

The Subprime and the Euro Debt Crises

Carlo Favero

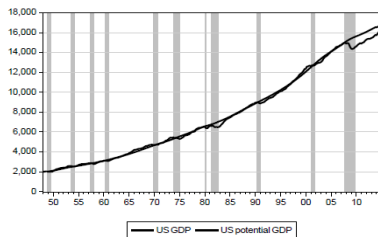
Dept of Finance, Bocconi University

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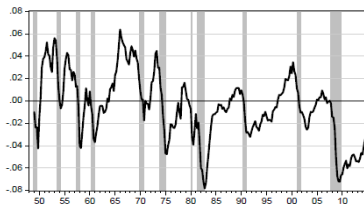
The Ingredients

- cycle vs trend
- monetary policy and fiscal policy
 - Zero Lower Bound, Quantitative Easing, Large Scale Asset Purchasing Programme, interest rate path
 - balance sheet of a central bank
 - Long Term Bonds and policy rates
 - spreads
 - austerity
- banks
 - balance sheet of a bank
 - leverage, repos, CDO and CDS

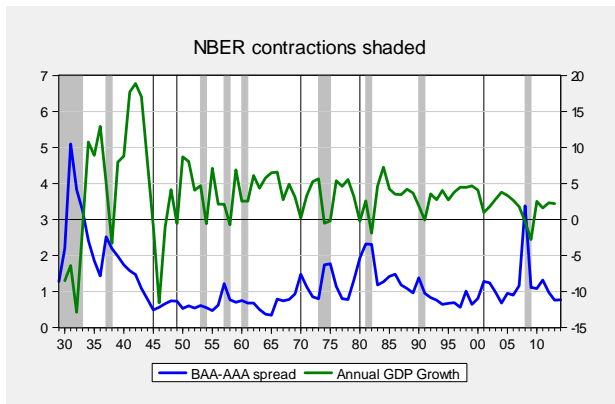
NBER contractions shaded



NBER contractions shaded



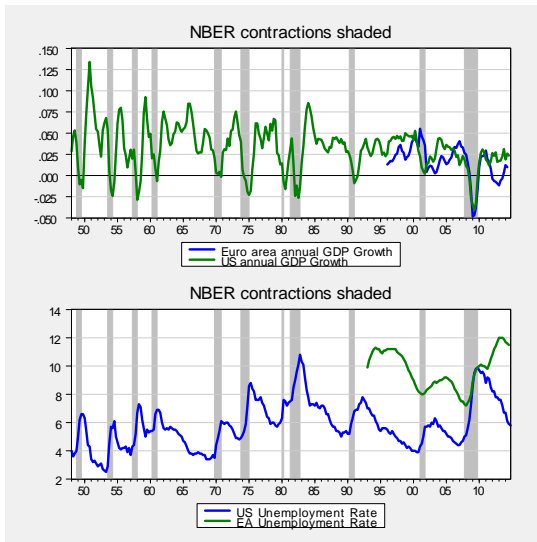
The Big Picture



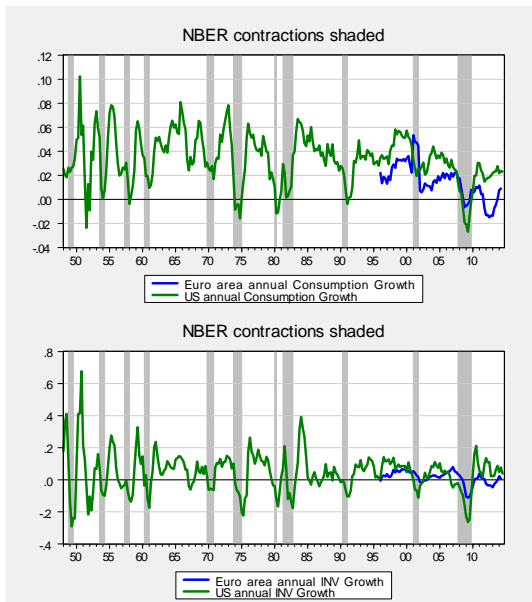
The dimension of the crisis

- The worst crisis in the postwar era. Global GDP contraction and rise in unemployment
- Contraction in Consumption and Investment, drop in Consumers' Confidence
- Global stock market collapse
- Huge drop in wealth
- Fluctuations in risk premia and euro area sovereign bond spreads

