The Recent Global Financial Crisis: An Overview

Seminar on Crisis Management and Bank Resolution

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The Recent Global Financial Crisis: An Overview

- Global Financial Crisis: underlying causes
- Evolution of the Global Financial Crisis – early years
- Regulatory Reforms

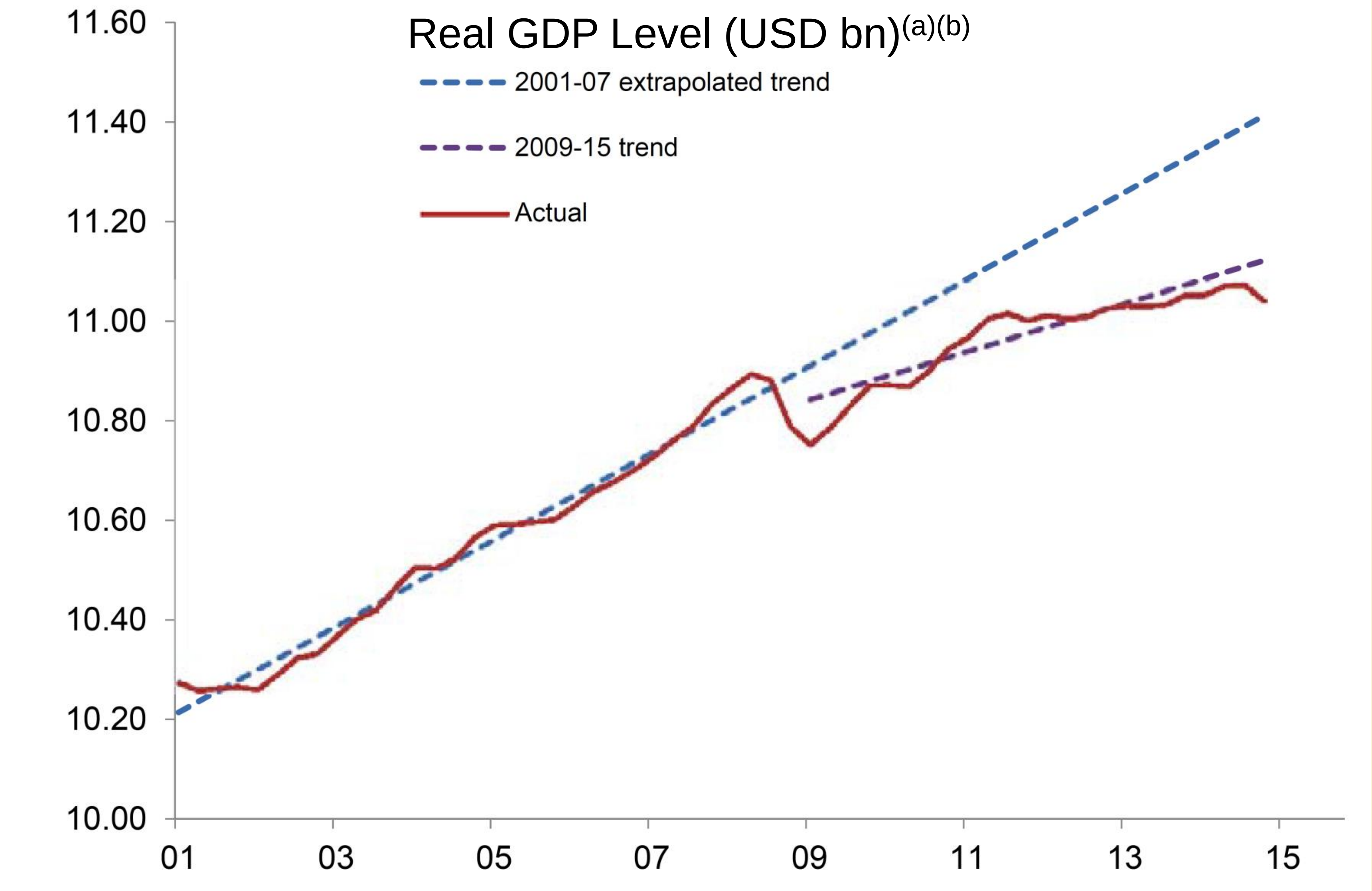
The crisis

"It is a crisis of confidence, of capital, of credit and of consumer and business demand"

– The Financial Stability Plan of the USA (10 Feb 2009)

- Also a humanitarian crisis

Financial Crisis: Why are we concerned?



(a) Seasonally adjusted quarterly data, on a logarithmic scale, in billions of current US dollars
(b) Sample consists of BCBS member countries: Argentina, Belgium, Brazil, Canada, China, France, Germany, Hong Kong SAR, India, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Singapore, Spain, South Africa, Sweden, Switzerland, Turkey, the United Kingdom and the United States.
Source: Bill Coen Speech-Dec 2016

The Financial Crisis – some aspects

Overall Economy-
-Macroeconomic imbalances
-Low real interest Rates
-Benign eco. environ.
-Ample liquidity
-Search for "yield"
-Rising house price "bubble"

Financial Sector-
- Increased risk appetite
-Leverage
-growth of financial sector

- Risk Management
  - underwriting standards & originate-to-distribute strategy
  - Liquidity risk
  - Stress Testing
  - Compensation

