Sub-prime and the Crisis in Structured Finance

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Indian Council for Research in International Economic Relations

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"I THOUGHT WE WERE JUST BUYING A HOUSE!"

Biggest financial crisis since 1929?

- **"The most wrenching (crisis) since the end of the second world war"**

(Alan Greenspan, former Governor, US Federal Reserve, writing in the ***Financial Times***, March 3, 2008)

A Turning Point?

- **"By the decision to rescue Bear Stearns, the Federal Reserve, the institution responsible for monetary policy in the US, chief protagonist of free-market capitalism, declared this era over"**

(Martin Wolf, ***Financial Times***, March 26, 2008)

Contents

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- The Engulfing Financial Crisis
- Restructuring Structured Finance
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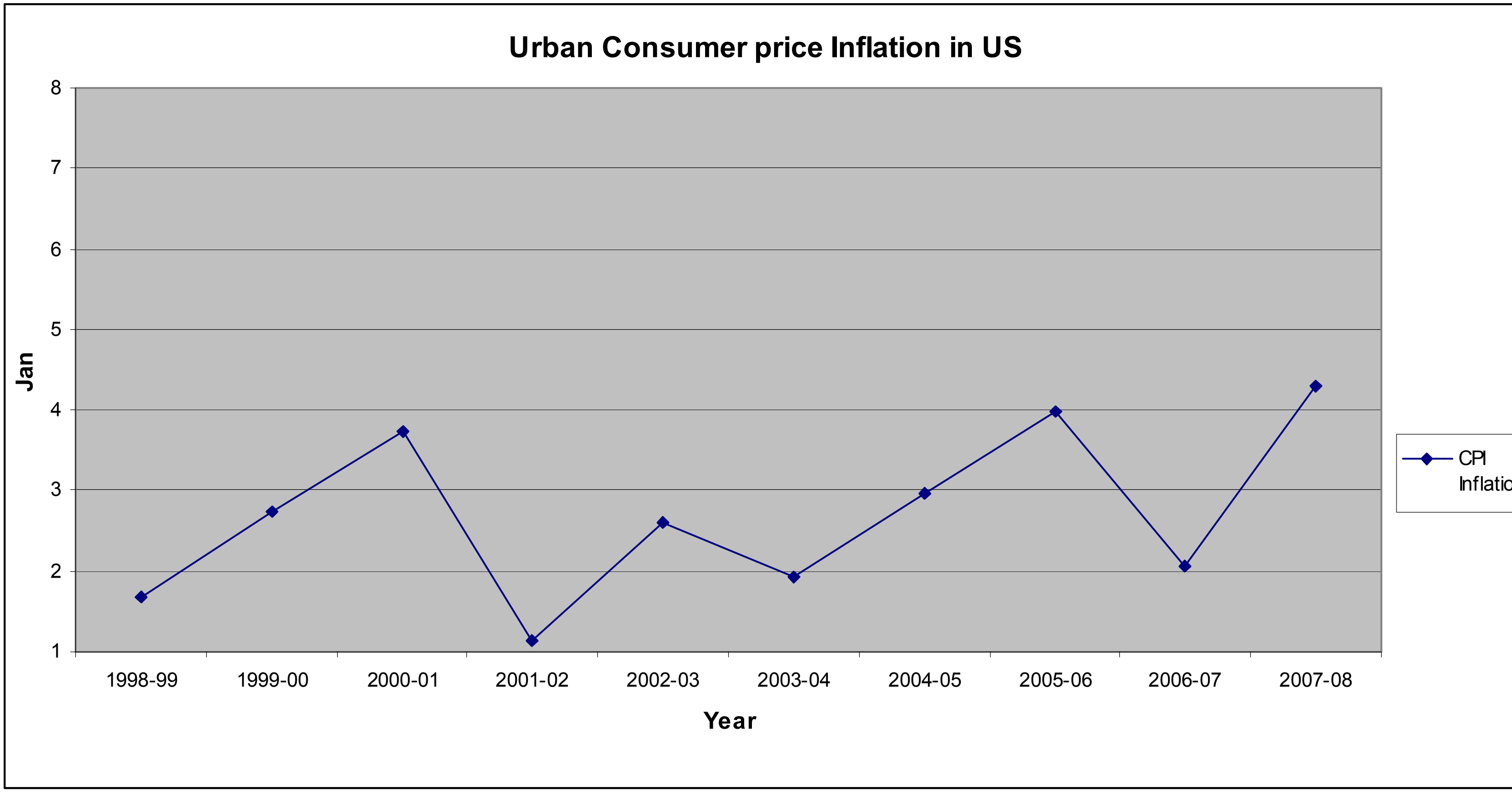
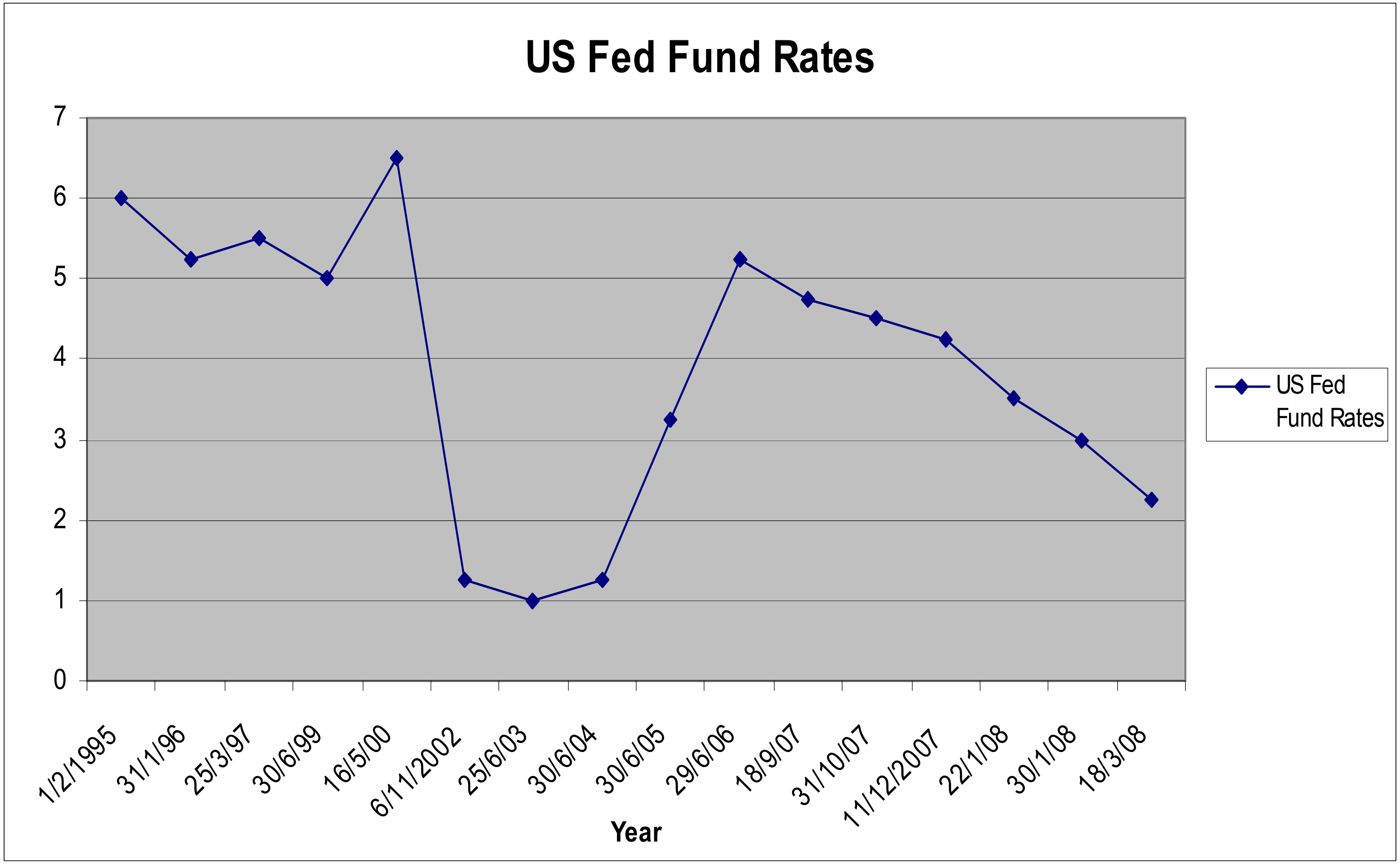
Macroeconomic Backdrop of the Current US Financial Crisis

