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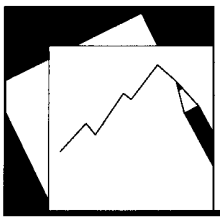

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Securitization: Lessons Learned and the Road Ahead

Miguel Segoviano, Bradley Jones, Peter Lindner, and Johannes Blankenheim

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Securitization: Lessons Learned and the Road Ahead

Prepared by Miguel Segoviano, Bradley Jones, Peter Lindner, and Johannes Blankenheim[1]

Authorized for distribution by Luc Everaert

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Abstract

This paper examines the financial stability implications arising from securitization markets, with one eye on the past and another on the future. The paper begins by deriving a number of "lessons learned" based on an examination of key industry developments in the years before the crisis. Emphasis is placed on the various ways in which securitization markets dramatically changed shape in the years preceding the crisis, vis-à-vis their earlier (simpler) incarnation. Current impediments to securitization markets are then discussed, including a treatment of various regulatory initiatives, the operational infrastructure of securitization markets, and related official sector intervention. Finally, a broad suite of policy recommendations is presented to address the factors that either contributed to the crisis or may currently be posing obstacles to growth-supportive, sustainable securitization markets. These proposals are guided by the objective of preserving the beneficial features of securitization, while mitigating those that pose a potential risk to financial stability.

JEL Classification Numbers: G2, G21, G23, G24, G28

Keywords: Finance; Financial Crisis; Intermediation; Bank, Mortgages, and Foreclosures; Financial Instruments; Institutional Investors; Investment Banking; Rating; Rating Agencies; Regulation.

Authors' e-mail addresses: msegoviano@imf.org; bjones@imf.org; plindner@imf.org; and jblankenheim@imf.org.

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EXECUTIVE SUMMARY

Like most forms of financial innovation, there are cost and benefits associated with the securitization of cash flows. From a conceptual perspective, a sound and efficient market for securitization can be supportive of the financial system and broader economy in various ways such as lowering funding costs and improving the capital utilization of financial institutions—benefits which may be passed onto borrowers; helping issuers and investors diversify risk; and transforming pools of illiquid assets into tradable securities, thus stimulating the flow of credit—an issue of particular relevance for some European countries. However, these features need to be weighed against the potential costs, including the risk that securitization contributes to excessive credit growth in and outside of the formal banking system; principal-agent problems that amplify perverse incentives; the complexity and opaqueness of certain products which make efficient pricing problematic; and the heavy reliance of the industry on credit ratings.

Against this backdrop, this paper attempts to address the implications for financial stability arising from securitization. The analysis proceeds in three stages: (i) the role of securitization in the years preceding the crisis is distinguished from earlier benign periods and examined closely (and uniquely) in the context of self-reinforcing linkages across the financial sector; (ii) current obstacles to the efficient functioning of securitization markets are then looked at; and finally (iii) a suite of policy recommendations are calibrated to the preceding analysis.

The contributions of this paper are threefold. First, we identify a number of "lessons learned" based on an examination of key industry developments in the years before the crisis. While securitization markets expanded in a benign fashion for three decades until the late 1990s, the years immediately preceding the crisis saw an explosion in the issuance of highly complex, synthetic products and products based on low-quality, underlying collateral. Parts of the industry became intertwined in a powerful self-reinforcing system of misaligned incentives—comprising loan originators, securitization intermediaries, credit rating agencies (CRAs), and investors—and, when combined with easy monetary policy, culminated in systemic risk.

Second, we identify current impediments to the rehabilitation of securitization markets at the present time. These include capital charges that may have the unintended effects. In addition, the asymmetric treatment of securitized assets vis-à-vis assets with similar characteristics might result in new risk concentrations in coming years (particularly in covered bonds). Additional factors of importance are regulatory complexity and uncertainty; an operational infrastructure which requires further reforms; and ongoing official sector involvement in securitization and credit markets.

The paper concludes with policy recommendations to address the factors that either contributed to the crisis or may currently be posing obstacles to securitization. These proposals are distilled into a set of principles and guided by the objective of preserving the beneficial features of securitization while mitigating those that pose risks to financial stability.

GLOSSARY

ABCP	Asset-backed commercial paper
ABS	Asset-backed security
ABS-CDO	Asset-backed security-collateralized debt obligation
AE	Advanced economy
AFME	Association for Financial Markets in Europe
AMBAC	Ambac Financial Group
AMC	Asset management companies
AMLF	Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility
ATR	Ability-to-repay
BCBS	Basel Committee on Banking Supervision
BCRA	Backstop concentration ratio approach
BoE	Bank of England
CBO	Collateralized bond obligation
CDO	Collateralized debt obligation
CDS	Credit default swap
CEA	Commodity Exchange Act
CFPB	Consumer Financial Protection Bureau
CFTC	Commodity Futures Trading Commission
CLO	Collateralized loan obligation
CMO	Collateralized mortgage obligation
CPFF	Commercial Paper Funding Facility
CPO	Commodity pool operator
CMBS	Commercial mortgage-backed security
CP	Commercial paper
CRA	Credit rating agency
CTA	Commodity trading advisor
DoT	Department of the Treasury
ECB	European Central Bank
FASB	Financial Accounting Standards Board
FHA	U.S. Federal Housing Administration
FHLMC	Federal Home Loan Mortgage Corporation or “Freddie Mac”
FNMA	Federal National Mortgage Association or “Fannie Mae”
FSB	Financial Stability Board
FTPYME	Programa de Fondos de Titulización de Activos para PYME (Spanish Asset Securitization Funds for SMEs)
GFMA	Global Financial Markets Association
GNMA	Government National Mortgage Association or “Ginnie Mae”
GSE	Government-sponsored enterprise
HQLA	High-quality liquid assets
IAA	Internal assessment approach
IOSCO	International Organization of Securities Commissions

