

Business Cycles

Part 5: Financial Crises

Lecture 10: The Great Recession

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Outline

Part 1: Introduction

Part 2: Microeconomic Foundations

Part 3: The Real Business Cycle Model

Part 4: The New Keynesian Model

Part 5: Financial Crises

- Lecture 9: Monetary Policy and the Zero Lower Bound on Interest Rates
- **Lecture 10: The Great Recession**

Learning Objective of Today's Lecture

1. Learn about the typical structure of financial crises: similarities between the Great Depression and the Great Recession
2. Facts on the Great Recession
3. Underlying causes: mapping into our model
4. Unconventional policy interventions: mapping into our model

Literature

Required reading:

- Textbook chapter 37

Optional reading:

- Mishkin, F. (2011). Over the Cliff: From the Subprime to the Global Financial Crisis, *Journal of Economic Perspectives* 25(1): 49-70.
- Hall, R. (2010). Why Does the Economy Fall to Pieces After a Financial Crisis? *24(4): 3-20.*

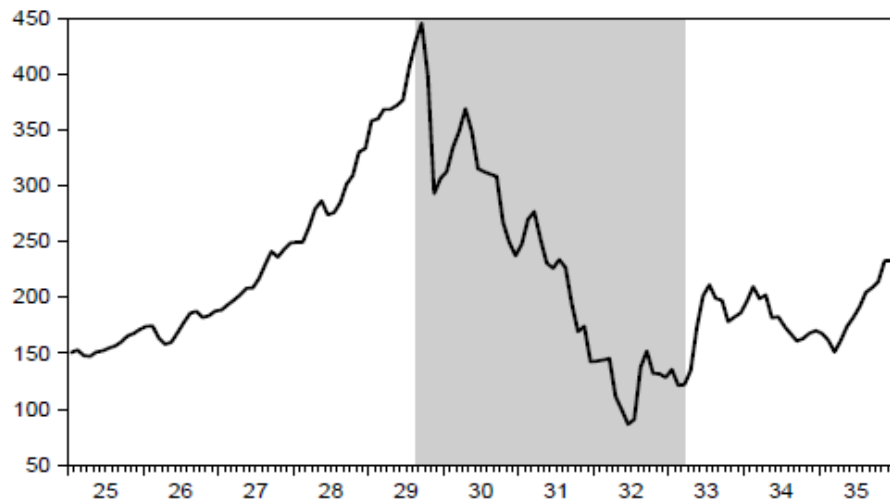
Financial crises

- Financial crises occur with regularity in market economies.
- Common in the US prior to the founding of the FED and the centralization of the monetary and banking systems.
- Two major US (and global) financial crises, followed by recessions:
 - The Great Depression (1929-1933) from general stock market,
 - The Great Recession (2007-2009) from housing market.
- Associated with disruptions between the flows of funds from savers to borrowers: an increase in credit spreads is the tell-tale sign of financial crises.
- Asset price booms and busts usually precede financial crises and cause the increase in credit spreads.
- As a consequence, reduction in aggregate demand and potentially recession.

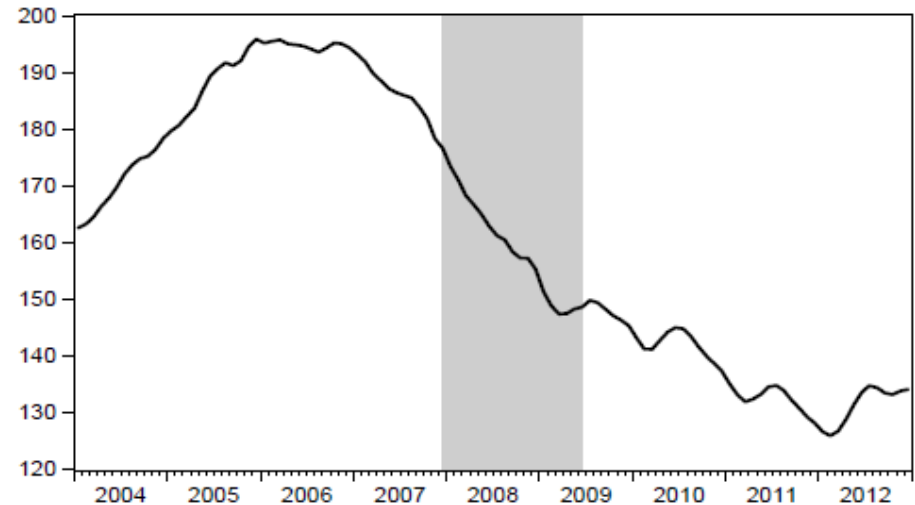
Asset Price Boom and Bust

- Boom: high lending activity, general euphoria, poor regulation.
- Decline in asset prices affect the economy through two channels.
 - Wealth effect channel: households own assets, a fall in assets value decreases their present discounted value of lifetime income and reduces consumption demand.
 - Banking panics: insolvency concerns lead to bank run, banks are forced to sell assets for liquidity, asset prices decline and interest rate spreads increases.

Real S&P 500 Stock Market Index



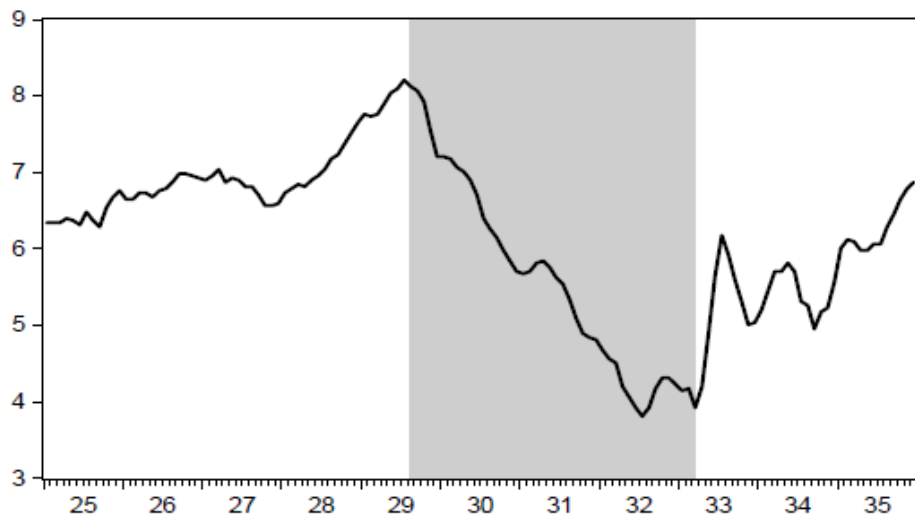
Real Home Price Index



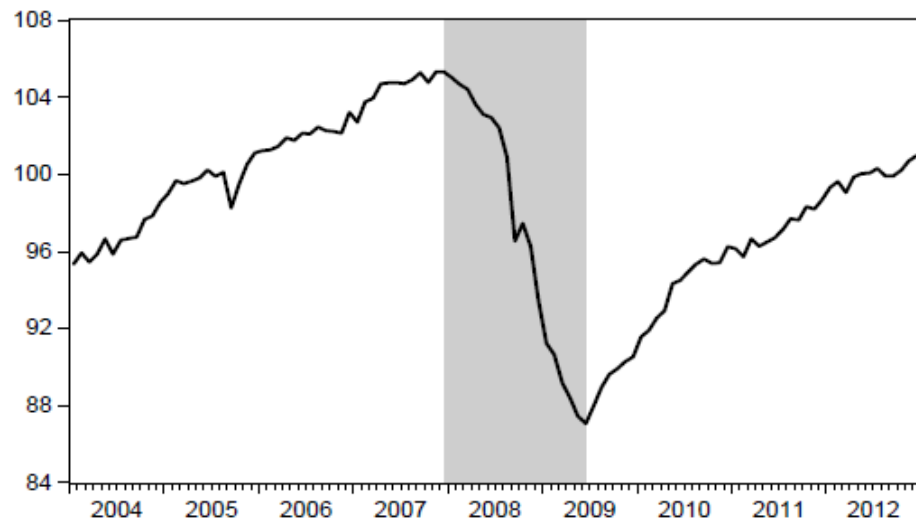
The Great Depression vs. the Great Recession

- The Great Depression was worse than the Great Recession in terms of lost output.
- Unemployment rate rose in the U.S. up to 25 percent, versus 10 percent in the recent global crisis.
- Likely due to different interventions: Central banks more reactive in the Great Recession.