Low Inflation

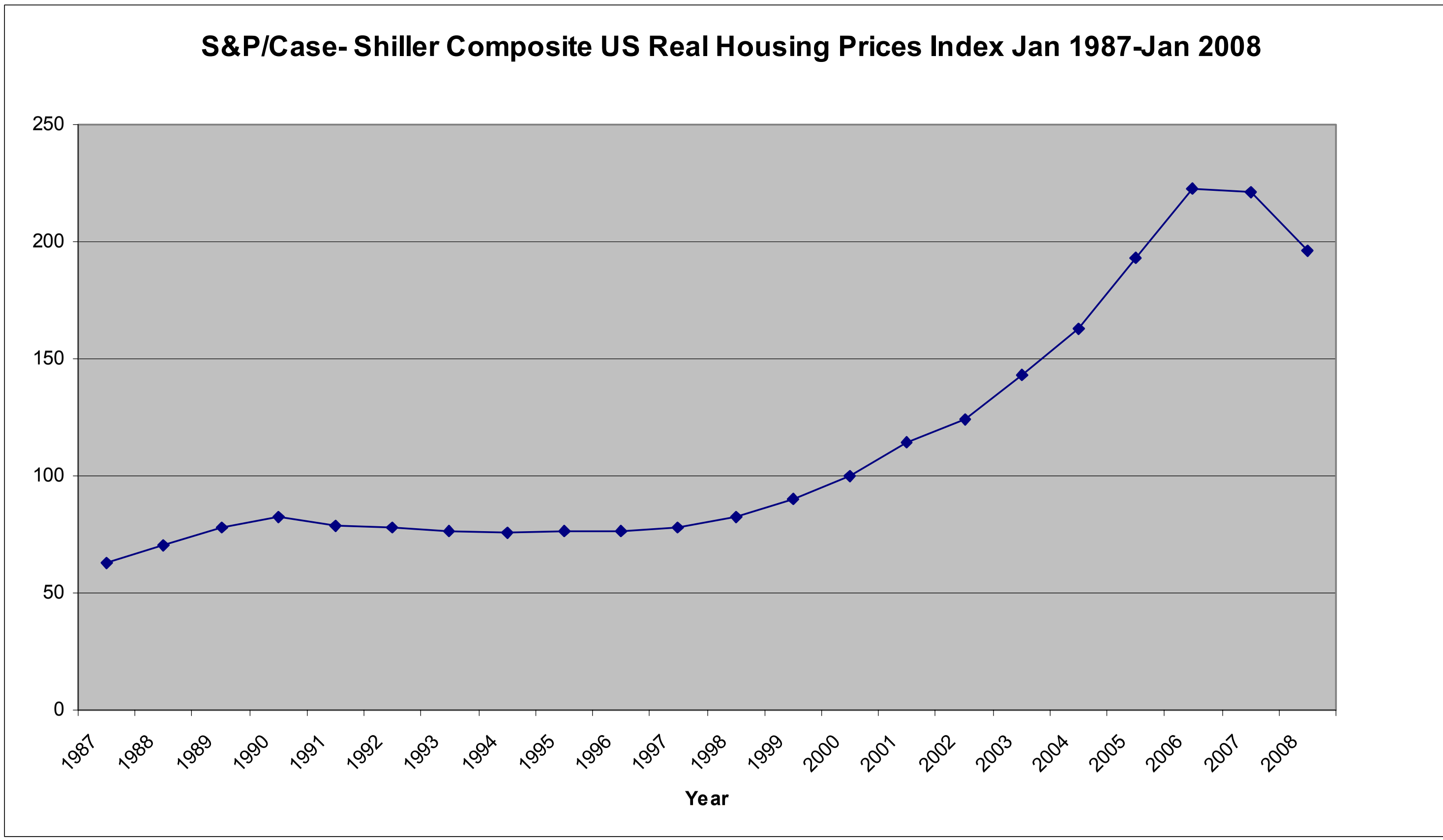


The Greenspan ‘Put’



