

THE SUBPRIME CRISIS

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They reached the lofty rock, where, at the summit, they beheld the king hanging thro' his helms from the monster's horns.

THE SUBPRIME CRISIS

Good ideas collide with market realities

Roger J. Bowden

*'No man is an island, entire of itself.
Every man is a piece of the continent,
a part of the main.'* John Donne

*'Thus doth contagion make
cowards of us all'. Will
Shakespeare (brought up to date
a little).*

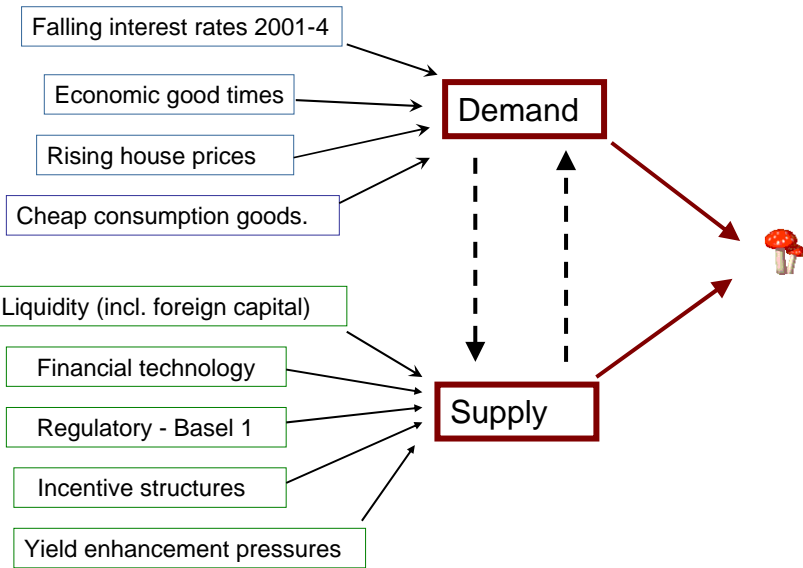
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A cheery 'Good Morning' from the Financial Times – headlines, Nov 11 2008

GM to suspend production at Korean plants
 Merrill chief sees severe global economic downturn
 World Bank sees severe global economic downturn
 Oil prices slide as cautious approach to deals
 Exports fuel Asia's slowdown fears
 Demand falls in US and Europe
 Wall Street beset by economic fears
 Macao vows to rescue casinos
 Russia changes law
 Vodafone in mobile phone market

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Origins 1: The debt explosion



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Origins 2: The debt explosion

- More relaxed attitude to debt, as economic expansion continued through the mid to late 90's. Both demand and supply.
 - In some cases supported by social objectives such as affordable housing
 - Managerial incentives to encourage debt origination
 - The mortgage guarantee industry in full flight
- Much of the debt explosion was indirectly supported by financial technology:
- Structured investment vehicles to take debt off balance sheet and economise on capital (see later)
 - Credit default swaps (see later)

Focal points

- The US housing market (see next slide)
- 100% mortgages in UK and elsewhere
 - Role of mortgage insurance
- Eurozone and UK bank loans to projects in emerging markets, esp. Eastern Europe. Often denominated in USD.
- Using blue chip shares as collateral to finance takeovers, esp. in Russia

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More on housing finance...

Carter and Clinton era rule changes at Fannie Mae and Freddie Mac:

- Aimed to encourage broader homeownership, especially among minorities (Community Reinvestment Act 1977).
- Imposed targets and quotas on participating banks to access FM guarantees/securitisation purchases
- Allowed FM and FMac to hold only 2.5% capital.

In other countries:

- Mortgage insurance (could have 100% mortgages -- 95% in NZ);
- Fixed rate mortgages --

all made it easier to finance a property on more limited income with apparently lesser risk

- Use of home mortgage for revolving credit
- But low mortgage rates a potential repayment trap with high house prices

Fannie and Freddie: a case of convergent twins?

Fannie Mae buys FHW insured loans from mortgage originators, repackages the loans as mortgage-backed securities, and sells them to investors in the secondary mortgage market with a guarantee that principal and interest payments will be passed through to the investor in a timely manner. Also, Fannie Mae may hold the purchased mortgages for its own portfolio. By purchasing the mortgages, Fannie Mae and Freddie Mac provide banks and other financial institutions with fresh money to make new loans. This gives the United States housing and credit markets 'flexibility and liquidity'.

Freddie Mac's supplies money for lending to originators. Its primary method of making money is by charging a guarantee fee on loans that it has purchased and securitized into mortgage-backed security bonds. Investors, or purchasers of Freddie Mac MBS, are willing to let Freddie Mac keep this fee in exchange for assuming the credit risk, that is, Freddie Mac's guarantee that the principal and interest on the underlying loan will be paid back regardless of whether the borrower actually repays.

--Wikipedia, slightly adjusted

How homes became more affordable to people who couldn't afford them

- 'Option Adjustable Rate Mortgages' : Borrowers offered low initial payments that would recast higher after several years.
 - OK in a rising market if you can resell the house before your payments increase. But instead, many of them got trapped
 - According to Credit Suisse, monthly option recasts are expected to accelerate starting in April, 2009, from \$5 billion to a peak of about \$10 billion in January, 2010
 - Some of these loans have already started to recast. About 13% of option ARMs that were issued in 2006 were delinquent by 60 days by the time they were 18 months old.

From a market contact....