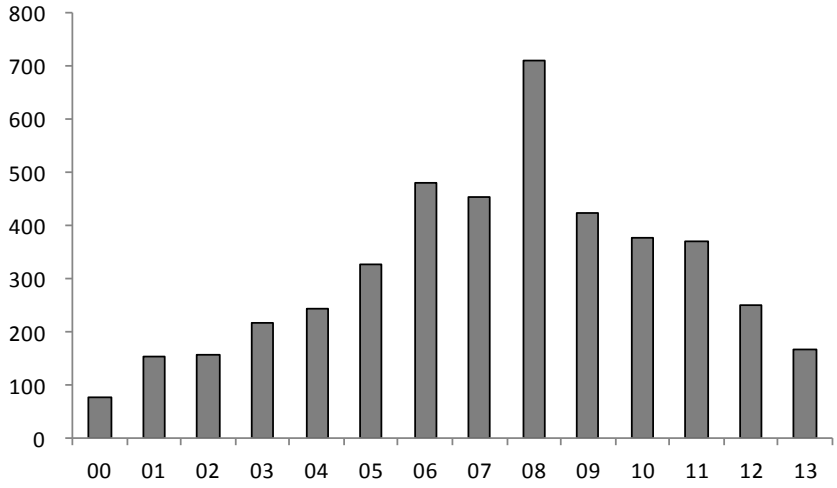
IRB	Internal ratings-based approach
KfW	Kreditanstalt für Wiederaufbau
LCR	Liquidity coverage ratio
LTV	Loan-to-value ratio
MBS	Mortgage-backed security
MERS	Mortgage Electronic Registration Systems, Inc.
MSFA	Modified supervisory formula approach
NSFR	Net stable funding ratio
NRSRO	Nationally recognized statistical rating organization
OFHEO	Office of Federal Housing Enterprise Oversight
OTC	Over-the-counter
PCS	Prime collateral securities
QE	Quantitative easing
QM	Qualified mortgage
QRM	Qualified residential mortgage
RMBS	Residential mortgage-backed security
RBA	Ratings-based approach
RRBA	Revised ratings-based approach
REIT	Real Estate Investment Trust
ROE	Return on equity
RW	Representations and warranties
RWA	Risk-weighted assets
SA	Standardized approach
SEC	Securities and Exchange Commission
SIV	Structured investment vehicle
SME	Small- and medium-sized enterprises
SPV	Special purpose vehicle
SFA	Supervisory formula approach
SSFA	Simplified supervisory formula approach
S&P	Standard & Poor’s
TALF	Term Asset-Backed Securities Loan Facility
TruPS	Trust-preferred security

I. INTRODUCTION

Securitization, like other forms of financial innovation, has costs and benefits associated with it. There are conditions under which securitization can be a net benefit for the financial system and vice versa. As such, securitization as a concept is neither inherently good nor bad per se—a point underscored by the marked variation in the performance of different classes of securitized assets during and after the global financial crisis (GFC). This point of departure stands in contrast to some of the more polarizing views associated with securitization, which were advanced in the aftermath of the GFC.

There are a number of channels through which a healthy market for securitization might support both the financial system and the broader economy. Securitization can lower funding costs and economize on capital for financial institutions—benefits that may be passed along to businesses and consumers (Duffie, 2007). Securitization can help issuers and investors diversify and transfer risk across different asset classes, geographies, industries, instruments, and credit risk. By transforming a pool of illiquid assets into tradable securities, securitization also constitutes a potentially valuable tool for assisting with the resumption of credit flow to worthy borrowers—an issue of particular relevance today for many advanced economies (AEs), especially in Europe where credit conditions remain tight and securitization volumes have regressed to decade lows (Figure 1).[2]

Figure 1. Annual Securitization Issuance in Europe
(In billions of euro)



Source: European Securitization Forum.

Notes: Figures for 2013 are annualized based on data as at end 2013:Q2.

[2] For an example of how securitization, in combination with other policies, can be utilized to ease credit conditions for small- and medium-size enterprises (SMEs) in Europe see Box 3.

However, these potential benefits need to be weighed against the potential downside risks to the financial system, which can arise from sub-optimally functioning securitization markets. Because securitization has the capacity to increase the flow of credit inside or outside of the formal banking system, the "financial accelerator" effect could result in excessive increases in credit growth and asset prices. Principal-agent problems combined with severely misaligned incentives, potentially worsened by asymmetric information, may also be an important feature of some securitization markets. The issues associated with highly complex and opaque product design (not well understood by regulators or investors) were also brought to light by the recent crisis. Finally, the industry has had a tendency to unduly rely on conventional credit without conducting its own due diligence; hence, investor herding on the sole basis of external credit ratings can result and the impact of CRA modeling errors can be exacerbated across the industry.

Against this backdrop, the overarching motivation for this paper was to examine the financial stability implications arising from securitization. In pursuit of this aim, the analysis presented in this paper makes a threefold contribution to the related literature and policy discussion.

First, we identify a number of "lessons learned" based on the examination of key industry developments in the years leading up to the crisis. While global securitization markets expanded without causing economic or market disruptions over the three decades leading up to the late 1990s, in the years immediately preceding the GFC issuance patterns changed dramatically. Many industry participants became intertwined in a powerful self-reinforcing cycle driven by misaligned incentives. This system comprised four elements—loan originators, securitization intermediaries, CRAs, and investors—and against the backdrop of highly accommodative monetary policies, eventually culminated in systemic risk. In this sense, securitization was not a principal cause of the crisis per se, but rather one of a number of channels that amplified some of the underlying excesses of the pre-crisis period. This is a distinction with important policy implications, in that it suggests remedial actions should be targeted at each of the elements involved in the securitization chain (including loan originators, CRAs, and investors) for those remedial actions are to be most effective. Nevertheless, as it stands, virtually the entire securitization industry became stigmatized, and many securitization markets that performed well over the crisis, and/or those that could help restore the flow of credit to worthy borrowers at the present time, have been rendered uneconomical in recent years (BIS, 2011).

Second, the paper addresses impediments to the healthy functioning of the securitization markets at the present time. In what is an inherently difficult task, the various regulatory responses to the crisis have made considerable progress in addressing some of the aforementioned issues, which emerged in securitization (and other related) markets, though additional refinements may be required to successfully rehabilitate securitization markets, particularly in regard to the following:

- **Regulation.** Some recent (and legacy) initiatives may give rise to incentives which inadvertently encourage leveraged product structures, contribute to the exploitation of "cliff effects," or possibly facilitate regulatory arbitrage. Additionally, the imposition of asymmetric capital charges, where relatively punitive charges apply to securitized assets vis-à-vis assets with similar characteristics, could result in the concentration of risk in

other areas of the capital markets (such as covered bonds) in the coming years. Regulatory complexity and uncertainty also continue to be cited by industry participants as significant obstacles to the resumption of growth-supportive securitization markets.

- **Operational infrastructure.** Additional reforms to address the role played by servicers, trustees, and CRAs, particularly as they relate to the systemically important U.S. mortgage market, may be required.