Industrial Production Index

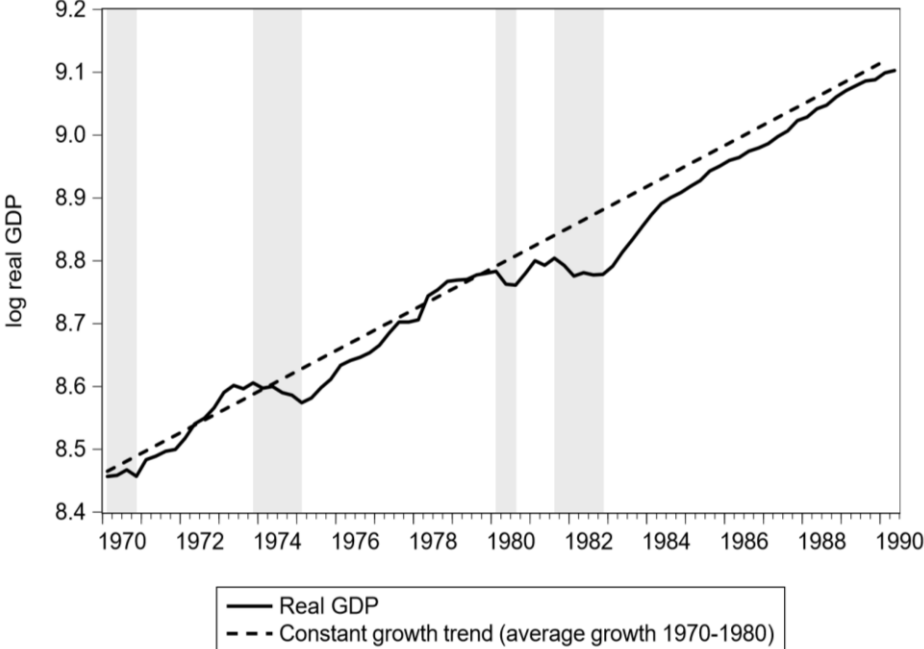
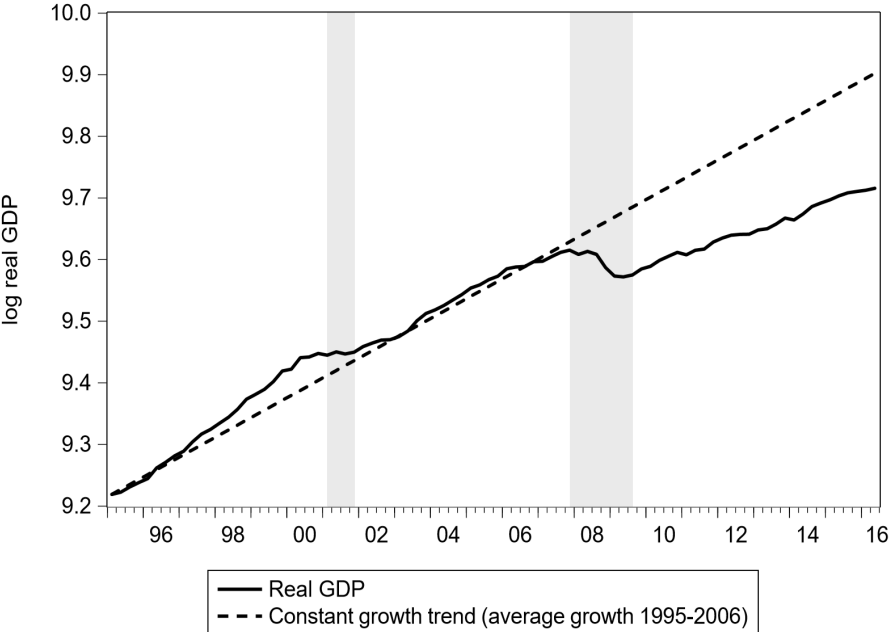


Industrial Production Index



Loss in Output

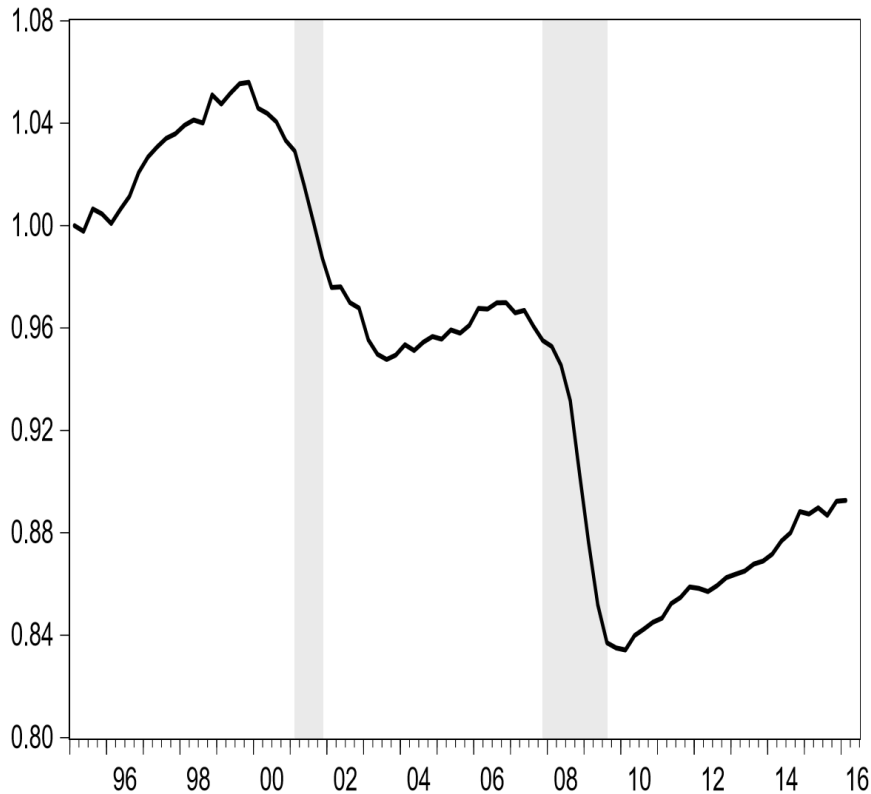
- Reduction in real GDP relative to linear trend of more than 10%.
- No reversion to pre-crisis trend; unlike in case of recessions that do not coincide with financial crises.



