Financial markets during the crisis, Blindern, October 13

Ole Christian Bech-Moen

Overview (part I)

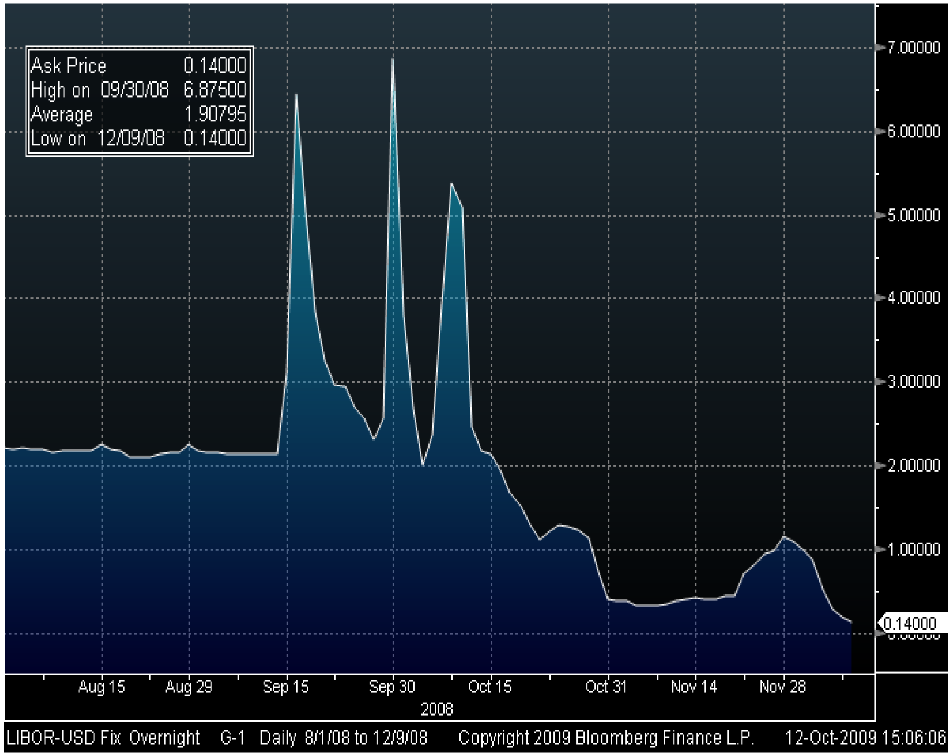
- Dramatic market movements
- The US housing market
- Banks’ balance sheets

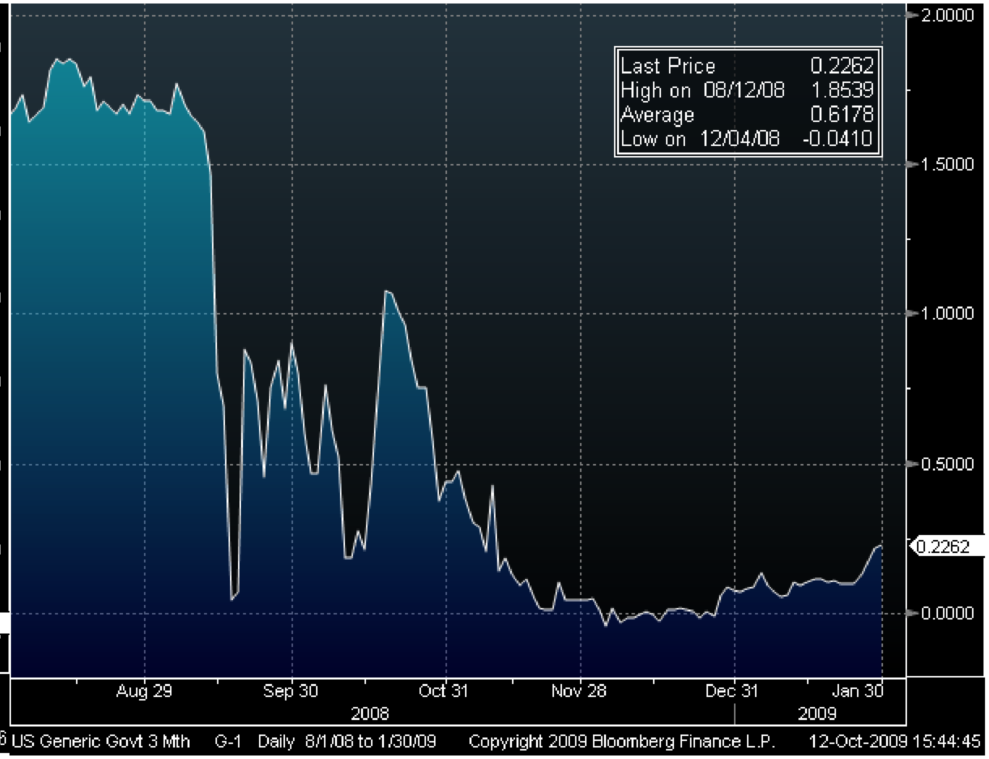
Market movements

Interest rates out of control…

•Fed could not keep the overnight rate even close to its target – intraday the actual overnight rate was 5-6 times as high as the Fed Funds.

•The safe 3M US T-bill (lending money to the US government for 3 months) gave a negative yield in December last year. I.e. investors were willing to pay money to the US government to “look after” their money. Last time this happened was after Pearl harbour.



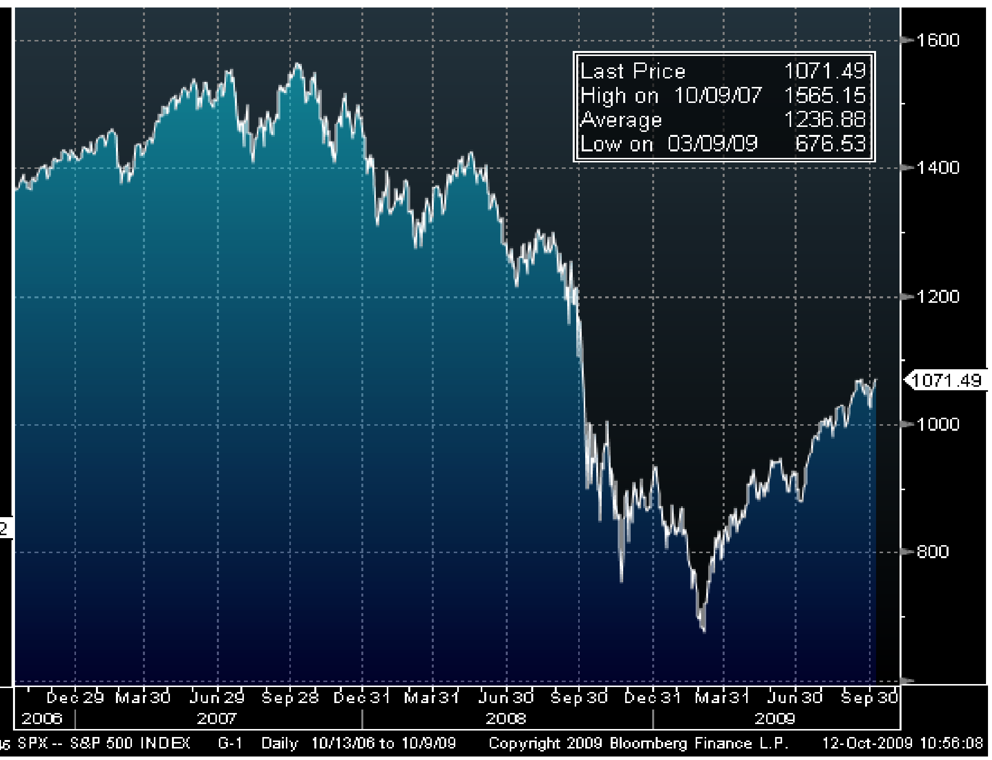


Market movements

Stock markets plummeted

•Expected volatility in the stock market (Wall Street's fear measure) sky-rocketed (left hand chart). I.e. investors were expecting a bumpy ride going forward.

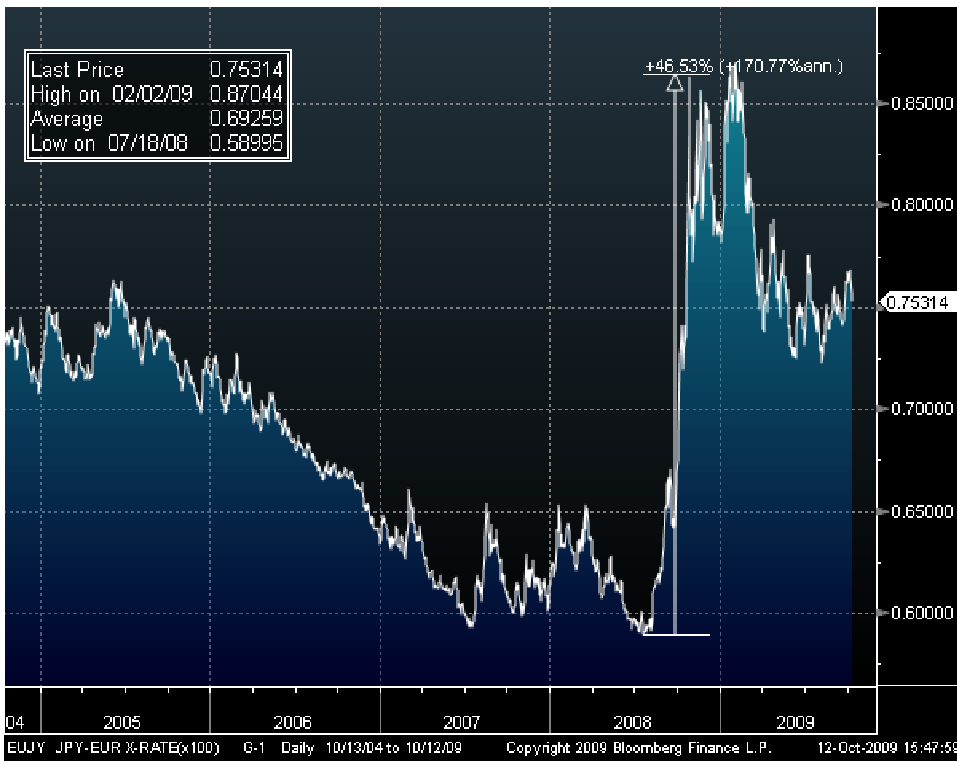
•Stocks fell world-wide. The S&P 500 (right hand chart) halved erasing 10 years of stock market gains.

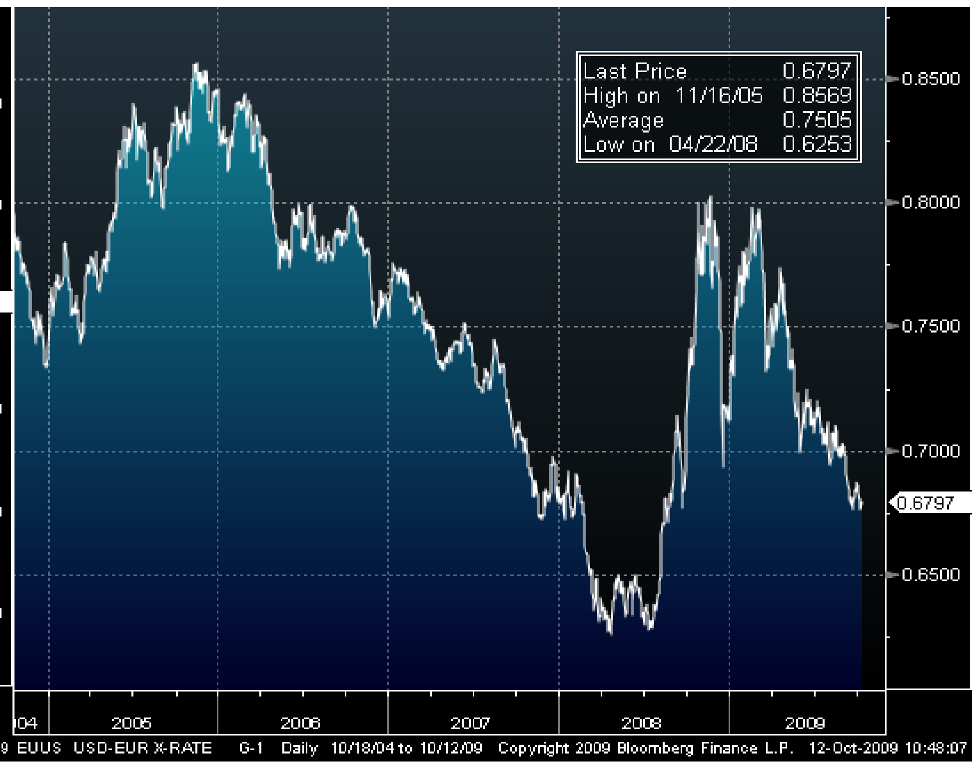


FX carry trades reversed

•Investors went out of risky positions in the FX markets. Carry-trades (borrowing in a low interest rate currency to invest in a high interest rate currency) popular for years were rapidly reversed. Consequently the yen strengthened significantly (e.g. against the euro, left hand chart).

