

ECN 106 Macroeconomics 1

Lecture 10

Giulio Fella

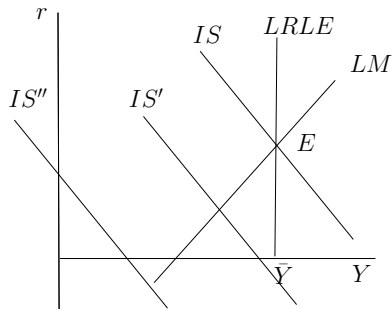
Roadmap for this lecture

- ▶ Shocks and the Great Recession of 2008-
- ▶ Liquidity trap and the limits of monetary policy
- ▶ Alternative policies

The Great Recession of 2007-20??

- ▶ Burst of housing bubble. Fall in investment and increase in default rates.
- ▶ Losses of financial institutions that had lent against real estate as collateral or held mortgage-backed securities.
- ▶ With lots of financial institutions nearly bankrupt, freeze in interbank lending as banks did not know which banks were healthy.
- ▶ Large increase in (risk) premium that banks required to lend (flight to safe assets).
- ▶ Further fall in investment, the stock market and consumption.

The financial crisis of 2007- in the short run model



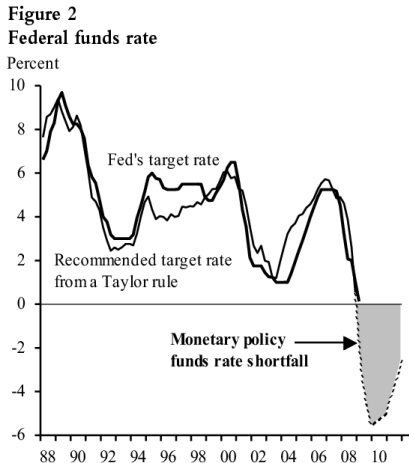
- ▶ IS to IS' . Fall in consumption associated with burst of US housing bubble.
- ▶ IS' to IS'' . Fall in investment due to increase in risk premium ρ

Lessons from the Great Depression

- ▶ Stimulate aggregate demand directly (IS right)
- ▶ Use monetary policy to provide liquidity and stimulate demand
- ▶ Avoid deflation

Why not using monetary policy as usual

Federal funds rate according to Taylor rule (Rudebusch)



Monetary Policy and the zero lower bound

- ▶ Standard monetary policy
 - Use open market operations to set a short-term nominal interest rate (swap short-term government bonds for bank reserves),
- ▶ If money (deposits) pay zero interest, the short-term nominal interest rate on government bonds cannot fall below the **zero lower bound**
 - if the nominal rate on short-duration government bonds is zero agents are indifferent between holding bonds and deposits
 - deposits and short-duration government bonds are perfect substitutes
- ▶ Some authors (e.g. Krugman) calls this situation “liquidity trap”
 - standard monetary policy is powerless

The LM curve revisited

- ▶ Combination of output and interest rate for which the money market is in equilibrium.

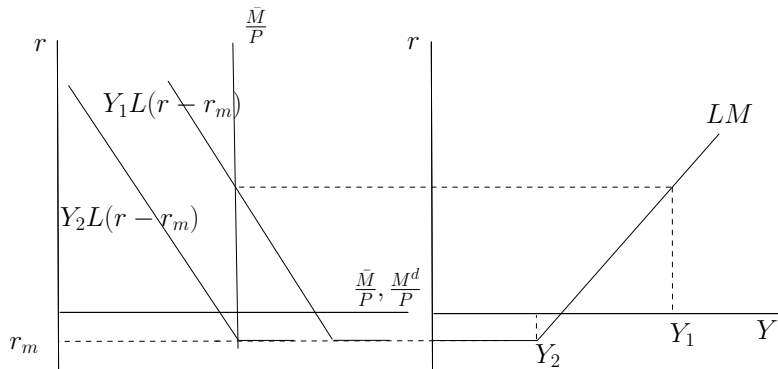
$$\frac{\bar{M}}{P} = YL(r + \pi^e - i_m) \quad (40)$$

- Money demand negatively related to opportunity cost of holding money ($i - i_m$)
- $i = r + \pi^e$: nominal interest rate on government bonds
- i_m : interest rate on money holdings (e.g. interest rate on current account deposits)
- For simplicity, we have assumed $i_m = 0$, up to know.