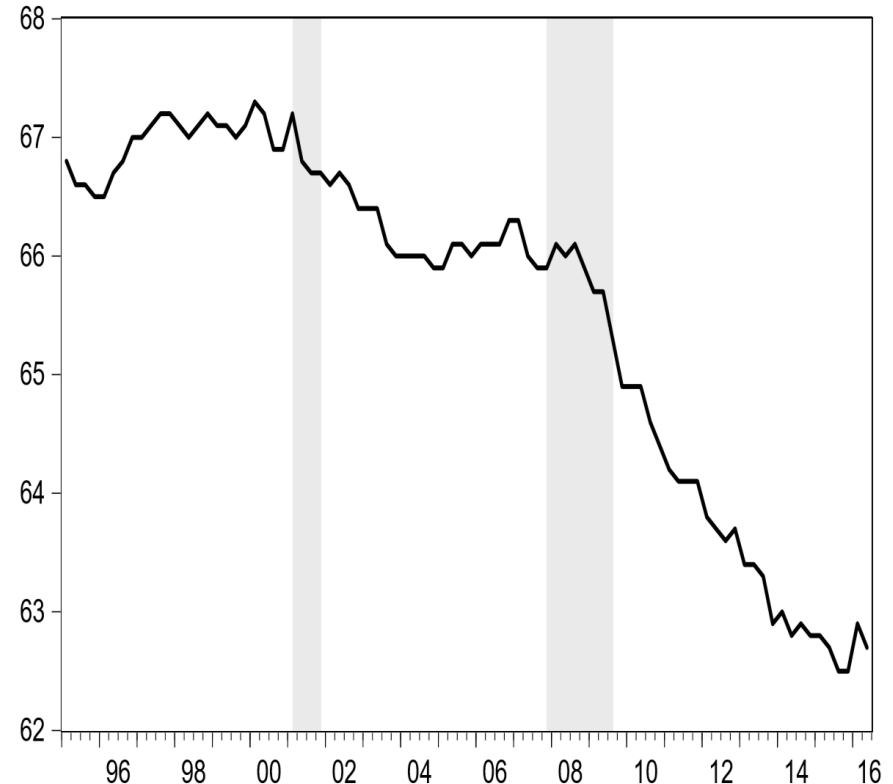
Drop in Labor Market Indicators

- Unemployment rate doubled; recovery, however, visible
- No recovery in terms of hours and participation rate; strong decline of both indicators

Hours (Index)



Participation rate (%)



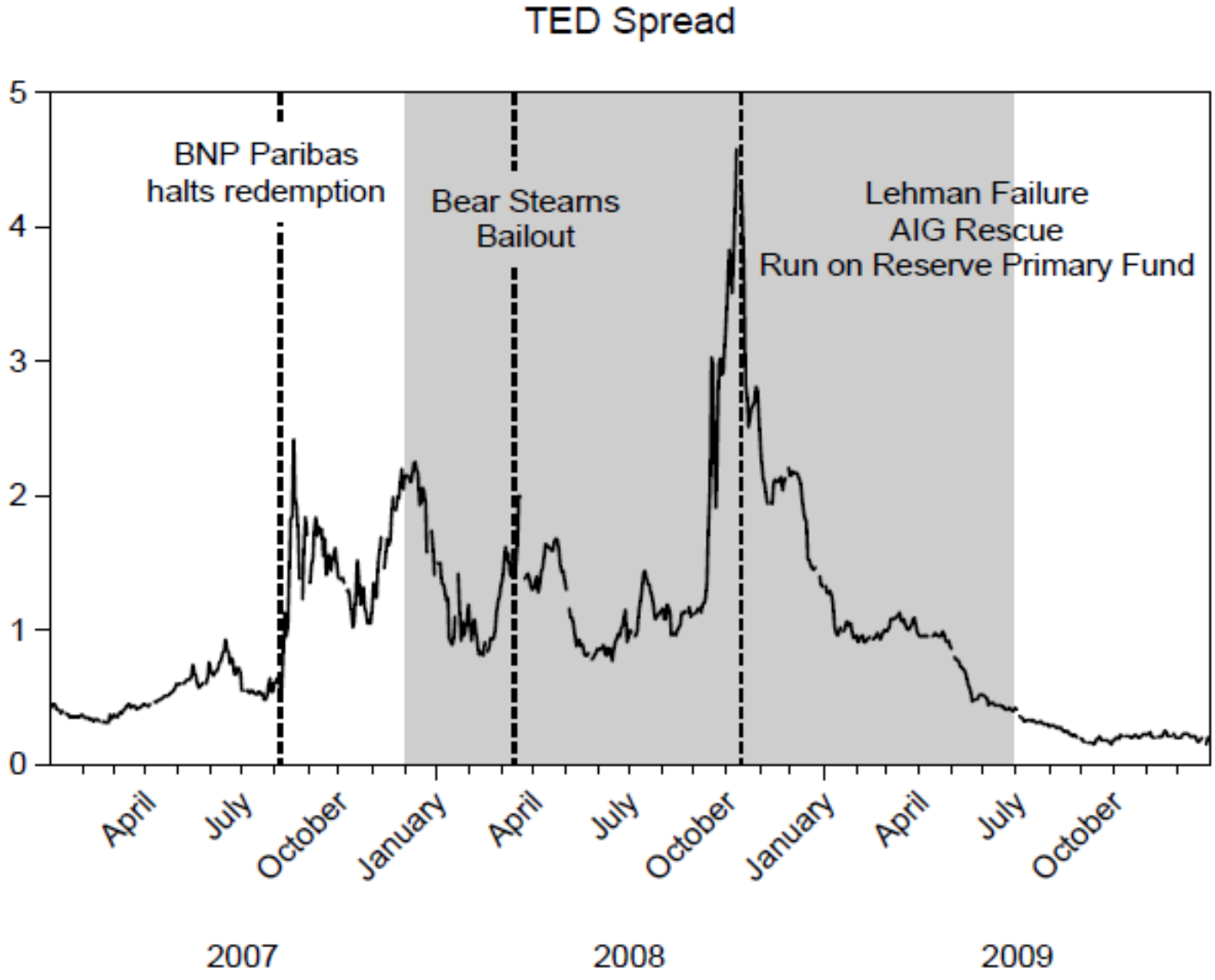
The Great Recession: MBS and Subprime Loans

- It had origins in the housing market.
- Investment banks provided funding for mortgage loans by buying apparently safe mortgage related assets (mortgage backed securities, MBS). Funded themselves with short term loans from large institutional investors.
- MBS are based on underlying actual mortgages. Some “subprime” borrowers. Subprime loans: loans at no money down with low interest rates.
- Subprime borrowers ineligible to traditional mortgage. When interest rate reset, they use accumulated equity in their house as a down payment on the refinance deal.
- This works as long as houses appreciate in value: cash flow from the MBS sensitive to house prices.
- Collapse in housing prices led to widespread financial panic
- Why? Over-exposure to previously thought safe mortgage-related assets (MBS) combined with increasing interconnectedness of financial institutions

The Great Recession: More Specifics on the Run

- Run of institutions (rather than depositors) on other financial institutions.
- MBS not accepted as collateral anymore. Short term funding for financial institutions dried up.
- To meet liquidity shortfalls, institutions sold assets unrelated to MBS. Financial assets price collapsed.
- Feedback effect: institutions selling assets look more vulnerable. Further liquidity pressures.
- Financial institutions quit lending.
- Credit spreads throughout the economy rose.
- Bear Stearns bailout and Lehman Brothers bankruptcy: two of the major shocks in financial markets
- Interest rates relevant for consumer and business loans also increased markedly.

