Credit risk shifting via securitization – from cardiac arrest to rehab. An empirical study.

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Abstract

This paper analyze the rise, fall and rebirth of securitization as a vehicle for funding loans, and evaluates the various proposals aimed at restarting them on a sounder footing. The first quarter of the paper searches out the root causes of the subprime mortgage crisis, with particular emphasis on the systemic elements that turned the crisis of subprime mortgage-backed securities in the United States into a world-wide financial crisis. It explains the triggers of the crisis and gives answer what catalysts led to events gathering momentum. It highlights the period of exceptional macrostability and the global savings glut. It identifies the causes and consequences of the financial innovations that created the real estate boom and bust. The second quarter of the paper explains the role of securitization, the process of pooling illiquid assets into marketable securities, in financing mortgages and discuss primarily what has gone wrong. To facilitate the market remobilization, the paper address in the third quarter six issues that need to be resolved for securitization to return. The final fourth provides an update on what actions financial regulators, supervisors and standard-setters have taken to restore confidence in loan securitization, what lessons the rating agencies have learned, and how securitization markets have evolved after the financial crisis.

***Keywords*:** securitization, cdo, cds, clo, regulation, basel III, stc, sts, credit rating agencies; default
***JEL codes*:** G01, G24, G32, G33, G38

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List of Abbreviations

AAA	Best quality borrowers
ABCP	Asset-backed commercial paper
ABS	Asset-backed securities
AFME	Association of Financial Markets in Europe
AG	Aktiengesellschaft
AIFM	Alternative investment fund managers
ARM	Adjustable rate mortgage
ASF	American Securitization Forum
BBA	British Bankers' Association
BBB	Medium class borrowers
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
BNP	Banque Nationale de Paris
BoE	Bank of England
BPS	Basic point system (5 bps means 0.05%)
CAR	Certificate for automobile receivables
CARD	Certificate for amortizing revolving debt
CCF	Credit conversion factor
CCP	Central counterparty
CDO	Collateralized debt obligation
CDS	Credit default swap
CEO	Chief Executive Officer
CFTC	Commodities Futures Trading Commission
CLO	Collateralized loan obligation
CMBS	Commercial mortgage-backed securities
CMO	Collateralized mortgage obligation
COVID	Coronavirus disease
CP	Commercial paper
CRA	Credit Rating Agency
CRD	Capital Requirement Directives
CRR	Capital Requirements Regulation
CRS	Credit risk sharing
DRD	Default and Recovery Database
EBA	European Banking Authority
ECB	European Central Bank
ESA	European Supervisory Authorities

ESMA	European Securities and Markets Authority
ETF	Exchange Traded Fund
EURIBOR	Euro Interbank Offered Rate
FASB	Financial Accounting Standard Board
FDIC	Federal Deposit Insurance Corporation
FED	Federal Reserve System
FHLMC	Federal Home Loan Mortgage Corporation
FICO	Fair Isaac Corporation
FSOC	Financial Stability Oversight Committee
GAAP	Generally Accepted Accounting Principles
GDP	Gross domestic product
GFC	Global financial crisis
GNMA	Government National Mortgage Association
GSE	Government sponsored enterprise
HEL	Home equity loans
IFSL	International Financial Services London
IKB	Deutsche Industriebank AG
IMF	International Monetary Fund
IOSCO	International Organization of Securities Commissioners
IRB	Internal Ratings Based Approach
JSDA	Japan Securities Dealers Association
KKR	Kohlberg, Kravis & Roberts
LB	Landesbank
LBBW	Landesbank Baden-Württemberg
LBO	Leveraged buy-out
LIBOR	London Interbank Offered Rate
LF	Liquidity facility
LLC	Limited Liability Company
LLR	Lender of last resort
MBA	Master of Business Administration
MBS	Mortgage-backed securities
NRSRO	Nationally Recognized Statistical Rating Organization
OFHEO	Office of Federal Housing Enterprise Oversight
OTC	Over the counter
REMIC	Real Estate Mortgage Investment Conduits
RMBS	Residential mortgage-backed securities
RTS	Regulatory Technical Standards
SEC	Securities and Exchange Commission
SIFI	Systemically important financial institution

SIFMA	Securities Industry and Financial Markets Association
SIV	Structured investment vehicle
SOFR	Secured Overnight Financing Rate
SPM	Subsequent participating manufacturer
SPV	Special purpose vehicle
SSPE	Securitization special purpose entities
STC	Simple, transparent, comparable
STS	Simple, transparent, standardised
TAF	Term auction facility
TBA	To be announced
TDS	Total debt service
TFSM	Task Force on Securitization Markets
UCITS	Undertakings for the collective investment in transferable securities
US	United States

1. Introduction

The global market for securitization has slumped since August 2007 due to turbulence in credit markets, a lack of liquidity and a reduction in investors' tolerance of risk. These difficulties were triggered by the subprime[1] mortgage crisis and compounded by the downfall of Lehman Brothers, as well as the nationalisation of the United States federal agencies - Fannie Mae and Freddie Mac. Furthermore, balance sheets of many banks were weakened by holding large tranches of mortgage-backed securities (MBS)[2] and asset-backed securities (ABS)[3]. This resulted in the recapitalisation of some banks in a number of countries. Many of these overleveraged borrowers, including banks and other investors have exited the securitization market.[4] This development has given the decades-old concept of securitization a bad name.

Securitization is a process that involves repackaging portfolios of cash-flow-producing financial instruments into securities for transfer to third parties. The interest and principal payments from the assets are passed through to the purchasers of the securities. Securitization got its start in the 1970s, when home mortgages were pooled by United States government-backed agencies. Starting in the 1980s, other income-producing assets began to be securitized, and in recent years the market has grown dramatically. In some markets, such as those for securities backed by risky subprime mortgages in the United States, the unexpected deterioration in the quality of some of the underlying assets undermined investor confidence. Both the scale and persistence of the attendant financial crisis seem to suggest that securitization - together with poor credit origination, inadequate valuation methods, and insufficient regulatory oversight - could severely hurt financial stability.[5]

Increasing numbers of financial institutions employ securitization to shift the credit risk of the assets they originate from their balance sheets to those of other financial institutions, such as banks, insurance companies, and hedge funds. They do it for a variety of reasons. It is often cheaper to raise money through securitization, and securitized assets were then less costly for banks to hold because financial regulators had different standards for them than for the assets that underpinned them. In principle, this "originate and distribute" approach brought broad economic benefits too – spreading out credit exposures, thereby diffusing risk concentrations and reducing systemic vulnerabilities.

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1 Subprime refers to a borrower that is less likely to repay a loan. Subprime borrowers may be classified as "subprime" because of many things, including bad credit or lack of credit history, low income or high debt to income ratios, and/or large loans relative to the value of the securing property.

2 Mortgage-backed securities (MBS) are a form of collateralized debt obligation (CDO) where the underlying is a mortgage, most commonly in recent years, residential mortgages. MBS are created when the sponsor buys up mortgages from lenders, pools them, and packages them for sale to the public, a process known as securitization.

3 An asset-backed security (ABS) is essentially the same thing as a mortgage-backed security, except that the securities backing it are assets such as loans, leases, credit card debt, a company's receivables, royalties and so on, and not mortgage-based securities.

4 **IFSL Research** (2009).

5 See **Jobst, A.A.** (2008), pp. 48f.

Until the subprime mortgage crisis unfolded, the impact of securitization appeared largely to be positive and benign. But securitization also has been indicted by some for compromising the incentives for originators to ensure minimum standards of prudent lending, risk management, and investment, at a time when low returns on conventional debt products, default rates below the historical experience, and the wide availability of hedging tools were encouraging investors to take more risk to achieve a higher yield. Many of the loans were not kept on the balance sheets of those who securitized them, perhaps encouraging originators to cut back on screening and monitoring borrowers (a bank selling loans must continue to convince loan buyers of its commitment to evaluate the credit quality of borrowers by maintaining a portion of the loan's risk[6]), resulting possibly in a systematic deterioration of lending and collateral standards. Another problem is an excessive reliance on the wholesale market to fund lending growth, as in Northern Rock's case.[7] The fact that the alternative "buy and hold" model (i.e., the bank loan is kept in the balance sheet until maturity) has been eroded during the last years makes even more compelling to understand why do banks securitize. However, the emergence of securitization and, more recently, credit derivatives challenges the traditional paradigm.

The objective of this paper is to shed some light on determinants of the securitization process. What true role did securitization play in the recent financial crisis, what went wrong, and how can it be brought back to life? First of all, the paper discusses a variety of factors leading to the subprime mortgage crisis.

6 See **Gorton, G.B./Pennacchi, G.G.** (1995), pp. 389 - 411.
7 See **Llewellyn, D.T.** (2008a), pp. 35 - 38.

2. Roots of the subprime mortgage crisis

When Investors started searching for higher returns in 2003, excess liquidity began to pour into subprime mortgage market, driving prices of MBS up and yields down. At the time when investors were confronted with a decline in house prices in the United States and the impact of the earlier rise in United States interest rates the credit bubble burst, starting in the United States mortgage market.[8] The United States subprime crisis became a full-blown global banking and economic crisis. Stock markets sold off, implied equity market volatility rose to unprecedented levels and credit spreads surged to multi-decade highs. The global economy fell into a recession. Money markets became strained and investors fled to safe, high-quality government securities. Central banks were forced to provide massive extra liquidity and to cut interest rates sharply to avert any further deterioration.

"One (error) was that monetary policy around the world was too loose too long. And that created this huge boom in asset prices, money chasing risk. People trying to get a higher return. That was just overwhelmingly powerful [...]. We all bear a responsibility for that [...]. The supervisory system was just way behind the curve. You had huge pockets of risk built up outside the regulatory framework and not enough effort to try to contain that. But even in the core of the system, banks got to be too big and overleveraged. Now again, here's an important contrast. Banks in the United States, even with investment banks now banks, bank assets are about one times GDP of the United States. In many other mature countries – in Europe, for example – they're a multiple of that. So again, around the world, banks got to just be too big, took on too much risk relative to the size of their economies."[9]

2.1 How did the subprime bubble come to be?

Bianco explains that a housing bubble is an economic bubble that occurs in local or global real estate markets.[10] He defined it by rapid increases in the valuations of real property until unsustainable levels are reached in relation to incomes and other indicators of affordability. Following the rapid increases are decreases in home prices and mortgage debt that is higher than the value of the property.

Housing bubbles can be definitively identified only in hindsight after a market correction, which occurred in the United States around 2006.[11] Former Chairman of the Federal Reserve Board, Alan Greenspan, said in 2007 that "we had a bubble in housing," and that he "really didn't get it until very late in 2005 and 2006."[12]

Like most asset bubbles, this subprime bubble had multiple origins. Following a few studies, including those done at the International Monetary Fund (IMF)[13], at the Bank for International Settlements (BIS)[14], and various central

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8 See **Llewellyn, D.T.** (2008a), p. 37.

9 The revelation came from **Timothy Geithner** with PBS's Charlie Rose (May 12, 2009), who asked the United States Treasury Secretary: "Looking back, what are the mistakes and what should you have done more of? Where were your instincts right, but you didn't go far enough?".

10 See **Bianco, K.M.** (2008), p. 3.

11 **Wikipedia** (2010).

12 **Financial Times** (2007).

13 **Dodd, R.** (2007).

14 **BIS** (2009a).

banks, four key elements were mentioned as drivers: (1) global excess liquidity; (2) too low levels of interest rates; (3) high securitization activity; and (4) weak bank regulation.[15]

The Bank of England (BoE) Financial Stability Report (2008) accurately summarized the building and global nature of the issue quite concisely:

"Over the past year, financial market participants have been struggling to manage vulnerabilities that are the legacy of a prolonged spell of balance sheet expansion. [...] Benign economic conditions helped anchor expectations of continued stability. This, along with rising asset prices and low global real interest rates, boosted the demand for and supply of credit in a number of developed economies [...] apparent reductions in macroeconomic uncertainty and strong competitive pressure to maintain returns encouraged investors and financial firms to take on ever greater risk."[16]

2.1.1 Global excess liquidity

Global excess liquidity is often understood as monetary liquidity that is not needed by households, firms and governments to finance real economic transactions such as sales or purchases of goods or services. Then by definition, excess liquidity is the amount of money that is used to finance transaction in financial asset markets such as bond, equity or real estates.[17] In order to assess the creation as well as the stock of global excess liquidity, one might look at the growth rates of world money supply and global nominal gross domestic product (GDP) as well as at the ratio between both variables.

If money expands permanently faster than nominal GDP, excess liquidity will be created, leading to a rising money-to-GDP stock. Admittedly, the argumentation is based on two crucial and debatable assumptions. First, that the velocity of money remains constant over time. Second, that nominal GDP is a good approximation for the transaction demand for money. Based on these two assumptions, the global liquidity has indeed grown much faster than global nominal GDP since 1996. In particular since 2000/2001 both the narrow and broad money stocks have clearly outpaced nominal GDP. Especially between 2001 and 2003, when world growth weakened and central banks started to inject massive amounts of liquidity into the financial system.[18]
During the past asset boom, it was often said that a global savings glut had boosted asset prices. First, extraordinarily tranquil macroeconomic conditions coupled with a flow of global savings from countries with sizeable current account surpluses (e.g., Germany, Japan, China and Russia) and oil-exporting countries resulted in lower long-term interest rates and reduced macroeconomic volatility. Second, an expansion of securitization in subprime MBS assets produced sophisticated financial assets with relatively high yields and good credit ratings. This favourable situation in the United States saw a remarkable period of low inflation and low nominal short-term interest rates and steady growth.[19] *Dell'Ariccia et al.* suggest that lending was excessive – what they call "credit booms"

[15] See **Maddaloni, A./Peydro, J.-L.** (2009), p. 2.
[16] **BoE** (2008), p. 7.
[17] See **Fels, J.** (2005).
[18] See **Becker, S.** (2009), p. 7.
[19] See **Mizen, P.** (2008), p. 533.

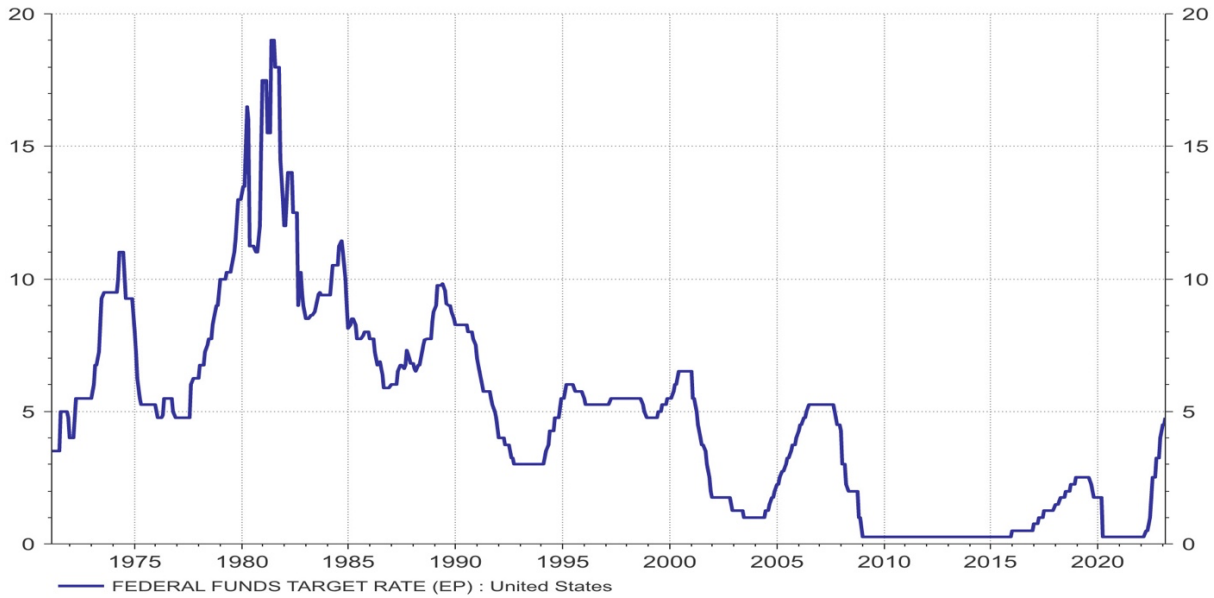
– in the past five years.[20] However, the excess money supported the asset inflation and affect the money policy of the Federal Reserve System (FED).

2.1.2 Low interest rate

In the early 2000s the United States found compelling reasons to pursue a cheaper money policy – it wished both to devise a "soft-landing" from the "New Economy"[21] share bubble and to demonstrate that the United States powerhouse was unscathed by terrorism. After the 9/11 it became a national security priority to inflate the purchasing power of the United States consumers.

The FED, under the leadership of Greenspan, moved quickly to slash its benchmark federal funds rate to 1% in 2004, at this time the lowest level in more than 30 years (see figure 1).

Figure 1: The federal funds rate. January 1971 - February 2023 series



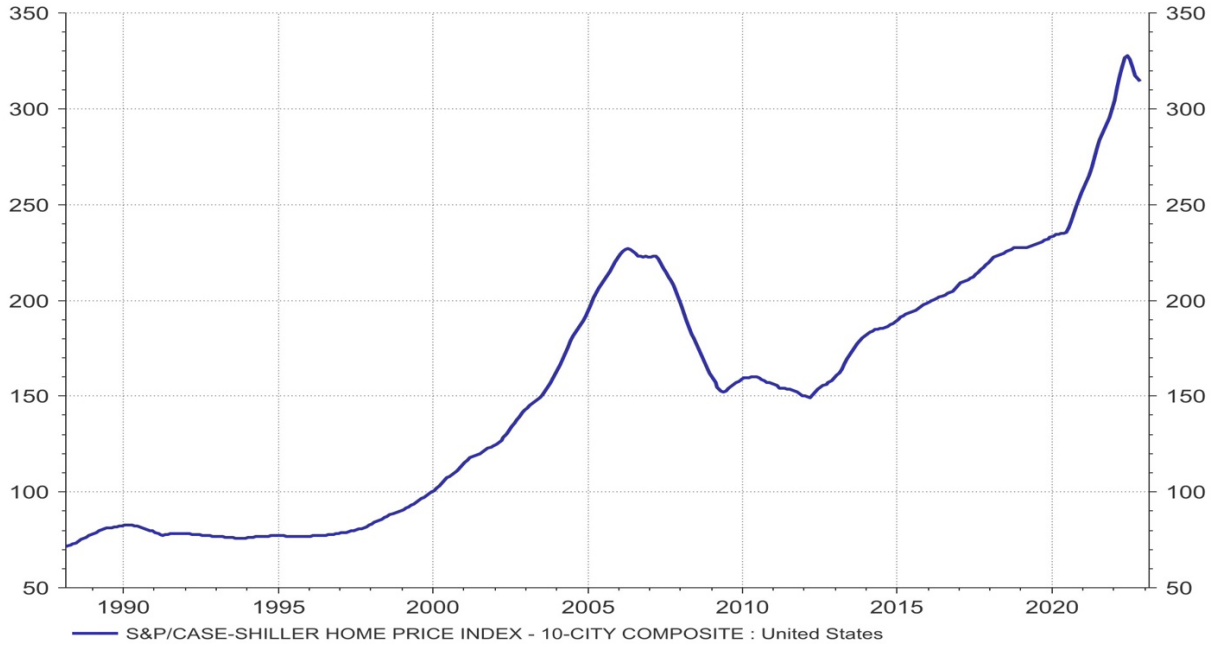
Source: Thomson Reuters Datastream, 23.2.2023

At the time, Greenspan was acclaimed by economists for mitigating business cycle volatility and returning the economy back into a period of rapid growth. In hindsight, however, this period of easy money may have enabled the run-up in housing prices (see figure 2).

[20] See **Dell'Ariccia et al.** (2008).

[21] The term "New Economy" describes aspects or sectors of an economy that are producing or intensely using innovative or new technologies. This relatively new concept applies particularly to industries where people depend more and more on computers, telecommunications and the internet to produce, sell and distribute goods and services.

Figure 2: S&P/Case-Shiller 10-City Composite Index for house prices in the United States



Source: Thomson Reuters Datastream, 23.2.2023

While housing prices were increasing, consumers were saving less and both borrowing and spending more. Consumption boomed over this period with the savings rate falling to less than 1.0 percent in the years 2005-2007. Household debt grew from $7.0 trillion at yearend 2000 to $13.9 trillion in midyear 2008.[22]

The ECB used a sequential Monte Carlo algorithm to simulate the post-9/11 deteriorating economic conditions and the Fed's subsequent response. Ultimately, it determined that 1% was below the natural cost of capital, and households were able to borrow at rates which failed to properly account for their creditworthiness or lack thereof. The European Central Bank (ECB) has argued:

"After the 2000 stock market bubble burst, the Fed has successfully managed to reduce business cycle volatility (resulting in the mildest US recession ever!) by reducing short-term rates to a 45-year low of 1 percent, while effectively convincing the bond markets that rates would have been kept so low for a considerable period. Yet, it remains an open question whether or not the Fed has cut interest rates by 'too much' and left them low for 'too long' in relation to the current economic conditions. Possible, the exceptionally low cost of capital - at a time when the expected worldwide return on capital has likely increased - might have encouraged excessive borrowing, allowing financial imbalances to build up."[23]

Boeri and *Guiso* argue that the seeds of the credit booms were sown by Greenspan when he cut short-term interest rates in response to the 9/11 attacks.[24]

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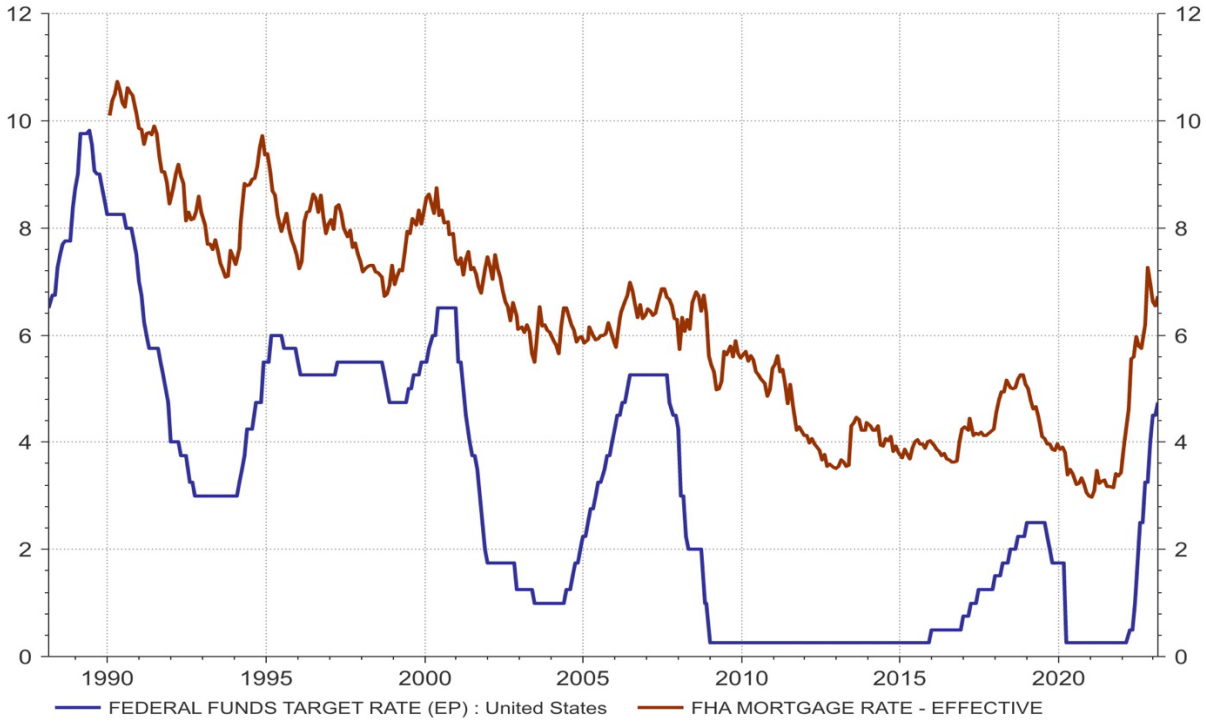
[22] **FED** (2008), p. 8.
[23] **ECB** (2007a), p. 5.
[24] See **Boeri, T./Guiso, L.** (2007), pp. 37 - 39.

In this period of low interest rates, investors were on the lookout for a yield pickup and accepted higher risks in the process. Financial institutions enjoyed high profit margins in mortgages loans, since the spread of mortgage rates over the fed funds rates was considerably wide, see figure 3.

Figure 3: The mortgage rate and the federal funds rate. January 1990 – February 2023 series



Source: Thomson Reuters Datastream, 23.2.2023

In consequence of low short-term interest rates the housing market in the United States grew very fast.

Investment in home ownership is one of the major ways that households can build wealth. The typical household held in 1995 neither corporate equity nor innovative products, implying that most households find it difficult to invest in anything but their home.[25] Because home ownership is such an important economic factor, in particular the mortgage market.

In the United States the mortgage comprise four categories, defined as follows: (1) prime conforming mortgages are made to good quality borrowers and meet requirement that enable originators to sell them to government-sponsored enterprises (GSEs[26], such Fannie Mae and Freddie Mac); (2) jumbo mortgages exceed the limit set by

[25] See **Tracy, J./Schneider, H./Chan, S.** (1999).

[26] The Government created the first mortgage-backed securities (MBS) in the late 1960s. During the 1980s, the activities of the Federal National Mortgages Association (founded originally in 1938 but made into a government sponsored enterprise in 1968 and hereafter called Fannie Mae), the Federal Home Loan Mortgage Corporation (founded 1970, hereafter Freddie Mac) and the Government National Mortgage Association (founded in 1968 and hereafter Ginnie Mae) expanded rapidly as the Savings and Loan industry retreated from historic role as the main provider of mortgages in the United States. The

Fannie Mae and Freddie Mac (the 2008 limit set by Congress is a maximum of $729.750 in the continental United States, but a loan cannot be more than 125 percent of the county average house value – the limit is higher in Alaska, Hawaii, and the United States Virgin Islands), but are otherwise standard; (3) Alt-A mortgages do not conform to the Fannie Mae and Freddie Mac definitions, perhaps because a mortgage has a higher loan-to-income ratio, higher loan-to-value ratio, or some other characteristic that increases the risk of default; and (4) subprime mortgages lie below Alt-A mortgages and typically, but not always, represent mortgages to individuals with poor credit histories.[27] Subprime mortgages are mortgages that are considered to be significantly more risky than average.

Nichols et al. found that credit-constrained borrowers with substantial wealth are most likely to finance the purchase of a home by using a subprime mortgage.[28]

Subprime lending is a relatively new and rapidly growing segment of the mortgage market that expands the pool of credit to borrowers who, for a variety of reasons, would otherwise be denied credit. For instance, those potential borrowers who would fail credit history requirements in the standard (prime) mortgage market have greater access to credit in the subprime market.[29] There is no legal definition for a subprime borrower, but lenders use a combination of characteristics to identify one, including: (1) borrowers with low credit scores[30]; (2) high debt-service-to-income ratio, greater than 40 percent on average; (3) higher loan-to-value ratio of 80 percent or more; (4) smaller loan size of $100.000 on average; (5) less documentation; and (6) higher mortgage rates of 200 basis points on average over prime borrowers.[31]

The 2000 to 2006 period was characterized by a huge increase in subprime mortgage lending. *Jaffee* documents two periods of exceptional subprime mortgage growth.[32] The first expansion occurred during the late 1990s when the volume of subprime lending rose to $150 billion, totalling some 13 percent of total annual mortgage originations. This expansion came to a halt with the "New Economy" crisis of 2000/2001. A second expansion phase was from 2002 until 2006, when the subprime component of mortgage originations rose from $160 billion in 2001 to $600 billion by 2006 representing more than 20 percent of total annual mortgage originations (see figure 4). *Chomsisengphet* and *Pennington-Cross* argue that these expansions occurred because changes in the law allowed mortgage lending at high interest rates and fees, and tax advantages were available for secured borrowing versus unsecured borrowing.[33]

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government sponsored enterprises (GSE) produced the condition to make the private market for MBS grow. Indeed, the private market for MBS has grown up under and with the cooperation of the GSEs for the past 20 years.

27 See **Mizen, P.** (2008), p. 535.

28 See **Nichols, J. et al.** (2005), pp. 197 - 219.

29 See **Dash, A.P.** (2009), p. 206.

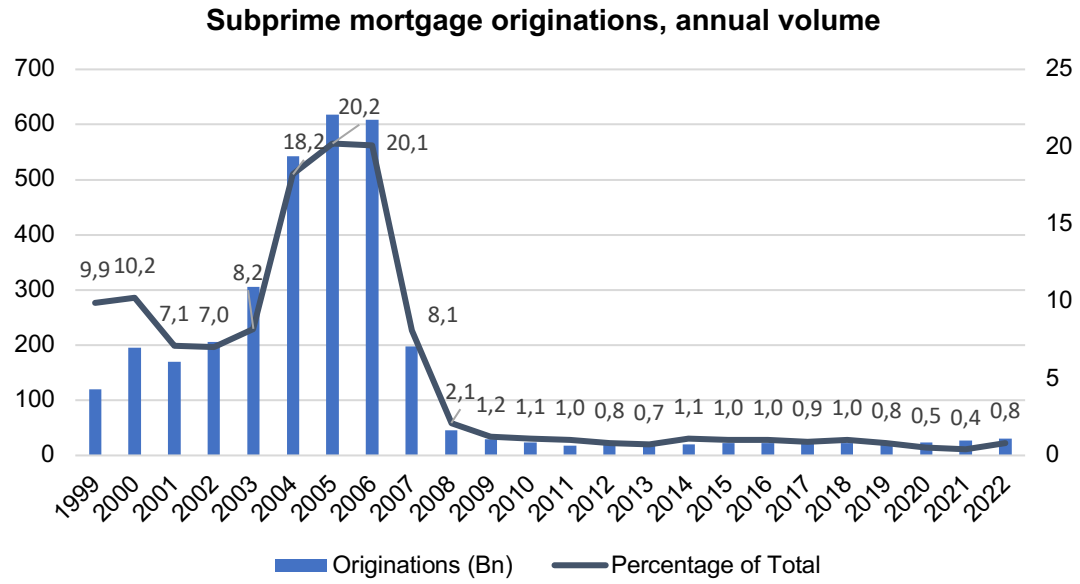
30 **Staten, M.** (2004): "Subprime Lending: Defining the Market and its Customers", Testimony before the United States House of Representatives Committee on Financial Services. Available at: http://www.access.gpo.gov/congress/house/house03ch108.html, 19.04.2010.