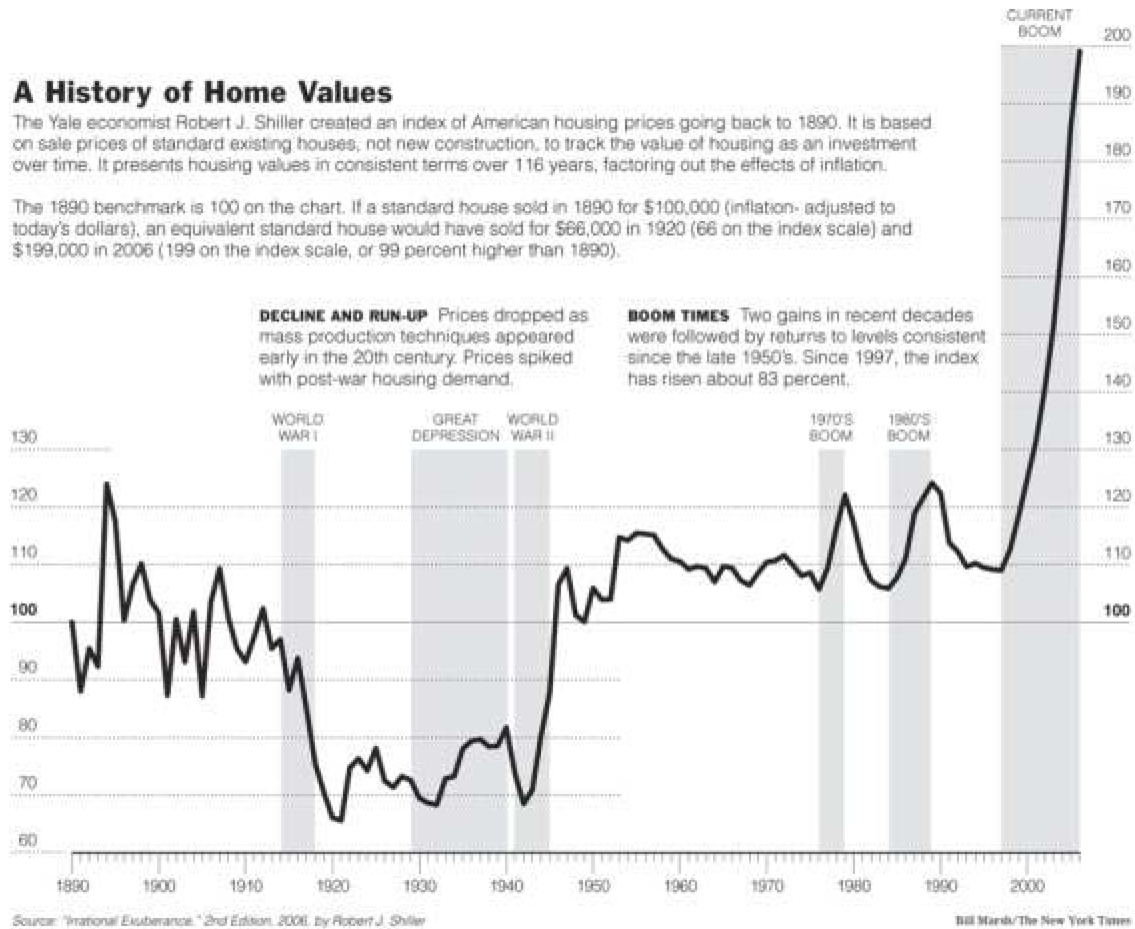
Real Estate Boom

2000=100

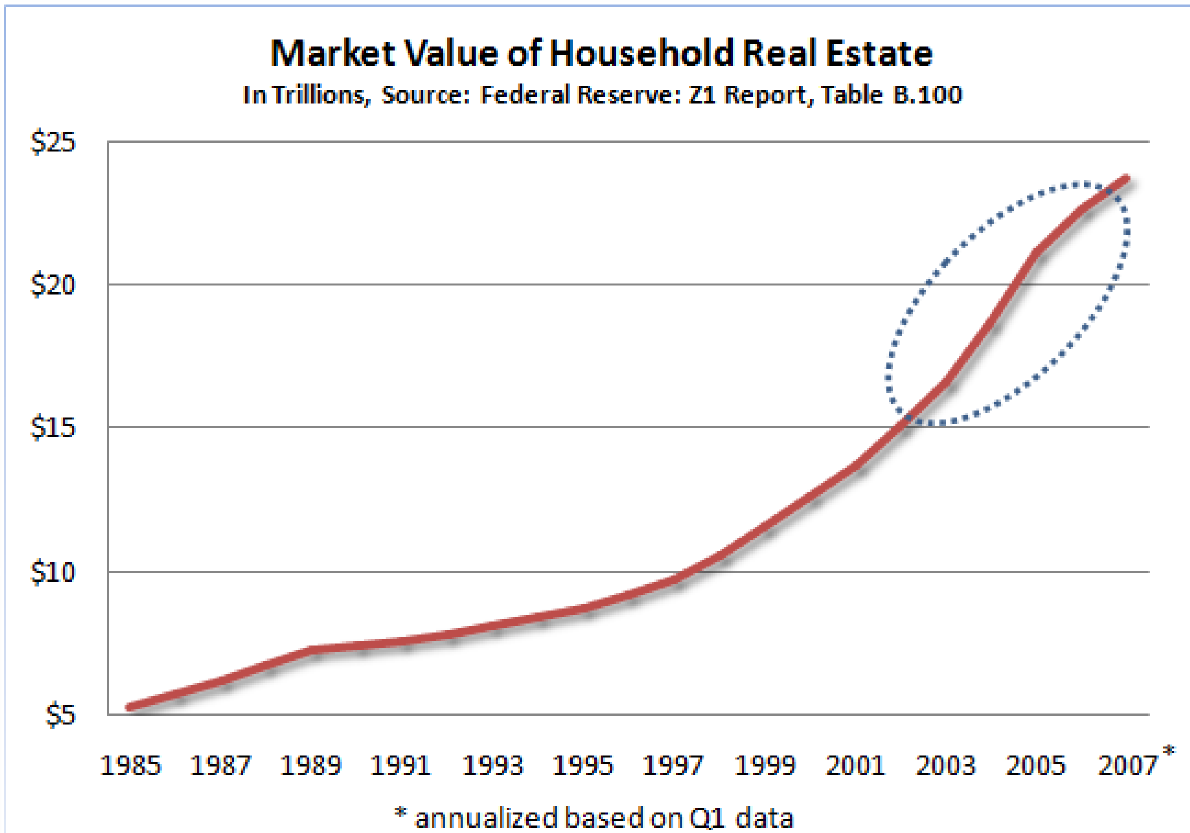


Shiller Index : Long-term Trends

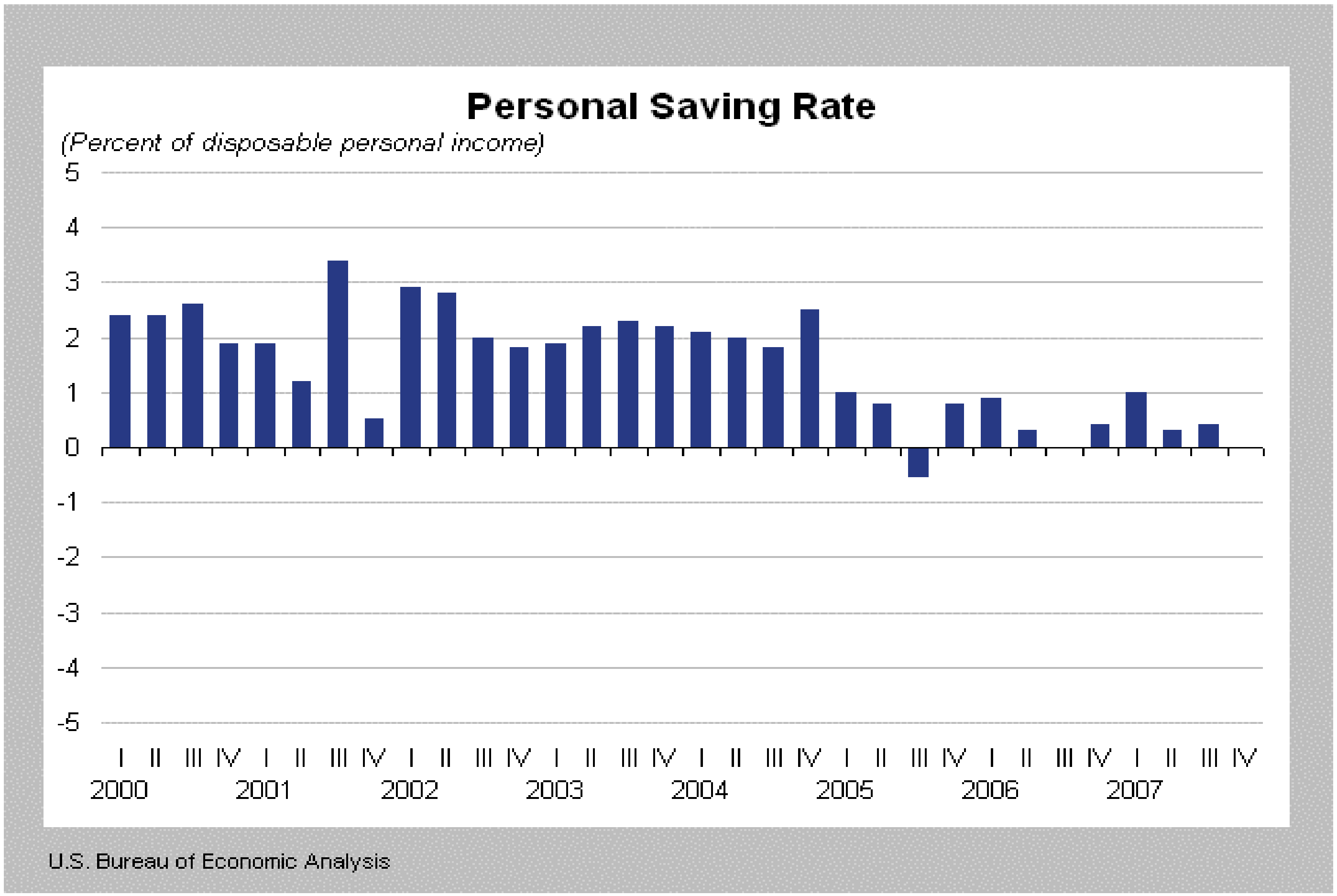
1890=100



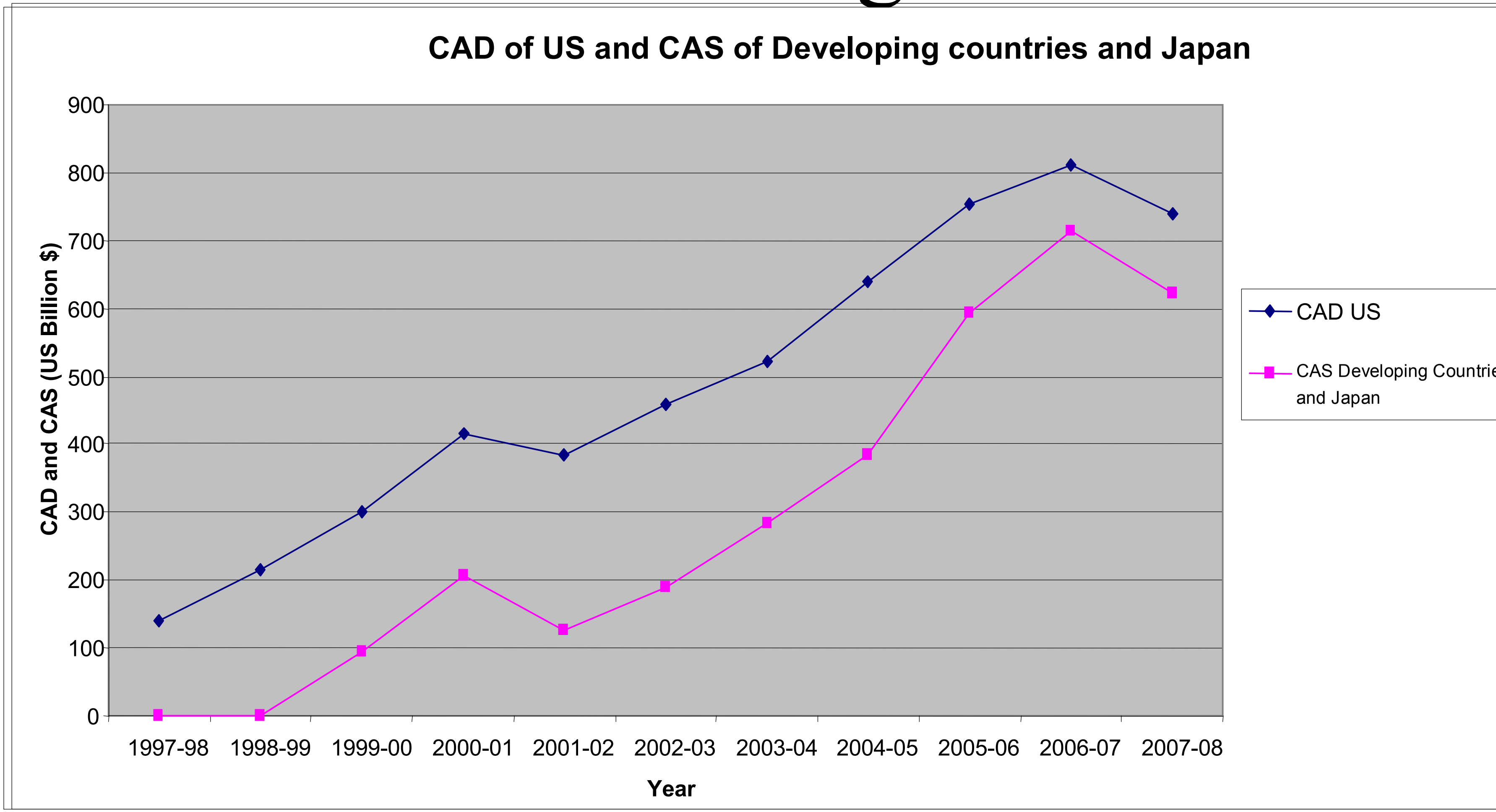
The US Housing Bubble



Falling US Personal Savings



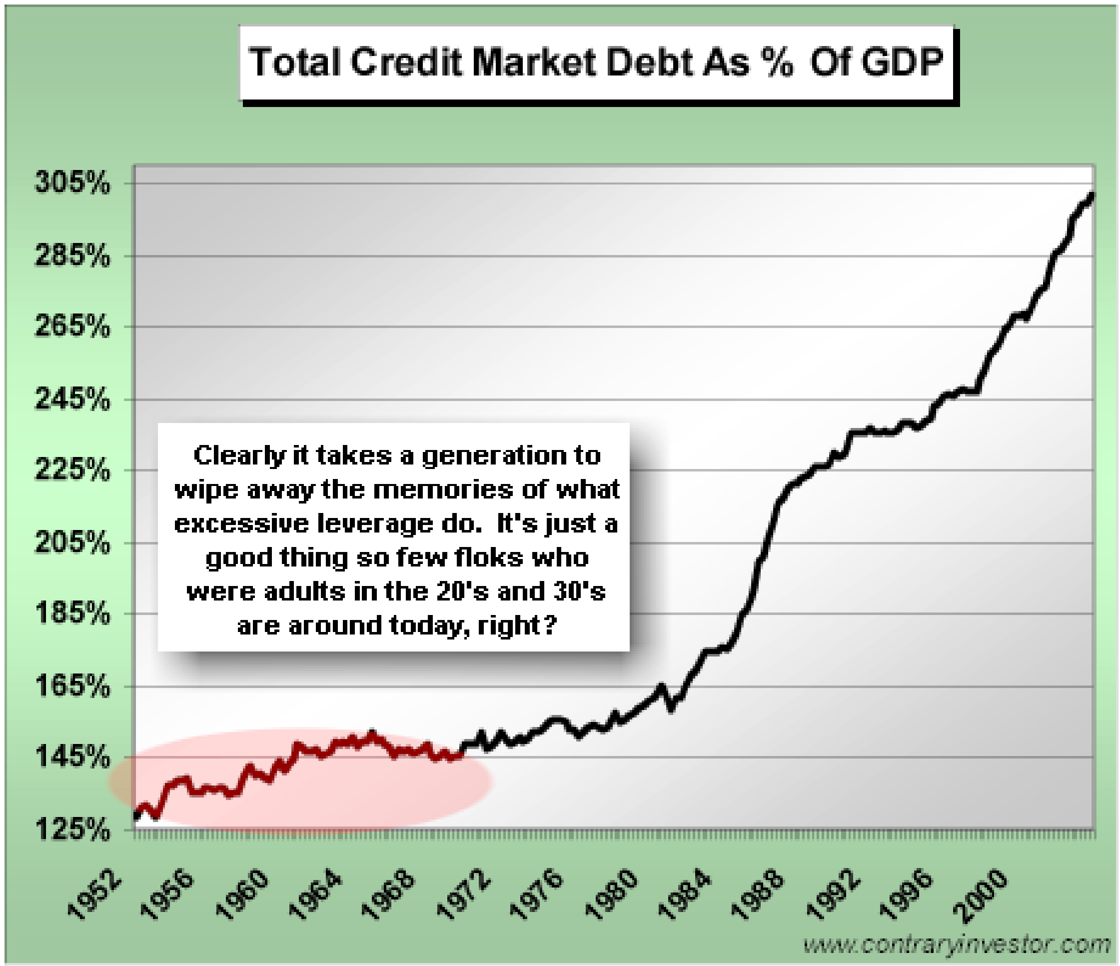
US Current Account Deficit & Its Funding



