University of Essex

Workshop on Financial Crisis

The Credit Crunch: Causes, Consequences and Cleanup

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Professor Sheri Markose

*Director CCFEA(**Centre For Computational Finance and Economic Agents and)***
and Economics Department

University of Essex

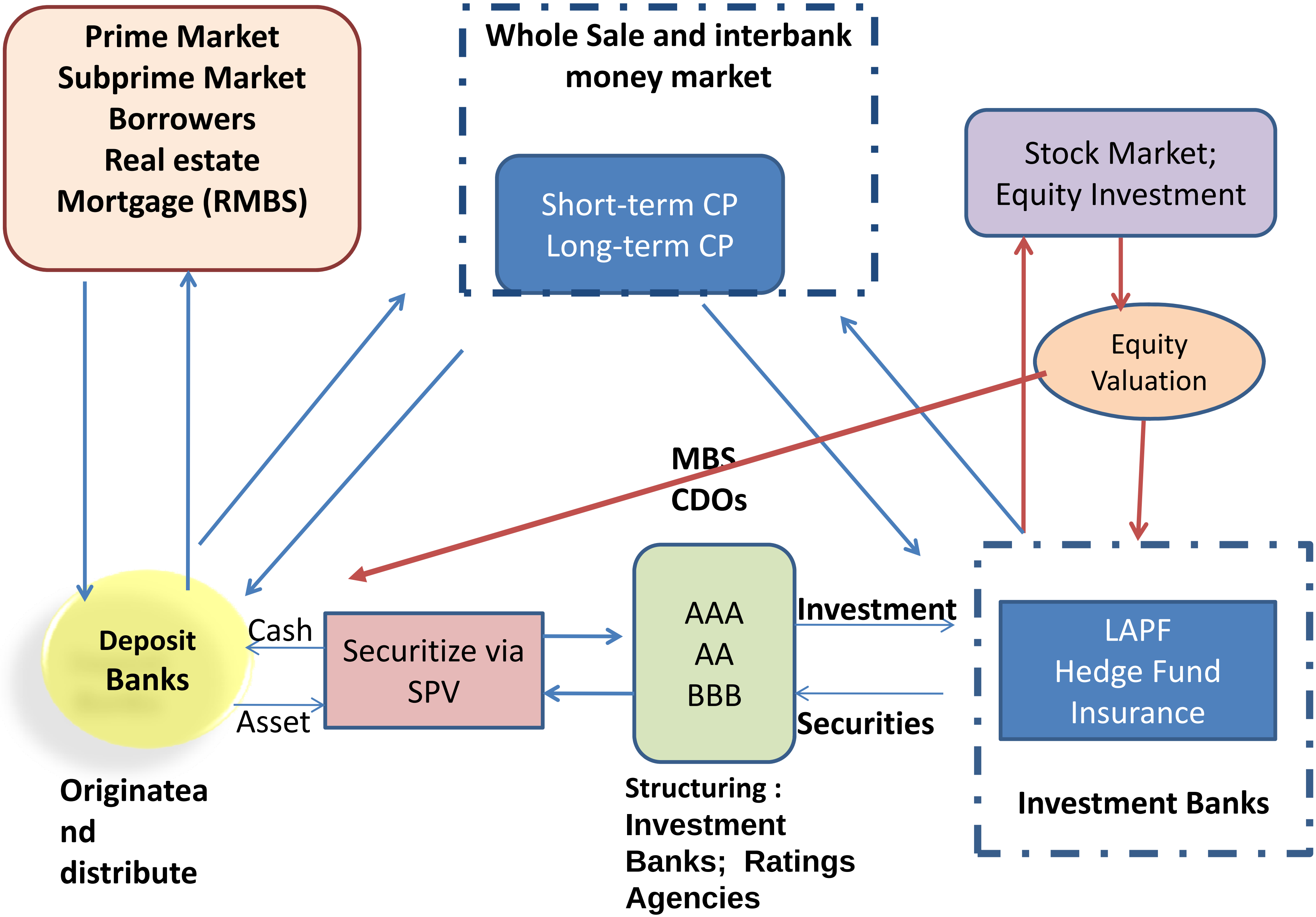
Road Map: Crisis and why are we still mired in it ?

- Financial contagion : Massive interrelationships from innovations RMBS, CDOs, CDS (weapons of mass destruction) and non-linear feedback loops
- Securitization (ABS) as a money pump ; ‘credit crunch’ quite simply the cessation of this with involuntary ‘rehousing’ by banks of impaired/toxic ABS that was spirited off balance sheet; Technical insolvency of (most) banks implies they cannot lend nor raise money from money markets
- With market failure replace lite touch by consistent public policy rules and direct delivery of ‘medicine’ specifically rather than generic tools; Small and medium sized firms going to the wall (30 K per month)
- Recovery bank for toxic assets and *not* insurance whilst on bank balance sheet : A brief example of inadequate modeling tools: Geithner problem
- Liquidity Trap : Quantitative easing too generic : 1/3 wrongly directed going overseas
- Why Dogs did not bark

Why Did the Dogs not bark?

- **Deep Doctrinal Errors; Complacency driven inability of academe and regulators to keep up research on financial innovations and to build models mapping the massive feedback loops (BoE research dept. dysfunctional; Hank Poulsen was aghast at the stone age tools in the US Treasury when he was having to draw up TARP)**
- **Willem Buiter lambasts :** ***The unfortunate uselessness of most 'state of the art' academic monetary economics' 6 March 2009, VOX*** **: Wrong Pricing Models**
- **Since demise of Keynesian macro econometric models of policy analysis :long standing lack of replacement of integrated quantitative models of macro, financial sectors**
- **Lucas Critique of Econometric Models**
- **Unfortunate misunderstanding of Lucas "surprise" inflation; latter is about regulatory arbitrage (Markose 1998, 2000)**
- **Disastrous attempts to tie hands of regulators to precomitment strategies to control money supply (1992 toppling of Sterling and ERM peg by Soros)**
- **Overflow of above into practice of central banking and financial regulation: the idea that central banks can control modern money supply (replete with money substitutes) by a simple quantitative rule is the consequence of a very large academic literature. BoE control of inflation with CPI since 1992**
- **My crusade is for full digital mapping of many key with live data feeds**
- **Complex systems methods and Agent Based Modelling with Feedback Loops**