31 See **Agarwal, S./Ho, C.T.** (2007).

32 See **Jaffee, D.W.** (2008).

33 See **Chomsisengphet,S./Pennington-Cross, A.** (2006), pp. 31 - 56.

Figure 4: Subprime mortgage originations, annual volume



Source: LendingTree analysis of Federal Reserve Bank of New York/Equifax panel data (2022)

2.1.3 High securitization activity

The cheap money and the housing boom encouraged banks to engage in more risky lending practices. This made house purchase possible for many families that had previously been considered to be not sufficiently creditworthy to qualify for a mortgage. These families increased the demand for real estate and price rose. To mortgage brokers and mortgage lenders the combination of more lending and higher house prices was attractive. More lending meant bigger profits. Higher house prices meant that the lending was well covered by the underlying collateral. If the borrower defaulted, the resulting foreclosure would not lead to a loss.[34]

The lending base now widened to include subprime borrowers and the lending tactic became more aggressive by offering either initial low interest rates (so-called "teaser rates"[35]) or payment options (option ARMs). To quote from *Krinsman*:

"In 2005 and 2006 lenders made it easier for borrowers to obtain subprime loans. For example, the typical subprime borrower with a "FICO credit score"[36] between 450 and 680 could obtain a loan with little or no down

[34] See **Hull, J.C.** (2009), p. 2.

[35] Teaser rate means an initial rate on an adjustable-rate mortgage (ARM). This rate will typically be below the going market rate, and is used by lenders to entice borrowers to choose ARMs over traditional mortgages. The teaser rate will be in effect or only a few months, at which point the rate will gradually climb until it reaches the full indexed rate, which will be a static margin rate plus the floating rate index to which the mortgage is tied. The problem: credit checks often calculate the charges on the basis of the low teaser rate alone.

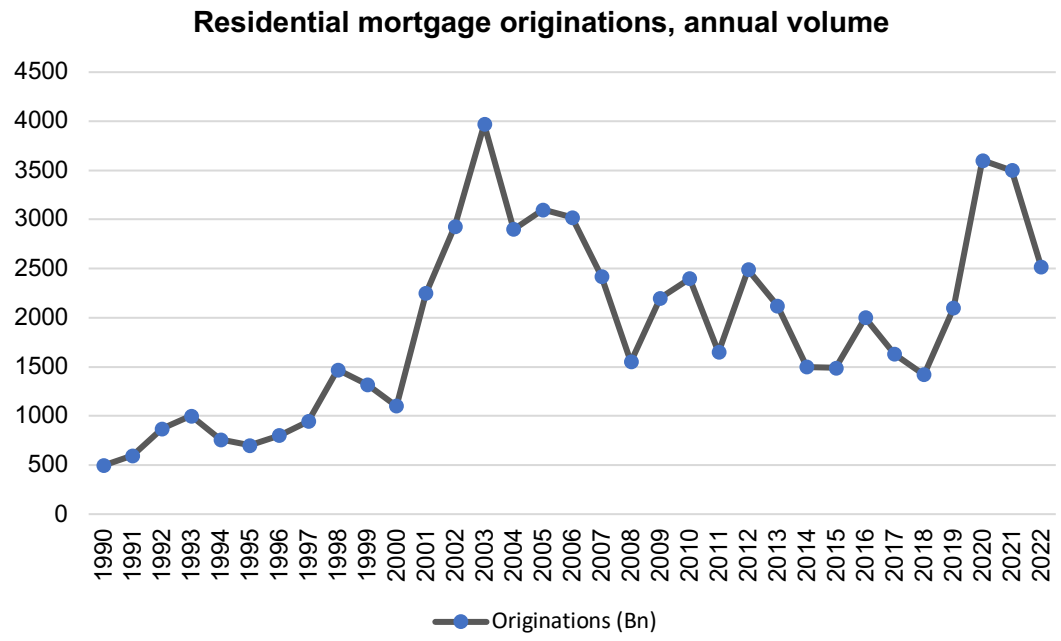
[36] Mortgages where the borrower had a FICO score (a credit score created by Fair Isaac Cooperation to measure consumer credit worthiness) less than 620 were typically classified as subprime, but when the down payment was low, 680 was sometimes used as the subprime cutoff.

payment, provide little or no documented proof of income or assets, obtain a loan with a low initial 'teaser' interest rate that reset a new, higher rate after two or three years [...]."[37]

On a wide-spread scale, the standard credit approval criteria based on a maximum levels of total debt service (TDS) ratios for mortgage borrowers were either violated or ignored. The default risk was no longer a concern since mortgage originators had no intention of retaining the loans on their balance sheets. Hence, the unprecedented expansion of high risk non-traditional mortgage loans took place. Higher volume of lending activities was supported by complex securitization of mortgages.

The market for mortgages in the United States increased from $458 billion in 1990 to nearly $4 trillion at its peak in 2003 (see figure 5). Most of these mortgages were packaged into MBS. Many of these MBS were sponsored by the GSE. The GSE frequently relied on either the commercial or investment banks to put these packages together and help sell them. This meant that the repackaging of mortgages into bonds became the largest fee generation business for many banks. Those who did this included Lehman Brothers, Bear Stearns, Merrill Lynch, Morgan Stanley and Goldman Sachs. Of course, commercial banks and bank holding companies like Bank of America, Wells Fargo, Citibank and Countrywide Financial were also deeply involved in the selling and packaging of mortgages and MBS. All of these banks aggressively packaged and sold MBS securities to insurance companies, pension funds and banks around the world. They later held onto a large number of these securities which they financed through short-term borrowings from financial markets.[38]

Figure 5: Residential mortgage originations, annual volume



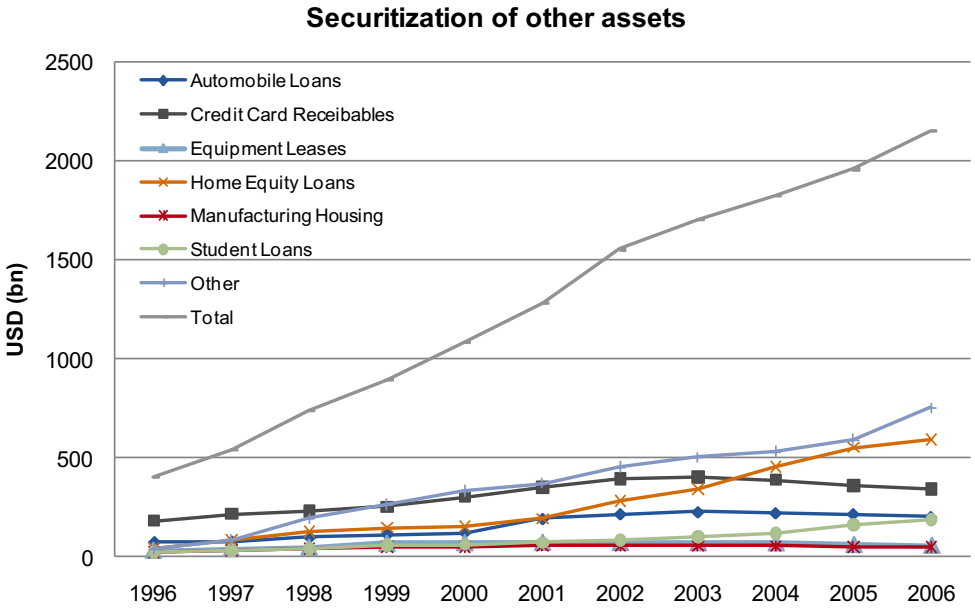
Source: U.S. Residential Property Mortgage Origination Report (2022)

[37] See **Krinsman, A.N.** (2007), pp. 13 - 19.
[38] See **Hellwig, M.** (2008), pp. 12ff.

The investment banks realized that other assets besides mortgages could be securitized. It started with equipment leases in 1985 with computers, followed by auto loans (certificate for automobile receivables, CAR).[39] Credit Cards (certificates for amortizing revolving debts, CARD) were securitized in 1986 by Bank One with the help of Salomon Brothers; students loans, and home equity loans (HEL ABS) followed.[40] "First-Level" securitization now has been extended to intellectual property rights (royalties on music [Bowie Bonds], movies [Bond Bonds], perfumes [Calvin Klein Bonds], etc.), as well as future flows (i.e., securities backed by the expected cash inflows from assets not yet produced) and many others sources of cash flows.[41] In 2007, the newest collateral in first-level securitization was in carbon emission allowances, infrastructure loans, nonperforming loans, and others.[42]

The idea that underlying assets could be packaged and sold to investors as bonds that would pay out from the cash flow on the underlying asset caught fire. Markets sprung up for these different securitization assets. Figure 6 shows how these markets grew from 1996 to 2006. In 1996, about $450 billion in these various kinds of assets were securitized and this grew to about $2.3 trillion by 2006. This possibility created a huge expansion in all forms of customer credit markets. This meant that nearly everyone that wanted to borrow money for nearly everything found a willing creditor to loan them money. These creditors frequently acted as loan originators did in the mortgage markets. They would create debt and then sell off the rights to the cash flow to investment banks who would package the debt into collateralized debt obligations (CDOs).[43]

Figure 6: Securitization of other assets, annual volume



Source: Fligstein, N./Goldstein, A. (2009), p. 47

[39] See **Kothari, V.** (2006), pp. 402 - 410.
[40] See **Obay, L.** (2000), pp. 74ff.
[41] See **Hurst, R.R.** (2001), pp. 501ff.
[42] See **de Vries Robbé, J.J./Ali, P.U.** (2007).
[43] See **Fligstein, N./Goldstein, A.** (2009), p. 17.

Beside the CDO boom, another sort of secondary markets also grew up: the credit default swap (CDS) market.[44]

The CDS market exploded over the past decade to more than $45 trillion in mid-2007, according to the International Swaps and Derivatives Association. This is roughly twice the size of the United States market (which is valued at about $22 trillion and falling) and far exceeds the $7.1 trillion mortgage market and $4.4 trillion United States treasuries market.

CDSs are insurance-like contracts that promise to cover losses on certain securities in the event of a default. They typically apply to municipal bonds, corporate debt and mortgage securities and are sold by banks, hedge funds and others. The buyer of the credit default insurance pays premiums over a period of time in return for peace of mind, knowing that losses will be covered if a default happens.
The next two subsections briefly describe the role of CDOs and CDS. Both products have been in existence for many years and have been used to increase liquidity and the availability of credit in the financial markets.

2.1.3.1 Collateralized debt obligation (CDO)

The reason for spectacular growth in securitization activity since 1999 are linked to two factors: the increased demand from investors; technological and financial innovation.

First, the demand for CDO has grown rapidly from institutional investors, who are more willing and able to invest in credit risk. CDOs cater for the increasing number of sophisticated institutional investors seeking to buy assets that typically have a good rating and provide an extra yield over government bonds.[45] Moreover, these securities can be constructed to offer specific, sometimes even tailor-made, risk-return trade-offs that can be segmented by rating, asset class, sector and country of origination thereby tapping into a broader investor base.[46] Second, technological advancements have been instrumental in the development of CDOs via dramatic improvements in the storage, processing and pricing of financial data. Technological progress has therefore changed the cost structure of issuing CDOs. As shown in figure 7, the CDO market experienced two booms (1996 and 2004), both driven by ideal arbitrage conditions.[47]

Llewellyn argues that the impetus for financial innovation can be considered in terms of its broad determinants, and in particular wealth effects, portfolio behaviour and preferences of users, portfolio behaviour and preferences of the suppliers of financial services, portfolio constraints, changes in the market and economic environment, regulation, policy changes, technology, and competition.[48]

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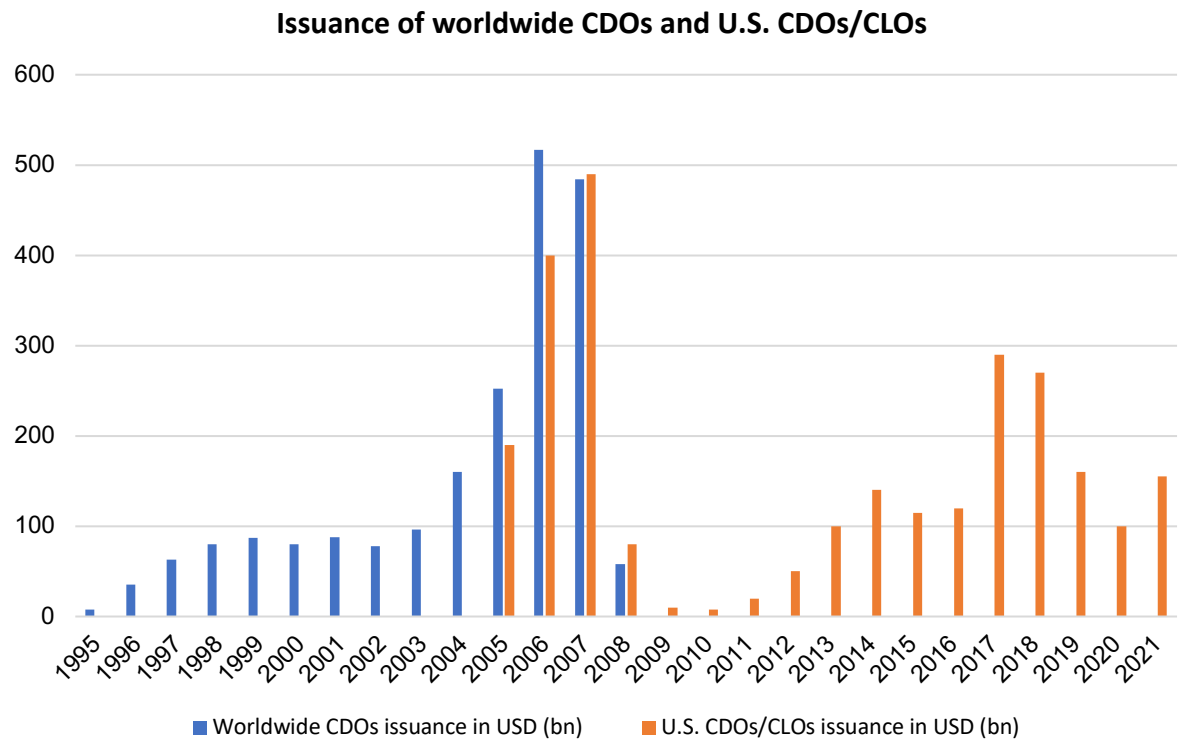
[44] See **Barmat, J.** (1990), pp. 3 - 22.
[45] See **Rajan, R.** (2005).
[46] See **ECB** (2007b), p. 10.
[47] See **Kothari, V.** (2006), pp. 417 - 418.
[48] See **Llewellyn, D.T.** (1992), pp. 14ff.

Figure 7: Issuance of worldwide CDOs and U.S. CDOs/CLOs, annual volume



Source: Kothari (2006), p. 418 before 1996, FDIC (2006), p. 7 for the period 1996-2004, SIFMA (2010), for the period 2005-2008, SIFMA (2022), for the period 2005-2021

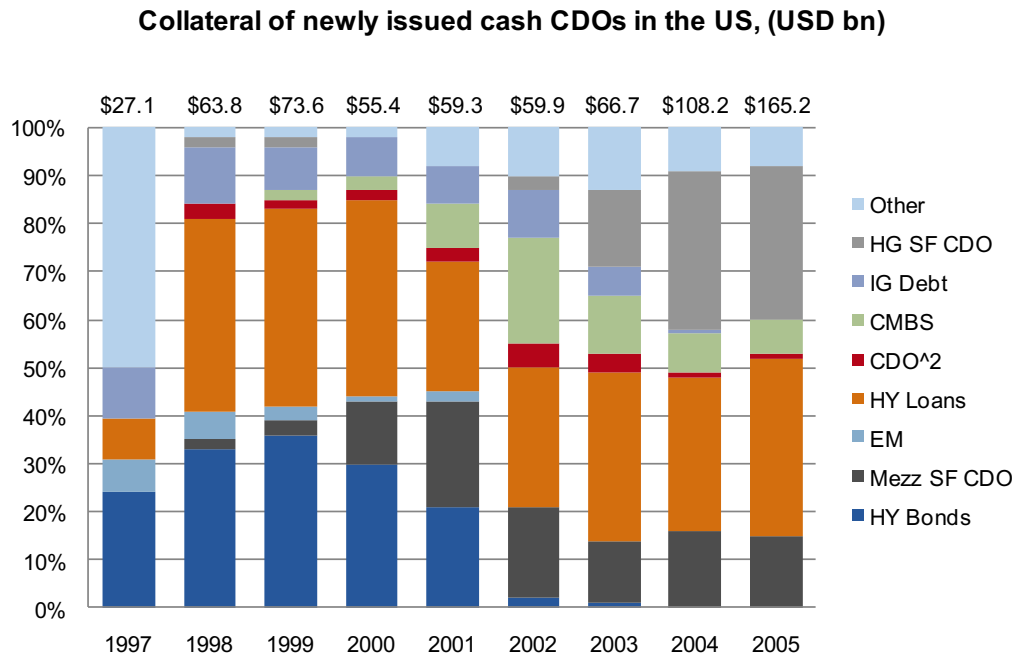
Figure 8 shows that in the United States the main underlying collateral of CDOs used to be high yield debts (bond and loans), but, since 2003, structured finance CDOs have been a major collateral (leading to CDO-squared). Investment-grade backing has been a very small and declining proportion of overall collateral.[49]

"Banks are motivated to securitize investment-grade commercial loans because by doing so they effectively subject themselves to the market's capital requirements for such loans instead of their regulator's. Tight competition has compressed the margin that banks earn on investment-grade loans to the point that more institutions are considering investment-grade lending to be an inefficient use of capital."[50]

CDO-squared have been very successful and have comprised up to 20% of the total CDO market in 2005 and 2006.[51] CDO-cubed (cash CDOs backed by CDO-squared) have existed since 1999, but only represented a small proportion of structured securities because of their very high complexity.

[49] See **Tymoigne E.** (2009), pp. 29 - 31.
[50] See **Kalser, K./Puwalski, A.** (1998).
[51] See **Boultwood, B./Meissner G.** (2008).

Figure 8: Collateral of newly issued cash CDOs in the United States



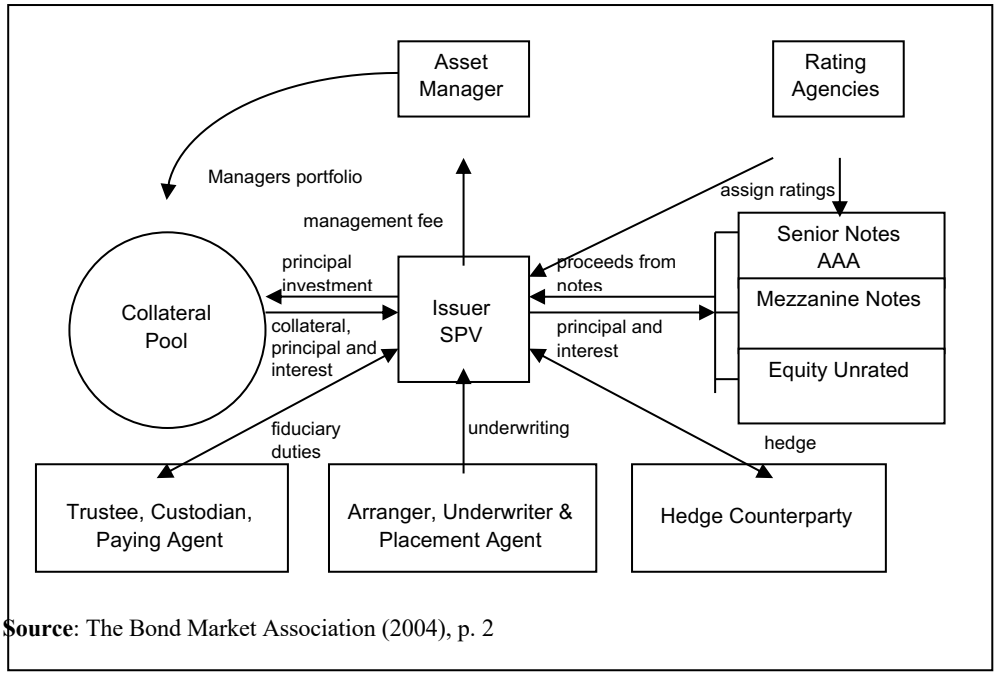
Source: FDIC (2006)
Note: HY = high yield, IG = investment grade, CDO^2 = CDO squared, HG SF = high grade structured finance, Mezz SF = mezzanine structured finance, CMBS = commercial mortgage-backed securities, EM = emerging markets.

With the 2001 recession and accounting scandals, the CDO market experienced a setback from 2001 to 2003, but came back in force in 2004.[52]

The CDO was introduced by Drexel Burnham Lambert Inc. in 1987.[53] A CDO is a structured finance product that securitizes a diversified pool of debt assets into multiple classes of notes from the cash flows generated by such assets. A securitization, in abstract terms, is a reallocation of risk. Securitization is the process of converting assets into securities backed by those assets and is used for: lower funding costs, accounting purposes, accessing the capital markets and generating fees – servicing and underwriting.[54] Typically, a bankruptcy remote special purpose vehicle (SPV)[55] is created to hold the collateral and issue liabilities, which will comprise both debt and equity components (see figure 9).

[52] See **Moore, P.** (2004).
[53] **Salas, C/Hassler, D.** (2007).
[54] See **Nelson, J.** (2000), p. 1.
[55] A CDOs bankruptcy risk is minimized by setting it up as an SPV, thereby limiting the universe of potential creditors with claims against the CDO, and by building into the CDO transaction structural impediments and disincentives to those creditors commencing bankruptcy proceedings against the CDO. The SPVs business purpose and activities are limited to only those necessary to effect the particular transaction for which the SPV has been established.

Figure 9: Basic CDO: SPV with debt and equity components



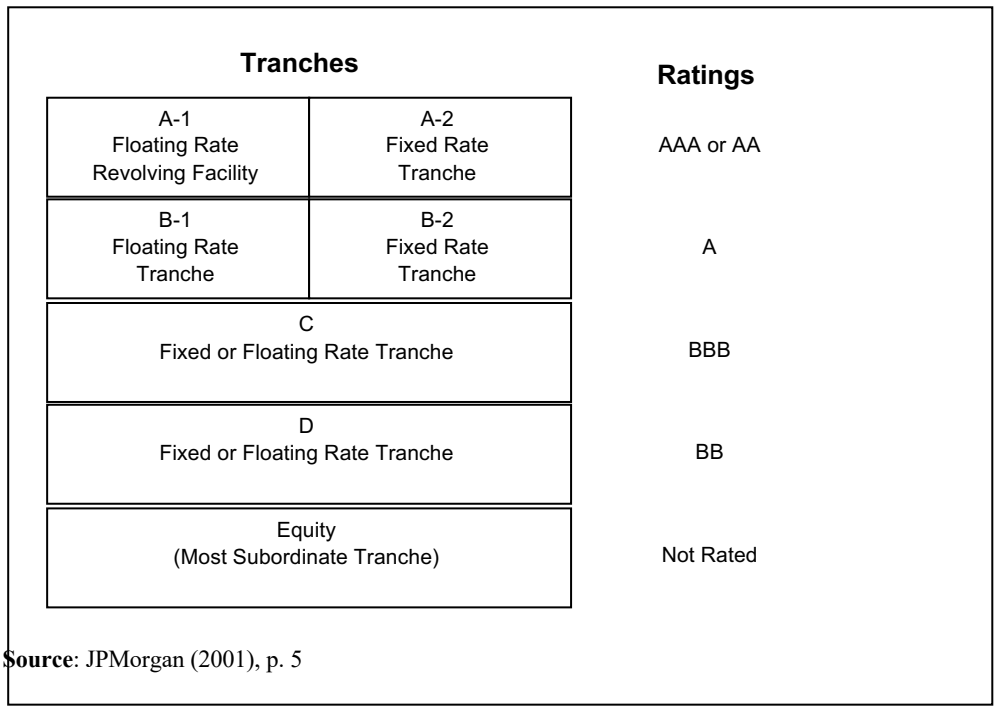
Source: The Bond Market Association (2004), p. 2

The difference between a CDO and other pooled investments, such as mutual funds, is the portioning of risk among the investors. Unlike mutual fund, in which investors have rights and risks in proportion to the size of their investment, some CDO investor have more rights and greater security than other CDO investors of the same transaction based on the priority level of repayment for each tranche of securities, which is based on the risks associated with each investor are outlined in the transaction's indenture.[56]

A CDO cash flow structure allocates interest income and principal repayments from a collateral pool of different debt instruments to a prioritized collection of CDO securities, which are called tranches. While there are many variations, a standard prioritization scheme is simple subordination: senior CDO notes are paid before mezzanine and lower-subordinated notes are paid, with any residual cash flow paid to an equity piece.[57] The senior notes are usually rated AAA to A and have first claim on cash flows. The mezzanine and subordinated notes are usually rated BBB to B and have a subordinate claim on cash flows. The equity tranche, which occupies a first-loss position, is generally unrated and receives all or most of the residual interest proceeds of the collateral. Figure 10 shows a typical CDO structure.

[56] **The Bond Market Association** (2004), p. 1.
[57] See **Duffie, D./Gârleanu, N.** (2001), p. 2.

Figure 10: Typical CDO tranching



Source: JPMorgan (2001), p. 5

The CDO equity represents a leveraged investment in the collateral; it has both a higher expected return and a higher volatility of return than the underlying class. The underlying class could be static or revolving, and may consist of any variety and configuration of: corporate bonds, bank loans, emerging market sovereign debt, project finance debt, ABS and other structured finance securities (such as CMBS[58], RMBS[59] and HEL[60]), and credit derivatives. The underlying collateral is managed by an asset manager who generally has demonstrated experience in managing the asset classes mandated by the transaction. The asset manager, who often has broad discretion to purchase and trade collateral, plays a key role in each CDO transaction.[61]

A cash-flow CDO is one for which the collateral portfolio is not subjected to active trading by the CDO manager, implying that the uncertainty regarding interest and principal payments to the CDO tranches is determined mainly by the number and timing of defaults of the collateral securities. A mark-to-market CDO is one in which the CDO tranches receive payments based essentially on the mark-to-market returns of the collateral pool, as determined in large part by the trading performance of the CDO manager.

Cash flow CDOs are usually classified as either arbitrage or balance sheet transactions. Arbitrage transactions attempt to capture for equity investors the spread between the relatively high yielding assets and the lower yielding liabilities represented by the rated notes. Balance sheet transactions, by contrast, are primarily motivated by the issuing institution's desire to remove loans and other assets from their balance sheets, to reduce their regulatory

[58] CMBS (commercial mortgage-backed securities): A type of mortgage-backed security that is secured by the loan on a commercial property. A CMBS can provide liquidity to real estate investors and to commercial lenders.

[59] RMBS (residential mortgage-backed securities): A type of security whose cash flows come from residential debt such as mortgages, home-equity loans and subprime mortgages.

[60] HEL (home equity loan): A type of loan in which the borrower uses the equity in their home as collateral.

[61] See **Barclays** (2002).

capital requirements and improve their return on risk capital. Some balance sheet transactions use credit derivatives to transfer the credit risk of assets from balance sheets to CDOs without the sale or transfer of the assets themselves. These structures, which may be non-funded or partially funded, are called "synthetic CDOs".[62]

Diversification within a CDO's portfolio can make it stronger than merely the sum of its parts. The idea of diversification is central to estimating the riskiness of a CDOs different classes. Professionals grapple with diversification through the statistical concept of "correlation". They gauge the riskiness of a CDOs different classes by running computer simulations where they make assumptions about correlation. The rating agencies often use the same approach when they analyze CDOs for the purpose of rating them. For example, when a CDOs underlying portfolio consists of corporate bonds, Standard & Poor's assumes a constant correlation of 0.3 for companies within a given industry and zero correlation among companies in different industries. Similarly, when a CDOs underlying portfolio consists of ABS, Standard & Poor assumes constant correlation of 0.3 within an ABS sector and 0.1 between ABS sector.[63] Assumptions about correlation have a strong effect on the predicted credit quality of a CDO. Correlation can produce opposite effects on different tranches in a CDO. Senior tranches tend to benefit from low correlation of credit risk among the assets in the underlying portfolio. Conversely, the junior tranches tend to benefit from high correlation. Strong diversification respectively low correlation dampens the overall performance volatility of a CDOs underlying portfolio. That is, strong diversification makes extreme outcomes less likely. The CDOs senior tranche can suffer only if the extreme outcome of very high losses occurs. On the other hand, the CDOs equity tranche may survive only if the extreme outcome of very low losses occurs. Thus, the senior tranche favours low correlation but the equity tranche favours high correlation.[64]

Participants in a CDO transaction include investors, the underwriter, the asset manager, the trustee and collateral administrator, rating agencies, accountants and attorneys.
CDOs contain a number of unique benefits that make them attractive to investors, originators and borrowers for a variety of reasons.