"In Bakersfield, California, a Mexican strawberry picker with an income of \$14,000 and no English was lent every penny he needed to buy a house for \$720,000."

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Jingle mail



Unlike many other countries, the US homeowner (= mortgagor) can walk away from a mortgage, simply handing the keys to the bank (= mortgagee).

[In other countries, the homeowner would remain liable to pay the loan balance if the bank cannot sell the house for \geq loan value. If you can't repay, you can be declared bankrupt.]

'Jingle mail' was the outcome as many of the subprime loans turned bad from 2006. Owner simply posted the keys to the bank or its administering trustee.

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SUB-PRIME LENDING IN CLEVELAND METRO AREA

% home loans made by sub-prime lenders, 2005

0% – 9%

10% – 22%

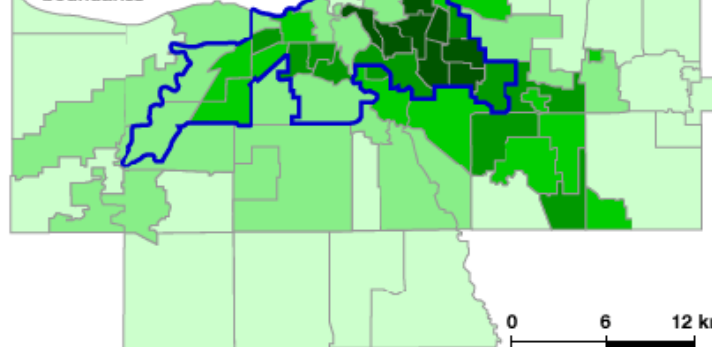
23% – 38%

39% – 56%

57% – 100%

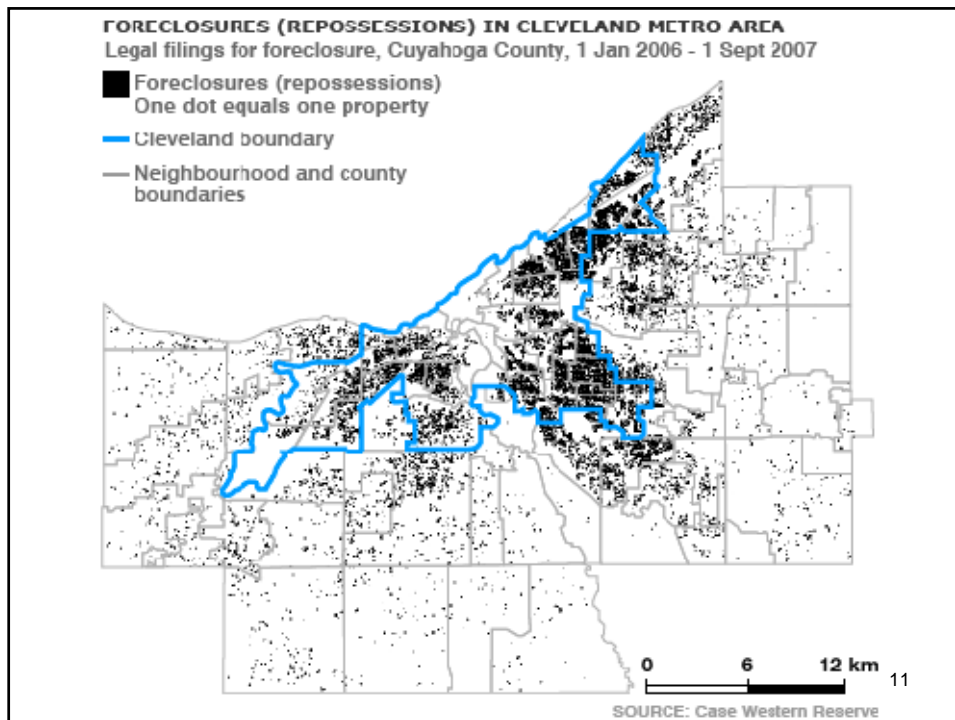
— Cleveland boundary

— Neighbourhood and county boundaries



SOURCE: Case Western Reserve

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'Subprime' label catchy but not the whole story

A lot of attention paid in the media to 'predatory lending' with mortgage originators such as Citigroup singled out. Sweeteners such as low interest holidays for a year.

Many loans were indeed of very poor quality and when economy turned bad would default. Also an assumption that house prices would keep rising, so speculative buyers caught in a cash squeeze when unable to sell.

But not all mortgages were of poor credit quality:

- A range of credit quality from the poor to the good
- Packaged into *tranches* (= groups) according to probability of default, or other aspects relevant to pricing, such as estimated time to repayment

A central problem of the whole structure was that the good loan tranches vanished 'down the gurgler' along with the bad ones.