•The dollar strengthened when investors really got scared – bringing money home and seeking a safe haven in large, liquid markets…

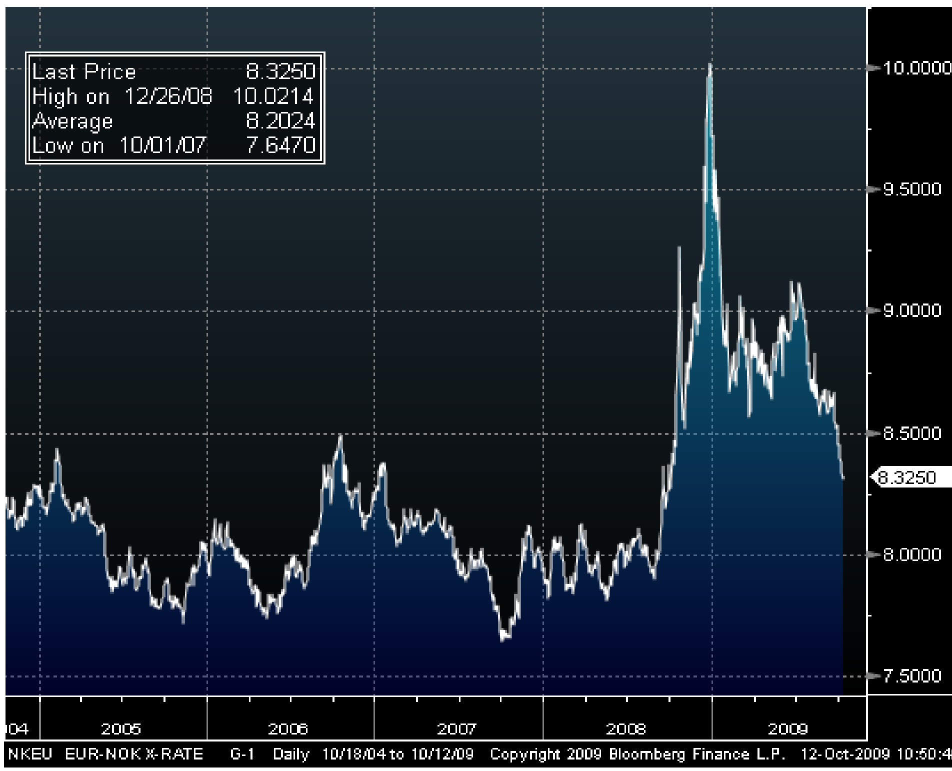




Large currencies preferred

•…in contrast to small FX markets as the NOK and the SEK (against the euro to the left and right, respectively).

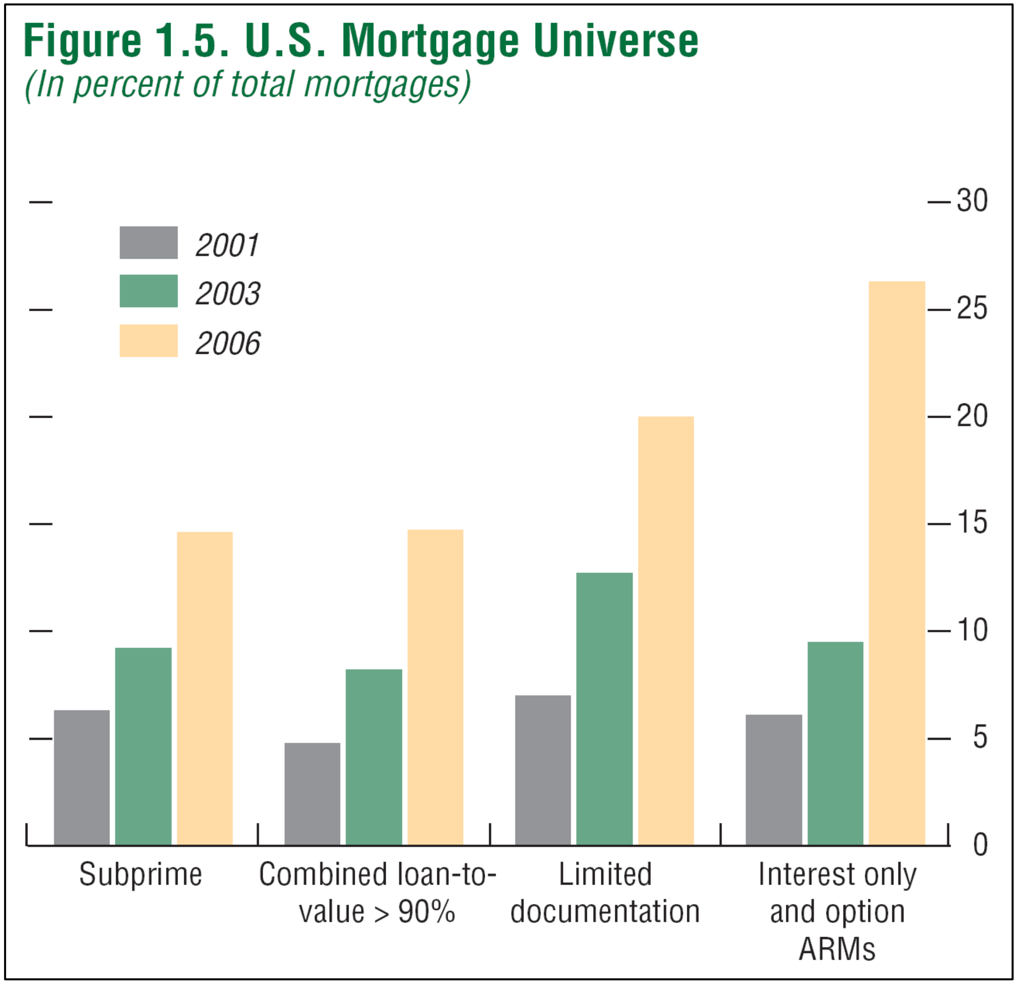
•Having borrowed money in e.g. yen was not a good idea for Norwegian investors. If one had one's mortgage denominated in yen, it increased by 70% in NOK from August 2008 to January 2009.



US Housing Market

Complex mortgages…

- The share of mortgages going to subprimers was rapidly increasing
- Loan-to-value increased
- "Unconventional" mortgages increased
- NINJA

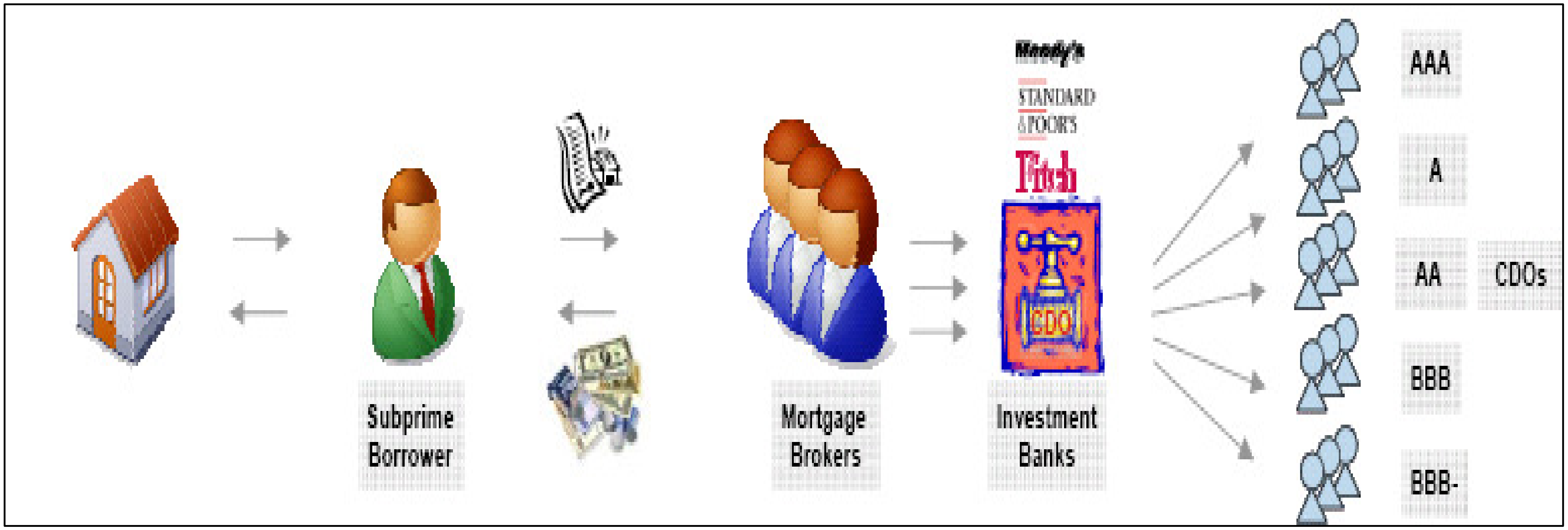


Creative financial maths

•Investment banks pooled many subprime loans and issued collateralized debt obligations. These obligations were given different priority to the stream of down payments from the subprimers.

•E.g. those with the highest priority received a coupon as long as 10% of the pooled subprimers still were paying (and those with the lowest priority did not receive anything if not more than 90% of the subprimers were paying)

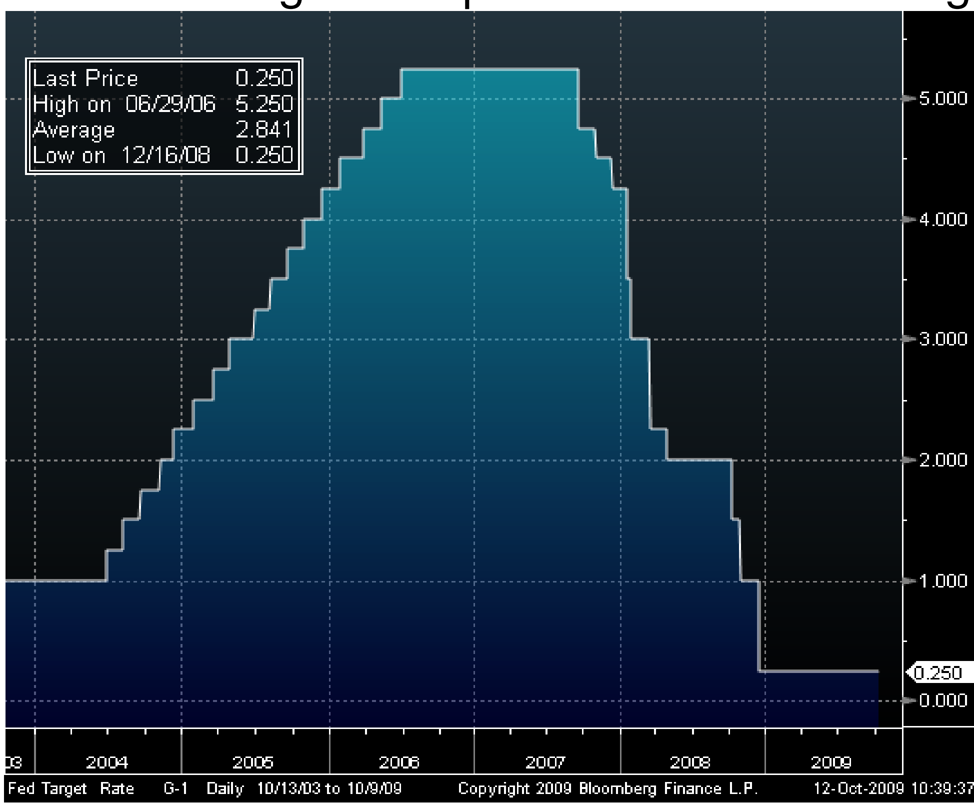
•The high priority ones got a high rating (AAA, but should they?), investors bought those (the low priority ones were hard to sell, investment banks kept those)

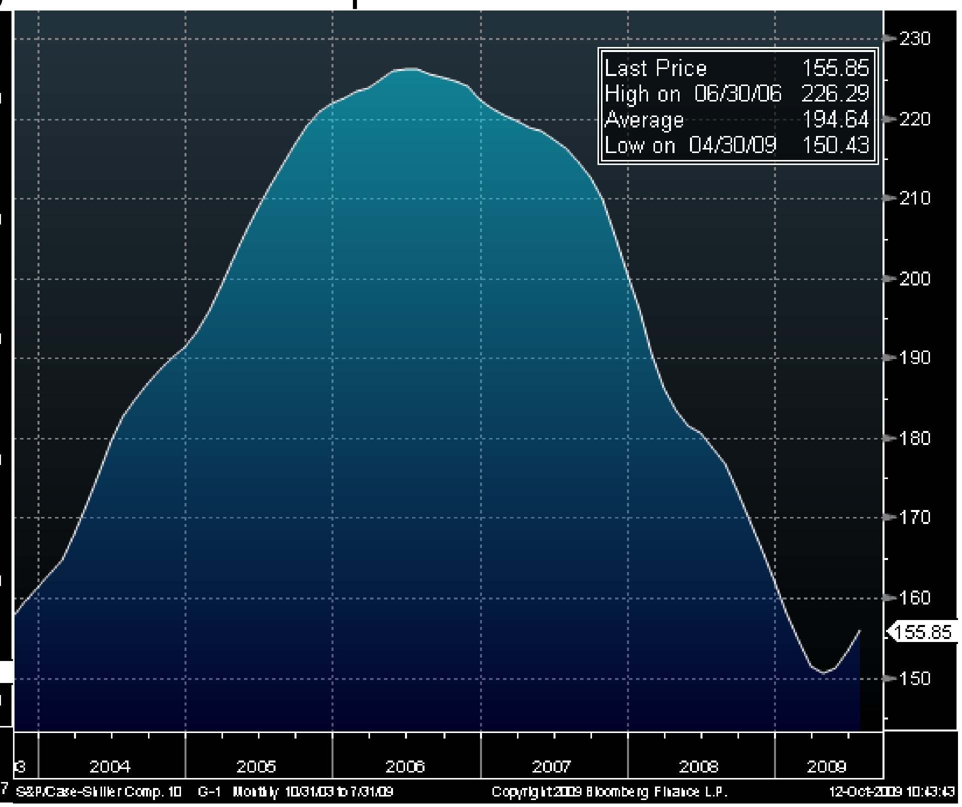


US Housing Market

Interest rates ⇧, house prices ⇩

- Just after the interest rate peaked (to the left), house prices started to fall (to the right) (2006)
- The interest rate on the mortgage was substantially higher than a few years ago (and many now experienced resets at high levels after period with low teaser rate)
- Falling house prices made refinancing difficult if not impossible





