

## Practice Problems C: Aggregate Supply & Demand

Revised: May 1, 2013

*This will not be collected or graded, but it's a good way to make sure you're up to speed. We recommend you do it before the next class.*

### 1. Inflation high and low.

- (a) Describe in one paragraph how fiscal deficits can cause hyperinflation. Show qualitatively how the Treasury and Central Bank balance sheets change.
- (b) During the 1990s, the US economy experienced high output growth and low inflation. How is this possible? Why didn't the economy "overheat"?

#### Solution:

- (a) Hyperinflation. During hyperinflations the Treasury typically can't issue debt — investors won't buy it — so it sells the debt to the Central Bank. Their balance sheets start out like this

Treasury			
Assets		Liabilities	
		Bonds	200

Central Bank			
Assets		Liabilities	
Bonds	100	Money	100

Then they change into something like this, with greater government debt and a larger supply of money (currency):

Treasury			
Assets		Liabilities	
		Bonds	250

Central Bank			
Assets		Liabilities	
Bonds	150	Money	150

In essence, the Bank traded 50 in currency for 50 in bonds, and the Treasury used the currency to pay people it owed money to.

- (b) There's no inherent conflict between high growth and low inflation. That's exactly what you'd expect to see if AS shifts to the right (higher productivity?) and AD shifts along with it as monetary policy "accommodates" the increase in growth.

2. Shocks. Fill out the following table, telling us, for each shock, whether it affects the supply or demand curve and whether the short-run impact on output and prices is positive (+) or negative (−):

Shock	Supply or Demand?	Output Effect	Price Effect
Sales tax holiday			
Increase in money supply			
Improved inventory control			
Better information technology			
Fall in world oil prices			
Facebook goes bankrupt			

**Solution:** Summary:

Shock	Supply or Demand?	Output	Price
Sales tax holiday	demand	+	+
Increase in money supply	demand	+	+
Improved inventory control	supply	+	−
Better information technology	supply	+	−
Fall in world oil prices	supply	+	−
Facebook goes bankrupt	supply (ha!)	+	−

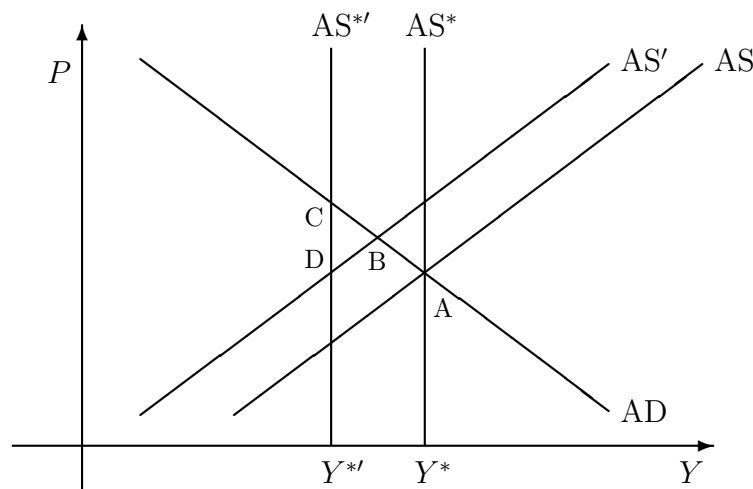
Here's the thought process. Supply or demand? If it affects purchases of

goods, it's demand. If it affects production of goods, it's supply. Impact on output and prices? If supply shifts, they move in opposite directions. If demand shifts, they move in the same direction.

3. Clean air. As part of its clean air initiative, the Canadian government now requires firms to submit lengthy reports about the impact of its activities on the environment. (This is fiction, by the way: any connection to real governments, dead or alive, is purely coincidental.) Our mission is to look at the impact of such an initiative on aggregate supply and demand.
- What is the likely impact of the initiative on aggregate supply and demand? (Ask yourself: Does this affect the production or purchase of goods and services?) If we start at a position of long-run equilibrium, which curves shift, and in what direction? Show the result in the appropriate diagram.
  - What is the short-run impact on inflation and output? The long-run impact?
  - Do you think anything is missing from this analysis?

**Solution:**

- The idea is that it shifts the AS curves to the left — both of them. Why? It now takes more people to produce the same goods. Here's how that might look:



- We start at A. When the curves shift, the new short-run equilibrium is where AD crosses the new AS: namely B. The new long-run equilibrium is where AD crosses the new AS\*: namely C. Overall, the new regulations reduce output and raise prices.

- (c) Lots of things! Some of them: (i) The monetary authority could offset the impact on prices by shifting AD to the left, leaving us at D. This is the usual accommodation of supply shocks. (ii) We might regard this as a good thing. The question is how we value clean air relative to other things and how steep the tradeoff is (how much output are we giving up?).