Excessive Leveraging

- US private sector debt as a proportion of the GDP peaked at 230% just before the Great Depression, plunging to under 50% at the end of WWII, and then rose to 270% by 2005.
- The outstanding volume of exchange-traded and over-the-counter derivatives increased from US$5.7 trillion (or 26% of global GDP) in 1990 to US$415.2 trillion (or 789% of global GDP) at the end of 2007.
- The proliferation of derivatives and structured instruments curiously overlapped with the rise of hedge funds — from 300 in 1990 to 10,000 today. As their unleveraged assets under management increased from US$50 billion in 1990 to US$2 trillion, hedge funds (and others employing similar strategies) fuelled the growth of derivatives to become major providers of market liquidity
- At the end of 2007, Bear Stearns had a ratio of assets to shareholders’ equity of 34 to 1, closely followed by Morgan Stanley and Lehman had ratios of assets to shareholders' equity of 33 to 1, closely rivaled by 28 to 1 at Merrill. The curse that felled Bear Stearns: If the value of the portfolios of any of these firms falls by 3%, their entire capital would be wiped out.

Excessive Leveraging



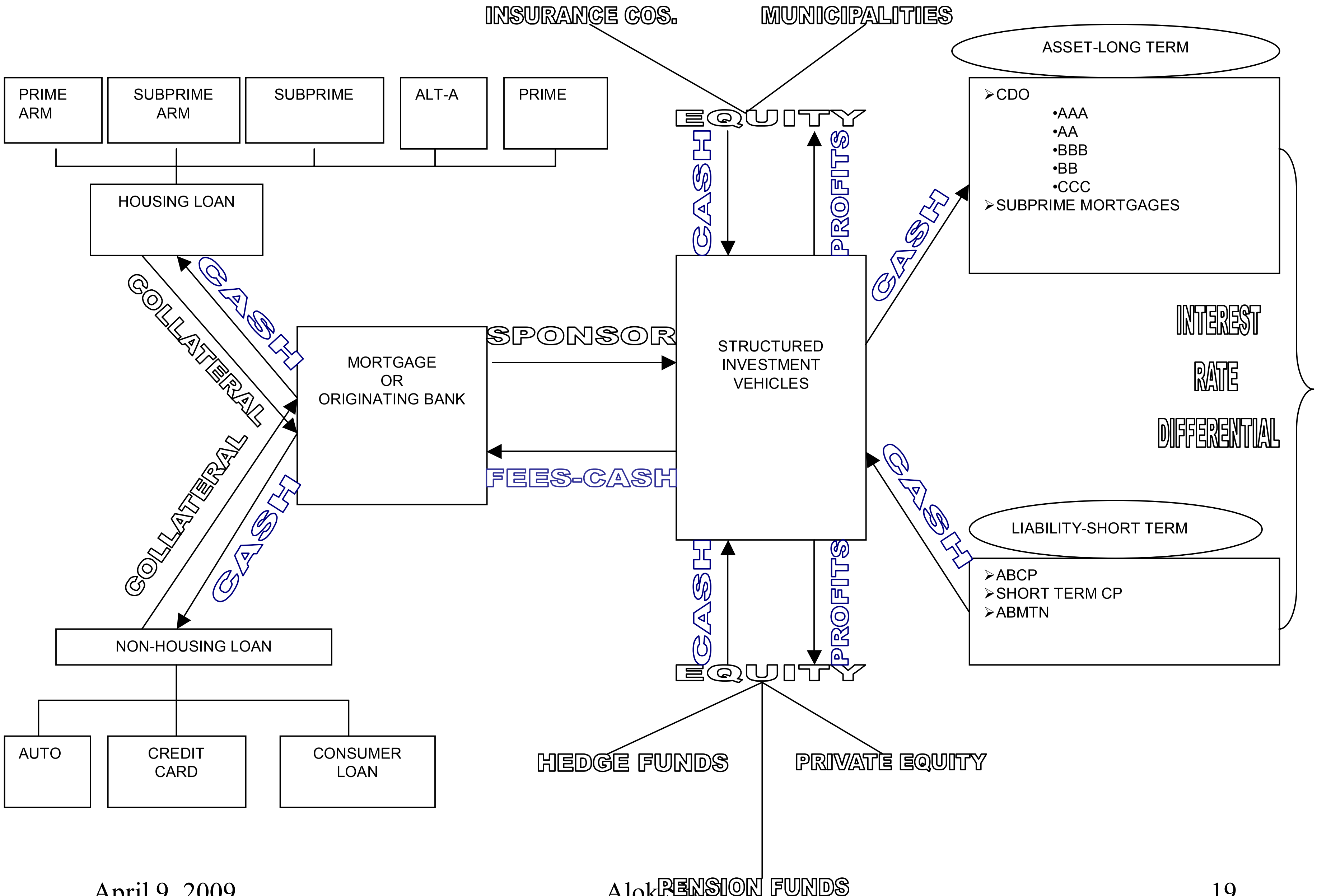
Asset Backed Securitization

Sub Prime Housing Mortgages

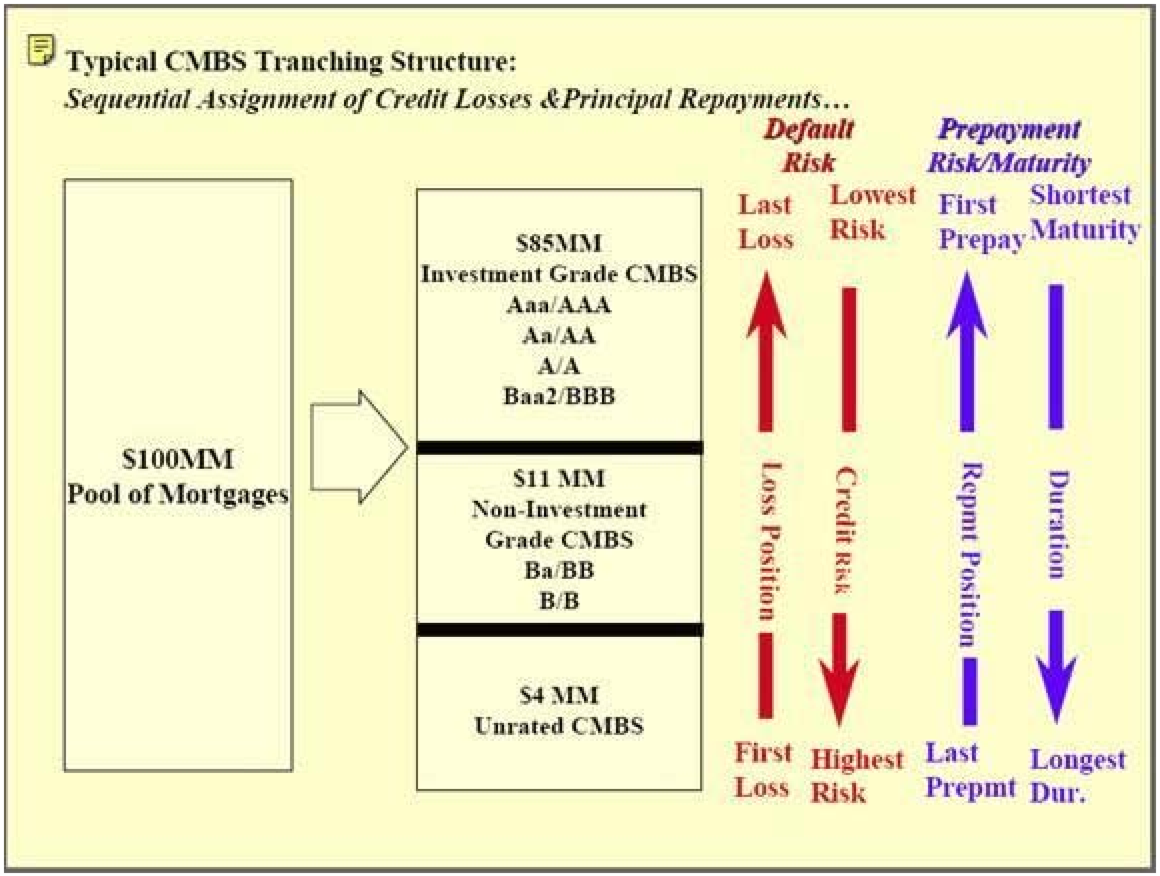
- Prime mortgages, such as those through the regulated agencies Fannie Mae and Freddie Mac, insist on proving adequate income to repay loan along with necessary covenants/documentation.
- Cheap money, housing boom and financial innovation diluted credit discipline through
  - ‘Covenant lite’ Alt A loans.
  - Sub-prime loans that did not insist on income adequacy since they were predicated on wealth increases (‘home equity’) in a booming market.
- Because of the current income deficit, Sub prime loans costs were back-loaded ARMs: 2/28 ‘teaser interest rate’ and “Interest Only”
- Sub prime mortgages allowed several minority and low income groups to own houses. ***US Census Bureau***: Home ownership increased to 69.3% in 2004, up 5.4% since 1991.
- The housing boom was also speculative, especially in the States of Nevada, Arizona, Florida and California where a large number of investor driven house purchases were made.