CDOs offer investors exposure to a wide array of assets. Because CDO structures strictly limit the collateral concentration within any one issuer, industry or geographic region, investors are able to diversify among a large number of credits via a single investment. In addition to achieving greater diversity within specific asset types through exposure to a pool of perhaps 100 investment-grade credits, CDO investors can also diversify across asset types within the same transaction. For example, a typical multi-sector ABS pool may consist of home equity loans, CMBS and RMBS. Hence, via their collateral pools, CDOs enable traditional fixed income investors to participate in varied underlying collateral markets while relying on the investment manager's resources and expertise in those respective markets.[65] CDO structures allow investors to choose securities suitable to their specific risk-reward profile by separating the cash flows of the underlying collateral into tranches of investment-grade and non-

[62] See **Barclays** (2002).
[63] See **Standard & Poor's** (2002), p. 44.
[64] See **Nomura Fixed Income Research** (2004), p. 3.
[65] **The Bond Market Association** (2004), p. 7.

investment grade securities. As previously mentioned, risk tranching also enables issuers to offer, within a single transaction, CDOs across the entire risk/reward spectrum, ranging from the least risky, AAA rated securities to the high risk, unrated equity investment (as shown in figure 10). A risk-averse investor, for example, can choose to invest in the higher rated senior notes, while investors with higher risk tolerances can select from subordinated notes and equity asset classes.[66] CDOs often offer higher yields when compared to other ABS sectors and investment grade corporate bonds. The yield pickup increases as investors move toward the riskier end of the credit spectrum. As a leveraged instrument, CDO equity represents a unique investment opportunity as part of a diversified portfolio of financial assets without mark-to-market or margin call unwind risk. The financial leverage provided by a CDO could be fixed for as long as 12 years, although the equity owner has the right to exercise an optional redemption feature provides additional flexibility to an equity investor in a CDO, offering potentially greater upside if the collateral performs well and appreciates in price. Like any other structured finance product, investments in CDOs involve risk. A clear understanding of the risks, mitigants and potential rewards for taking these risks are imperative for all CDO investors and asset manager. Some of these risks are: credit risk, interest rate risk, liquidity risk, prepayment risk, reinvestment risk, asset manager risk, currency risk, counterpart risk and systemic risk.

For originators CDOs improve returns on capital by converting an on-balance-sheet lending business into an off-balance-sheet fee income stream that is less capital intensive. Depending on the type of structure used, CDOs provide efficient access to capital markets. Transaction can be structured with AAA ratings on most of the debt, so pricing is not tied to the originator's credit rating. Furthermore CDOs minimise issuer-specific limitations on ability to raise capital. Capital raised depends on the terms, credit quality, prepayment assumptions, and servicing of the assets and prevailing market conditions. Entities that are unable to borrow based on their individual credit quality, or who do so only at significant cost, may be able to compete with CDOs. This applies as well to entities that are unable to raise equity. Another advantage is, that CDOs allows to convert illiquid assets to cash. Assets that are not readily sellable may be combined to create a diversified collateral pool against which notes can be issued. Then CDOs generate earnings. When a true sale CDO transaction takes place between the originator and the SPV, this sale has to take place at market value of the underlying assets. The transaction is reflected in the originator's balance sheet, which will eventually boost earnings for the particular quarter of financial year by the amount of sale. It is also advantageous that CDOs transfer risk to third parties. Financial risk from defaults on loans or contractual obligations by customers can be partially transferred to investors and credit enhancers.[67]

Borrowers receive by the use of CDOs better credit terms. Borrowers benefit from the increasing availability of credit terms, which lenders may not have provided if they had kept the loans on their balance sheets. For example, lenders can extend fixed rate debt, which many consumers prefer over variable rate debt, without overexposing themselves to interest rate risk because of the existence of a market for CDO securities. Credit card lenders can originate very large loan pools for a diverse customer base at lower rates. Nationwide competition among credit

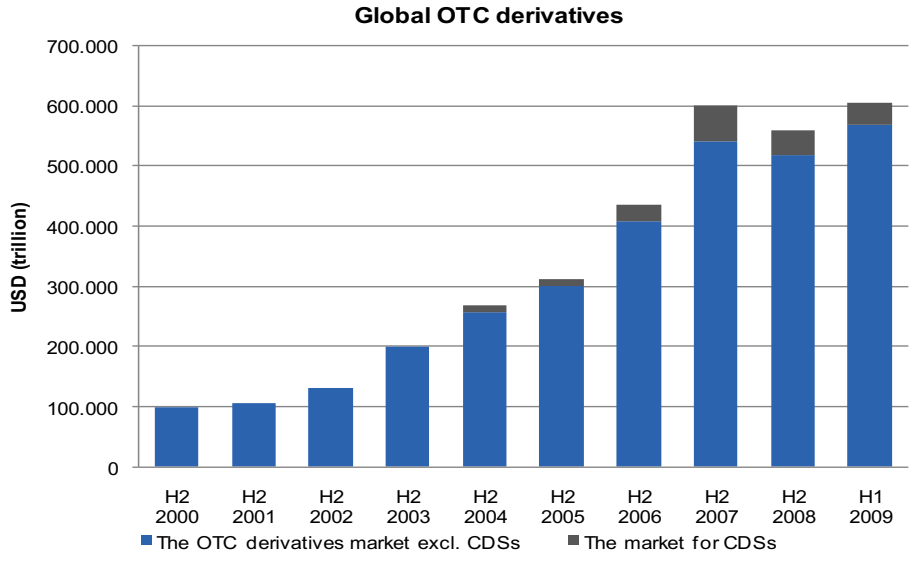
[66] **The Bond Market Association** (2004), p. 7.
[67] **PricewaterhouseCoopers** (2007), p. 9.

originators, coupled with a strong investor appetite for CDOs, has significantly expanded both the availability of credit, and the pool of cardholders over the past decade.[68]

2.1.3.2 Credit default swap (CDS)

More and more attention has been paid to risks financial products are exposed to other than market risk or interest risk. Credit risk, which consists of default risk and credit spread risk, is an important member of the risk family. Default risk is the risk that a party fails to carry out pre-promised payments. Credit spread risk is the risk "due to the possible widening of the credit spread or worsening in credit quality" that exists even when a party does not default.[69] Various credit derivative products have been developed to protect investors against potential credit risks. With the ongoing financial crisis in the financial market worldwide, properly quantifying credit risk has become extremely important. According to the half-yearly BIS over-the-counter (OTC) derivative statistics, credit derivatives accounted for 6% of total outstanding OTC derivatives at the end of June 2009 in terms of nominal amounts (see figure 11).[70] Measured in gross terms the market is large – the rise of the CDSs market had been remarkable. Growing popularity of CDSs followed a general trend of mounting volumes in the OTC derivatives market. Swaps, options and forwards had been used to hedge interest rate, foreign exchange, and market for quite a while before CDSs entered the stage. When volume peaked in 2007, CDS gross notional amount outstanding had reached a notable $58 trillion. Although large in absolute terms, the size of the CDS market may not be as huge as these numbers suggest. CDSs remain a small segment of the $600 trillion OTC derivatives market, constituting less than ten percent of the total volume (for example, see the last pillar in figure 11).

Figure 11: Notional amounts for OTC derivatives, annual volume

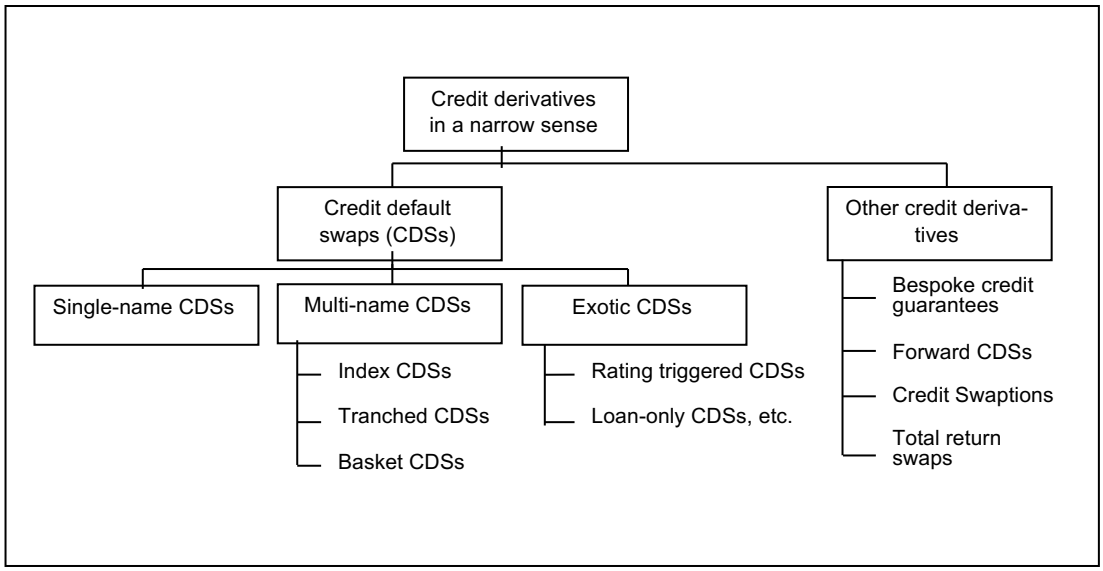


Source: BIS (2009b), p. 1

[68] **PricewaterhouseCoopers** (2007), p. 10.
[69] **Arvanitis, A./Gregory, J.** (2001), p. 4.
[70] **BIS** (2009b), p. 1.

CDSs can come in various forms depending on the underlying reference entity and any other varying contractual definitions (see figure 12). The most commonly used groups include CDSs based on single-name corporate or sovereign borrowers and CDSs referenced to various entities (multi-name CDSs). Single-name and multi-name CDSs constitute also the dominant form of credit derivatives – the wider category to which CDSs belong. A survey conducted by the British Bankers Association (BBA) finds that 63% of credit derivatives are either single-name or index products.[71]

Figure 12: Various forms of CDSs and other credit derivatives



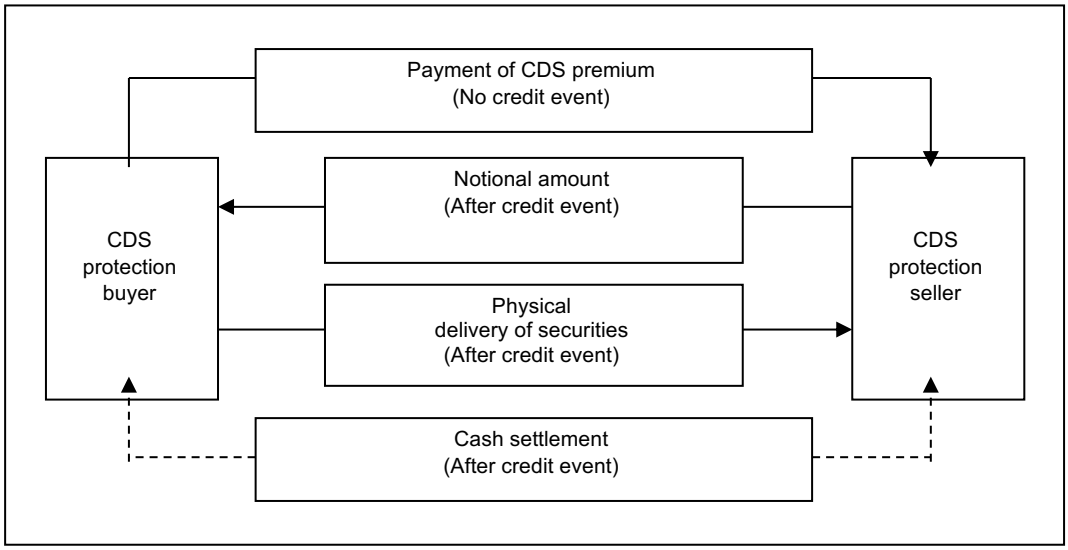
Source: Weistroffer, Ch. (2009), p. 7

A single-name CDS accounts for the traditional and most common form of CDSs. They are referenced to an individual company (or sovereign borrower) and provide protection against the risk of a credit event. The company is known as the reference entity and a default by the company is known as a credit event. The buyer of the insurance obtains the right to sell a particular bond issued by the company for its par value when a credit event occurs. The bond is known as the reference obligation and the total par value of the bond that can be sold is known as the swap's notional principal. The buyer of protection makes periodic payments to the protection seller until the occurrence of a credit event or the maturity date of the contract, whichever is first (see figure 13). If a credit event occurs the buyer is compensated for the loss (possibly hypothetically) incurred as a result of the credit event.[72] Typically, a credit event is defined as bankruptcy, failure to pay or restructuring. The amount of the payments made per year by the buyer is known as the CDS spread. Suppose, for example, that the CDS spread for a five-year contract on Daimler with a principal of €10 million is 150 basis points. This means that the buyer can enter into a five-year contract where €150.000 per year is paid and the right to sell bonds issued by Daimler with a face value of €10 million for €10 million in the event of a default by Daimler during the life of the CDS is obtained. In a standard contract, payments are made semi-annually or quarterly in arrears. If the reference entity defaults, there is a final accrual payment covering the period from the previous payment to the default date and payments then

[71] See **BBA** (2006).
[72] See **Sipos, A.** (2005), p. 7.

stop. Contracts are sometimes settled in cash rather than by the delivery of bonds. In this case there is a calculation agent who has the responsibility of determining the market price of bonds issued by the reference entity a specified number of days after the credit event. The cash settlement is then the face value of the bond less the post-default market price.[73]

Figure 13: Basic CDS overview



Source: ECB (2009), p. 9

While single-name contracts account for the majority of all trades, multi-name contracts have become almost as popular during recent years. The rapid growth of this market segment is due to index trades being used increasingly for trading purposes as well as proxy hedges.[74] A multi-name CDS protect against default risk of one or a combination of securities inside a portfolio, rather than single-name credit derivative, which only covers securities from a single issuer. Index CDSs are the key product among multi-names. A CDS index contract is an insurance contract covering default risk on the pool of names in the index. Index contracts differ slightly from single-name securities. The main difference is that a buyer of protection on the index is implicitly obligated to pay the same premium, called the fixed rate, on all the names in the index. In addition, index contracts restrict the eligible types of credit events to bankruptcy or failure to pay. In the case of a credit event, the entity is removed from the index and the contract continues (with a reduced amount) until maturity.[75] Another common form of multi-name CDS is that of the tranched index CDSs. Typically, a tranche will be exposed only to portfolio losses that fall into a medium range of possible losses, e.g. between 3 and 7 percent. Portfolio losses below 3 percent will then be borne by more the junior tranches, while losses exceeding 7 percent will be borne by tranches that are more senior.[76] A further multi-name CDS is that of basket CDSs. Basket CDS are similar to indices, as they relate to portfolios of reference entities, which can comprise anything from 3 to 100 names. However, basket CDSs may be more tailored than

[73] See **Hull, J.C./White, A.** (2002), pp. 3 - 4.
[74] Proxy hedging refers to the practice of buying protection for a reference entity whose default risk is closely correlated to the risk in question, for which a direct hedge in turn is not readily available.
[75] See **Amato, J.D./Gyntelberg, J.** (2005), p. 74.
[76] See **Amato, J.D./Gyntelberg, J.** (2005), pp. 73ff.

index contracts and are more opaque in terms of their volumes and pricing. Basket CDSs, for example, include specific sub-categories such as first-to-default CDSs. In addition, derivative instruments such as CDS options (called CDS swaptions) are now also being traded. Holders of these instruments are entitled – but not obliged – to enter into forward-start CDS contracts to buy or sell protection. This type of instrument may benefit from increased investor interest in the environment of increased transparency that may result from stronger migration of CDSs to central counterparties (CCPs).[77]

CDSs swaps can be used by investors: (1) as a risk management tool; (2) as a trading instrument; and (3) as an instrument to spread risks more efficiently.

First, CDSs are often used to manage the credit risk. Suppose a sound and prosperous corporate borrower wishes to take out a loan with its local bank. The bank, however, has already large exposures to this borrower or the industry in question and does not want to further expand its loan book, as this would mean increasing concentration risk. One way to avoid concentration risk and nevertheless grant the loan is to buy credit protection via a CDS. Such a form of hedging enables the bank to pass on its credit risk to another bank, which may not be able to directly do business with the corporate borrower but wishes to gain exposure. By offering CDS protection, it nevertheless becomes exposed to the credit risk of the corporate borrower. All three parties involved, the bank granting the loan, the bank providing protection and the borrower may benefit from such a transaction. Compared to traditional hedging methods such as portfolio diversification, asset securitization or outright loan sales, CDSs do not require the protection buyer and the seller to adjust the underlying loan portfolios. Instead, credit risk exposure can be managed by arm's lengths transactions at relatively low cost, leaving the bank-customer relationships unaffected.[78] Moreover, the protection buyer can use CDSs to free regulatory capital. By buying CDS protection, credit risk of the reference entity is replaced by the risk of the CDS counterparty failing. If this means a true reduction in risk exposure, less capital will be committed to the loan, which in turn frees capital for other productive investments.

Second, the buyer of credit risk protection does not necessarily need to be exposed to the underlying risk when entering into a CDS contract. CDS may also be used for pure trading purposes, where traders try to exploit possible mispricing between different asset classes or take open positions if they believe the market will evolve in a certain direction. Similarly, sellers of credit protection are able to gain access to the credit market via an arm's lengths financial transaction. By using CDSs, they do not have to prefund their exposure and do not bear interest rate risk generally associated with the purchase of bonds or the extension of loans.[79]

Third, the traditional view states that CDSs help to shift risks from those who hold highly concentrated portfolios to those who benefit from taking on additional exposure. As a result, risks are distributed across institutions and countries leaving the individual institution better diversified and thus more robust to the failure of an individual borrower. For instance, during the years 2001 and 2002, when a high number of corporate bankruptcies threatened

[77] See **ECB** (2009), p. 10.
[78] See **Franke, G./Krahnen, J.-P.** (2009).
[79] See **Weistroffer, Ch.** (2009), pp. 8 - 9.

to strain the financial sector, CDSs turned out to be a mitigating factor. In the case of Enron, Swissair and Argentina CDSs helped to ease the strains put on the financial system.[80] To the extent that the protection sellers were able to assume the exposure at a lower cost than the original lender the overall costs of bearing the risk was reduced. Thus, the use of CDSs potentially reduces borrowing costs and increase credit supply for corporate and sovereign debtors.[81]

During the financial crisis of 2007-2009 it became clear that the mere existence of a CDS market was not a sufficient condition for achieving a more stable financial system. There are several reasons for this. First, CDSs may have contributed to an alignment of risk profiles across financial institutions, thereby increasing the institution's vulnerability to common systematic shocks. Second, as the case of AIG and monoline insurers have shown, credit risks may have piled up in certain parts of the financial system, that did not have adequate organizational or financial capacities to deal with those risks. Finally, by increasing counterparty risk, while at the same time leaving market participants largely uninformed about this risk, CDSs may have constituted a further channel for spill-over effects possibly adding to the system's vulnerability. As the crisis demonstrated, the full benefits of enhanced risk diversification cannot be reaped until the deficiencies mentioned have been rectified. Current regulatory and industry initiatives thus try to establish the means necessary to minimise possible externalities of the CDS market.[82]

2.1.4 Weak bank regulation

Regulation has played a key role in the development of the subprime and securitization market. Although it was possible for banks to issue covered bonds since 1981 (Law 2/1981 of mortgage market regulation), it was not until 1992 (Law 19/1992 of securitization vehicles) that SPV to securitize mortgages were authorized. The SPV to securitize other assets than mortgages were set out in 1998 (Royal Decree 926/1998). Finally, synthetic securitization has been possible since 2003 (Law 62/2003). Banks only started to issue significant amounts of these assets after the main overall securitization framework (Basel II) was developed.[83]

Blundell-Wignall et al. explained that the recent financial crisis as being caused at two levels: by global macro policies affecting liquidity and by a very poor regulatory framework that, far from acting as a second line of defence, actually contributed to the crisis in important ways. The policies affecting liquidity created a situation like a dam overfilled with flooding water. Interest rates at one percent in the United States and zero percent in Japan, China's fixed exchange rate, the accumulation of reserves in Sovereign Wealth Funds, all helped to fill the liquidity reservoir to overflowing (see chapter 2.1.1). The overflow got the asset bubbles and excess leverage under way. But the faults in the dam – namely the regulatory system – started from about 2004 to direct the water more forcefully into some very specific areas: mortgage securitization and off-balance-sheet activity. The pressure became so great that the dam finally broke, and the damage has already been enormous.[84]

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80 See **Effenberger, D.** (2004), p. 2.
81 See **Ashcraft, A.B./Santos, J.A.** (2009), pp. 514 - 523.
82 See **Weistroffer, Ch.** (2009), p. 10.
83 See **Van Order, R.** (2007), p. 7.
84 See **Blundell-Wignall, A. et al.** (2008), p. 2.

One of the key triggers was the introduction of a new regime for supervising all banks, the Basel II regime, which significantly boosted the attractiveness to banks of lending money secured on residential property. That led to a rise in loans to subprime borrowers, which were then packaged into securities and sold to institutions. In 2004, four specific factors came into play:[85] First was President Bush's "American Dream" proposals to make it easier for poor Americans to obtain mortgages. Second was the tougher capital requirements imposed on the mortgage finance groups Freddie Mac and Fannie Mae, which triggered an invasion of banks into their territory. Third was the transition towards Basle II, which made mortgage lending more attractive and fostered the creation of off-balance-sheet vehicles. The final element was a policy shift by the Securities and Exchange Commission (SEC), which allowed investment banks to increase their leverage from about 15 to one to as much as 40 to one. The combination of these four changes in 2004 caused the banks to accelerate off-balance-sheet mortgage securitization as a key avenue to drive the revenue and the share price of banks. There was not much objection at the Reserve Bank conference to the idea that low interest rates and related policies (like "American Dream") were a factor, nor that higher leverage in investment banks and multi-layered regulation in the United States is problematic, of which the Fannie Mae and Freddie Mac controls were but one symptom. When Office of Federal Housing Enterprise Oversight (OFHEO) imposed greater capital requirements and balance sheet controls on Fannie Mae and Freddie Mac, banks that had been selling mortgages to them faced revenue gaps and an interruption to their earnings. Their solution was to create their own Fannie Mae and Freddie Mac look-alikes: the structured investment vehicles (SIVs) and CDOs. This new surge of RMBS caused by the "Fannie Mae –Freddie Mac" regulator was picked up much too late by bank regulators to take effective action. There was greater dissent, however, with respect to the idea that the transition from Basel I to Basel II was a "co-sponsor" of the added pressure to originate mortgages and issue RMBS. This deserves some response, because it goes to the very heart of the key regulatory issue that still confronts policy makers. That issue is one of understanding the business model and corporate culture that always pushes risk taking too far and results in periodic crises.[86]

2.2 What caused the subprime bubble to burst?

The collapse of the subprime mortgage finance and securitization system in the United States was the start of the financial crisis. It has affected investors in North America, Europe, Australia and Asia and it is feared that write-offs of losses in securities linked to United States subprime mortgages and, by contagion, other segments of the credit markets, could reach a trillion US dollars. It brought the asset-backed commercial paper (ABCP)[87] market to halt, hedge funds have halted redemptions of failed, CDOs have defaulted, and SPVs have been liquidated. Rating agencies began to downgrade RMBS tranches on a huge scale without making any major preannouncements. From the first quarter of 2005 to the third quarter of 2007, Standard & Poor's reports for CDOs of asset-

[85] See **Blundell-Wignall, A. et al.** (2008), p. 3.

[86] See **Blundell-Wignall, A. et al.** (2008), p. 4.

[87] Conduits and SIVs had funded their purchases of CDOs and other securitized assets by issuing their own asset-backed commercial paper (ABPC) at short maturities. The expansion of mortgage-related ABCP issuance accounted for half the growth in the commercial paper market in 2005-2007.

backed securities, 66% were downgraded and 44% were downgraded from investment grade to speculative grade, including default. Banks have suffered liquidity problems, with losses since the start of 2007 at leading banks and brokerage houses topping $300 billion, as of June 2008. Credit related problems have forced some banks in Germany to fail or to be taken over and Britain had its first bank run in 140 years, resulting in the effective nationalization of Northern Rock, a troubled mortgage lender. The United States Treasury and Federal Reserve helped to broker the rescue of Bear Stearns, the fifth largest United States Wall Street investment bank, JPMorgan Chase during the weekend of March 17, 2008. Banks, concerned about the magnitude of future write-downs and counterparty risk, have been trying to keep as much cash as possible as a cushion against potential losses. They have been wary of lending to one another and, consequently, have been charging each other much higher interest rates than normal in the interbank loan markets. The crisis has affected the general economy. Credit conditions have tightened for all type of loans since the subprime mortgage crisis started 2007. The deepening crisis in the subprime mortgage market and securitization has affected investor confidence in multiple segments of the credit market, with problems for commercial mortgages unrelated to subprime, corporate credit markets, leveraged buy-out loans (LBOs), auction-rate securities, and parts of consumer credit, such as credit cards, student and car loans. In January 2008, the cost of insuring European speculative bonds against default rose by almost one-and-a-half percentage point over previous month, from 340 bps to 490 bps, while the United States high-yield bond spread has reached 700 bps over Treasuries, from 600 bps at the start of the year.[88]

Given the flaws in the system of subprime mortgage finance and securitization in the United States, the collapse of this system should not have come as a surprise. Indeed, long before the outbreak of the crisis, quite a few observers had warned that residential real-estate markets were experiencing a bubble and the only question was when the bubble would break.[89]

The subprime bubble began to burst at various times during 2007 as a result of a combination of factors: (1) a decline in house prices in the United States; (2) the impact of the earlier rise in the United States interest rates; (3) large-scale defaults on subsequent participating manufacturers (SPMs); and (4) a sharp decline in the prices of outstanding complex products.[90]

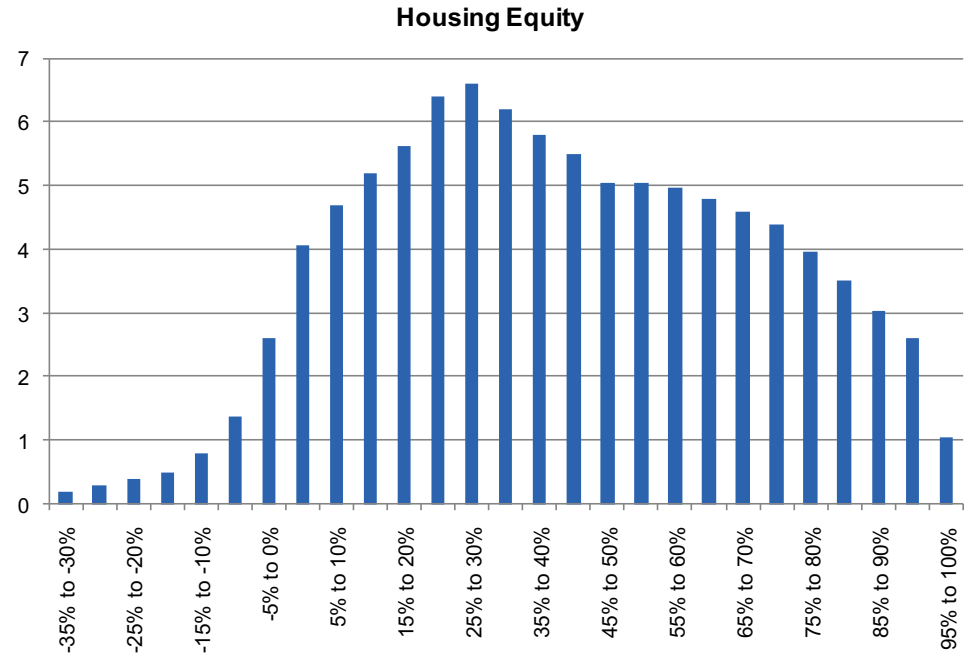
First, house prices peaked and began to turn down in the middle of 2006. This led to rapid rises in default rates, especially in the subprime market. While the worst abuses in the mortgage market were in the subprime segment, the main reason that defaults were initially concentrated so heavily in this sector is that subprime homeowners were the most vulnerable segment of the population. They did not have retirement accounts that they could draw down of family from whom they could borrow, when they found that they could no longer meet their mortgage payments. As a result, when they no longer had equity in their home against which to borrow, many subprime homeowners had little choice but to default on their mortgage. Many of the subprime loans that began going bad in 2006 and 2007 were not purchase mortgages but rather mortgages used to refinance homes. Subprime lenders

88 See **Crouhy, M.G. et al.** (2008), p. 4.
89 See **Shiller, R.** (2005).
90 See **Llewellyn, D.T.** (2008a), p. 38.

aggressively, and often deceptively, marketed mortgages for refinancing to low and moderate income homeowners as a way of getting access to extra money to meet bills or pay for big purchases like a car or home remodelling. As a result of these new subprime loans, families who had been secure suddenly faced the loss of their home.[91]

The basic problem is that house price declines create large amounts of negative equity. Homeowners with negative equity cannot draw upon their capital gains buffer to cushion against adverse financial events such as job loss or mortgage reset by refinancing, and they therefore become much more likely to default. The importance of this problem is illustrated in Figure 14, which shows data compiled by First American CoreLogic on the distribution of home equity among United States mortgage holders at the end of 2006.

Figure 14: Falling prices leave homeowners with negative housing equity



Source: First American CoreLogic (2010)
Note: All data as of December 2006

About 7% of United States mortgage holders had negative equity at that point. Another 4% had equity of 0-5%, 5% each had equity of 5-10% and 10-15%, and 6% each had equity of 15-20% and 20-25%. Thus, the proportion of mortgage holders with negative equity would rise to 21% given a uniform home price decline of 15%, 27% given a drop of 20%, and 33% given a drop of 25%.[92] These are very large numbers. There are approximately 54 million households with mortgages in the United States, so 27% of all mortgage holders corresponds to about 14.6 million households. If negative-equity homeowners on average have mortgage debt of $250.000, this would imply

[91] See **Baker, D.** (2008), p. 79.
[92] **Fitch Ratings** (2007) reports that 70% of the residential mortgage backed securities issued in 2006 were in areas that had negative housing price appreciation as of Q2 2007.

that a 20% home price decline from late-2006 levels would put about $3.6 trillion of mortgages debt "under water".[93]

Second, as the impact of increase in short-term interest rates (the Fed began raising the overnight lending rate in June 2004) kicked in and house prices flattened, stretched borrowers were left with no choice but to default as prepayment and refinancing options were not feasible with little or no housing equity. As defaults mounted, the feedback loop that had amplified home price growth dragged prices down, which turn made it impossible for many overstretched borrowers to refinance to avoid default.[94] The nature of subprime products intensified the effects on the housing slowdown. About 80 percent of subprime loans originated in 2005 were ARMs, with the 2/28 making up 75 percent of these mortgages.[95] Once the low introductory teaser expires, the rate "resets" and becomes linked to an index. At this point, the monthly payments are almost certain to go up. The extent to which the borrower experiences this payment shock depends on the level of short-term interest rates upon reset. Therefore, any upward movement in rates or stagnation in home prices will subject the borrower to increased payment shock, and hence, elevated likelihood of default. As the housing market slowed and subprime borrowers faced higher rates, many were unable to refinance and had no option but to default on their loan.