Financial Contagion



2008 Value of SubPrime: How to Value Toxic Assets ?

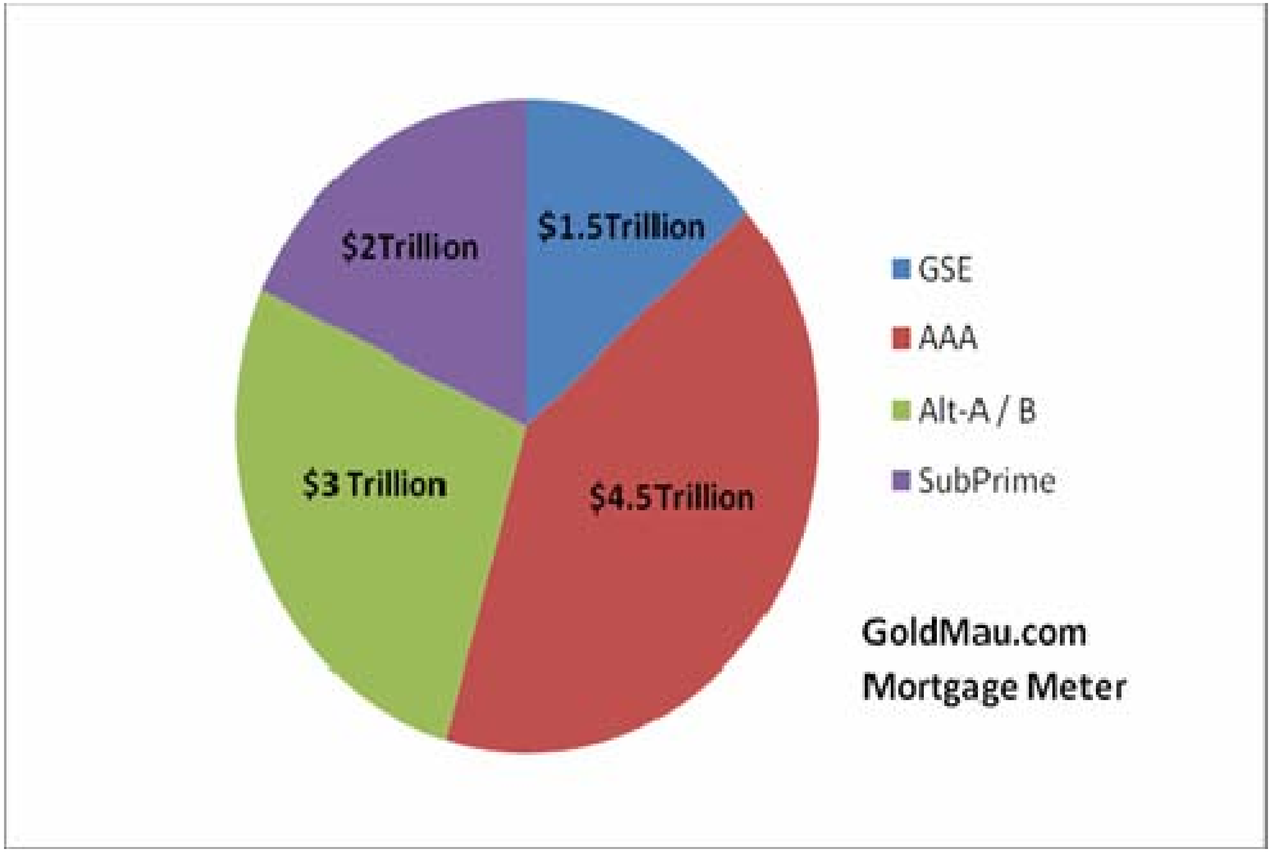
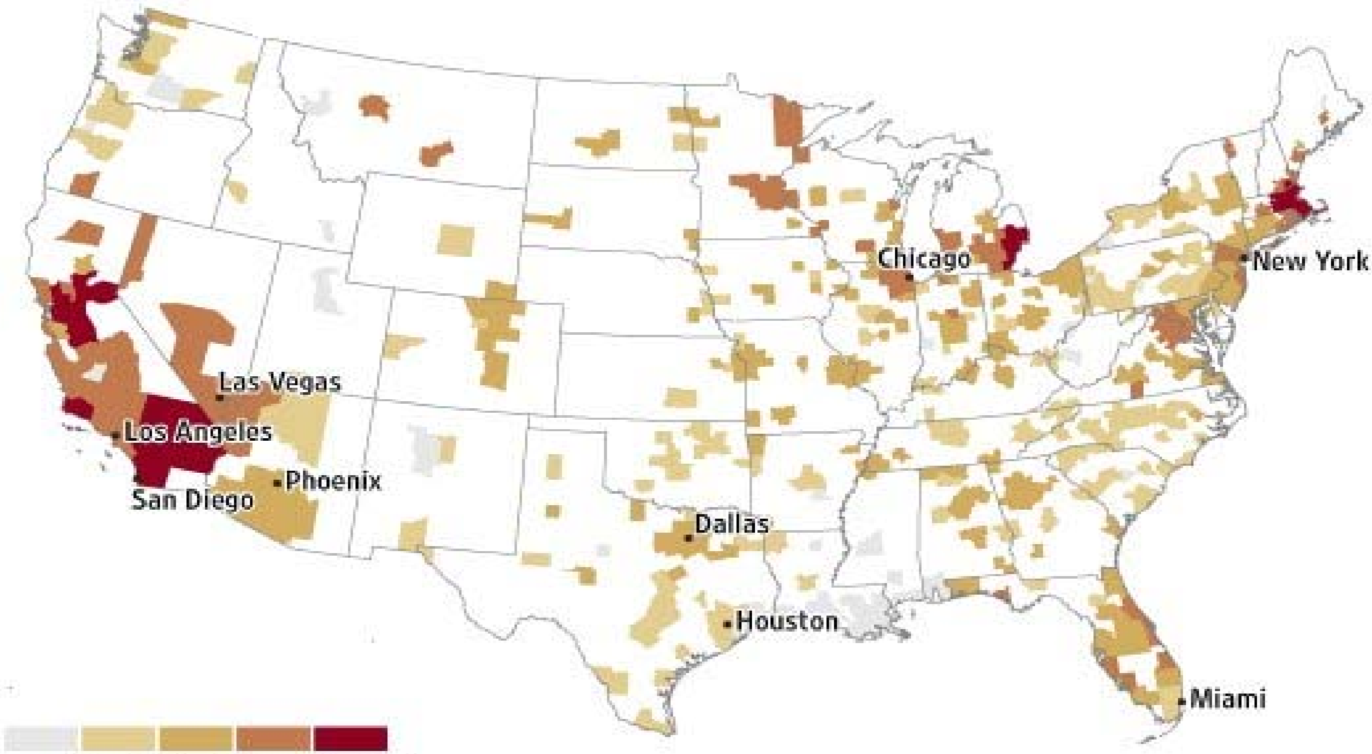