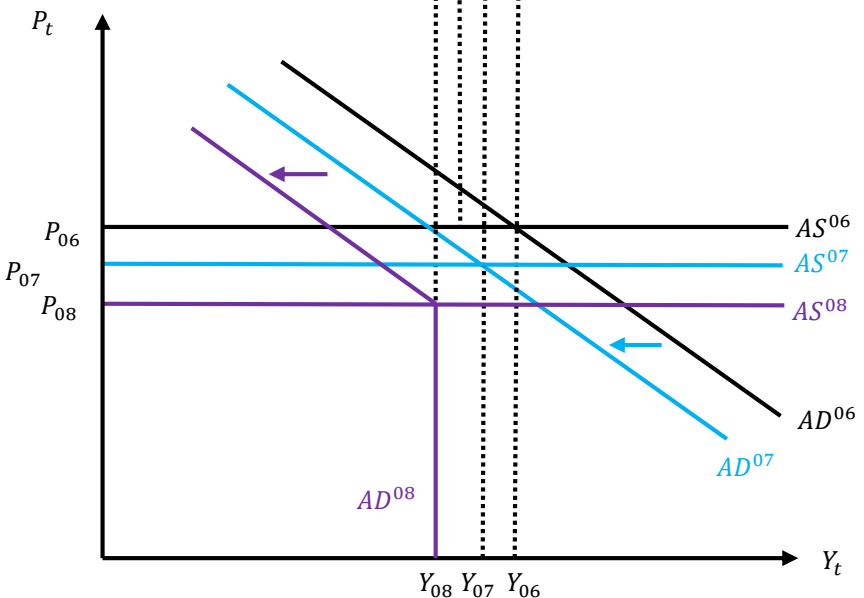
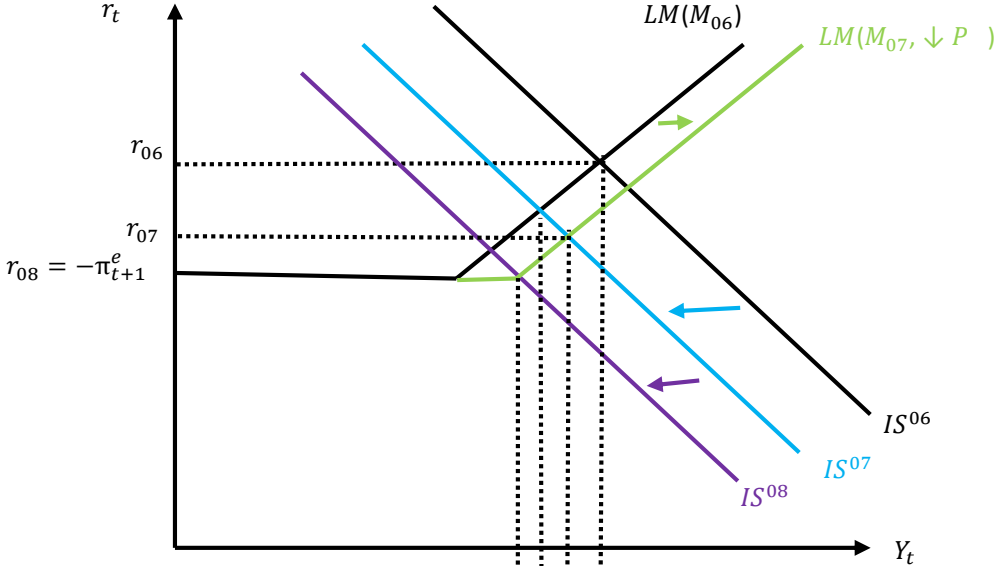
TED spread during the Financial Crisis



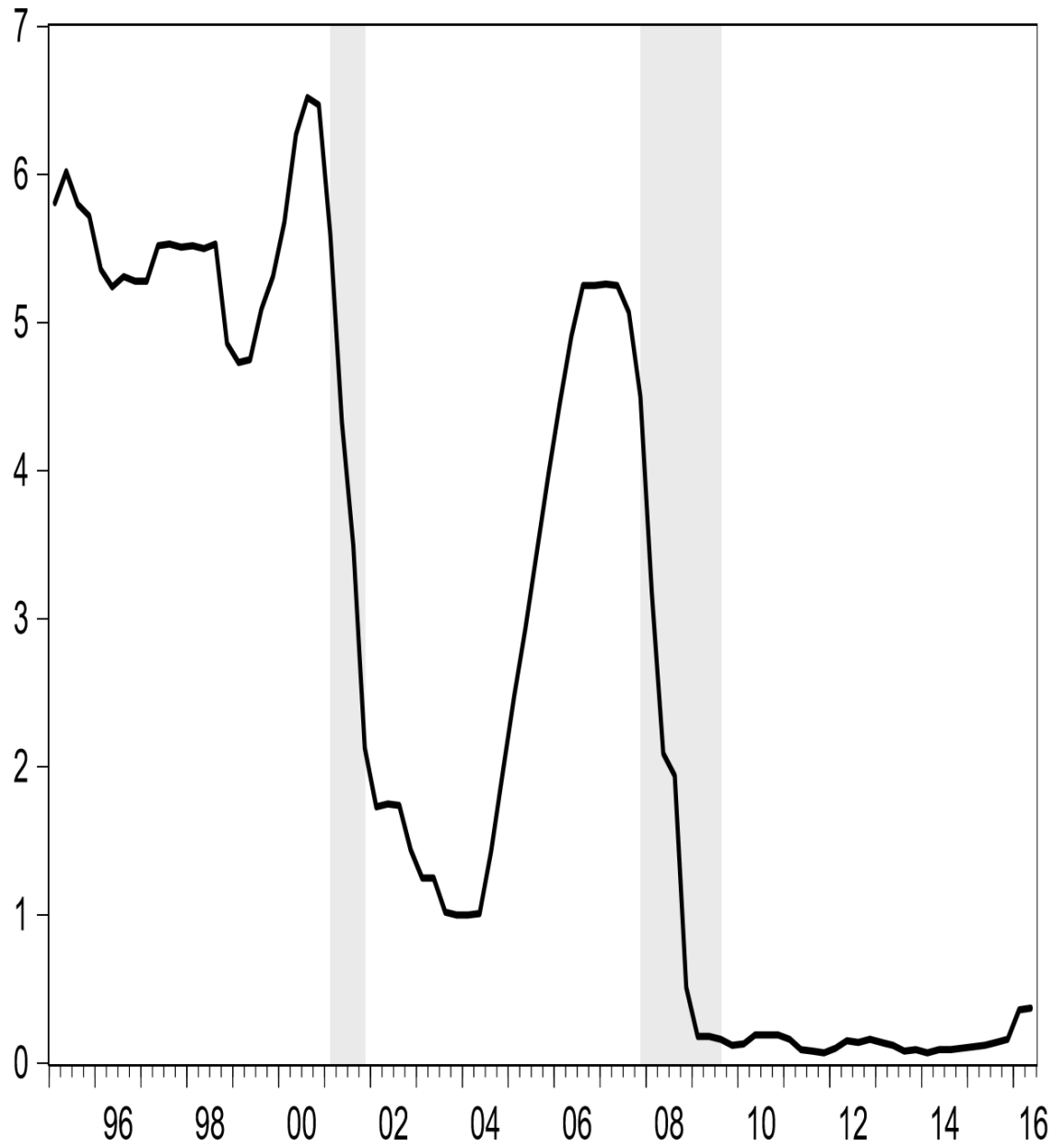
Tying the Facts into our Model

- Phase I) Housing bust:
 - Decline in house prices represents a wealth shock which reduces consumption demand; negative IS/AD shock
 - Slight output slowdown, Fed responds by lowering interest rates
- Phase II) Financial crisis:
 - Liquidity crisis of financial institutions, which are forced to sell assets (fire sale).
 - Loan supply decreases and credit spreads (f_t) increase; negative IS/AD shock
 - By the time this hit (mid-2008), the ZLB was essentially binding
- Phase III) Intensification of the Financial crisis:
 - Biggest increase in credit spreads (f_t), combined to binding ZLB
 - Output reduction much larger than it otherwise would have been
 - Financial market intervention (trying to reverse increases in f_t and housing prices)
 - Non-standard monetary policy (trying to raise expected inflation)
 - Fiscal expansion: IS shift