US Housing Market

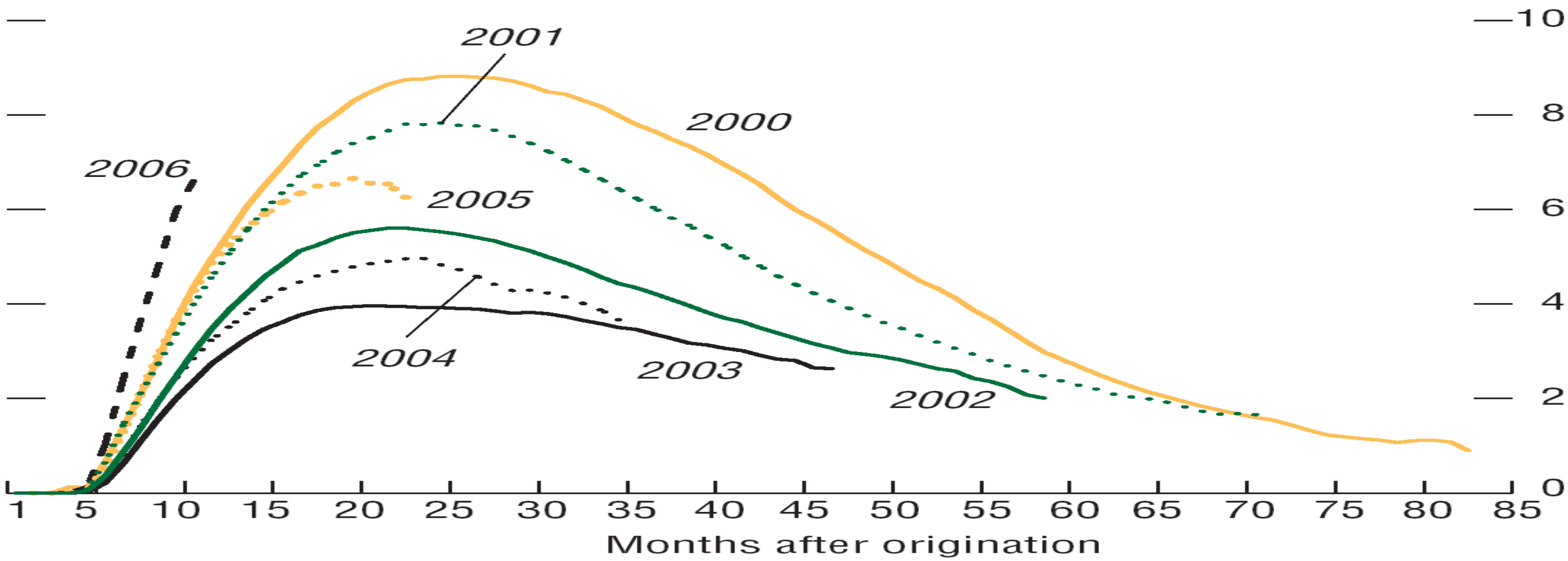
Delinquencies and defaults!

•The subprimers of 2006 was sub-subprime…

•The number of non-performing mortgages skyrockets

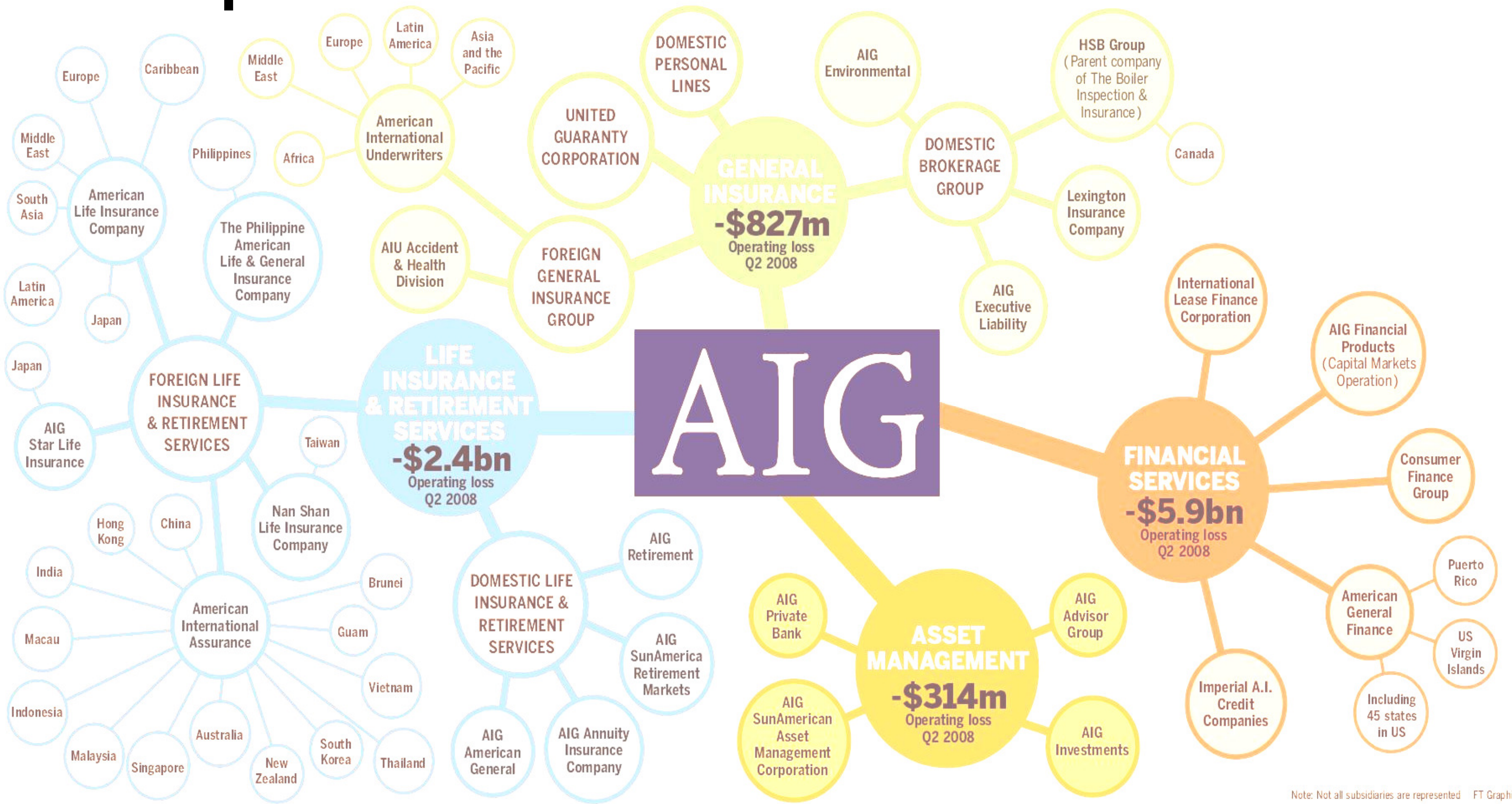
•Who's sitting on that risk again? Not only complex mortgages and creative financial maths make it hard to figure it out, but also the financial institutions had grown big and complex

Figure 1.4. Subprime 60-Day Delinquencies by Mortgage Vintage Year
(In percent of payments due)



US Housing Market

Complex institutions!

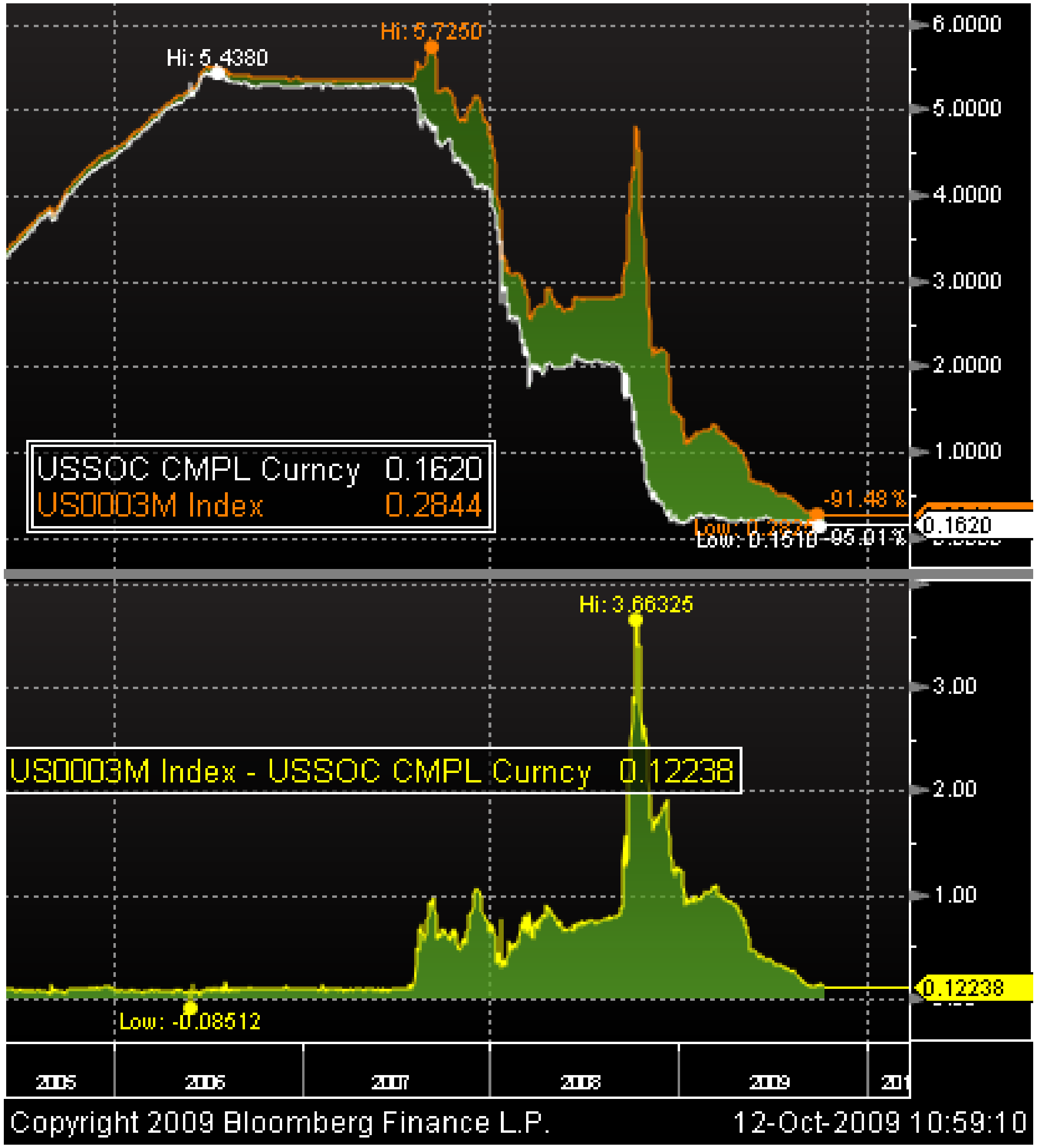


•Big financial institutions did not want to lend money in case of default from counterpart or in case they needed the funds themselves

•(Man United vs Newcastle = AIG vs Northern Rock…)

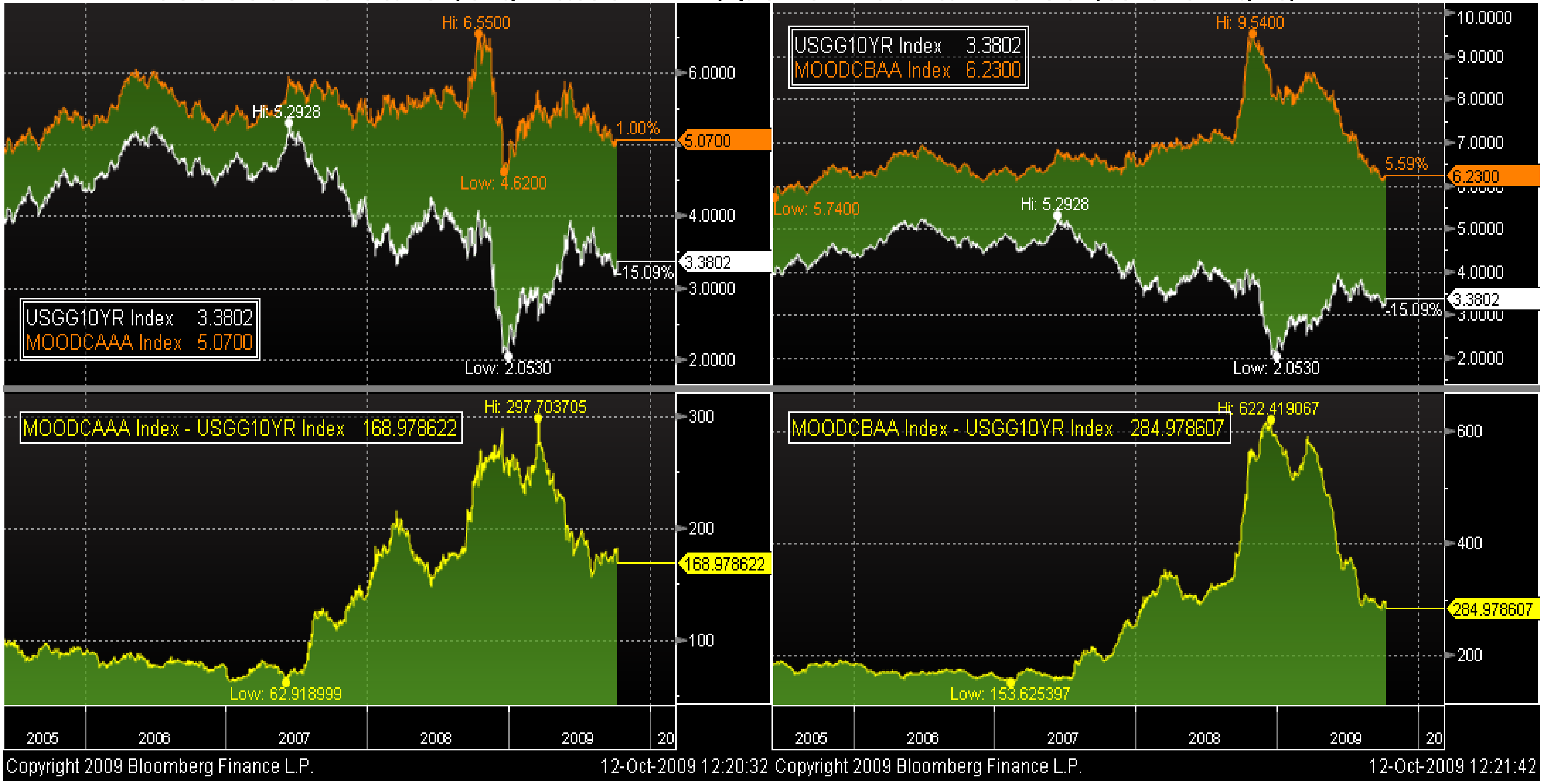
Interbank rates jump

- Since the financial institutions are far less willing to lend, the interest rate on such loans increase dramatically
- Under normal circumstances the credit risk attached to these loans are negligible, so the interest rate (orange) is usually close to the interest rate on the interest rate offered by the central bank (white)
- The difference (yellow) went from below 0.10%-points to more than 3.00%-points
- (note that it is almost back to normal already!!)