The LM curve revisited II

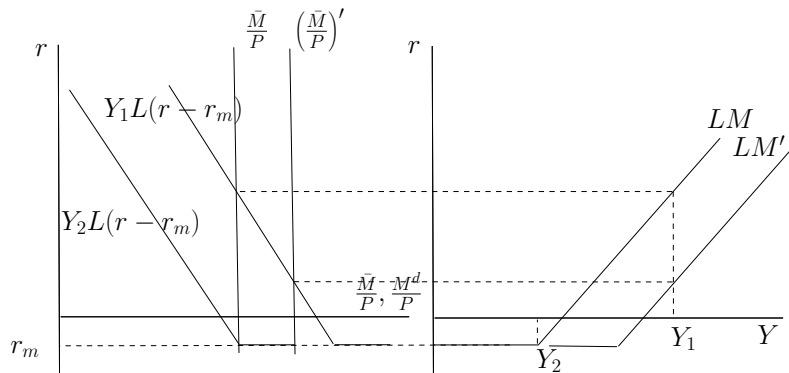
- ▶ Upward sloping: if output, hence money demand, increases the nominal interest rate $i = r + \pi^e$ has to fall to maintain money market equilibrium for given \bar{M} and P .
- ▶ But i , the nominal interest rate on bonds, cannot be lower than i_m as people would not hold bonds as they can always get a rate of return i_m by holding bank deposits
- ▶ Money demand becomes perfectly elastic at $i = i_m$.
- ▶ $i = r + \pi^e$ implies money demand becomes perfectly elastic at $r = r_m = i_m - \pi^e$ in the (Y, r) space.
- ▶ If $i_m = 0$, the real return on money $r_m = -\pi^e$.

The LM curve when $i = i_m$



- ▶ For $Y < Y_2$ the LM is perfectly elastic at $r = -\pi^e$ ($i = 0$) as agents are willing to hold any amount of money at $i = 0$.

Shifts in the LM



- Changes in \bar{M} or P shift only the upward-sloping section of the LM curve.

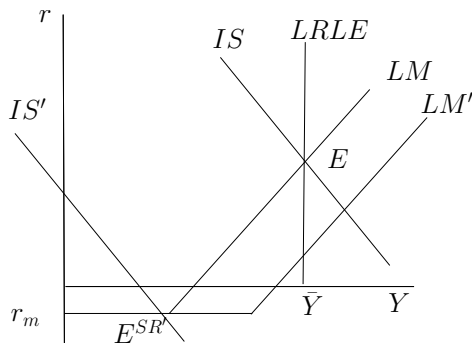
Liquidity trap

- ▶ The economy is initially in SR and LR equilibrium at point E.
- ▶ Suppose a series of large goods market shock shifts the IS curve down to IS' $\rightarrow r$ for which the economy would be at full employment is below r_m . New SR equilibrium is $E^{SR'}$.
- ▶ Such a situation is called a liquidity trap. Let's see why.

Liquidity trap

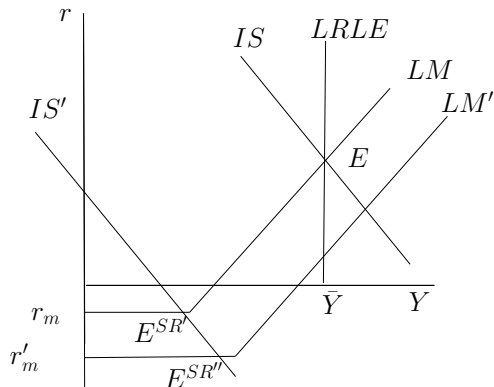
The ineffectiveness of **conventional** monetary policy

Changes in \bar{M} or P (with $r_m = i_m - \pi^e$ unchanged) shift the LM curve **right** but have no effect on equilibrium output.



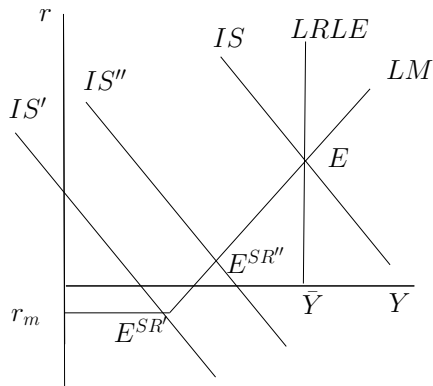
Liquidity trap: changes in r_m

Suppose r_m falls; i.e. i_m falls or π^e increases. Horizontal part of LM shifts down.



Liquidity trap: shifting the IS curve

Suppose \bar{G} increases or \bar{T} falls. IS shifts right to IS'' .



Liquidity trap: intuition

Why does **conventional** monetary policy fails.