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Structures in the subprime crisis

More aggressive banks, seeking higher market share and returns on shareholder funds, economised on Basel capital by using **Structured Investment Vehicles (SIV's)** and other conduits:

- 'Originate and distribute' model.
 - Generating fees was the intention for banks under pressure on margins
- Net effect was to move mortgages off balance sheet, economise on bank capital

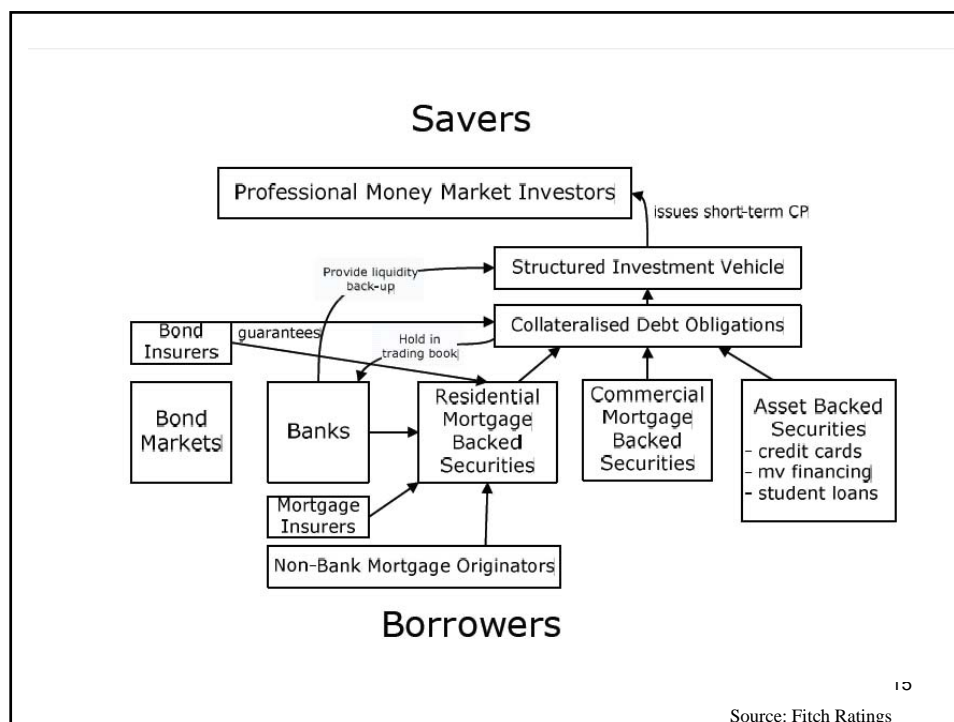
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[Subprime lending structures – continued]

How a typical structure worked:

1. Bank or other lender (e.g. Countrywide) originates home mortgages and repackages them in tranches of different quality (securitisation)
2. The higher quality tranches are insured by 'monoline insurers' (e.g. AMBAC, MBIA – reinsure with Swiss Re etc.) or have credit default swaps with counterparties (e.g. AIG)
3. SIV's purchase mortgage packages from the banks
4. SIV's finance purchases by issuing commercial paper (CP, mainly short term debt), collateralised on the mortgages.
5. Banks support the SIV CP purchases by undertaking to purchase any shortfall or otherwise provide temporary liquidity to SIV's.

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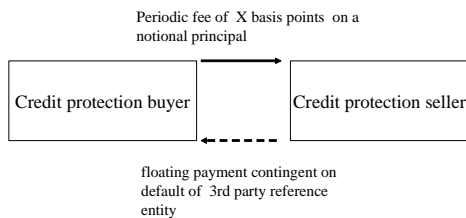
‘Conduits’ and ‘churning’

‘Conduits’ were structures established by banks, that had the effect of multiplying up the loans that could be written from a more limited capital base.

- Bank establishes structures with a modest amount of capital, invested in high grade assets like government bonds.
- Bank also originates MBS or ABS (asset backed securities), packages into tranches, perhaps keeping the very lowest grade on its own balance sheet.
- Conduit sells some of the government bonds and uses the funds to buy the mortgages from the banks.
- Conduits then sells the mortgages tranche to the general investing public. In UK these might have included local councils, charities as well as mortgage fund managers
- Use the funds so generated to buy more mortgages from the parent bonds, keeping a small proportion for its own capital base (‘churning’ capital).
- So in effect a reserve ratio system.
- Conduits, and through them the banks, offered a recourse facility whereby investors could sell loans back if credit standing could not be sustained.

Credit default swaps: alternative arrangements

Credit Default Swap

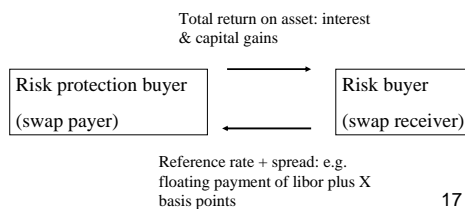


A straight credit default swap is more like straight insurance. The periodic fee of so many basis points (e.g. 50bp = 0.50% interest) corresponds to an insurance premium

AIG's Financial Products division in London was a heavy writer ...

Total Return Swap

In a total return swap, the risk buyer (e.g. a hedge fund) receives any capital gain or bears any capital loss, as well as the interest from the underlying instrument such as a credit tranche bond.



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More on financial technology

Synthetic CDO's

Can be unfunded or funded

- Funded
 - Investors put money into the fund, which is invested in high grade liquid securities
 - Yield is enhanced by writing credit default swaps linked to credit of reference entities
 - Promoters like this arrangement because the collateral against contingent swap calls is provided by the liquid assets.

Tranches graded by the reference entities

- High tranches might be given AAA credit ratings

Structures were often promoted by banks who might have themselves loaned money to one or more of the reference entities

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Bank exposures

Mainstream ('high street') banks were to some extent exposed from the quality of their own loan book. But they were more typically exposed by following an 'originate and distribute' model for subprime mortgages. Nonetheless, they inherited indirect exposures such as the following:

- Recourse exposure, also known as credit enhancement – originating bank covers a designated % of the losses, or undertakes to buy back if loans fail within a designated put period. A reserve account is created for the purpose.
- Originator retains an implicit proportion because of over-collateralisation where MBS's are issued to market value less than the face value of the underlying mortgages
- Trading book: receive side of credit default swaps

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The fallout !