- **Official sector involvement.** The cost/benefit analysis of some of the central banks' intervention activities in credit markets will change through time and needs to be closely monitored, as does the treatment of securitized assets at the discount windows of major central banks. Where possible, official sector involvement in securitization and underlying credit markets should focus largely on addressing market failures, rather than exerting an omnipresent influence on the price and availability of credit (after the acute crisis stage has passed), so as to minimize the risk of a new sort of distortions emerging in the future.

Finally, the paper offers a broad menu of policy proposals in order to specifically address each of the major issues identified earlier in the analysis. These proposals are distilled into a set of principles which are guided by the core objective of preserving the beneficial features of securitization while mitigating, if not eliminating, those that pose a risk to long-term financial stability.

II. Revisiting the Role of Securitization in the Crisis

A. Key Developments in Securitization Markets—The 2000s in Historical Perspective

In the three decades leading up to the turn of the century, securitization steadily broadened in size and scope without major incident.[3] The industry was born in 1970 in the United States with the securitization of U.S. government-guaranteed residential home mortgages by the Government National Mortgage Association (GNMA or "Ginnie Mae," Figure 2).[4] Over the course of the 1980s, a market emerged for consumer asset-backed securities (ABS) in the United States and residential mortgage-backed securities (RMBS) in the United Kingdom. The 1990s saw the issuance of securitized commercial real estate assets in the United States, in addition to the development of the ABS and mortgage-backed securities (MBS) markets in both continental Europe and the United Kingdom. By the turn of the century, the issuance of U.S. private-label securitizations stood at US$1 trillion, around five times that of Europe (IMF, 2009). Dramatic changes in the composition of the industry then unfolded in the years immediately preceding 2007, some of which had a significant impact on the global financial system. Issuance volumes surged in very complex, risky, and opaque market segments that had previously played only a peripheral role. At the global level between 2000 and 2007, issuance of collateralized debt

[3] For a more detailed history of the modern ABS market, see Appendix I.

[4] The basic features of the securitization process are explained in Appendix II.

obligation (CDO) increased more than six times to US$1 trillion, while issuance of CDO-squared product increased eleven-fold to around US$300 billion (Figure 3). In the United States, annual issuance volumes in the subprime segment of the mortgage market increased from US$100 billion to just over US$600 billion over the 2000–06 period.[5] This lifted the subprime share of total U.S. mortgage origination from a low of 6.9 percent to a peak of 20.1 percent in just five years (Figure 4). Most of these were adjustable-rate mortgages, usually starting with a two- or three-year fixed-rate period and deferral of principal repayment up to five years, which meant that borrowers were heavily exposed to upward interest rate as well as principal payment shocks at the reset times. The emergence of private players (outside of the two government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, and Ginnie Mae) as a new force in MBS issuance was associated with a sharp decline in lending standards over this period.[6] Private-label residential MBS issuance in the United States increased from US$148 billion in 1999 to US$1.2 trillion by 2006 (Figure 5), increasing its share of total issuance from 18 percent to 56 percent.

Though certain parts of the securitization market undoubtedly played a role in the GFC, it is also important to point out, however, that this was not endemic to *all* securitization markets. As the widely varying performance of securitized assets before, during, and after the GFC demonstrates, it would be misleading to discuss the market for securitization as a single, homogenous asset class. For instance, the institutional characteristics of the U.S. subprime mortgage market constitute quite a separate case of securitization from which it is difficult to infer general conclusions about other segments of the securitization market (BIS, 2011).

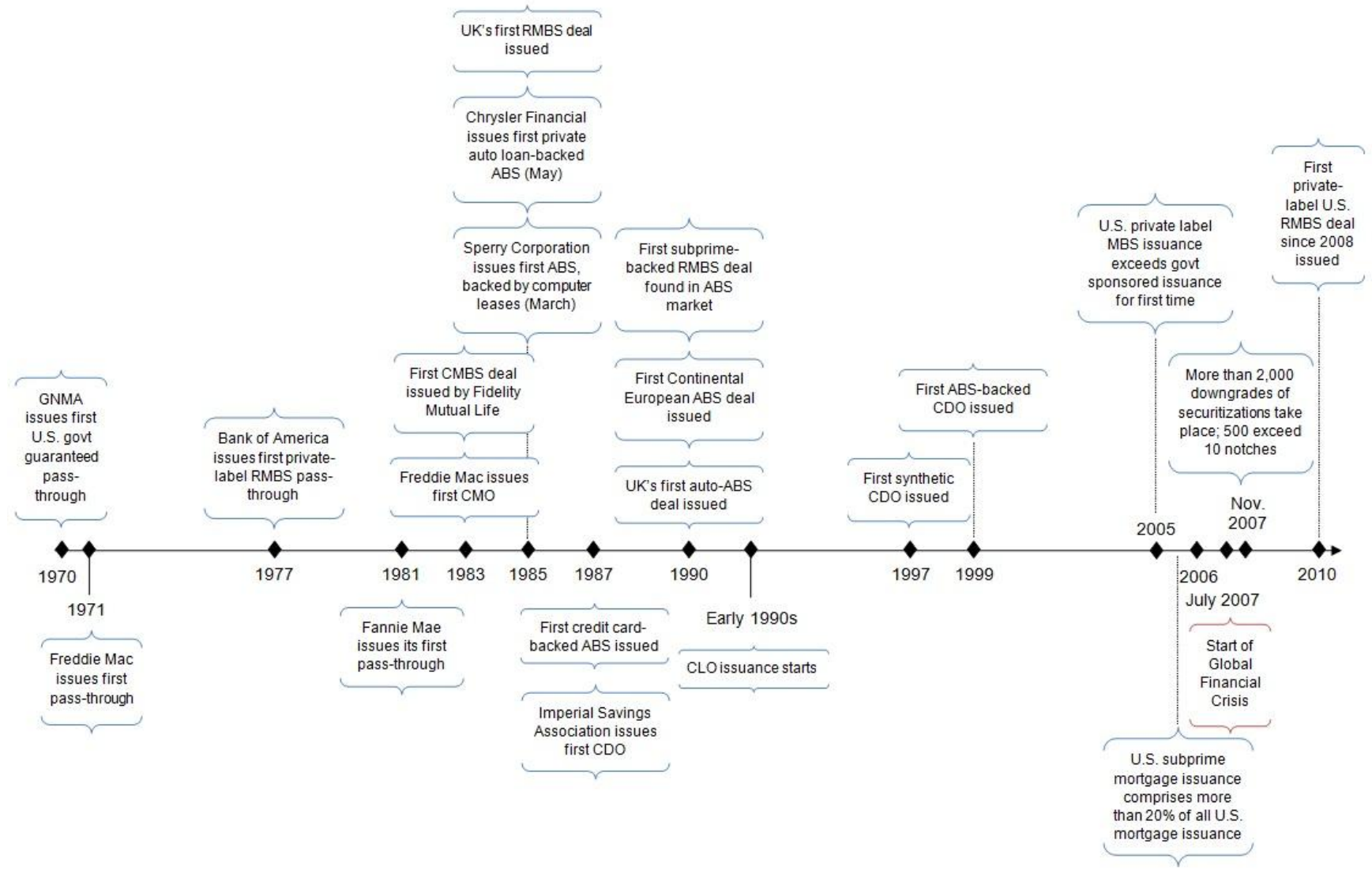
A number of securitization products have established a long track record of solid performance, including through the trough of the crisis. For instance, the cumulative impairment rates from 1993–2011 for U.S. auto loan, credit card, student loan, and equipment lease ABS were 0.3, 0.7, 1.7, and 5.9 percent respectively (Moody's, 2012a). These three asset classes have represented 81 percent of ABS issuance in the United States since 2008.[7] Some studies have documented that in the case of U.S. collateralized loan obligations (CLOs) underlying corporate loans generally performed no worse, and in some instances better, than unsecuritized loans of comparable credit quality (Benmelech, Dlugosz, and Ivashina, 2012). Others have found no support for the idea that U.S. leveraged-buyout deals held in structured credit vehicles were of a lower quality or performed worse than buyout deals that were not subsequently involved with securitization (Shivdasani and Wang, 2011). Securitized mortgages in Italy have been established to have a lower probability of default than mortgages that were not securitized (BIS, 2011). Standard and