- ▶ People are willing to hold any amount of money the government supplies at $i = i_m$, $r = r_m = i_m - \pi^e$ as the opportunity cost of holding money is zero. Monetary policy cannot affect the nominal and real interest rates, hence equilibrium output.
- ▶ Higher expected inflation allows to reduce r without i becoming negative. Investment increases.
- ▶ Higher desired expenditure increases output at unchanged investment.

Policy response to the crisis: what has been done

- ▶ Central banks cut nominal interest rates all the way down to zero (at which point conventional monetary policy is powerless).
- ▶ Non-conventional monetary policy: central banks tried to reduce the risk premium by conducting open market operations in (risky) corporate bonds (qualitative easing).
- ▶ Governments recapitalized (bailed out) banks hoping to bring down the risk premium.
- ▶ Automatic fall in tax revenue and increase in budget deficits: automatic stabilization.

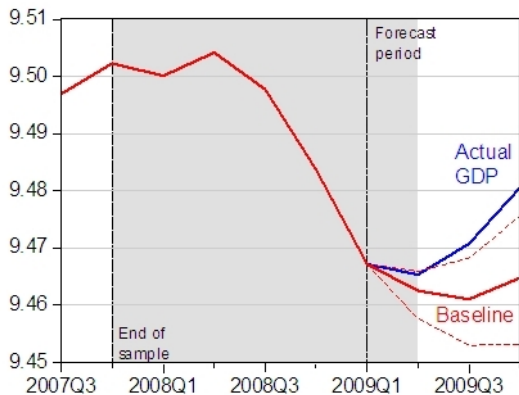
What can be done

- ▶ Shift IS curve up
 - I. Fiscal policy
 - II. Non-standard monetary policy: target premium ρ
- ▶ Shift LM curve down
 - III. Nearly-standard monetary policy
 - IV. Credit policy

I. Fiscal policy

- ▶ Keynesian recipe
- ▶ Expansionary fiscal policy increases aggregate demand at given interest rate
- ▶ The US government introduced a \$800b fiscal stimulus package at the beginning of 2009
 - \$250b tax cuts
 - \$500b expenditure and transfers

I. US Fiscal stimulus: estimated effectiveness



Source: Econbrowser - Menzie Chinn

I. Fiscal policy: historical precedents

- ▶ Great Depression
 - Relative agreement: fiscal expansion was relatively small and unlikely to have made a difference
 - it took World War II
 - Italy's Abyssinian war in 1932, though, was followed by rapid growth
- ▶ Japan in the 1990s
 - Share of government purchases in GDP rose from 32% in 1990 to 38% in 2000.
 - The Japanese economy is still depressed.
 - Counterfactual?

I. Fiscal policy: potential problems

- ▶ Most G10 countries are experiencing a huge increase in debt/GDP ratio.
 - Both discretionary and automatic fall in tax revenue
 - Markets may start doubting solvency and require larger risk premia
- ▶ It may have little impact.
 - Consumers may cut consumption in the expectation of higher future taxes.
 - Temporary cuts in VAT or investment tax credit (Feldstein) may be more effective.

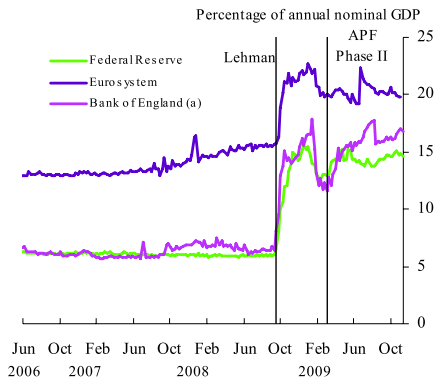
Monetary policy and the Central Bank balance sheet

Table 4: The Federal Reserve's Balance Sheet (billions of dollars)

Assets			Liabilities		
	<i>May 2007</i>	<i>Feb. 2009</i>		<i>May 2007</i>	<i>Feb. 2009</i>
U.S. Treasuries	790	475	Currency	814	890
Loans	0	546	Treasury accounts	5	237
Other	116	861	Reserves	7	603
			Other	80	152
<i>Total Assets:</i>	906	1,882	<i>Total Liabilities:</i>	906	1,882

Note: The Federal Reserve has expanded its balance sheet by nearly \$1 trillion to fight the financial crisis. Source: Federal Reserve Release H.4.1. See also James Hamilton's *Econbrowser* blog entry "[Federal Reserve balance sheet](#)", December 21, 2008.

CB balance sheet size in the current crisis

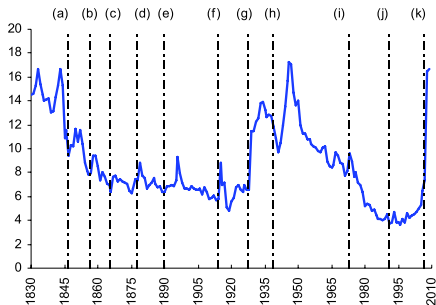


(a) Excludes loans and associated deposits in course of settlement.