4. The non-crisis down under. The 2008 recession was relatively mild in Australia. After three quarters of falling GDP, output began growing rapidly. In late 2009, the Reserve Bank of Australia (RBA) began to raise its target interest rate.
- (a) What might have motivated the RBA to raise the interest rate?
  - (b) What is the likely impact on aggregate supply and demand curves? On inflation and output growth?

**Solution:**

- (a) The usual suspects are higher growth and higher inflation. You could look at this in terms of AS/AD, with the AD shifting out as the economy recovered. Or you could use the Taylor rule.
- (b) If they raise the interest rate, this corresponds to a decrease in the money supply (or money supply growth) and a shift left of AD. The interpretation would be that AD had shifted right during the recovery and they now think offsetting it is appropriate. If they shift AD left, that reduces output growth and inflation.

5. Inflation and output. Using the last two problems as input, consider the relation between inflation and output growth.
- (a) When do inflation and output growth move in the same direction?
  - (b) When do they move in opposite directions?

**Solution:**

- (a) When AD shifts.
- (b) When AS shifts.

6. US monetary policy in 2010. The Federal Reserve's Federal Open Market Committee (FOMC) met April 27-28, 2010, and released this statement:

Information received since the FOMC met in March suggests that economic activity has continued to strengthen and that the labor market is beginning to improve. Growth in household spending has picked up recently. ... Business spending on equipment and software has risen significantly. ... Housing starts have edged up but remain at a depressed level. ... With substantial resource slack ... and longer-term inflation expectations stable, inflation is likely to be subdued for some time. ... The Committee will maintain the target range for the federal funds rate at 0 to 1/4 percent. ...

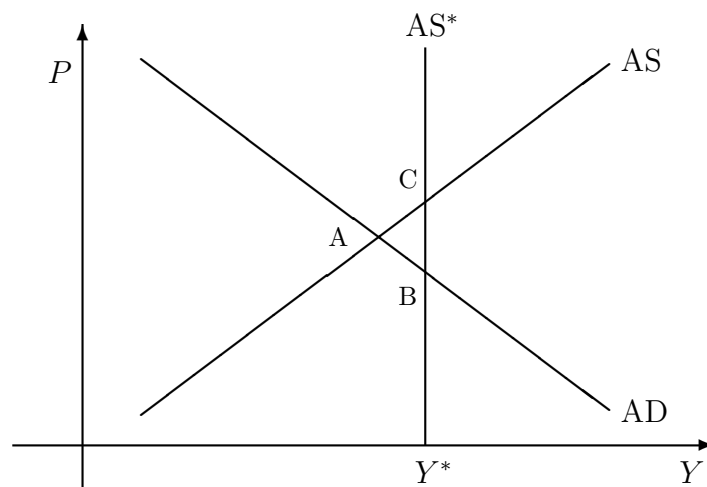
Voting against the policy action was [Kansas City Fed President] Thomas M. Hoenig, who believed that ... [an] exceptionally low level of the federal funds rate ... was no longer warranted.

Later the same week, the Bureau of Economic Analysis announced that in the first quarter real GDP growth was estimated to be 3.2% and inflation (in the GDP price index) 0.9%. Both are expressed at annual rates.

- (a) Consider this information in the context of the aggregate supply and demand framework. Based on the FOMC statement, where is the short-run equilibrium of the economy relative to the Fed's inflation target and the long-run equilibrium level of output? Illustrate your answer with the appropriate diagram.
- (b) Given your answer to (a), what should the Fed's response be? How should it change the money supply? The fed funds rate?
- (c) Given your answer(s), do you agree with Hoenig? Why or why not?

**Solution:**

- (a) The phrase "substantial resource slack" suggests that output is below its long-run equilibrium. The phrase "inflation is likely to be subdued for some time" suggests that inflation is below target (2% say). That suggests a picture something like this, with A as the short-run equilibrium.



(We don't know that  $C$  is at the intersection of  $AS$  and  $AS^*$ , just that it's above and to the right of  $A$ .)

- (b) The goals of policy are (i) stable prices (ie, 2% inflation) and (ii) long-run equilibrium level of output. From (a), we know that the Fed believes both are below their target levels. We can move both in the right direction by shifting the  $AD$  curve to the right. An increase in the money supply has this effect. Typically we would describe this as a drop in the "fed funds" rate.
- (c) Hoenig could have several things in mind, including (i) a different opinion about the state of the economy and/or (ii) a belief that current interest rates are too low already (we already shifted  $AD$  to the right). The latter might be based, for example, on a calculation of the Taylor rule.