Figure 1.5: Increase in Subprime Delinquency 2005 to 2006 Map



Source: First American LoanPerformance; Census Bureau , and Wall Street Journal Online

Where it Began : Securitization of Bank Loans

Regulatory Arbitrage

- Basel I required 8% of equity capital against bank assets ie. the loan side of the balance sheet
- Consider £1 bn Mortage Loans
- Equity Capital needed £80 million
- If .5 bn securitized and moved off balance sheet ie.50% of securitization
- Bank now needs only £40 million of Equity Capital ; further 40 million can be lent out ; securitize again and again ….. MONEY PUMP
- Recall Regulation Q which restricted deposit interest rates to 3% - led to the Euro Dollar markets and global finance

Sub-prime Market
MBS on Loan on Real Estate:Source FDIC

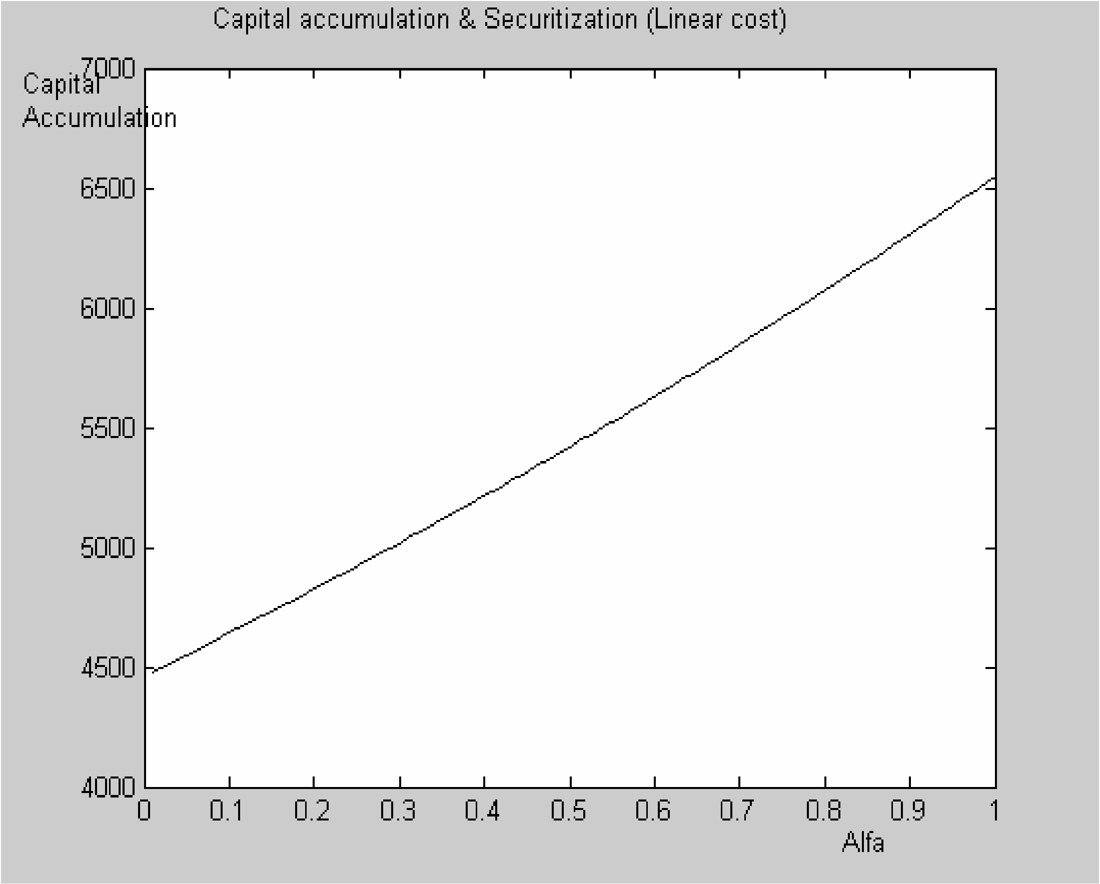
	WASHINGTON Mutual	NEW CENTURY
2001.3	0.497971656	0.255255547
2001.6	0.427332242	0.236253407
2001.9	0.393723897	0.205321179
2001.12	0.302951192	0.180109436
2002.3	0.232911549	0.17544783
2002.6	0.198129305	0.218473105
2002.9	0.170938075	0.192971619
2002.12	0.155603184	0.157524953
2003.3	0.110635337	0.130638446
2003.6	0.071946644	0.109395568
2003.9	0.076294759	0.126652608
2003.12	0.052989651	0.122883974
2004.3	0.037408302	0.112385321
2004.6	0.038606	0.127830593
2004.9	0.035673732	0.134108553

Was there excessive securitization ?
Underpricing of Credit Risk: Wrong Pricing Model

The question is how were banks able to willy nilly pass on the subprime loans ? In other words what needs explaining is how so much bad stuff got passed on. The ‘popular’ answer: Default risk on these loans and hence costs to the bank for securitization in coupon payments and credit enhancement **were under estimated** .