LBO Boom

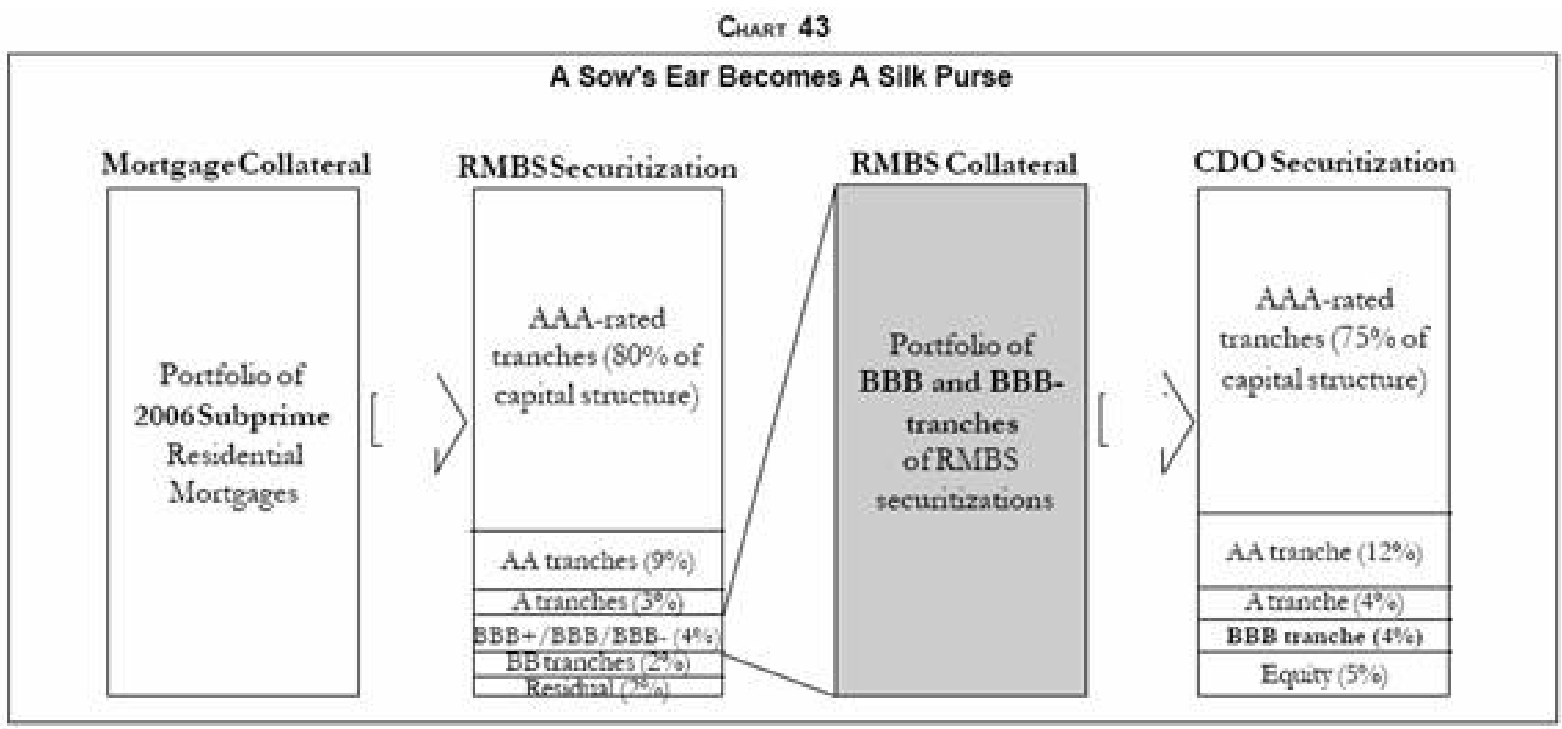
- PEFs took advantage of low cost funding to leverage funds with cash flows of target company as collateral.
- Leveraging through senior and mezzanine bank loans and high yield junk bonds as their prices dropped in view of high liquidity and low interest rates.
- Banks subsequently sold the debt through senior and junior CBO/CLO tranches, a la the CDO model.


INSURANCE COS.
MUNICIPALITIES
ASSET-LONG TERM
PRIME ARM
SUBPRIME ARM
SUBPRIME
ALT-A
PRIME
HOUSING LOAN
CASH
COLLATERAL
MORTGAGE OR ORIGINATING BANK
SPONSOR
FEES-CASH
STRUCTURED INVESTMENT VEHICLES
EQUITY
CASH
PROFITS
➢CDO
•AAA
•AA
•BBB
•BB
•CCC
➢SUBPRIME MORTGAGES
INTEREST RATE DIFFERENTIAL
LIABILITY-SHORT TERM
➢ABCP
➢SHORT TERM CP
➢ABMTN
COLLATERAL
CASH
NON-HOUSING LOAN
AUTO
CREDIT CARD
CONSUMER LOAN
HEDGE FUNDS
PRIVATE EQUITY
PENSION FUNDS

Structured Finance: Alchemy



Structured Finance: Alchemy Squared



Assets of Commercial Banks in US

Commercial Banks in US		US $ Billion		
Assets		**10,973**		
Bank credit		9,290	**- 85%**	
➢ Securities in bank credit	-	**26%**		
➢ Loans and leases in bank credit	-	**74%**		
o Commercial & industrial				21%
o Real estate				52%
o Consumer				12%
o Other				15%
Other		1,683	**- 15%**	

Disintermediation: Mortgage Debt Outstanding

Trillions of dollars, end of period

Type of holder and property	2003	2004	2005	2006	2007Q3 p
All holders	**9.4**	**10.7**	**12.1**	**13.3**	**14.4**
Commercial banks	**24%**	**24%**	**24%**	**26%**	**24%**
Mortgage Pools & Trusts	**48%**	**47%**	**48%**	**49%**	**50%**
(Private Mortgage Conduits)	**(10.4%)**	**(13.4%)**	**(17.5%)**	**(19.1%)**	**(20.5%)**
Savings institutions	**9%**	**10%**	**10%**	**8%**	**8%**
Individuals & others	**10%**	**11%**	**11%**	**11%**	**10%**

Outstanding Consumer debt

(excl. loans secured by real estate)

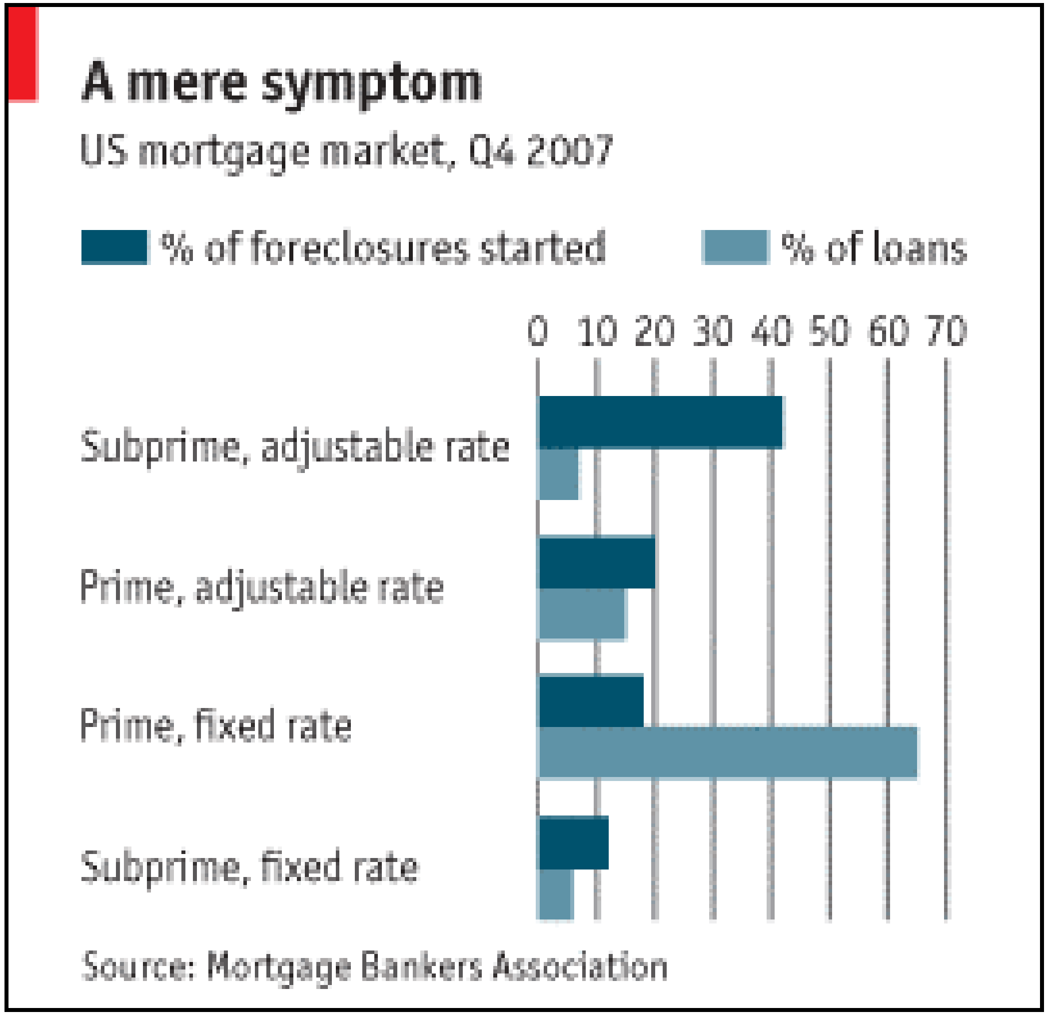
Total in US $ Billion (Oct.2007)	**2,504.4**	
By major holder		
Commercial banks	771.1	30.8%
Finance companies	568.1	22.7%
Credit unions	238.6	9.5%
Federal government and Sallie Mae	98.2	3.9%
Savings institutions	87.2	3.5%
Non-financial business	53.8	2.1%
Pools of securitized assets	687.3	27.4%