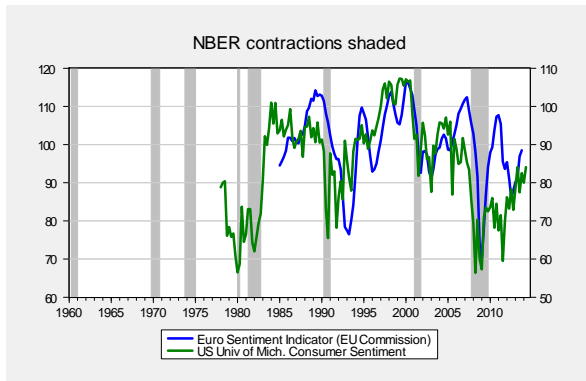
GDP Growth and Unemployment



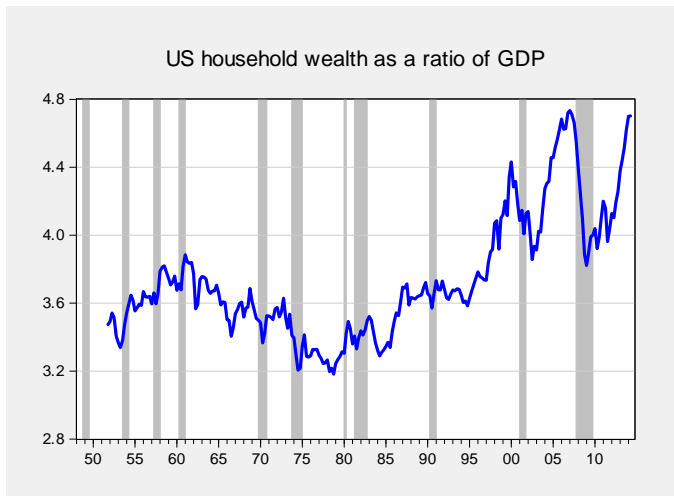
Consumption and Investment



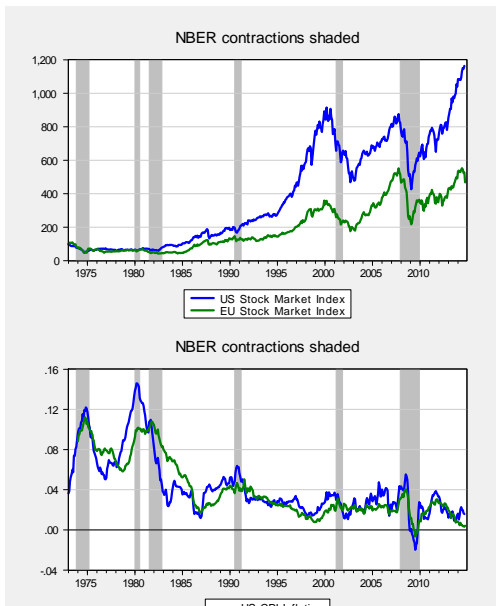
Consumer Confidence



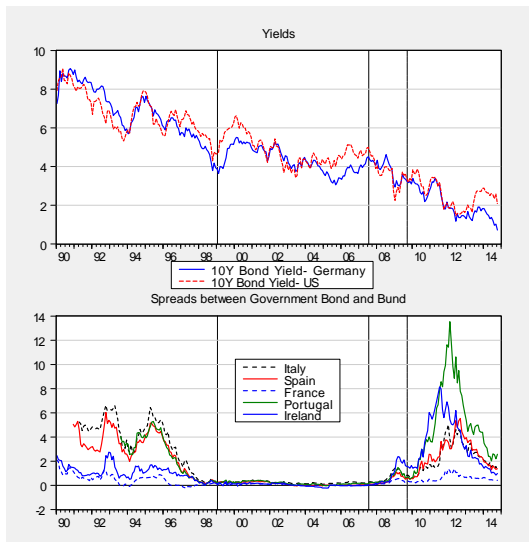
Households Wealth



The Stock Market and Inflation



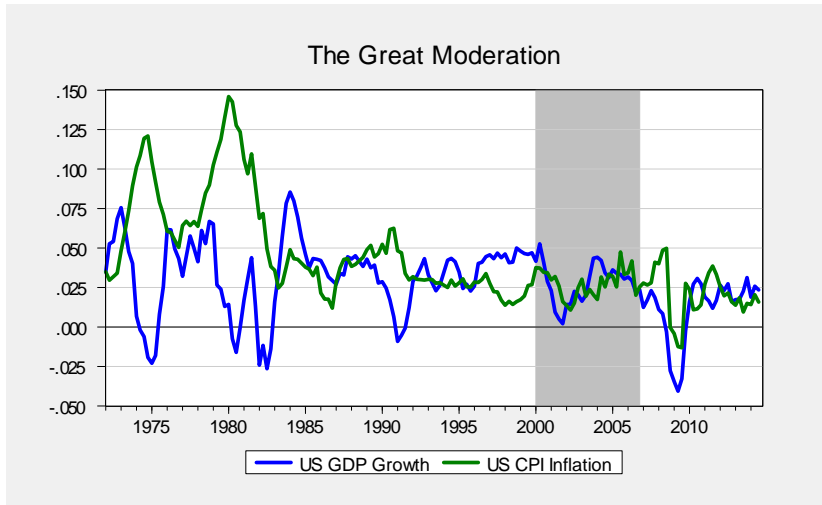
Sovereign Bonds



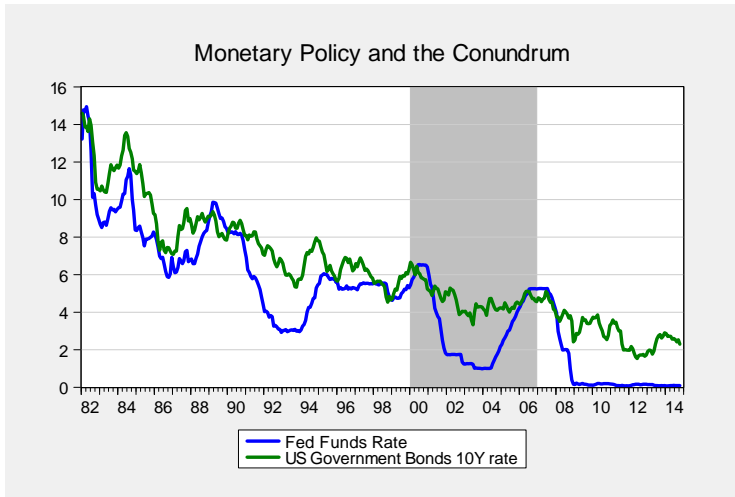
The Initial Conditions