Source: National accounts data, Federal Reserve, ECB, Bank of England.

CB balance sheet size in the UK

Chart 2: Bank of England balance sheet as a percentage of annual nominal GDP



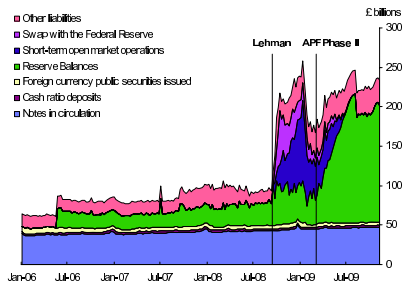
- (a) Famine / End of railroad boom (1847)
- (b) Overextension of credit from 1855-1866 (1857)
- (c) Failure of Overend Gurney (1866)
- (d) Failure of City of Glasgow Bank (1878)
- (e) Support for Barings (1890)
- (f) WWI (1914)
- (g) Currency and Bank Note Act (1928)
- (h) World War II (1941)
- (i) Secondary Banking Crisis (1973)
- (j) Small Banks Crisis (1991)
- (k) Current Crisis (2007)

Notes: The balance sheet observations are end-February for 1830-1966, end-year for 1967-2008, and November for 2009.

Sourced: Consensus forecast, ONS, Bank of England calculations . A variant of this chart was originally published in a speech by Andy Haldane (Chart 5, of 'Banking on the State')

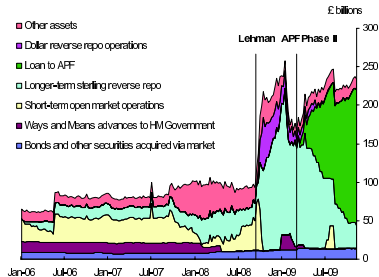
BoE balance sheet composition

Chart 3: Bank of England consolidated balance sheet: liabilities^(a)



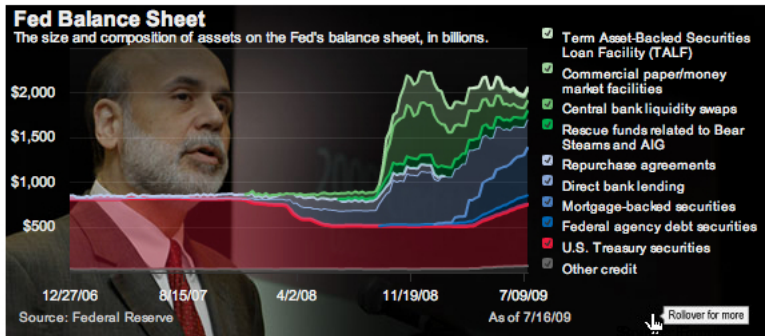
(a) Excludes loans and associated deposits in course of settlement.

Chart 4: Bank of England consolidated balance sheet: assets^(a)



(a) Excludes loans and associated deposits in course of settlement.

Fed balance sheet composition



Monetary policy

- ▶ When return on short term government bonds $i = 0$ monetary policy can affect demand by
 - buying *long term* government bonds until their return is zero
 - affecting risk/liquidity premium ρ_t
 - lowering r_m by
 - raising expected inflation π_t^e
 - lowering i_m

III. Nearly-standard monetary policy

- ▶ **Quantitative easing**: increase monetary base.
- ▶ What to buy: all government bonds with positive nominal return
 - Nearly-standard
 - it involves only risk-free, liquid, bonds (effectively government bonds);
 - only difference, **all** maturities.
- ▶ Purpose: to drive down long term returns which are what matters for investment

III. Nearly-standard monetary policy: higher π^e

Target a higher π_t^e . It reduces r_m and shifts LM down.

- ▶ Needs a credible commitment to sufficiently high *future* prices
 - Bank of Japan was not credible in that respect.
- ▶ Introduce/change inflation target (again credibility)
- ▶ Quantitative easing
 - The increase in the money supply has to be perceived to be permanent
 - Otherwise ineffective

Limits to (large scale) quantitative easing

It requires a credible commitment

- ▶ to large enough inflation while the economy is depressed
- ▶ to reverse the position (cut the money supply) when demand for money falls back to normal.
- ▶ Fine line to walk. Why?
 - Unwinding (in large quantities) likely to depress prices of government bonds and raise cost of public borrowing
 - Treasury tax and expenditure plan need to be consistent with solvency
 - Treasury may put pressure on Bank (particularly if it has to recapitalize it).

