Balance-Sheet Channel in Subprime Crisis

Nobuhiro Kiyotaki

General Features of financial crisis (Reinhart-Rogoff, H. Shin)

1. Varieties of financial crisis

banking crises: failures and/or government bailouts of major financial institutions

debt crises: defaults on external and domestic government debts

inflation crises: annual inflation rate of 20% or more

currency crisis: annual depreciation rate of 15% or more against the key currency

2. Early warning signs of financial crisis

asset price inflation, in particular real estate price

credit boom: rise of leverage rate or debt-income ratio

non-core liabilities of financial intermediaries expand

capital inflows, or current account deficit

3. Average of major financial crisis of advanced and emerging market economies after WWII

real GDP falls by 9.3% in 2 years

equity price falls by 56% in 3.4 years

unemployment rate rises by 7% in 4.8 years

housing price falls by 35% in 6 years

government debt is almost doubled in 3 years, mainly due to fall in tax revenue

Then

Quick recovery: output, working capital investment, stock price

Slow recovery: credit, fixed capital investment, real estate price

Legacy: government debs

The subprime crisis is the turmoil of finance and aggregate economic activities since 2007, that is triggered by an increase of defaults of the US subprime mortgage - housing loans to the households who are not qualified for the traditional mortgage

Unique features of subprime crises is securitization and run on shadow banking

Traditional Bank	
securities	deposits
loans	bank equity

Securitized Banking

$$\text{Borrowers} \overset{\text{Mortg}}{\rightleftarrows} \text{Originators} \overset{\text{Mortg}}{\rightleftarrows} \text{Banks} \overset{\text{Mortg}}{\rightleftarrows} \text{SPV} \overset{\text{MBS}}{\rightleftarrows} \text{Lenders}$$

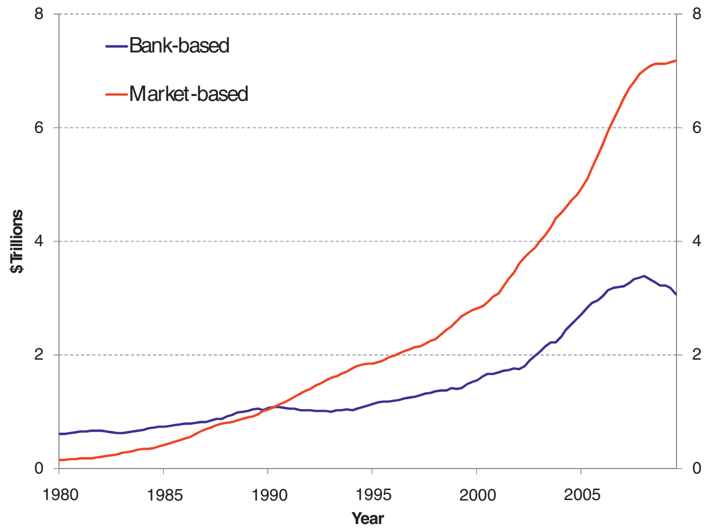


Figure 4

Market-based and bank-based holdings of home mortgages. Data taken from the U.S. Flow of Funds, Federal Reserve, 1980–2009.

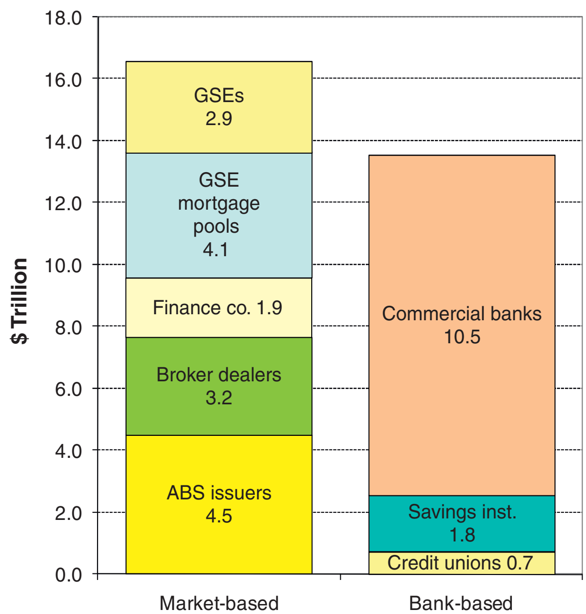


Figure 5

Total assets at the end of the second quarter of 2007. Data taken from the U.S. Flow of Funds, Federal Reserve. ABS, asset-backed security; GSE, government-sponsored enterprise.