- The great moderation: low volatility of inflation and growth
- monetary policy and the conundrum
- low risk aversion and restored confidence
- house price bubble and the "Greenspan put"

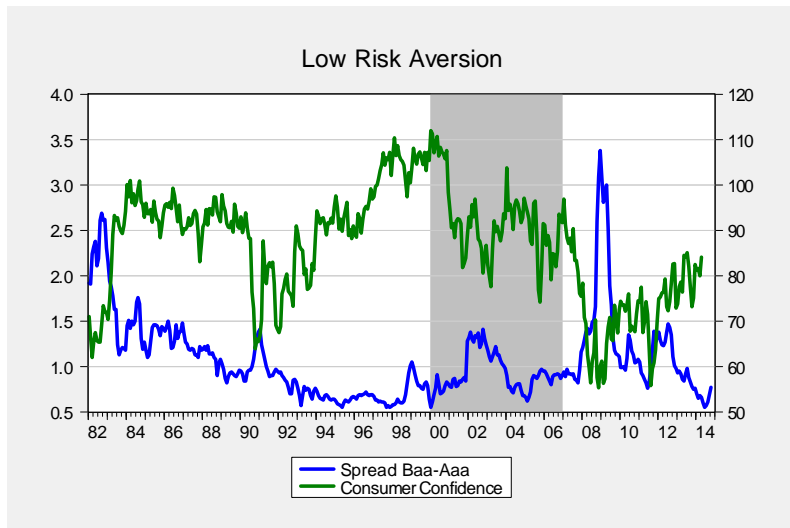
The Great Moderation



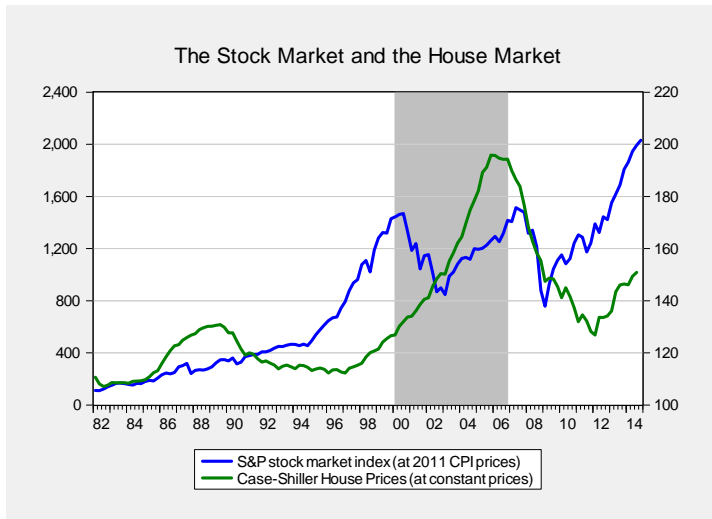
Monetary Policy and the Conundrum



Low Risk Aversion and Restored Confidence



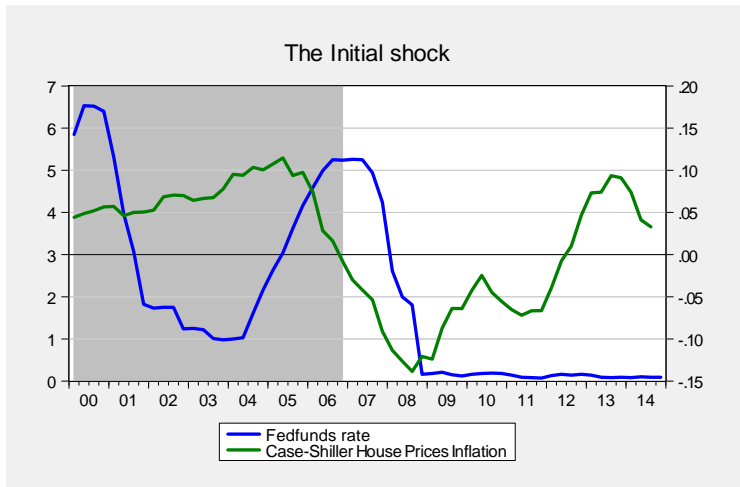
The House Price bubble and the "Greenspan put"