- Basel II Framework
- Supervisory failures

Underlying weaknesses

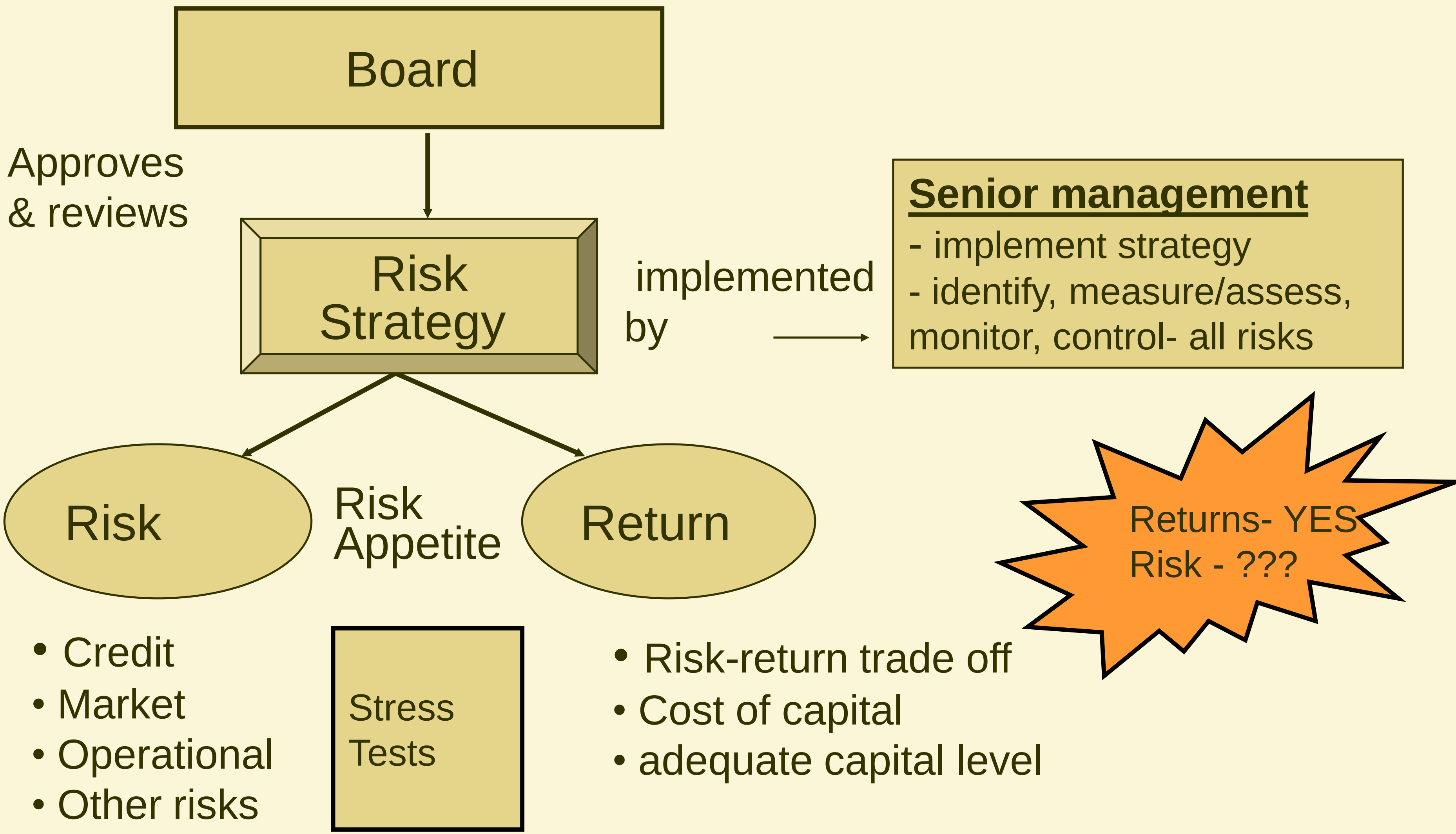
- Rating Agencies
- Transparency
- Valuation

- Financial Stability Assessment
- Perimeter of regulation
- Bank resolution

A Subprime Crisis?

- Subprime mortgages- $1.3 trillion (Mar 07)
- US residential mortgages- $10.6 trillion (mid-08)
- Total Loans- $70 trillion
- Total Bonds - $70 trillion

1. Risk Management- Risk Appetite



1. Risk Management – Risk Appetite

"As long as the music is playing, you've got to get up and dance"–July 2007

"Take away the punchbowl just as the party gets going"

Strategy

- Markets (subprime)
- Customers (subprime)
- Competition (subprime business)
- Shareholders (return)

Risk Appetite

Capital at Risk

- Market Risk
- Credit Risk
- Operational Risk
- Other risks???

Stress Tests

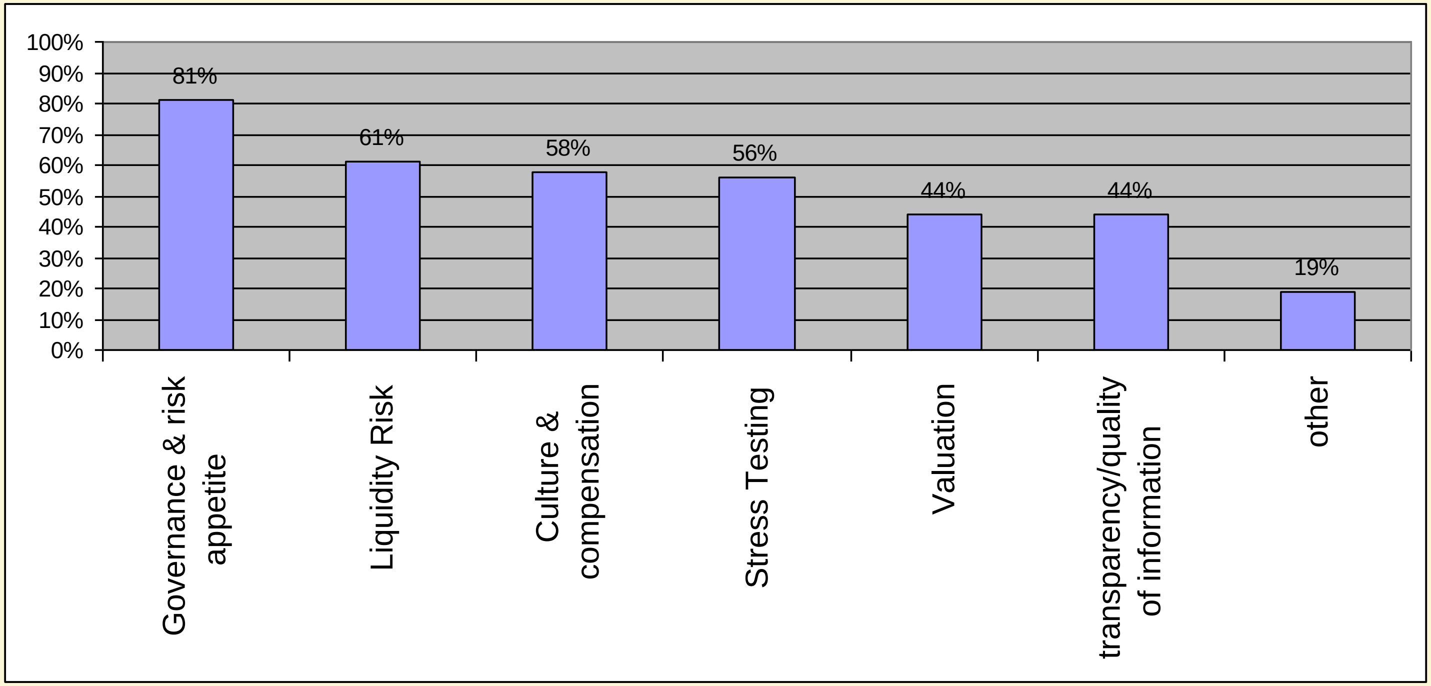
Internal Constraint

- Organisation
- People
- Systems

1. Issues in Risk Management

- Risk culture- “sales driven” culture vs. focussed on risk (Return and not Risk was the focus)
- Role of Chief Risk Officer –
  - CRO of Freddie Mac (Houses being used like ATMs)
  - $30bn profits 2003-07; $200bn govt. capital- Sept 2008
- Risk governance – Board oversight of risk
- Risk management methodologies
  - Misplaced reliance on sophisticated maths (VaR)
  - Gross vs net exposures
- Stress testing
- ….. “As long as the music is playing, you’ve got to get up and dance”–July 2007
- …. “Take away the punchbowl just as the party gets going”