Third, another bad omen for the housing market was the collapse of the SPMs in early 2007. By early 2007, the United States' SPMs started to show signs of collapsing from higher-than-expected home foreclosure rates. As homeowners fell behind in their mortgage payments in ever-growing numbers, foreclosures continued to rise and interest rates rose to their highest level in years. These conditions left subprime lenders unable to finance new loans. Due to the collapsing subprime market, Ameriquest, formerly the country's largest subprime lender, closed its doors and laid off 3,800 employees. In addition to the plunge in the housing market, Ameriquest made a $325 million settlement with 30 states' Attorneys General over deceptive marketing and lending practices. Economists saw the failures of subprime lenders as bad omens for the housing market as a whole.[96]

Fourth, the value of many of the outstanding complex structured products, including some of those backed by high-quality assets, has fallen. In the corporate credit markets, spreads in the below-investment grade segment have recently widened to the highest levels since the beginning of the turmoil. In addition, the cost of buying protection against the risk of default by some of the major financial institutions (as reflected in corporate CDSs spreads) has increased again, reaching levels comparable to those seen in March 2007, before the Bear Stearns rescue. In equity markets, the stock prices of non-financial firms have also declined sharply since early May 2007, while (implied) stock market volatility rose to a peak in July and has remained high. These developments reflect market expectations of a deteriorating corporate earnings outlook, increased financing costs and high and volatile commodity prices. Overall, a number of developments, both external to and within the euro area, suggest that the uncertainty surrounding the euro area financial stability outlook has increased. This assessment reflects to a

93 See **Greenlaw, D. et al.** (2008), pp. 14 - 15.
94 See **IMF** (2009), p. 92.
95 See **Youngblood, M.** (2006), pp. 1 - 4.
96 See **Katalina M. Bianco, J.D.** (2008), pp. 12 - 13.

considerable extent the continuing decline in United States house prices, which is leading to a sharp rise in loan delinquencies and losses, and associated further declines in the prices of MBS.[97]

2.3 Broadening of the crisis into a banking/liquidity/solvency crisis

The troubles in the United States housing market rippled into money markets in which banks and other financial institutions raise short-term funds. In response, banks hoarded cash and withdrew credit from each other, which elevated LIBOR rates and resulted in credit tightening. This credit crunch signified a widespread erosion of trust. The increased cost of funding and in some cases downgrades of financial institutions also restricted the ability of conduits and structured investment vehicles (SIVs) to issue ABCP. By September 2007, the ABCP market became completely illiquid. As funding dried up and the value of SIVs assets tumbled with failing United States housing prices, some of the SIVs became insolvent.[98] As a result of these developments, Bear Stearns warned investors on July 18, 2007 that they would lose money held by hedge funds in subprime-related assets and an IKB Deutsche Industriebank AG conduit incurred losses and was not able to roll over its ABCP; it drew on a credit line from its parent bank but this was insufficient and IKB was bailed out through a fund organized by its major shareholder, KfW Bankengruppe, on August 7, 2007. Two days later, BNP Paribas suspended withdrawals from three hedge funds heavily invested in CDOs that it was unable to value. On August 17, Sachsen LB, a German bank, had failed to provide enough liquidity to support its conduit Ormond Quay, and Sachsen LB was taken over by Landesbank Baden-Württemberg (LBBW) at the end of August. The need for rollover funding by conduits and SIVs created pressure on banks liquidity, giving them little incentive to lend on the interbank market to other banks or to invest in short-term-paper. The spread between the ABCP rate and the overnight interest swap rate (the rate in overnight lending converted to the same maturity as the ABCP assets using a fixed-rate swap rate), which measures the default and liquidity risk of ABCP, rose substantially by more than 100 bps in August 2007. In consequence, banks hoarded liquidity to cover any losses they might experience on their own books through conduits, or those of their SIVs, which might need to be taken back onto their balance sheets. These losses turned out to be substantial and involve large investment banks, such as UBS, Merrill Lynch, and Citigroup, whose CEOs would pay the price by resigning as losses were revealed.[99]

The problems were not restricted to the United States ABCP Market. Funds in Canada, Europe and Australia have experienced liquidity and funding difficulties, some being forced into bankruptcy. The need to generate cash forced the sale of assets. This affected many quantitative hedge funds, such as Renaissance Technologies, which fell 8.7%. Exchanges rates were affected, as funds reduced their leverage. Selling by hedge funds and nervous investors also forced municipal bond prices down. Other players were affected. Real estate funds were hard hit due to both falling real estate prices and the tumult in the credit markets. The average fund investing primarily in the United States lost 17.2% over the first three month of the summer and were down 16.5% on the year. Fund

97 See **ECB** (2008).
98 See **Hellwig, M.** (2008), p. 9.
99 See **Mizen, P.** (2008), p. 542.

redemptions have forced managers to sell assets in falling markets. KKR Financial Holdings LLC, a real estate firm, 12% owned by Kohlberg, Kravis Robert & Co. reported in the middle of August that losses threaten its ability to repay $5 billion in short term debt. It announced plans to raise $500 million by selling shares of Morgan Stanley and Farallon Capital. Merger arbitrages were also hit, with many being forced to unwind positions to offset losses. The gap between target's stock price and the price the buyer has agreed to pay widened to 68% in August, compared to a spread of 11% at the end of June 2007. Sowood Capital Management liquidated positions in a number of pending mergers and went into default.[100] In the fight to gain deals, banks had waived such provisions as the "market out" clause, which allows banks to re-negotiate and underwriting deal if market conditions have deteriorated. Banks are now having to re-negotiate deals without this weapon in their arsenal. Home Depot delayed and re-negotiated a $10.3 billion deal to sell its construction supply business to private equity firms.[101]

Asset-backed structured products are difficult to value for many reasons. First, is the general complexity of the liability structure, the cash flows waterfalls, and the different types of collateral/interest rate triggers. Each structure is unique and computer programs used to simulate the cash flows to the different bonds must be tailored made to each trust. Second, is the valuation of the assets in the collateral pool. For subprime ABS, this typically implies valuing a pool of several thousand subprime mortgages with different terms and a wide diversity in the characteristics of the borrowers. For CDOs, this implies valuation of bond issued by ABS trusts; and for CDO squad structures, this implies the valuation of bonds issued by CDOs. Compounding these difficulties, many of the asset pools are synthetic CDSs on ABS, which need to be valued. Third, cash flows to trusts often depend on future values of the collateral of the future ratings of the collateral by the rating agencies. This creates an additional layer of complexity: to estimate the value today, it is necessary to estimate values in the future or predict future credit ratings of the collateral. Fourth, is the scarcity of data about the nature of the different asset pools. Data on the asset pools usually not readily available and not updated on a regular basis.[102] The collapse of CDO valuations, and the doubts about CDS coverage, reflected mutual distrust among those holding the securities rather than simple incomprehension. The gross notional amount of CDSs was no less than $58 trillion, or three times the size of United States GDP. CDO issuance last between 2004 and 2008 was $1.6 trillion, while outstanding financial securities total $10.8 trillion.[103]

The uncertainty associated with the scale of the losses that banks might face created a dislocation in the interbank markets. Banks would not lend to other banks for fear of the scale counterparty risk. If borrowing banks had unrevealed losses they might not repay the funds that they borrowed from other banks. The result of the dislocation in the capital and money markets would lead to the Northern Rock bank run in the United Kingdom and the threat of bankruptcy for Bear Stearns in the United States.

[100] Sowood played credit spread vs. equity prices and was crushed when spread widened while equity markets didn't fall.
[101] See **Crouhy, M.G. et al.** (2008), pp. 21 - 22.
[102] See **Crouhy, M.G. et al.** (2008), p. 22.
[103] See **Blackburn, R.** (2008), p. 96.

In consequence, the FED has offered greater liquidity of enormous size on several occasions to the banks in an effort to safeguard the stability of the financial markets but it is very likely that their problem is solvency not liquidity.[104]

In a liquidity crisis, investors fear panic-driven selloffs of the assets concerned. The decisive characteristic of a liquidity crisis is that no major bank fails as long as it is possible to prevent its assets from being sold off. In accordance with the classic Bagehot rule, which has its origins in the 19th century, a central bank should provide ample liquidity to overcome a liquidity crisis. However, the price of this additional liquidity should be a higher interest rate than normal to prevent those investors who have not been careful enough from benefiting from overly favourable interest rates. If this policy is adopted, the liquidity crisis should resolve itself as soon as the panic selling stops.

However, the application of the Bagehot rule would make a solvency crisis even worse. This is because the main characteristic of a solvency crisis is that even large banks are effectively bankrupt. As a result, the provision of additional liquidity at a higher "penalty" interest rate would exert even more pressure on the prices of assets and therefore exacerbate the solvency situation of the banks concerned. This means that in such a situation the central bank must provide ample liquidity at a lower interest rate to bolster asset prices and to keep the major banks afloat. This is tantamount to "socialising" the banks' losses.
However, if the central bank fails to successfully address the solvency crisis, it only has a further three cards up its sleeve: (1) it can let things run their natural course and do nothing, (2) it can generate inflation to lower the real strain on banks or (3) it can nationalize the banks concerned.

In the early stage of the financial crisis central banks found that they had to be innovative in issuing liquidity directly to the most troubled parts of the financial system by developing term lending. The problem for the central banks was that although there was plenty of liquidity in overnight markets, there was a shortage of funds at 1-, 3- and 6-month maturities where the banks needed it, causing the cost of funds at these maturities to rise. The standard tool did not work well in dealing with this problem. Later the crisis has forced the central banks to become more innovative. For example, the FED has initiated the new term auction facility (TAF), an auction of money market funds for United States banks, while the BoE has broadened the range of collateral it will accept for open market operations. These liquidity management innovations have been triggered by the worsening subprime mortgage crisis and fears that it may spread to other markets, as a result of which banks are unwilling to lend each other money for more than a few days. This has caused a steep and sustained rise in the EURIBOR rate in the interbank markets over the money market rates sought by the ECB.

Traditionally, the central banks try to achieve their targets of price and financial market stability via the overnight rate on the interbank markets by altering the size of their balances via open market operations or by having banks utilise the marginal lending facility. However, the latter in particular is massively stigmatized because if a bank

[104] See **Blackburn, R.** (2008), p. 96.

utilises the marginal lending facility, which involves a higher interest rate, this implies to other banks that it is unable to raise any funding at lower rates in the interbank market. In other words, a bank will only resort to the ECB for funding if no-one else will lend it any money. Although the central banks have a broad arsenal of instruments for pumping liquidity into the banking system, they do not have any mechanism for ensuring that this additional liquidity actually reaches those banks that require it. This means that interest rate cuts alone could not sufficient to overcome the crisis because they do not guarantee the appropriate distribution of the additional liquidity generated as a result.

On the other hand, do the central banks unwittingly encourage bank to take excessive risks? Moral risk arises when an insured persons acts in such a way that is not in the interests of the insurer. Generally speaking, insurance is a good thing because it makes it possible to assume risks that would otherwise not be acceptable. It is only because there is such a thing as fire insurance, for example, that it is possible for mortgages to be taken out. Yet, the existence of insurance also has a bearing on the incentives of the parties involved in connection with central bank monetary policy, the term "Greenspan put" (or more recently "Bernanke put") has been coined in reference to the Fed over the past few years.[105] This refers to the assumption that the FED will always come to the rescue of financial market participants in a crisis afflicting the financial market by lowering its rates. This means that the downside risk for the financial markets is limited through the exercise of a put option. While it is perhaps true that the FED's communication efforts since the outbreak of the financial crisis have occasionally left something to be desired, it is wrong to assume that there is such a thing as the "Bernanke put". Or to quote from a statement made by Bernanke himself on August 31, 2007:

"It is not the responsibility of the Federal Reserve – nor would it be appropriate – to protect lenders and investors from the consequences of their financial decisions."[106]

That said, part of the FED's remit is to protect the economy from the adverse effects on the real economy of a financial crisis. This is the great lesson learned from the Great Depression of the thirties and the "Lost Decade" in Japan during the nineties. The central bank thus plays the role of a fire insurance company. Yet, just as is the case with an insurance policy, the greater the risk the higher the premiums should be. This is precisely the principle underlying the Bagehot rule in the case of a liquidity crisis: the central bank provides ample liquidity - but at a higher (penalty) interest rate to avoid excessive risk-taking. Thus, if the Bagehot rule is strictly applied, the central bank as the "lender of last resort" should not be encouraging financial market participants to take excessive risks.

An entirely different question is whether the complex system of regulatory rules and regulations does not of itself induce banks to take excessive risks. As banks constitute the heart of the capitalist system and play an immensely important role by providing a payment system and offering a safe haven for cash, they enjoy a large number of implicit and express state guarantees: the lender of last resort (LLR) facilities of the central banks in the event of a solvency crisis, formal and informal deposit guarantees as well as informal guarantees for all liabilities (and

[105] **Investopedia** (2010).
[106] **FED** (2007).

meanwhile also capital) as banks are frequently seen as being "too big to fail". As a result of these guarantees, banks do not have any incentive to back the risks they take with sufficient capital. This has led to numerous government rules and regulators governing such things as capital adequacy, risk management and minimum liquidity requirements. However, these rules in turn provide banks with an incentive to circumvent them. Examples of such tendencies include off-balance-sheet entities such as SIVs and conduits. Looking ahead over the next few years, it will be necessary to consider ways of controlling the systematic acceptance of excessive risk by banks for which the tax payer is ultimately liable.

3. What went wrong with securitization?

Securitization – the process of pooling relatively illiquid obligations into securities that can be traded in the capital markets – is considered one of the most important financial developments in recent history. This financing technique was developed to address the problem of insufficient mortgage capital, then was adapted and expanded by participants in the private markets to facilitate many types of consumer and commercial borrowing.

Securitization has experienced tremendous growth since it was introduced in the 1970s, expanding from the first and long-predominant asset class, residential mortgage loans, to encompass a wide range of financial assets, including commercial mortgage loans, automobile loans and leases, student loans, credit card receivables and small business loans. Before the abrupt decline of securitization volume in 2007, the annual issuance of MBS alone had increased from $259 billion to $2,018 billion between 1990 and 2006, a 679% increase or 13% on an annually compounded basis. At the end of 2007 there were more than $7 trillion of MBS outstanding.[107]

Due to increasing importance as a funding vehicle and credit risk shifting instrument, it is not surprising that securitization has attracted considerable academic interest. According to *Modigliani* and *Miller*, in perfect capital markets, a firm's careful financing decisions are irrelevant because they do not create firm value.[108] Thus, in-line with their evidence, it is not crucially whether a firm adopts asset securitization or not. However, in modern economic views, there are sufficient theoretical rationalizations for a firm or organization to securitize their assets: in case of signalling *Myers* and *Majluf*[109], *Riddiough*[110], *Minton et al.*[111], *Plantin*[112]; in case of avoiding underinvestment *Benveniste* and *Berger*[113], *James*[114], *Stanton*[115], *Sopranzetti*[116]; in case of avoiding asset substitution *Lockwood et al.*[117], *Thomas*[118]; in case of reducing intermediation costs and increasing opportunities for risk sharing and risk diversification *Hess* and *Smith*[119], *Bannier* and *Hänsel*[120], *Hoffmann* and *Nitschka*[121]; and finally in case of avoiding the costs of standard bankruptcy *Skarabot*[122], *Gorton and Souleles*[123], *Ayotte* and *Gaon*[124]. In conclusion, even though asset securitization is costly and would not be undertaken in frictionless and complete markets, recent financial theory suggests that firms may benefit from asset securitization.

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[107] See **Sabry, F./Okongwu, C.** (2009), p.16 (referencing data taken from "The 2007 Mortgage Market Statistical Annual", Vol. II, pp. 3 - 7).
[108] See **Modigliani, F./Miller, M.H.** (1958), pp. 261 - 297.
[109] See **Myers, S.C./Majluf, N.** (1984), pp. 187 - 221.
[110] See **Riddiough, T.J.** (1997), pp. 121 - 152.
[111] See **Minton, B. et al.** (1997).
[112] See **Plantin, G.** (2004).
[113] See **Benveniste, L.M./Berger, A.N.** (1987), pp. 403 - 424.
[114] See **James, C.** (1988), pp. 395 - 422.
[115] See **Stanton, R.** (1995), pp. 677 - 708.
[116] See **Sopranzetti, B.J.** (1999), pp. 291 - 301.
[117] See **Lockwood, L.J. et al.** (1996), pp. 151 - 164.
[118] See **Thomas, H.** (1999), pp. 321 - 333.
[119] See **Hess, A.C./Smith, C.W., Jr.** (1988), pp. 341 - 346.
[120] See **Bannier, C.E./Hänsel, D.N.** (2006).
[121] See **Hoffmann, M./Nitschka, T.** (2008).
[122] See **Skarabot, J.** (2001).
[123] See **Gorton, G.B./Souleles, N.S.** (2005).
[124] See **Ayotte, K.M./Gaon, S.** (2005).

Yet, how could something as universally applauded as financial engineering go so wrong? Since the start of the financial crisis, some academics have pointed to aspects of securitization as contributing causes of the crisis.

Hull argues that agency problems in the banks' originate-to-distribute model may have contributed to the crisis and casual empiricism suggests that the interests of mortgage originators were not aligned with those of investors.[125] Similarly, *Hellwig* discusses the fact that if originators held the equity tranches of securitizations and if, due to the packaging and diversification, the probability of portfolio returns falling short were negligible, then moral hazard risks would also be negligible.[126] However, he notes that often originating institutions did not hold the equity tranches of the portfolios that their securitizations created. Articles such as *Jensen* and *Meckling*[127], *Harris* and *Raviv*[128], and *Fama* and *Jensen*[129] suggest that, even with elaborate contracts between managers and shareholders, the interests of shareholders and managers not fully aligned.

Ashcraft and *Schuermann* describe various frictions in the securitization process leading to conflicts of interest including: (1) complexity of some of the subprime products: some of the products were too complex, leading to misunderstanding of or misrepresentations to the borrowers; and (2) credit ratings: there are not sufficient distinctions between structured and corporate ratings.[130] *Franke et al.*[131] and *Hellwig*[132] cite the complexity of securitization and lack of transparency as a contributing factor to the crisis. This opened the possibility of both excessive borrowing and excessive lending. Then due to complexity and products lack of transparency, it is difficult to see through the structure to the assets that make up their collateral. Consequently, in a crisis, structured products may prove difficult to sell or to value. At the start of the financial crisis, investors typically did not know what portion of the collateral for a CDO was composed of subprime mortgages from default-prone regions. As a consequence, the market for some structured products dried up.

Mian and *Sufi* suggest that securitization may have created a moral hazard for originators.[133] They argue that securitization-driven shift in the supply of mortgages to subprime borrowers strongly contributed to the expansion in mortgage credit from 2002 to 2005 that was subsequently followed by a sharp increase in mortgage defaults from 2005 to 2007.

Gorton and *Pennacchi* show that contract mechanisms such as a partial sale of loans can mitigate moral hazard problems in which lenders do not exert enough effort investigating the risk associated with loans that they intend

[125] See **Hull, J.C.** (2009), p. 8.
[126] See **Hellwig, M.** (2008), p. 33.
[127] See **Jensen, M.C./Meckling, W.H.** (1976), pp. 305 - 360.
[128] See **Harris, M./Raviv, A.** (1978), pp. 20 - 30.
[129] See **Fama, E.F./Jensen, M.C.** (1983), pp. 301 - 325.
[130] See **Ashcraft, A.B./Schuermann, T.** (2008).
[131] See **Franke et al.** (2007).
[132] See **Hellwig, M.** (2008), p. 6.
[133] See **Mian, A./Sufi, A.** (2008).

to sell.[134] In a similar vein, *DeMarzo* argues that securitization allows sophisticated intermediaries with special skills in valuing assets to mitigate the "lemons" problem when selling assets to the market.[135]

Schwarcz finds the moral hazard argument weak and argues that lower lending standards may have been caused by distortions that resulted from a liquidity glut.[136] Lenders, he proposes, may have competed aggressively for business allowed mortgagors to borrow almost completely on the assumption of future home price appreciation. The decline in lending standards resulted in a large volume of riskier loans. When housing prices began to fall in 2006, mortgage defaults soared. As demand for highly rated tranches intensified and securitization become more complicated and less transparent, underwriting incentives weakened because securitizers and credit rating organizations did little actual due diligence. Yet, rating agencies that specialize in such information collection did not slow the game. They advised MBS and CDO issuers about how to package the MBS in ways that could obtain the highest ratings for the resulting CDOs. Rating agencies also generally failed to account for the increased riskiness of the underlying loans. Instead, they awarded their highest ratings to an extraordinarily large share of CDOs that were backed by risky subprime MBS. The agencies apparently had little incentive to spend resources to screen the underlying loans or the lenders adequately. At the final stage of securitization, many investors relied on the assessment of the rating agencies when they purchased CDOs. The complexity of the CDOs made it difficult for investors to screen the underlying assets, but they could have chosen not to purchase large volumes of CDOs that were too complex to assess and lacked a track record of safety. Rather than undertake their own costly screening efforts, CDO investors often behaved like free riders who could benefit from the screening that others had undertaken.

Another issue with securitization – as with loan sales – is that outsourcing the funding side of an originator's balance sheet undermines its incentives to monitor the quality of the loans it originates. Troubled loans become the property and problems of someone further down the transaction chain. In the years running up to the financial crisis, mortgage lenders reduced their costly screening of borrowers in order to increase their lending and profit. By reducing screening, they saved costs directly and they also expanded the range of potential borrowers so that they could boost the number of loans. With costs reduced, more loans mean higher profits if – as usually occurred – the mortgage lenders quickly sold the new loans to other intermediaries who would securitize them. Reduced screening meant that lenders made an increasing share of home loans without documentation of borrower's wealth, income or employment. *Keys et al.* provide empirical evidence to suggest that securitization adversely affect the screening incentives of lenders.[137]

Llewellyn finds that difficult valuation problems as well arise with structured securitized products. He argues that structured securitized products may not always traded in secondary markets, and so the products becomes difficult for accurate valuations to emerge.[138] The alternative that is commonly used for valuations to be made by investors

[134] See **Gorton, G.B./Pennacchi, G.G.** (1995), pp. 389 - 411.
[135] See **DeMarzo, P.** (2005), pp. 1 - 35.
[136] See **Schwarcz, S.L.** (2008).
[137] See **Keys, B.J. et al.** (2008).
[138] See **Llewellyn D.T.** (2008b), p. 17.

on the basis of complex mathematical formula which, as noted in *Ayadi* and *Behr*, may not always account for the true risk and which may apply over-simplistic methods to assess the risk profile.[139]

The 1988 Basel Accord (Basel I) also helped to generate a supply of loans to be resecuritized. The accord tied two layers of bank capital requirements to an arbitrarily risk-weighted sum of their assets. The arbitrariness of the weights gave banks an incentive to move assets into off-balance-sheet securitization vehicles because capital charges on credit lines with which sponsors supported these vehicles were lower than the charges levied against on-balance-sheet position.[140]

3.1 Excessive complexity

Schwarcz discusses how the complexity of financial products resulting from securitization can deprive investors from the information required for markets to work efficiently.[141] *Hull* discusses the complexity of some of the securitized products that were traded and states that investors did not understand them enough to accurately determine their cash flow.[142]

Many structured securities (e.g., RMBS, CDOs) were so complex that due diligence was too costly or impossible for investors. CDOs are a good example. Typically, a CDO consisted of junior tranches of RMBS from different offerings, sometimes paired with other types of ABS involving receivables from things like credit cards or auto loans. At best, the investor received data on the quality of the underlying bond. But it was impossible for the investor to x-ray the offering in order to analyze the underlying home mortgages, credit card borrowers, or auto loans themselves. That was even more impossible when the CDO was a "synthetic CDO" made up of CDSs on RMBS and ABS.[143]

Even in regular RMBS (as an example), complexity was a big problem. One issue was the sheer number of tranches. Another was the fact that many RMBS offerings featured complex credit enhancement rules about who would receive cash flows from the mortgages in what amounts, depending on changes in the amount of subordination or overcollateralization. This meant that investors could not just stop with estimating expected losses from the mortgages. They also had to analyze who would get what cash flows when, based on a changing kaleidoscope of scenarios.[144] In addition, too many offerings were made on a "to be announced" or "TBA" basis, which meant that investors could not scrutinize the underlying loans because the loans had not yet been put in the loan pool. Finally, many securitization deals involved custom features that undermined standardization.

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[139] See **Ayadi, R./Behr, P.** (2009).
[140] See **Caprio, G., Jr. et al.** (2008), p. 12.
[141] See **Schwarcz, S.L.** (2008).
[142] See **Hull, J.C.** (2009), p. 10.
[143] See **McCoy P.A.** (2009), p. 8.
[144] See **Fender, I./Mitchell, J.** (2009), pp. 27ff.

In consequence, investors underestimated the risk of complex structured securities substantially and held a too high portion of complex structured products.

3.2 Non-functioning credit rating

The role of modern credit rating agencies is to provide specialized intelligence, in the form of publicly-available ratings, for use by investors seeking to price opaque securities. The subprime mortgage crisis suggests that the rating agencies execution of this function was substandard. They failed adequately to distinguish between the riskiness of different securities. They were too generous in providing AAA ratings. They failed to downgrade MBS as the housing market and hence the value of the underlying mortgage obligations deteriorated. They then aggravated the crisis by reacting with wholesale downgrades once the market collapsed.[145]

Fender et al. demonstrate, using a hypothetical CDO, that shocks to assumptions used in the credit rating can affect CDO tranche ratings more than similar corporate bonds.[146] The reason is the tranching process, which results in a nonlinear relationship between the credit quality of underlying assets and those of tranched products, and a higher sensitivity of the ratings of tranched products to changes in the systematic risk.

Manns argues that rating agencies were virtual prerequisites for most debt issuances, and yet had no accountability or incentive to perform their role as "gatekeepers of risk".[147] The author advocates accountability through the use of SEC-administered user fee systems where creditors would finance the ratings, not the issuers of the debt.

Another problem, as *Calomiris* notes, stems from the use of ratings by bank regulators. Basel II directs regulators to use bond ratings to determine the range of permissible bank investments and, for smaller banks lacking their own internal models, weighted capital requirements.[148] Unsurprisingly, banks have responded to this delegation of public authority by applying subtle pressure on the rating agencies to elevate the entire spectrum of bonds a couple of notches, without necessarily disguising information about relative risks, in order to widen their investment choices and lower their capital costs. This dynamic works to heighten banking-sector risk and subverts the intent of regulators use of bond ratings.

A related source of problems concerns the agencies conflict of interest. Rating agencies first earn fees from advising on how to structure bonds and derivatives so that these receive the desired rating. They then have a not-so-subtle incentive to rate those issues in the promised manner. All of these patterns were apparent in earlier crises. But in the recent financial crisis that the problem has hit home perhaps policy-makers will take the question of how to constrain the ratings process more seriously.[149]

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[145] See **Eichengreen, B.** (2008), p. 23.
[146] See **Fender et al.** (2008), pp. 87 - 101.
[147] See **Manns, J.** (2009).
[148] See **Calomiris, C.W.** (2007), p. 18.
[149] See **Eichengreen, B.** (2008), p. 23.

3.3 Information asymmetries

Loutskina and *Strahan* provide an interesting analysis of the role of information that does not directly relate to securitization.[150] They show how inadequate information helps explain the real estate bubble and burst. The authors argue that lenders who are concentrated in a few markets behave like informed investors, while diversified lenders behave like uninformed investors. Concentrated lenders are said to earn higher profits than diversified lenders. The authors show that the share of concentrated has declined over the past 15 years to nearly zero in 2006. As a result, the authors argue that the real estate market became dominated with uninformed investors which set the stage for the bubble and then the burst.

Hellwig opines that the lack of transparency meant that the extent of systemic risk exposure could not be foreseen by the various players.[151] He discusses that funding troubles at one firm can quickly spread to other firms due to the "lemons" problem, where in the presence of asymmetric information, potential investor fear that sellers are trying to unload their lower quality assets and so they pull funding entirely or, at the very least, demand deep discounts for them.

In his seminal paper, *Akerlof* shows that adverse selection and moral hazard may occur in markets characterized as having asymmetric information between participants.[152] Building on this idea, *Stiglitz* and *Weiss* present a model showing that, in a world with imperfect information, the use of interest rates or collateral in the screening process can introduce adverse selection and reduce overall expected loan profitability.[153]

Asymmetric information (adverse selection) occurs when, ex ante, one of the participants in a financial transaction is better informed than the other about certain aspects of the product quality. With traditional lending, banks have a comparative advantage in collecting proprietary information about borrowers, which reduces asymmetry about the probability of loan repayment. Under the originate-to-distribute model, however, where originator banks remove loans from their balance sheets by selling them to investors, there may be a reduced incentive for the banks to collect information, since they are partially separated from the consequences of the borrowers' default and may therefore lack in the incentive to develop a long-term relationship with potential borrowers.[154] A major concern about securitization is that it has weakened banks' incentives to screen borrowers, which allowed a higher percentage of bad-quality loans to enter the credit market over the 2000-2007 period. The question of whether securitization has diluted screening incentives has been of great importance to policy-makers since the start of the financial crisis in 2007. The problem of asymmetric information may operate throughout the securitization process, in that the originator of loans may have more information about the quality of the assets than arrangers do; similarly, arrangers may be better informed than asset managers.[155]

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[150] See **Loutskina, E./Strahan, P.E.** (2008).
[151] See **Hellwig, M.** (2008).
[152] See **Akerlof, G.A.** (1970), pp. 488 - 500.
[153] See **Stiglitz, J.E./Weiss, A.** (1981), pp. 393 - 410.
[154] See **Diamond, D.W.** (1984), pp. 393 - 414.
[155] See **Paligorova, T.** (2009), p. 36.

