

The Zero Lower Bound (ZLB)

ECON 30020: Intermediate Macroeconomics

Prof. Eric Sims

University of Notre Dame

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Readings

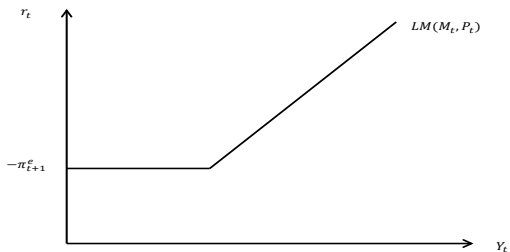
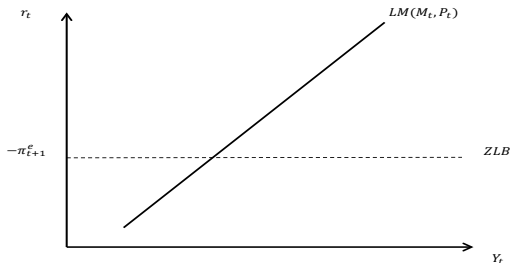
- ▶ GLS Ch. 26

The Zero Lower Bound

- ▶ The most important development for monetary policy in the US and other developed countries in the last decade is the zero lower bound (ZLB)
- ▶ Refers to the fact that nominal interest rates cannot go negative under conventional wisdom
 - ▶ Several central banks have recently experimented with negative nominal interest rates on interbank lending (not really on rates relevant for households and firms)
 - ▶ There must be a limit to how negative interest rates can go
 - ▶ Some prefer term *effective lower bound* (ELB)
- ▶ At any rate, what is relevant for the economy is not so much that the nominal interest rate is zero, but rather that (i) it cannot be lowered further and (ii) it cannot be lowered in response to adverse demand shocks
- ▶ This is potentially very costly and can be difficult to escape. Japan has been at the ZLB for two decades now
- ▶ Sometimes called a “liquidity trap” – demand for liquidity becomes infinite

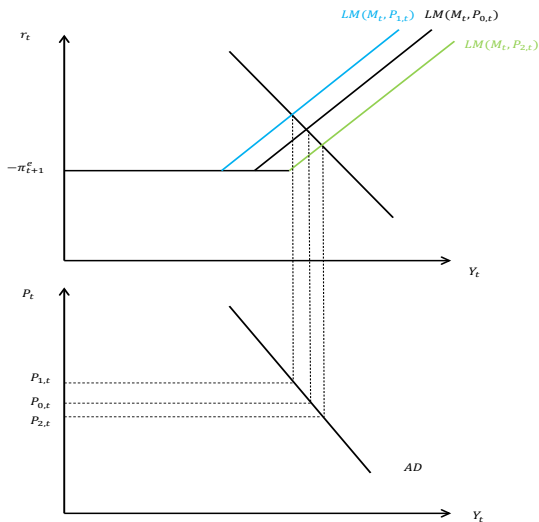
The LM Curve

- ▶ The ZLB means there is a lower bound on the real interest rate of $-\pi_{t+1}^e$. Introduces a kink into the LM curve