1. Top Issues in Risk Management- IIF, Dec 2009



Source- IIF- reform in the financial services industry: Strengthening Practices for a More Stable System, Dec 2009

2. Risk Management: Credit underwriting- The Subprime Loans

What is “**Subprime”**

- Delinquencies- last 1 or 2 years, bankruptcy- last 5yrs
- FICO score -660 or lower (300- 850)
- Debt-To-Income ratio (DTI – 50% or more)

- Credit underwriting standards for mortgages were declining (LTV, IO, full documentation loans)
  - “Low Doc”/ “No-Doc” regarding borrowers’ income
  - “Stated Income”, “Stated Assets”, NINJA Loans
  - “Collateral dependent loans” – predatory lending
  - Low initial payments “teaser rates” – 2/28, 3/27 mortgages *with 100% financing* – ***Risk Layering***
- *Why was this being done?*

3. Securitisation

Originate-to-hold	**Originate –to-distribute**
Raise retail deposits and grant loans which are held on B/S till they mature High customer focus	Originate/outsource loans and distribute through securitisation. Not retained on B/S - Incentives for credit risk assessment?
Assets – Loans Revenue – interest income Liabilities – retail deposits	Securities Fee income Wholesale funding
Credit origination, servicing and monitoring performed by the same bank	Split up into several distinct activities performed by several separate entities

3. Securitisation -
The Originate-to-Distribute model …

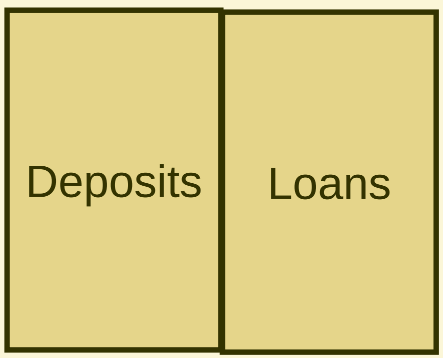
“There is growing recognition that the dispersion of credit risk by banks to a broader and more diverse group of investors, rather than warehousing such risk on their balance sheets, has helped make the banking and overall financial system more resilient.

The improved resilience may be seen in fewer bank failures and more consistent credit provision. Consequently the commercial banks may be less vulnerable today to credit or economic shocks”

IMF Global Financial Stability Report, April 2006

3. Securitisation & OTD – as intended and as it evolved…

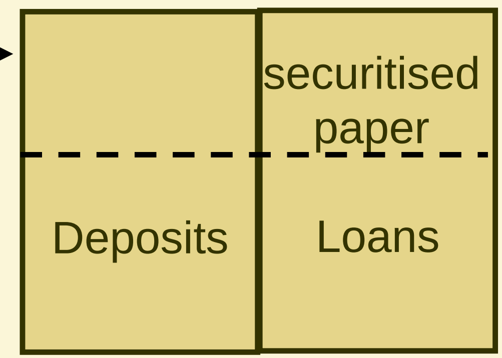
Bank 1



Liability Asset

Non-bank Investor
1, 2, 3…
Risk transferred to
non-bank sector

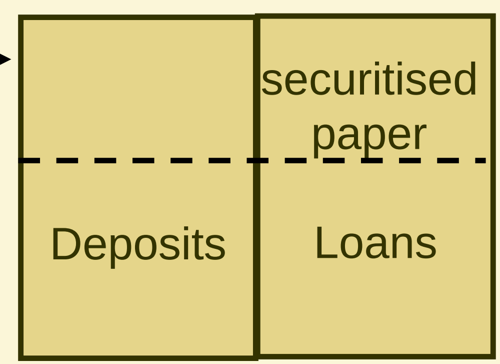
Bank 1



Liability Asset

Non-bank Investors – 1,2,3… ??
Bank 1 & others (Prop. trading desk) -$1.3tr.
Sold to bank 2 - risk retained via Cr. derivative
Sec. Paper used as collateral for S.T. Liquidity
Who carries the risk???