Investors “feared” even AAA

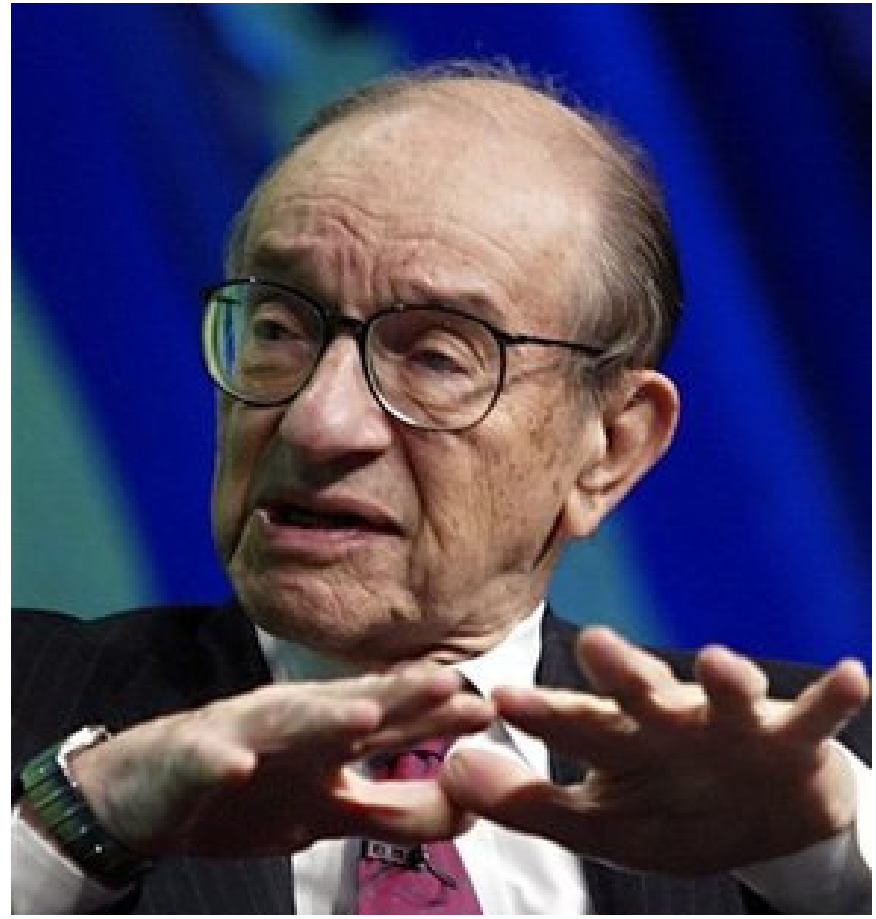
- AAA papers means that they are really safe (the default probability is extremely low). “Only” some government bonds are safer. The yield difference was prior to the crisis less than 1%-points. Under the crisis it was almost 3%-points (to the left)
- Less secure loans (e.g. rated BAA) performed far worse (to the right)



US housing market

Greenspan was wrong

– *Where once more-marginal applicants would simply have been denied credit,* ***lenders are now able to quite efficiently judge the risk posed by individual applicants and to price that risk appropriately****. These improvements have led to rapid growth in subprime mortgage lending.*

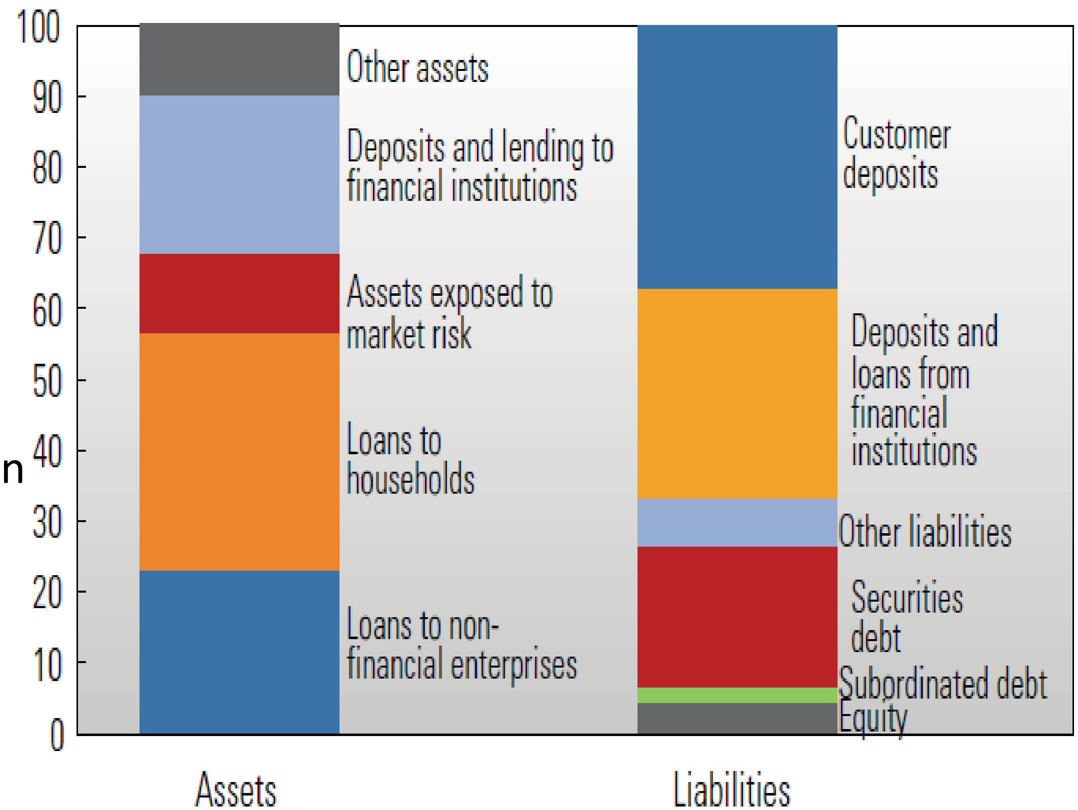


Quoted from presentation given at Fed conference April 2005

Banks' balance sheet

- Problem: Some international banks lost a lot of money:
  (I) sell assets (but not too cheaply)
  (II) raise more capital
  (III) reduce lending.
- Rescue packages world-wide were directed towards buying assets (for a high enough price) and/or to inject capital to prevent (III) from happening.
- Norwegian banks have not taken direct hits on the "left side of the balance sheet", but the market value of e.g. AAA-liquidity portfolios has decreased substantially.
- The problems are more related to the liabilities. E.g. the price on short-term funding costs skyrocketed.

Chart B.3 Bank[1)] assets and liabilities as of end-2008. Per cent



1) All banks in Norway. Norwegian banks' foreign subsidiaries and branches abroad are not included.

Sources: Statistics Norway and Norges Bank

- Norges Bank Financial Stability Report 1/09 – May

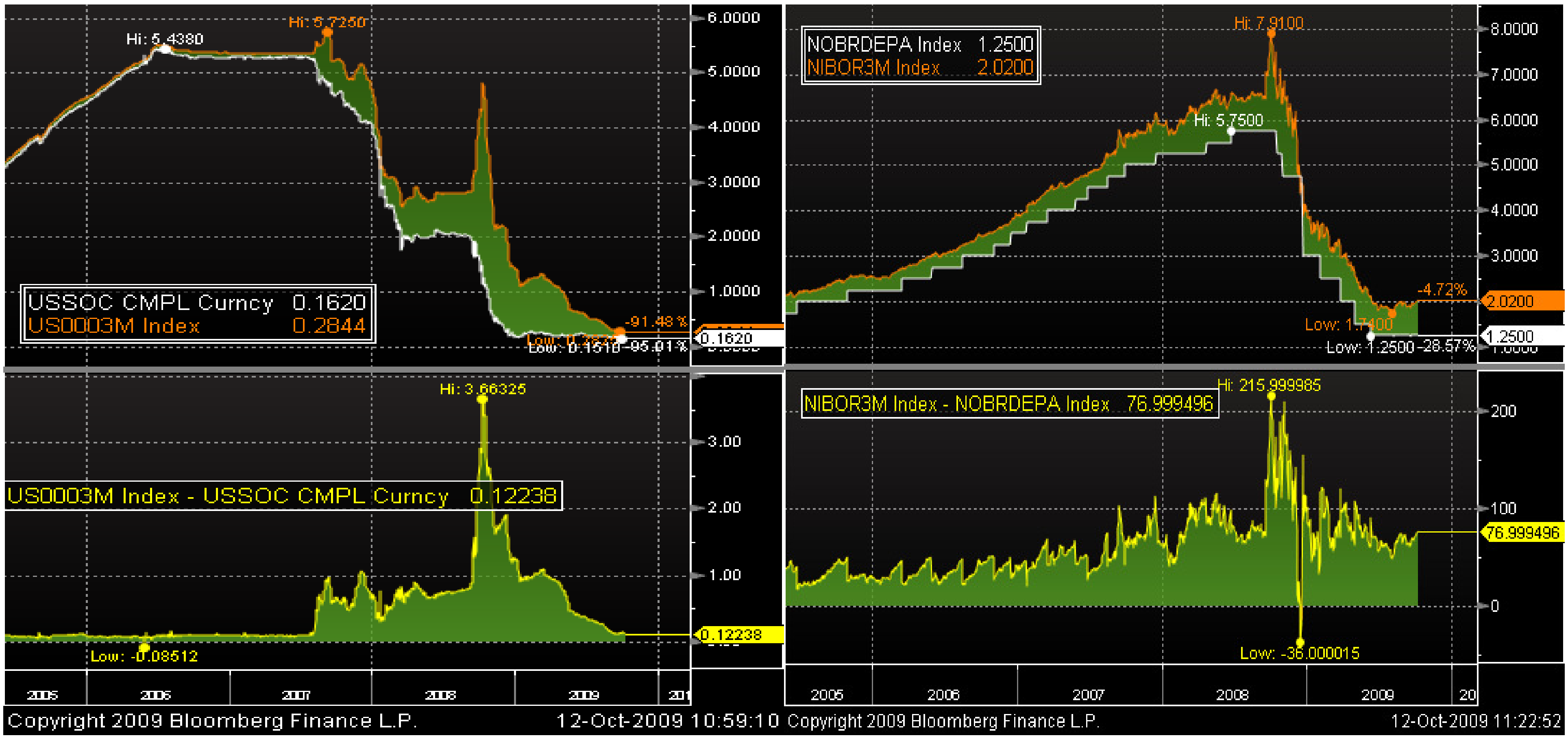
From Libor to Nibor

- NIBOR – Norwegian InterBank Offered Rate is the offer rate of an unsecured NOK loan (with maturities from over the night up to a year) in the interbank market.
- To raise NOK liquidity in this market, one raises a USD loan and then exchange it for NOK. Consequently the price of a NOK loan depends on two factors:
  (I) The price of the USD loan (normally the LIBOR rate (the USD counterpart to NIBOR))
  (II) The difference between the price of exchanging USD for NOK now (the spot rate) and NOK back to USD at maturity (the forward rate). This difference is called the forward premium.
- Normally the forward premium reflects the difference between the expected sight deposit rates in Norway and the US over the period from now up to maturity (determined by the central banks).
- Examples:
  (I) If the expected Folio is lowered by X, the forward premium changes, so the Nibor is lowered by X.
  (II) If the expected Fed Funds is lowered by X, the LIBOR is lowered by X, which is exactly offset by a change in the forward premium such that the NIBOR is left unchanged.
  (II) If the LIBOR increases because e.g. credit risk increases, this does not affect the forward premium, so NIBOR will increase as well.

Banks in trouble

Imported "noise"

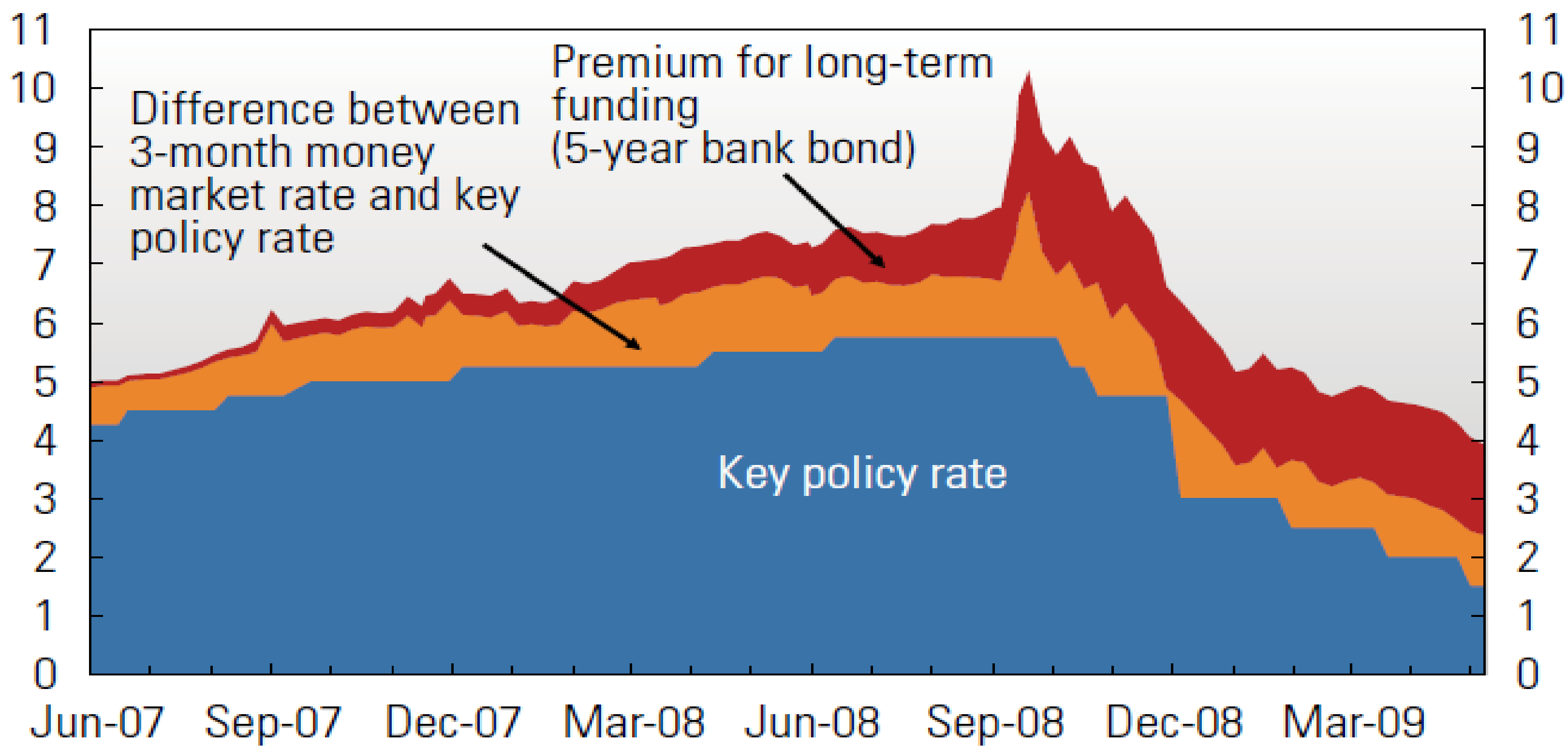
- The widening of the spread between interest rates on interbank loans and central bank loans in the US (to the left, seen before) is "imported" to Norway (to the right).
- Usually when the Norge Bank folio rate is 5.75%, the NIBOR 3M is roughly 6%. Now it was almost 8%.