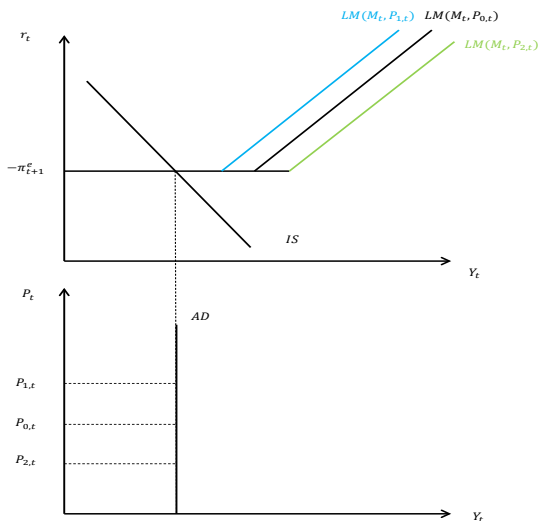
The AD Curve: Non-Binding ZLB

- ▶ The AD curve is normal so long as away from the kink



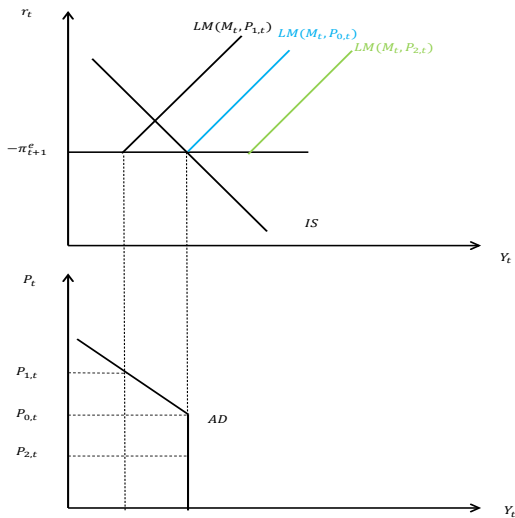
The AD Curve: Binding ZLB

- ▶ The AD curve is vertical in the region where the ZLB binds – changes in $\frac{M_t}{P_t}$ do not affect Y_t



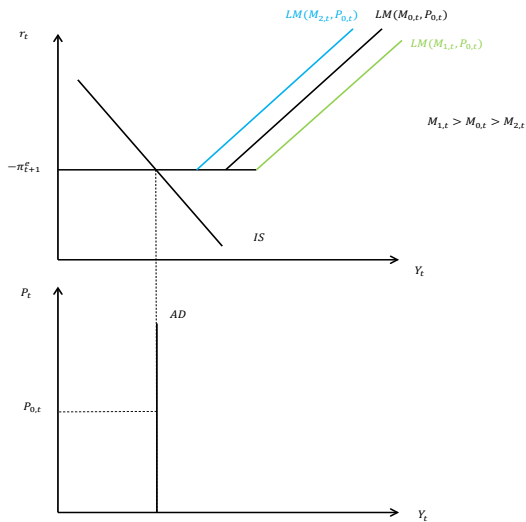
The AD Curve: Binding and Non-Binding

- ▶ The AD curve is downward-sloping at high price levels (high interest rates), becomes vertical in a region



Liquidity Trap

- ▶ At the ZLB, an increase in the money supply **does not affect** the position of the *AD* curve

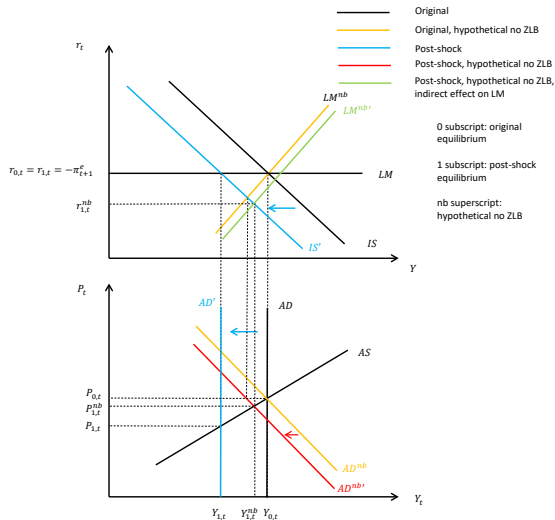


ZLB and Equilibrium Effects of Shocks

- ▶ At the ZLB the real interest rate is effectively fixed
- ▶ This changes in significant ways how the economy reacts to exogenous shocks
- ▶ **Amplifies** output responses to *IS* shocks
- ▶ **Dampens** output responses to supply shocks
- ▶ In a sense, **exacerbates** role of price stickiness relative to neoclassical model

