

Problem 1. Define the **short run** and the **long run**.

Answer 1. The short run is a length of time over which wages and prices are sticky. So in the short run, the labor market can be out of full employment equilibrium (e.g. positive cyclical unemployment).

In the long run, wages and prices are fully flexible so that there is full employment (cyclical unemployment is zero). We will assume that demand and supply of labor do not change and therefore potential GDP is constant. Therefore the long run aggregate supply function (LRAS) is simply potential GDP, a vertical line at Y_p .

Problem 2. Which of the following are implied by the LRAS? (More than one may be true. And suppose net exports are zero, which is the typical assumption in this course.)

- (a) Government spending completely crowds out private spending
- (b) The money supply will not affect real GDP and other real variables like unemployment and the real wage
- (c) Government borrowing can affect monetary policy via the Fisher effect
- (d) The Federal Reserve can reduce efficiency wages by reducing inflation

Answer 2: a & b. Since LRAS is vertical, it's easy to see that shifting aggregate demand has no effect on equilibrium output – it's going to be at Y_p . This means monetary policy and fiscal policy cannot affect output in the long run, they will only generate changes in the price level.

So if the government spends \$100, it must mean private spending ($C + I$) declines by \$100 so that the economy is still at Y_p . To illustrate, we can write

$$\Delta Y = \Delta C + \Delta I + \Delta G + \Delta NX.$$

In the long run, $Y = Y_p$ and therefore $\Delta Y = 0$. So we have

$$\Delta C + \Delta I = -\Delta G.$$

This is called *complete* crowding out. And if the Federal Reserve increases the money supply by 1,000,000,000%, output in the long run is unchanged. This is called *money neutrality*.

Problem 3. Suppose a recession hits the economy and expenditure decreases. What is the **self-correcting mechanism** that restores full employment?

Answer 3. Here's the chain of logic for the self-correcting mechanism.

- Suppose demand goes down for some reason. For instance, households and firms become pessimistic and cut their borrowing and spending accordingly.
- Then at the existing price level, firms are producing too much stuff – they won't be able to sell it all, too expensive.
- Therefore firms would like to lower the price of their goods. They will also lower nominal wages so that the real wage W/P doesn't skyrocket. (A decrease in P with no change in W leads to a higher real wage.)

This implies that as long as firms can reduce the price of their goods and reduce the nominal wage, there should be no cyclical unemployment. But uh, cyclical unemployment exists in the real world, so this can't be quite right. Something is missing.

Problem 4. This dude said, “In the long run, we are all dead.”

- (a) Adam Smith
- (b) John Maynard Keynes
- (c) David Ricardo
- (d) Count Chocula
- (e) Chef Boyardee
- (f) Colonel Sanders
- (g) The Pillsbury Doughboy

Answer 4: b. Keynes meant that analyzing what happens in the long run is not relevant to current affairs. In the short run wages and prices might not be fully flexible and accordingly the economy might not be at full employment. Hence there might be room for fiscal or monetary policy to get the economy back to full employment.

Both wage and price rigidity can arise from legally binding, written and signed contracts (i.e. *explicit contracts*), or from social considerations (i.e. *implicit contracts*). A firm might not want to cut someone’s wage because it will make them look bad because bad PR might hurt sales. A firm might not want to raise the price of a good because it might offend customers.

Problem 5. According to Keynes (i.e. short-run macroeconomics), which of the following is the trigger for recessions?

- (a) supply shocks
- (b) erratic monetary policy
- (c) demand shocks
- (d) wage and price rigidity

Answer 5: c. Here's the chain of logic for the Keynesian (SRAS) model.

- Suppose demand goes down for some reason. For instance, households and firms become pessimistic and cut their borrowing and spending accordingly.
- Then at the existing price level, firms are producing too much stuff – they won't be able to sell it all, too expensive.
- So firms would like to lower the price of their goods. Problem is, wages are sticky in the short-run, and therefore lower prices means higher real wages. Firms don't like to pay high real wages.
- So firms lower their prices, but only a little. Real wages increase, quantity of labor demanded falls (workers are laid off), output falls below potential, and $u_c > 0$.

Problem 6. Shifts in the SRAS are caused by

- (a) changes in inventory
- (b) changes in production costs
- (c) changes in substitute goods
- (d) changes in the house of flies
- (e) none of the above

Answer 6: b. As wages (and input costs more generally) are allowed to adjust closer and closer to their equilibrium values, firms are allowed to adjust prices closer and closer to their equilibrium values. This can be seen by shifting the SRAS curve over time until SRAS, LRAS, and AD all intersect in the same place.

For example, if the economy is hit by a negative AD shock, then price level will fall a little and output will fall (shift AD to the left). Over time wages can adjust downwards, and hence firms are able to lower their price a little bit more and consequently produce a little bit more – this means SRAS shifts downwards. Eventually SRAS will shift so far down that it'll intersect at Y_P again.

Big point is this: in the short run, you can have below potential GDP and hence cyclical unemployment. This is because the *self-correcting mechanism* by which prices and real wages reach their long-run equilibrium values is interrupted by various rigidities, in our case nominal wage rigidity.