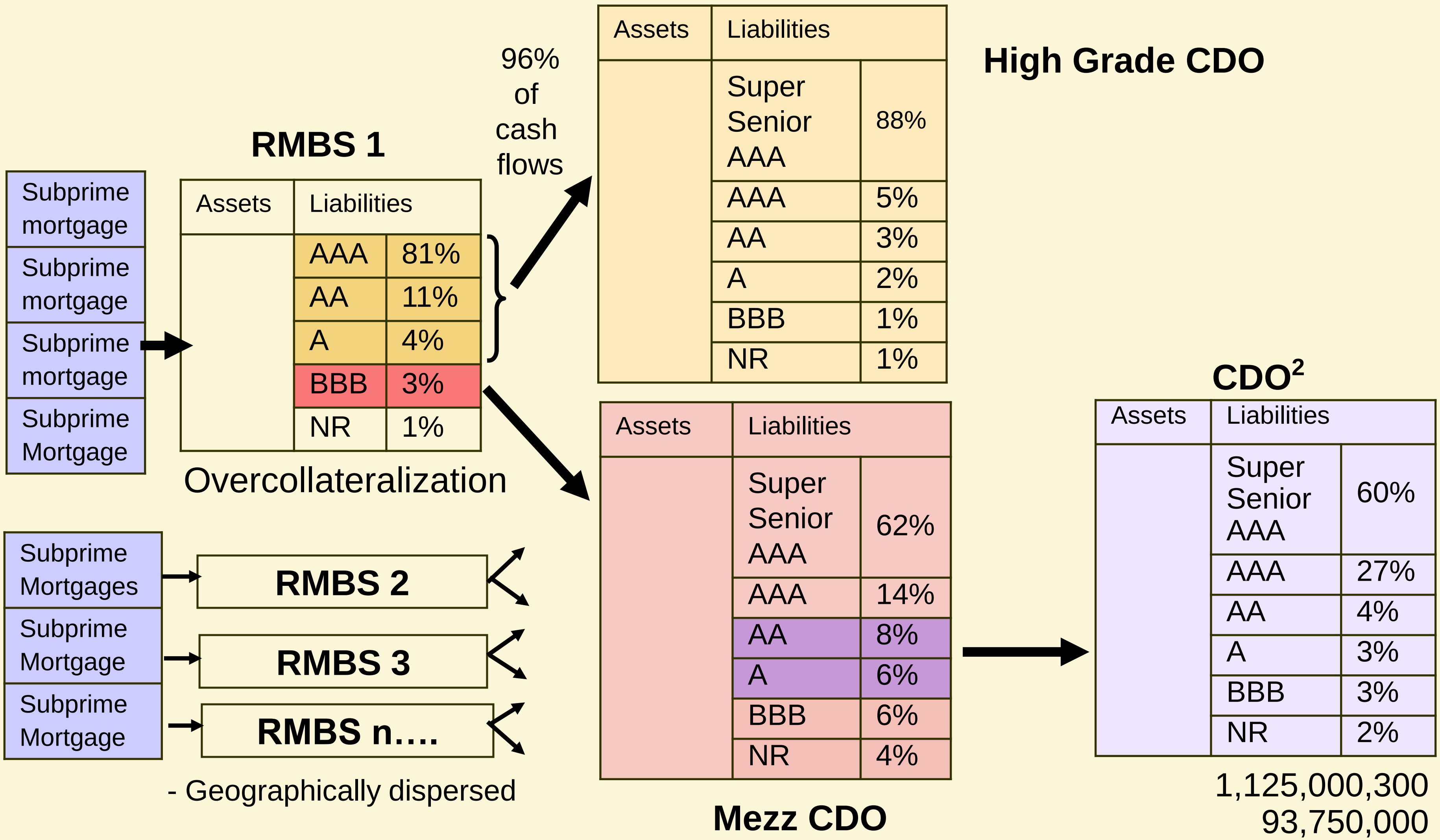
Bank 1



Liability Asset

Risk Transfer
Or
Risk Concentrations

3. Securitisation of Subprime Mortgage Loans



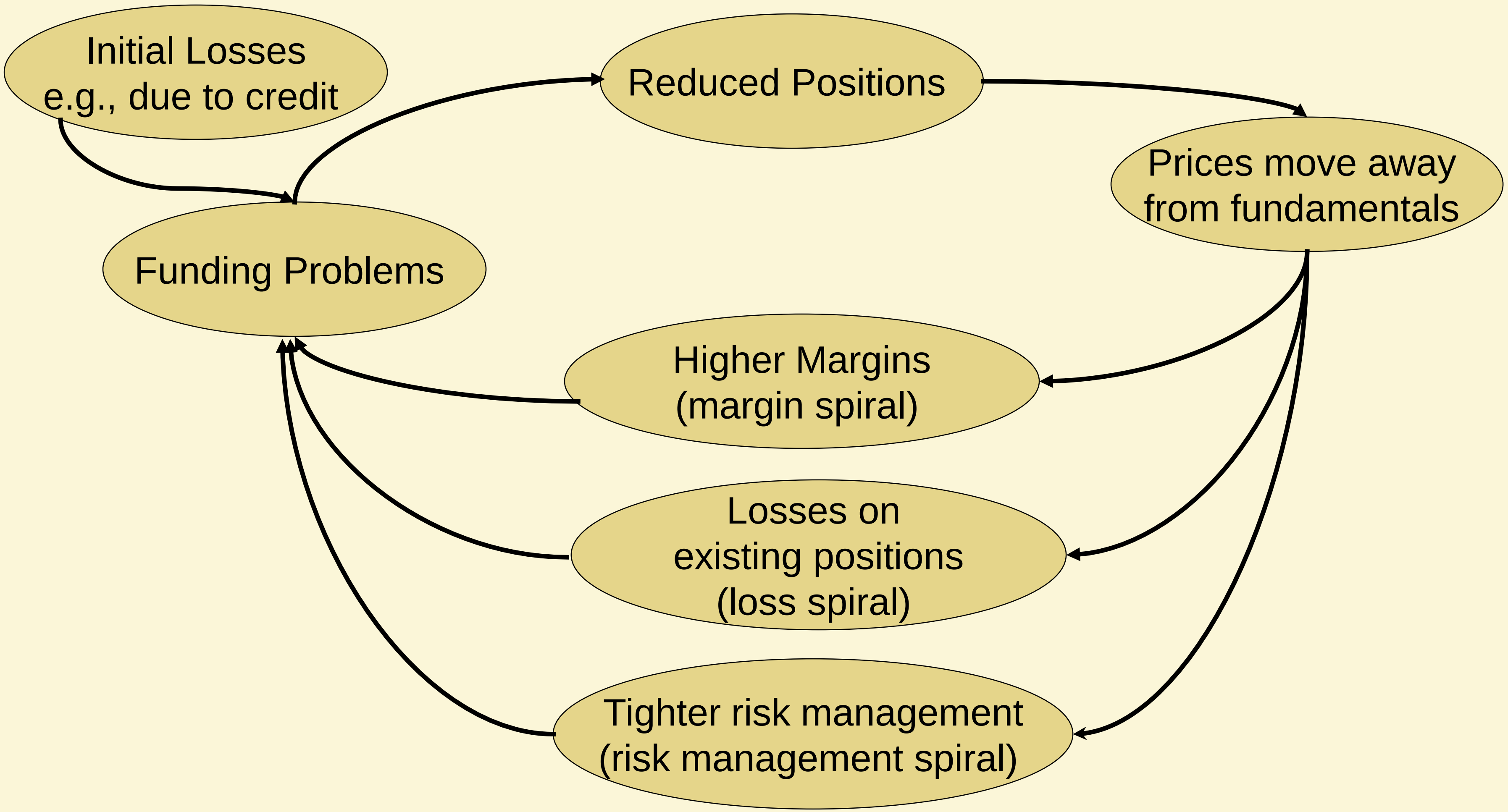
3. Securitisation - Due Diligence

Typical contract details – (a)	
1. Pages in a CDO^2 prospectus	300
2. Pages in ABS CDO prospectus	300
3. Pages in RMBS prospectus	200
4. Number of ABS CDO tranches in a CDO^2	125
5. Number of RMBS in a typical CDO	150
6. Number of mortgages in a typical RMBS	5,000
Metrics of Complexity – (a)	
Pages to read for a CDO^2 investor (1+ 3*5*2*4)	1,125,000,300
Pages to read for ABS CDO investor (2+3*5)	30,300
Max number of mortgages in a CDO^2 [(b)] (4*5*6)	93,750,000
Max number of mortgages in ABS CDO [(c)] (5*6)	750,000
(a) CDO^2 – CDO of ABS CDO; (b) & (c) – assuming no overlap in the composition of RMBS/CDO pools Source- Andrew Haldane – 8 lessons from the crisis, June 2009	