The Initial Shock

- In 2006, following the increase in monetary policy rates between 2004 and 2006, house prices started to fall.
- Between 2006 and 2008 house prices fell 20 per cent
- this is not a huge shock. The collapse in houseprices caused losses in the mortgage and especially in the subprime mortgage market. These losses can be estimated in around 650 billions USD, equivalent to a drop of **4 percent** in the S&P index.
- In October 1987 the S&P index fell by **20 per cent** in one-month, but this shock has not sparked neither a financial crisis nor a recession
- the peculiarity of the subprime crisis is not in the initial shock but in the transmission mechanism

The Initial Shock



The Transmission Mechanism

- Liquidity and Leverage. Procyclical leverage as the key in the transmission mechanism
- CDO and CDS. The link between procyclical leverage and the housing market
- A Black Swan in the money market. The effects of the lack of trust in the REPO market.

Liquidity and Leverage (Adrian and Shin,2007)

	Passive Investor		Active Investor	
time	Assets	Liabilities	Assets	Liabilities
0	House, 10	Mortgage, 9	House, 10	Mortgage, 9
		Equity, 1		Equity, 1
Leverage	10		10	
1	House price goes up 1 per cent			
	House, 10.1	Mortgage,9	House 10.1	Mortgage,9
		Equity 1.1	Trading Ass,1	Debt 1
				Equity 1.1
Leverage	9.2		10.1	

Liquidity and Leverage (Adrian and Shin, 2007)

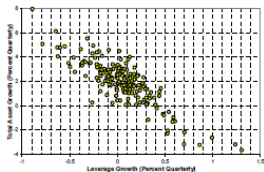
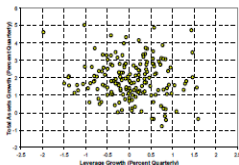


Figure 2.2: Total Assets and Leverage of Household



Total Assets and Leverage of Non-financial, Non-farm Corporates

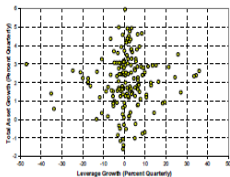


Figure 2.4: Total Assets and Leverage of Commercial Banks

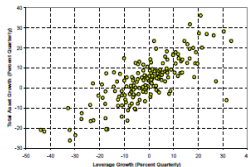
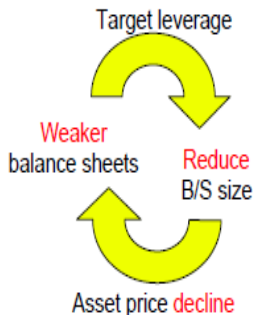
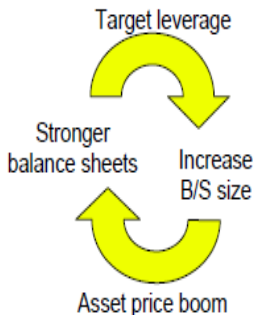


Figure 2.5: Total Assets and Leverage of Security Brokers and Dealers

The balance sheet of an investment bank

Assets	Liabilities
Trading assets	Short positions
Reverse repos	Repos
Other assets	Long term debt
	Shareholder equity

Procyclical leverage and the transmission mechanism



- Collateralized debt obligations are the instruments to transform mortgages into securities that are considered safer and can be used as collateral in repo's
- Credit Default Swap can provide insurance against the worst case scenarios

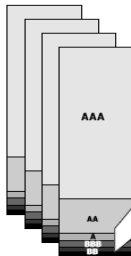
Collateralized Debt Obligations

Collateralized Debt Obligations

Collateralized debt obligations (CDOs) are structured financial instruments that purchase and pool financial assets such as the riskier tranches of various mortgage-backed securities.

1. Purchase

The CDO manager and securities firm select and purchase assets, such as some of the lower-rated tranches of mortgage-backed securities.



**New pool
of RMBS
and other
securities**

2. Pool

The CDO manager and securities firm pool various assets in an attempt to get diversification benefits.

First claim to cash flow from principal & interest payments...

next claim...

*next...
etc.*

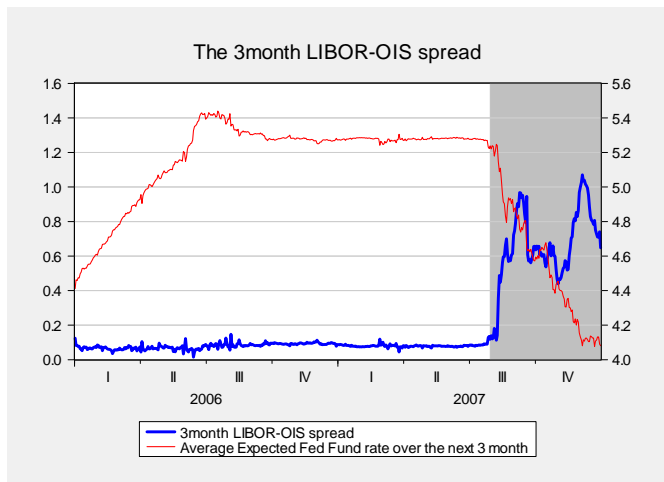


3. CDO tranches

Similar to mortgage-backed securities, the CDO issues securities in tranches that vary based on their place in the cash flow waterfall.