Household	
deposit	loans
MMMF etc	
tangible a	net worth

Non-financial Business	
financial a	loans etc
productive a	net worth

Gov&CB	
sec	MB
	TB

Loan Originator	
loans	ABCP
	bank loan
	net worth

Banks	
reserve	deposit
securities	other liab
loans	net worth

SPV	
loans	ABS

Lenders w/ High Leverage	
TB	Repo
ABS	bank loan
others	net worth

Deep Pocket Lenders	
TB, Repo, ABCP	MMMF
ABS	pensions etc
others	net worth

During the boom: Defaults of mortgage is largely due to idiosyncratic shocks to individual households $\longrightarrow$ low correlation $\longrightarrow$ senior tranche is safe and not sensitive to the default risk

During recession: Housing price falls $\rightleftarrows$ difficult to refinance & correlated default (more than 90% of subprime mortgages are either refinanced or default within 5 years)

Senior tranche is no longer safe and is subject to the problem of adverse selection and moral hazard again $\longrightarrow$ loose liquidity $\longrightarrow$ value falls further

ABX (price index of subprime MBS)

AAA tranche: 100 (up to 7/07) $\longrightarrow$ 40 (7/08)

Credit boom - Expansionary bank balance-sheet channel

Favorable conditions (low interest rate and asset price boom)

Net worth of financial intermediaries (banks) expands $\longrightarrow$

• Banks can borrow more, but supply of core deposit is limited $\longrightarrow$ Expand non-core deposit (borrowing from other financial institutions including foreign banks)

• Banks can lend more, but fund demand of traditional borrowers is limited $\longrightarrow$ Lend to inferior borrowers and other financial institutions

$\longrightarrow$ Credit chains become longer

Abundant supply of credit further push up the price of financial and nonfinancial assets

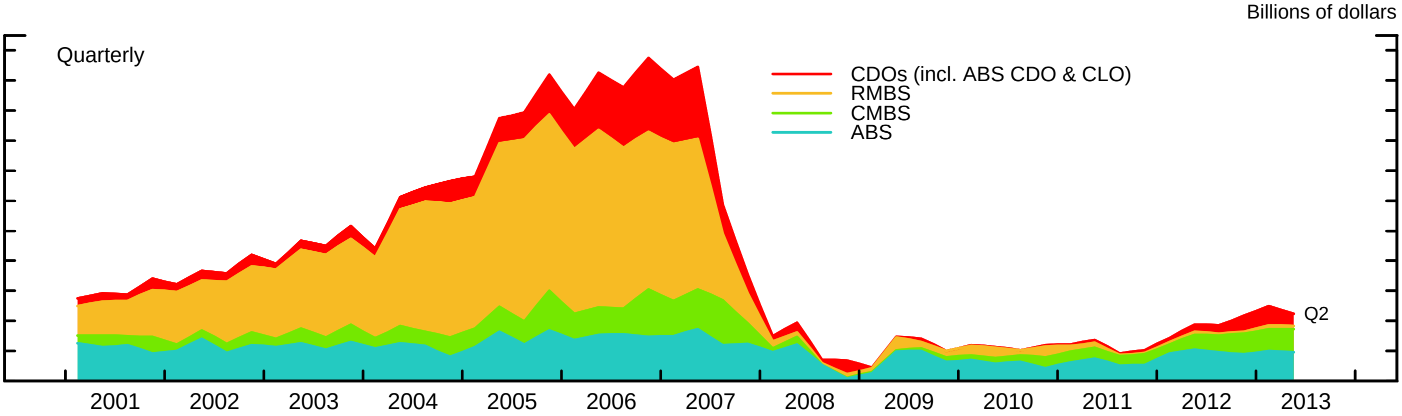
Subprime Crisis: Contractionary bank balance sheet channel

Banks loose the net worth

Asset prices fall $\rightleftarrows$ Banks contract the balance sheet

Credit contracts and recession deepened

Chart 13
U.S. Securitization Issuance



Note: CLO refers to all securities backed by loans or bonds issued by businesses. CMBS and RMBS refer respectively to securities backed by commercial and residential mortgages. ABS refers to securities backed by consumer loans.

Source: Asset-backed Alert, Commercial Mortgage Alert from Harrison Scott Publications, Inc. (downloaded May 8, 2013).

Government Policy

Responses to the problems of money market: Shortage of liquidity

(A1) Fed lends more aggressively

(a) Reduce target short-term interest rate (becomes zero in Dec 2008)

(b) Lend anonymously for longer duration: Term Auction Facility (up to $900bil)

(c) Lend more broadly against wider collateral: Primary Dealer Credit Facility, ABCP MMF Liquidity Facility

(d) Lend Treasury securities against wide collateral: Term Securities Lending Facility

