y



Marginal rate is the slope of the function at a point Average is slope of ray back to origin Note: obviously the actual US tax system is more complicated and has more kinks (ie jumps of Marginal Tax Rate) but it's usually a continuous function

Expenditure-Output Model – more complicated version

- C = a + b(Y T)
- $T = T_0 + tY$
- $I = I_0$
- $G = G_0$
- $X = X_0; M = M_0$
- Y = C + I + G + (X M)

- $Y = [a + b(Y \{T_0 + tY\})] + I_0 + G_0 + (X_0 M_0)$
- $Y = a + bY bT_0 btY + I_0 + G_0 + (X_0 M_0)$
- $Y bY + btY = a bT_0 + I_0 + G_0 + (X_0 M_0)$
- $Y(1 b + bt) = a bT_0 + I_0 + G_0 + (X_0 M_0)$
- $Y = \left(\frac{1}{1-b+bt}\right) \left(a bT_0 + I_0 + G_0 + (X_0 M_0)\right)$
- Now the multiplier is $\frac{1}{1-b+bt} = \frac{1}{1-b(1-t)}$
- if b=0.8 and t=0.3 then multiplier is 2.27
- any change to a or T_o or G_o or X_o or M_o has same multiplier