- So long as house prices increase CDOs are easy to refinance and estimation of default risk is unimportant
- they can be used as collateral in REPO and allow to expand banks balance sheet
- if a SIV is used to redistribute risky subprime mortgages are not anymore in banks balance sheet (and the incentive to monitor disappears)
- but when house prices start collapsing the whole construction falls and a **black swan** in the money market appears

A Black Swan in the money market



The explosion of the crisis

Early 2007	Spreading Subprime Worries
Summer 2007	Disruptions in Funding
Late 2007 to Early 2008	Billions in Subprime Losses
March 2008	The Fall of Bear Stearns
March to August 2008	Systemic Risk Concerns
September 2008	Conservatorship of Fannie Mae and Freddie Mac
	Bankruptcy of Lehman
	Bailout of AIG

The Policy Interventions

- Expansionary Monetary Policy: Conventional (but policy rates hit the zero bound) and unconventional
- Expansionary Fiscal Policy:

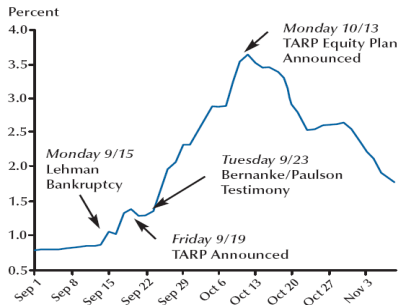
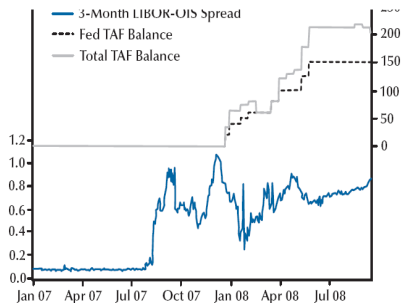
Monetary Policy Interventions

- Extending Liquidity Provision: Term Auction Facilities, Term Securities Lending facility (reduce the discount window stigma by making the money available to all banks at once through a regular auction)
- Asset Repurchases: TARP 1
- Recapitalization: TARP Equity Plan

The first two measures create a buyer for bad assets, which is not enough if banks do not have capital

Monetary Policy Interventions

TAF and TARP 1 do not work, but TARP Equity Plan has an important effect on the market



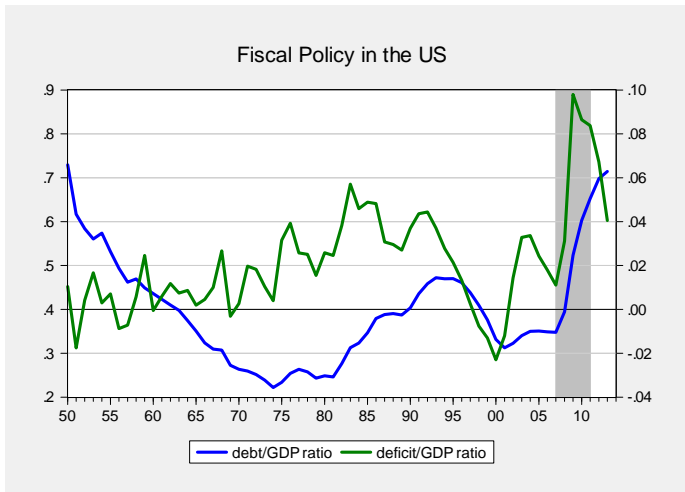
The Fed Balance Sheet: Assets

Federal Reserve Assets (in billions of dollars)		
	4 July 07	26 Nov 08
<u>Securities</u>		
Held Outright		
Uncommitted	\$790.6	\$295.4
Committed to TSLF		\$193.2
Repurchase Agreements	\$ 30.3	\$ 80.0
<u>Loans</u>		
Primary Credit	\$ 0.19	\$ 91.7
Term Auction Credit		\$406.5
Primary Dealer Credit		\$57.9
Portfolio of Maiden Lane LLC [†]		\$27.0
Portfolio of Maiden Lane III LLC ^{††}		\$21.1
ABCP Money Market Liquidity Facility		\$53.3
Credit to American International Group		\$55.9
Other credit extensions		\$0.0
Commercial Paper Funding Facility		\$294.1
Foreign Exchange Reserves [†]	\$ 20.8	\$24.8
FX Swaps		\$476.7 [†]
Gold [*]	\$ 11.0	\$ 11.0
<u>Other assets</u>	<u>\$27.5</u>	<u>\$ 20.5</u>
Total Assets	\$880.4	\$2,109.1