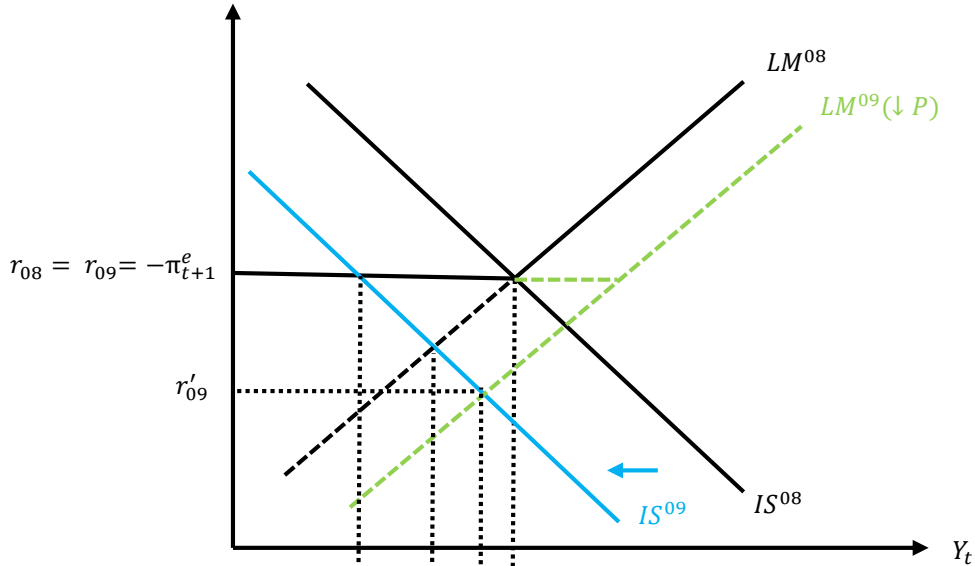
Housing Market Collapse and Increase in Credit Spreads



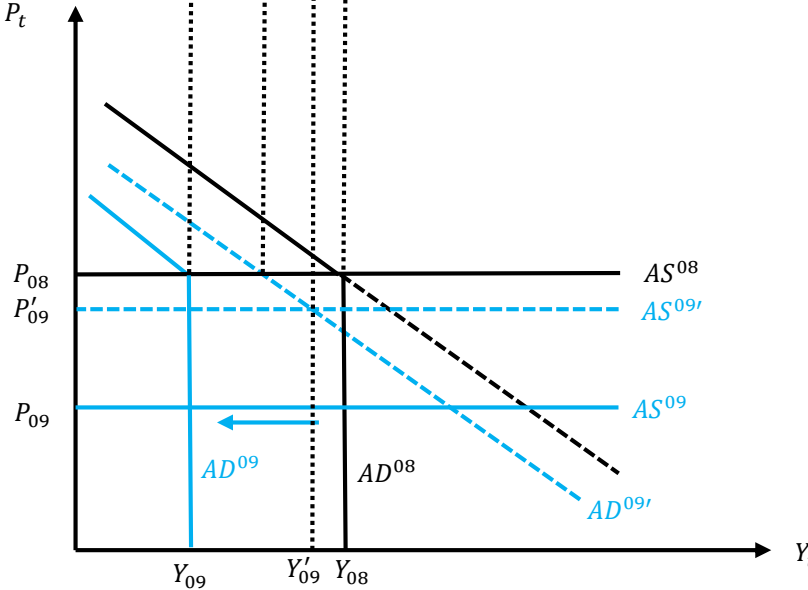
Binding ZLB



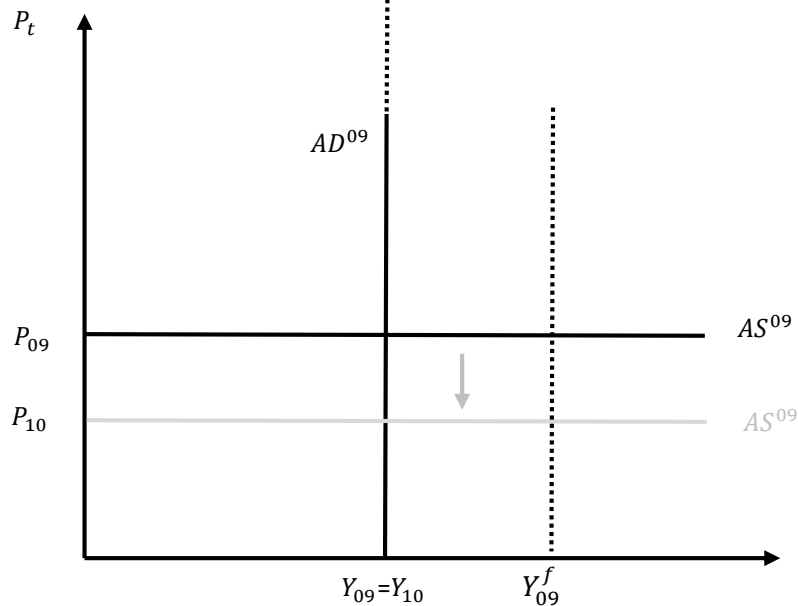
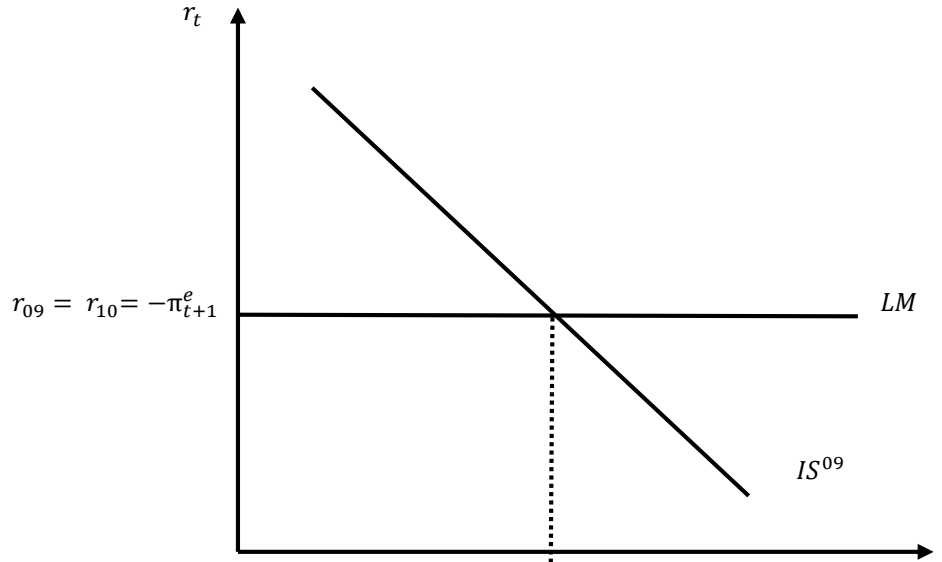
Intensification of Financial Crisis in 2008-09 with and without ZLB