4. OTD Model and Liquidity Risk

- OTD model – belief in “Liquidity through marketability”
  - But Marketability and Liquidity are different
- OTD model- vulnerable due to dependence on market liquidity
  - Liquefy illiquid assets:
    - “idiosyncratic” shock - works for one bank
    - But “system wide” shock - Fire sale losses, market liquidity evaporates
  - Changes in investor risk appetite can dry up market liquidity
- Funding liquidity constraints and/or additional capital requirements due to -
  - “Warehousing risk”- involuntary build-up of warehoused assets?
  - “Pipeline risk”- commitments to further loans in the pipeline

4. Downward Liquidity Spirals



Sources: Garleanu and Pedersen (2007) and Brunnermeier and Pedersen (2008)

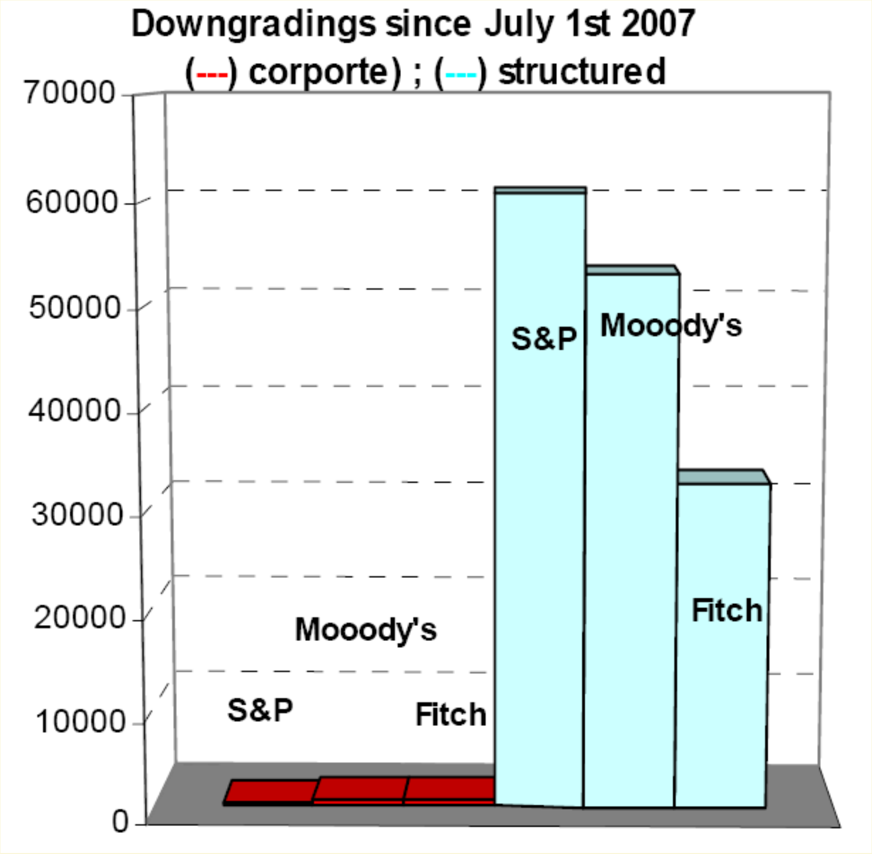
4. Margin Spirals: Typical "Haircut" or Initial Margin (%)

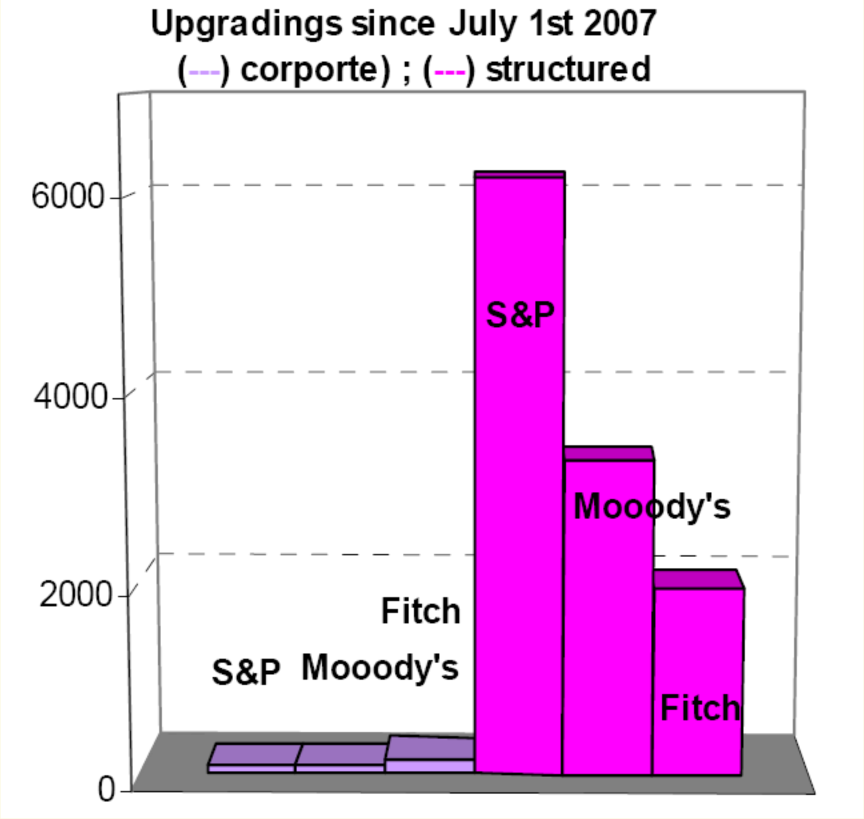
	Apr 2007	Aug 2008
US treasuries	0.25	3
Investment-grade bonds	0-3	8-12
High-yield bonds	10-15	25-40
Equities	15	20
ABS CDOs: AAA	2-4	95[1]
AA	4-7	95[1]
A	8-15	95[1]
BBB	10-20	95[1]
Equity	50	100[1]
Prime MBS	2-4	10-20
ABS	3-5	50-60

[1]Theoretical haircuts, as CDOs no longer accepted as collateral

Source: IMF GFSR Oct 2008

5. Role of Rating Agencies - Structured finance vs. corporate ratings





July 07-June 08 -downgrades of Structured ratings–145,899; of corporate ratings- 1,445

Source- EU study

Jan 2008 -12 AAA-rated companies globally vs 64,000 AAA structured finance instruments