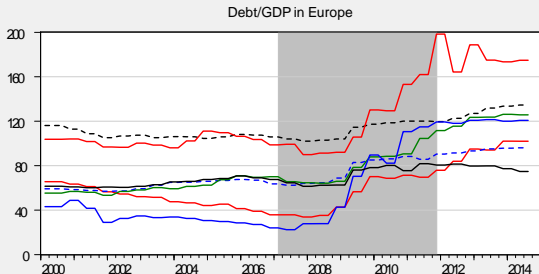
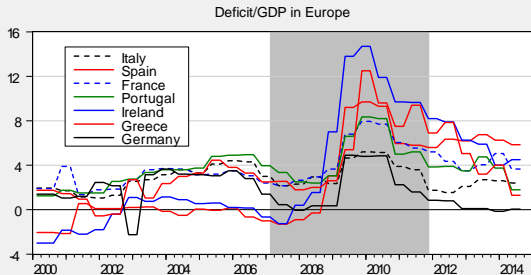
The Fed Balance Sheet: Liabilities

Federal Reserve Liabilities (in billions of dollars)		
	4 July 07	26 Nov 08
Federal Reserve Notes	\$781.4	\$835.1
Commercial Bank Reserve Balances	\$ 16.8	\$582.7
Reverse Repos w/ Dealers		\$25.0
U.S. Treasury Supplementary Financing Account		\$479.1
Liabilities related to Foreign Official and US Treasury Deposits	\$ 42.4	\$136.8
Other Liabilities	\$ 5.7	\$5.8
Total Liabilities	\$846.3	\$2,065.5
Capital	\$ 34.1	\$49.4

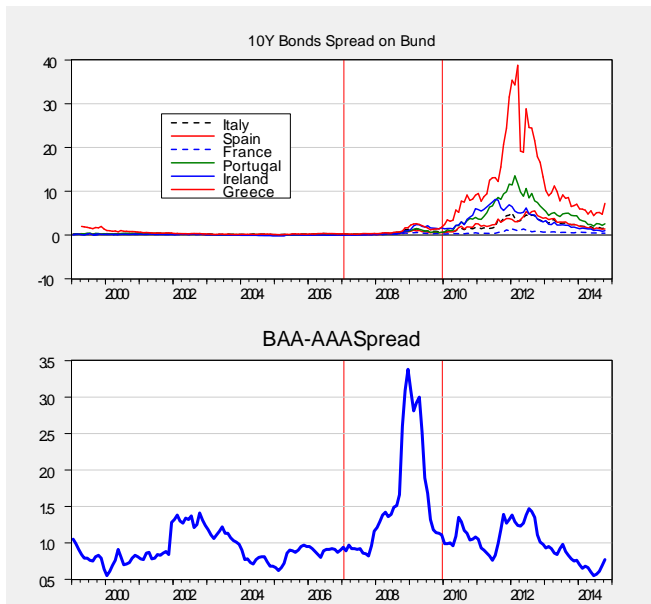
Expansionary Fiscal Policy in the US



Expansionary Fiscal Policy in Europe

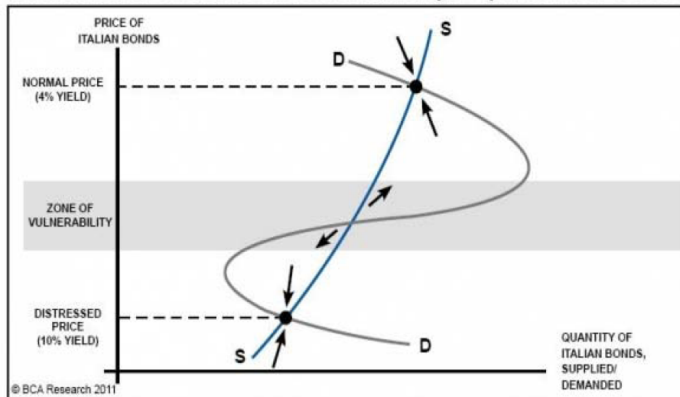


Spreads: local versus international factors



Same fundamentals different yields

When A Lender Of Last Resort Is Absent, Multiple Equilibria Are Possible



Same fundamentals different yields

$$\left(R_{t,t+k}^i - R_{t,t+k}^{ger} \right) = \Delta e_{t,t+k} + RP_{t,t+k}^i$$

Unconventional Monetary Policy in the Euro Zone

- Substantial increases in size of central bank balance sheet
- Buy medium and long term public debt and private assets
- Lower long-term interest rates
- Channels of influence
 - Shift markets' stocks of assets of different maturities and risks
 - Fewer long-term assets, more liquidity, bank deposits
 - Induce shift into equities, long-term public and corporate bonds
 - Higher equity stock prices, stimulate investment
 - Lower exchange rate
 - Stimulate bank lending
 - Raise expected future inflation and create expectations that CBs will hold policy interest rates lower for longer

- Plans to buy €1.1 tn – at a rate of €60 bn per month until sept 2016 – €850 bn of public debt plus private sector assets – started March 2015
- Will not buy if yields fall below -0.2%
- ceiling set at current yield paid by ECB on bank reserves

The transmission mechanism of monetary policy

- Monetary policy controls directly short-term rates but it affects the economy through long-term rates.
- Long terms rates are determined by two factors the average (future) short term-rate until maturity of the bond and the term premium
- In normal times the expectations channel dominates the term premium
- The crisis has changed this by inducing a negative term premium in the US and a positive and heterogenous term-premium in Euro area