Ratings companies helped pass off sub prime with high ratings. **Basel II in 2004 requiring equity against MBS came too late**

Figure I.5 Capital accumulation and α analysis I (T=5) (linear Cost)



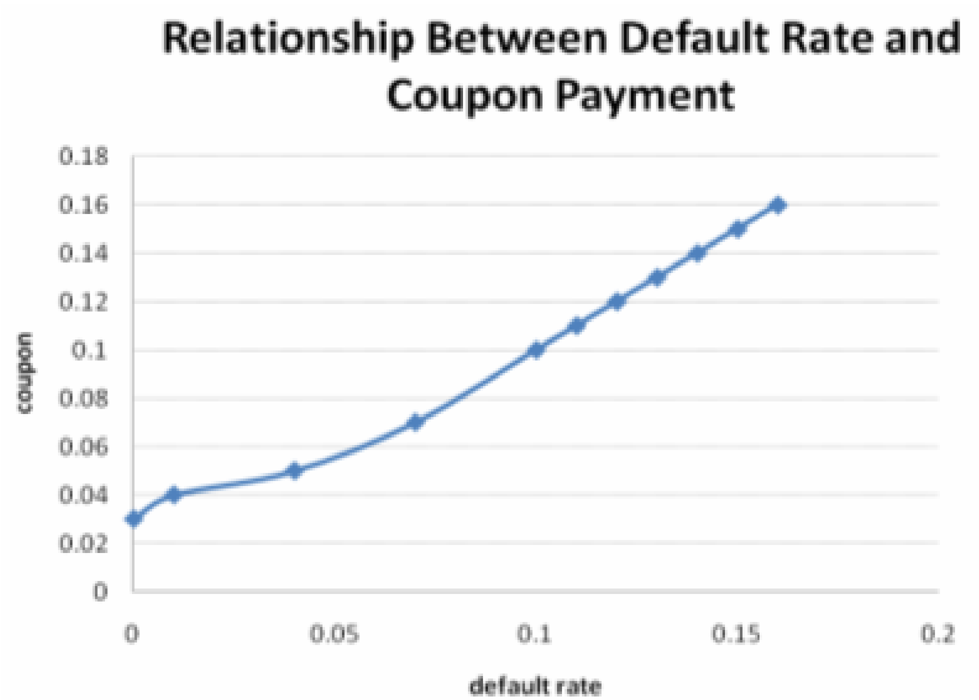
With linear costs note that as a higher and higher % of assets are securitized, a bank can keep improving its capital accumulation and ROE :

The Money Pump model of Securitization

Costs of MBS

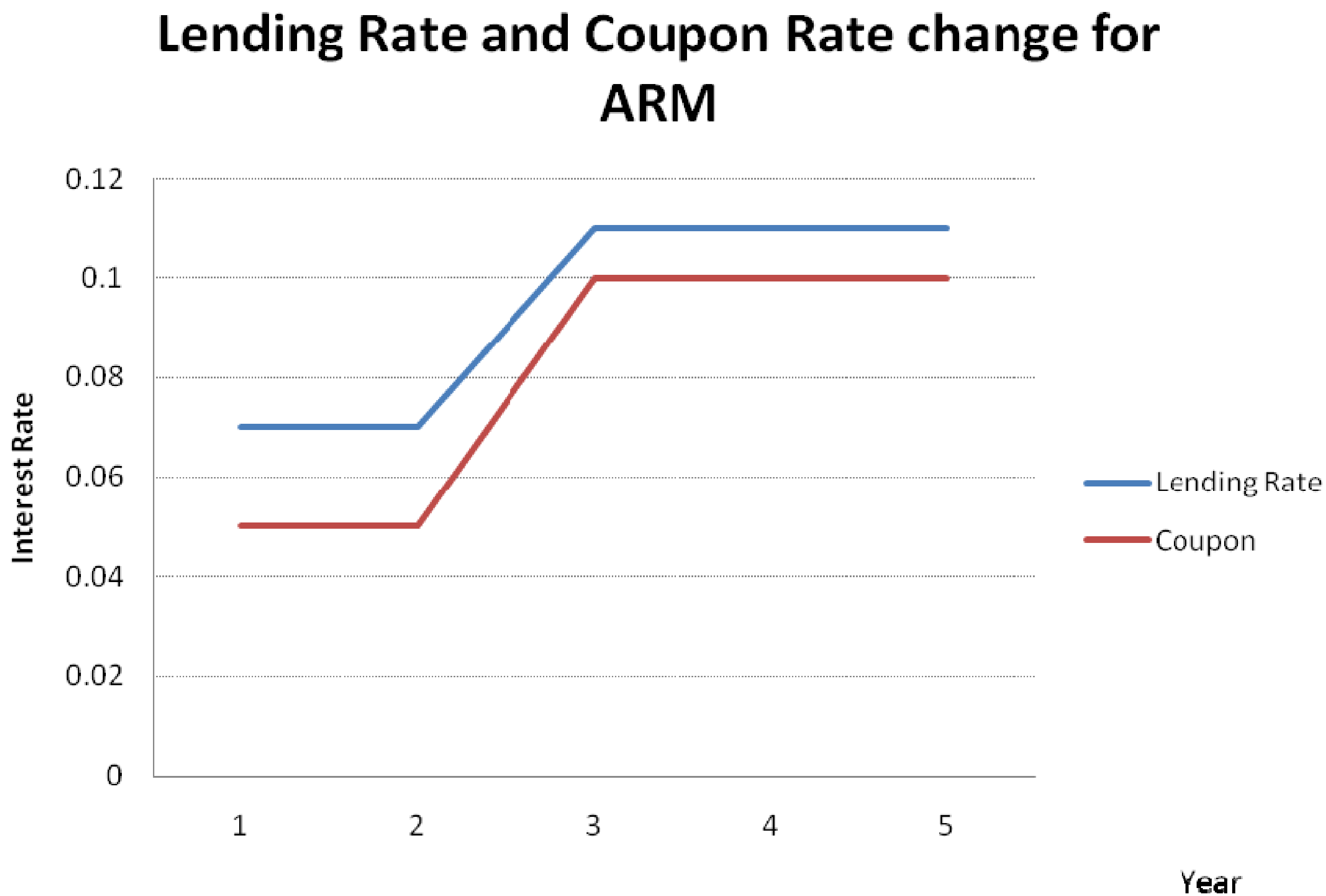
$C(\alpha) = \alpha R^C + \alpha^2 R^C, R^C$ is Coupon Rate on MBS.