The following “Akerlof’s Model of Lemons” should illustrate the issue of asymmetric information. Consider a market with 100 people who want to sell their used cars and 100 people who want to buy a used car. Everyone knows that 50 of the cars are "plums" (high-quality cars) and 50 are "lemons" (low-quality cars). The current owner of each car knows its quality but the prospective purchasers do not know whether any given car is a plum or a lemon. The owner of a lemon is willing to sell it for $1000 and the owner of a plum is willing to sell it for $2000. The buyers of the car are willing to pay $2400 for a plum and $1200 for a lemon. If it is easy to verify the quality of the cars there will be no problems in this market. The lemons will sell at some price between $1000 and $1200 and plums will sell at some price between $2000 and $2400. But what happens to the market if the buyers cannot observe the quality of the car? Buyers will have to guess about how much each car is worth. If each car is equally likely to be a plum as a lemon, then a buyer would be willing to pay the expected value of the car : ½$1200 + ½$2400 = $1800. The problem is as follows: who would be willing to sell their car at that price? The owners of lemons certainly would, but the owners of the plums would not be willing to sell their car for this price because they require at least $2000 for it. But buyers know this and hence they would only be willing to pay up to $1200. As a result only lemons will be sold on the market for a price between $1000 and $1200. Even though the price at which buyers are willing to buy plums exceeds the price at which sellers are willing to sell them, no such transactions will take place.

Given the heterogeneity of the product, asymmetric information implies bad products are a negative externality on good products. The key to solving the problem is to break the asymmetric information, either through costly signalling and/or incentive contracts, or via repeated games and reputation (with punishment strategies), or via regulation (legal monitoring).

As noted by *Chiappori* and *Salanié*, examples of other markets characterized as having similar asymmetric information problems include insurance, managerial incentive contracts, and corporate governance.[156]

3.4 Moral hazard

Mian and *Sufi* note that default rates from 2005 to 2007 increased significantly more in zip codes (they define subprime zip codes as those in the highest quartile of zip codes based on the fraction of residents with a credit score below 660) where mortgages were sold in private securitizations or non-commercial bank finance companies during the boom in 2002-2005, perhaps a sign of a moral hazard created by the securitizations.[157]

A moral hazard is where one party is responsible for the interests of another, but has an incentive to put his or her own interests first. Financial examples include the following: (1) a bank might sell customers structured products knowing that it is not in the customers interests to buy it; (2) a bank might pay its managers excessive bonuses out of funds that they managing on the customers behalf; (3) a bank might take risks that customers then have to bear.

[156] See **Chiappori, P.A./Salanié, B.** (2003), pp. 115 - 149.
[157] See **Mian, A./Sufi, A.** (2008).

Moral hazards such of these are a pervasive and inevitable feature of the financial system and of the economy more generally. Dealing with them is one of the principal tasks of institutional design. In fact, it is no exaggeration to say that the fundamental institutional structure of the economy has developed to be the way it is in no small part in response to these pervasive moral hazards.[158]

Many of these moral hazards involve increased risk-taking in the phase of the subprime mortgage crisis. In the later stage, a bank would grant a mortgage with a view to holding it to maturity. If the mortgage holder defaulted, the bank would usually make a loss. It therefore had an incentive to be careful who it lent to and prospective borrowers would be screened carefully: a would-be subprime borrower did not have much change of getting a mortgage. However, if a bank originates a mortgage with view to selling it on (i.e., securitizing it), this incentive is seriously weakened. In fact, if it sells on the mortgage to another party it has no interest in whether the mortgage defaults or not, and is only concerned with the payment it gets for originating the loan. The originating bank is now happy to lend to almost anyone, and participants end up in the patently unsound situation where mortgages are being granted with little or no concern about the risks involved.[159]

"Even the doziest mortgage broker can originate subprime mortgages for even the least creditworthy borrowers. The fact that the borrowers are incapable of making payments on the mortgage will magically be priced into the mortgage by the securitization process, which will bundle the mortgage with other mortgages originated by a similarly lax process and sell the lot to an unsuspecting German Landesbank attracted by the high initial yield. Everyone will make fees on the deal, everyone will be happy."[160]

By mischance, this Ponzi scheme could keep going for only as long house prices continued to rise and new entrants continued to come into the market. Once interest rates started to rise and house prices started to fall (see chapter 2.2), then the supply of suckers inevitably dried up and the whole edifice began to fall in on itself.

3.5 Lax screening and lending standards

The financial crisis revealed an extraordinary range of screening and monitoring failures in the securitization of subprime mortgages. The problem started with the initial selection of subprime borrowers and continued throughout the stages of securitization all the way to the investors who purchased complex CDOs supported by subprime MBS. In the years running up to the crisis, mortgage lenders reduced their costly screening of borrowers in order to increase their lending and profit. By reducing screening, they saved costs directly and they also expanded the range of potential borrowers so that they could boost the number of loans. With costs reduced, more loans mean higher profits if the mortgage lenders quickly sold the new loans to other intermediaries who would securitize them.

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158 See **Dowd, K.** (2009), p. 141.
159 See **Dowd, K.** (2009), p. 143.
160 **Hutchinson, M.** (2008).

Lax screening meant that lenders made an increasing share of home loans without documentation of borrowers' wealth, income or employment. This decline in lending standards resulted in a large volume of riskier loans. When housing prices began to fall in 2006, mortgage defaults soared.

Keys et al. suggests that securitization of subprime loans led to lax lender standards, especially when there is "soft" information about borrowers which determines default risk but is not easily verifiable by investors.[161] *Demyanyk* and *Van Hemert* find that the growth of the subprime mortgage market is associated with a decrease in loan quality adjusted for observed loan characteristics and macroeconomic circumstances from 2001 to 2007.[162]

The importance of screening incentives is further highlighted by *Rajan et al.*, who claim that the originators' lack of incentives to collect information about borrowers led to estimates of default probabilities that were biased downwards.[163] In particular, originators of loans acquire two types of information: verifiable (loan-to-value ratios and FICO scores) and unverifiable (soft) information, which is not easily documented (e.g., possible termination of the borrowers' job or expenses that are not included in the credit report). As the distance between the borrower and the investor increase, originators do not have the incentive to collect soft information, which, since it is not verifiable, cannot be reflected in the price of the loans. Models using data from a low-securitization regime will systematically under-predict default probabilities in a high-securitization regime, when soft information is more important. Better statistical techniques may not reduce model risk, because the growth of securitization has changed incentives to determine the riskiness of loans. This suggests that regulators, credit-rating agencies, and investors may face challenges when they rely solely on historical data to estimate the riskiness of assets.[164]

A host of recent papers therefore suggest that securitization has weakened the incentives of originators to screen, resulting in a large increase in poor-quality securitized loans over the 2000-2007 period. Alternatively, the growth in credit supply facilitated by securitization has forced an expansion of the pool of borrowers to include those who are more risky.[165]

3.6 Misguided incentive structures

Unterman argues that misguided incentives in a global crisis with severely deleterious social effects resulted.[166] He discusses that in the world of finance, the greatest way to achieve a dramatic increase in wealth is to take large risks, of course, this is also the easiest way to lose it. A great deal of the so-called financial innovation preceding the crisis was devoted to finding ways to take on as much risk as possible. The rise of off-balance-sheet

[161] See **Keys, B.J. et al.** (2008).
[162] See **Demyanyk, Y./Hermert, O.V.** (2008).
[163] See **Rajan, U. et al.** (2008), p. 1.
[164] See **Paligorova, T.** (2009), p. 38.
[165] See **Shin, H.S.** (2009), pp. 309 - 332.
[166] See **Unterman, A.J.** (2009), pp. 2ff.

instruments, CDS, and the spectacular risk-taking of individuals in the financial industry are all connected to the great rewards available through risk-taking.

3.6.1 Financial misalignment incentives

The United States subprime mortgage market meltdown, the catalyst of the recent financial crisis, resulted from the lack of incentives to originate good quality credit inherent in the originate-to-distribute model. The risk transfer achieved through the securitization of credit obligations resulted in extremely inadequate monitoring of borrowers as originators became detached from risk of default. In the subprime market mortgage, originators were able to transfer all risk of loss, creating a misalignment of interests with investors. Unfortunately, this led to the deterioration of credit underwriting standards but did not succeed in distributing risk to those more capable of handling it. At the height of the subprime bubble, credit risk transfer became more of a regulatory arbitrage tool than a means to disperse risk to those most suited to hold it. The methods used to achieve the securitization process flourished from a misalignment incentive inherent in the regulation of financial institutions. This in turn encouraged the migration of assets and liabilities to off-balance-sheet instruments to avoid capital charges.[167]

The use of off-balance-sheet instruments emerged as a way to insulate investors from the threat of bankruptcy by an asset provider by legally transferring assets to a bankruptcy-remote entity. This protection facilitated greater access to credit for businesses and individuals. However, in many cases the driving force behind the use of off-balance-sheet instruments became regulatory arbitrage, as this transfer reduced capital requirements if institutions selling investments and decreased disclosure and other regulatory obligations.[168] The supposed virtue of off-balance-sheet instruments was that they allowed risks traditionally held and monitored by banks to be dispersed to a diverse set of investors, reducing the risk of financial shocks. In reality, these instruments were manipulated to allow financial institutions to accumulate more risk, encouraging negligent lending practices and illusory risk transfers. Institutions sponsoring off-balance-sheet instruments provided large credit enhancements and guaranteed liquidity lines, continuing their economic exposure to these instruments. These commitments were not adequately recognized for the purpose of regulatory capital requirements, allowing banks to expand their balance sheets and take on more leverage. This regulatory arbitrage allowed banks to maintain balance sheet risks without the capital requirements. Contributing to the regulatory failure was a total mispricing of risk incorporated into traditional capital requirements. This resulted in less capital being required for some highly risky subprime CDOs than necessary for loans to all but a tiny fraction of the world's most reliable companies.[169]

3.6.2 Incentive pay

Llewellyn argues that reward systems based on short-term profits can be hazardous as they may induce managers to pay less attention to the longer-term risk characteristics of their decisions.[170] He discusses that high staff

[167] See **Unterman, A.J.** (2009), p. 2.
[168] See **Stiglitz, J.E.** (2008).
[169] See **Unterman, A.J.** (2009), p. 3.
[170] See **Llewellyn, D.T.** (2008b), p. 29.

turnover, and the speed with which officers are moved within the bank, may also create incentives for excessive risk-taking.

This excessive risk taking stimulated the subprime bubble era of finance, encouraged high-risk behaviour in search of short-term gains and did not promote long-term growth, stability, or true economic wealth. According to *Paul Volcker*:

"In the name of properly aligning incentives, there are enormous rewards for successful trades and for loan originators. The mantra of aligning incentives seems to be lost in the failure to impose symmetrical losses – or frequently any loss at all – when failures ensue."[171]

The distorted system of compensation at many financial institutions is based on large bonuses awarded annually based on performance that year to motivate high rates of business. This allows members of the investment industry to profit in good times but not share the losses in bad times and all the while encourage unchecked risk-taking. The short-term nature of the industry is such that, at the end of 2007, when the financial crisis became apparent, people were still receiving record-setting bonuses.[172]

The most unfortunate aspect of this quandary is that the taxpayer, who has witnessed unnecessary economic destruction created by blatant financial irresponsibility, has actually been forced to pay bonuses to the very people who concocted the financial meltdown.[173]

3.7 Insufficient regulatory oversight

By applying minimum capital requirements to bank balance sheets and requiring more capital protection of riskier assets, the 1988 Basel Accord (Basel I) encouraged banks to shift risky activities off-balance-sheet. The growth of structured investment vehicles (SIVs) and conduits was not exactly a coincidence. By design, the creation of these off-balance-sheet entities allowed banks to reduce the capital associated with a given risk profile. In addition, it reduced the transparency of risky activities and hid them from regulatory scrutiny. Unsurprisingly, these innovations encouraged excessive risk taking, inadequate transparency, and weak regulatory scrutiny.[174]

Why did the framework of regulation and supervision fail to fulfil its principal purpose of avoiding or mitigating financial crisis? There are many reasons. First, the application of the regulations themselves contributed to the crisis and made it worse when it came because, among other things, they had a pro-cyclical bias, did not pay enough attention to liquidity, had built-in reliance on ratings agency opinions and were wide open to regulatory arbitrage. Second, the authorities failed to maintain financial stability and were found wanting in dealing with the crisis, in part because the roles of the three parties were not well enough defined and it was not clear who was in

[171] **Volcker, P.** (2008).
[172] See **Unterman, A.J.** (2009), p. 4.
[173] See **Unterman, A.J.** (2009), p. 4.
[174] See **Eichengreen, B.** (2008), p. 21.

charge. Third is, that too little attention was paid to macro-prudential supervision (oversight of the aggregate impact on financial stability of individual banks' actions). Fourth, most of the authorities concentrated on its responsibility for conduct-of-business supervision (concerned mainly with consumer protection) and did not pay full attention to micro-prudential supervision (the solvency and sustainability of individual banks). Finally, authorities had an inadequate understanding of the complexity and limitations of the risk assessment models used by the banks it was supervising. It seems clear that the causes of the crisis were not simply management failure at some (but by no means all) banks but also commensurate failures in regulation and supervision, together with shortcomings on the part of the ratings agencies.[175]

Banks need to hold a minimum level of regulatory capital. Up till now, under Basel I framework, that capital was a very rough function of the level of risk held in their assets. For instance, a loan to a firm needed 8% of capital, no matter what the risk of the firm was. That is one of the main reasons why banking supervisors engaged in 1999 in a thorough revision of the capital regulatory framework. That process ended up in the so-called Basel II framework, in which the capital requirements of banks will be better aligned with the risk profile of their portfolios.[176] In this way, they will be obliged to hold a higher level of capital for loans granted to high risk borrowers.[177] However, thanks to securitization it is possible that banks sell a part of those loans (in particular that of better quality) and with the proceeds, lend to riskier borrowers so as to increase the expected returns of their portfolio with no change in capital requirements. This would be in line with the predictions of *Greenbaum* and *Thakor* that better quality assets will be sold (securitized) and poorer quality assets will be funded with deposits under asymmetric information (see chapter 3.3) and without government intervention.[178] *Pennacchi* considers bank regulation as one of the incentives to securitize.[179] Similarly, *Thomas* finds that securitization alleviates the regulatory burden.[180]

[175] See **House of Lords** (2009), p. 5.
[176] See **Jones, D.** (2000), pp. 35 - 58.
[177] See **Van Order, R.** (2007), p. 4.
[178] See **Greenbaum,S./Thakor, A.** (1987), pp. 379 - 401.
[179] See **Pennacchi, G.G.** (1988), pp. 375 - 396.
[180] See **Thomas, H.** (2001), pp. 306 - 330.

4. How can securitization be resurrected?

The securitization and structured credit market have become critically important to the global capital markets, and thereby also to the world economies. The absence of well-functioning securitization markets negatively impacts consumers, banks, issuers and investors, resulting in lower economic activity and fewer than needed new jobs being created in the future. The price of credit is likely to be higher for the consumer and the availability rarely seen. Banks will no longer have a tool to reduce risk and diversify their financing sources to free up capital for other activities. Investors will encounter rising difficulty in gaining exposure to an asset class that has become significant part of their portfolios.[181]

While acknowledging that there is a real need to strengthen the securitization process in the future to correct weaknesses in current market practices that this financial crisis has revealed, governments and regulators world-wide have also attested to the significant benefits to the economy that this process brings:

"A process that has been extremely valuable in extending the availability of credit to millions of homeowners nationwide and lowering their cost of financing."[182]

"The securitization of their loan portfolios has provided banks with access to an additional funding source and enabled them to mitigate some of the risks intrinsically related to their core business of liquidity transformation [...]. By allowing banks to transform their illiquid assets into marketable securities and providing an additional source of funding to expand lending, securitization provides an effective mechanism to mitigate such risks and reduces the role in liquidity transformation traditionally performed by depository banks."[183]

Without well-functioning and efficient securitization markets, financial growth and economic stability could be impaired. Securitization is an essential, long-standing mechanism used by financial institutions for providing the capital and liquidity required to finance worldwide demand for consumer and business credit. Given current capital constraints and challenges to distributing securitized products, financial institutions are unlikely over the next several years to have the wherewithal to meet the demand for credit necessary to support robust economic recovery and growth.

The speed and eventual form in which securitization returns will ultimately depend on several factors, many of which are beyond the ability of the industry to affect. Macroeconomic and global market conditions, mark-to-market risk volatility and confidence in forecasting, housing prices, delinquencies, defaults, foreclosures and loss severities on residential real estate will have a great impact on the ability and willingness of investors and financial institutions to value, invest in, and distribute existing and future mortgage-related and other securitization. A new investor base may be needed to augment the demand from financial institution that are currently very capital-constrained and from investor segments of the last few years that have withdrawn from the market. The market

[181] See **Global Joint Initiative** (2008), p. 1.
[182] See **Paulsen, H.M., Jr.** (2007).
[183] **Gonzáles-Páramo, J.M.** (2008): "Speech at the Global ABS Conference June 1, 2008 in Cannes".

recovery overall also will be very depend on the successful implementation of a variety of measures taken by governments and regulators worldwide. [184]

On June 17, 2009, the U.S. Treasury Department released a report, "Financial Regulatory Reform – A new Foundation: Rebuilding Financial Supervision and Regulation" (the "Treasury Report"). In the case of securitization, the Treasury Report focused on general erosion of lending standards as the cause for the breakdown of the securitization market and recommended: (1) altering incentive structures; (2) aligning compensation with long-term performance of assets; (3) increasing transparency of the securitization market; (4) strengthening performance of credit rating agencies; and (5) reducing over-reliance on credit ratings.[185]

The IMF had also been calling for a number of the securitization market reforms, in particular: (1) credit rating agency reforms; (2) improved disclosure and transparency standards; (3) realigning regulatory capital requirements; (4) basing compensation on long-term performance; and (5) product standardization and simplification.[186] Table 1 provides a summary of these and other recent policy recommendations and the progress made toward meeting them. Some of them will be described in the next subsections.

Table 1: Securitization policy progress report

Issue	Status
Credit rating agencies	
Incentive conflicts	All major agencies compliant with internal governance controls called for in the IOSCO Code of Conduct.
Rating over-reliance/shopping	Agencies agree with New York State Attorney General to implement a fee-for-service revenue model for residential MBS securities. U.S. government calling for publication of preliminary ratings.
Transparency and disclosure	European and U.S. legislation to force rating agencies to disclose rating performance metrics, and differentiate their structured credit ratings. U.S. Securities and Exchange Commission to require rating agencies to make available details behind rating actions in machine-readable form.
Rating differentiation	
Disclosure and transparency	
At transaction level	American Securitization Forum (Project "RESTART") working on introducing enhanced transaction reporting (loan pool composition and ongoing performance detail).
Accounting standards	Accounting standards to require improved disclosure of off-balance-sheet entities and tighten requirements for moving assets of balance sheet.
Regulations	
Capital requirements	Basel II amendments to increase capital requirements where necessary, and to minimize loophole gaming and incentives for regulatory arbitrage.
Compensation policy	FASB ends gain-on-sale accounting for certain securitizations, eliminating upfront revenue recognition.
Securitizer incentives	European Parliament and U.S. government call for securitizer risk retention, and accounting standards make it harder to remove assets from securitizer balance sheets.
Product standardization	No progress on product standardization, although the American Securitization Forum is working on legal documentation standardization.

Source: IMF (2009), p. 96

[184] See **Global Joint Initiative** (2008), p. 2.
[185] See **U.S. Department of the Treasury** (2009).
[186] See **IMF** (2009), pp. 95 - 100.

4.1 Reducing complexity

The dramatic losses suffered on exposures to ABS, CDOs, and other resecuritizations by even the most sophisticated financial institutions illustrate that the riskiness of complex products was vastly underestimated. Part of this problem has been fixed by the markets in that these structures have vanished, and more onerous bank capital requirements for resecuritizations are due to significantly change the economics of these instruments. At least in the near future, investors are likely to insist on simpler structures that are less vulnerable to model risk and easier to analyze. *Fender* and *Mitchell* explain that in this context, simplicity could mean increased standardization of structures, based on a smaller number of tranches and less reliance on structural features (other than subordination) for credit enhancement.[187] This could help to bring investors back into the market.

Valuation difficulties could also be alleviated if securitization products were simplified. Some of the product complexity was well intentioned, such as excess spread traps and triggers designed to bolster the creditworthiness of the senior tranches. Others, such as microtranching, were designed to game rating agency models. In any case, this product complexity has made some securities extremely difficult to value and risk-manage, and to the extent that regulation or market practices encourage such complexity, these components should be eliminated.[188]

4.2 Increasing transparency standards

Enhanced market practices and transparency around the due diligence efforts that occur during the pre-securitization process would give investors greater comfort with regard to the underlying assets in securitization. New, industry-endorsed pre-securitization due diligence standards that exceed those that may be required under applicable regulation, as adapted for differences across jurisdictions, will establish a common basis for evaluating the accuracy and integrity of information that is presented and relied upon in evaluating the risk and performance characteristics of securities, including by the rating agencies. The *Global Joint Initiative* recommends that core standards be developed regarding the pre-securitization due diligence process, as well as regarding disclosure of information about that process.[189]

Improving disclosure standards and making detailed information about the assets underlying structured finance products publicly available also could help reduce rating shopping (i.e., “cherry picking”) by making it possible for entities other than the credit rating agency hired by the originator to develop and disseminate opinions about the securities.[190]

[187] See **Fender, I./Mitchell, J.** (2009), p. 34.
[188] See **IMF** (2009), p. 100.
[189] See **Global Joint Initiative** (2008), p. 12.
[190] See **IMF** (2009), p. 97.

Fender and *Mitchell* argues that better and more timely information, relating both to the riskiness of the underlying assets and to their performance over time, together with standardized reporting of this information, would assist investors in their due diligence efforts.[191]

4.3 Reducing over-reliance on credit ratings

Over-reliance on ratings has been a key factor behind the financial crisis. Better ratings might be required. Therefore, Credit Rating Agencies (CRAs) should provide enhanced, clear, concise, and standardized disclosure of CRA rating methodologies, underlying data examination and verification, as well as CRA surveillance procedures, so as to foster greater transparency and allow market users of ratings to understand their bases and limitations. Then CRAs should ensure that rating performance of structured products are consistently in line with rating performance of other asset classes, which will increase investor confidence in the reliability of ratings. However, regulators should avoid mandating the use of separate ratings scales or unique ratings indicators or modifiers for structured finance ratings.[192]

Furthermore, AAA should be AAA. Investors primarily view the structured products market as an AAA market. Triple-A connotes a tower of security. The market needs to address price and ratings volatility and restore the credibility of the AAA rating.

Regulatory initiatives directed toward CRAs have come from the International Organization of Securities Commissioners (IOSCO), the United States and the European Union. IOSCO developed a voluntary code of conduct for CRAs aimed at safeguarding the quality and integrity of the rating process, maintaining CRA independence, avoiding conflicts of interest, and promoting transparency and timeliness in ratings disclosure. The first regulatory regime applicable to CRAs was created in the United States with the passage of the Credit Rating Agency Reform Act of 2006 (Reform Act). Under the Reform Act, CRAs may register with the SEC as nationally recognized statistical rating organizations (NRSROs). In addition to overseeing compliance by the NRSROs with their own procedures and methodologies for issuing and maintaining credit ratings, the SEC prescribes rules to avoid conflicts of interest. The European Union adhered to the IOSCO code of conduct until recently.[193]

Beyond that, greater market transparency through enhancing transparency in the CRA process should empower investors and other market participants to do more of their own credit research, and thereby reduce the markets' overall reliance on CRAs.

[191] See **Fender, I./Mitchell, J.** (2009), p. 34.
[192] See **Global Joint Initiative** (2008), p. 15.
[193] See **Committee on Capital Markets Regulation** (2009), p. 25.

4.4 Aligning compensation with long-term performance of assets

The *IMF* reported that compensation systems based on immediately measurable accounting results also played a role in creating the conditions that led to the crisis.[194] Then, compensation systems provide strong incentives for transactions which allow for large gains on sale, for example, through first profit positions. Risks imposed on others tend to be ignored. Moreover, the incentives of an annual bonus depend on bonus-profit accounting. If the profit in early years does not correctly anticipate losses and risks which may materialize in later periods only, then the present value of manager bonus will be overstated. Finally, if the manager does not face a threat to risk taking through a malus, then one should not be surprised by very high bank leverage.[195] So the United States Treasury advocating for the compensation of brokers, originators, sponsors, underwriters and others involved in securitization to be linked to the longer-term performance of securitized assets.

Introducing a longer-term perspective on structuring securitizations should force originators to better account for the risk-return trade-off of the instrument and provide incentives for better underwriting standards.[196]

A welcome development in this regard is the FASBs[197] elimination of the gain on sale accounting treatment that had added to the profitability of certain securitizations. Formerly, United States Generally Accepted Accounting Principles (GAAP) permitted the securitizer to recognize the gain on sale at the initiation of the securitization. Recording the gain on sale of loans securitized in an MBS would require a securitizer to project the future cash flow of the underlying loans and account it up front. Gain on sale treatment will no longer be allowed under United States GAAP for certain mortgage securitizations where control is not surrendered; instead, securitizer will have to recognize the income over time as payments are received, thereby eliminating the upfront profitability of these securitizations. This would enhance the transparency of income statements and provide incentives to originators to better assess risk exposures of securitizations.

4.5 Restoring demand

Fixed-rate investors always have a continued need for fixed-rate ABS products for their yield and duration, but much of this real money has recently lost its appetite due to the continual spread widening. Every bond they have bought at cheap levels in 2006 and 2007 cheaper and the interest in ABS products shrank.[198]

With the evaporation of the floating-rate paper investor base, there is a significant problem for generating demand for the legacy assets, which is distinct from the goal of developing demand for primary issuance of new assets.

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[194] See **IMF** (2009), p. 99.
[195] See **Franke, G./Krahnen, J.-P.** (2009), p. 44.
[196] See **IMF** (2009), p. 99.
[197] The FASB (Financial Accounting Standards Board) is a private, not-for-profit organization whose primary purpose is to develop generally accepted accounting principles (GAAP) within the United States in the public's interest.
[198] See **Citigroup Global Market** (2008), p. 29.

Thus, as the traditional floating-rate investor base is gone, over-invested, or delivering, and with more supply expected to come to the market, this will likely present a challenge to the market. Confounding the issue further is that most available new investment money is currently going into paper that is now guaranteed by a sovereign, or to severely distressed debt. Therefore, it may take time until investors eventually start looking at relative value that the legacy securitized assets present.[199]

To compensate for this and to attract fresh floating-rate investors, primary markets should begin to see new, simpler, less leveraged structures with higher quality assets. This will probably require additional time as issuers will need to originate the new assets first, and then ramp up critical mass for a securitization issue. This means any new issuance will start at much lower levels, and would initially require less demand. But as banks raise capital with new guaranteed bonds at lower costs, it is to expect that some of those funds will be reinvested into wider spread ABS products. This new demand will take time to build but eventually can hopefully replace lost SIV programs and start tightening ABS secondary and primary issuance spreads.[200]

4.6 Realigning regulatory capital requirements

Resecuritization is largely responsible for loss of confidence in the securitization market. At the beginning of 2009 the Basel Committee published proposals to re-instill confidence in the securitization market.[201] Much higher risks are called for especially for two-tier securitization structures (resecuritizations). The market for ABCP would be affected by the changes in two ways: First, even a minimal share of a securitization product in the asset portfolio of a conduit would suffice to classify the entire conduit as a resecuritization transaction. Second, it is intended that the ABCP rating will no longer be recognized in regulatory terms if the investing bank itself provides the liquidity facility or credit enhancements for the ABCP. Furthermore, in the future the differentiation between the maturities of liquidity facilities will no longer be included in the regulatory capital weighting. These changes relate to Pillar I of the regulatory framework and are explained subsequent. The Committee's proposal also calls for changes with regard to quality-related requirements in connection with Pillars II and III although these are not further analyzed here.

Resecuritizations as well as CDOs of ABS are two-tier securitization structures in which the securitized portfolio also contains other securitizations. However, the recent financial crisis has shown that precisely these products were largely responsible for the loss of confidence of investors in the securitization instrument due to their complexity and lack of transparency. Here the Basel Committee gave a very broad definition of a resecuritization:

„A resecuritization exposure would be defined as a securitization exposure where one or more of the underlying exposures meet the framework's definition of a securitization exposure. This definition would capture collateralized debt obligations (CDOs) of asset-backed securities (ABSs) including, for example, CDOs backed by residential mortgage-backed securities. The definition would also mean, for example, that a liquidity facility to an ABCP

[199] See **Citigroup Global Market** (2008), pp. 29 - 30.
[200] See **Citigroup Global Market** (2008), p. 30.
[201] See **BIS** (2009c), p. 2.

programme or to a transaction within such a programme that held asset-backed securities would be considered a resecuritization exposure. This definition would also capture a securitization exposure where the underlying exposures consisted of hundreds of mortgage loans and a single ABS. In other words, if one underlying exposure was a securitization exposure, the securitization exposure in question would be considered a resecuritization."[202]

Accordingly, just one single securitization exposure in a securities portfolio suffices in order to classify it as a resecuritization pursuant to the proposals made by the Basel Committee. Here the definition of a securitization is based on the requirements for securitizations according to the Capital Requirements Directives (CRD): (1) division of the counterparty default risk resulting from the securitized portfolio into initially at least two securitization tranches; (2) one of the securitization tranches must be subordinate to the other; (3) claims for payment by investors depend exclusively on the performance of the securitized portfolio and any related collateral involved (limited recourse); (4) non-performance for the whole securitization transaction is not deemed to have occurred when loss allocations have been made for one or more subordinate tranches from the same transaction; and (5) the securitization transaction must be uniformly documented.