Long-term funding also expensive

- Remember: Even the yield on AAA papers increased, so banks, no matter how solid, had to pay a higher interest also on longer term financing.

Chart 1.11 Costs of money market funding and long-term funding. Percentage. Weekly figures. Week 24 2007 – Week 21 2009

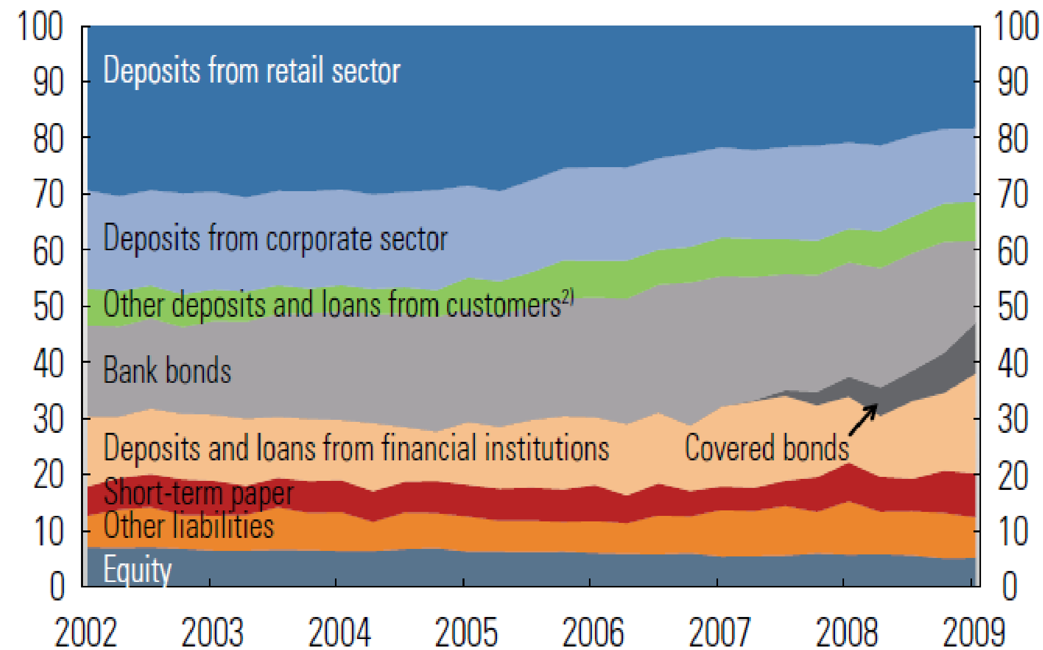


Sources: DnB NOR Markets and Norges Bank

Covered bonds, anyone?

- The latest three years covered bonds grew in importance for Norwegian banks' funding.
- Covered bonds are similar to the CDOs mentioned earlier, but also the bank issuing the bonds must default if the bondholders are to loose money (i.e. they are much safer). In addition, only prime mortgages are pooled.
- But: no one wanted these bonds during the crisis, so the Norwegian banks struggled getting financing.
- But Kristin Halvorsen swapped the covered bonds for government bonds, which were in high demand. Good for the banks.

Chart B.16 Funding sources for Norwegian banks and mortgage companies.[1] Percentage of total assets. Quarterly figures. 02 Q1 – 09 Q1



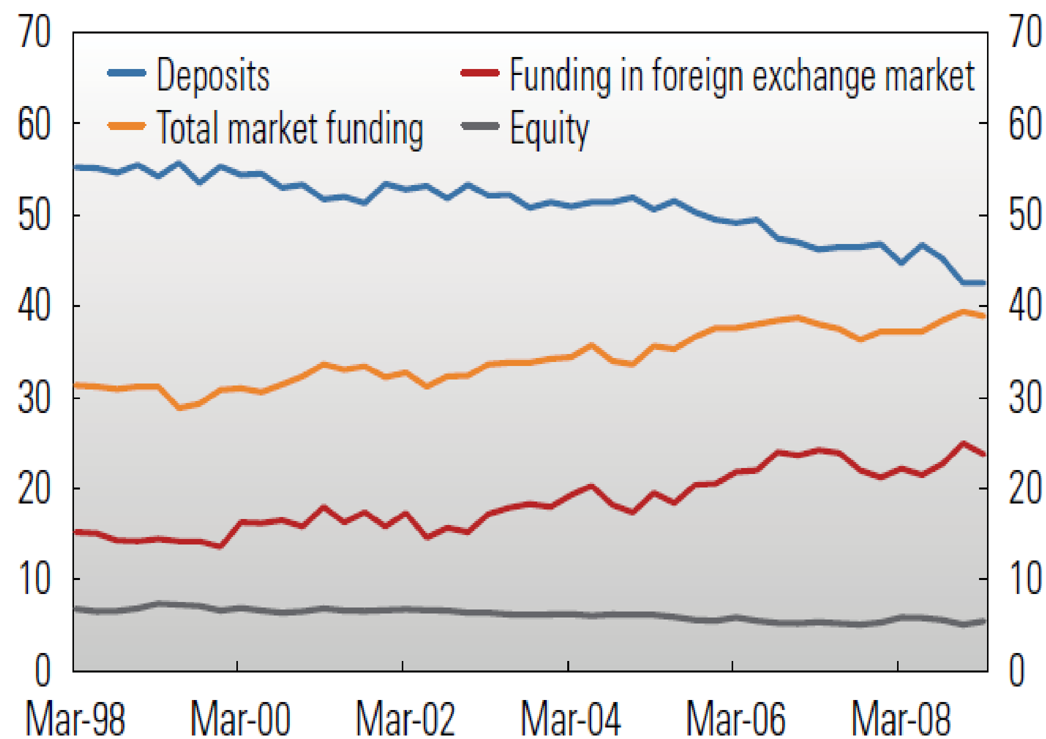
[1] All banks except branches and subsidiaries of foreign banks in Norway. All mortgage companies entitled to issue covered bonds
[2] Mainly deposits from non-resident customers and Norwegian government administration

Source: Norges Bank

Deposits less important

- The gearing has been high "always".
- Market funding, and in particular from abroad, in contrast to deposits has steadily increased latest 10 years.
- This made Norwegian banks more vulnerable to the crisis in international financial markets than before.

Chart B.9 Funding sources for banks.[1] Percentage of total assets. Quarterly figures. 98 Q1 – 09 Q1



1) All banks except branches and subsidiaries of foreign banks in Norway

Source: Norges Bank

Banks in trouble

Ongoing process, new regulations

Monday Oct 12 2009
All times are London time

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Barclays to sell £4bn assets

By Patrick Jenkins, Banking Editor

Published: October 11 2009 23:05 | Last updated: October 11 2009 23:05

Barclays is planning to spin off a £4bn portfolio of complex credit assets as the bank presses ahead with a process to clean up its balance sheet and ease shareholder concerns over its investments.

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FSA sets out tough new liquidity rules

By Brooke Masters and Patrick Jenkins

Published: October 5 2009 12:04 | Last updated: October 5 2009 12:26

UK banks and investment firms would have to increase their holdings of cash and government bonds by £110bn and cut their reliance on short-term funding by 20 per cent in the first year of tough liquidity standards **put forward by the Financial Services Authority** on Monday.

If the FSA ramps up the requirements in subsequent years, as expected, banks and investment firms could have to increase their holdings of easily saleable assets by a total of £370bn or cut their reliance on short-term funding by 80 per cent from today's levels and boost their cash and bonds by a total of £170bn.

Banks in trouble

Banks’ balance sheet

There are

two sides of

the balance sheet –

the left side and the right side.

On the left side, there is nothing right,

and on the right side,

there is nothing left.

Kilde: Holbergfondene

Overview (part II)

- Central banks' response
  - cutting rates and presenting low paths
  - buying assets (quantitative easing)
- Interest rate markets (including understanding fixed rates from Lånekassa)

Central banks' response

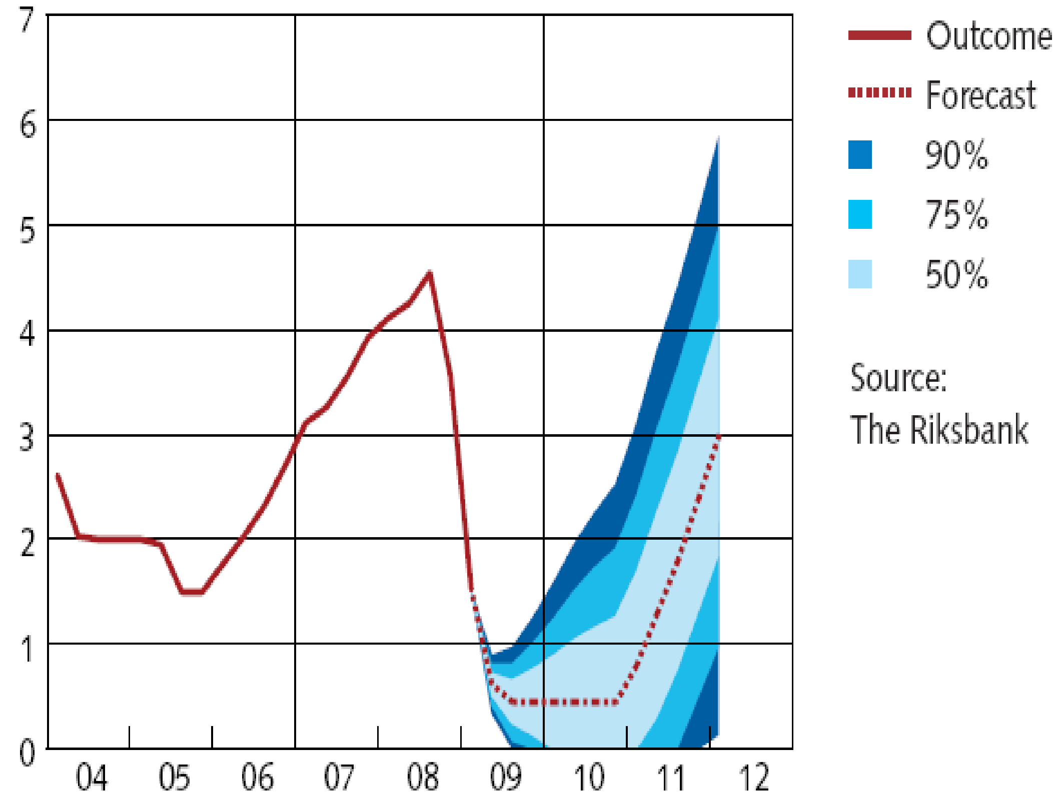
Lowering the policy rate

- All central banks lowered their policy rates to stimulate the economy under the financial crisis.
- But the crisis was so severe that they wanted to do more. In particular they wanted to lower the longer interest rates (not only the very short policy rates), which are found to be the most important.
- Several banks started lending to banks at longer maturities (e.g up to a year in the euro zone and Sweden) to a fixed rate.
- Another way of trying to lower longer interest rates is to lower the expectations of future short interest rates – if the market expects the policy rate to be kept low for a long while, the longer interest rates will fall. No one wants a high fixed rate, if the short rate is known to be kept low. We'll use the Riksbank as an example.
- A third way is to buy longer dated government bonds. The demand for the bonds increases, the price increases and the yield (interest rate) falls. If the central banks print money to buy the bonds, this may also spur inflation expectations, so the real interest rates may come down (the nominal interest rate minus the expected inflation). This is called quantitative easing. We'll briefly have a look at the Federal Reserve's policy.