6. Risk Governance and Compensation – Issues

	Losses in 2007 (bn)	decline in Stock value	CEO compensation
Countrywide (now BoA)	$1.6 bn	80%	Mr. Mozilo – ● Compensation - $120 million ● Stocks of countrywide
Merrill Lynch (now BoA)	$10 bn	45%	Mr O'Neal – $l6l million retirement package
CitiGroup	$10 bn	48%	Mr. Prince- ●Performance Bonus- $10 million ●Stock options- $28 million ●Perks- $1.5 million (per annum)

Source- US Congressional hearings

6. Risk Governance & compensation

- Higher risks, higher short term profits and higher bonuses
- “Privatisation of gains and socialisation of losses”
- The sheer size of compensations
- Bonuses in government assisted financial firms
- FSB Principles – effective governance of compensation, its alignment with risk taking and supervisory oversight
  - compensation outcomes- symmetric with risk outcomes
  - compensation payout schedules- sensitive to time horizon of risks
  - mix of cash, equity and other forms of compensation - consistent with risk alignment
- Basel Committee - Pillar 2 assessments (July 2009)
- Compensation Principles and Standards Assessment Methodology- (Jan 2010)

5. Shadow banking system & the Perimeter of Regulation

- US - non-bank financial system (esp., money & funding markets) had assets equal to banking system

- The public policy considerations prior to crisis-
  - role of market discipline & self- regulation
  - Only banks could create systemic risk
  - Regulating non-banks & financial products would be too costly, reduce innovation and impede risk transfer

Early 2007- asset size of ABCP conduits, SIVs, Auction-rate preferred securities, tender option bonds & variable rate demand notes- $2.2 trillion; Assets financed overnight in triparty repo - $2.5 trillion; Assets held in hedge funds - $1.8 trillion; B/S of the then five major investment banks- $4 trillion; **Total assets = 10.5 trillion**
Total assets of the top five BHCs at that point - over $6 trillion, **entire banking system - about $10 trillion.**

7. Shadow banking system, Liquidity Issues, Perimeter of Regulation

- Big Size but no Regulation
- Functions (leverage, maturity transformation), & safety nets (?)
- A crisis of shadow banking. Collapse of -
  - Wholesale financing- non-bank mortgage lenders- subprime/Alt-A
  - ABCP financing- entire system of SIVs, Conduits – back on B/S
  - Repo financing- broker-dealers (Investment banks) in US
  - ST MM financing- MMMF ($3 trillion)- "breaking the buck"
- G-20 Nov 15 '08 communiqué, "..a special emphasis on institutions, instruments and markets that are currently unregulated…"

Early 2007- asset size of ABCP conduits, SIVs, Auction-rate preferred securities, tender option bonds & variable rate demand notes- $2.2 trillion; Assets financed overnight in triparty repo - $2.5 trillion; Assets held in hedge funds - $1.8 trillion; B/S of the then five major investment banks- $4 trillion; **Total assets = 10.5 trillion**
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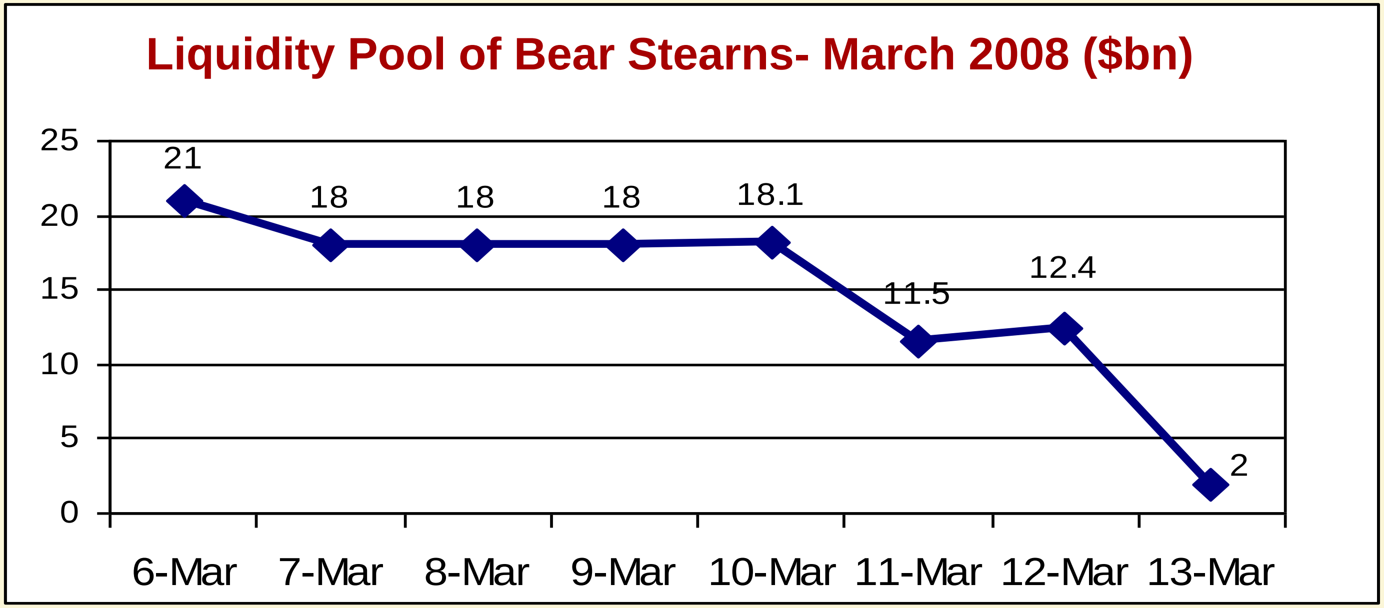
- Global Financial Crisis: underlying causes
- **Evolution of the Global Financial Crisis**
- Regulatory Reforms

Evolution of the Financial Crisis

Stage 1: Aug ’07 – mid Mar ’08 - Prelude

- Concerns over losses on US subprime loans escalated into widespread financial stress. Liquidity injection by central banks
- Bear Stearns bought by JPMorgan Chase. Northern Rock problem



Source- Cox’s letter to Wellink- Mar 20, 2008

Evolution of the Financial Crisis

Stage 2: mid March to mid-Sept 2008 – Lehman Bankruptcy

- Concerns shifted from funding liquidity to bank solvency (especially if leveraged and exposed to impaired assets)
- Merrill bought by BoA
- Lehman Bros bankruptcy – a watershed
- Goldman Sachs & Morgan Stanley become “BHCs”

Stage 3 –15 Sept- late Oct 08 - Global Loss of Confidence

- Emerging markets also affected – exports, tightening financing

Stage 4 – Focus on global economic downturn (late Oct- mid-Mar 2009)