This broad definition of resecuritization would cover a large number of securitization structures. Many CDO and ABCP programs have explicitly permitted the purchase of other ABS in their investment guidelines. A reclassification of these securitization structures as a resecuritization transaction would considerably increase the regulatory capital requirement.

A further proposal for change relates to the definition of senior resecuritization positions. According to this, the securitization portfolio of a senior resecuritization may only contain the most senior securitization tranches, which in turn do not constitute a resecuritization position (CDO cube or CDO³).[203] The criterion of granularity is not to be applied for resecuritization. This is intended to prevent the securitization being broken down further into a large AAA senior tranche with 7% risk weight and a small mezzanine tranche with (maximum) deduction from capital. The aim of this repeated slicing into tranches was to reduce the risk weight to a minimum. However, the financial crisis has shown that precisely this resulted in risks being concealed or making it particularly difficult to evaluate. The proposals of the Basel Committee would result in a doubling of risk weights and thus also of the regulatory capital requirements for two-tier securitization structures. If one also allows for the fact that precisely the ratings for CDOs of ABS have come under massive pressure since the start of the crisis, it becomes clear that the capital requirement for this asset class has already increased over the past year and a half. If the proposal is compulsorily implemented in this form, the risk weight for CDOs on ABS would significantly increase once again. For instance, the risk weight for a downgrade from AAA to BBB+ using the Standardized Approach could increase from the original 20% to 225% and based on the IRB Approach from the original 7% to 350%.

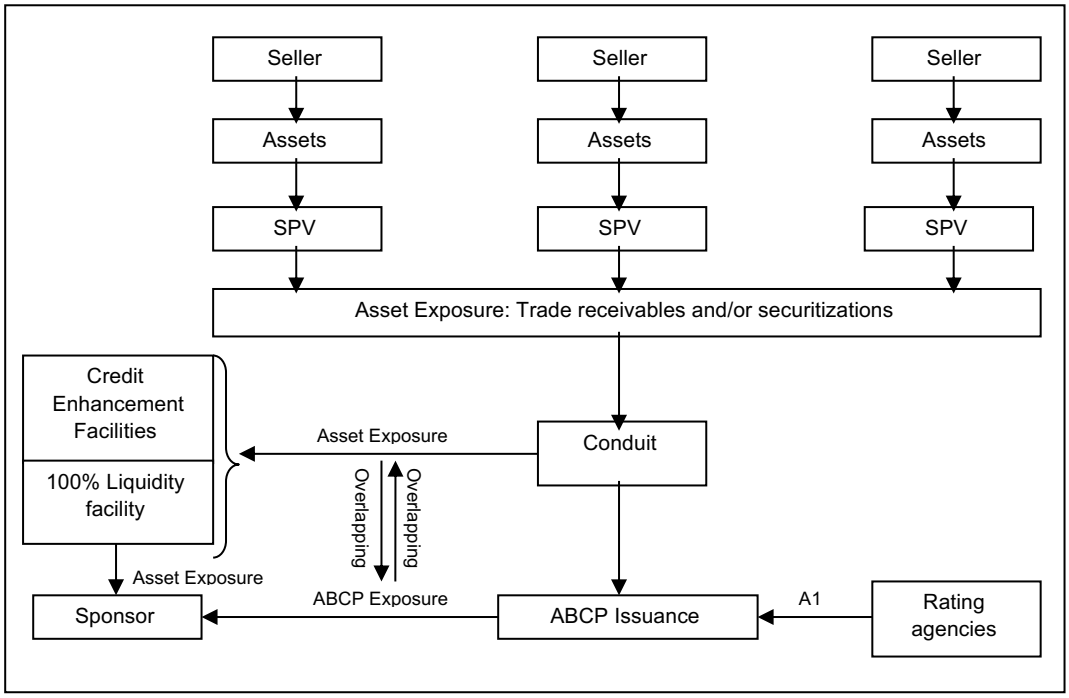
The regulatory treatment of ABCP liquidity facilities was a major weakness in the Basel I framework. Under Basle I the off-balance-sheet risks of securitized assets did not have to be underpinned with regulatory capital. Since the

[202] **BIS** (2009c), p. 2.
[203] See **BIS** (2009c), p. 3.

introduction of the new Basel II framework at the beginning of 2008, banks have had to underpin the liquidity facilities provided with corresponding equity capital. However, the current proposals by the Basel Committee are aimed at tightening up the regulations for securitization liquidity facilities and investments in ABCP, the rating of which is based mainly on underpinning measures (liquidity facilities, credit enhancements) by the investing bank.[204]

In its proposal the Basel Committee questions the recognition of ABCP ratings, in which the investing bank provides the supporting measures. As a rule, ABCP programs are able to draw on liquidity facilities in order to guarantee repayment of the commercial papers (CPs) or the purchase of new assets (for example, ABCP is paid back in a "rolling" form by issuing new ABCP). Here the liquidity facility generally covers more than 100% of the outstanding CPs and, in addition to the credit risks, may also hedge exchange-rate and interest-rate risks. When evaluating ABCP programs the rating agencies take existing liquidity facilities and credit enhancements into account. The rating of an ABCP is thus based to a not inconsiderable extent on the quality of the liquidity facility provided. If the risks of the securitized assets are assumed by a facility, but ultimately by the sponsor of the liquidity line, the latter must underpin the risks of these assets with corresponding equity capital. If the sponsors now buy ABCP from a program for which they themselves provide the liquidity facility, the proposal made by the Basel Committee requires that the rating of this "self-guaranteed" ABCP no longer be recognized in regulatory terms. This would result in a much higher capital requirement for the sponsors. Figure 15 gives an example of the exposure of the sponsor of a multi-seller ABCP program who invests in its own ABCP.

Figure 15: Asset and ABCP exposure of a multi-seller ABCP program



Source: Own graph

[204] See **BIS** (2009c), pp. 3 - 6.

A glance at the sponsors' exposure shows that when buying its "own" ABCP the sponsor bears the risk from the asset portfolio twice (overlapping) – first via the liquidity facility and/or credit enhancements and second, via the ABCP purchased. In these cases the CRD offers the possibility of allowing for overlapping in the risk weighting. When the risk-weighted outstanding amounts are calculated, only that position or part of a position has to be included that produces the higher-weighted outstanding amounts. The proposals made by the Basel Committee affect this procedure by no longer permitting recognition of ABCP ratings based on a liquidity facility provided by the sponsor itself. The risk weight of this ABCP would increase massively as capital would have to be withdrawn for non-rated positions. Accordingly, sponsor banks would now have to apply the higher ABCP risk weight. Although overlapping in the exposure can still be considered, the proposals contain restrictions with regard to the size of the facilities. Liquidity facilities that do not cover 100% of the outstanding ABCP cannot then fully include overlaps in the risk weighting. If the facility covers only 50% or less, no overlaps may be included in the risk weighting. Accordingly, the facility and ABCP must be risk-weighted.

The Basel Committee proposals on the treatment of resecuritizations are fundamental in nature. There can be no doubt that the regulatory treatment of these lex products is in need of revision. Due to the broad definition and the much higher risk weights for resecuritizations, incentive effects are created, which would have a significant impact on the ABS market. A conceivable option would be to split the asset portfolios of ABCP program into trade receivables and securitizations. Nor could renewed selling pressure in the ABS market be ruled out as ABCP conduits and CDOs could offload the ABS holdings in their portfolios. The strict definition of resecuritization on the basis of a securitization position in the asset portfolio therefore makes little sense. Alternatively, risk weights could be staggered on the basis of threshold values or differentiation made via the capital conversion factor.

5. What regulatory initiatives have been introduced after the crisis?

In response to the concerns raised by the financial crisis, the financial regulators and standard-setters have implemented a number of initiatives intended to re-establish securitization on a sustainable basis.[205]

One of the first regulatory measures relating to the securitization process were aimed at removing disincentives and conflicts that distorted markets before the crisis, as well as measures to support the correct pricing of credit risk. These include the following measures: (1) measures that directly address the conflicts of interest created by misaligned incentives within the securitization chain, (2) measures that address information asymmetry within the securitization process by increasing transparency of the securitization structure, (3) measures that address inappropriate incentives created by accounting revenue recognition principles and compensation systems for securitizers or originators, and (4) reforms designed to enhance oversight of credit rating agencies governance and reduce regulatory reliance on ratings.

On July 21, 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 was signed into U.S. federal law by President Barack Obama as an attempt to regulate the securitization market. It was the largest regulatory overhaul of financial markets since the Glass-Steagall Act nearly eight decades earlier. The act not only phased out the riskiest securitization assets, but also forbade banks from using customer deposits to invest in derivatives, including swaps (Volcker Rule), enhancing the separation of proprietary trading from commercial banking activities. Also, it required the Commodity Futures Trading Commission to regulate swaps, setting up a clearinghouse to trade and price this type of derivatives.

Furthermore, in 2010, during the November Seoul Summit, leaders of the G-20 countries agreed on new bank capital and liquidity regulations (Basel III), proposed by the Basel Committee on Banking (BCBS). These new rules addressed some loopholes that had been exploited by banks, through securitized assets. Yet, although these regulations appear to convey some degree of safety to banks, if many of their activities are taken off their balance sheets, the risk associated with their portfolios might, on the contrary, be amplified.

In addition, the BCBS and the IOSCO has issued 2015 criteria for identifying simple, transparent and comparable (STC) securitizations. The purpose of these criteria is not to serve as a substitute for investors due diligence but rather to identify and assist in the financial industry's development of simple and transparent securitization structures.

Also, the EU Securitization Regulation introduced in 2019 significantly reformed the EU securitization market with a framework for simple, transparent and standardized (STS) securitizations.

[205] See **Basel Committee on Banking Supervision** (2011), p. 19.

5.1 Regulatory initiatives relating to the securitization process

5.1.1 Measures to induce a stronger alignment of the interests

The G20 Leaders' statement from the Pittsburgh Summit in September 2009 recommended that securitization sponsors or originators retain part of the credit risk of the underlying assets in order to induce a stronger alignment of the interests of the issuers of securitizations and the final investors.

IOSCO in its September 2009 report "Unregulated Financial Markets and Products" also recommended that consideration be given to requiring originators and/or sponsors to retain a long-term economic exposure to securitizations to appropriately align interests in the securitization value chain.[206] IOSCO recommended that the introduction of any retention requirement needed to be carefully tailored to appropriately align interests and suggested a number of principles to assist regulators in considering retention requirement approaches for their jurisdictions.[207]

The risk retention concept is intended to better align interests of the suppliers of securitization and investors. While some degree of risk retention has already been in practice, formalizing the requirement for "skin-in-the-game" has the potential to incentivize originators, issuers and investors to properly conduct quality screenings, improve underwriting standards and adequately monitor for credit risk.[208] Although there are a number of alternative mechanisms for promoting the alignment of interests between securitizers and investors such as contractual representations and warranties, credit risk retention has emerged as a significant reform initiative in the European Union and the United States.

IOSCO's Task Force on Unregulated Financial Markets and Products Implementation Report, published in March 2011, found that 11 out of 12 jurisdictions surveyed had implemented, were implementing or were considering implementing some sort of long-term risk retention requirement in accordance with IOSCO recommendations.[209] In the European Union, the new article 122(a) of CRD II includes a minimum risk retention rate, according to which a credit institution shall be exposed to the credit risk of a securitization position only if the originator, sponsor or original lender has explicitly disclosed to the credit institution that it will retain, on an ongoing basis, a material net economic interest which, in any event, shall not be less than 5 per cent of the total issuance of securitization products. This new requirement came into force on 31 December 2010.

[206] See **IOSCO Technical Committee** (2009), p. 18.
[207] See **IOSCO Technical Committee** (2009), pp. 58 - 62.
[208] See **Financial Stability Overnight Council** (2011).
[209] The IOSCO Report also found, among other things, that all member jurisdictions surveyed were expected to implement IOSCO recommendations in relation to increasing transparency through disclosure, requiring independence of service providers, and reviewing investor suitability requirements.

In the United States, section 941 of the Dodd-Frank Wall Street Reform and Consumer Protection Act (the Dodd-Frank Act) requires a securitizer to retain at least 5 per cent of the credit risk of any asset that the securitizer, through the issuance of an ABS, transfers, sells, or conveys to a third party.

5.1.2 Measures to improve disclosure and transparency

Regulators and supervisors in most countries took steps to provide securitization products and markets with higher transparency standards and more stringent disclosure requirements. These transparency-enhancing measures were adopted by many central banks and securities regulators and were also promoted by industry associations.

In the European Union, the amendments to the CRD from September 2009, which became effective on 31 December 2010, included new disclosure requirements in which sponsoring and originating credit institutions must ensure that prospective investors have readily available access to all materially relevant data on securitization structures from the date of the issuance onwards.[210]

In the United States, the Dodd-Frank Act now contains various provisions on ABS issuer disclosure. One provision states that all issuers of registered ABS, regardless of the number of investors in an asset class, are subject to the ongoing reporting requirements of the Exchange Act. The Act also authorizes the SEC to suspend or terminate regulations for various classes of registered ABS under certain conditions if deemed necessary to protect investors or the public interest.

There have also been a number of industry initiatives to promote standardization of documents and structures. In December 2009, the American Securitization Forum (ASF) published "model" documents for representations and warranties aimed at: (1) better aligning the incentives of mortgage lenders and investors in mortgage loans; and (2) significantly increasing the transparency of representations and warranties by making them easier to compare from transaction to transaction.[211] The Association of Financial Markets in Europe (AFME) has also been actively working with the ECB and the Bank of England on improved reporting standards for their respective repo programmes, which became mandatory in late 2011. The Japan Securities Dealers Association (JSDA) has enforced its self-regulation on communication about the nature and risks of the underlying assets and also developed a standardized information reporting package in 2009 to improve the transparency of transactions in securitized products.

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[210] Parallel to the EU regulation, several national authorities have recently pursued new rules to increase transparency in this field. The Spanish securities markets supervisor (CNMV) has recently implemented a pioneering specific regulation aimed at increasing the periodic public reporting requirements for securitization funds that oblige all securitization funds managers operating in Spain to file public and reserve statements that in some cases contain information at the individual-loan level. Prudential regulation issued in 2011 in Italy includes disclosure requirements both for intermediaries holding securitization positions and for those exposed to the credit risk associated with a securitization.

[211] The model representations are part of the ASF's Project RESTART, an industry-developed initiative launched in February 2008 to help rebuild investor confidence in mortgage and ABS, restore capital flows to the securitization markets and, ultimately, increase the availability of affordable credit to all American consumers and small businesses.

5.1.3 Eliminating compensation misalignments

Compensation systems based on immediate rather than longer-term financial outcomes contributed to a divergence of interests between securitization organizers and investors. The compensation of those involved in the securitization, who would otherwise not be active after launch, could be paid out over time based on product performance. This would better align the securitizer's income with the longer-term performance of the securitization.

In the United States, rules have been enacted that link the long-term performance of the underlying assets to the compensation of the parties originating the underlying loans, particularly in the area of residential mortgages. At a broader level, there have also been enactments in many member countries to re-regulate incentive compensation programs in financial organizations.

5.1.4 New regulations on credit rating agencies

Not only did the crisis lead to a loss of confidence by investors and institutions in credit ratings used for securitization, but more broadly revealed significant concerns regarding the potential conflicts of interest arising from the business model of credit rating agencies in the context of securitization.

In Japan, in order to enhance transparency and disclosure related to credit ratings used for securitization, rating agencies are required to publish information that may be deemed valuable in an assessment by a third party of the appropriateness of the credit rating; and stakeholders are encouraged to implement measures to enable a third party to verify the appropriateness of the credit rating in line with IOSCOs revised code of conduct (2008).

In both the United States and Europe, rating agencies will be subject to increased disclosure requirements going forward, designed to increase transparency in connection with structured finance ratings. The rating agencies themselves note that they have restructured their ratings processes to allow for more oversight and examination of decisions, and to improve the comparability of ratings across different investments. At the same time, while market participants have expressed skepticism of ratings, there are still instances of rating reliance and shopping, as in the case of U.S. Re-Real Estate Mortgage Investment Conduits (Re-REMICs), which are transactions that involve repackaging downgraded tranches of securitizations into new portfolios for securitization.

5.2 Dodd-Frank Wall Street Reform and Consumer Protection Act

The most influential piece of legislation, however, was enforced in July 2010 – Dodd-Frank Wall Street Reform and Consumer Protection Act. Dodd-Frank reform addresses the issues that arose during the financial crisis and it implements some new regulative steps towards financial stability, accountability and transparency of the financial system.

5.2.1 A new Oversight Committee for systemically important financial institution

The Financial Stability Oversight Committee (FSOC) is created. It promotes efficiency, oversees financial institutions other than banks and their transparency and introduces the term "systemically important financial institution" (SIFI), that is basically an official term for "too big to fail". Among other things, FSOC has a right to prevent mergers of large institutions from happening.[212]

5.2.2 Prohibition of proprietary trading with hedge funds and private equity funds

The Volcker Rule (Sec. 619 of Dodd-Frank) prohibits "proprietary trading and certain relationship with hedge funds and private equity funds". In other words, banks are not allowed to own or use hedge funds for their own sake, only on behalf of their customers. Banks were given 7 years until July 2015 in order to fully comply with these provisions.

5.2.3 Hedge funds are now to be regulated by the SEC

Under the Wall Street Transparency and Accountability Act of 2010 (Dodd-Frank, 2010), hedge funds are now to be regulated by the SEC and the Commodities Futures Trading Commission (CFTC). They are also obligated to provide information about their portfolios and trades, so the SEC could evaluate and control market and other risks. Moreover, the SEC and the CFTC also oversee risky derivatives such as credit default swaps. Previously traded over-the-counter derivatives are now required to be traded through exchanges or clearing houses, overseen by the SEC.

5.2.4 SEC opens office for Credit Ratings

Within SEC the Office of Credit Ratings is created. It oversees all nationally recognised statistical rating organizations and among other things requires them to disclose all crucial information such as rating methodologies, policies and procedures.

5.2.5 New responsibility of overseeing credit and debit cards

The Consumer Financial Protection Bureau under the Treasury Department took the responsibility of overseeing credit and debit cards and consumer loans (excluding auto loans), regulating credit cards fees, bank fees and

[212] See **Brose S.M./Flood D.M./Krishna D./Nichols B.** (2014), p. 19.

underwriting fees. Banks now have more requirements in terms of mortgage underwriting. The main goal was to protect consumers from excessive fees risky mortgage loans.[213]

5.2.6 Increased supervision, investors protection and new whistleblower program

Dodd-Frank increased supervision of insurance companies, investor protection and encouraged a whistleblower program.[214] The Government Accountability Office also got a right to audit the Federal Reserve on various occasions and especially in case of emergency lending.

Dodd-Frank Reform was a major piece of legislation that made changes in such acts as Gramm-Leach-Bliley, the Bank Holding Company Act and others. Previous deregulation tendencies proved themselves inefficient and even harmful and the Dodd-Frank attempted to change the course. The implementation of such an extensive piece of law will undoubtedly require a significant amount of time since Dodd-Frank affects various areas of financial markets. Many issues still remain to be resolved until regulations are fully adopted.[215]

5.3 Basel III and securitization

The revision of the Basel International Capital Framework (known as Basel III), will include some new elements that will potentially affect, to a significant extent, the incentives for banks to securitise loans and hold securitization assets. Among the reforms introduced by Basel III, the following seem the most relevant for securitization activity.

5.3.1 Capital requirements

There are several Basel III provisions that address areas of concern that were highlighted during the financial crisis and which supervisors determined were not adequately addressed under the previous framework. More specifically, in July 2009, the Basel Committee (the Committee) published Enhancements to the Basel II Framework.

These enhancements are intended to strengthen the framework and respond to lessons learned from the financial crisis. Because of the higher degree of inherent risk in resecuritization exposures, the Committee significantly increased the risk weights applicable to such exposures under both the standardized and internal ratings based approaches relative to the risk weights for other securitization exposures. As a result, the capital requirements for resecuritizations have risen dramatically. In addition, to address the lack of appropriate due diligence on the part of investing institutions and deter them from relying solely on external credit ratings, the Basel framework now requires banks to meet specific operational criteria in order to use the risk weights specified in the Basel II

[213] See **Amadeo, K.** (2016).
[214] See **Dodd-Frank, Sec. 748** (2010).
[215] See **Guynn, D. R./Polk, D.** (2010).

securitization framework. Failure to meet these criteria for a given securitization exposure will result in the exposure being risk weighted at 1,250 per cent, which is equivalent to a deduction from capital. The Committee also increased the capital requirements for short-term liquidity facilities under the Standardized Approach by increasing the credit conversion factor (CCF) for all eligible liquidity facilities to 50 per cent, regardless of the maturity of the liquidity facility (LF). Prior to this revision, eligible LFs under one year were converted to an on-balance sheet equivalent amount by applying a 20 per cent CCF.

The Committee also has revised the market risk rules to increase the level of capital that must be maintained against securitization exposures held in the trading book. In addition, the Committee is currently in the process of reviewing whether the risk weights for all securitization exposures should be recalibrated, which could lead to higher capital requirements.

5.3.2 Liquidity ratios

The new Basel III framework includes provisions for new liquidity metrics.[216] Specifically, there are two liquidity ratios: (1) the liquidity coverage ratio, aimed at ensuring that a bank maintains an adequate level of unencumbered high quality assets that can be converted into cash to meet its liquidity needs (for a 30-day period) under an acute liquidity stress scenario; and (2) the net stable funding ratio, which seeks to promote a stable medium and long-term funding of the assets and activities of banks. Although these ratios are subject to possible changes in their calibration and both will undergo extended observation periods before they are fully phased-in, securitizations are considered as illiquid assets and as such are not included in the liquidity coverage ratio buffer of high-quality liquid assets.

5.4 BCBS Criteria for simple, transparent and comparable securitization (STC)

The financial crisis highlighted that even simple and transparent securitizations could perform poorly if the underlying assets were subject to weak underwriting and poor governance. Therefore, investors need to carry out a careful risk assessment of securitizations, including their own evaluation of the credit quality of the underlying assets.

The identification of criteria for simplicity, transparency and comparability is intended to help transaction parties – including originators, investors and other parties with a fiduciary responsibility – evaluate the risks of a particular securitization across similar products. In the case of investors, these criteria should assist them with their due diligence on securitizations, but in no case would these criteria serve as a substitute for such due diligence.

[216] See **Basel Committee on Banking Supervision** "Basel III: International framework for liquidity risk measurement, standards and monitoring" (2010), pp. 36 - 37.

By improving simplicity in terms of assets and structure, the STC criteria may contribute to a more accurate assessment by both investors and supervisors of the risk of securitization exposures. By improving transparency, the STC criteria may help provide investors with greater access to comprehensive and reliable information about the structure and the underlying assets' characteristics and their performance during the life of the transactions. Together, these may help investors conduct a more thorough analysis of the risks and returns. Combined with greater comparability of certain elements of securitization transactions, these could lower the hurdles for assessing securitizations.

5.4.1 Process of developing STC criteria

In 2014 the BCBS and IOSCO established a joint task force to review developments in securitization markets. This Task Force on Securitization Markets (TFSM) was charged with (1) identifying the factors that may be hindering the development of sustainable securitization markets, and (2) developing criteria to identify and assist in the financial industry's development of simple and transparent securitization structures.

The TFSM collected data, surveyed national authorities and market participants, and undertook bilateral interviews as part of its assessment of securitization markets. The TFSM considered the various types of investors that may be investing in securitization, and focused in particular on the participation of non-bank investors such as insurance companies, pension funds and certain investment funds in securitization markets.

Building on this work, in December 2014 the BCBS and IOSCO published for consultation 14 criteria to identify certain features of simple, transparent and comparable securitizations. The consultative document sought feedback on (1) whether the criteria achieved the targeted goals; (2) whether the criteria were appropriate, sufficiently detailed and clear enough; and (3) whether further work should be undertaken to develop criteria for short-term securitizations (e.g., ABCP), which have been so far outside of the scope of the Committee's goals; and enhance the level of standardization of securitization transactions' documentation.[217]

5.4.2 Key STC criteria

5.4.2.1 Nature of the assets

In simple, transparent and comparable securitizations, the assets underlying the securitization should be credit claims or receivables that are homogeneous. In assessing homogeneity, consideration should be given to asset type, jurisdiction, legal system and currency.

[217] See **Basel Committee on Banking Supervision** "Criteria for identifying simple, transparent and comparable securitizations" (2015), p. 4.

As more exotic asset classes require more complex and deeper analysis, credit claims or receivables should have contractually identified periodic payment streams relating to rental,[218] principal, interest, or principal and interest payments. Any referenced interest payments or discount rates should be based on commonly encountered market interest rates,[219] but should not reference complex or complicated formulae or exotic derivatives.[220]

5.4.2.2 Asset performance history

In order to provide investors with sufficient information on an asset class to conduct appropriate due diligence and access to a sufficiently rich data set to enable a more accurate calculation of expected loss in different stress scenarios, verifiable loss performance data, such as delinquency and default data, should be available for credit claims and receivables with substantially similar risk characteristics to those being securitized, for a time period long enough to permit meaningful evaluation by investors. Sources of and access to data and the basis for claiming similarity to credit claims or receivables being securitized should be clearly disclosed to all market participants.

5.4.2.3 Payment status

Non-performing credit claims and receivables are likely to require more complex and heightened analysis. In order to ensure that only performing credit claims and receivables are assigned to a securitization, credit claims or receivables being transferred to the securitization may not, at the time of inclusion in the pool, include obligations that are in default or delinquent or obligations for which the transferor or parties to the securitization are aware of evidence indicating a material increase in expected losses or of enforcement actions.

5.4.2.4 Consistency of underwriting

Investor analysis should be simpler and more straightforward where the securitization is of credit claims or receivables that satisfy materially non-deteriorating origination standards. To ensure that the quality of the securitized credit claims and receivables is not affected by changes in underwriting standards, the originator should demonstrate to investors that any credit claims or receivables being transferred to the securitization have been originated in the ordinary course of the originator's business to materially non-deteriorating underwriting standards. Where underwriting standards change, the originator should disclose the timing and purpose of such changes.

[218] Payments on operating and financing lease are typically considered to be rental payments rather than payments of principal and interest.

[219] Commonly encountered market interest rates may include rates reflective of a lender's cost of funds, to the extent sufficient data is provided to investors to allow them to assess their relation to other market rates.

[220] The Global Association of Risk Professionals (GARP) defines an exotic instrument as a financial asset or instrument with features making it more complex than simpler, plain vanilla, products.

Underwriting standards should not be less stringent than those applied to credit claims and receivables retained on the balance sheet.

These should be credit claims or receivables which have satisfied materially non-deteriorating underwriting criteria and for which the obligors have been assessed as having the ability and volition to make timely payments on obligations; or on granular pools of obligors originated in the ordinary course of the originator's business where expected cash flows have been modelled to meet stated obligations of the securitization under prudently stressed loan loss scenarios.

5.4.2.5 Asset selection and transfer

Whilst recognizing that credit claims or receivables transferred to a securitization will be subject to defined criteria,[221] the performance of the securitization should not rely upon the ongoing selection of assets through active management on a discretionary basis of the securitization's underlying portfolio. Credit claims or receivables transferred to a securitization should satisfy clearly defined eligibility criteria. Credit claims or receivables transferred to a securitization after the closing date may not be actively selected, actively managed or otherwise cherry-picked on a discretionary basis. Investors should be able to assess the credit risk of the asset pool prior to their investment decisions.

In order to meet the principle of true sale, the securitization should effect true sale such that the underlying credit claims or receivables: (1) are enforceable against the obligor and their enforceability is included in the representations and warranties of the securitization; (2) are beyond the reach of the seller, its creditors or liquidators and are not subject to material recharacterization or clawback risks; (3) are not effected through credit default swaps, derivatives or guarantees, but by a transfer of the credit claims or the receivables to the securitization; and (4) demonstrate effective recourse to the ultimate obligation for the underlying credit claims or receivables and are not a securitization of other securitizations.

In applicable jurisdictions, securitizations employing transfers of credit claims or receivables by other means should demonstrate the existence of material obstacles preventing true sale at issuance and should clearly demonstrate the method of recourse to ultimate obligors. In such jurisdictions, any conditions where the transfer of the credit claims or receivable is delayed or contingent upon specific events and any factors affecting timely perfection of claims by the securitization should be clearly disclosed.

The originator should provide representations and warranties that the credit claims or receivables being transferred to the securitization are not subject to any condition or encumbrance that can be foreseen to adversely affect enforceability in respect of collections due.

[221] E.g., the size of the obligation, the age of the borrower or the LTV (loan to value) of the property, DTI (debt-to-income) and / or DSC (debt service coverage) ratios.

5.4.2.6 Initial and ongoing data

To assist investors in conducting appropriate due diligence prior to investing in a new offering, sufficient loan-level data in accordance with applicable laws or, in the case of granular pools, summary stratification data on the relevant risk characteristics of the underlying pool should be available to potential investors before pricing of a securitization.

To assist investors in conducting appropriate and ongoing monitoring of their investments performance and so that investors that wish to purchase a securitization in the secondary market have sufficient information to conduct appropriate due diligence, timely loan-level data in accordance with applicable laws or granular pool stratification data on the risk characteristics of the underlying pool and standardized investor reports should be readily available to current and potential investors at least quarterly throughout the life of the securitization. Cut-off dates of the loan-level or granular pool stratification data should be aligned with those used for investor reporting.

To provide a level of assurance that the reporting of the underlying credit claims or receivables is accurate and that the underlying credit claims or receivables meet the eligibility requirements, the initial portfolio should be reviewed[222] for conformity with the eligibility requirements by an appropriate legally accountable and independent third party, such as an independent accounting practice or the calculation agent or management company for the securitization.

5.4.2.7 Redemption cash flows

Liabilities subject to the refinancing risk of the underlying credit claims or receivables are likely to require more complex and heightened analysis. To help ensure that the underlying credit claims or receivables do not need to be refinanced over a short period of time, there should not be a reliance on the sale or refinancing of the underlying credit claims or receivables in order to repay the liabilities, unless the underlying pool of credit claims or receivables is sufficiently granular and has sufficiently distributed repayment profiles. Rights to receive income from the assets specified to support redemption payments should be considered as eligible credit claims or receivables in this regard.