	Default Rate (1-γ)	Coupon Rate on MBS 2007	Coupon Rate[1] 88-04
CCC-	0.33	0.16	
CCC	0.16	0.16	
BB-	0.15	0.15	
	0.16	0.14	
	0.13	0.13	
	0.12	0.12	
	0.11	0.11	
BB	0.1	0.1	0.0987
	0.07	0.07	
BBB	0.05	0.06	0.0642
A			0.0517
AA	0.001	0.04	0.0503
AAA	1	0.03	0.044

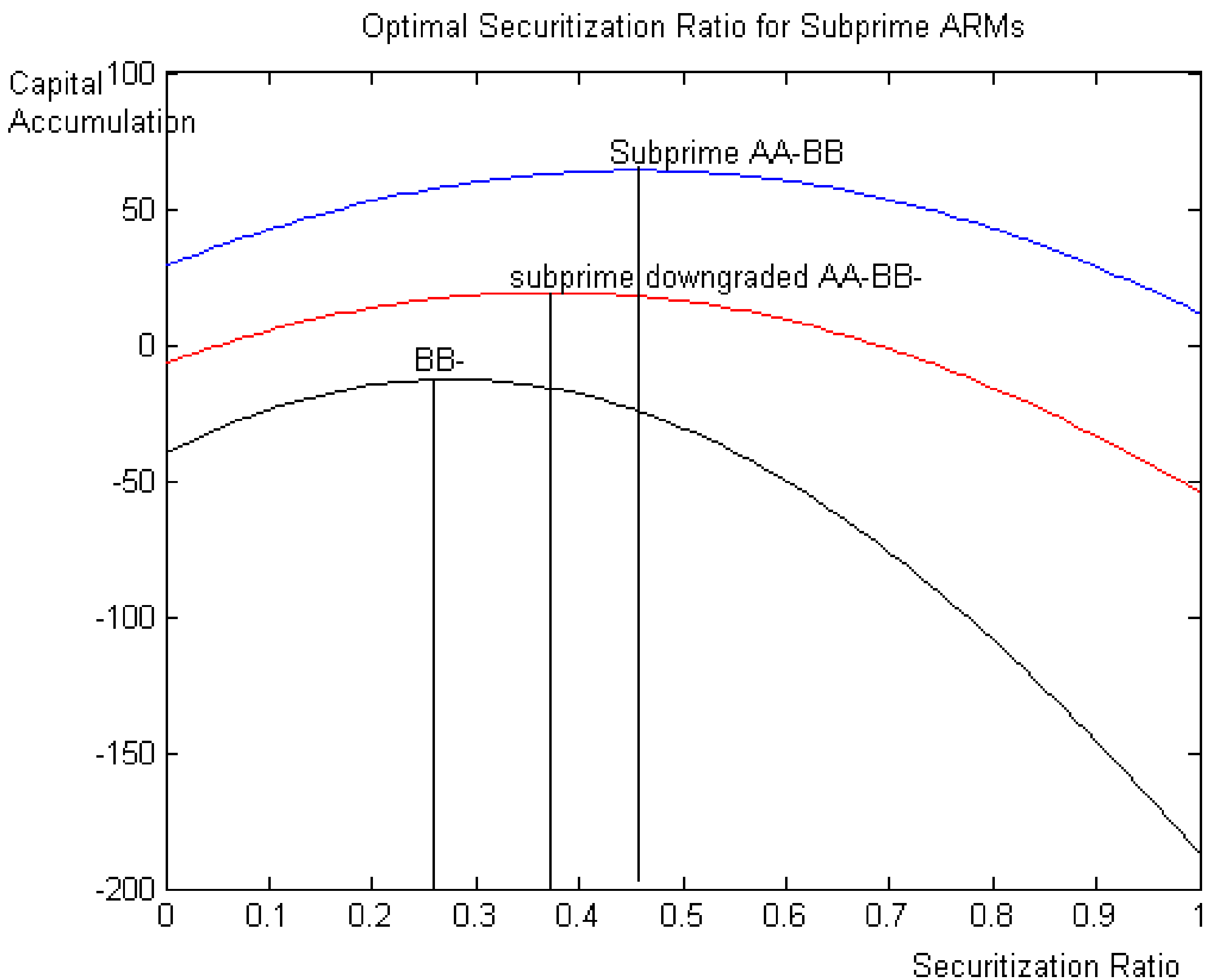


Citibank Report 2007

Sub-prime: Exploding ARM:2006



Capital Accumulation non-existent if sub-prime credit risk properly accounted for



ra = 15% and rd = 3% (for BB-) ; ra= 11%; rd=3% (BB) ; ra= 7.5% , rd= 3% (BBB);

ra = 5% rd = 3% (AA)

Origins of Crisis and Why We Are Mired in it ?

- **‘Weapons of mass destruction’(Warren Buffet): Residential Mortgage Backed Securities (RMBS) on Sub Prime Mortgages, Collateralized Mortgage/Debt Obligations (CM/DOs) and Credit Default Swaps (CDS)**
- **Little or no regulatory scrutiny**
- **Multiples of debt/leverage (‘shadow’ banking sector est. at $62 tn vs. deposit based banking at $39 tn and M0 at $ 3.9 tn Source: Guardian 29Feb 09) with little contribution to returns from investment in the real economy (Global GDP $55 tn). Systemic Ponzi scheme collapsed, (Aug 07Bear Sterns – Northern Rock – Sept 08 Lehman etc) , then Freddie Mac and Fanny Mae in Sept 08, severe mark downs on the market value of retail banks**
- **Interbank and short term markets for liquidity seized up resulting in the credit crunch.**
- **‘Liquidity trap’ even at low interest rates of 1% or under, a loss of investor and consumer confidence**
- **Little traction in interest rate policy, reflation by printing money, euphemistically called ‘quantitative easing’.**
- **Limited success to date of tax payer bail-out of the banking system :Why ?**
- **Radical options:A ‘toxic’/ Recovery bank or full nationalization of banks**
- **Massive public sector spending on capital projects to prevent a slide into another ‘Great Depression’**