The Riksbank's interest rate path

- Riksbank in April: Low interest rate, and the path signals that the policy rate will be kept low for a long while.
- This may affect the longer interest rates. E.g. if the market believes the Riksbank the two year fixed interest rate should be very low, since the floating rate will be very low over the coming two years (seen from April).
- (Norges Bank and CB of New Zealand also present optimal interest rate paths)

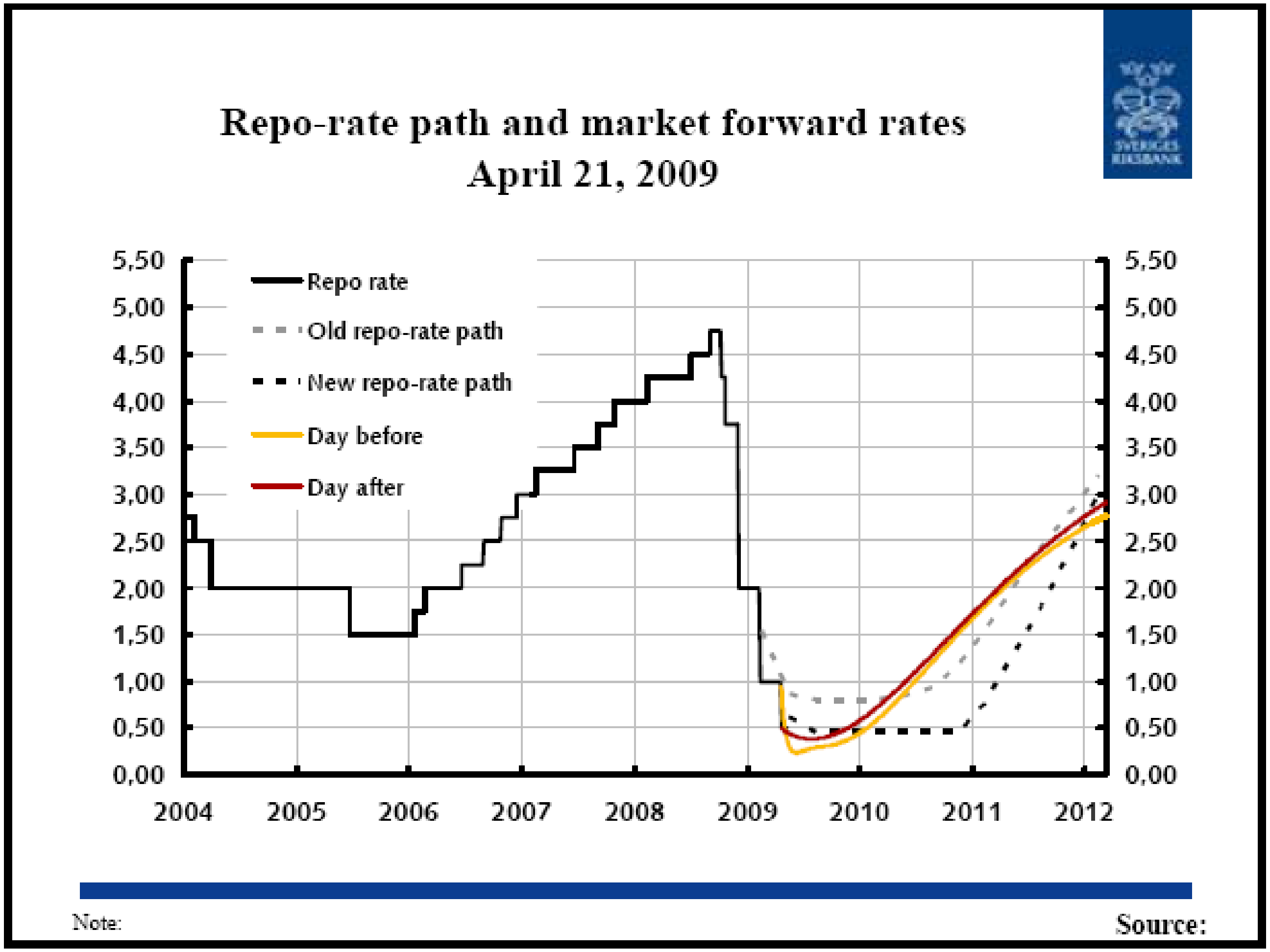
Figure 1. Repo rate with uncertainty bands
Per cent, quarterly averages



April
http://www.riksbank.com/upload/Dokument_riksbank/Kat_publicerat/Rapporter/2009/mpu_april_2009.pdf

Svensson: Not credible

- Svensson, Deputy Governor of the Riksbank, shows at a conference at Norges Bank in June that the market did not find the new path credible.

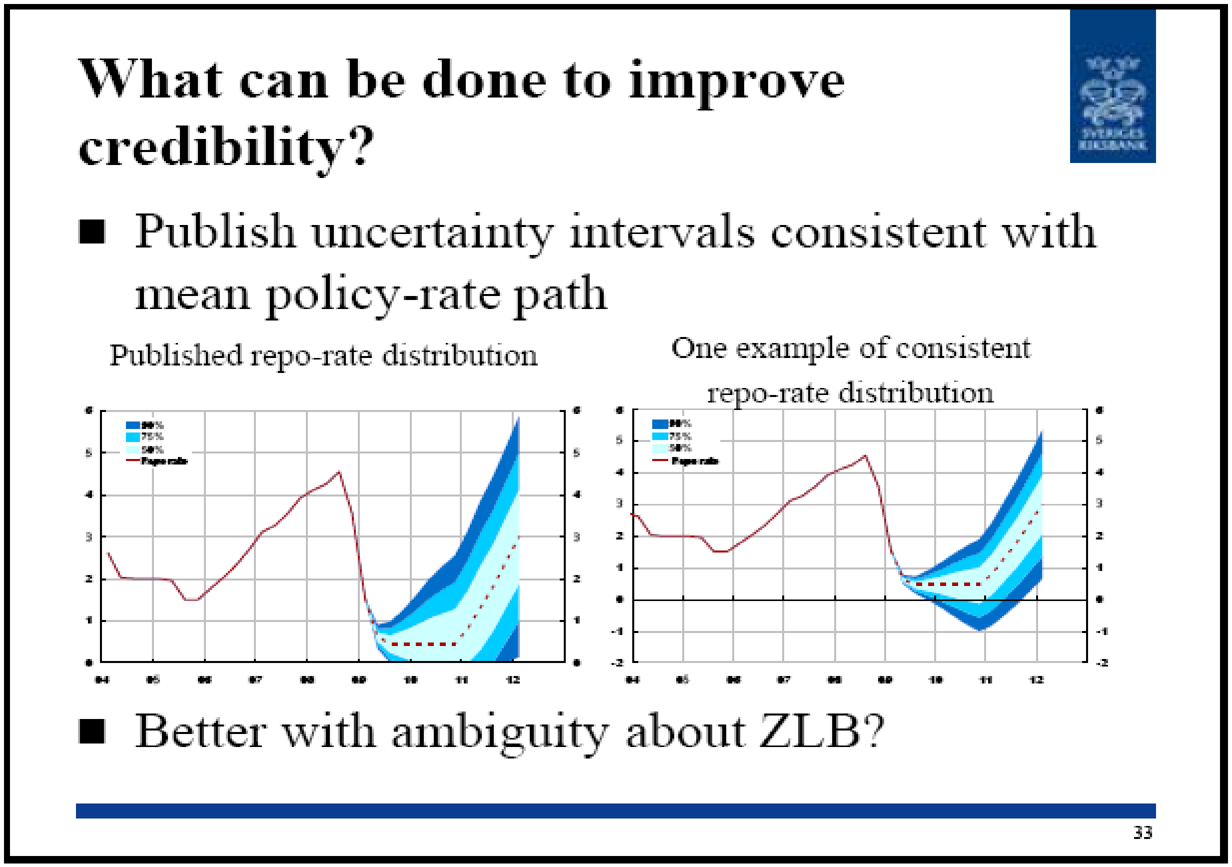


http://www.nbim.no/upload/74686/keynotes/svensson_speech.pdf

Central banks' response

Due to poor communication?

- Svensson, who knows that the market interest rate should be interpreted as an expectation (a mean) of likely outcomes, sees that there was something strange with the published path. Does the Riksbank say that rates almost cannot go lower, but certainly can be set higher? No wonder the market is above the path!
- Svensson also stresses that the Riksbank people have to underline that the path is an expected value.



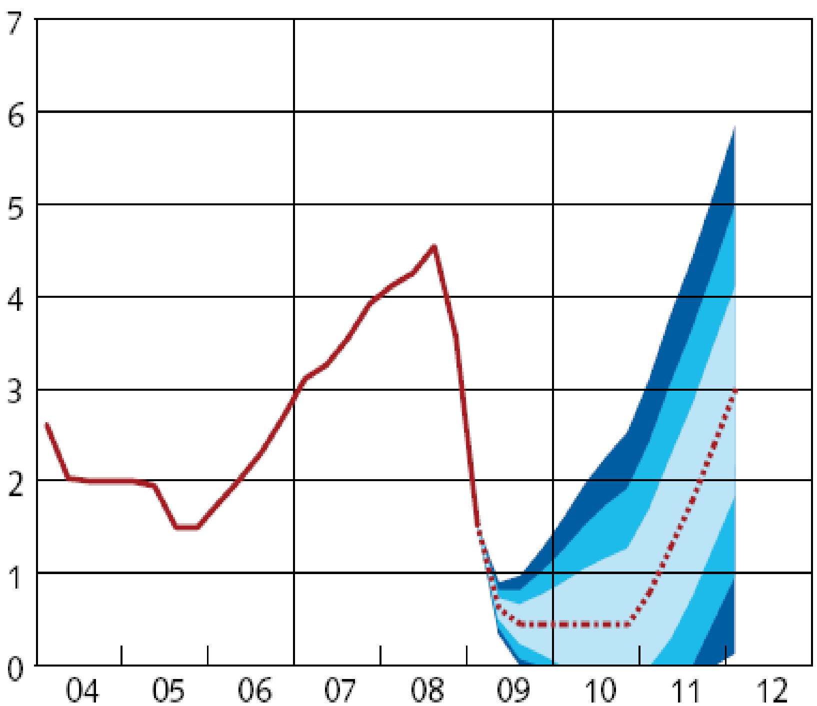
http://www.nbim.no/upload/74686/keynotes/svensson_speech.pdf

Central banks' response

July: Another shot

- Path looks better…

Figure 1. Repo rate with uncertainty bands
Per cent, quarterly averages



April
http://www.riksbank.com/upload/Dokument_riksbank/Kat_publicerat/Rapporter/2009/mpu_april_2009.pdf

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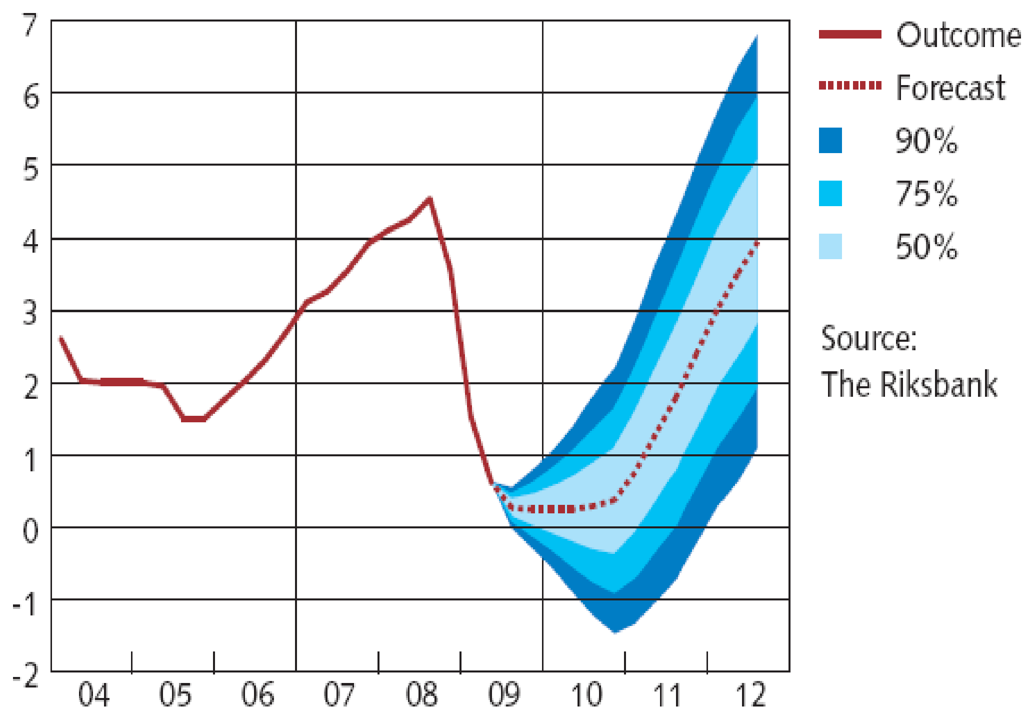
Per cent, quarterly averages



July
http://www.riksbank.com/upload/Dokument_riksbank/Kat_publicerat/Rapporter/2009/MPR_July09.pdf

Central banks' response

but minutes are a mess…

First: "Anders Vredin also made it clear that the repo rate path should be interpreted as a mean forecast, that is the probabilities that the repo rate will be above or below the path in the period ahead are judged to be equally large".

Svensson explains: "The forecasts that the Riksbank publishes are all mean forecasts, including the repo rate path, as we heard earlier. … Mr Svensson believed that the Riksbank should do all that it can to bring repo rate expectations down towards the repo rate path. Better communication would help with this, primarily in the form of a clarification that the repo rate path should be seen as a mean forecast".

But Öberg: "His assessment was that with today's cut the repo rate has in practice reached its lower limit and that it should not be reduced more than this".

And Nyberg: "Mr Nyberg supported the proposal to cut the repo rate by 0.25 percentage points to 0.25 per cent … On the other hand, Mr Nyberg was not in favour of making any further cuts in the repo rate".

And Öberg again: "Mr Öberg said that his view of the repo rate path is that it represents the most probable development of the repo rate, but that uncertainty is in practice solely upwards".