Stage 5 – First signs of stabilisation (from mid-March 2009)

- Improving asset valuations, equity and credit markets. US stress tests

Lehman Brothers – An Investment Bank
(end 2007 – 433 subs, 20 countries)

- 15 Sept 2008 – filed for bankruptcy
- Sixth largest counterparty in OTC derivatives market
- Key Role in repo market
- MMMFs Exposures to LB debt (Reserve Primary wrote off $785mn, “break the buck”, $184bn MMMF redemptions)
- Inter bank market seize up

Source: Herring and Carmassi
in Oxford Handbook of Banking

Agenda

1. The origins of the financial crisis:
   Weaknesses in risk management

2. Evolution of the crisis (in brief)

3. Lessons: Responses to the crisis (in brief)

Response to Financial crisis

- G-20 Finance Ministers & Governors -
  - Issues arising from Financial Crisis
  - Improve regulation, supervision & overall functioning of global financial markets
- FSF renamed as FSB with new members, new mandate
- Basel Committee – increased membership, regulatory reforms in response to the crisis

G-20 - Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, UK, USA, EU, IMF & World Bank (85%of global GDP, 80% of trade)
Basel Committee 45 members from 28 jurisdictions, nine observers including intl. org., and other bodies. Membership expanded in 2009 and again in 2014
FSB – 19+ Hong Kong SAR, Singapore, the Netherlands, Spain, Switzerland - represented by Central Bank, Supervisory Agency (if separate), Finance Ministry, Securities supervisor,
International organisations – BIS, ECB, EC, IMF, OECD, WB
Standard setters – BCBS, CGFS, CPSS, IAIS, IASB, IOSCO

Financial Stability Board (FSB): Membership

- Established: April 2009 (strengthened organisational footing in Jan. 2013 with legal personality, strengthened governance etc., while maintaining links with the BIS)
- Unique composition among international bodies:
  - Ministry of Finance, Central Banks, Supervisory & Regulatory authorities
  - international bodies, including standard-setters and regional bodies like the ECB/ European Commission.
  - All the main players who set financial stability policies across different sectors of the financial system
- A Coordinating Body - Policies not legally binding, nor intended to replace the normal national and regional regulatory process
- Close relationship with the G20 (formation, policy endorsed)
- Outreach – 6 regional consultative groups (RCGs), reach out to authorities in 70 other countries, including EMDEs

Financial Stability Board: Mandate

- assess vulnerabilities affecting the financial system and identify and oversee action needed to address them;
- promote co-ordination and information exchange among authorities responsible for financial stability;
- monitor and advise on market developments and their implications for regulatory policy;
- advise on & monitor best practice in meeting regulatory standards;
- undertake joint strategic reviews of the policy development work of the international standard setting bodies to ensure their work is timely, coordinated, focused on priorities, and addressing gaps;
- set guidelines for & support the establishment of supervisory colleges;
- manage contingency planning for cross-border crisis management, particularly with respect to systemically important firms; and
- collaborate with the IMF to conduct Early Warning Exercises.

FSB

Vulnerabilities Assessment

- The Standing Committee on Assessment of Vulnerabilities (SCAV) - identifies & assesses risks and vulnerabilities in the financial system.
- macro-financial related vulnerabilities and risks arising from structural weaknesses in the financial system (such as misaligned incentives, amplification mechanisms or other forms of potential market stress).

Policy Development & Coordination

Key focus areas-

- Building resilience of financial institutions
- Ending too-big-to-fail
- **Effective Resolution Regimes and Policies**
- Transforming shadow banking to transparent and resilient market-based financing
- Making derivatives markets safer

Implementation Monitoring

Standing Committee on Standards Implementation (SCSI) - coordinates and oversees the monitoring of the implementation of agreed financial reforms and its reporting to the G20.

- Peer reviews of FSB Members (an obligation of membership)

The Coordination Framework for Implementation Monitoring (CFIM)-

- *Basel II/2.5/III framework;*
- *OTC derivatives market reforms;*
- *compensation practices;*
- *resolution frameworks;*
- *GSIFI policy measures*
- *shadow banking*

Other FSB Work

FSB action plan to assess and address the decline in correspondent banking

- FSB's November 2015 four-point action plan to assess and address the decline in correspondence banking, namely:
  - Further examining the causes and effects of the problem
  - Clarifying regulatory expectations, including through guidance by the Financial Action Task Force (FATF)
  - Domestic capacity-building in jurisdictions that are home to affected respondent banks;
  - Strengthening tools for due diligence by correspondent banks
- Task Force on Climate-related Financial Disclosures (TCFD) sets out recommendations for consistent, comparable, reliable, clear and efficient climate-related disclosures by companies
- Measures to reduce misconduct risk: Second Progress Report – Sep 2016, etc.

Regulatory Reforms after the Financial Crisis: The Micro & The Macro…..

- Quality, consistency and transparency of the capital base
- Enhancing Risk Coverage
- Supplementary Leverage Ratio
- Liquidity
- Regulatory Buffers –
  - Liquidity
  - Capital Conservation Buffers
  - Countercyclical Capital Buffers
  - G-SIB/D-SIB
  - Leverage Buffers

Macroprudential Approach -

- Procyclicality – risk over a period of time
- Risk at a point of time – cross sectional view
- Systemic Risk – (cross-jurisdictional activity, Size, Interconnectedness, Substitutability, Complexity)
- Recovery and Resolution of SIFIs
- Macro-Stress Tests