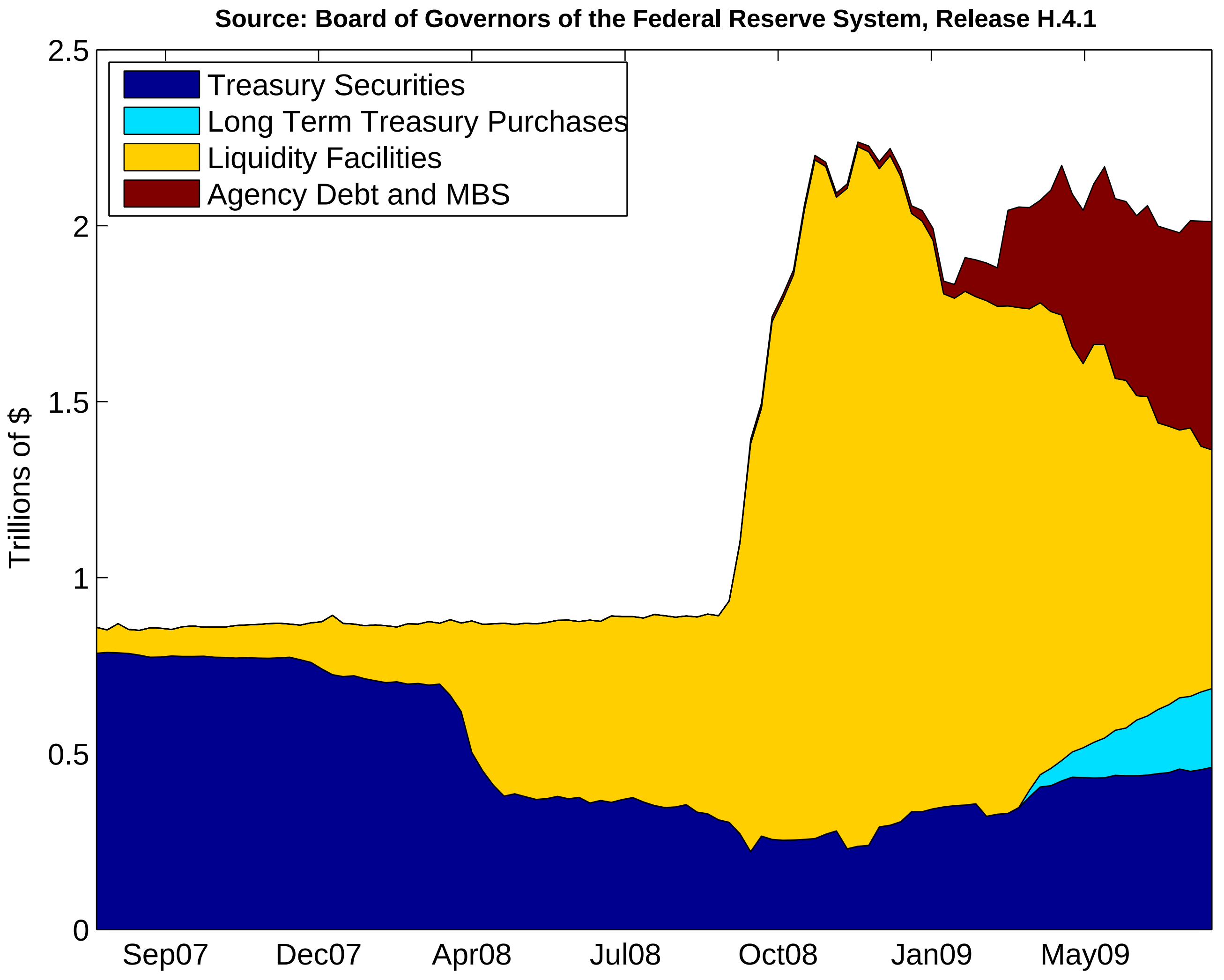
(e) Lend against recently originated AAA ABS and CMBS: Term Asset-Backed Securities Loan Facility (TALF)

(f) Swap lines with foreign central banks who lend dollars

(A2) Fed & Treasury buy securities as investors

(a) Commercial Paper Funding Facility: buy high-quality commercial papers (up to $1600b)

(b) Govt buys securities from Fannie Mae, Freddie Mac and Ginnie Mae (up to $1300b)


Source: Board of Governors of the Federal Reserve System, Release H.4.1
Treasury Securities
Long Term Treasury Purchases
Liquidity Facilities
Agency Debt and MBS
Trillions of $
0
0.5
1
1.5
2
2.5
Sep07
Dec07
Apr08
Jul08
Oct08
Jan09
May09

(A3) Government provides guarantees

(a) FDIC increases the deposit insurance from \$100K to \$250K per deposit

(b) FDIC guarantees non-interest bearing deposits

(c) Govt guarantees MMMF

(B) Shortage of Equities of Financial Institutions

(a) Shut down insolvent institutions

(b) Inject capital to solvent banks who are short of equities: Use \$330b of Troubled Asset Relief Program (TARP) (AIG \$40b, Citi \$45b, other \$250b)

(C) Proper assignment of policy instruments to the target

Control inflation $\longleftarrow$ interest rate policy

Liquidity shortage $\longleftarrow$ liquidity provision policy

Capital shortage $\longleftarrow$ shut down insolvent banks, encourage solvent banks to raise equity from privates, inject capital publicly if there is externality

Mitigate moral hazard due to too-big-to-fail $\longleftarrow$ banking regulations $+$ facilitate resolution of large banks

(D) To the extent that banking regulation and bank resolution are not perfect, monetary policy may have to react to the early warning signs of future financial crises