The negative term premium in the US

- LSAPs influence interest rates via supply-and-demand effects in the long-term bond market.
- As the Fed buys more long-term bonds, their price goes up, and their yield falls, even if expectations of future short rates are unchanged. Said differently, the so-called term premium on long-term bonds declines.
- As a matter of fact LSAP have induced a negative risk premium

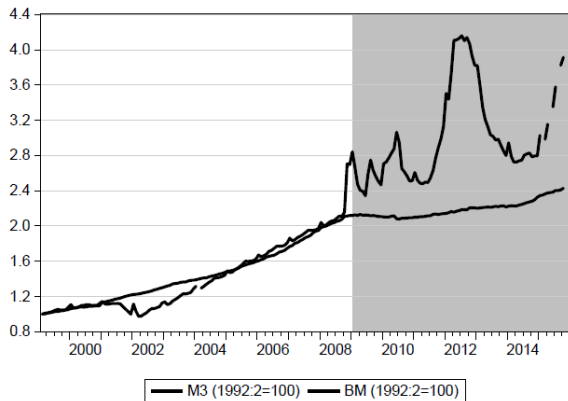
The negative term premium in the US

- When policy works by moving term premiums, as opposed to moving expectations about the path of short rates, the transmission to the real economy may be altered
- A risk-neutral firm faces a rate on its 10-year bonds of 2 percent. At the same time, it expects that the sequence of rolled-over short-term rates over the next 10 years will average 3 percent. Hence, there is a term premium of minus 1 percent.
- The firm should take advantage of the cheap long-term debt by issuing bonds.
- It can take the proceeds of the bond issue and use these to pay down short-term debt, repurchase stock, or buy short-term securities.
- These capital-structure adjustments all yield an effective return of 3 percent.
- the hurdle rate for new investment remains pinned at 3 percent

The term premium in Europe

- In Europe the debt crisis has induced positive term premia heterogenous across countries.
- The same monetary policy is associated to very different long-term rates, these rates are higher in countries with a more difficult fiscal situation, which are countries where the stimulus is most needed
- The same monetary policy impacts differently on consumption and investment in the euro area because fiscal fundamentals affect the transmission of monetary policy

Euro area M3 and Monetary Base



Balance Sheets

Central Bank		Commercial Banks	
Assets	Liabilities	Assets	Liabilities
Treasury bills	Notes and coin In circulation	Loans to Customers - hh & firms	Deposits
Government Bonds	Reserves of Commercial Banks	Mortgages	Loans from other financial Institutions & mkts
Other assets	Capital (equity)	Gov bonds	
		Reserves at Central Bank	Capital (equity)

Balance Sheets

following €1 tr QE – private sector sells assets

Central Bank		Commercial Banks	
Assets	Liabilities	Assets	Liabilities
Treasury bills	Notes and coin in circulation	Loans to Customers - hh & firms	Deposits +€1 tr
Government Bonds +€1 tr	Reserves of Commercial Banks +€1 tr	Gov bonds	Loans from other financial Institutions & mkts
Other assets	Capital (equity)	Mortgages	Capital (equity)
		Reserves at Central Bank +€1 tr	

Balance Sheets

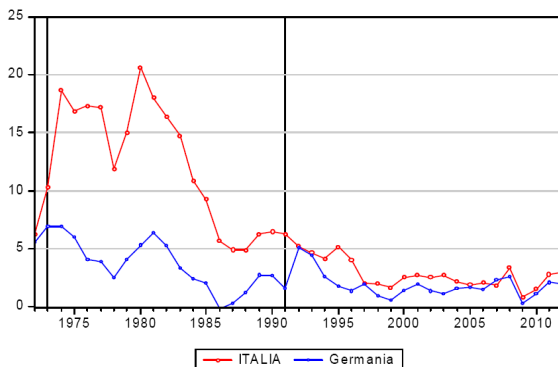
following €1 tr QE – banks sell assets

Central Bank		Commercial Banks	
Assets	Liabilities	Assets	Liabilities
Treasury bills	Notes and coin In circulation	Loans to Customers - hh & firms	Deposits
Government Bonds +€1 tr	Reserves of Commercial Banks +€1 tr	Gov bonds -€1 tr	Loans from other financial Institutions & mks
Other assets	Capital (equity)	Mortgages	Capital (equity)
		Reserves at Central Bank +€1 tr	

- Low growth, high unemployment (especially youth unemployment) remarkable asymmetry in the distribution of private wealth and high public debt. This is Italy in 2014.
- All these problems have **not** been caused by the euro
- Let us go back to 1973. The Bretton Woods system (the peg of all exchange rates to the dollar is abandoned because Non-US countries are tired of financing US twin deficits: a flexible exchange rate system is introduced)

Two Economic Regimes (up to 1991)

- inflation regime: use inflation to promote growth
- stability regime: use price stability to promote growth



