

## LECTURE 20: SHIFTING AD-AS

### I. On Income

- a. One of the strongest relationships in macroeconomics is the relationship between disposable income (DI) and consumption (C). The more you make, the more you spend. There is a positive correlation between the two.
  - i. *Disposable income* is income after taxes.
- b. *Savings* (S), or anything that's not spending, is also positively correlated with disposable income. It becomes investment.
  - i. Or,  $S = DI - C$
- c. *Marginal propensity to consume* (MPC) describes what portion of an additional amount of income goes to consumption. It ranges from zero to one (but sometimes more).

$$\text{marginal propensity to consume} = \frac{\Delta C}{\Delta DI}$$

- i. Typically people with a low income have a high MPC. MPC decreases as income rises. The same is true for whole economies. But for simplicity, we will be assuming MPC is constant.
- d. *Marginal propensity to save* (MPS) describes what portion of an additional amount of income goes to saving. Ranging from zero to one.

$$\text{marginal propensity to save} = \frac{\Delta S}{\Delta DI}$$

- i. Since you can either save or spend your income,

$$MPS + MPC = 1$$

### II. The Keynesian (or Fiscal) Multiplier

- a. Suppose I give you \$1. What could you do with it?
  - i. Some of it you will save, some of it you will spend.
  - ii. The portion you spend will be added to someone else's income.
  - iii. This additional income will be partly spent as well, adding to someone else's income.
  - iv. And so on...
- b. All these individual transactions, added together, increase GDP and it increases it by more than the initial \$1 I gave you. We call this the

Keynesian Multiplier, after John Maynard Keynes, the father of macroeconomics.

$$\text{Keynesian Multiplier} = \frac{\text{change in real GDP}}{\text{initial change in spending}}$$

- i. How much more depends on the MPC.
- ii. If  $MPC = 0.9$ , GDP increases by  $\$1 + \$0.90 + \$0.81 + \$0.73 + \dots$
- iii. If  $MPC = 0.8$ , GDP increases by  $\$1 + \$0.80 + \$0.64 + \$0.51 + \dots$
- iv. This infinite series converges such that total multiplier equals

$$\text{Keynesian Multiplier} = \frac{1}{1 - MPC} = \frac{1}{MPS}$$

- v. So a 0.9 MPC is a multiplier of 10; at 0.8, the multiplier is 5.
- c. Economists estimate the actual multiplier is much lower than what we predict here. This equation gives us an upper bound. The actual value (somewhere between zero and 2.5) is lower because...
- i. New income is dissipated in the form of taxes and imports.
  - ii. Inflation from extra spending reduces the real GDP gains.
  - iii. Savings becomes investment, which is also spent but on different things. This process takes longer than spending, but it does decay the spending gains thanks to opportunity cost.
  - iv. The equation derives from an infinite series, but it can take a long time for money to change hands that often! In practice, it might only change hands a few times before the year runs out. On the other hand such spending *will* increase real GDP; it's just a matter of time.

### III. Shifting LRAS

- a. When LRAS curve shifts, something fundamental just happened in the economy. We call these *real shocks* (because they have a real effect: an effect that's adjusted for inflation).
  - i. A positive shock increases real GDP. Examples include technology, increases in the capital stock, higher levels of education, and increases in the population.
  - ii. A negative shock decreases real GDP. Examples include disasters and wars (which reduce both the capital stock and the population), and a fall in education levels.

### IV. Shifting SRAS

- a. *Productivity*. If an economy can produce more output with the same number of inputs, that's effectively the same as reducing input prices. In both cases, by spending the same amount of money on inputs, the economy will be able to create more output. Increases in productivity shift AS right/down. LRAS should shift in the same direction

(assuming this is a permanent increase in productivity) at the same time.

- b. *Legal Environment*. Changes in regulations shift the AS curve in the same way changes in input prices shift AS. Complying with regulations are costly.
- c. *Taxes/Subsidies*. Paying taxes are costly, too. Subsidies, on the other hand, reduce cost-per-unit of production.
- d. *Input prices*. While input prices are sticky, they are not set in stone. If wages fall (say, because of an increase in immigration) or the dollar appreciates (thus importing inputs are cheaper), the SRAS shifts right/down.
  - i. Cheaper dollars thus have two effects; one for input prices and one for greater exports/fewer imports.
  - ii. Here we can relax my rule from Unit 1: it's now okay to shift more than one curve. In this case, AD would shift right/up *and* AS would shift left/up.
- e. When LRAS shifts, SRAS shifts with it, as long the real shock affects the short-run, too (which it usually does).
  - i. Note that the last two effect (taxes/subsidies and input prices) are all various kinds of prices. They don't have a real effect and thus they don't reflect economic fundamentals so these changes don't shift LRAS.

## V. Shifting AD

- a. Like our microeconomics demand curve, our aggregate demand curve can shift. These changes are all unexpected changes.
- b. Consumer spending
  - i. *Wealth*. If consumers' assets suddenly become more valuable, AD shifts right/up.
  - ii. *Borrowing*. A sudden increase in borrowing also shifts AD right/up. It shifts lefts/down if people suddenly begin to save more.
  - iii. *Consumer Expectations*. Similarly, changes in expectations can change spending habits. If people think the economy will pick up, spending will increase.
  - iv. *Personal Taxes*. Lower taxes means more disposable income and thus more spending and a rightward/upward shift in AD.
- c. Investment spending
  - i. *Real interest rates*. The interest rate is the cost of borrowing. Unexpected higher interest rates not only encourage savings,

they discourage investment spending. Decrease the real interest rate and AD will shift right/up.

- ii. *Expected returns*. If interest rates are the cost of investment, this is the benefit. Whether the returns are higher because of lower taxes, better technology, better business conditions, or something else, higher expected returns shifts AD right/up.
- d. *Government spending*. Not much nuance to this one. As government spends more, AD shifts right/up. Again, remember *ceteris paribus*: we assume taxes and interest rates are not changing because of this government spending.
- e. Net Export spending
  - i. *National income abroad*. If other countries are suddenly wealthier, AD shifts right/up because they will buy more U.S. goods.
  - ii. *Exchange rates*. Suppose the dollar suddenly becomes less valuable (for some reason other than the price level). For our purposes that's effectively the same thing as incomes abroad increasing. In both cases, foreigners will buy more U.S. goods. AD will shift right/up.
- f. *Money supply*. Like government spending, this is pretty straightforward. More money means AD shifts right; less money means it shifts left.