The Engulfing Sub Prime Financial Crisis

Onset of Sub Prime Crisis

- Interest rates rise
- Housing prices fall
- ARMs reset at higher 'floating' interest rates
- Home equity turns negative making it difficult to buy cheaper second/third mortgages
- Sub prime defaults rise
- Foreclosures increase

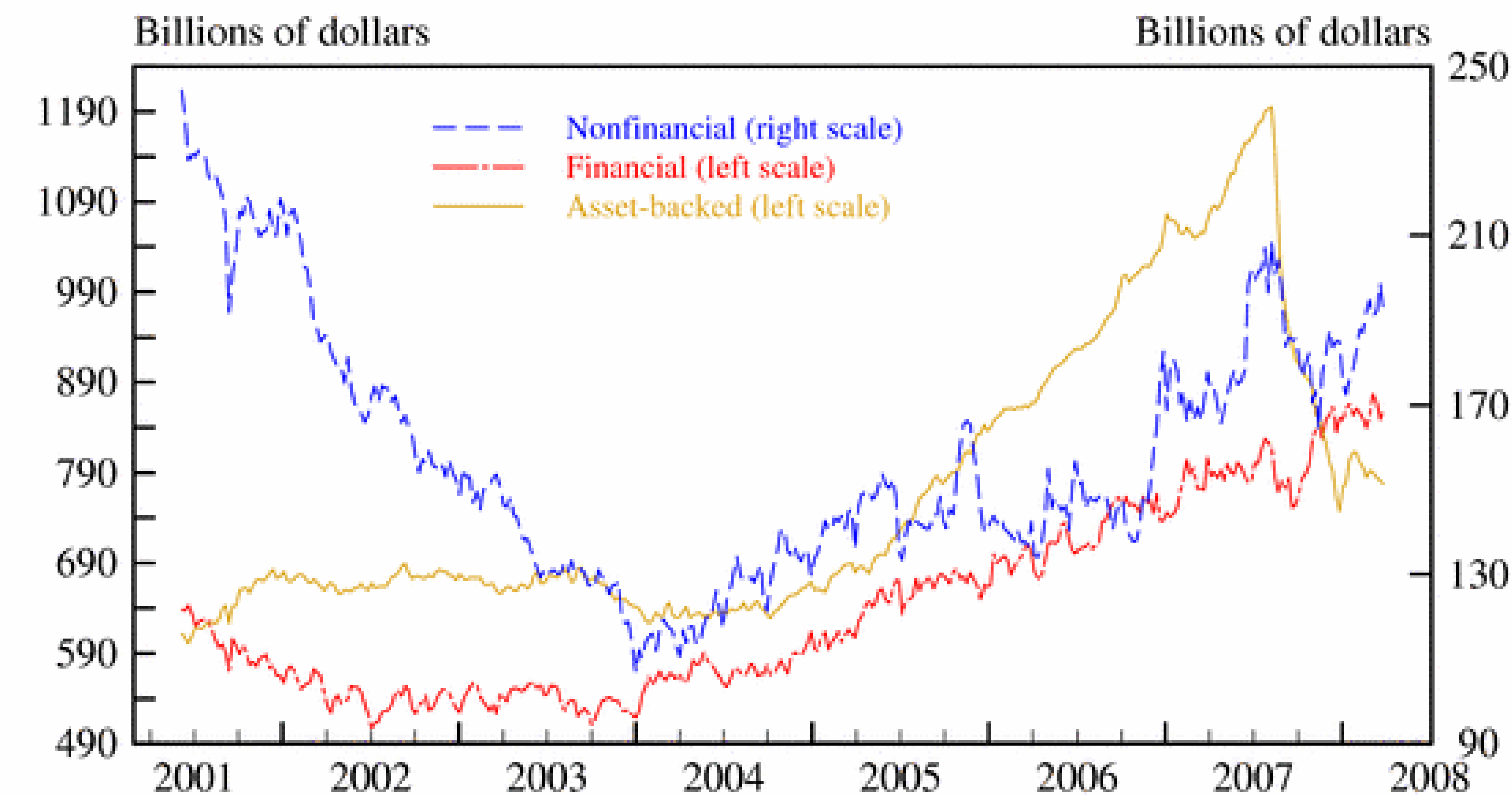
Sub Prime Mortgage Defaults



Contagion

- Prices of ALL CDOs fall
  - Sub prime mortgages were repackaged with highly rated paper
  - Wide dispersion of asset backed paper
  - Information asymmetries regarding risk distribution
- CDO market collapses and ABX index plunges
- Leveraged CDO investors like hedge funds and PEFs face margin (‘haircut’) pressures leading to distress selling pressures
- Cost of rolling over ABCP rises as market dries up
- Banks forced to take CDOs back on balance sheets
- Banks book losses by marking to market
- Capital adequacy norms makes bank hoard liquidity leading to credit freeze, de-leveraging and and re-pricing of risk
- LBO market dries up and banks unable to take debt off their balance sheets

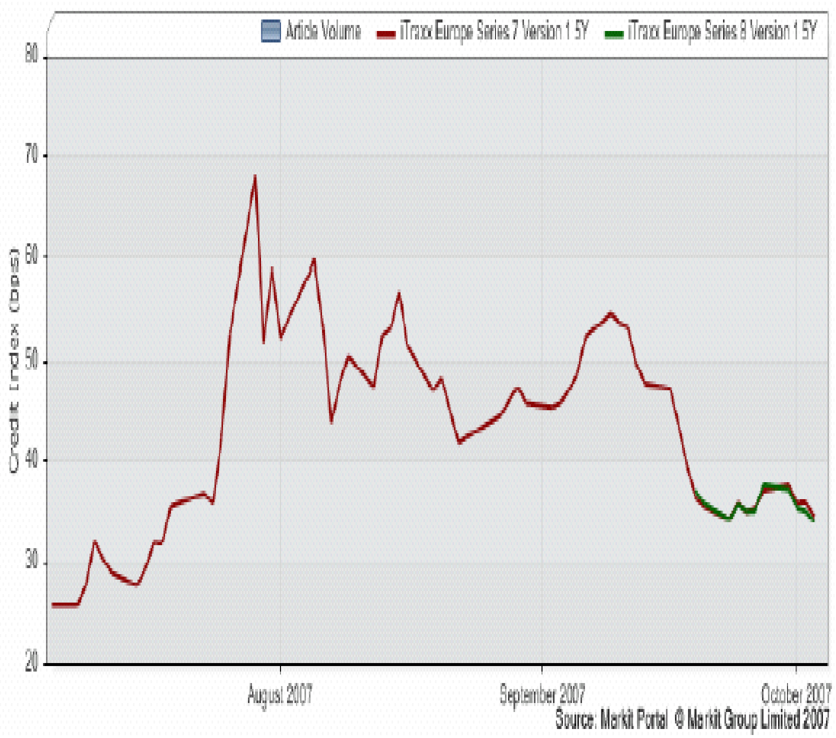
De-leveraging



US Commercial Paper Outstanding

Credit Re-pricing I

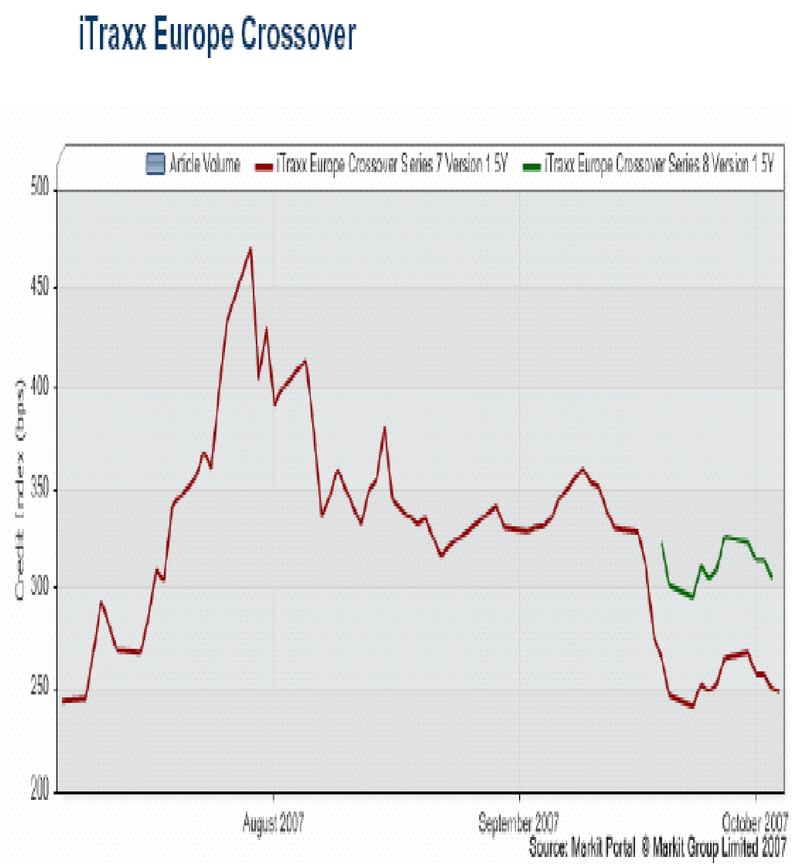
iTraxx Europe



March 29, 2008

Index	Term	Coupon
iTraxx Europe	3Y	1.40%
iTraxx Europe	5Y	1.65%
iTraxx Europe	7Y	1.70%
iTraxx Europe	10Y	1.75%