Svensson (in frustration?): Deputy Governor **Lars E.O. Svensson** found it regretable that there is once again a risk that the Riksbank's communication regarding the repo rate path will be contradictory and unclear, as a statement that the repo rate has reached its lowest limit conflicts with the fact that the repo path is a mean forecast and will lead to the mean being higher.

http://www.riksbank.com/templates/Page.aspx?id=32162

Central banks' response

Fed's quantitative easing (QE)

March 18 2009, Federal Reserve press release:

"To provide greater support to mortgage lending and housing markets, the Committee decided today to increase the size of the Federal Reserve's balance sheet further by purchasing up to an additional $750 billion of agency mortgage-backed securities, bringing its total purchases of these securities to up to $1.25 trillion this year, and to increase its purchases of agency debt this year by up to $100 billion to a total of up to $200 billion. Moreover, to help improve conditions in private credit markets, the Committee decided to purchase up to $300 billion of longer-term Treasury securities over the next six months".

http://www.federalreserve.gov/newsevents/press/monetary/20090318a.htm

Central banks' response

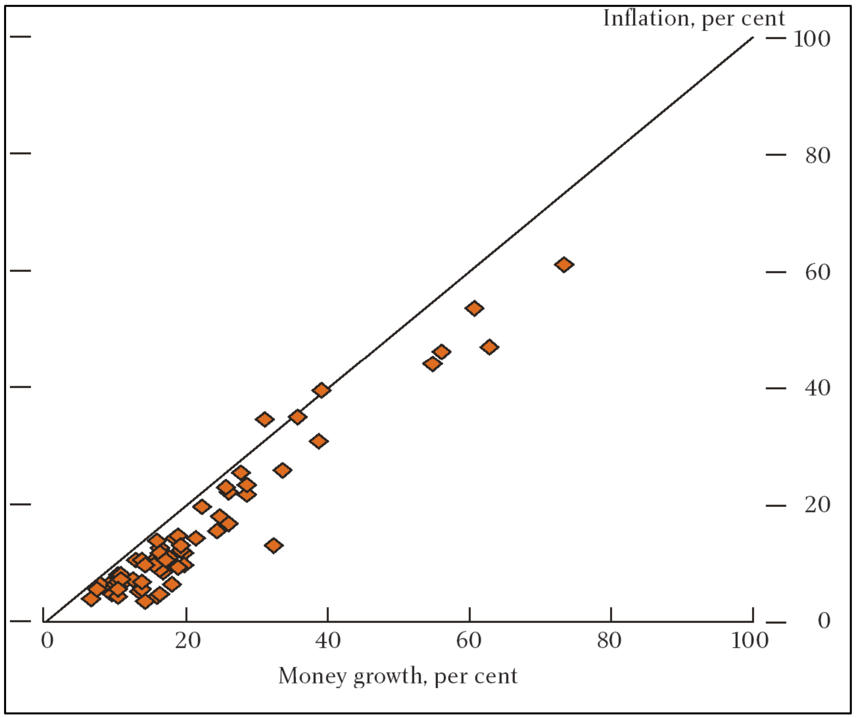
Lower real interest rates!

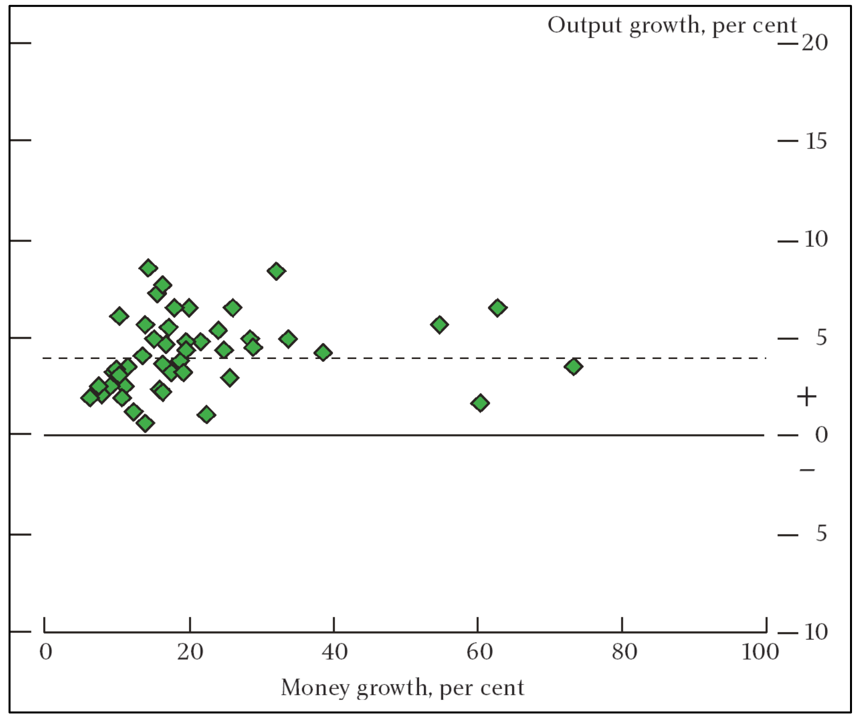
- Nominal interest rates fell after the press release, but started increasing fairly soon.
- Real interest rates, however, fell after the press release and is still below the level before the release. Is it QE that has led to higher break-even inflation ("market's inflations expectations")?

Central banks' response

Money gives inflation, not growth?

- Friedman: *Inflation is always and everywhere a monetary phenomenon.*
- Quantity theory: Inflation = money supply growth + velocity change - real GDP growth.
- Alternatively: *"Too much money chasing too few goods"*.

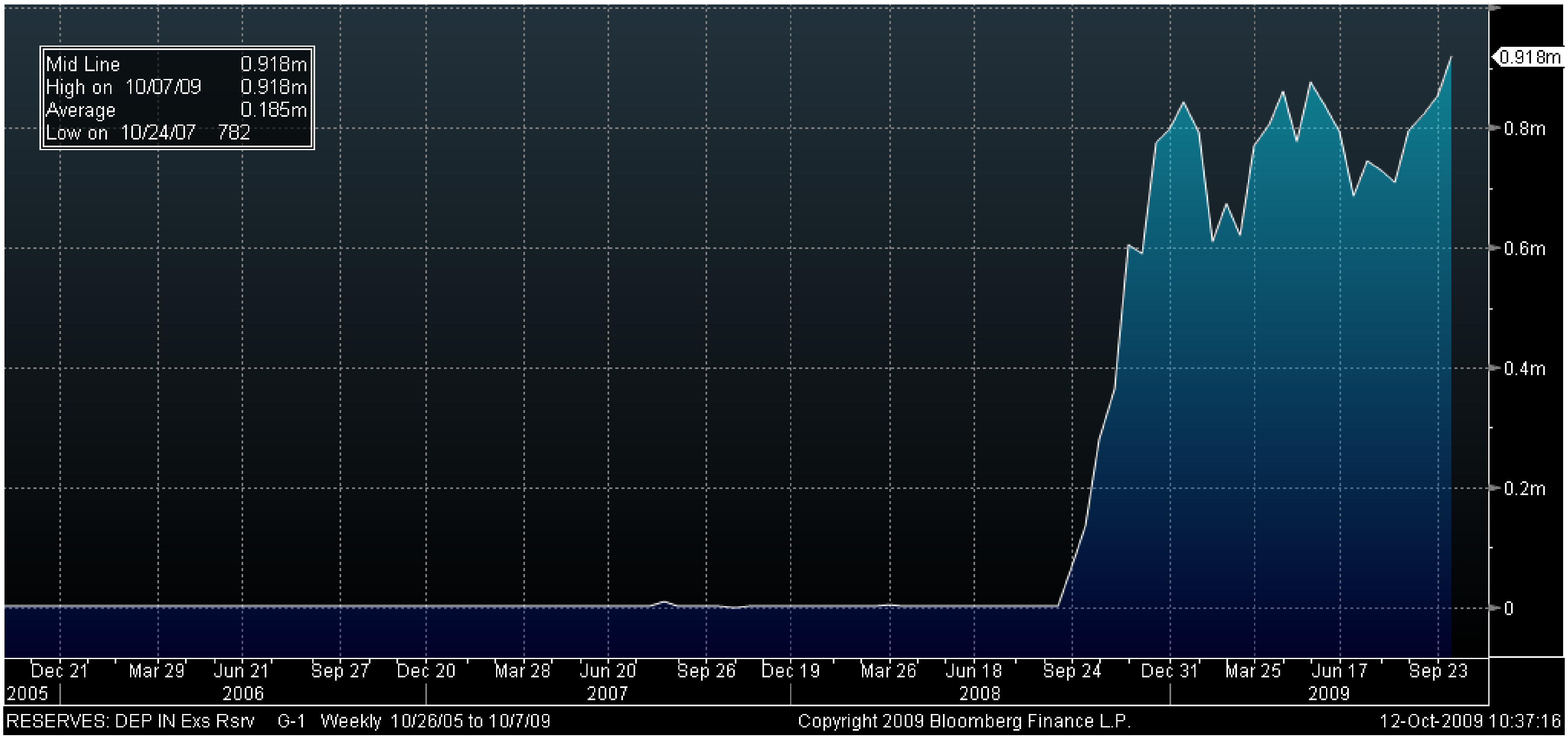




CB's policy response

But Fed-money ends up at Fed…

- Fed is printing money, buying assets. That means that either the banks directly or indirectly through other sellers of assets to the Fed receive money from the Fed.
- One reason for conducting QE is for this money to be lent to businesses and so on.
- But it looks like most of the money ends up at Fed again. Banks are holding more reserves at the Fed than they need to, and the excess reserves are increasing.

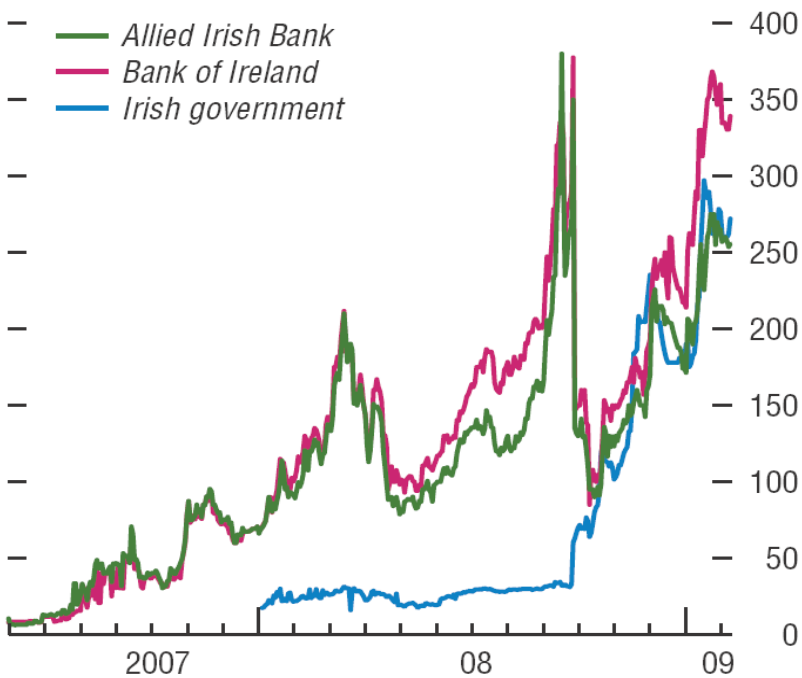


Central banks' response

Sovereign risk instead

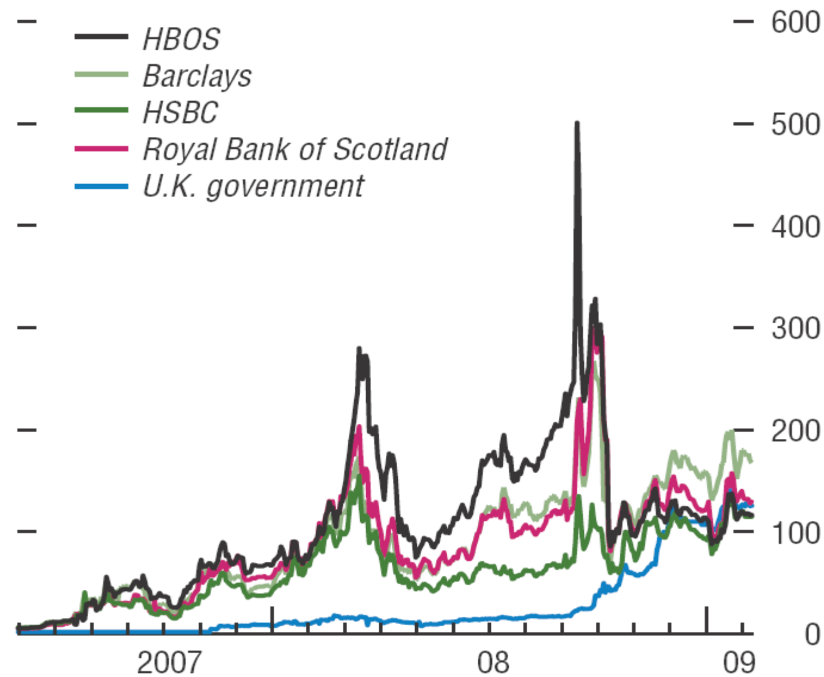
- Some governments started guaranteeing for debt issued by banks => insuring against default on government debt increased...

Irish Banks and Sovereign Five-Year Credit Default Swap Spreads
(In basis points)



Source: Bloomberg L.P.