Nothing very wrong with the securitisation process itself, indeed had been praised as a way of distributing risk to those who can best bear it, e.g. hedge funds who buy the lower grade (junior) or as counterparty in credit default swaps.

The weak point was the liquidity exposure of the whole structure. From 2006, as US economy turned down, housing repossessions soared. Jingle mail!

- ↓ Investor confidence in SIV assets plummeted in 2006-7.
- ↓ The CP market dried up and SIV's could not refinance.
- ↓ So banks had to step in and supply the liquidity on terms that were too generous given the impaired quality of the collateral.
- ↓ As the crisis spread, other institutions affected by loss of liquidity and confidence.
- ↓ Central bank intervention to ease liquidity, also in some cases government guarantees extended (UK/Northern Rock).

But was it a market over- reaction?

- ↑ Most SIV quality was not too bad at the time, though it became so in the meltdown
- ↑ In the meantime, banks seized the opportunity to make big tax losses by writing off bad debts.

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Fallout 2: Financial markets

Equity markets

- Falling stock market
- Banks needing to recapitalise
 - Flood of new private capital raising via preference shares and rights issues, e.g. Mitsubishi UFJ 990bn JPY (about 17.5bn NZD) to support Bear Stearns purchase and domestic troubles
 - Treasury bailouts involving equity injections (see later)
- Monoline insurers and reinsurers needing to raise more capital (AIG see later)
- Equity dilution

Funds management industry

- Declining value, e.g. super/pension fund shortfalls, impacts on wealth – see later
- Redemption freezes
 - Mortgage trusts and cash management trusts (if commercial paper used as enhancer)
 - In NZ partly because of RBNZ guarantees extended to alternatives ²¹

Fallout 2: Financial markets cont'd

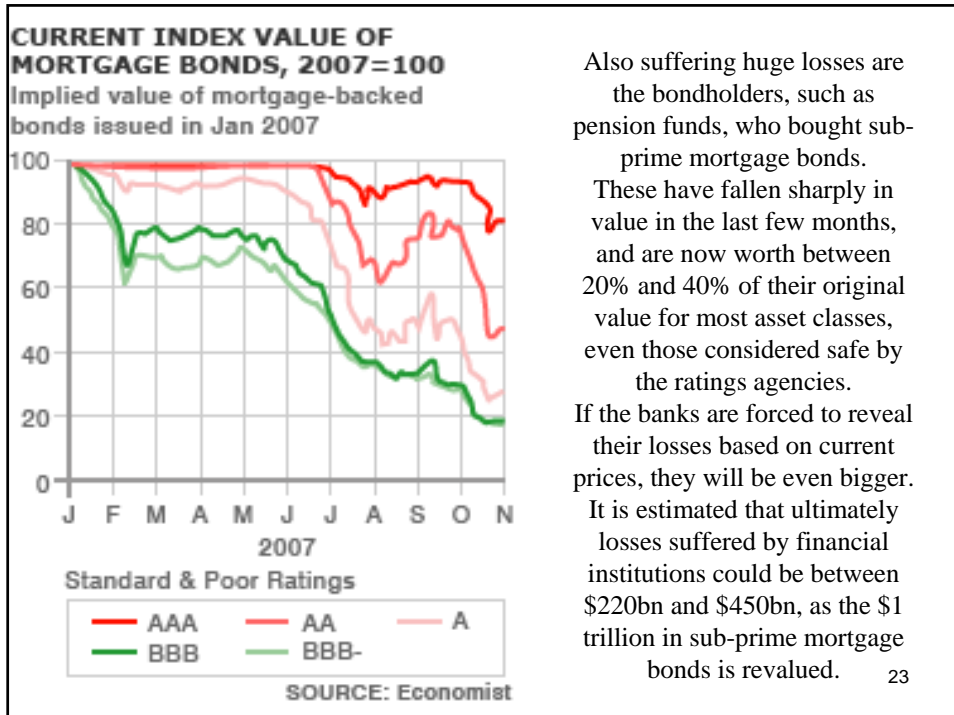
Interest rate markets

- Flight to quality in interest rate markets
- Volume of govt issues to finance rescue packages – see later
- A liquidity spread in response to bank problems in raising/rolling over over commercial paper, other funding channels
 - Rates on bank debt rise to open up a gap relative to the swap rate
- All this raises the corporate cost of capital via risk and liquidity premiums
- Distortion of pricing spreads

Currency markets

- Rising US dollar:
 - UK and Euro banks call in USD loans - Eastern European problems
 - Repatriation into US and Japan of foreign assets (Korean Won)
 - Unwinding of carry trades (NZ and Australian dollars)