5.4.2.8 Currency and interest rate asset and liability mismatches

To reduce the payment risk arising from the different interest rate and currency profiles of assets and liabilities and to improve investors' ability to model cash flows, interest rate and foreign currency risks should be

[222] The review should confirm that the credit claims or receivables transferred to the securitization meet the portfolio eligibility requirements. The review could, for example, be undertaken on a representative sample of the initial portfolio, with the application of a minimum confidence level. The verification report needs not be provided but its results, including any material exceptions, should be disclosed in the initial offering documentation.

appropriately mitigated at all times, and if any hedging transaction is executed the transaction should be documented according to industry-standard master agreements. Only derivatives used for genuine hedging of asset and liability mismatches of interest rate or currency should be allowed.

5.4.2.9 Payment priorities and observability

To prevent investors being subjected to unexpected repayment profiles during the life of a securitization, the priorities of payments for all liabilities in all circumstances should be clearly defined at the time of securitization and appropriate legal comfort regarding their enforceability should be provided.

To ensure that junior note holders do not have inappropriate payment preference over senior note holders that are due and payable, throughout the life of a securitization, or, where there are multiple securitizations backed by the same pool of credit claims or receivables, throughout the life of the securitization programme, junior liabilities should not have payment preference over senior liabilities which are due and payable. The securitization should not be structured as a "reverse" cash flow waterfall such that junior liabilities are paid where due and payable senior liabilities have not been paid.

To help provide investors with full transparency over any changes to the cash flow waterfall, payment profile or priority of payments that might affect a securitization, all triggers affecting the cash flow waterfall, payment profile or priority of payments of the securitization should be clearly and fully disclosed both in offering documents and in investor reports, with information in the investor report that clearly identifies the breach status, the ability for the breach to be reversed and the consequences of the breach. Investor reports should contain information that allows investors to monitor the evolution over time of the indicators that are subject to triggers. Any triggers breached between payment dates should be disclosed to investors on a timely basis in accordance with the terms and conditions of all underlying transaction documents.

Securitizations featuring a revolving period should include provisions for appropriate early amortization events and/or triggers of termination of the revolving period, including, notably: (1) deterioration in the credit quality of the underlying exposures; (2) a failure to acquire sufficient new underlying exposures of similar credit quality; and (3) the occurrence of an insolvency-related event with regard to the originator or the servicer.

Following the occurrence of a performance-related trigger, an event of default or an acceleration event, the securitization positions should be repaid in accordance with a sequential amortization priority of payments, in order of tranche seniority, and there should not be provisions requiring immediate liquidation of the underlying assets at market value.

To assist investors in their ability to appropriately model the cash flow waterfall of the securitization, the originator or sponsor should make available to investors, both before pricing of the securitization and on an ongoing basis, a

liability cash flow model or information on the cash flow provisions allowing appropriate modelling of the securitization cash flow waterfall.

To ensure that debt forgiveness, forbearance, payment holidays and other asset performance remedies can be clearly identified, policies and procedures, definitions, remedies and actions relating to delinquency, default or restructuring of underlying debtors should be provided in clear and consistent terms, such that investors can clearly identify debt forgiveness, forbearance, payment holidays, restructuring and other asset performance remedies on an ongoing basis.

5.4.2.10 Voting and enforcement rights

To help ensure clarity for securitization note holders of their rights and ability to control and enforce on the underlying credit claims or receivables, upon insolvency of the originator or sponsor, all voting and enforcement rights related to the credit claims or receivables should be transferred to the securitization. Investors' rights in the securitization should be clearly defined in all circumstances, including the rights of senior versus junior note holders.

5.4.2.11 Documentation disclosure and legal review

To help investors to fully understand the terms, conditions, legal and commercial information prior to investing in a new offering[223] and to ensure that this information is set out in a clear and effective manner for all programmes and offerings, sufficient initial offering and draft underlying documentation should be made available to investors (and readily available to potential investors on a continuous basis) within a reasonably sufficient period of time prior to pricing, or when legally permissible, such that the investor is provided with full disclosure of the legal and commercial information and comprehensive risk factors needed to make informed investment decisions. Final offering documents should be available from the closing date and all final underlying transaction documents shortly thereafter. These should be composed such that readers can readily find, understand and use relevant information.

To ensure that all the securitization's underlying documentation has been subject to appropriate review prior to publication, the terms and documentation of the securitization should be reviewed by an appropriately experienced third party legal practice, such as a legal counsel already instructed by one of the transaction parties (e.g., by the arranger or the trustee). Investors should be notified in a timely fashion of any changes in such documents that have an impact on the structural risks in the securitization.

[223] For the avoidance of doubt, any type of securitization should be allowed to fulfil the requirements of Criterion 11 once meets its proscribed standards of disclosure and legal review.

5.4.2.12 Alignment of interest

In order to align the interests of those responsible for the underwriting of the credit claims or receivables with those of investors, the originator or sponsor of the credit claims or receivables should retain a material net economic exposure and demonstrate a financial incentive in the performance of these assets following their securitization.

5.4.2.13 Fiduciary and contractual responsibilities

To help ensure servicers have extensive workout expertise, thorough legal and collateral knowledge and a proven track record in loss mitigation, such parties should be able to demonstrate expertise in the servicing of the underlying credit claims or receivables, supported by a management team with extensive industry experience. The servicer should at all times act in accordance with reasonable and prudent standards. Policies, procedures and risk management controls should be well documented and adhere to good market practices and relevant regulatory regimes. There should be strong systems and reporting capabilities in place.

The party or parties with fiduciary responsibility should act on a timely basis in the best interests of the securitization note holders, and both the initial offering and all underlying documentation should contain provisions facilitating the timely resolution of conflicts between different classes of note holders by the trustees, to the extent permitted by applicable law.

The party or parties with fiduciary responsibility to the securitization and to investors should be able to demonstrate sufficient skills and resources to comply with their duties of care in the administration of the securitization vehicle.

To increase the likelihood that those identified as having a fiduciary responsibility towards investors as well as the servicer execute their duties in full on a timely basis, remuneration should be such that these parties are incentivized and able to meet their responsibilities in full and on a timely basis.

5.4.2.14 Transparency to investors

To help provide full transparency to investors, assist investors in the conduct of their due diligence and to prevent investors being subject to unexpected disruptions in cash flow collections and servicing, the contractual obligations, duties and responsibilities of all key parties to the securitization, both those with a fiduciary responsibility and of the ancillary service providers, should be defined clearly both in the initial offering and all underlying documentation. Provisions should be documented for the replacement of servicers, bank account providers, derivatives counterparties and liquidity providers in the event of failure or non-performance or insolvency or other deterioration of creditworthiness of any such counterparty to the securitization.

To enhance transparency and visibility over all receipts, payments and ledger entries at all times, the performance reports to investors should distinguish and report the securitization's income and disbursements, such as scheduled principal, redemption principal, scheduled interest, prepaid principal, past due interest and fees and charges, delinquent, defaulted and restructured amounts under debt forgiveness and payment holidays, including accurate accounting for amounts attributable to principal and interest deficiency ledgers.

5.5 EU Securitization regulation

The European securitization markets did not suffer the same problems as the United States ones.[224] Nevertheless, issuing and investing in the EU markets slumped drastically. In the wake of the great financial crisis, central banks and many stakeholders agreed on the need to revive the EU securitization market. The European Commission therefore committed to the goal of reviving the securitization market in the EU on a safe and sustainable basis. In the 2014 investment plan for Europe, the Commission identified the creation of a flourishing market of high-quality securitizations as one of the five areas where immediate action was needed and included this action in the list of building blocks for a Capital Markets Union.

Following up on these policy commitments, in 2015 the Commission proposed a comprehensive legal framework consisting of a new Securitization Regulation and targeted changes to the prudential treatment of securitization.

The negotiations between the co-legislators - the European Parliament and the Council - concluded in 2017. Regulation (EU) 2402/2017[225] (the "Securitization Regulation") and Regulation (EU) 2017/2401, amending Regulation (EU) No 575/2013 on prudential requirements for credit institutions and investment firms, entered into application on 1 January 2019.

The Securitization Regulation builds on a number of provisions that were already in place and which had been partly amended in reaction to the crisis. These provisions, however, were scattered across a large number of sectoral legal acts that applied to different market entities, including: (1) the Capital Requirements Regulation (CRR) for banks;[226] (2) the Solvency II Directive for insurers; and (3) the Undertakings for the Collective Investment in Transferable Securities (UCITS) and Alternative Investment Fund Managers (AIFM) directives for asset managers. The Securitization Regulation creates a single and harmonized legal framework for the main parties involved in a securitization transaction. These are original lenders, originators, sponsors, securitization special purpose vehicles and institutional investors participating in the EU securitization market. In addition, the Securitization

[224] See Commission staff working document: "Impact assessment accompanying the document Proposal for a Regulation of the European Parliament and of the Council laying down common rules on securitization and creating a European framework for simple and transparent securitization and amending" in Directives 2009/65/EC, 2009/138/EC, 2011/61/EU and Regulations (EC) No 1060/2009 and (EU) No 648/2012 and "Proposal for a Regulation of the European Parliament and of the Council amending" in Regulation (EU) No 575/2013 on prudential requirements for credit institutions and investment firms, 30.9.2015 (SWD (2015)185 final).

[225] See **Regulation (EU) No 2402/2017 of the European Parliament and of the Council** (2017).

[226] See **Regulation (EU) No 575/2013 of the European Parliament and of the Council** (2013).

Regulation creates a specific framework for simple, transparent and standardized (STS) true-sale securitizations to improve the transparency and reduce the complexity of the market.

The importance of a well-functioning securitization market to provide sufficient credit to the real economy was once again underlined by the Capital Markets Recovery Package[227] to help the EU economy to recover from the COVID-19 pandemic. The package included amendments to the Securitization Regulation with the aim of expanding the scope of the STS regime to on-balance-sheet synthetic securitizations[228] and to remove certain regulatory impediments to the securitization of non-performing exposures. These amendments were adopted by the European Parliament and Council in March 2021.

More than three years after the entry into application of the new securitization framework, and as announced in the 2020 Capital Markets Union action plan[229], this report takes stock of the development of the market and discusses important aspects of the legal framework. This report fulfils the Commission's legal mandate under Article 46 of the Securitization Regulation to present a report to the European Parliament and to the Council on the functioning of the Securitization Regulation, accompanied, if appropriate, by a legislative proposal. It also fulfils the legal mandate under Article 45a (3) to report to the co-legislators on the creation of a specific sustainable securitization framework, building on the relevant European Banking Authority (EBA) report. This report also addresses the issues raised by the European supervisory authorities (ESAs) opinion of 25 March 2021 to the European Commission on the jurisdictional scope (the "Joint Committee opinion"), by providing legal interpretations of certain provisions of the Securitization Regulation. It also takes into account the recommendations made by a high-level forum on the Capital Markets Union, created by the Commission in 2019.[230]

5.5.1 Key STS Criteria

The STS Criteria are predictably split into three categories: simplicity, standardization and transparency. At the time of writing the EBA has released non-binding guidelines (STS Guidelines) which will apply from 15 May 2019 to assist national competent authorities and market participants with interpretation of the STS Criteria.

5.5.1.1 Simplicity

Underlying exposures must be transferred by means of true sale, assignment, or transfer with the same legal effect - no severe clawback provisions are allowed where the seller of underlying exposures becomes insolvent. The STS

[227] See https://ec.europa.eu/info/publications/200722-proposal-capital-markets-recovery_en

[228] In contrast to a true-sale securitization, in a synthetic securitization the underlying credit risk associated with a pool of loans is transferred by the use of credit derivatives or guarantees, and the exposures being securitized remain exposures of the originator.

[229] See Action 6 of the action plan: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:590:FIN

[230] See Final report of the high-level forum on the Capital Markets Union 'A new vision for Europe's capital markets' https://ec.europa.eu/info/files/200610-cmu-high-level-forum-final-report_en.

Guidelines require a legal opinion to be provided on this, a requirement which arguably goes beyond the Securitization Regulation text.[231]

Where assignment of the underlying exposures is to be perfected, specified perfection triggers must be in place, focusing on credit quality deterioration, insolvency of the seller and unremedied breaches by the seller.

Representations are required from the seller that the underlying exposures are not in a condition that would affect enforceability of the true sale analysis.

Active portfolio management of assets is not permitted subject to the STS Guidelines carve outs for substitution for breaches on underlying exposures, replenishment, repurchase for clean-ups or defaulted assets and ramp up.

Asset types in the pool must be homogenous. This is the subject of separate draft regulatory technical standards (RTS) and is discussed below.

The underlying exposures must be full recourse to debtors and have defined periodic payment streams.

Origination of assets must have been in the ordinary course of business, with underwriting standards no less stringent than those applied to that originator's non-securitized assets. Changes in underwriting standards after the closing of the securitization must be disclosed. The STS Guidelines clarify that the originator is not required to hold the similar non-securitized assets or to have originated them at the same time as the securitized exposures.

Defaulting assets and credit-impaired debtors cannot form part of the pool unless there is a guarantor (that is not also credit impaired) for the full securitized exposure amount. At least one payment must have been made on the asset by the debtor.

The structure of the securitization cannot depend predominantly on the sale of assets securing the underlying exposures.

5.5.1.2 Standardization

Interest rate and currency risk must be appropriately mitigated and there must be no derivatives in the underlying pool. The STS Guidelines specify that "a major share" of the interest rate and currency risks must be hedged.

On enforcement there can be no cash trapping (other than where favourable to investors), amortization must occur sequentially and there can be no automatic sale of assets at market value.

[231] See **Shiren, N./Collins, A.** (2019), pp. 1 - 2.

Where the priorities of payments allow for non-sequential payments, there must be triggers at specified pre-determined levels linked to the performance of the underlying exposures on which payments revert to sequential payments.

Early amortization or termination of revolving periods must occur where credit quality or the value of underlying exposures falls below a predetermined threshold, on the insolvency of the servicer, or, where the securitization is revolving, it is not possible to generate sufficient new underlying exposures.

The servicer must have expertise in servicing exposures of a similar nature, with policies, procedures and risk management controls in place that relate to servicing such exposures. The STS Guidelines require the documented policies, procedures and risk management controls of unregulated servicers to be substantiated by a third-party (such as a credit rating agency or external auditor) review, but the lack of clarity in this area may in practice restrict STS servicers to regulated entities.

Conflict resolution between classes of investors and voting rights must be clear and facilitate timely resolution of conflicts between classes. The STS Guidelines require provisions specifying a maximum time during which a meeting to resolve a conflict must take place.

5.5.1.3 Transparency

The originator and sponsor must provide historical default and loss performance data covering a period of at least five years in respect of substantially similar exposures to those being securitized before pricing. The STS Guidelines allow for the use of publicly available or third-party data if the seller is unable to provide data.

A sample of the underlying exposures and data is to be subject to external verification by an independent party.

The originator or sponsor must provide a liability cash flow model before pricing and ongoing after pricing.

5.5.2 Key Practical Implications

The most notable aspects of the EU Securitization Regulation 2019 are (1) credit-granting criteria; (2) risk retention; (3) transparency and (4) due diligence.

5.5.2.1 Credit-Granting Criteria

A securitizing entity: (1) will be required to apply the same credit-granting criteria to exposures that are to be securitized as it does to exposures that are not to be securitized, (2) must ensure that those criteria are “sound and

well-defined", and (3) have "effective systems in place to apply those criteria and processes to ensure that the credit-granting is based on a thorough assessment of the obligor's credit-worthiness".

If an originator purchases exposures of an original lender which were originated after 20 March 2014, with a view to securitizing them, the originator will also need to check that the original lender's credit-granting criteria complied with the above general requirements.

Securitization of self-certified mortgages originated after 20 March 2014 (when the Mortgage Credit Directive came into force) will be prohibited.

5.5.2.2 Risk Retention

The risk retention level will remain at 5%, and the five retention methods will not change.

The existing 'indirect approach' to ensuring compliance with the retention requirements remains (i.e., the obligation on institutional investors to check that the retention requirements have been met), while a new "direct approach" will also apply.

The new "direct approach" is a notable change, creating a direct obligation on originators, sponsors and original lenders to comply with the retention requirements, even if the investors are not established in the EU, and even if the investors are EU institutional investors who will also be required to verify compliance with the retention requirements.

If multiple entities could be subject to the direct obligation by virtue of being an originator, sponsor or original lender, they will need to agree the allocation of responsibility between themselves. In the absence of agreement, responsibility will rest with the originator.

The definition of "originator" has been tightened so that only an entity of substance can act as originator, to ensure that the retention requirements cannot be satisfied by using an SPV whose sole purpose is to securitize exposures.

The new Securitization Regulation also prohibits an originator from deliberately selecting assets for securitization on the basis that they are more likely to suffer losses than the assets that the originator will retain on its balance sheet for the same period.

5.5.2.3 Transparency

Creating new securitization positions after 1 January 2019 will trigger the application of the transparency requirements under the new Securitization Regulation.

Originators, sponsors and securitization special purpose entities (SSPEs) will be required to make detailed information available to holders of securitization positions, competent authorities and (upon request) potential investors.

The disclosure requirements are more onerous than those currently contained in the Capital Requirements Regulation, and are more aligned with what was envisaged by Article 8b of the Credit Rating Agencies Regulation.

The information to be disclosed must include loan level data, all transaction documents, the prospectus (or deal summary where there is no requirement for a prospectus), and investor reports (including retention details). There are additional disclosure requirements in respect of STS securitizations, which are covered in our briefing on the STS securitization framework.

Much of the above information must be provided before pricing. Loan level data and investor reports must be disclosed quarterly (or monthly for asset-backed commercial paper transactions).

Any inside information relating to the securitization that the originator, sponsor or SSPE is obliged to make public under the Market Abuse Regulation, and any material breach of the transaction documents (including details of any related remedy, waiver or consent) must be disclosed without delay, as must any material changes to the transaction documents.

The originator, sponsor and SSPE must agree between themselves who is responsible for meeting the disclosure obligations, and that party must disclose the information via a "securitization repository".

The European Securities and Markets Authority (ESMA) was mandated to develop Level 2 measures, setting out the finer detail of the information that must be disclosed. ESMA's Final Report, containing its final draft Level 2 measures on the detailed requirements for the disclosure of loan level data and investor reports, and setting out standardized disclosure templates, is here, and is currently with the Commission for approval.

In respect of private securitizations (i.e., a securitization in respect of which no prospectus is required) there is no requirement to disclose the above information via a securitization repository or website, but it must still be disclosed on a bilateral basis.

5.5.2.4 Due Diligence

The due diligence obligations of "institutional investors" (i.e., credit institutions, investment firms, insurers, reinsurers, alternative investment fund managers (AIFMs), pension funds, investment managers or authorized entities appointed by pension funds, UCITS management companies, and internally-managed UCITS) will all be contained

in the new Securitization Regulation. Many of these requirements are very similar to those that already apply to credit institutions, investment firms, insurers, reinsurers and AIFMs under sector-specific legislation.

Before holding a securitization position, an institutional investor must verify compliance by the originator/original lender with the credit-granting criteria referred to above where the originator/original lender is established in a third country, or is established in the EU but is not a credit institution or investment firm. There is no requirement on an institutional investor to verify matters relating to credit-granting where the originator/original lender is an EU credit institution or an EU investment firm.

An institutional investor must also check that the retention requirement has been met, that the retention has been disclosed, and that the originator, sponsor or SSPE (as applicable) has complied with the transparency requirements.

Prior to holding a securitization position, an institutional investor must carry out a due diligence assessment which enables it to assess the risks involved by considering, at a minimum, the risk profile of the securitization position and the underlying exposures, and the structural features of the securitization that could materially impact performance.

An institutional investor must also have written procedures in place to monitor compliance with its verification and due diligence obligations, and to monitor the performance of the securitization position and the underlying exposures.

While the due diligence obligations apply to EU-based regulated entities, an out-of-scope investor could still decide to diligence a securitization to ensure that the requirements of the EU securitization regime regarding credit-granting, retention and disclosure are being met.

Two years after the European Commission published its proposals to reform the EU securitization market[232], and following lengthy negotiations, provisional agreement was finally reached between the Commission, the EU Council and the European Parliament on 30 May 2017 on the proposed new Securitization Regulation, and related amendments to the Capital Requirements Regulation.

5.5.3 STS framework for synthetic securitization

STS framework for synthetic securitizations February 2022 saw reportedly the first credit risk-sharing transaction based on the new EU STS standard for synthetic securitization with PGGM (a pension fund administrator and asset manager) and Alecta entering into a Credit Risk Sharing (CRS) agreement with BNP Paribas with an €8

[232] See **Official Journal of the European Union** "Regulation (EU) 2017/2402", (2017), pp. 35 - 80.

billion loan portfolio as the underlying. Under the Securitization Regulation, synthetic securitizations were excluded from the STS framework and did not enjoy the favourable regulatory capital treatment extended to traditional securitization. To cater for the synthetic STS framework - "Requirements for simple, transparent and standardized on-balance-sheet securitizations" - has been inserted into the STS framework.[233] Technical reporting standards for synthetic securitizations have been submitted by ESMA to the European Commission for endorsement. Currently, entities are only voluntarily required to use STS synthetic notification templates for the purposes of reporting. The framework now affords synthetic securitizations (credit protection agreements) the same favourable regulatory conditions that have been provided to traditional securitization. The revised framework, however, prescribes additional requirements for such securitization agreements including risk retention ratios, the appointment of a third-party verification agent to carry out a review of certain aspects of the credit protection when a credit event is triggered, conditions on the use of synthetic excess spread and high-quality credit protection (collateral).

[233] See **European Parliament** (2021).

6. What have rating agencies learned?

Major credit rating agencies have been repeatedly criticized over the past two decades for failing to provide timely and accurate warnings to debt market participants about high-risk issuers or for underestimating the risks associated with loan securitizations. Some have argued that credit rating agencies lack sufficient incentives to monitor issuers because regulators have relied heavily on credit ratings since the mid-1970s (*Partnoy*, *1999*[234]*; Partnoy, 2010*[235]). Others have blamed the business model of issuer-paid agencies for facilitating economic attachment to issuers, and research has found that the issuer-paid model encourages optimistic ratings (e.g., *He, Qian, and Strahan*[236]; *Jiang*, *Stanford and Xie*[237]; *Xia and Strobl*[238]; *Bruno, Cornaggia, and Cornaggia*[239]; *Cornaggia and Cornaggia*[240]; *Xia*[241]; *Efing and Hau*[242]; *Baghai and Becker*[243]). The other view - held by CRAs - is that the need to maintain a good reputation outweighs the incentive issues raised by critics.

Using corporate issuers from 2003-2015, *Bonsall*, *Koharki, Kraft, Muller and Sikochi*[244] examined whether rating agencies use their discretion in reported ratings to become more defensive toward issuers with higher default risk. The analysis focused on two broad attributes of credit ratings: accuracy and relevance to investors. Rating agencies and academics have focused on these attributes when examining the overall quality of credit ratings. An empirical challenge in examining this research question was that both issuer credit risk and rating attributes may be a function of unobservable issuer characteristics that are correlated with rating agencies' reputational concerns. To address this empirical challenge and provide evidence that rating agency actions are strategic, they separately examined Moody's grid-based ratings, which are largely objective because they are based on general financial ratios and standard hard (quantitative) adjustments, and Moody's soft rating adjustments, which are largely subjective qualitative adjustments made by rating committees. This approach is similar to that used by *Griffin and Tang*[245] to examine the strategic use of rating adjustments to inflate CDO ratings to AAA in the pre-financial crisis period and to that used by *Kraft*[246] to examine the strategic use of Moody's soft rating adjustments for issuers with ratings-based performance pricing in credit agreements.

Further, the study examined whether the lessons learned about defensive behavior are more pronounced in the years following the 2008 global financial crisis and for issuers that receive greater media attention. The global financial crisis led to massive declines in MBS and CDO ratings. *deHaan*[247] provides evidence that the reputational

[234] See **Partnoy, F.** (1999), pp. 619 - 712.
[235] See **Partnoy, F.** (2010).
[236] See **He, J./Qian J./Strahan P.** (2012), pp. 2097 - 2137.
[237] See **Jiang, J.X./Stanford, M.H./Xie, Y.** (2012), pp. 607- 621.
[238] See **Xia, H./Strobl, G.** (2012).
[239] See **Bruno, V./Cornaggia, J./Cornaggia K.R.** (2016), pp. 1578 - 1597.
[240] See **Cornaggia, J./Cornaggia, K.**: (2013), pp. 2229 - 2259.
[241] See **Xia, H.** (2014), pp. 450 - 468.
[242] See **Efing, M./Hau, H.** (2015), pp. 46 - 60.
[243] See **Baghai, R./Becker, B.** (2020), pp. 425 - 444.
[244] See **Bonsall, S.B./Koharki, K./Kraft, P./Muller, K.A./Sikochi A.** (2022), pp. 2 - 6.
[245] See **Griffin, J. M./Tang, D.Y.** (2012), pp. 1293 - 1328.
[246] See **Kraft, P.** (2015), pp. 641 - 674.
[247] See **deHaan, E.** (2017), pp. 161- 189.

damage to CDO ratings caused by problems with MBS and CDO ratings spilled over to corporate ratings, leading CRAs to improve the quality of corporate ratings after the crisis. In addition, *Bonsall, Green and Muller*[248] find that CRAs assign more timely and accurate ratings to more visible issuers. CRAs have incentives to assign higher quality ratings to such issuers. First, issuers are more closely scrutinized by market participants, which may make inaccurate ratings more likely to be detected. Second, information about inaccurate ratings is quickly disseminated among market participants. Both can lead to reputational damage for a credit rating agency and a loss of future rating opportunities for new issues.

6.1 In terms of rating accuracy

In terms of accuracy, the research found that the rate of Type I errors (i.e., missed defaults) is lower for issuers with higher pre-default credit risk, with results attributable to soft rating adjustments. In addition, it was possible to find that the rate of Type II errors (i.e., incorrect default predictions) is lower for issuers with higher default risk, again due to subjective soft rating adjustments. Using Moody's Default and Recovery Database (DRD), it was also found that the ability of soft rating adjustments to predict default one and three years in advance increases for issuers with higher default risk. In addition, the study disclosed that soft rating adjustments are better at predicting repayment losses for issuers with higher pre-default credit risk. This evidence is important because determining the redemption rate requires a comprehensive assessment of the interplay of capital structure, creditor rights, jurisdiction, state law, and other factors in determining liquidation payouts. In all of these analyses, it can be said that the results are more pronounced in the years following the financial crisis and for issuers that receive more media coverage. Overall, these results provide evidence that the major rating agencies are using their discretion in the rating process to defensively assign more accurate ratings to issuers with higher credit risk.

6.2 In terms of rating relevance for Investors

In terms of relevance to investors, the study finds that soft rating adjustments better explain issue returns when issuers' expected default risk is higher. In addition, the stock market response to rating downgrades was found to be increasingly stronger for downgrades based solely on soft rating adjustments as default risk increases. This result suggests that soft rating adjustments reveal private information and do not simply reflect public information that is already known to financial markets. No comparable evidence was found for rating upgrades, which is consistent with previous research that upgrades tend to provide less information to financial markets (e.g., *Holthausen and Leftwich*[249]). In addition, the study finds that the market reaction to downgrades is more pronounced in the period following the downgrade. Financial crisis and for more broadly covered issuers. The final set of tests examines an important channel through which CRAs can achieve more accurate and relevant ratings - the strategic assignment of better credit analysts. Consistent with this possibility, better-trained analysts (i.e., analysts with a

[248] See **Bonsall, S.B./Green, J./Muller, K.A.** (2018), pp. 61 - 94.
[249] See **Holthausen, R./Leftwich, R.** (1986), pp. 57 - 89.

Master of Business Administration (MBA), particularly from a top MBA program) were found to be more likely to be assigned to issuers with higher expected default risk. In addition, the study revealed that analysts who are older, have longer tenure in the industry and at the CRA, and cover a greater number of issuers are more likely to be assigned to issuers with higher expected default risk.

6.3 Further insights into rating practice

First, the study provided evidence that CRAs use the economic incentives modeled by *Bolton, Freixas and Shapiro's*[250] to rate issuers with higher expected default risk more conservatively. These incentives lead to important improvements in ratings, including more accurate and relevant ratings, as CRAs reveal more of their private information. In addition, the observed improvement in rating quality prior to issuer default suggests that these infrequent events provide agencies with strong incentives to assign higher quality ratings (i.e., issuer default is closely monitored by various market participants, including investors, competitors, regulators, and the media). Consistent with discretionary improvements, the changes were found to be driven by subjective soft rating adjustments rather than grid-based ratings, and the results obtained were more pronounced in the post-financial crisis period, when CRAs are trying to restore their damaged reputations, and for issuers with greater attention, which pose greater reputational risk to CRAs. These results provide the first evidence for *Bolton et al.* hypothesis that the costs associated with a rating default-which can typically only be assessed when the issuer defaults, as CRAs have private information at other times can lead to higher quality ratings when CRAs are more likely to "get caught." The reputational damage that occurs when a CRA is caught may lead to less investor use of CRA services, as predicted by *Bolton et al.*, less reliance on ratings by regulators, and greater oversight and possible legal liability by regulators. Taken together, these findings suggest that the looming costs of detecting rating errors may mitigate some of the opportunistic incentives created by the issuer compensation model.

From a regulatory perspective, the evidence suggests that broad-based regulations such as those established by the Credit Rating Agency Reform Act of 2006 and the Dodd-Frank Wall Street and Consumer Protection Act of 2010 should take into account the tendency of credit rating agencies to become more defensive toward issuers with higher expected default risk.

