

Macroeconomics | Activity 8, Lecture 9

Shocks, the Zero Lower Bound and the Deflation Trap

In Class Group Activity

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Lesson of the day. Demand and supply shocks move output and inflation through the AS/AD model. When the central bank's interest rate hits zero it can no longer cut, and if prices start to fall, deflation raises the real interest rate and deepens the slump. At the zero lower bound, falling prices are a trap, not relief. In 1933 the anchor was lost and the spiral ran; in 2008 expectations stayed anchored near 2 per cent, and that is the whole difference.

Phase 1 – Concept checks

ANSWERS

ConceptTest 1. Answer. (d), stagflation. The price shock shifts AS up, and the economy slides up the AD curve: firms pass the cost into prices, the bank responds to the higher inflation with a higher rate, and spending falls. (a) treats a supply shock as a demand shock, which would move inflation and output the same way, downward. (b) counts spending on more expensive oil as a demand boom, but the shock enters through costs, not through $\bar{a}$. (c) assumes firms absorb the cost, yet the AS curve says they pass it on, which is what makes the shock inflationary.

ConceptTest 2. Answer. (a). By the Fisher relation $R = i - \pi^e$, a zero nominal rate with expected deflation means a positive real rate, and the bank cannot cut below the floor to offset it. (b) gets the sign wrong: deflation raises the real rate, it does not lower it. (c) imports gold-standard logic: when money was a fixed weight of gold the money supply was chained to the gold stock, but a modern bank at the floor faces no such rule. (d) is the psychology of inflation, not deflation: when prices are falling, people delay purchases, they do not rush them.

ConceptTest 3. Answer. (b). Borrowers pay $R = R_{ff} + \bar{f}$, so the AD intercept becomes $\bar{a} - \bar{b}\bar{f}$: a jump in $\bar{f}$ shifts AD down and left, exactly like a negative demand shock, and inflation falls below target. (a) confuses the premium with the policy parameter $\bar{m}$, which is what sets the slope. (c) puts the shock on the wrong curve: the wedge cuts spending through the borrowing rate, it is not a production cost shock $\bar{o}$. (d) trusts the rule to offset the premium, but the rule responds to inflation, not to $\bar{f}$, and in 2008 the rate was already near its floor.

ConceptTest 4. Answer. (c). With expectations anchored at about 2 per cent, the zero rate was a real rate of about -2 per cent in 2009; in 1933 expected deflation of about 6 per cent a year made it about $+6$ per cent, and that 8-point gap did the damage. (a) gives the credit to QE, but the real rate was held by expectations anchored at 2 per cent; the asset purchases came later and worked only slowly, not within weeks. (b) has it backwards: at the floor expectations matter more, not less, because they alone set the real rate. (d) contradicts the figure: the corporate spread jumped from about 2 to above 6 points even as the Fed cut, and it took QE and the bank rescues to keep credit flowing.

Phase 2 – The desk problem

FULL WORKING

(a) **A helpful case (worked for you).** With $i = 0$ and expected inflation $+3$ per cent, $R = 0 - 3 = -3$ per cent. A negative real rate encourages borrowing and spending.

(b) **Deflation arrives.** With $i = 0$ and expected inflation -2 per cent,

$$R = 0 - (-2) = +2 \text{ per cent.}$$

(c) **The swing.** The real rate moves from -3 per cent to $+2$ per cent, a rise of **5 percentage points**, even though the central bank has not touched its nominal rate. The whole swing comes from the switch between expected inflation and expected deflation.

(d) **The spiral.** A slump lowers inflation and can tip it into deflation. With the nominal rate already at zero, falling expected inflation raises the real rate $R = i - \pi^e$, which discourages spending and investment and deepens the slump; the deeper slump pushes prices down further, raising the real rate again. The central bank cannot cut its way out, because the nominal rate is already at zero. That self-feeding loop is the deflationary spiral.

(e) **Two economies at the floor.** In Economy A, prices fell about 25 per cent over four years, so expected deflation ran at about $25/4 \approx 6$ per cent a year: $\pi^e \approx -6$ per cent. Then

$$\text{A: } R \approx 0 - (-6) = +6 \text{ per cent,} \quad \text{B: } R = 0 - 2 = -2 \text{ per cent.}$$

The gap is $6 - (-2) = 8$ percentage points. These are not invented economies: A is the United States in 1933, B is the United States in 2009. Both banks sat at the same nominal rate; the whole 8-point gap comes from expectations alone.

A five-point swing in the desk economy, an eight-point gap between 1933 and 2009, and in every case the central bank frozen at zero. At the zero bound, the fight is over expected inflation, and falling prices are not relief but a trap.

Phase 3 – The case

WORKED ANSWERS

The episode is the Great Depression in the United States, 1929–33.

1. Prices fell about 25 per cent over four years, roughly 6 per cent a year, so expected inflation was about -6 per cent. With the nominal rate near zero, the Fisher relation gives $R = 0 - (-6) \approx +6$ per cent, and in the worst years of deflation it was higher still. Borrowers faced a steep real cost of credit precisely when the economy was collapsing. Policy that looked loose in nominal terms was in fact very tight.

2. What matters for spending and investment is the real rate, not the nominal one. When prices fall, a dollar borrowed must be repaid in dollars worth more, so the real burden of borrowing rises even if the nominal rate is zero. Deflation therefore turns a zero nominal rate into a high real rate, which cuts off exactly the spending the economy needs.

3. The turn came from a change in what people expected prices to do, not from a further rate cut. In 1933 the United States left the gold standard and devalued the dollar from about \$20.67 to \$35 for an ounce of gold, a large monetary expansion, and the government committed to reflation, to stopping and reversing the fall in prices. Expected inflation rose, the real rate fell sharply, and recovery began. Bernanke (1995) showed that countries which left gold earlier recovered earlier; the United Kingdom left in 1931. The nominal rate had little room left; it was expectations that moved.

4. Once the nominal rate is at zero, the danger is deflation, because it raises the real rate the central bank can no longer lower. The way out is to change what people expect about prices: to commit credibly to reflation, to raising the price level, so that expected inflation rises and the real

rate falls. Modern tools for this are asset purchases and clear guidance that policy will stay easy until prices recover.

Rates near zero looked easy, but with prices falling a quarter the real cost of borrowing was punishing. The Depression only turned when the country promised to reflate and expectations flipped. At the zero bound, the fight is over expected inflation.

End of solutions. Sources: Jones, *Macroeconomics* 6e, Ch. 13–14; standard accounts of the Great Depression, the 1933 US departure from the gold standard, and Bernanke (1995). All figures verified.