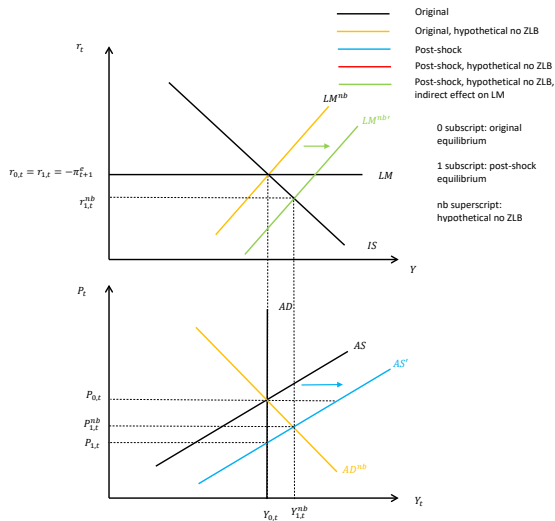
Amplifies Effects of IS Shocks

- ▶ Intuitively, because r_t cannot react to partially offset



Dampens Effects of AS Shocks

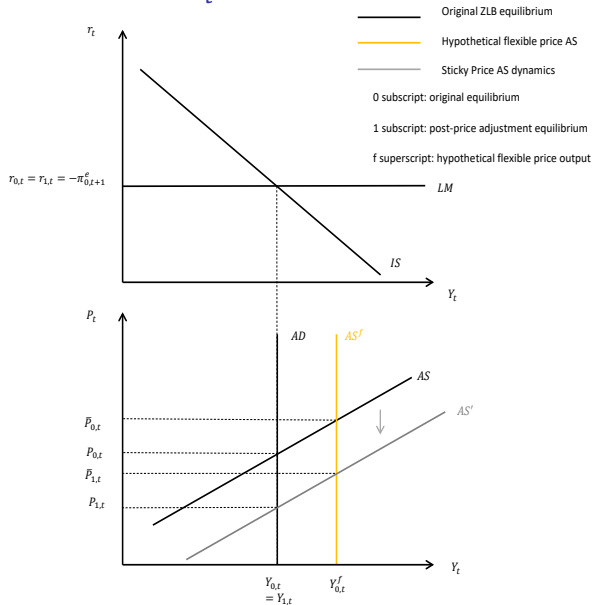
- ▶ Intuitively, because r_t cannot move in such a way as to stimulate demand



Why is the ZLB Costly?

- ▶ Ignoring stabilization policy and nominal rigidities, a zero nominal interest rate is often optimal (so-called Friedman Rule)
- ▶ Yet central bankers are afraid of the ZLB
- ▶ Two principal reasons:
 1. Normal stabilization policy is not available. Negative demand shocks are much more costly than otherwise
 - ▶ Easy to see. Price stability is a good goal in standard model, implying AD curve effectively horizontal. ZLB makes AD curve instead vertical
 2. Things won't get better on their own. AS shifts don't eliminate output gaps if AD is vertical
 3. Things could get worse. AS shifts could induce declining inflation expectations, which raise real interest rates and further depress output. "Deflationary spiral"