- Black: 2008 equilibrium
- Blue: 2008-2009 IS shock due to increase in credit spreads
- Dashed blue: hypothetical AD effect without ZLB
- Dashed green: hypothetical indirect LM effect with no ZLB

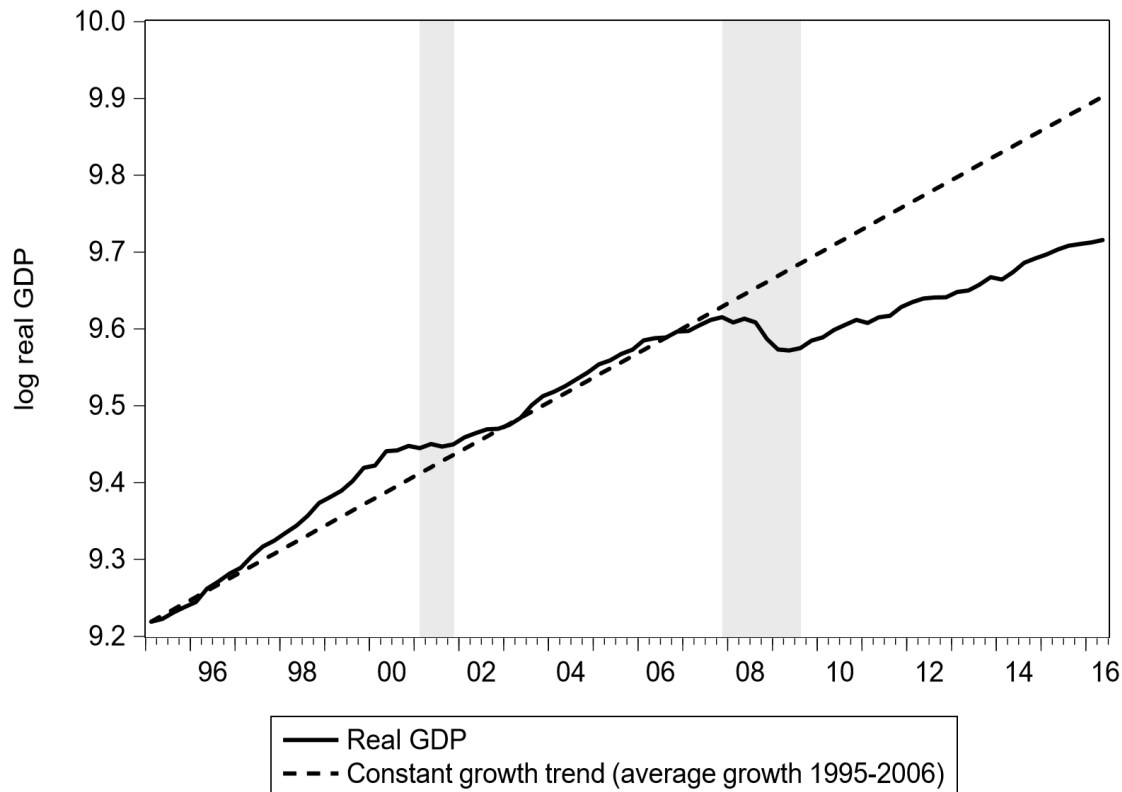


Weak Recovery



Weak Recovery

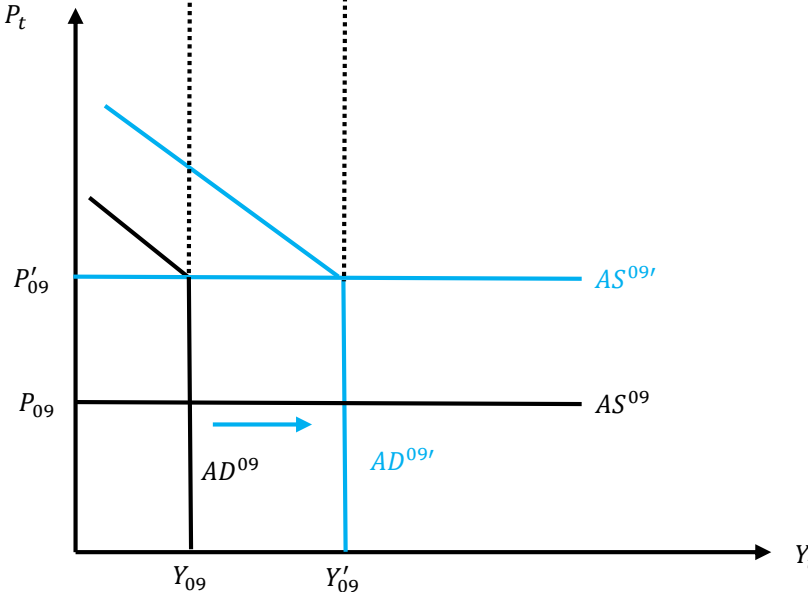
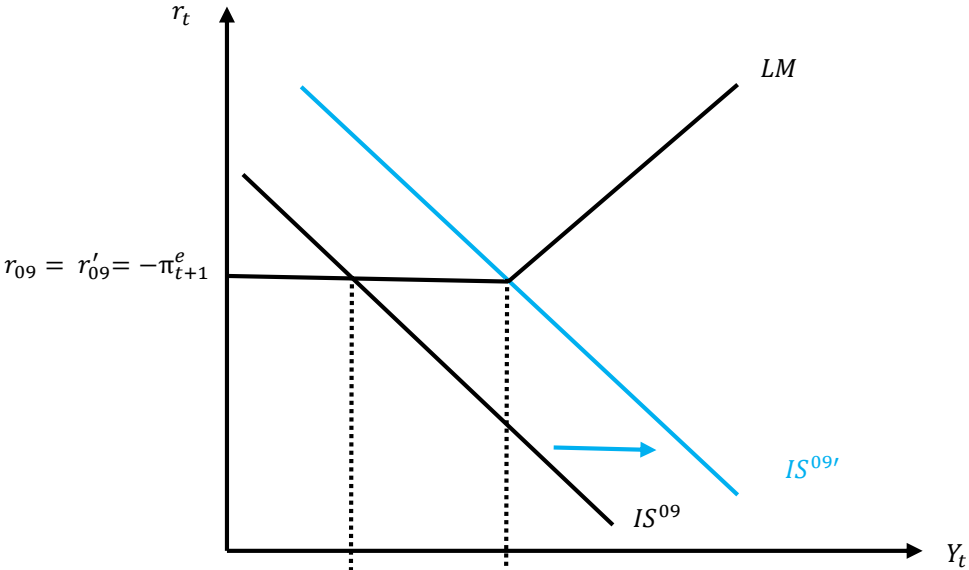
- Output declined as well as price level.
- Inflation rate went sharply negative but no deflationary spiral.
- Despite the ZLB binding, output recovered. Although no bounce back to pre-crisis trend, as we often observe it in recessions not associated with financial crises.



Unconventional Policy Actions: Federal Reserve Lending

- The financial crisis was a liquidity crunch: run on the shadow banking system.
- Traditional policy: the central bank steps in as the lender of last resort, it lend funds to financial institutions facing funding shortfalls.
- Institutions facing funding issues were not designated as commercial banks, hence not eligible for conventional discount loans
- Emergency lending and liquidity provision more important than traditional means i.e. Fed's discount window.
- Objective: to restore liquidity to financial markets, to get financial institutions lending again, to try to reverse the increases in credit spreads f_t .