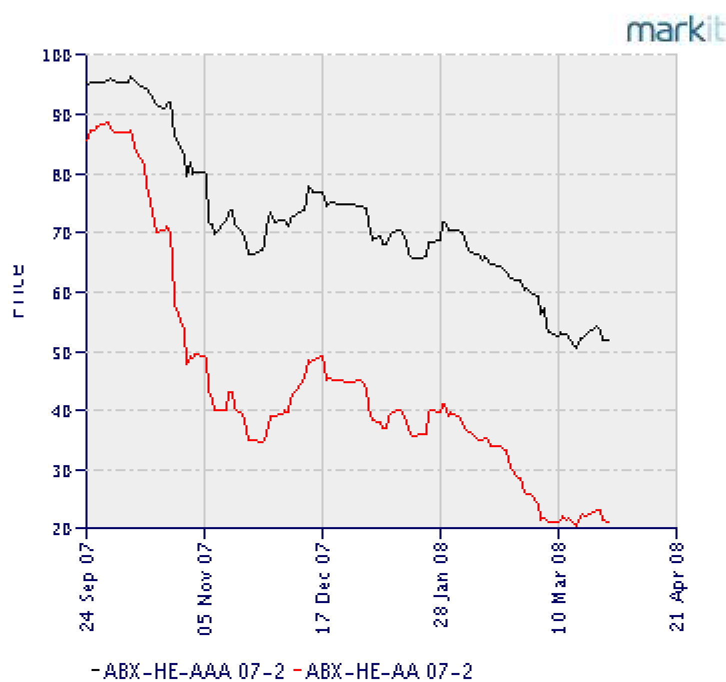
Credit Re-pricing II



March 29, 2008

Index	Term	Coupon
iTraxx Europe Crossover	3Y	6.25%
iTraxx Europe Crossover	5Y	6.50%
iTraxx Europe Crossover	7Y	6.45%
iTraxx Europe Crossover	10Y	6.40%

Mark to Market Dilemma

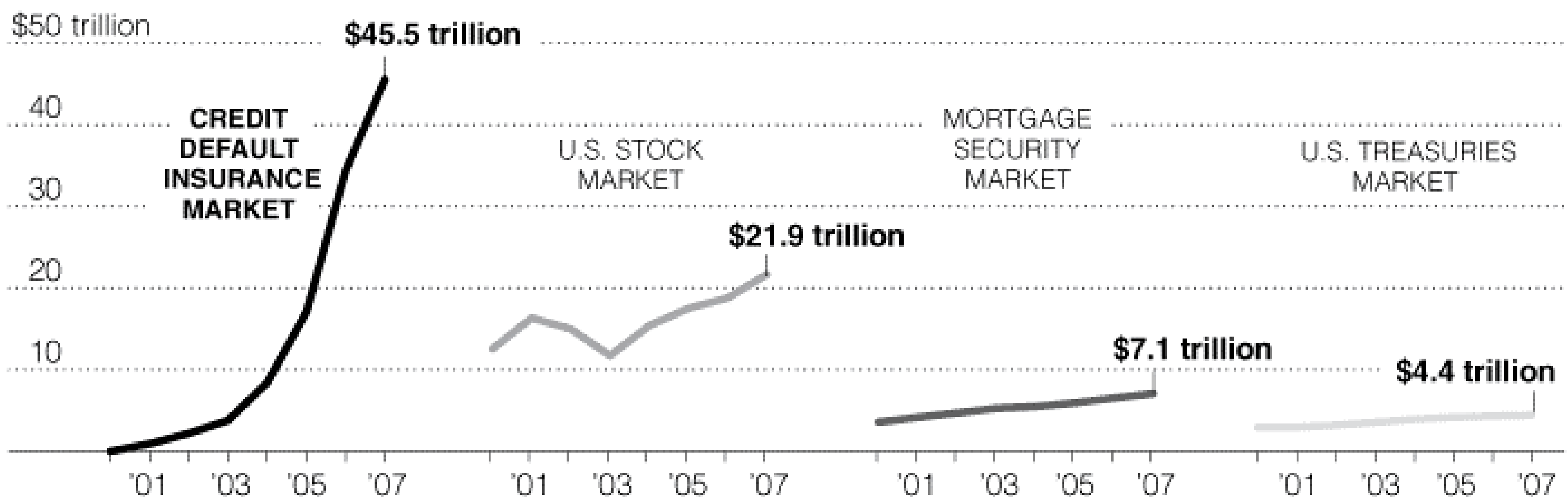


Date	Index Name	Coupon	Price
28-Mar-08	ABX-HE-AAA 07-2	0.76%	51.93
28-Mar-08	ABX-HE-AA 07-2	1.92%	21.32
28-Mar-08	ABX-HE-A 07-2	3.69%	16.07
28-Mar-08	ABX-HE-BBB 07-2	5.00%	12.18
28-Mar-08	ABX-HE-BBB- 07-2	5.00%	11.93

Credit Default Swaps

In the Shadow of an Unregulated Market

The value of the credit default insurance market is now much larger than the domestic stock market, mortgage securities market and United States Treasuries market.



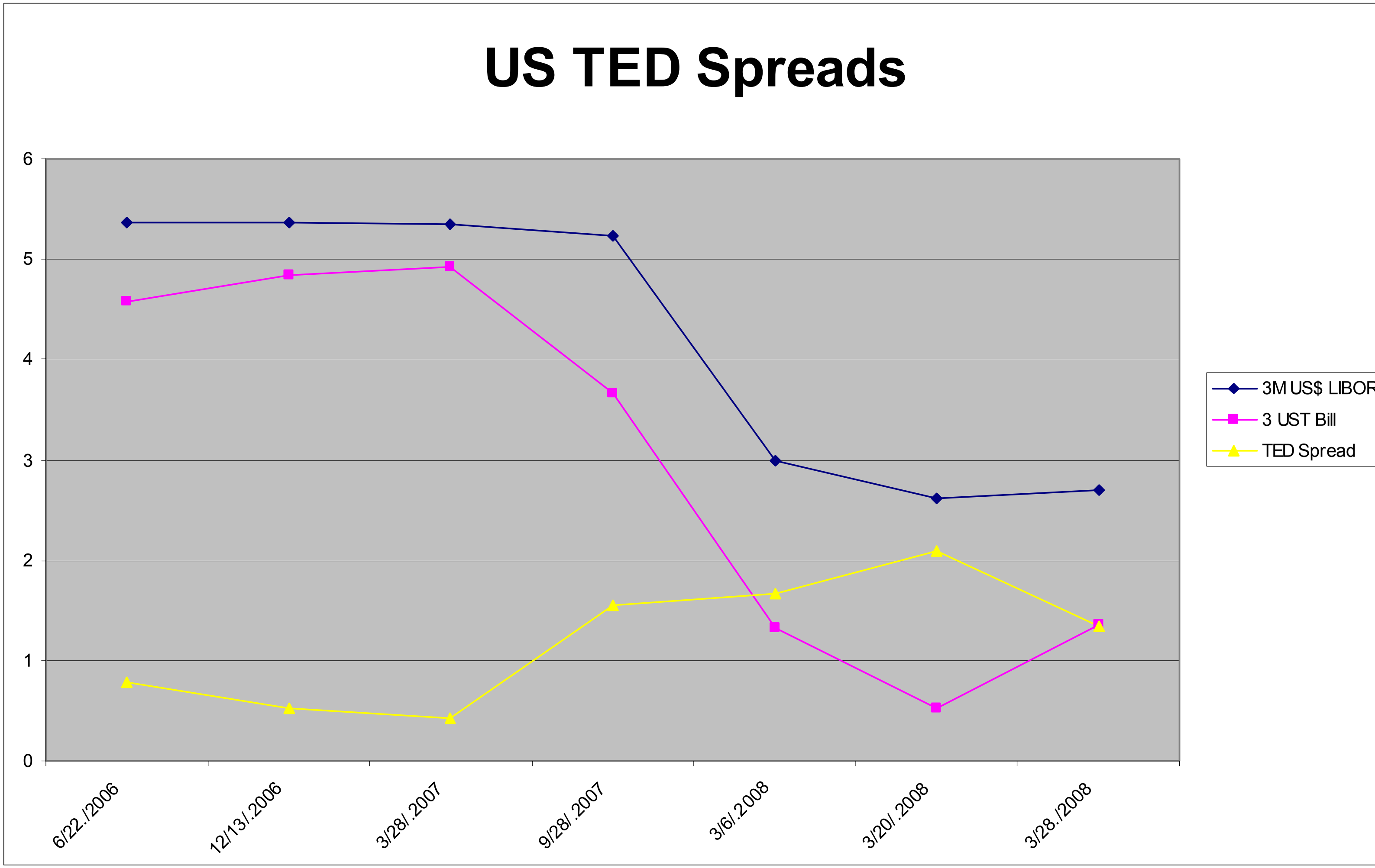
Sources: Thomson Proprietary Research; International Swaps and Derivatives Association