Collateralized Debt Obligation,CDO
Weapon of mass destruction (Warren Buffet)

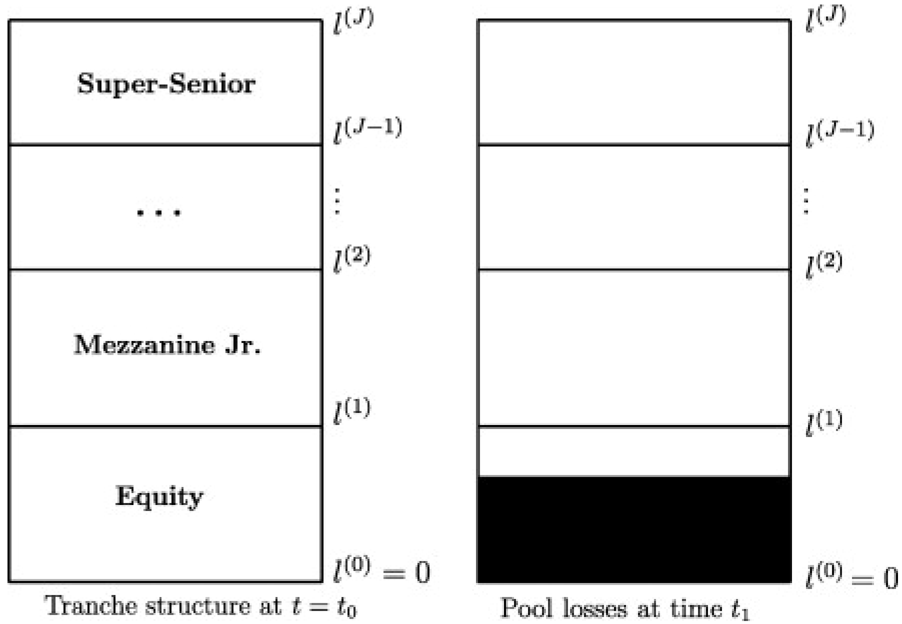
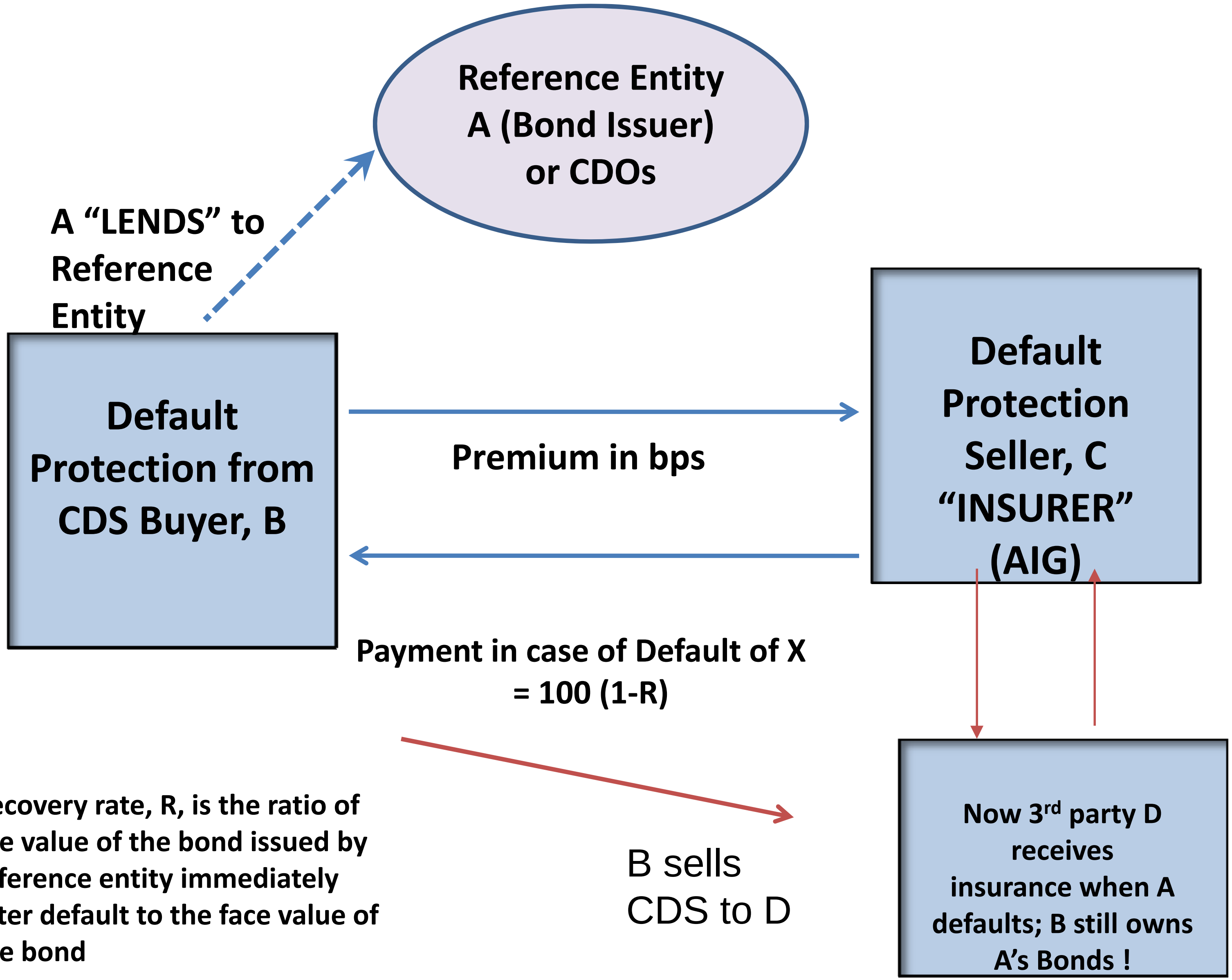