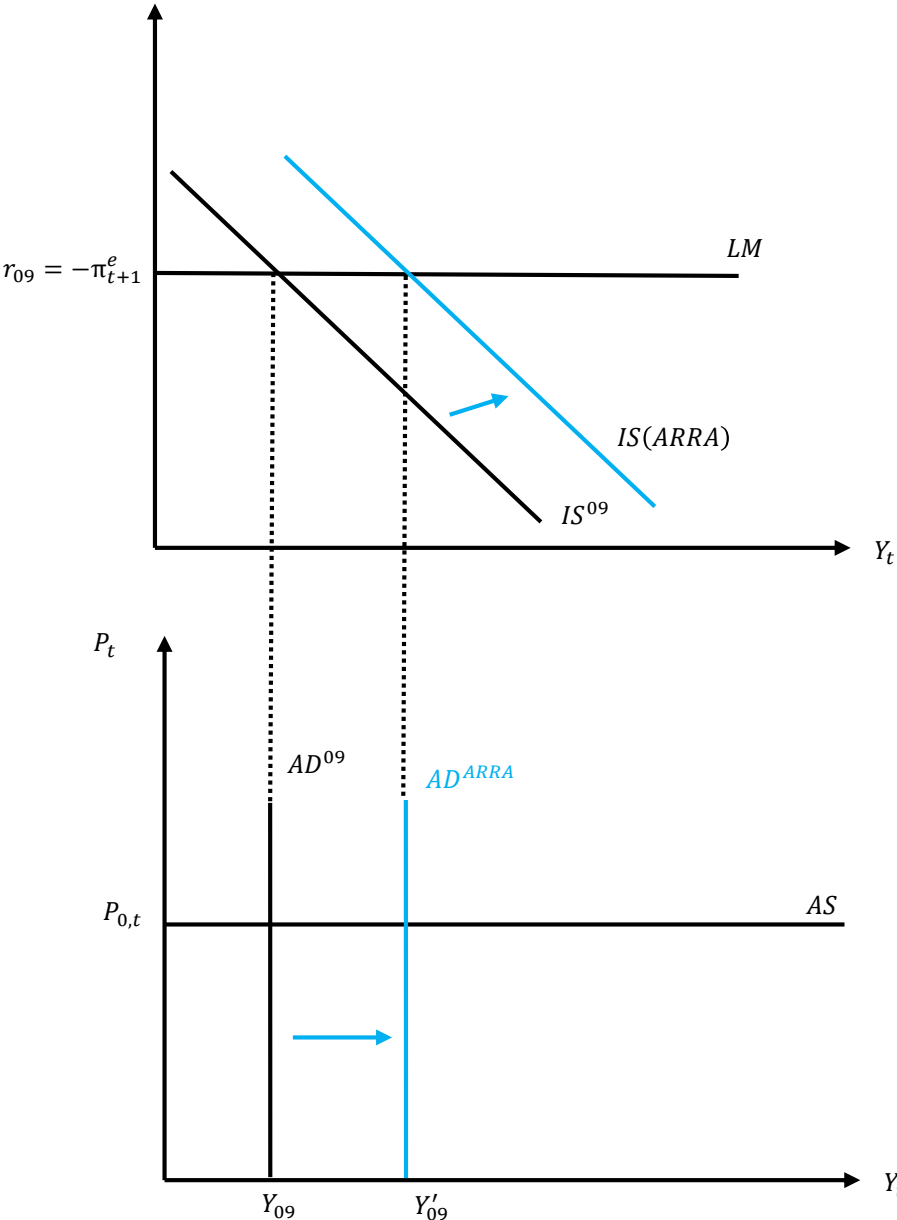
Policy Response: Quantitative Easing



Unconventional Policy Actions: Fiscal Intervention

- As noted earlier, when ZLB binds, IS shocks have bigger output effects.
- Increase in G_t has no crowding out if the interest rate is fixed at its lower bound.
- Hence, fiscal expansion makes more sense in such extreme circumstances and is even quite desirable.
- American Recovery and Reinvestment Act (ARRA): Federal spending increases and tax cuts totaling about \$800 billion to spread over 10 years.

Fiscal Stimulus



Unconventional Policy Actions: Fiscal Intervention

- Bailouts and Troubled Asset Relief Program (TARP): purchasing “troubled assets” from large financial institutions.
- Similarities with Federal Reserve Lending but it is a program by the Treasury, hence classified as a fiscal program.
- Cause of the financial crisis was breakdown in lending because of fears of insolvency
- Buy up the bad assets leading to insolvency: get rid of the underlying problem
- Can think about this angle of policy response as trying to reduce interest rates, that would be passed on to consumers and businesses in the form of lower interest rates on mortgage loans, business loans, etc.

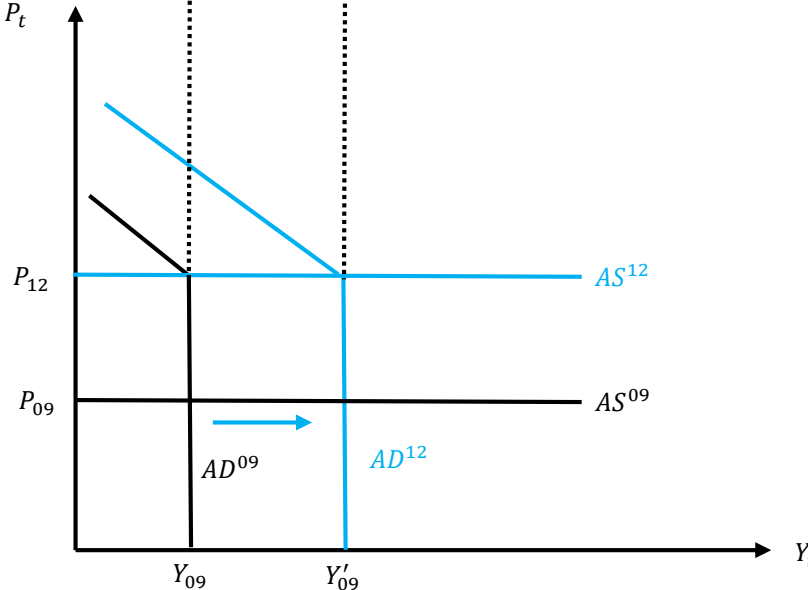
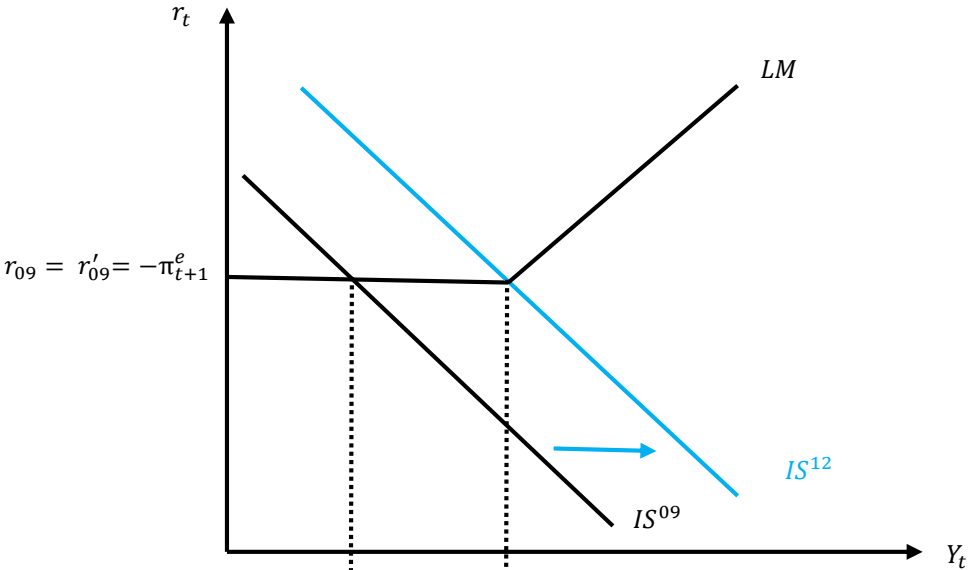
Unconventional Monetary Policy: Quantitative Easing