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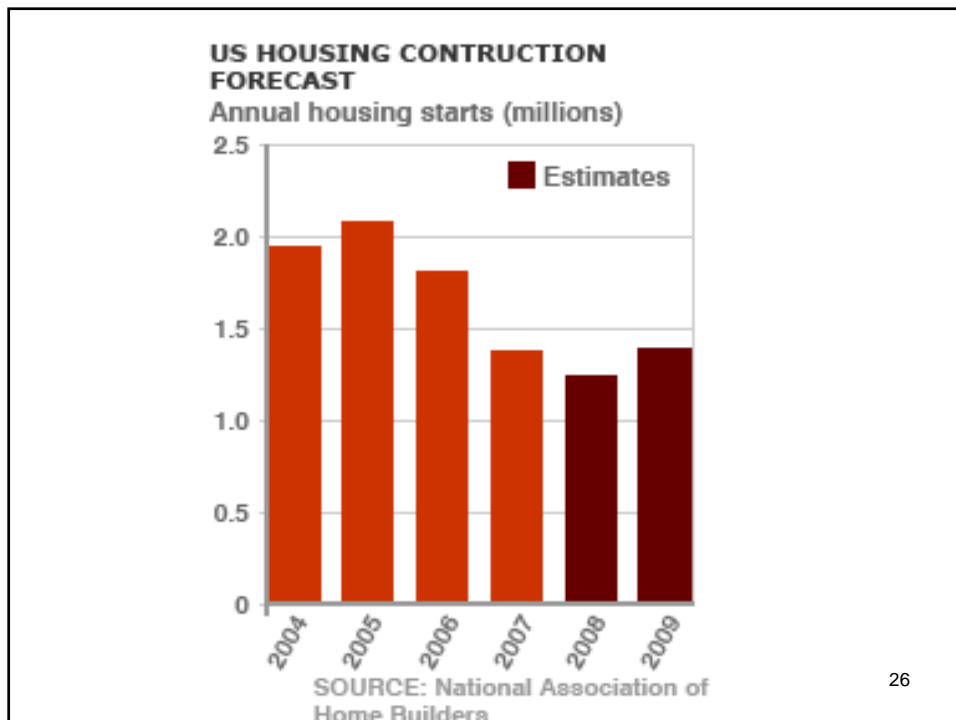
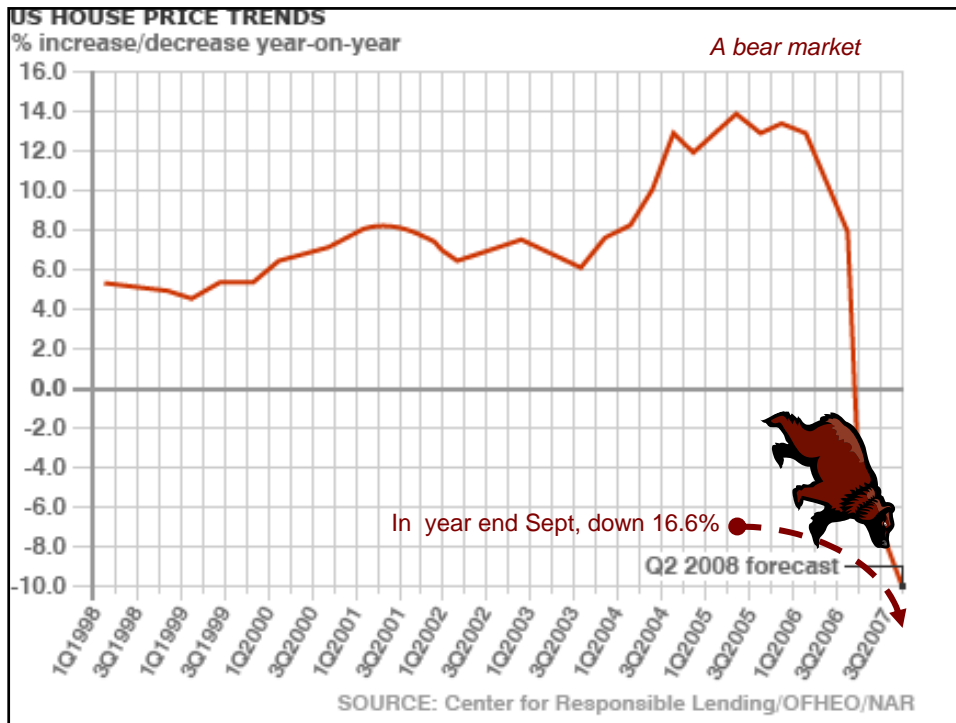
Also suffering huge losses are the bondholders, such as pension funds, who bought sub-prime mortgage bonds. These have fallen sharply in value in the last few months, and are now worth between 20% and 40% of their original value for most asset classes, even those considered safe by the ratings agencies. If the banks are forced to reveal their losses based on current prices, they will be even bigger. It is estimated that ultimately losses suffered by financial institutions could be between \$220bn and \$450bn, as the \$1 trillion in sub-prime mortgage bonds is revalued. 23

Fallout 3: Economic activity

- Tobin's Q goes into reverse (declining house prices): Home building seizes up
- Wealth effect from house prices, equity prices, fund values, impacts on:
 - Automobile purchases (see later the effect on manufacturers)
 - Whitegoods, electronics etc (Circuit City in US files for insolvency)
 - General consumption, travel
- Auto industry further impacted by high oil prices
- Declining corporate liquidity impacts on supply

The multiplier divides and the accelerator decelerates:

- Production and employment in building, auto, consumer durables
- Investment in computers, plant & equipment
- Retail activity and employment
- Unemployment and falling incomes



Policy measures 1: Finance sector

- Government guarantees
 - Of retail bank deposits and other financial institutions
 - Distortionary aspects: optimality aspects
 - Of wholesale funding, or of foreign bank debts (Korea)
- Direct government support of financial institutions (e.g. US TARP, UK, Eurozone)
 - Purchase of troubled assets
 - Uptake of preference shares in troubled banks
 - Provision of loans, perhaps with share warrants attached
 - May have good behaviour bonds
 - Agreement to limit executive compensation or stop junkets
- IMF resurgit: bailouts of Hungary, Turkey, Belarus, Ukraine, Pakistan, Iceland, Latvia

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Central bank comfort

- Falling central bank rates (now almost zero in US, Japan, UK)
- Deposit guarantees
- Liquidity support
 - In NZ repo agreements with MBS as collateral
 - Support via US FRB currency swaps with RBNZ for offshore bank funding in USD
- More recently central packages have monetarized debt: US Fed and Bank of Japan have either bought govt bonds or have bought private sector asset backed securities. Expands the monetary base.