[5] In addition to subprime mortgages, Alt-A and so-called jumbo loans (high-quality mortgages that were too large to be guaranteed by the GSEs) were also securitized as private-label RMBS. The three categories are sometimes referred to as nonconforming loans, because they do not meet the requirements for purchase by the GSEs.

[6] For instance the National Association of Realtors found that by 2006 the median first-time homebuyer in the United States made a down payment of only 2 percent, with 43 percent of buyers making no down payment at all.

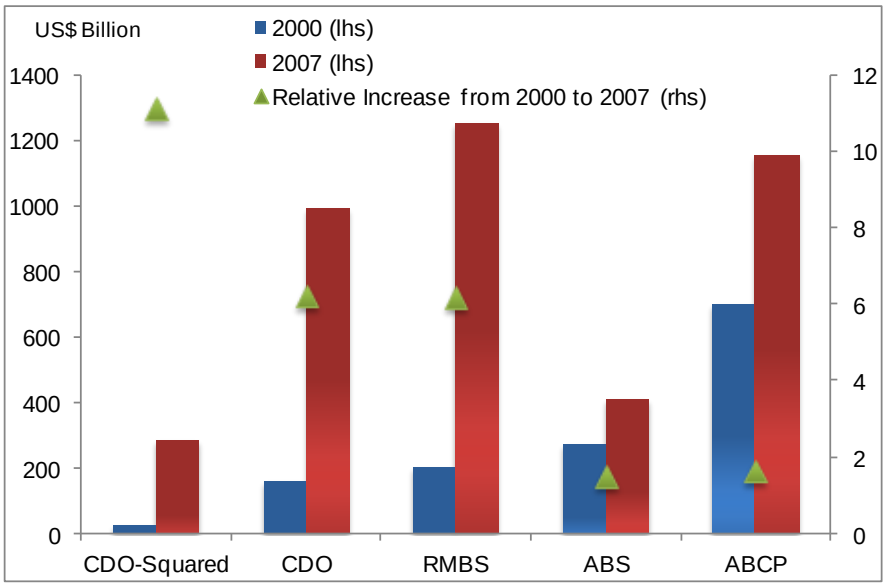
[7] http://www.sifma.org/uploadedFiles/Research/Statistics/StatisticsFiles/SF-US-ABS-SIFMA.xls

Figure 2. Key Developments in Global Securitization Markets



Source: IMF staff.

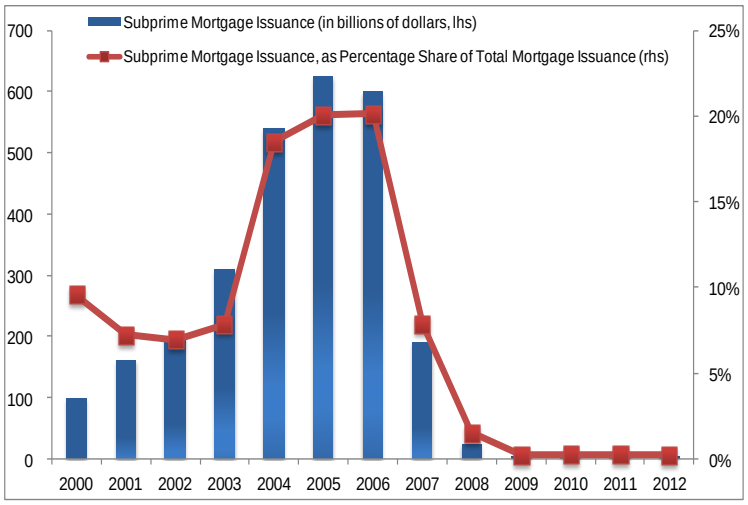
Figure 3. Global Private-Label Securitization Issuance by Type



Source: IMF staff, 2009.

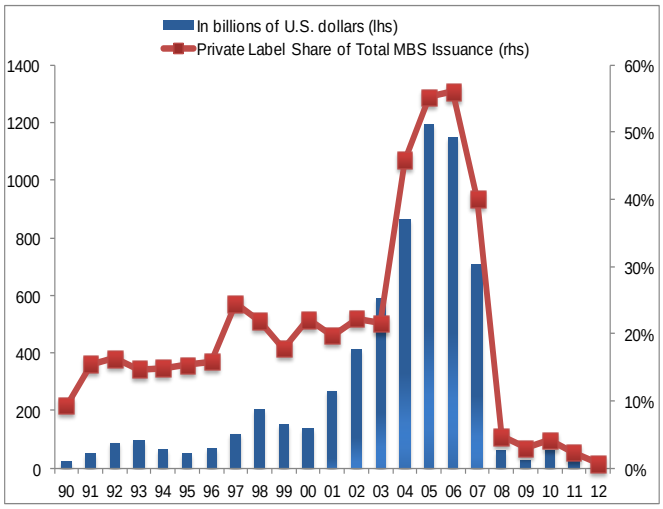
Notes: CDO-Squared denotes CDOs whose collateral was generally sourced from other ABS-CDO tranches, either of the cash or the synthetic type. RMBS here includes residential mortgage subprime ABS, which are excluded from the ABS category in this figure.