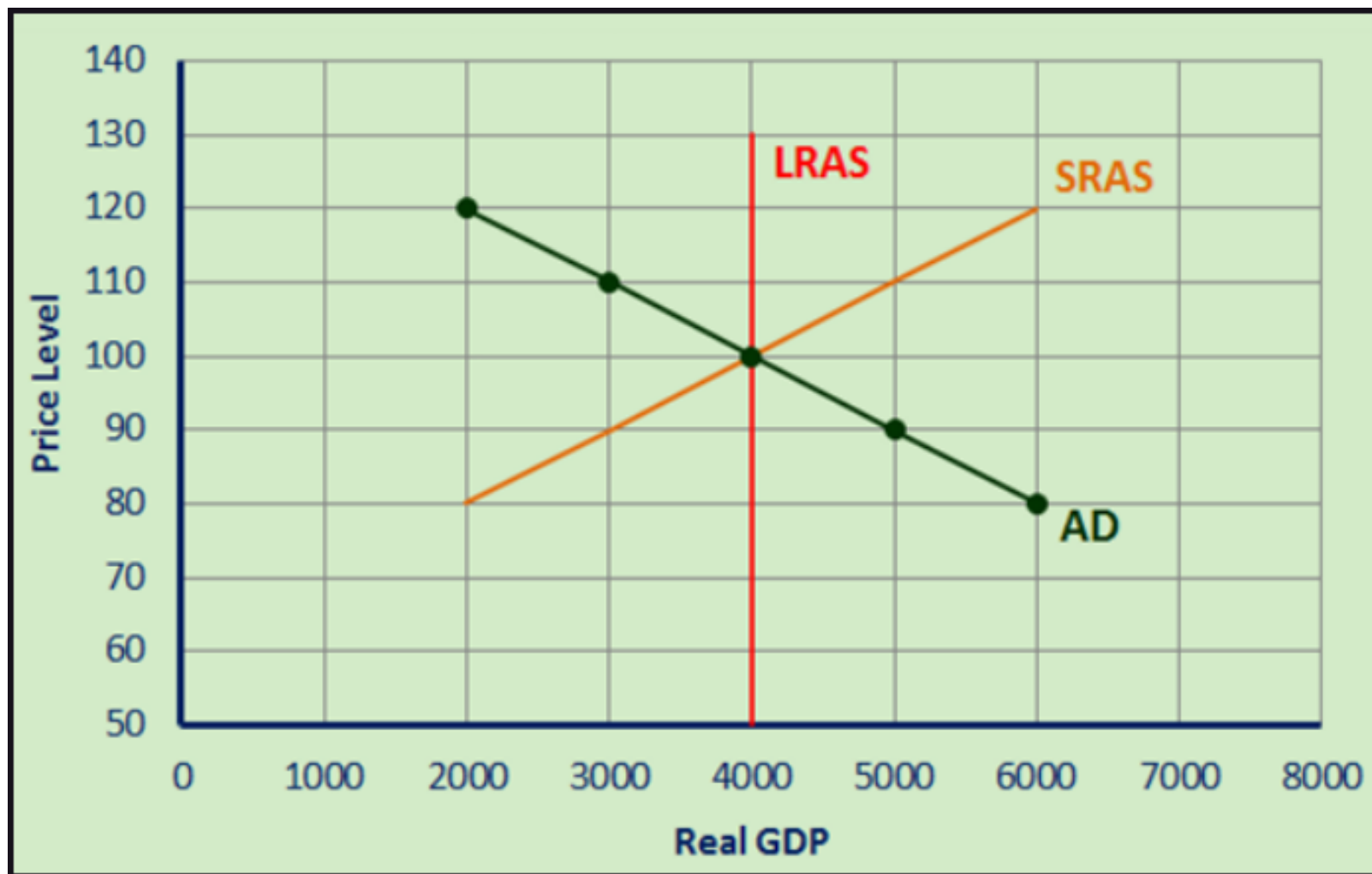
Note that a steeper SRAS implies a stronger self-correcting mechanism – it more closely resembles the vertical LRAS than a flatter SRAS would. In other words, a slow self-correcting mechanism is captured by a horizontal SRAS, whereas a rapid self-correcting mechanism is captured by a vertical SRAS.

Problem 7. Stagflation poses a policy dilemma because

- (a) expansionary policy would cause inflation to increase even more
- (b) contractionary policy would cause output to fall even more
- (c) self-correcting mechanism takes a long time
- (d) all of the above
- (e) all of the above and none of the above and only some of the above and three of the below

Answer 7: d. Stagflation is when SRAS shifts to the left, which is called an *adverse supply shock*. An example is a sudden increase in oil prices. This shift gives lower Y and higher P . Increasing AD will increase Y but at the expense of higher P . Decreasing AD will bring P back down but at the expense of lower Y . So there's a tradeoff between inflation and unemployment in the short run. Since the long run takes a while to actually happen, it's not clear what, if anything, should be done apropos demand management policy.

Problem 8. Suppose MPC is 0.75. What happens in the short run and the long run if there is a balanced budget increase in government spending of 2000 units?



Answer 8. Recall that a balanced budget increase in government spending means that G increases by 2000 and TX also increases by 2000 to pay for the increase in G . The increase in TX by 2000 means that disposable income Y_d falls by 2000, and therefore consumption C changes by $0.75 \times -2000 = -1500$. Therefore in the first round, overall expenditure changes by $\Delta G + \Delta C = 2000 - 1500 = 500$.

Now to capture the full multiplier effect, take the first round expenditure of 500 times the multiplier $1/(1 - MPC) = 4$, which implies that AD shifts to the right by $500 \times 4 = 2000$. Notice that this number is exactly the change in G ; the increase in taxes cancels out the multiplier effect of the increase in G .

So the big takeaway is this: when there is a *balanced budget* increase in G , aggregate demand will only shift by that same amount, not by some multiple thereof.

Anyway, as shown on the next page, the equilibria are:

- Short run equilibrium: $Y = 5000, P = 110$
- Long run equilibrium: $Y = 4000, P = 120$