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Policy measures 2: The Treasury as Public Sector Capitalist

BY mid Nov the **US government** had, or was about to acquire, equity stakes in many of the largest banks in the US:

Citigroup, JP Morgan Chase, Bank of America, Goldman Sachs, Morgan Stanley, Wells Fargo, Bank of New York Mellon, State Street and Merrill Lynch,

together with proposals to inject equity into some smaller banks.

The UK **Labour government** has likewise become a capitalist: Northern Rock. Lloyds TSB & HBOS (40%), Royal Bank of Scotland (60%). **Benelux** countries (Fortis Bank)

? How will the govt, as major shareholder in common, manage competing banks

? How will the govt proceed to stage out its shareholding

? What will happen as govt deposit guarantees approach their intended horizon

It is possible that state shareholding will extend to commercial/industrial sectors

- US govt and big three automakers

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US financial bailouts (to end Feb 2009)

AIG - \$180bn

Bank of America - \$45bn

Citigroup - \$50bn

JP Morgan Chase - \$25bn

Wells Fargo - \$25bn

Goldman Sachs - \$10bn

Morgan Stanley - \$10bn

State Street - \$3bn

Bank of New York Mellon - \$3bn

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Policy measures 3: Optimal financial policy

- Old Q of when rescues to be mounted:
 - Old rule of 'too big to fail' may have less force in a system linked by swap counterparties and other commitments
- Hurried nature of packages cobbled together, subsequent changes
- How far to go with guarantees before calls into question possibility of govt default?
- When is a guarantee likely to amount to just an outright grant (Citigroup?)
- What was best sequence for NZ?
 - Top down, i.e. start by guaranteeing wholesale CP funding in London (some NZ banks have programs independently of Oz parents)?
 - Bottom up, i.e. immediate guarantees at the retail end. Problem here is where to draw the line: Credit unions, finance companies, cash fund managers, mortgage funds?
 - How much should be charged up front for the guarantee facility?
 - What happen as the guarantee horizon approaches? Liquidity support may be necessary or gradual phase out provisions.

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Policy measures 4: Fiscal -- A new New Deal?

- Resurgence of old fashioned Keynesian deficient demand public spending Abandonment of fiscal responsibility targets.
- Room to move limited by financing constraints conditioned by
 - Existing public debt levels
 - New demands on the public debt for financial bailouts

China will inject almost 1trillion NZD equivalent into infrastructure over the next two years (some doubts about new)): Low income housing, rural water/sewage, roads, airports

- Probable repatriation of reserves to finance, exchange rate implications
- Package welcomed by stock markets in Japan and ASEAN region
- **Korea's** fiscal stimulus covers tax reductions, low income subsidies, infrastructure spending
- **Japan's** new government spending, mortgage tax breaks, other benefits
- **Australia's** AUD 6billion package of support for its automotive industry including a green car innovation fund
- **Germany's** 50billion euro package. **France, Spain** likewise, **UK** probably next.³²



Looking ahead 1...

Shake ups:

- Prudential procedures
 - o Extension of regulatory scope by accident or design
 - o Basel III, MifiD II, Solvency III etc?
 - o Bank capital adequacy revisited – new Basel weightings?
 - Allowable counterparties (hedge funds for credit default swaps??)
 - No more implicit guarantees for subsidiaries
- Governance and reward structures
 - o Rewards unadjusted for risk
 - No cash bonuses, all shares
 - Quarantine payouts for longer
 - o Distortionary role of unbalanced incentive structures
 - o Revision of managerial compensation: How much is enough?
- More harmonisation between BIS, IMF and other international regulators
- An international risk management bureaucracy!

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Looking ahead 2:

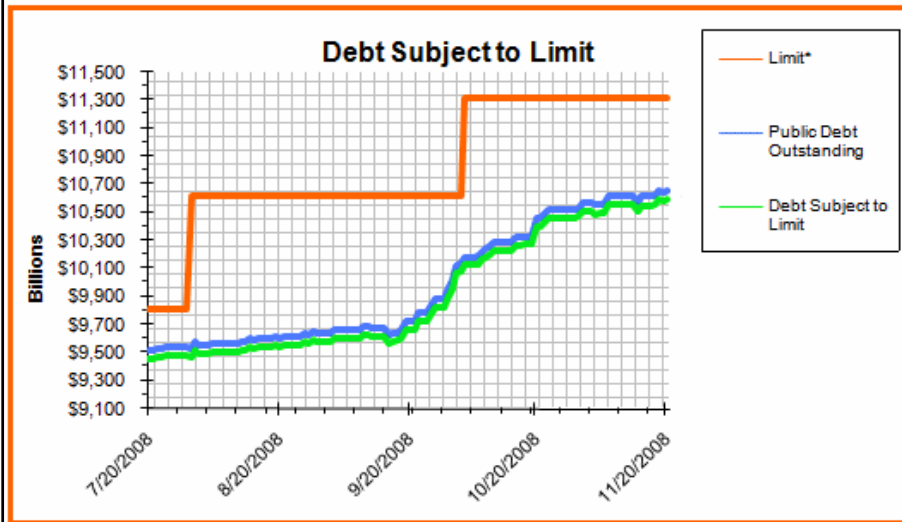
Interest rate indigestion



- Huge supply of new Govt debt to finance bailouts or deficit financing + Obama plans for USD700b fiscal stimulus
- Right now has ready appetite (flight to quality) + accommodative monetary policy. So T-bill interest rates stay very low at short end.
- May be market indigestion as supply of US sovereign debt soars. Very recent auctions of T-bonds and notes have met market resistance: 3-10 year yields up. Similarly in Euro zone.
- And when economy recovers, govt bonds might be dumped, raise interest rates.
- Counter is that US government will (hopefully) be buying back or retiring debt with sale proceeds of bailed out equity.
- Yield curve (term structure) may change shape. Already steeper round 2-3 years because of big supply of 3-5 year issues.

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There's no limits like debt limits, like no limits I know....



TreasuryDirect: U.S. Department of the Treasury Bureau of the Public Debt. 35

The US debt overhang: US Treasury obligations

Country/Bloc	Sept 2008	Sept 2007
China	585.0	467.7
Japan	573.2	591.9
UK	338.4	120.3
Caribbean banking centres	185.3	99.1
Oil exporters	182.2	137.1
Brazil	141.9	110.1
Luxembourg	91.8	58.4
All other countries	762.7	668.7
Total	2860.5	2253.3
Of which...		
Foreign official	1822.7	1607.7
T-Bills	276.8	178.3
T-Bonds	1544.9	1429.4

Looking ahead 3: Exchange rates, equity prices

Exchange rates:

Right now USD strong from capital repatriation etc. But:

- The debt overhang and the US dollar
 - China, Japan may repatriate USD reserves
 - Would strengthen JY
- Carry trade in AUD and NZ moribund for now

Equity:

Gradual divestment of government equity in banks etc; overhang may depress equity for some time

- Bank stocks stay low because of dividend restrictions/extra stock
- And future sales as US govt uses proceeds to retire debt (US has 3 year horizon)
- Other stocks could recover quicker if industrial bases recover
- But in meantime, lid on equity prices, in addition to general economic conditions.

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Looking ahead 4: New Zealand's economic outlook

Woe ahead but outlook not as bad as some OECD countries

- Some natural buffers work in our favour
- Fiscal position not flash, but debt capacity remains better than others

Demand patterns

- Defensive exposure of important export items, notably dairy, hort.
- Tourism and the babyboomer floor
- Forestry has adverse medium term outlook
- Net Immigration bearish
- We'll find out whether education is really a negative beta industry.

Exchange rate buffer works (at last...)

- Back to basics— current account fundamentals rule, OK
 - o Unwinding of carry trade
 - o Capital inflow dries up with home country bias
- OCR helped by more relaxed stance towards blip in cost push inflation.

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The blame game kicks off...

"Consider the terrible consequences of the 'anything goes' Bush Administration, whose irresponsible non-regulation of financial institutions has led to this crisis." US House Speaker, Nancy Pelosi (D), Jan 2009

Charges not very well formulated, but have included;

- Failing to supervise and police the market for mortgages, to ensure that they had acceptable probabilities of repayment
- Failing to regulate the terms and conditions of credit default swaps
- SEC's failure to detect Bernard Madoff's gigantic Ponzi scheme for his hedge fund which collapsed to the tune of \$50bn and (so far) two high profile suicides
- Lack of supervision or moral leadership on executive salaries and bonus packages

Defenders have blamed the Clinton administration for repealing (1999) the Glass-Steagall Act of 1933, which separated the activities of deposit taking commercial banks, from those of investment banks, which invest money, and enabled them to trade instruments such as MBS and CDO's.

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Quotable quotes...

From the ever optimistic AIG Chairman Edward M. Liddy in early 2009:

AIG will be ...

"A great company, going forward"

For sale are ...

"Some very wonderful assets"

On cancelling USD180 m. worth of scheduled corporate functions after congressional agro:

"We will prevent this happening in the future"

(Several weeks after this, the US Treasury extended the original FRB-TARP preference share package with a 5 year \$60b loan and an extra \$52.5b to buy up distressed securities.. The Federal Reserve of New York created a joint company with AIG, now called Maiden III, to buy back positions from credit default swap counterparties. AIG was heavily criticised by the US Federal Chairman Ben Bernanke for an extreme lack of internal oversight in writing such huge volumes of credit default swaps). A further rescue is now in progress after AIG announced another huge loss.

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The bright side to the subprime crisis



...from a London contact ...

If you had purchased £1000 of Northern Rock shares one year ago they would now be worth £4.95.

With HBOS your £1000 would have been worth £16.50.

£1000 invested in XL Leisure would now be worth less than £5.