Figure 4. U.S. Subprime Mortgage Issuance



Source: Inside Mortgage Finance; and IMF staff.

Figure 5. U.S. Private-Label MBS Issuance



Source: Inside Mortgage Finance; and IMF staff.

Poor's data show only 0.07 percent of the balances underlying European RMBS, accounting for more than half of total European securitization issuance originated before June 2007, had defaulted by end-2011 (AFME, 2012). This was in stark contrast to the performance of CDOs of

ABS, where the default rate was around 30 percent over the same period. During the period of market turbulence in 2011, the marked-to-market performance of European RMBS was superior to most European Union (EU) sovereign debt, senior bank debt, and many covered bonds (with the exception of *Pfandbriefe*; AFME, 2012). Therefore, sweeping generalizations about the performance of securitization should be interpreted with caution.

Although a thorough review of the factors behind the divergent performance of securitized assets is beyond the scope of this paper (much of our focus is on the products that performed most poorly and inflicted most damage on the financial system), differences in the types of collateral in asset-backed securitizations seem to be relevant. For instance:

- Most ABS have much shorter amortization periods than conventional mortgages and, hence, carry significantly lower risk of principal loss;

- Given home prices tend to appreciate over the long term (at least in nominal terms), in contrast to automobiles and other physical property that frequently secure ABS, both lenders and investors may be inclined to be more aggressive in estimating recovery values for housing-related securities;

- Non-house collateral is fungible (e.g., a car can easily be repossessed and sold with relatively lower frictional costs than housing);

- In some cities, it can take significant periods of time to evict delinquent mortgagors (for instance, around three and half years in New York City), while delinquent borrowers using other forms of credit, such as car loans and credit card debt, have much shorter periods of forbearance. Because of this, stressed borrowers may prioritize the repayment of debts in such a way so as to ensure they meet car loan and credit card obligations (as the use of these facilities would otherwise be cut shortly after default), ahead of mortgage payments (where it may be possible to live “rent free” for a considerable time).

Box 1. Securitization—An Overview

Funding Transactions

The underlying assets are loans, legal rights to specific assets (e.g., leased equipment), and rights to specific cash flows (e.g., cash flows from equipment leases).

Non-Funding Transactions[1/]

The underlying assets are securities, subordinated debt, SME loans, or obligations to make payments on derivatives contingent on certain events occurring, like CDS.

<table>
<tr><th colspan="2">ABS</th><th colspan="3">RMBS</th><th>CMBS</th><th colspan="2">ABCP Conduits</th><th colspan="5">CDOs</th></tr>
<tr><td rowspan="3">Non-RMBS
Credit Cards, Auto Loans, Student Loans, and “Niche Product”[2/]</td><td colspan="3">Private-label RMBS</td><td>Govern-ment-backed Lending</td><td rowspan="3">Commercial Mortgages</td><td>Single- & Multi-seller Conduits</td><td>Arbitrage Conduits
SIVs
SIV-Lites</td><td rowspan="3">CBOs [6/]</td><td rowspan="3">Hedge CDOs[7/]
(usually synthetic)</td><td rowspan="3">CLOs</td><td colspan="2">ABS-CDOs</td><td rowspan="3">TruPS CDOs[9/]</td></tr>
<tr><td>Subprime[3/]
(“Home Equity Loans,[4/] Low Quality)</td><td>Alt-A
(Inter-mediate Quality)</td><td>Prime Jumbo, Non-US Resid-ential Mort-gage Loans</td><td>U.S.: GSEs (FHLMC & FNMA) & GNMA
Collateral: Conforming Mortgages</td><td>Collateral: Claims on receivables, leases, etc.</td><td>Collateral: Securities</td><td>Cash CDOs</td><td>Synthetic CDOs[8/]</td></tr>
<tr><td colspan="4"></td><td>Germany: KfW[5/]</td><td colspan="2">Largely financed via the sale of highly rated ABCP</td></tr>
</table>

This figure is intended to provide a broad overview of the markets for securitized fixed-income products. It is not meant to elucidate all dimensions of those markets, but rather to provide a taxonomy of the main product categories, relate the various market sectors and subsectors to each other, and list the main types of collateral and the main participants in some sectors.

Note: ABCP = asset-backed commercial paper; ABS = asset-backed security; ABS-CDO = asset-backed security-collateralized debt obligation; CBO = collateralized bond obligation; CDO = collateralized debt obligation; CDS = credit default swap; CLO = collateralized loan obligation; CMBS = commercial mortgage-backed security; FNMA = Federal National Mortgage Association; GNMA = Government National Mortgage Association; GSE = government-sponsored enterprise; KfW = Kreditanstalt für Wiederaufbau; MBS = mortgage-backed security; RMBS = residential mortgage-backed security; SIV = structured investment vehicle; SME = small- and medium-sized enterprise; TruPS = trust-preferred security.