III. Nearly-standard monetary policy: negative i_m

Negative i_m . Taxing banks/individual money holdings. It increases r_m and shifts LM down.

- ▶ Feasible on banks: bank reserves are not bearer assets (cannot be hidden under the mattress).
- ▶ One further instrument for the central bank
 - Used in Sweden: $i_m = -0.25$ at present
 - Fed can now pay (positive), but not negative interest on reserves
- ▶ Why has it not been tried in the US/UK? A guess:
 - Banks are hoarding reserves as a cushion against funding illiquidity
 - It could just reduce their profits without inducing them to lend.
 - Forcing banks to lend by making i_m very negative might just increase the risk of default as banks are still highly leveraged

II. Non-standard monetary policy: liquidity provision

Qualitative (or Credit) easing

Drive the liquidity premium component of ρ_t (liquidity premium) on private assets to zero.

- ▶ Lender of last resort to banks (funding liquidity)
 - “Provision of short-term liquidity to sound financial institutions”
- ▶ Market maker of last resort (asset market liquidity)
 - “Provision of liquidity directly to borrowers and investors in key credit markets”
 - Accept a wider range of private sector collateral and counterparties
 - Outright purchase of illiquid private securities

Problems with credit easing

- ▶ Getting the price right
 - Price has to compensate for default risk
 - Too high and taxpayers lose, too low and it does not help
- ▶ Private assets are subject to default risk even if bought at the appropriate price
- ▶ If the Treasury does not guarantee the private debt the Central Bank buys, the Bank capital may be impaired to a point where it either
 - has to be recapitalized discretionally by the Treasury or
 - has to print its way out of insolvency
- ▶ Either way the Bank ability to fight inflation is impaired
 - BoE has Treasury guarantee but not the Fed, ECB has no fiscal backing whatsoever.
 - That is why ECB is wary of buying Greek bonds.

Problems with credit easing

Unwinding when the economy recovers involves the same problems as for QE, but compounded

- ▶ Markets for certain assets may be very illiquid or no longer exist.
- ▶ Selling may depress prices a lot
- ▶ Capital loss for the Bank

One extra tool for when things improve

Positive interest on reserves

Bernanke: “[W]e expect the interest rate paid on reserves to become an effective instrument for controlling the federal funds rate.”

- ▶ FED and BoE can pay interests on bank reserves
- ▶ Useful when they want to tighten without reducing their balance sheet in a hurry.
- ▶ Rather than withdrawing reserves by selling assets, the Central bank ensures they are not lent by paying a high enough interest rate i_m on them.
- ▶ Costly, though.
 - Private banks are effectively loaning their reserves to the Central Bank rather than the public.

Is all this working?

Bernanke: “In particular, borrowers with access to public equity and bond markets, including most large firms, now generally are able to obtain credit without great difficulty. Other borrowers, such as state and local governments, have experienced improvement in their credit access as well. However, access to credit remains strained for borrowers who are particularly dependent on banks, such as households and small businesses.”

- ▶ Why are banks hoarding reserves rather than lending them out?

Zombie banks

- ▶ A bank on the verge of insolvency and highly leveraged is very reluctant to lend to risky projects.
- ▶ A small loss could tip it into insolvency.
- ▶ Hopes to rebuild its balance sheet in two ways
 - Waiting for the recovery to raise the price of their assets.
 - Through the spread their funding cost and their lending rate.
- ▶ Rebuilding balance sheets this way is painfully slow
 - This is what happened to Japan

Rebuilding banks' balance sheets

- ▶ Large enough unexpected inflation
- ▶ Wholesale reorganization/bankruptcy
 - Wipe out shareholders and turn all debt but deposits into equity
 - What if capital markets seize up again (as when Lehman Brothers collapsed)?
- ▶ Recapitalizing banks with public capital
 - It has happened, but
 - Moral hazard
 - (Shadow) banking system too large and too leveraged relative to fiscal capacity
 - Fiscal capacity is already running out

The Great Recession of 2007-20??: is it enough?

- ▶ Is non-conventional monetary policy expansionary enough?
 - Fear that it may be difficult to withdraw money when things turn around. Central banks would have to sell large quantities of risky assets bringing down their price and possibly endangering the recovery. The alternative could be high inflation. A dilemma.
- ▶ Is fiscal policy expansionary enough?
 - Lots of concern about deficits and debts and the possibility of default. Yet...
 - For most countries debt levels are not too large by historical standards (cfr. Britain post-Napoleonic wars), though high by peace-time standards.
 - Cutting too early may kill the recovery (cfr. 1937).