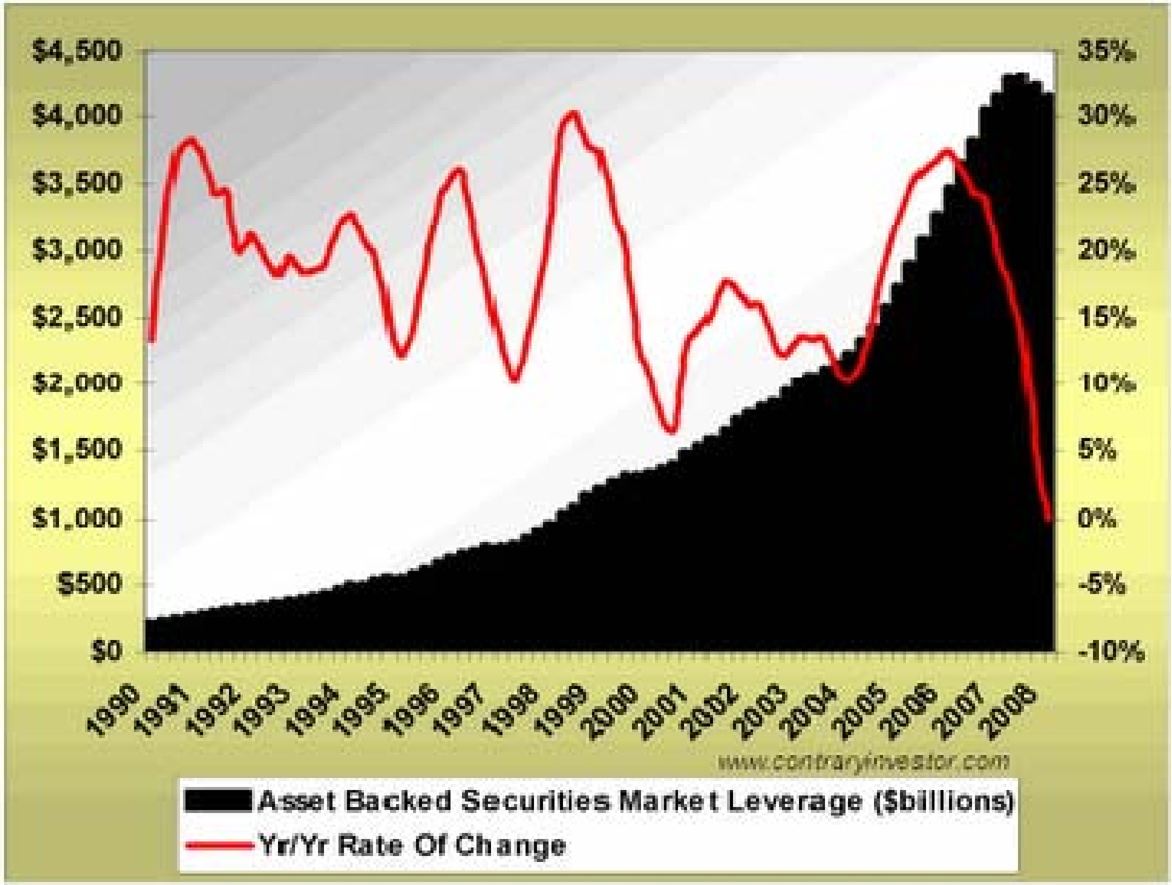
Fig. 1. Tranche structure at time t_0; at time t_1, pool's losses (shaded in black) absorbed by Equity tranche; Mezzanine Jr., Mezzanine, Senior and Super-Senior tranches are not yet affected by pool losses.

Credit Default Swap Structure(CDS) and Bear Raids



Recovery rate, R, is the ratio of the value of the bond issued by reference entity immediately after default to the face value of the bond

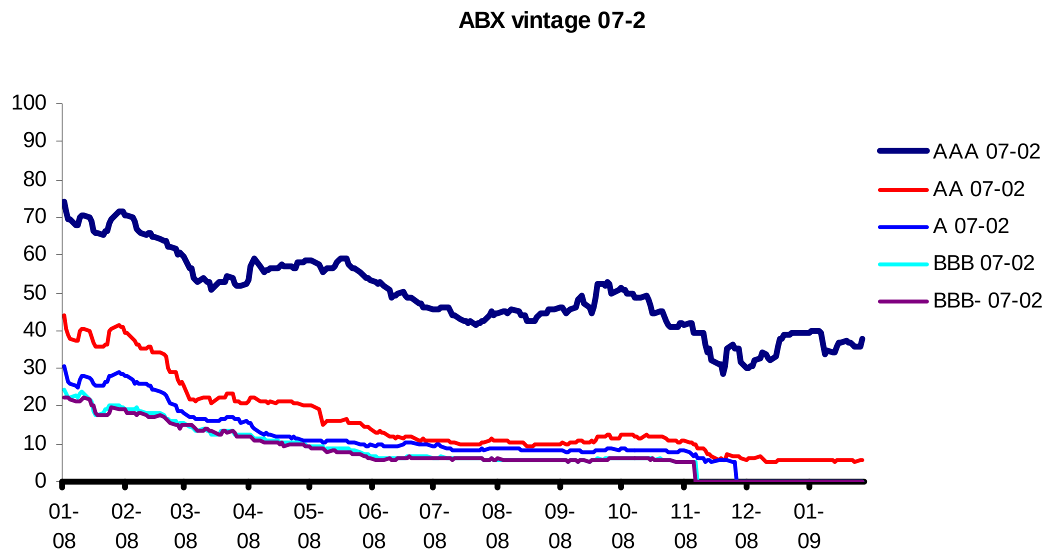
Credit Crunch Mainly From ZERO Growth in ABS vs Troubled Assets Relief Program (TARP)