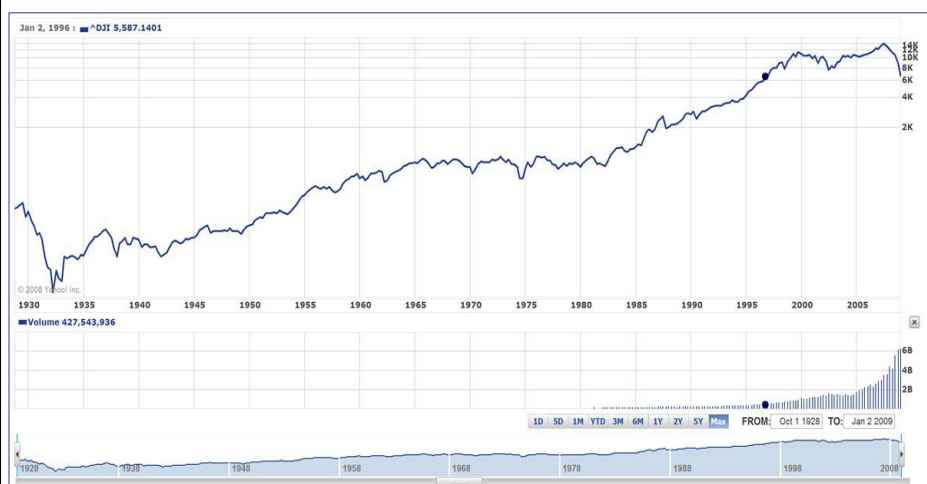
Bradford and Bingley the same.

But if you bought £1000 worth of Tennents Lager one year ago, drank it all, then took the empty cans to an aluminium re-cycling plant, you would get £214.

So based on the above statistics the best current investment advice is to drink heavily and re-cycle!

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The very long term perspective: so far not as bad as 1929



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Developments since the start of 2009

United States

TARP gives way to the Financial Stability Plan

- Capital Assistance Program. The 'Financial Stability Trust', a new entity of the US Treasury will invest via 'convertible securities' (unclear if bonds or preferred shares) that banks can convert to ordinary equity at a pre-specified price.
- Public-Private Investment Fund. Joint US Treasury, Federal Reserve and FDIC. Designed to leverage up private investor purchases of troubled illiquid assets. Up to USD1trillion.
- Consumer & Business Lending Initiative. Joint with Federal Reserve, up to USD 1 trillion. Will buy asset backed securities for small businesses, commercial real estate or autos, credit cards, other commercial credit. Has to be AAA rated. (Replaces earlier Term Asset-Backed Securities Loan Facility (TALF) from the Federal Reserve.
- Other: US Treasury to become a major financial regulator for any entity obtaining public funds via the above programmes.

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United States: macroeconomic

- Signs of a liquidity trap developing, as consumers elect to hang on to their cash.
- Unemployment rate hits 8.1% in February 2009.
- US automakers in serious trouble, have asked govt for more money. GM has cut jobs by 10,000 worldwide (see also Opel in Germany), similarly Chrysler and Ford.
- **President Obama's first budget (Feb 27 announcement)**
 - Budget deficit for the current year predicted to be \$1.75 trillion, which is 12.3% GDP, biggest deficit since World War II.
 - Includes \$634bn for healthcare reform and an extra \$250bn to be set aside to bail out US banks.
 - Tax cuts for low to middle income families

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Japan

In January 2008, Japanese exports were down by 45% compared to Jan 2008. The Japanese economy *contracted* by 12.5% in last quarter 2008.

Japanese companies, facing a serious economic downturn, have found it very difficult to raise debt. The Japanese Govt has recently announced that it will (via the State Bank) use some of its large foreign exchange reserves to ease a squeeze in corporate financing. Loans will be denominated in USD. Toyota will seek about USD2 billion in such loans.

Eastern Europe (e.g. Poland, Latvia and Hungary)

The banking sectors in Central and Eastern Europe are to get a 24.5bn euro (\$31bn; £21.8bn) rescue package from The European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB) and the World Bank.

The funds are particularly aimed at helping small firms survive.

The two-year joint initiative with national govts will include equity and debt financing, and access to credit and risk insurance aimed at encouraging lending.

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Europe

France

Govt will bail out some large banks (Banque Populaire and Caisse d'Epargne) to the tune of EUR6.4 billion, structured as loans probably convertible to shares.

Germany

GM subsidiary Opel, with about 26,000 employees, has asked the German government for 3.3 billion euros. If they don't get it, it's likely they will file for insolvency.

One problem is that Opel is a wholly owned subsidiary of GM and has reportedly already pledged its German assets to the US government. Opel would have nothing to offer as security for the German government.

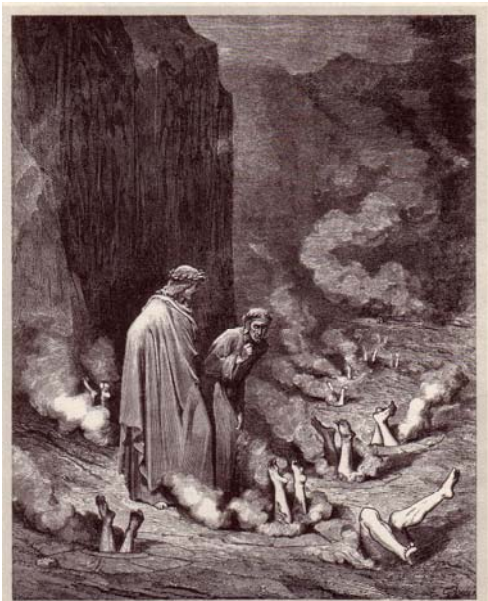
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Research topics

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The outcome: the financial system in purgatory

[The Roman poet Vergil shows Dante Alighieri, the author of *Divine Comedy*, a corner of purgatory, which is a state of limbo]



*Io stava come 'l frate che confessa
Lo perfido assassin...*

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