Second, the study provides evidence that contributes to the growing literature on how rating agencies strategically assign ratings across rating levels. Related research has focused exclusively on showing that ratings are opportunistically assigned higher at key rating thresholds to support issuers. to accommodate issuers. In one important area, several studies show evidence of strategic behavior at the investment grade threshold. For example, *Beaver et al.*[251] find that Moody's, a SEC-certified rating agency, is more reluctant to downgrade clients below investment grade than Egan-Jones, a non-SEC-certified rating agency, which is related to Moody's being more cautious in contracting due to the use of its ratings. In addition, *Jiang et al.* provide evidence that the initial introduction of the issuer-

[250] See **Bolton, P./Freixas, X./Shapiro, J.** (2012), pp. 85 - 111.
[251] See **Beaver, W./Shakespeare, C./Soliman, M.** (2006), pp. 303 - 334.

pays model in the 1970s led to the assignment of more favorable ratings, especially for investmentgrade clients. In contrast, *Bonsall* provides evidence that credit ratings became more timely, accurate, and informative after the switch to the issuer-pays model, raising the possibility that the more favorable ratings are due to more favorable private information about future performance rather than client catering. Recent studies provide further evidence of catering to the investmentgrade threshold (e.g., *Kedia, Rajgopal, and Zhou*[252]). In another important threshold setting, previous research shows that ratings are used to cater to customers when they are near the AAA threshold for CDOs. *Griffin and Tang* find that rating agencies lowered their standards just before the financial crisis to accommodate clients by making positive rating adjustments, which led to a greater number of AAA CDO tranches for clients. The results obtained add to these earlier findings by showing that behavior consistent with the incentives of the issuer-pays model is most pronounced in areas Incentives, CRAs assign ratings at different CRAs assign ratings at different rating levels not to accommodate client interests but to behave defensively to limit potential reputational and economic damage when rating issuers that matter most to investors and regulators.

Third, the study adds to the accounting literature that examines how credit agencies use soft rating adjustments. *Kraft* finds that soft rating adjustments are an important component of ratings and are associated with credit spreads, which increases the relevance of ratings to users. *Kraft* provides evidence that higher soft adjustments are used to support issuers with performance-based pricing clauses, with muted support for issuers near the investment grade threshold and rated by Fitch. The inferences obtained go beyond the results observed by *Kraft* for the investment grade threshold, as the investment grade threshold is not necessarily generalizable to other rating levels. Moreover, the predictions of *Bolton et al. (2012)* cannot be unambiguously tested using the investment-grade results because few investment-grade issuers actually default and the incentives of the issuer compensation model dominate CRA behavior.

Finally, the results obtained by *Bonsall et al. (2022)* contribute to the findings to recent research on ongoing monitoring by credit rating agencies. *Bonsall, Koharki, and Neamtiu*[253] find that CRAs conduct lax post-issuance monitoring of obligors as the attention of various stakeholders involved before and during a bond issuance (e.g., underwriters, regulators, and legal representatives) wanes over time. The results suggest that soft rating adjustments made by rating agencies for higher-risk issuers result in ratings that are more relevant and reveal more private information from rating agencies, suggesting continued monitoring and increased information production.

[252] See **Kedia, S./Rajgopal, S./Zhou, X.A.** (2017), pp. 632 - 653.
[253] See **Bonsall, S./Koharki, K./Neamtiu, M.** (2015), pp. 1779 - 1810.

7. How did the securitization markets evolve before and after the financial crisis?

7.1 The Early Stage of the securitization market

In the early 1930s, the U.S. government set itself the political goal of promoting private housing construction, which was still relatively limited at the time. In this way, housing was to be made accessible to more strata of society (*Bertl*[254]). For that goal, several institutional actors were initiated. Furthermore, a secondary market for mortgages was established and, as part of the reforms, the government also influenced the structuring of the mortgage agreements. Instead of a term of up to 5 years, high prepayments, final maturity and a variable interest rate, the mortgages now amortized steadily in a term of up to 30 years with fixed interest rates (*McConnell and Buser*[255]). This set of policies was supposed to be successful. Since the 1940s, the result was a rapid growth of mortgages and private residential buildings. In 1965, the private home ownership rate had grown to 63.4%.

Facing problems in the mortgage market since the 1960, the U.S. government introduced numerous reforms and restructuring measures. Thus, Fannie Mae, among others, was privatized in 1968. Furthermore, in the same course, the state-owned Government National Mortgage Association (GNMA), also known as Ginnie Mae, was demerged from Fannie Mae. In 1970, the Federal Home Loan Mortgage Corporation (FHLMC), publicly known as Freddie Mac, was founded likewise as a private institution following the same concept operated by Fannie Mae.

In 1968, Ginnie Mae assisted the first “pass-through” securitization, as it provided a guarantee to a transaction of privately issued MBS. To create a pass-through MBS, numerous mortgages were pooled and fractional claims were issued, whereas the payment of these assets then was transferred pro rata to the securities. Consequently, all securities were equally affected by payment defaults. In 1983, Freddie Mac issued the first structured securitization called collateralized mortgage obligation (CMO). In contrast to a simple pass-through security, the payments of a pool of mortgages were divided into distinct tranches differing in priority, risk and interest. This modification made securitizations increasingly more attractive to investors.

By the late 1970s, private players had already extended securitization techniques to nonconforming mortgages. By the early 1980s, the prevailing "originate-to-hold" banking model became unviable as the Federal Reserve changed its monetary policy (Gorton and Metrick). As a result of this development, and in conjunction with legal changes in the structure and design of SPVs, banks began to securitize and distribute loans. The originate-to-distribute model had emerged, for which the Basel regulations provided further incentives (*Pozsar*[256]). In consequence private-label MBS began to succeed in the mid-1980.

[254] See **Bertl, A.** (2004), p. 24.
[255] See **McConnell, J.J./Buser, S.A.** (2007), p. 7.
[256] See **Poszar, Z.** (2008), pp. 13 - 26.

7.2 CDO was born

As a result of the dynamic development of the securitization market, a new form of structured financial products has emerged. These were the CDO's (collateralized debt obligations, see chapter 2.1.3.1*)*. First issued in 1987, CDOs remained relatively insignificant for the first 15 years and mainly contained underlying assets with reasonably predictable income streams.

It was not until 2003-2004, when the U.S. experienced its housing boom, that CDO issuers began to use subprime mortgages as underlying assets. This approach caused the popularity of CDOs to skyrocket. Between 2003 and 2006, CDO sales increased from $30 billion to $225 billion.

In 2006, the U.S. housing market began to contract. The housing bubble had led to inflation, which prompted the Federal Reserve to raise interest rates to correct it. As a result, many subprime mortgage holders were unable to make their mortgage payments and began defaulting on their mortgages. Mortgage lenders subsequently sold these homes, but in a declining housing market. As an outcome, demand for CDOs began to decline.

When the rating agencies began to downgrade them, many market participants were forced to sell their holdings. Either because risk limits had been reached, risk budgets had been used up, or minimum ratings were no longer given. A large volume of sales matched little demand, and the CDO market collapsed. CDOs quickly became one of the worst performing financial instruments.

After the crash, the market for CDOs virtually disappeared. In 2006 and 2007, about $386 billion worth of CDOs were issued. By the end of 2007 and through 2008, those numbers plummeted, and the market evaporated almost entirely.

Most institutions involved in the CDO market took significant losses when the crisis hit. According to The Intercept, Merrill Lynch posted $2.2 billion in losses in the third quarter of 2007. Citigroup, which has returned to investing in CDOs in recent years, reported $6.5 billion in losses. Goldman Sachs, one of the most prominent CDO peddlers in the pre-crisis years, realized its tenuous position before disaster struck and took out more than $13 billion in short positions on the real estate market, even as they continued offloading the CDOs on their own balance sheet. These losses threatened to destabilize the entire economy. If the largest institutions collapsed – the theory went – a domino effect would likely follow and exacerbate the entire crisis.

In consequence the U.S. government injected trillions of dollars into the economy in an attempt to stabilize the banking system. Interest rates were pushed down to 0 – 0.25% and they stayed on this level till 2015. Banks paid billions in fines and penalties, in fact, the six largest banks altogether paid at least $110 billion in penalties (*Podkul et al.* [257]). Banks and other depository institutions were ordered to decrease their indebtedness and they did: in

[257] See **Podkul, C./Gianordoli, G./Kuronen, J./Paige, T./Santilli, P./Sender, H.** (2017).

2008 financial sector's outstanding debt was $18 trillion, while already the next year outstanding debt decreased by 8%. In 2015 it totalled $15.2 trillion (which is 15.5% decrease compared to 2008). An average number of financial sector's outstanding debt for 3 quarters of 2017 was $15.7 trillion. As *Gross*[258] noticed, giant unleveraged banks don't exist anymore: Lehman Brothers collapsed, Bear Stearns got acquired by JP Morgan Chase, Morgan Stanley and Goldman Sachs went from investment banking into commercial banking and Merrill Lynch merged with Bank of America. Moreover, Basel III regulatory framework is being gradually implemented. Among other things, main changes also included a 4.5% common equity requirement (instead of 2%; implemented in 2015), a 6% Tier 1 capital ratio (instead of 4%; valid from January 2015) and introduction of a 3% leverage ratio and additional liquidity requirements (*Moody's Analytics*[259]). The full Basel III framework was supposed to be fully implemented by 2019 (*Basel Committee on Banking Supervision*[260]).

Despite the introduction of several regulatory measures on the securitization market 2010 and 2011, public attention was once again focused on securitization assets after the large trading loss sustained by J. P. Morgan. On May 10, 2012, Jamie Dimon, J.P. Morgan Chase CEO, announced the loss of $2 billion, due to the bank's bet on the strength of the market and, by 2014, the trade had cost the bank $6 billion. Some acknowledge the London Whale (1) case as the result of ineffective risk management, reigniting the controversies about the misuse of securitization assets and the need for even stricter regulations.

Among other problems banking sector was facing there is one worth mentioning again: bonuses and rewards of top banking executives, traders and CEOs. On many occasions they overlooked their customers goals and chased only their own in order to land such bonuses. Their compensations totalled millions yearly and were far too high for ordinary taxpayers. Did the situation change after the global financial crisis (GFC)? Both yes and no. According to Dodd-Frank, banks had to come up with new compensations systems that included deferred bonus payments instead of immediate cash bonuses, but all negotiations in this regard halted after Donald Trump became President of the United States in 2017 (*Hamilton and Dexheimer*[261]). Some banks even implemented so-called clawback provisions, according to which some of the bonuses have to be returned in case of big losses or violation of risk guidelines (*Cassidy*[262]). In other words, banks included stocks and stock options in their compensation plans in order to tone down society's disapproval, but laws remained the same so far. Not only big bonuses did not cease to exist, top bankers also did not carry any responsibility for almost failing the whole economy. "The largest man-made economic catastrophe since Depression resulted in the jailing of a single investment banker" (*Eisinger*[263]). Mr Seragelding, a Credit Suisse executive, who was sentenced to 30 months in prison "in connection with a scheme to hide more than $100 million in losses in a mortgage-backed securities trading book" (*U.S. Department of*

[258] See **Gross, D.** (2017).
[259] See **Moody's Analytics** (2013).
[260] See **Basel Committee on Banking Supervision** (2015).
[261] See **Hamilton, J./Dexheimer, E**. (2016).
[262] See **Cassidy, J.** (2013).
[263] See **Eisinger, J.** (2014).

Justice[264]). Many more individuals committed same or even worse financial crimes during the financial turmoil of 2007 – 2008, but why they were not prosecuted – it is a question for the American government.

During the financial crisis it was to see how an uncontrollably big financial institution can influence the whole economy, but consolidation trend became even stronger after the crisis. Many institutions failed, many merged into even bigger conglomerates. According to *FDIC*, the number of commercial banks decreased dramatically from 7,279 in 2008 to 4,918 in 2017, that is a 32% drop. Number of failed institutions declined as well since the financial crisis – 140 in 2009, 157 in 2010, while only 8 in 2017.

As for credit rating institutions, despite higher transparency requirements implemented by Dodd-Frank, nothing else has changed. CRAs still assign ratings to financial institutions and financial institutions still pay for them, hence the conflict of interest is still present. The Big Three still dominate the market: according to the Wall Street Journal (*Podkul et al.*), Moody's Investors Service, S&P Global Ratings and Fitch Ratings earned 94% of total revenues in the credit rating industry in 2016. In 2022 the Big Three control more than 90 percent of the European ratings market, which has an annual fee volume of €1.4 billion.[265] "One reason, market participants say, is that many investors remain wedded to the idea that a rating from the big three is an assurance of quality" (*Ramakrishnan and Scipio*[266]).

Mortgage debt was falling constantly after the crisis. In third quarter of 2012, for example, it totaled $8,03 trillion (*Federal Reserve Bank of New York*[267]), the same time in 2013 it decreased even further to $7.9 trillion (*Federal Reserve Bank of New York*[268]). In subsequent years, however, they began to rise again. By the end of 2017, they stood at $8.88 trillion (Federal Reserve Bank of New York), exceeding financial crisis levels for the first time in 9 years. Other household debt such as student loans, auto loans, and credit card debt also increased, and some say (*Davidson*[269]) that ever-increasing household debt is a cause for concern and may even lead to future bubbles.

7.3 CLO overtake CDO

In contrast to the CDO market, which declined sharply from 2009 to 2017, a similar class of securitization has seen strong growth in recent years. Gross issuance of Collateralized loan obligations (CLOs) in the end of 2011 in the U.S. reached $12 billion. Then years later, 2021, the CLO issuance totaled $184.4 billion. This represents an increase by a factor of 15.[270]

[264] See **U.S. Department of Justice** (2013).
[265] See **FAZ** (2022).
[266] See **Ramakrishnan, S./Scipio, P.** (2016).
[267] See **FED** (2012).
[268] See **FED**,(2013).
[269] See **Davidson, P.** (2017).
[270] See **Deutsche Bank** (2022).

2023, global CLOs are a $910 billion asset class within the broader $12 trillion structured fixed income market, with continued high growth rates. By contrast, the global CDO market is downright small. It was worth $23.32 billion in 2022. The global COVID-19 pandemic has been unprecedented and staggering, with collateralized debt obligation experiencing lower-than-anticipated demand across all regions compared to pre-pandemic levels. According to a study from Business Research Insights[271], the CDO market is expected to reach $39.67 billion in 2028.

7.3.1 The reason for the strong CLO growth

The last few years have been challenging for fixed income investors. At first, interest rates were below historical averages, creating a challenging search for yield. Then the environment changed dramatically in 2022, as the Federal Reserve implemented a series of interest rate hikes causing bond prices to fall sharply. Amid this volatility, a growing number of investors broadened their bond horizons and added floating rate debt to their portfolios to enhance the diversification of their fixed income holdings.

Unlike most traditional fixed income investments, floating-rate securities pay a yield that rises and falls with a benchmark interest rate, such as SOFR (Secured Overnight Financing Rate). Because the coupon "floats" over the prevailing interest rate, the prices of floating-rate bonds are less sensitive to changes in the prevailing interest rate.

While floating rate debt has existed for decades, its availability is limited in the U.S., and the choices for high-quality (rated A or above) securities are even more scarce. For many years, investors seeking floating-rate exposure favored the leveraged loan market, however, because this is a sub-investment grade market, the benefits of floating rate exposure are gained at the expense of lower credit quality. Given this tradeoff and the growing economic uncertainty, investors are increasingly turning to another type of floating rate debt - CLOs, as approximately 80% of CLOs carry a credit rating from A to AAA.

For nearly three decades, CLOs were largely only accessible to institutional investors, however, in 2020 the first CLO Exchange Traded Fund (ETF) launched, providing every investor with access to the benefits of this asset class. Due to this im-proved accessibility and a yield premium over other corporate credit instruments, the global CLO market has grown to over $1 trillion in size.

7.3.2 Difference between CLO and CDO

The rapid growth of leveraged finance and CLOs has parallels with developments in the U.S. subprime mortgage market and CDOs during the run-up to the GFC. But there are significant differences between the CLO market today and the CDO market prior to the GFC: CLOs are less complex, avoiding the use of credit default swaps (CDS) and resecuritizations; they are little used as collateral in repo transactions; and they are less commonly

[271] See **Business Research Insights** (2022).

funded by short-term borrowing than was the case for CDOs. In addition, there is better information about the direct exposures of banks. That said, there are also similarities between the CLO market today and the CDO market then, including some that could give rise to financial distress. These include the deteriorating credit quality of CLOs underlying assets; the opacity of indirect exposures; the high concentration of banks' direct holdings; and the uncertain resilience of senior tranches, which depend crucially on the correlation of losses among underlying loans.[272]

CDOs and CLOs are asset-backed securities (ABS) that invest in pools of illiquid assets and convert them into marketable securities. They are structured in tranches, which have different priorities in terms of the cash flows from the underlying assets. The most junior or so-called equity tranche is often unrated and earns the highest yields, but is the first to absorb credit losses. The most senior tranche, which is often rated AAA, receives the lowest yields but is the last to absorb losses. In between are mezzanine tranches, usually rated from BB to AA, which start to absorb credit losses once the equity tranche is wiped out. The larger the share of junior tranches in the capital structure of the pool, the more protected the senior tranche (for a given level of portfolio credit risk).

CLOs are backed by simpler, more diversified pools of collateral than CDOs. CDOs issued in the run-up to the GFC consisted mainly of subprime MBS, and CDOs backed by other CDOs (so called CDO squared) were common. In 2006, almost 70% of the collateral of newly issued CDOs corresponded to subprime MBS, and a further 15% was backed by other CDOs. Furthermore, more than 40% of the collateral gathered by the CDOs issued that year was not cash MBS, but CDS written on such securities. When conditions in the housing market turned, the complexity and opacity of CDOs amplified financial stress. In contrast, CLOs are much less complex. Their collateral is diversified across firms and sectors, and the known incidence of synthetic collateral or resecuritizations is minimal.

Senior CLO tranches currently appear to benefit from larger loss-absorbing cushions than existed for CDOs. Equity and, in particular, mezzanine tranches make up larger shares of the capital structure of CLOs than they did for pre-crisis subprime CDOs. However, the actual protection afforded to senior tranches depends crucially on their sensitivity to default risk and, importantly, loss correlation risk.

Default risk and losses-given-default depend on the quality of the underlying assets. For both CDOs and CLOs, strong investor demand led to a deterioration in underwriting standards. For example, U.S. subprime mortgages without full documentation of borrowers' income increased from about 28% in 2001 to more than 50% in 2006. Likewise, leveraged loans without maintenance covenants increased from 20% in 2012 to 80% in 2018. In recent years, the share of low-rated (B-) leveraged loans in CLOs has nearly doubled to 18%, and the debt-to-earnings ratio of leveraged borrowers has risen steadily. Weak underwriting standards reduce the likelihood of defaults in the short run but increase the potential credit losses when a default eventually occurs.

[272] See **BIS** (2019), pp. 11 - 12.

For CDOs, losses were exacerbated by the sensitivity of the structures to correlation risk. The underlying collateral was poorly diversified, disproportionally consisting of low-rated tranches of subprime MBS (BBB and lower). Such strong demand for low-rated MBS led to a growing reliance on synthetic exposures through CDS and rescuritization through CDO-squared vehicles, as discussed above. As a result, a large share of CDO payoffs were driven by a relatively small outstanding supply of low-quality securities. When housing prices fell and defaults on subprime mortgages mounted, returns on CDO mezzanine and senior tranches proved to be more highly correlated with the losses on equity tranches than many investors had expected.

Uncertainty about loss correlations is less acute for CLOs, yet remains a risk. Given the relative simplicity of these vehicles and the long history of defaults on high-yield corporate debt, loss correlations for leveraged loans (and thus CLOs) can in principle be estimated with more confidence than for subprime mortgages. However, the unusually high share of deals with low investor protection could materially affect the timing and clustering of defaults, compromising the reliability of these estimations.

When CDOs experienced losses, the eventual distress was worsened by opacity about banks' total exposures. Pre-crisis, banks retained mostly senior exposures, either directly or through SIVs, off-balance sheet entities where banks collected exposure to CDOs, and other securitized products. Sometimes, as investor demand for CDO mezzanine tranches swelled, banks ended up holding the senior tranches for which there was less demand. In other cases, banks became exposed to subprime BBB risk, as they "warehoused" the securities while the portfolio of MBS tranches was gathered by CDO managers. The SIVs, purportedly separate from their sponsoring banks, engaged in maturity transformation by funding themselves mainly in the short-term wholesale markets, making themselves susceptible to liquidity runs. Banks' indirect exposure through SIVs was underestimated by investors at the time, and banks' total exposure to CDOs before the GFC was hard to gauge accurately.

Currently, banks' exposure to CLOs is less opaque. Banks still hold mostly AAA tranches (Graph B, fourth panel), but these are recognized on their balance sheets and there is no indirect exposure through SIVs. That said, banks may have other indirect exposures. Moreover, among banks the concentration of CLO holdings is high. U.S. and Japanese banks are among the largest investors. Relatively few institutions account for the majority of banks holdings, and in some cases holdings are large relative to capital.

7.3.3 The benefits of CLO

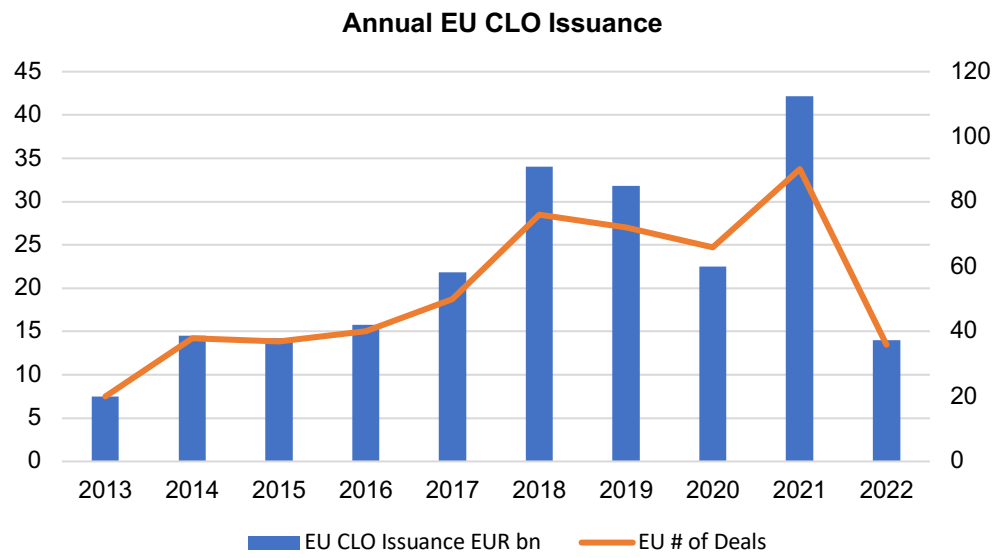
Thanks to continuous improvements, CLOs now offer investors several advantages. They can offer higher long-term returns than other types of corporate bonds, on a relative risk basis. The risk-return ratio is particularly favorable because the higher tranches in the CLO capital stack are typically overcollateralized and now have both more stringent collateral eligibility requirements and a higher degree of subordination. Higher subordination provides credit enhancement to senior debt tranche holders, for example, by diverting cash from debt tranches and equity. Active management of CLOs allows trades to be entered into to protect the portfolio from losses or to enhance

returns. A CLOs ultimate returns to investors therefore depend on the skill of the CLO manager at each stage of the lifecycle, from structuring, analyzing, and selecting loans to actively managing the portfolio. Recent CLO issues have received structural enhancements that allow for the benefits of active management while providing protections such as shorter notice periods and shorter reinvestment periods. These structural protections have attracted new investors to the asset class, while regulatory protections have pushed old investor categories out of the asset class. The result is that the "hot money" that invested in CLOs before the financial crisis has disappeared and been replaced by the return of strong and stable investors with longer-term horizons, such as pension funds, insurance companies, private equity houses, and family offices.

7.4 Russia's invasion stopped the record run of the European securitization market

2021 was a record year for European CLO issuance, with new issue volume of €38.6 billion and total reset volume of €42.2 billion, including the full equity tranche. The momentum was carried into 2022. European securitization markets achieved the strongest first quarter in terms of issuance since the global financial crisis. One reason for this optimism was the expansion of the triple-A investor base. Issuance momentum was short-lived, however, due to the Russian invasion of Ukraine and ongoing concerns about rising inflation and monetary tightening. Total securitization issuance in Q2 2022 was €37.4 billion, down about 44% from Q1 2022 and 1.9% from Q2 2021, while full-year 2022 new CLO issuance totaled €26.2 billion from 67 CLOs.[273] One area of particular focus in 2022 was ESG. Here, we saw the market move from negative screening of collateral (now standard in CLO eligibility criteria) to positive screening or scoring based on ESG considerations.

Figure 16: European CLO issuance, annual volume and number of deals



Source: Deutsche Bank Research (2022)

[273] See **Partners Group** (2023).

8. Conclusion

The 2007 financial crisis resulted from a moderate shock to the housing and mortgage markets, which was magnified by the uses of subprime mortgages in a variety of securitizations (ABS, MBS, CDOs, and ABCP), which produced a collapse of confidence in the architecture of securitization and led to a sudden need to reallocate and reduce risk in the financial system.

At the beginning of the subprime boom there was a long period with too low levels of interest rates supported by global excess liquidity. In this period, investors were on the lookout for search for yield and accepted higher risks in the process. The cheap money and the housing boom encouraged banks to engage in more risky lending practices. The lending base now widened to include subprime borrowers and the lending tactic became more aggressive by offering so-called "teaser rates" or option ARMs. Higher volumes of lending activities were supported by complex securitization of mortgages. The investment banks realized that other assets besides mortgages could also be securitized. In 2007, the newest collateral in first-level securitization was in carbon emission allowances, infrastructure loan, and nonperforming loans. This possibility created a huge expansion in all forms of customer credit markets. This meant that nearly everyone that wanted to borrow money for nearly everything found a willing creditor to loan them money. These creditors frequently acted as loan originators did in the mortgage markets. They would create debt and then sell off the rights to the cash flow to investment banks who would package the debt into CDOs. Besides the CDO boom, another sort of secondary market also grew up: the CDS market. The CDSs helped to shift risks from those who hold highly concentrated portfolios to those who benefit from taking on additional exposure. In the case of Enron, Swissair and Argentina CDSs helped to ease the strains put on the financial system. Another key trigger was the introduction of a new regime for supervising all banks, the Basel II regime, which significantly boosted the attractiveness to banks of lending money secured on residential property. That led also to a rise in loan to subprime borrowers, which were then packaged securities and sold to institutions. A decline in house prices in the United States, the impact of the earlier rise in the United States interest rates, large-scale on subsequent participating manufacturers, and a sharp decline in the prices outstanding complex structured products due to higher interest rate led to the bursting of the subprime bubble. The following financial crisis highlighted many of factors that have contributed to wrong securitization, from too-complex securitized products, a lack of due diligence by loan originators, information asymmetries, moral hazard, lax lending standards and screening and failure of regulators to understand the implication of the changing environment for the securitization.

In response to the concerns raised by the financial crisis, the financial regulators and standard-setters have implemented a number of initiatives intended to re-establish securitization on a sustainable basis.

The enactment of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 was the largest regulatory overhaul of financial markets since the Glass-Steagall Act nearly eight decades earlier. The act not only phased out the riskiest securitization assets, but also forbade banks from using customer deposits to invest in derivatives, including swaps, enhancing the separation of proprietary trading from commercial banking activities. Also, it required the Commodity Futures Trading Commission to regulate swaps, setting up a clearinghouse to

trade and price this type of derivatives. Furthermore, in 2010, during the November Seoul Summit, leaders of the G-20 countries agreed on new bank capital and liquidity regulations (Basel III), proposed by the Basel Committee on Banking (BCBS). These new rules addressed some loopholes that had been exploited by banks, through securitized assets. In addition, the BCBS and the International Organization of Securities Commissions has issued 2015 criteria for identifying simple, transparent and comparable (STC) securitizations. The purpose of these criteria is not to serve as a substitute for investors due diligence but rather to identify and assist in the financial industry's development of simple and transparent securitization structures. Also, the EU Securitization Regulation introduced in 2019 significantly reformed the EU securitization market with a framework for "simple, transparent and standardized" (STS) securitizations.

Excessive bond ratings were one of the causes of the financial crisis. Using corporate issuers from 2003-2015, *Bonsall*, *Koharki, Kraft, Muller and Sikochi* examined whether rating agencies use their discretion in reported ratings to become more defensive toward issuers with higher default risk. The analysis focused on several attributes of credit ratings. In terms of accuracy, the research found that the rate of Type I errors (i.e., missed defaults) is lower for issuers with higher pre-default credit risk, with results attributable to soft rating adjustments. In addition, it was possible to find that the rate of Type II errors (i.e., incorrect default predictions) is lower for issuers with higher de-fault risk, again due to subjective soft rating adjustments. Using Moody's Default and Recovery Database (DRD), it was also found that the ability of soft rating adjustments to predict default one and three years in advance increases for issuers with higher default risk. In addition, the study disclosed that soft rating adjustments are better at predicting repayment losses for issuers with higher pre-default credit risk. This evidence is important because determining the redemption rate requires a comprehensive assessment of the interplay of capital structure, creditor rights, jurisdiction, state law, and other factors in determining liquidation payouts. The study provided also evidence that CRAs use the economic incentives modeled by *Bolton, Freixas and Shapiro's* to rate issuers with higher expected default risk more conservatively. These incentives lead to important improvements in ratings, including more accurate and relevant ratings, as CRAs reveal more of their private information. In summary the reforms that rating agencies have undertaken since 2008 - increased transparency in the development of rating models and the conduct of ratings, partitions between analytical and commercial activities, increased compliance and internal controls - have brought improvement.

In contrast to the CDO market, which declined sharply from 2009 to 2017, a similar class of securitization has seen strong growth in recent years. Gross issuance of CLOs in the end of 2011 in the U.S. reached $12 billion. Then years later, 2021, the CLO issuance totaled $184.4 billion. This represents an increase by a factor of 15.

2023, global CLOs are a $910 billion asset class within the broader $12 trillion structured fixed income market, with continued high growth rates. By contrast, the global CDO market is downright small. It was worth $23.3 billion in 2022. The global COVID-19 pandemic has been unprecedented and staggering, with collateralized debt obligation experiencing lower-than-anticipated demand across all regions compared to pre-pandemic levels. According to a study from Business Research Insights, the CDO market is expected to reach $39.7 billion in 2028.

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