Institutional arrangements for Financial Stability and Supervision

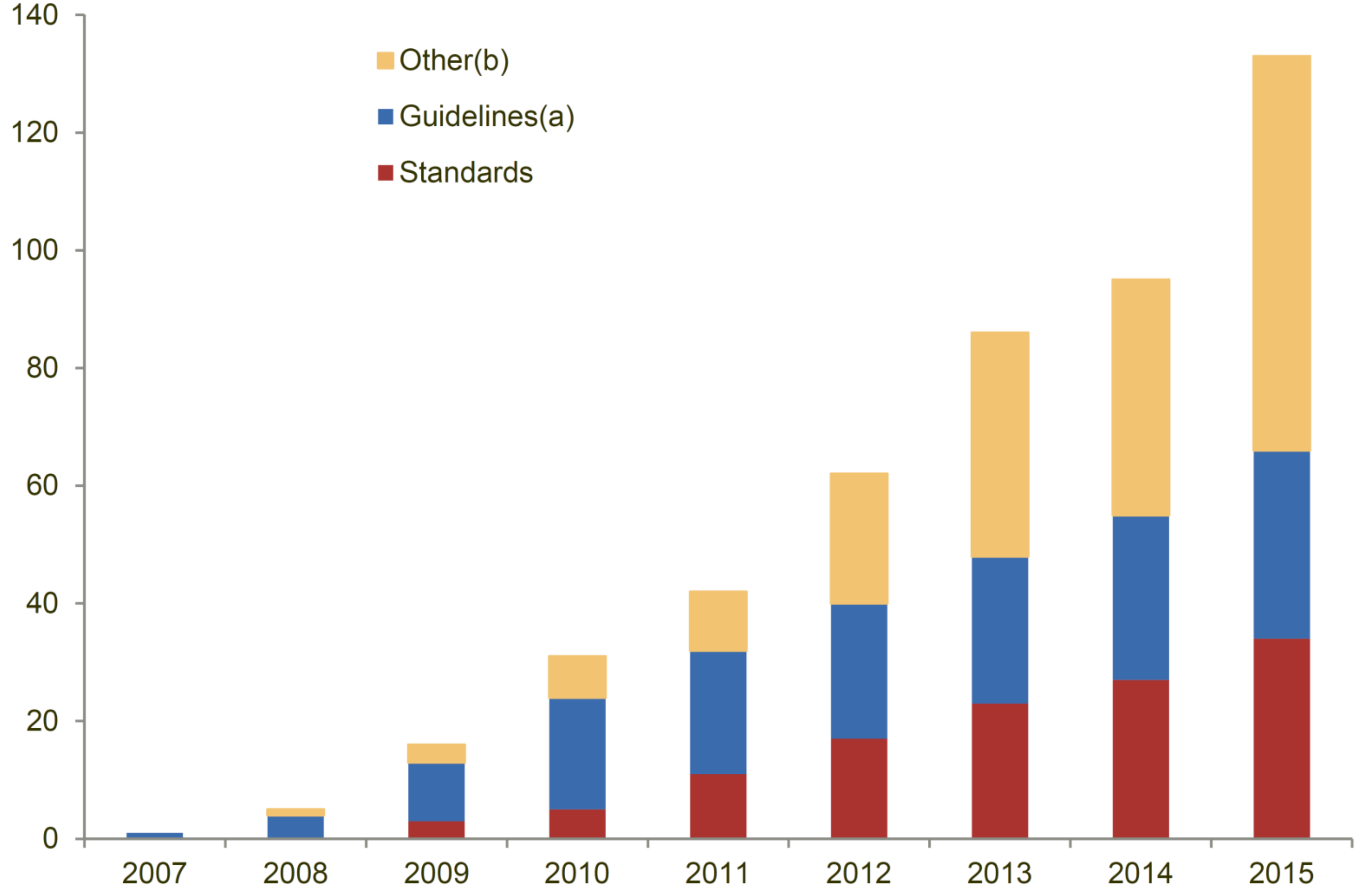
- Macroprudential Authority, Resolution Authority

Regulatory Metrics: Strengths & Weaknesses

Metric	Strength	Weakness
Risk-weighted ratio	Sets capital requirements according to perceived riskiness of a bank's assets.	Susceptible to setting too low capital requirements, either unintentionally (model risk), or intentionally (gaming)
Leverage ratio	Guards against inordinately low capital arising from model risk, gaming, excessive leverage	Does not differentiate risk, and could potentially result in risk shifting if used as the sole measure
Liquidity Coverage Ratio	Ensures min buffer of liquid assets for outflows; enables banks to meet early stages of liquidity run and/or resolution.	Reduces reliance on the least stable/very short-term liabilities only
Net Stable Funding Ratio	Matches liquidity of assets against stability of liabilities for resilience to medium-term funding risk	Does not directly ensure a buffer of usable short-term liquidity

Source: Bill Coen speech, Dec 2016

Is more Regulation the way forward?



Source: Basel Committee website and Secretariat calculations.
(a) Includes principles, sound practices and guidance.
(b) Includes implementation-related reports and ad-hoc publications.

Source: Bill Coen Speech- Dec 2016

Regulatory Consistency Assessment Programme (RCAP)

Time dimension — Monitor timely adoption of Basel standards across BCBS members

Rules dimension — Identify deviations from internationally agreed minimum that raise prudential concerns

Outcomes dimension — Understand implementation effects in terms of intended prudential outcomes

Bill Coen's speech, Dec 2016

Basel Committee's assessment of member's implementation

- Risk-based Capital Framework
  - Review of all BCBS jurisdictions (19) now complete
    - 15 "compliant"
    - 3 "Largely compliant"
    - 1 "Materially non-compliant"
  - More than 1000 findings
    - Most rectified during assessments
    - 85% of remaining findings are non-material
- Liquidity Coverage Ratio (LCR)
  - Review of 12 BCBS jurisdictions
    - 10 "compliant"
    - 2 "Largely compliant"

Bill Coen's speech, Dec 2016

Overview of jurisdictional assessments			
Status	**Jurisdiction**	**Publication date of assessment**	**Overall assessment grade**
Risk-based capital standards	Japan	Oct 2012	Compliant
	Singapore	Mar 2013	Compliant
	Switzerland	Jun 2013	Compliant
	China	Sep 2013	Compliant
	Brazil	Dec 2013	Compliant
	Australia	Mar 2014	Compliant
	Canada	Jun 2014	Compliant
	EU (9 members)	Dec 2014	Materially non-compliant
	United States	Dec 2014	Largely compliant
	Hong Kong	Mar 2015	Compliant
	Mexico	Mar 2015	Compliant
	India	June 2015	Compliant
	South Africa	June 2015	Compliant
	Saudi Arabia	Sept 2015	Compliant
	Russia	Mar 2016	Compliant
	Turkey	Mar 2016	Compliant
	Argentina	Sep 2016	Compliant
	Korea	Sep 2016	Largely compliant
	Indonesia	Dec 2016	Largely compliant
Liquidity (LCR)	Hong Kong	Mar 2015	Compliant
	Mexico	Mar 2015	Compliant
	India	June 2015	Largely compliant
	South Africa	June 2015	Compliant
	Saudi Arabia	Sept 2015	Largely compliant
	Russia	Mar 2016	Compliant
	Turkey	Mar 2016	Compliant
	Argentina	Sep 2016	Compliant
	Korea	Sep 2016	Compliant
	Indonesia	Dec 2016	Compliant
	Japan	Dec 2016	Compliant
	Singapore	Dec 2016	Compliant

Bill Coen’s speech, Dec 2016

Final Remarks: Post crisis reforms

- Resilient banks
  - Capital, liquidity
  - Buffers
  - Recovery
  - Resolution

- Implementation

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