

Macroeconomics | Lecture 9

Shocks, the Zero Lower Bound and the Deflation Trap

In Class Group Activity

· SJTU Summer School · Fatih Kansoy

How this block runs. You work in your home group of three or four, textbook open. Roles rotate: **Scribe, Reporter, Sceptic, Timekeeper**. Rates are in per cent.

- **Phase 1, Concept checks (~10 min).** Each group votes together, argues for 90 seconds, then settles on one answer.
- **Phase 2, Desk problem (~20 min).** One economy at the zero lower bound, read through the Fisher relation, part by part.
- **Phase 3, Case (~25 min).** One real story, ending hidden. Your group writes down a prediction, then we reveal what happened.

Word list. **Aggregate demand (AD):** higher inflation leads the central bank to raise the real rate and cut output, so AD slopes down in inflation-output space. **Aggregate supply** (the short-run Phillips curve): inflation rises when output is above potential. A **demand shock** shifts AD; a **supply shock**, such as an oil-price jump, shifts AS and can raise inflation while lowering output (**stagflation**). The **risk premium** $\bar{f}$ is the gap between the central bank's policy rate and the rate borrowers actually pay; in a crisis it can jump, so borrowing gets more expensive even while the bank cuts. The **zero lower bound (ZLB):** the nominal interest rate cannot fall much below zero. The **Fisher relation:** the real rate $R = i - \pi^e$, the nominal rate minus expected inflation. **Deflation** is a falling price level (negative inflation). **Quantitative easing (QE)** is buying assets in large amounts, when the short rate is stuck at zero, to keep credit flowing.

Phase 1 – Concept checks

~10 MIN

ConceptTest 1. An oil-price jump raises firms' costs for one period: a supply shock. In the short run, the model says the economy moves to a point with

- (a) lower inflation and lower output, because the shock works like a fall in demand and pulls both variables down together.
- (b) higher inflation and higher output, because the money spent on more expensive oil is extra spending that pushes output above potential.
- (c) lower inflation and higher output, because firms absorb the cost, cut their margins and sell more to stay competitive.
- (d) higher inflation and lower output, because firms pass the cost into prices and the bank's higher rate cuts spending.

ConceptTest 2. The nominal policy rate has reached zero and the price level starts to fall. The lecture calls this the most dangerous spot in the model because deflation

- (a) raises the real interest rate at exactly the moment the bank has no room left to cut the nominal rate.

- (b) lowers the real interest rate so far that savers pull out their funds and banks are left with little to lend.
- (c) forces the bank to raise the nominal rate to defend the currency's fixed value in gold, as banks once did.
- (d) leads people to rush their purchases before prices move again, which overheats the economy at the floor.

ConceptTest 3. In 2008 the Fed cut its policy rate toward zero, yet firms found borrowing more expensive: the risk premium $\bar{f}$ had jumped. In the AS/AD model, a jump in $\bar{f}$

- (a) makes the AD curve flatter, because lenders now respond to inflation more aggressively than the central bank does.
- (b) works like a negative demand shock, because borrowers pay the rate plus $\bar{f}$, so spending falls at every inflation rate.
- (c) shifts the AS curve up, because higher borrowing costs are a cost of production that firms pass into their prices.
- (d) leaves the AD curve where it is, because the policy rule moves the policy rate down to offset the premium lenders add.

ConceptTest 4. In both 1933 and 2009 the nominal policy rate sat near zero. The lecture argues that 2008 did not become another depression mainly because

- (a) the Fed's asset purchases pushed borrowing rates down within weeks, so real borrowing costs never had time to climb.
- (b) fiscal stimulus fully replaced monetary policy, since at the floor changes in expectations no longer move the real rate.
- (c) expected inflation stayed anchored near 2 per cent, so the zero nominal rate meant a negative real rate for borrowers.
- (d) the risk premium fell back on its own within months, so borrowing rates followed the policy rate down toward zero.

Phase 2 – The desk problem

~20 MIN

One economy, stuck at zero

The real interest rate that governs spending is $R = i - \pi^e$, the nominal policy rate minus expected inflation. In a deep slump the central bank would like to set R low, but it cannot push the nominal rate i much below zero.

(a) A helpful case (worked for you). A slump has pushed the bank to set $i = 0$. If expected inflation is +3 per cent, then $R = 0 - 3 = -3$ per cent. A negative real rate encourages borrowing and spending and helps pull the economy up, even though the nominal rate can go no lower.

(b) Deflation arrives. The slump instead brings mild deflation: expected inflation is -2 per cent, with i still at 0. Find the real rate R .

(c) The swing. Compare (a) and (b). Moving from +3 per cent expected inflation to -2 per cent deflation, by how many points does the real rate change, even though the central bank has not touched its nominal rate?

(d) **The spiral.** In one or two sentences, describe the deflationary spiral: how a slump that turns into deflation raises the real rate, which deepens the slump, which deepens the deflation, all while the nominal rate is stuck at zero.

(e) **Two economies at the floor.** Two real economies both sit with the nominal rate near zero. In Economy A, prices have fallen about 25 per cent over four years, and people expect the fall to continue at that pace. In Economy B, people expect inflation of about +2 per cent, the central bank's target. Work out the yearly expected inflation rate in Economy A, then the real rate R in each economy, and the gap between the two real rates.

Phase 3 – The case

~25 MIN

The slump that would not lift

How to run this. Read the story with your group. The ending is hidden on purpose. Answer questions 1 and 2, write down your prediction for question 3 before the reveal, and do not search the internet.

The story. After a great stock-market crash, one large economy fell into the deepest downturn in its history. Within four years output had fallen by roughly a third, and about one worker in four was jobless. The central bank had pushed short-term interest rates down close to zero. And yet, year after year, the economy kept sinking. There was one more fact that puzzled observers at the time: the general price level was not merely rising slowly, it was *falling*, by around a quarter over the four years of the slump.

The story stops here.

Four questions (write down your prediction for question 3 before the reveal):

1. Nominal interest rates were near zero, which sounds like very loose policy. Using $R = i - \pi^e$ and the fact that prices were falling by about 6 per cent a year, work out roughly what was happening to the *real* interest rate borrowers faced.
2. Explain in one or two sentences why a near-zero nominal rate can still mean tight, contractionary policy when prices are falling.
3. **Predict.** The economy did eventually turn up, and the recovery was one of the fastest on record. What kind of change do you think finally broke the fall: another small cut in the nominal rate, or something that changed what people expected prices to do?
4. State the general lesson for a central bank that has cut its rate to zero and still faces a slump with falling prices.

End of activity handout. I hand out the solutions after the block.