MR Dynamics: $Y_t < Y_t^f$ and ZLB Binds

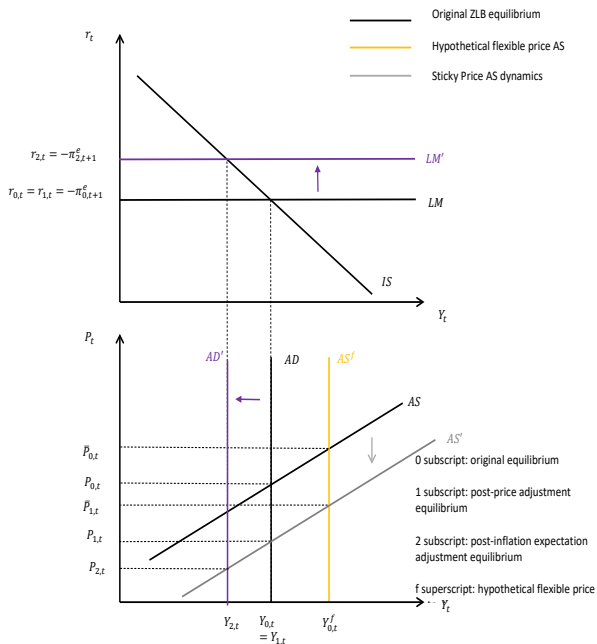


► Price adjustment will *not* close the gap

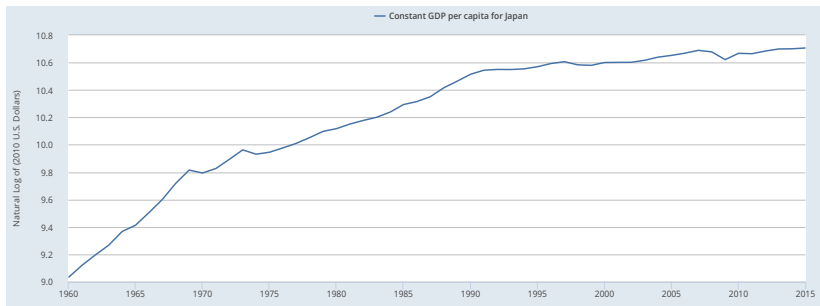
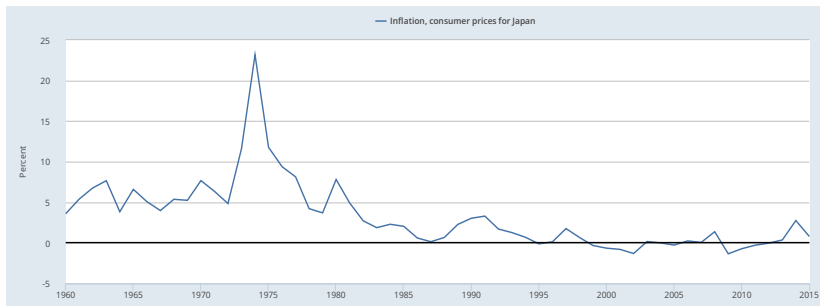
Deflationary Expectations

- ▶ What we will tend to observe is prices falling but the output gap not closing if the ZLB binds
- ▶ What if agents begin to expect falling prices?
- ▶ We've thought of π_{t+1}^e as exogenous, but what if a binding ZLB causes agents to begin to expect prices to continue falling (i.e. π_{t+1}^e to fall)?
- ▶ This will drive *up* the real interest rate, reducing demand, and making the output gap *bigger*

Deflationary Spiral



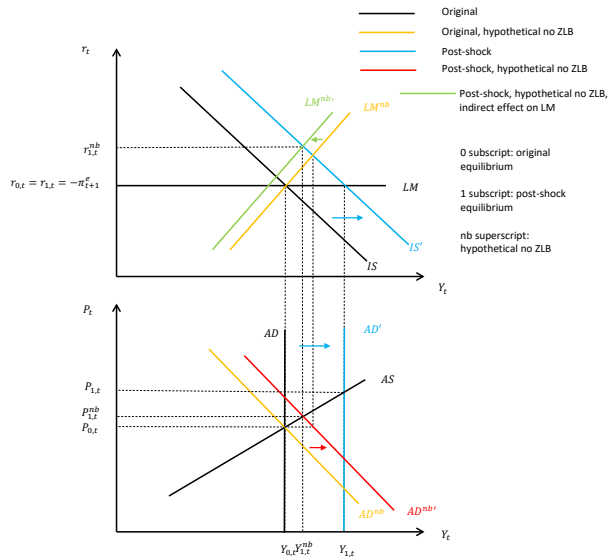
Japanese Experience



Fiscal Policy at the ZLB

- ▶ As noted above, IS shocks have bigger effects on output at the ZLB because there is no counteracting movement in the real interest rate
- ▶ Fiscal policy shocks (increases in G_t or reductions in taxes if there is no Ricardian Equivalence) are IS shocks
- ▶ Hence, these will have bigger effects on output at the ZLB – there will be no “crowding out”
- ▶ Many (though not all) economists think fiscal expansion makes sense at the ZLB