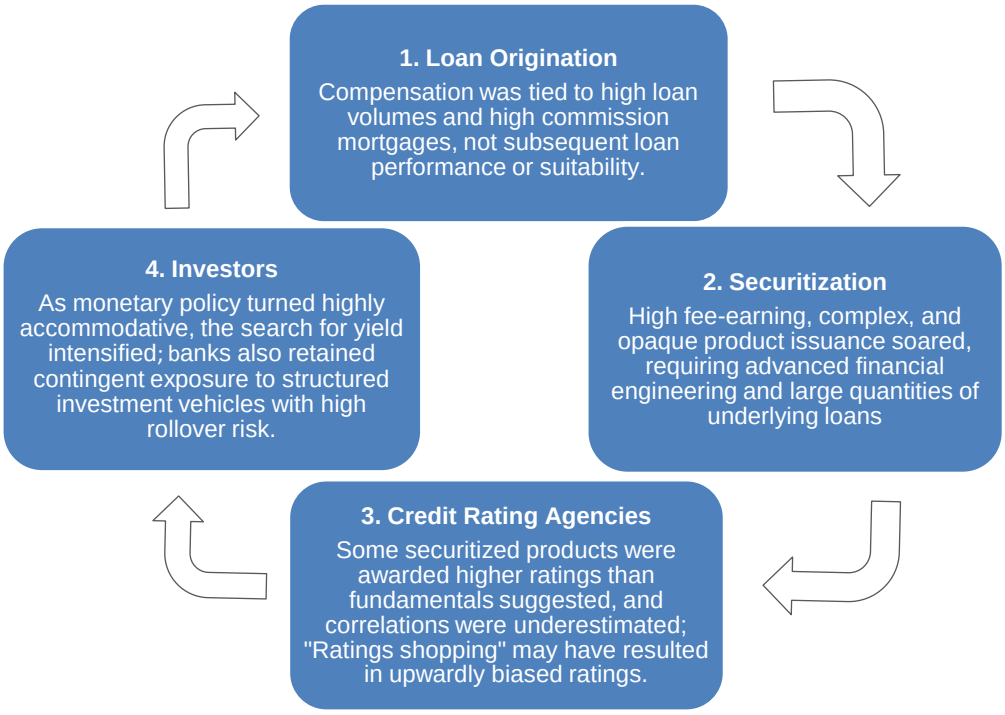
1/ CLOs, SME-ABS (sometimes subsumed under CDOs or CLOs), and TruPS are considered funding transactions if they are securitized directly from originator balance sheets, but are usually assembled by broker/dealers and asset managers independently of the originating bank(s), and in the case of traditional CLOs, involve tranches of *syndicated loans* which are traded.
2/ *Niche product* comprises mutual fund and legal fee securitizations, as well as securitizations of royalty payments and other recurring cash flows. Utility companies have used securitizations in the past to recover the cost of large projects, which became unviable (“stranded cost securitizations”), or of storm damages.
3/ Only subprime RMBS are part of the ABS market; Alt-A and jumbo-prime RMBS are part of and traded in the general private-label RMBS market.
4/ The fixed- income markets often use the terms *subprime* and *home equity loans* interchangeably. They are not the same as *home equity lines of credit (HELOCs)*, which are credit lines collateralized by second liens on borrowers’ homes (often covering 10–20 percent of the value of the home). When demand for such financing rose in the early 2000s in unison with U.S. home prices, mortgage originators sometimes refinanced homeowners wishing to add a HELOC into new first lien loans, with a loan-to-value ratio (LTV) at origination of 90–100 percent (and sometimes more); these loans allowed the borrower to take out cash during the refinancing (*cash-out refinancing*) and often were high-interest subprime loans, reflecting their higher risk status.
5/ The collateral underlying each of KfW’s PROVIDE transactions comprised mortgages from a single country, although the PROVIDE program eventually covered at least four European countries. The collateral had to obey certain restrictions on LTVs, debt-to-income ratios, and other loan characteristics. Most tranches of those deals were assigned a rating.
6/ CBO securitizations occurred where the underlying collateral was mainly corporate bonds. In the wake of the 2001 corporate credit crisis, most lost substantial value, and few were issued post-2001.
7/ Hedging transactions are often assembled by banks to hedge part of their activities; those could encompass CDS to hedge exposures from loans, credit valuation adjustments, and other sources.
8/ *Synthetic* refers to the fact that in these securitization structures, CDS on ABS tranches comprised most of the obligations of the CDO, with the CDO selling default insurance via CDS.
9/ TruPS are unsecured, subordinated debentures, which financial companies issued and which could be counted as Tier 1 capital. Initially issued by larger banks, TruPS issued by smaller banks were increasingly pooled into CDOs in the early 2000s. A few CDOs were launched based on pooled TruPS from smaller, even private, real-estate companies. TruPS CDOs lost significant value during the crisis, and the Dodd-Frank Act is restricting their ability to count towards Tier 1 capital, except for banks with less than US$500 million of assets (Day Pitney, 2010).

B. Misaligned Incentives and the Self-Reinforcing Cycle of 2000–07: Systemic Risk and the Role of Securitization

A host of individual factors played a role in the crisis, though of great importance to the formation of systemic risk was the way in which these factors reinforced one another. Misaligned incentives were critically important as they permeated the distinct links of the chain connecting borrowers with investors, while essentially fed upon each other. The role of incentives provided by various institutions to their employees, as well as to potential customers, and the interaction of these actors and institutions in a competitive marketplace has been established (in both theoretical and empirical settings) to lead to excessive risk-taking and socially suboptimal outcomes (Rajan, 2005, and Stein, 2013, and the literature cited therein).

Securitization was one channel, among others, that played a role in amplifying systemic risk by facilitating excessive leverage and risk concentration across the financial sector. Figure 6 presents a stylized model of the four key elements of the self-reinforcing securitization chain: poor underlying loan origination practices; the unprecedented issuance of complex and opaque securitized products; CRAs; and both leveraged and unleveraged investors. Against the broader backdrop of accommodative monetary policies and deficient regulation, this system eventually culminated in the realization of systemic risk.

Figure 6. Self-Reinforcing Credit Intermediation Cycle



The role of loan origination

Of the myriad factors contributing to the financial crisis, poor underlying loan origination practices were at the fulcrum. High demand for structured credit assets (discussed in detail below) fueled a sharp increase in loan origination, with a subsequent deterioration in lending standards, and significant increases in household indebtedness and asset prices. The various ways in which loan origination practices helped to sow the seeds for the GFC are documented below.

Deterioration in loan origination practices and lending standards

This issue was particularly pronounced in the U.S. (subprime) mortgage market[8] and had many facets, including:

Previously unregulated origination of mortgages and other consumer debt. In the United States, mortgage origination began to migrate increasingly from the regulated banking sector to nonbanks in the lead-up to the crisis, particularly to unregulated independent mortgage brokers (Bernanke, 2008).[9] These firms often sold their mortgages to banks which provided them with their pipeline financing.[10]

Compensation practices and unsuitability. As compensation in the loan origination industry (particularly mortgage origination) was tied to origination volumes and the sale of high fee products—rather than the suitability of products sold to borrowers ("predatory lending") and subsequent loan performance—a sharp decline in lending standards unfolded.[11] Similarly, as the business model for property appraisers depended on winning repeated business and mortgage originators selected appraisers to value homes, the latter were incentivized to err on the higher side of their estimates (New York Times, 2013). In turn, these inflated valuations supported the origination of larger initial mortgages and subsequent refinancings.