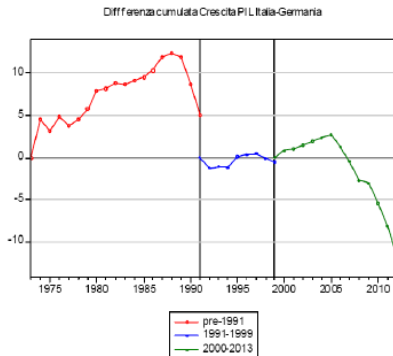
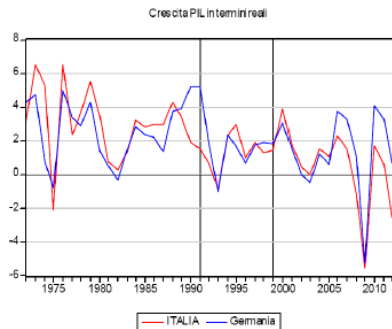
- Inflation Regime features: strong trade-unions, weak governments and non-independent central banks
 - trade unions put pressure, on private and government owned firms, to increase wages (strikes are the instruments).
 - Weak Government increases wages and employment in the public sector increasing the deficit as taxation is untouched.
 - higher public sector wages put pressure also on private sector firms, public contracts are used to subsidized them.
 - market might react asking higher interest rates to finance the debt, the government puts then pressure on the central and to roll the printing press and buy government bonds. Then we have inflation and trade deficit and loss of competitiveness. The solution is competitive devaluation of exchange rates. But exchange rate devaluation slashes the value of the initial wage increase, and we are back to square 1.

- Stability Regime features: independent trade-unions, governments and central banks with diversified competences
 - trade unions organize strikes for economic and not for political reasons
 - independent central banks prevents government from inflating the debt away
 - wage growth reflects productivity growth, stable prices. Stability stimulates investment and growth

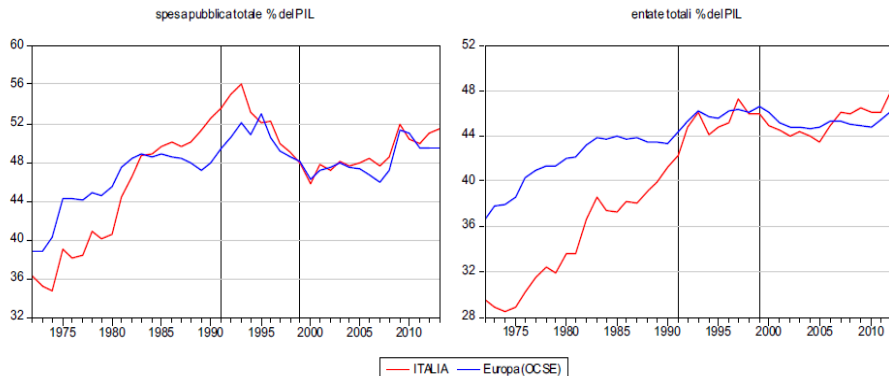
Differences across the two regime

Regime 1: high inflation, possible same growth with regime 2, but high public debt and social security debt, asymmetric increase in private wealth (because the redistributive effect of taxation does not take place)

The Data: Growth



The Data: Government Taxation and Expenditure



The Data: Private Wealth

- Private Net (of private and public debt) Wealth GDP ratio is almost 6 times GDP. 6 trillions housing, 1.2 trillion cash and deposits, 1.8 shares and investment funds
- The richest 10 per cent of the population holds 40 per cent of total wealth

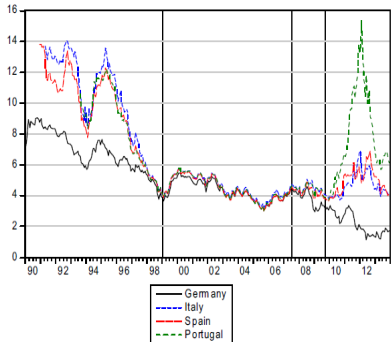
The Data: Nominal Effective Exchange Rate



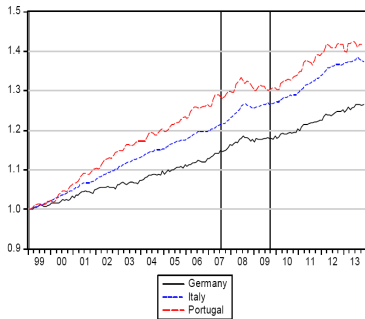
- After Bretton Woods collapse Germany Austria and Benelux adopt model 2, France Italy Spain Portugal and Greece model 1.
- not an equilibrium. Speculative attacks and competitive devaluation (particularly damaging (effective) in the agricultural sectors
- single currency is the solution. Convergence criteria are set up in 1991 and currency starts in 1999.
- unfortunately in 1999 the convergence process is still far from completion

Initially no problem because of a convergence enthusiasm sustained by the great moderation, institutional reasons help convergence (all the government bonds in the euro area have a zero risk weights to compute banks capital requirements). Capital flows towards peripheral countries that generates higher inflation and loss of competitiveness (no more competitive devaluation)

10Y Government Bond Yields



Consumer price indexes 1999:1=1



- the US subprime crises puts a sudden stop to capital flows, the debt crisis follows, only BCE intervention prevents the system from collapsing.
- persistent growth differentials between the core and the periphery emerge

Two alternatives

- default and euro exit (no problem solved back to the old regime 1)
- mobilize private wealth to promote growth