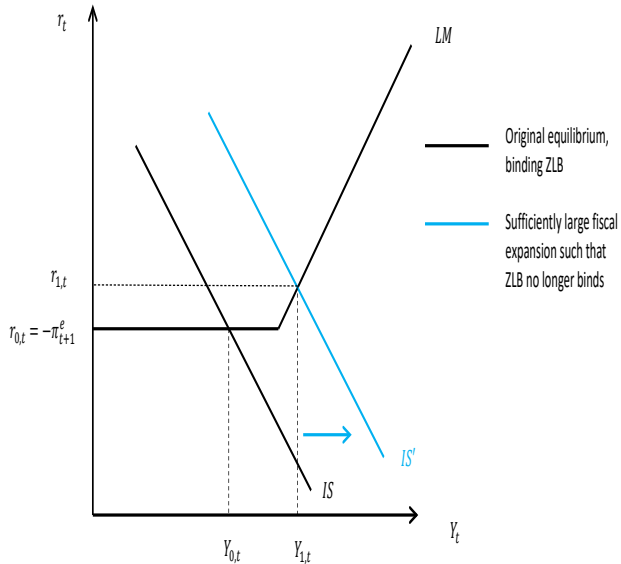
Increase in G_t at the ZLB



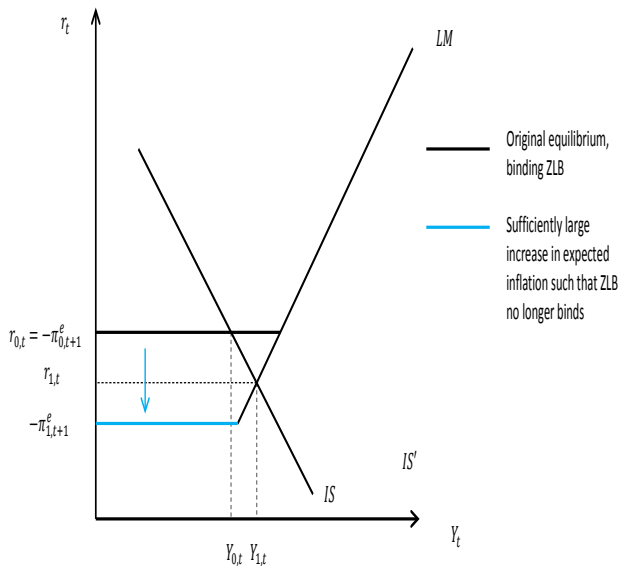
Escaping the ZLB

- ▶ To escape the ZLB, need to either (1) engage in sufficiently large fiscal expansion (see above) or (2) engineer higher (rather than lower) inflation expectations
- ▶ Higher expected inflation lowers the current real interest rate given a fixed nominal rate
- ▶ How to engineer higher inflation expectations?
 - ▶ Promise loose monetary policy in the period *after* the ZLB has ended (“forward guidance”)
 - ▶ Engage in non-standard open market operations, buying risky private sector debt or longer maturity government debt (“quantitative easing”)
 - ▶ Central bank credibility is critical to escape the ZLB

Large Fiscal Expansion



Inflation Expectations



How to Avoid the ZLB

- ▶ The ZLB is costly and hence to be avoided
- ▶ How to set policy *outside* of the ZLB to avoid hitting it?
- ▶ Simple solution: higher average inflation rate in MR
- ▶ This will mean that the nominal rate fluctuates about a higher average level, meaning less likely to hit the ZLB
- ▶ But this (i) moves you further away from Friedman Rule and (ii) may impose other costs (“shoeleather”)
- ▶ Coibion, Gorodnichenko, and Wieland (2012): optimal inflation rate to avoid ZLB is about 2 percent