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[8] Appendix 3 provides a description of the U.S. and European mortgage securitization markets. For reviews of the interlinkages between the U.S. residential mortgage markets and the wider credit crisis, see, Brunnermeier, 2009; Mian and Sufi, 2009; and Keys and others, 2010.

[9] U.S. Home Mortgage Disclosure Act data show that in 2006 more than 45 percent of high-cost first-time mortgages were originated by independent mortgage companies—institutions that were not regulated by federal banking agencies and that sold virtually all of the mortgages they originated (Bernanke, 2008).

[10] Pipeline—or "warehouse"—refers to both the accumulation of loans at the level of the originator, until such time that the loans are transferred to an originating bank, as well as the accumulation of such loans by banks for purposes of securitization. The provision of financing constituted another source of profit for banks and broker-dealers. The tightening of such credit facilities was an additional factor that contributed to the burst of the subprime-bubble.

[11] The U.S. Federal Deposit Insurance Corporation (FDIC) was well aware of predatory lending practices during the run-up in U.S. home prices: "The FDIC faces significant challenges associated with identifying, assessing, and addressing the risks posed to FDIC-supervised institutions and consumers by predatory lending," (FDIC, 2006).

Documentation practices. The general decline in lending standards was also associated with a meaningful rise in low- and no-documentation loans in the subprime and the Alt-A segments of the U.S. mortgage market. In such loans, the income and/or asset position of the loan applicant was often overstated by borrowers and/or not verified by underwriters (Federal Bureau of Investigation, 2004).

Credit and asset prices. The role of credit in fanning the flames of asset price boom-bust cycles (particularly involving real estate) has been long established (Kindleberger, 1978; Bordo, 1986; Bernanke, Gertler, and Gilchrist, 1996; Kiyotaki and Moore, 1997; Eichengreen and Mitchener, 2003; Goodhart, 2006; and Schularick and Taylor, 2012). This feedback loop can be intensified when unrealized asset price gains serve as collateral for new borrowing, as demonstrated in the boom and subsequent bust in the U.S. housing market. With additional credit provision and leverage (as via home-equity lines of credit or cash-out refinancings) based on unrealized capital gains rather than incomes and cash down payments, borrowers and lenders became highly exposed to a softening in asset prices.[12]

The role of securitization

New developments in securitization over the 2000–07 period amplified the financial crisis, particularly where U.S. subprime mortgages were involved. Broker/dealers were the dominant actors on the "supply side" of most of the new trends that emerged in securitization practices during this period. Against the backdrop of accommodative monetary policy, irresponsible loan origination practices, and complex financial products, a feedback loop ensued, where growing demand for highly rated structured products resulted in increased demand for low-quality underlying loans to serve as collateral. Thus, leverage and risk concentrations in the financial system became magnified. The basic features of this feedback loop are described below.

Originate-to-Distribute

The Originate-to-Distribute Model associated with the boom in securitization meant that originators often had little or no economic interest ("skin in the game") in the loans that were written and, therefore, did not always have a strong incentive to originate loans that borrowers could realistically repay, as long as there was a buyer for the loans. This contributed to the increase in poorly documented loans and loans to lower-quality borrowers (as documented above). While this phenomenon has been widely cited as a key contributor to the crisis (see Bernanke, 2008, and IMF, 2009), it is also important to note that the financial sectors of countries other than the United States, which did not employ the Originate-to-Distribute Model, also suffered significant turmoil (such as Spain, which was affected by a real estate bubble). This suggests that poor loan origination standards were more critical than the Originate-to-Distribute Model in and of itself. It should also be noted that European and U.S. loan originators often

[12] A deceleration in home price appreciation caused problems for some borrowers, most notably in the United States starting in 2006.

retained exposure to the underlying collateral risk in securitizations either via ownership of specific tranches or through contingent funding lines provided to structured product investors.

Financial engineering and increased demand for low-quality loans

Prior to the 2000s, securitized debt was typically backed by "plain vanilla" high-quality (residential and commercial) mortgages, auto loans, credit card receivables, and student loans, besides others. However in the early 2000s, demand for low-quality loans started generating its own supply, as broker-dealers increasingly utilized advanced structuring techniques to transform this collateral into highly rated structured securities. This was an attractive proposition for broker/dealers as many of these products generated higher fees than the "plain vanilla" and increasingly commoditized earlier incarnations of securitized products.[13] Re-securitizations of ABS into CDOs, and of CDOs into CDO-squares, as well as synthetic securitizations,[14] allowed the creation of ever greater amounts of highly rated, (relatively) high-yielding securitized bonds. Beyond primary issuance, broker/dealers also generated revenue by making markets in these securities, as well as in related ABS-based derivatives, and financing transactions for loan originators and investors.[15]

Broker/dealer leverage

Some analysts have noted that the 2004 "uniform net capital rule" exemption announced by the Securities and Exchange Commission (SEC) paved the way for a significant increase in balance sheet leverage employed by large broker/dealers, many of whom were particularly active in securitization markets.[16] This ruling exempted large U.S. broker/dealers (those with net capital in excess of US$5 billion) from the larger uniform capital requirements imposed on smaller institutions, which had been in place since 1975 (GAO, 2004). Upon receiving SEC approval, such firms were permitted to use internal mathematical models to compute the haircuts and corresponding capital requirements associated with their security holdings.

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[13] Return on equity (ROE) for the ABS/RMBS businesses at major investment banks was estimated to be in the mid-to-high double digits. Lehman Brothers and Morgan Stanley derived around 45 percent of their profits from their residential mortgage, ABS, and commercial real estate business lines in 2006/07.

[14] In a "synthetic securitization," derivatives provide the exposure to the underlying asset.

[15] As valuations of ABS and RMBS depend heavily on often subjective inputs like prepayment speeds and default rates, they are time and analytics intensive. Prior to the crisis, secondary market ABS trading often involved negotiations between investors and securities brokers around those input parameters, though short-maturity ABS were often held to term.

[16] Coffee (2008), Blinder (2009), and Stiglitz (2009) were among those faulting the SEC for allowing broker/dealers to substantially increase leverage. However, Cohan (2012) suggests the SEC exemption did not have a material impact, and the SEC has also contested this interpretation of its 2004 ruling on numerous occasions.