THE NEW YORK TIMES

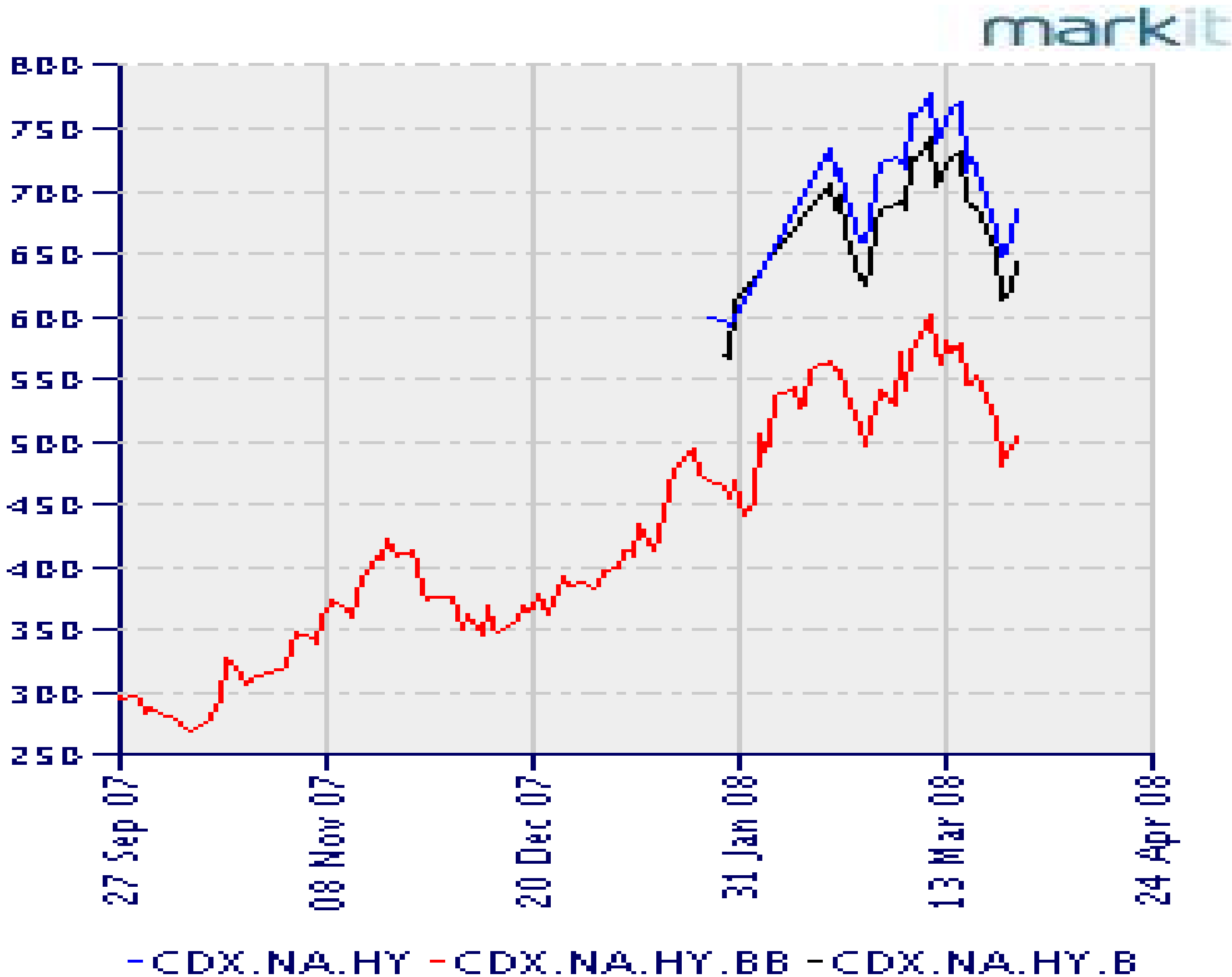
Contagion: CDS Crisis

Index March 29, 2008	**Spread**
CDX.NA.HY	685
CDX.NA.IG	142
CDX.NA.IG.HVOL	325
CDX.NA.XO	319
CDX.EM	272
CDX.EM.DIVERSIFIED	256
CDX.NA.HY.BB	504
CDX.NA.HY.B	643

Credit Freeze



Junk Bonds



markit
800
750
700
650
600
550
500
450
400
350
300
250
27 Sep 07
08 Nov 07
20 Dec 07
31 Jan 08
13 Mar 08
24 Apr 08
CDX.NA.HY
CDX.NA.HY.BB
CDX.NA.HY.B

Deleveraging

- US ABCP has fallen off sharply by 33% from its mid 2007 peak of US $ 1.2 trillion
- New structured finance deals declined by 89% in first quarter of 2008 relative to first quarter of 2007.
- Leveraged loans for buy-outs declined by 84% in first quarter of 2008 relative to first quarter of 2007.
- Leveraged loans for buy-outs declined by 84% in first quarter of 2008 relative to first quarter of 2007.
- Global debt issuance declined by 48%, and M&A volumes by 40%, compared to first quarter of 2007
- Banks write-down losses of $ 200 billion (out of $ 285 estimated by Standard and Poors)
- US Fed injects liquidity by repeatedly lowering Fed rates, lending to banks against doubtful collateral and bail-out of Bear Stearns.
- PEFs and SWFs step in to inject capital into banking system

Loan Delinquency Rates

	Real estate loans			Consumer loans						
	All	Residential 1	Commercial 2	All	Credit cards	Other	Leases	C&I loans	Agricultural loans	Total loans and leases
1985:04:00	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.73
1986:04:00	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.62
1987:04:00	4.93	n.a.	n.a.	3.53	n.a.	n.a.	1.71	5.81	6.87	5.21
1988:04:00	4.48	n.a.	n.a.	3.50	n.a.	n.a.	1.37	4.66	4.82	4.60
1989:04:00	5.19	n.a.	n.a.	3.78	n.a.	n.a.	1.84	4.82	3.86	4.89
1990:04:00	7.17	n.a.	n.a.	4.22	n.a.	n.a.	2.30	5.90	3.30	5.95
1991:04:00	7.12	3.43	11.33	4.22	5.30	3.62	2.23	5.66	3.35	5.78
1992:04:00	5.89	2.95	9.60	3.64	4.70	3.07	2.05	4.45	3.02	4.81
1993:04:00	4.25	2.51	6.62	3.06	3.91	2.56	1.16	2.81	2.37	3.35
1994:04:00	3.04	2.17	4.26	2.81	3.30	2.51	0.86	1.99	2.14	2.49
1995:04:00	2.79	2.33	3.38	3.42	3.99	3.02	1.02	1.88	2.29	2.46
1996:04:00	2.63	2.46	2.84	3.84	4.68	3.24	0.98	1.77	2.70	2.40
1997:04:00	2.35	2.39	2.21	3.93	4.90	3.27	1.14	1.55	2.19	2.27
1998:04:00	2.18	2.21	2.00	3.92	4.82	3.35	1.07	1.72	2.48	2.23
1999:04:00	1.88	2.11	1.45	3.71	4.63	3.17	1.28	1.87	2.33	2.09
2000:04:00	2.07	2.45	1.51	3.85	4.70	3.29	1.77	2.40	2.30	2.39
2001:04:00	2.25	2.41	1.90	3.86	4.86	3.30	2.36	3.43	2.32	2.82
2002:04:00	1.95	2.13	1.59	3.65	5.05	2.90	2.12	3.82	2.21	2.65
2003:04:00	1.74	1.93	1.38	3.46	4.62	2.79	1.68	2.81	1.95	2.21
2004:04:00	1.36	1.51	1.09	3.19	4.20	2.49	1.37	1.80	1.30	1.69
2005:04:00	1.47	1.78	1.03	2.82	3.65	2.25	1.26	1.43	1.05	1.60
2006:04:00	1.78	2.11	1.32	3.07	4.05	2.42	1.36	1.15	1.09	1.75
2007:04:00	3.08	3.43	2.72	3.56	4.67	2.84	1.43	1.33	1.05	2.6

Restructuring Structured Finance

Restructuring Structured Finance

- Strengthening Basel capital adequacy norms to address escalating off-balance sheet exposures
- Addressing liquidity risk arising from excessive leveraging and maturity mismatches minimizing moral hazards deriving from central bank/government bail-outs
- Reforming banking emolument structure
- Restoring credit discipline to the originate and distribute model
- Reviewing list of products that only qualified investors can buy
- Bringing hedge funds, SIVs and CDS within the regulatory framework
- Tweaking the Mark-to-Market mechanism
- Regulating regulators
  - Rating agencies
  - Central banks

US Treasury Blueprint

- Three separate regulators to replace the current system of segregated functional regulation of banking, insurance, securities and futures that is largely incompatible with today's integrated markets
  - Market stability regulator
  - Prudential regulator, including merging of the DEC and CFTC
  - Business conduct regulator

Unorthodox Suggestions

- Tax funded recapitalization of Banks
- Tax funded purchase of mortgage based securities
- Sponsoring consortium of private investors to buy mortgage based securities
- Suspending mark-to-market during financial crises
- Reviving the Glass-Steagall Act

The Regulatory Dilemma

- Finance is a brain for matching labour to capital, for allowing savers and borrowers to defer consumption or bring it forward, for enabling people to share, and trade, risks. The smarter the system is, the better it will do that. A poorly functioning system will back wasteful schemes and shun worthy ones, trap people in the present, heap risk on them and slow economic growth. This puts finance in a dilemma. A sophisticated and innovative financial system is susceptible to destructive booms; but **a simple, tightly regulated one will condemn an economy to grow slowly**.

- And even if you could put all that right, regulators would still fail, because of the nature of finance itself. Financial progress is about learning to deal with strangers in more complex ways. The village moneylender, limited by his need to know those he did business with, was gradually superseded by ever-broader impersonal markets that can cheaply mobilise colossal sums and sell more complex products. **The remarkable thing is not that finance suffers from booms and busts, but that it works at all.** People who would not dream of lending £1,000 to that nice family three doors down routinely hand over their life savings to strangers in a South Korean *chaebol* or an Atlantan start-up. **It all depends on trust. Regulators cannot know how trust will ebb and flow as new markets develop** the experience and practice they need to work better. They therefore cannot predict the peril of new ideas. They have to let new markets develop, or stifle them.

- **The notion that the world can just regulate its way out of crises is thus an illusion.** Rather, crisis is the price of innovation, so governments face a choice. **They can embrace new financial ideas by keeping markets open.** Regulation will be light, but there will be busts. The state will sometimes have to clear up and regulation must be about cure as well as prevention. **Or governments can aim for safety and opt for dumbed-down financial systems that hobble their economies and deprive their people of the benefits of faster growth.** ***And even then a crisis may strike***.

The Economist, London, April 3, 2008

Macro-economic Fall-out of the Crisis

- Funding of the real economy relatively unaffected so far.
- Near consensus that US is entering a recession on account of demand compression. Severity debated.
- Global slowdown, but extent of impact on global growth, especially Asia, uncertain. Decoupling hypothesis.