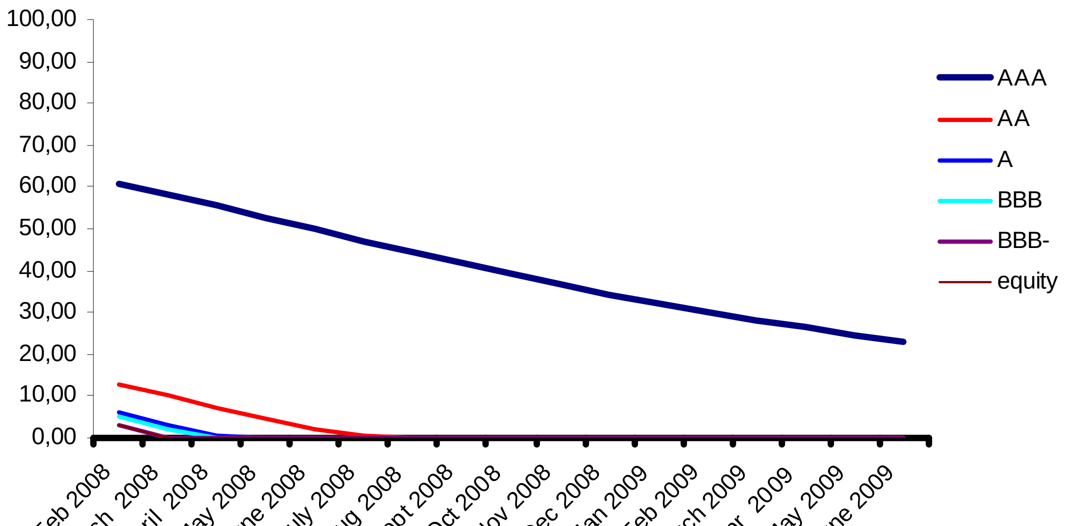


There is a view that ABX is too Depressed

- Using agent based model that takes the final 2007 vintage of $500 bn subprime mortgages state by state with individual loan characteristics (LTV and H FICO; Reset etc)
- Apply the state by state house prices *and a feedback loop to defaults* : ie. a contagion model of CMO pricing on subprime RMBS
- Compare this to extant methods : they cannot match ABX index
- Note as months pass mark to market losses mounting to 95% lost of 30% of $2tn + 70% lost on 70% of the same = $1.6 Tn (about the same size as capital in US commercial banks)
- Instead 1st quarter 09 pay 5 cents on $600 bn about 30bn plus 30 cents on Super Senior which is , $420 bn. Cost is .5 Tn. This will give good upside for the tax payer
- 2008 IMF/ First American Loan Performance estimated a default rate of 15% ; 09 25% default → this would translate to $300 billion (08) $500bn (09) of non-collectable principal and interest.

Geithner’s Job : What to Pay For Toxic Assets ?





Accounting Firms Require Mark to Market Vs Recovery Bank

- Clean up logic is fatally flawed when market rules are used after market failure
- Northern Rock nationalized but employees are paid bonuses to foreclose and repay tax payer
- Accounting firms fear litigation and enforce mark to market to ABX which is v. depressed; forcing greater bank balance sheet weakness and further tax payer injections and stock market downgrades
- Bank lending is impaired while these $1.6 trillion m-m losses remain on their balance sheets as reg. logic requires further recapitalization
- Insurance principle violated if left on balance sheet : if the only participants are those needing insurance there is no fair premia (adverse selection) Tax payer will be 'jipped'

Back To Basics

- Regulators and Govt. Bank of England and MPC wasted precious time focussed on inflation on the CPI instead of controlling explosion of ‘inside money’ via securitization which fuelled asset and house price inflation
- Bankers ; Greed
- Finance Academics: No use of complex system model on networks and feedbacks; inadequate models of Neoclassical economics (Taleb Nassim) Price of risk should be modelled not as a stand alone product but also inclusive of clean up costs from systemic risk a la price of products that degrade the environment
- Free market ethics and jurisprudence a la Kant does not give carte blanche to financiers to expropriate investors: Mutual interest not biased interest
- Good institutions make us rational (Hayek) not vice versa which is bogus neoclassical view of a fully knowing, optimizing homo economicus
- Independent validation and licensing of new food and drugs (FDA) and not commercial entities like ratings agencies for financial innovations

Macro-Prudential Systemic Risk Oversight and Other Reforms

- This should reside with the Central Bank ultimate responsibility for financial and banking stability. They should be monitoring exposures of firms and markets to asset classes especially credit derivatives
- FSA type agency to oversee 'licensing' of financial innovations with independent panel ; Independent validation and licensing of new food and drugs (FDA) and not commercial entities like ratings agencies for financial innovations
- All off balance sheet activity to be curtailed unless proven innocent
- Full digitization and transparent reporting of credit creation by licensed entities (ABS/CDOs apparently come with 'excel files' drawing on pools of assets that cannot be easily traced). This is within the realm of technology.
- Real time oversight of e-payment and settlement systems by central bank which currently remains
- New research into quantitative models for digitized banking and financial systems (with multi period simulator capabilities) to supplant demised macro-econometric models; new pricing models to include systemic risk in credit assets

Government financial sector bailouts as proportion of GDP (as of February 18 2009)	
UK	19.8%
Norway	13.8%
Canada	8.8%
USA	6.3%
Netherlands	6.2%
Sweden	5.8%
Greece	5.4%
Austria	5.3%
Ireland	5.3%
Belgium	4.7%
Spain	4.6%
Germany	3.7%
Portugal	2.4%
France	1.5%
Italy	1.3%
Saudi Arabia	1.2%
Switzerland	1.1%
Hungary	1.1%
Australia	0.7%

Public costs of banking failures, country

Concluding Remarks: 'Recovery Bank' for non-defaulted Subprime Securities Urgent

- http://www.essex.ac.uk/ccfea/SummerSchool/programme.htm#Module4 Our Centre anticipated that RMBS will end in tears
- Replace market rules by public policy rules for distressed sub prime assets in a consistent way so that foreclosures triggered by negative equity from falling house prices (which feeds on foreclosures) are limited
- Currently hand wringing about what to pay for these 'toxic' assets Original TARP objectives is being looked at again
- Past schemes successful : HOLC (Home Owners Loan Corporation 1933-1935) Returned a small profit by 1950. 1980 S&L clean up by Resolution Trust Corporation; 2002 Swedish Model
- There has been longstanding failure of academe in economics and the regulatory bodies to keep abreast of the institutional and technological innovations which have created unprecedented volumes of 'inside' money via securitization, a shrinking of state supplied 'outside' money with an IT based payments technology which has changed payments habits irrevocably, and a vast interconnected system of digital transference of financial liquidity in real time with very low latency.

Pain in the real economy suffered from contagion closer to $6- $10 Trillion (ie. 10%- 20% contraction of world GDP)