U.K. Banks and Sovereign Five-Year Credit Default Swap Spreads
(In basis points)

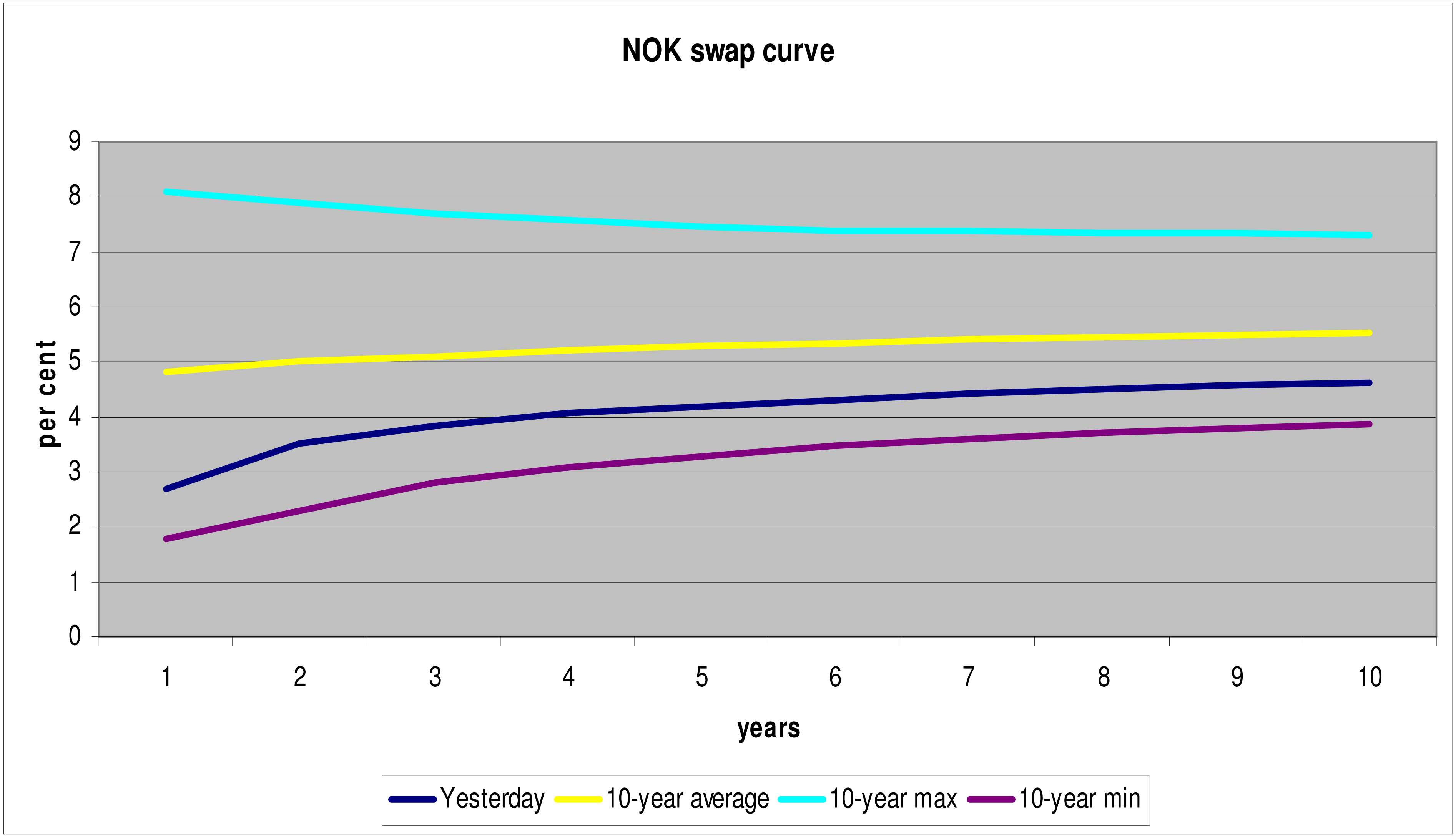


Source: Bloomberg L.P.

Interest rate markets

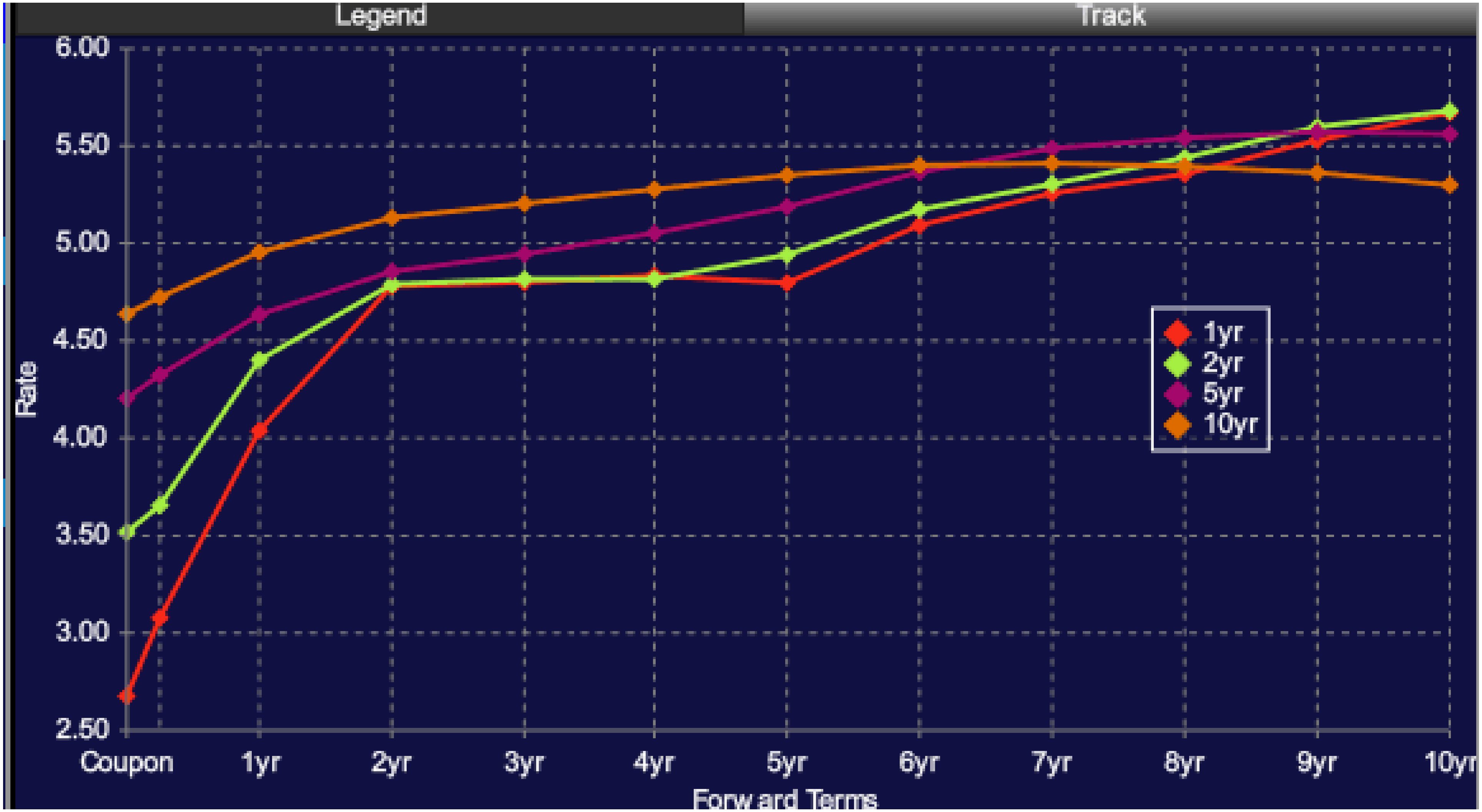
The swap curve

- Interest rates – different maturities (from spot = “today”)

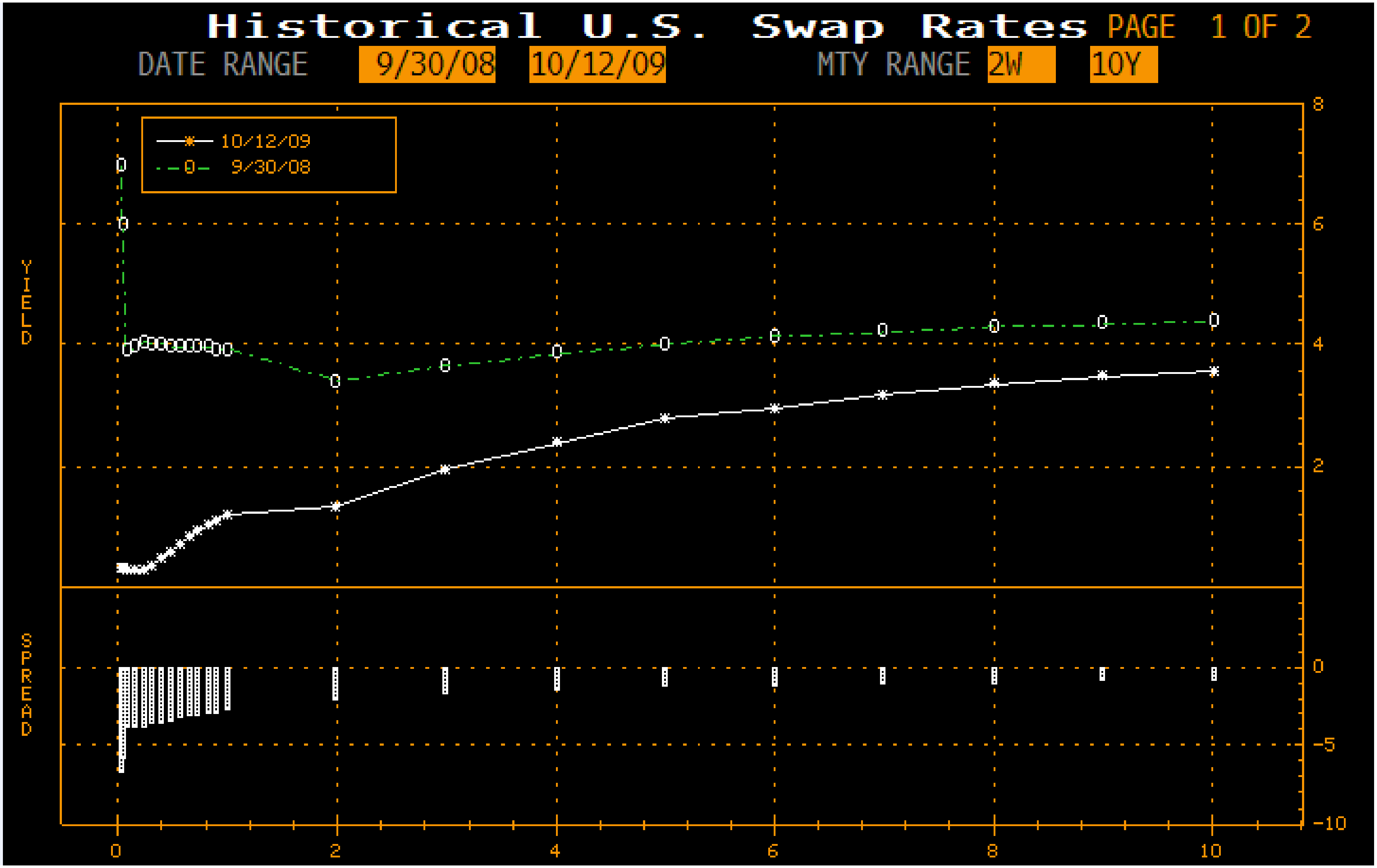


Forward swap rates

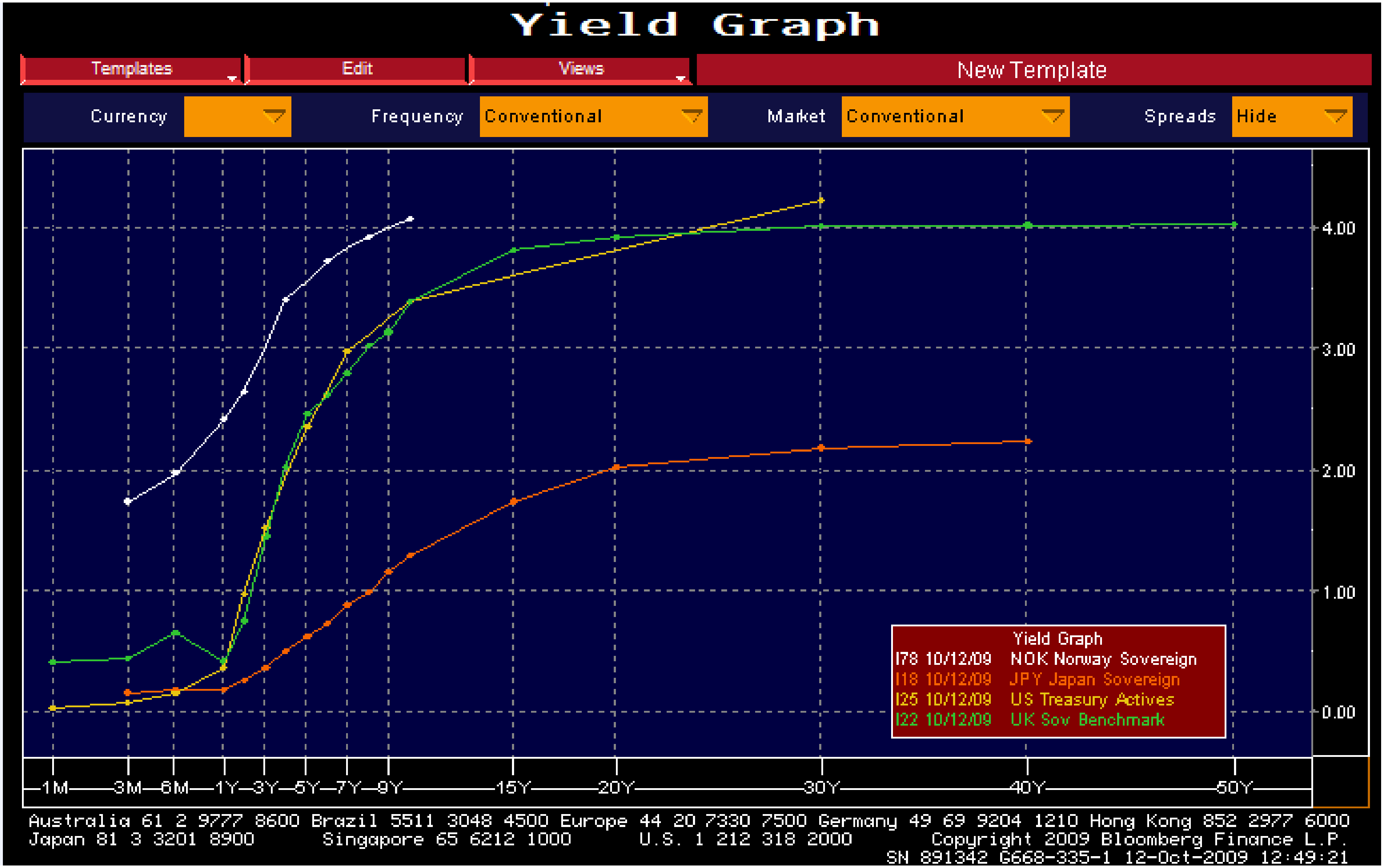
- Interest rates – maturities 1, 2, 5 and 10 year forward basis (e.g. the 1 year rate in 1 year is now 5%). The swap curve on the previous slide can be found at coupon – Y-axis.



A decreasing swap curve



Norway and Japan stand out



Interest rate markets

Lånekassen

- Exercise: Use graph below on yields of 10 year government bonds and information found here http://lanekassen.no/Hovedmeny/Tilbakebetaling/Renter-og-gebyrer/Slik-fastsettes-renten-i-Lanekassen/Slik-blir-renten-fastsatt/ to figure out previous offers from Lånekassen found here http://lanekassen.no/templates/satser____3008.aspx (small deviations may occur).