- We've written down model with one short term, riskless real interest rate, r_t
- In reality, many interest rates, which differ according to risk and time to maturity
- Conventional monetary policy: buy and sell government bonds, affecting money supply and short-term, riskless interest rate
- Quantitative easing: buy and sell longer maturity or higher risk bonds, affecting the risky longer term interest rates down.
- QE is based on the theory of segmented markets: debt instruments with different risk and maturity are not substitutes.
- Let f_t be called credit spreads. Relevant interest rate for consumption and investment is $r_t + f_t$
- QE's objective: increasing the price of these debt instruments and trying to lower f_t

Unconventional Monetary Policy: Forward Guidance

- What matters for investment and saving decisions are longer term interest rates
- Traditional monetary policy: affecting short term rates, which affects longer term rates
- Forward guidance: promise to keep short term rates low far off in to the future. Idea: get longer term rates to drop immediate
- Based on “expectations hypothesis” of interest rates: longer maturity rates are product of sequence of short maturity rates
- Hence, can think of forward guidance as also trying to impact f_t
- To lower risky and longer term interest rates, the Fed implemented QE and Forward Guidance, which should not be able to work simultaneously.
- Nonetheless, evidence suggests both policies contributed to lower interest rates.

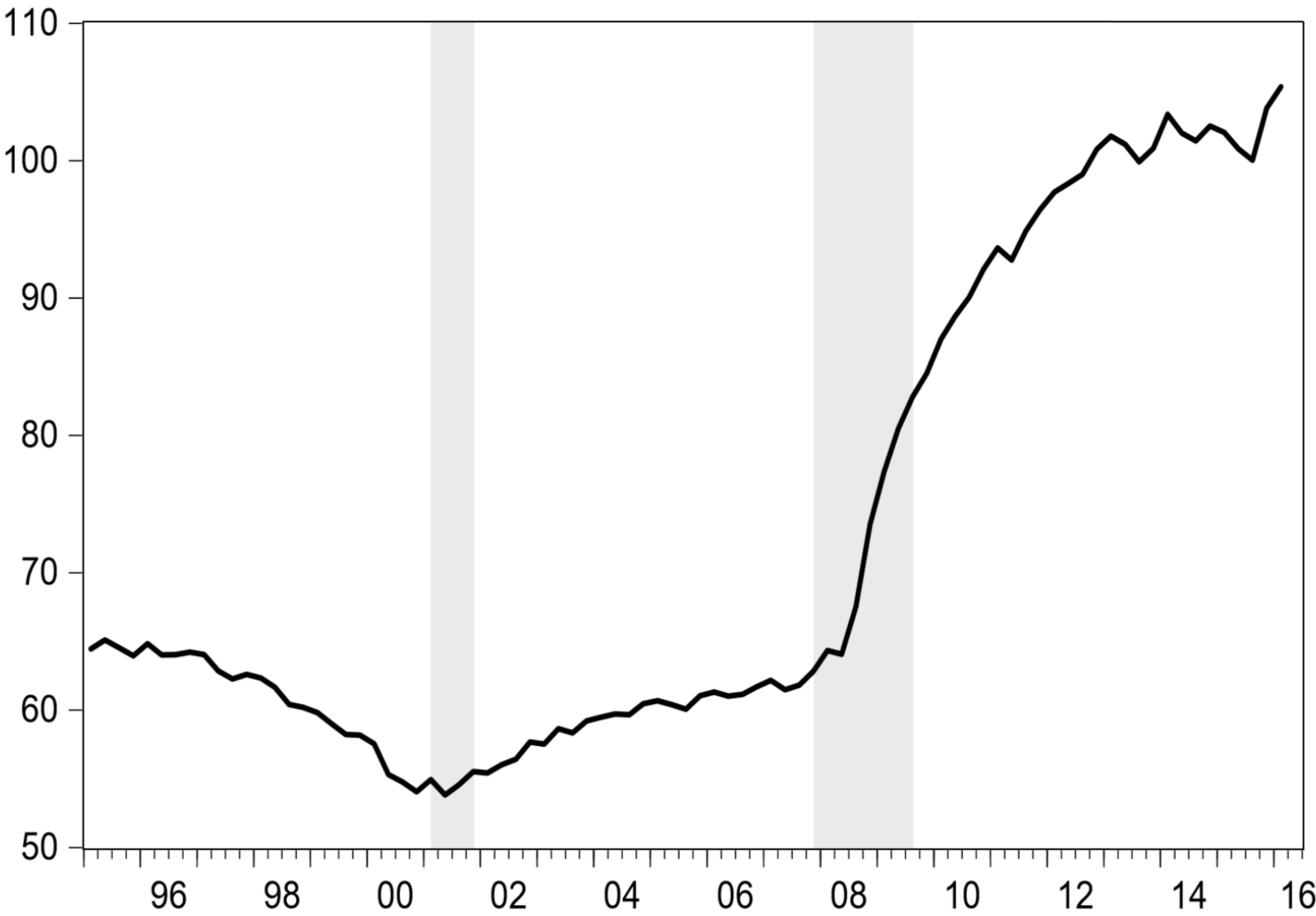
Effects of Quantitative Easing and Forward Guidance



Policy Angles: Summary

- Three different modes of policy response: extraordinary lending activities, non-standard monetary policy, fiscal stimulus
- Within context of our short-run NK model, all make some degree of sense given widely accepted view of underlying cause of Great Recession
- Did the policy changes work?
 - Financial market intervention: Indicators of financial stress went back to normal levels in 2009; Financial system didn't blow up
 - Non-standard monetary policy: Haven't had deflation, but inflation expectations haven't risen; Commercial banks sitting on lots of cash
 - Fiscal stimulus: Probably wasn't big enough and too late to do an enormous amount anyway; Raised government debt and policy related uncertainty; Little consensus within empirical literature on effects of stimulus

US Debt-GDP Ratio



Summary

- Tell-tale sign of a financial crisis: sharp increase in credit spreads
- Asset price booms and busts typically preceding financial crisis
 - General stock market boom prior the Great Depression
 - Housing market boom prior the Great Recession
- After busts there is financial panic, stemming from insolvency risk, and financial intermediaries run.
- The Great Recession as featuring several negative IS-shock
 - 1. housing crisis: direct effect of collapsing house prices
 - 2. financial crisis: increase in credit spreads (f_t) and Fed lowering interest rates. Reached ZLB.
 - 3. intensified financial crisis: highest f_t , exacerbated by the binding ZLB (no transitional dynamics to medium run).
- Unconventional policy responses: extraordinary lending actions, fiscal stimulus, quantitative easing and forward guidance can be modelled as positive IS-shocks.
- Emphasis on the importance of linkages between the financial system and the macroeconomy

Outlook

- It is my hope that this course has accomplished the following things:
 - Introduced you to some basic facts about business cycles, economic policy, and the Great Recession and the ZLB-period
 - Given you relatively simple theoretical frameworks to think about these issues
 - Honed your quantitative, mathematical, and modeling skills
 - Macroeconomics is a dynamic and ever-changing field
 - We have more questions than we have answers