Risk concentrations

Hundreds of billions of dollars of structured products were sold to SIVs, ABCP conduits, and SIV-lites. Given the relatively short duration of their liabilities-such entities were often funded largely with commercial paper (CP)-these entities harbored significant maturity and rollover risk. Additionally, in a number of cases banks retained explicit or implicit contingent exposure to these entities.[17] As such, risk was considerably more concentrated than commonly assumed prior to the crisis. In some cases, where illiquid funding markets resulted in the inability of investment conduits to roll over maturing liabilities, a number of banks were committed to taking the assets of the entities sponsored by them onto their balance sheets.[18,19]

Representations and warranties (RWs) and the role of quality control firms

Issues with the enforcement of RWs played a significant role in the crisis. RWs were a core element in the mortgage securitization process as they outlined the set of conditions to be met by the originator in the process of loan origination. These clauses were traditionally included in contracts as obligations of loan originators to issuing banks (arrangers) and of issuing banks to investors. If RWs were breached, investors had recourse to the issuing bank, which had to repurchase nonconforming mortgages. In turn, the issuing bank had recourse to the loan originator.[20] Because issuing banks were responsible for buybacks, they often used third-party contractors to establish whether mortgages submitted by originators were in line with the corresponding RWs. This process had two objectives: to assure banks that RWs were met and to bolster investor and servicer confidence in the quality of the mortgages. However, there were four main issues with the enforcement of RWs. First, compliance was difficult to verify. Second, third-party quality control firms sometimes based their surveillance on non-representative loan samples. Third, on occasion, quality control firms may have had conflicts of interest, as they were paid by issuing banks whose employees had an incentive to maximize securitization origination. Hence, quality control firms sometimes found themselves under pressure to minimize the incidence of substandard mortgages (Muolo and Padilla, 2008). Fourth, investors had (at best)

[17] The motivation for banks to retain direct exposure to securitizations, in order to mitigate investor concerns over asymmetric information, has been widely documented in related literature, beginning with Gorton and Pennacchi (1995).

[18] Prominent cases are Citigroup (US$49 billion worth of SIV assets) and State Street Bank (US$23 billion of ABCP conduit assets); see MarketWatch (2007) and State Street (2009), respectively.

[19] The incentive to engage in similar funding structures may be substantially reduced going forward given that under Basel 2.5, the capital charge for a credit line to a conduit has been increased to 50 percent of the charge applicable when the facility is funded, up from 20 percent previously. Additionally, regulatory scrutiny over securitized credit markets has increased in a meaningful fashion.

[20] RWs constituted another dimension of "skin in the game" for the originators and arrangers of securitizations (Coker, 2012).

only limited access to the information generated by the quality control firms, leaving them to rely on data provided by the arrangers.[21]

The role of credit rating agencies

Given their dominant global role in the debt and securitization markets, the three major CRAs—Standard & Poor's (S&P), Moody's, and Fitch—have come under intense scrutiny from policymakers, regulators, analysts, and investors since the crisis.[22] While the ratings generated by CRAs were assumed to represent an independent and accurate gauge of underlying credit risks, events prior to, during, and following the crisis have led investors, policymakers, and regulators to challenge this fundamental assumption.[23] These issues have been and remain critical to restoring confidence in securitization markets, particularly following a recent SEC report which confirmed the so-called "Big Three" still account for 97 percent of all outstanding credit ratings—a concentration level that has changed little since the crisis.[24]

Misaligned incentives

CRAs are overwhelmingly paid by issuers: nationally recognized statistical rating organizations (NRSROs) operating under the issuer-pay (rather than buyer-pay) model account for approximately 99 percent of all outstanding NRSRO credit ratings.[25] This structure may increase the incentive for CRAs to upwardly bias their ratings (relative to an unbiased assessment of credit worthiness) in order to win more business. This emerged as a significant issue in the lead-up to the crisis as structured financial products became significant contributors to the overall profitability of CRAs; S&P, for instance, derived around 40 percent of its revenues from structured products (Westlaw, 2013), while in 2006 Moody's earned more revenue from structured finance (US$881 million) than all its business revenues combined for 2001. The integrity of the process was further compromised in cases where issuers "ratings shopped" for the highest ratings. A lawsuit filed against S&P by the U.S. Department of Justice in 2012 described

[21] One large investor noted that this situation has persisted for recently issued private-label RMBS.

[22] S&P and Moody's are both U.S.-based, while Fitch is dual-headquartered in New York City and London (with its principal office in the United States).

[23] In response to some of the related issues raised by the GFC, the International Organization of Securities Commissions (IOSCO) has outlined measures designed to improve transparency in the credit ratings process, with implications for securitization markets (IOSCO, 2012).

[24] The 2012 SEC Annual Report on Nationally Recognized Statistical Rating Organizations. Market share across the Big Three was reported as follows: S&P (42.3 percent), Moody's (36.9 percent) and Fitch (17.9 percent).

[25] This structure has evolved as the main rating agencies have typically found issuers more willing to pay for these services than investors, since issuers need certain ratings in order to sell their bonds to regulated financial institutions (OECD, 2010). Of the ten NRSROs, only Egan Jones Ratings operates under the buyer-pays model (SEC, 2012).

what appeared to be an effort to increase business volumes by softening ratings criteria (Council on Foreign Relations, 2013).[26]

Non-robust ratings methodologies for complex structured securities

The methodological approaches required to assess highly complex, structured products are different from the fundamental, single-issuer analysis CRAs had long-employed to rate corporate, municipal, and sovereign bond issuers. The ratings for many complex CDOs and related structured products were based on complex models that in many cases were highly sensitive to small changes in parameter assumptions. The CDO sector expanded dramatically in a short space of time, by some US$600 billion between 2000 and 2006 (Figure 3). Errors in modeling and estimation techniques inevitably occurred, and the valuation methodologies of CRAs ultimately proved misleading with respect to the impact of realized defaults.[27] In 2007, as U.S. housing prices began to tumble, Moody's downgraded 83 percent of the US$869 billion in mortgage securities that it had rated triple-A in 2006 (Council on Foreign Relations, 2013). That same year S&P announced an overhaul of its CDO ratings methodology. Statistical estimation techniques for structured products related to the U.S. mortgage market proved to have been based on a benign historical sample period for home prices, and correlations were underestimated.[28] Concerns over internal working practices have also since surfaced. In one such example, it was revealed that programming errors stood behind some of Moody's triple-A ratings of structured securities known as constant proportion debt obligations.

Issuer interaction with CRAs

In some cases, broker/dealers (i.e., the arrangers) worked closely with CRAs to engineer and effectively game specific credit ratings so as to ensure demand for their securitized bonds. Based on slight modifications to variables such as collateral type and a deal's structure, deals could be optimized to attract ratings that would maximize issuers' revenues. Moreover, rating agencies were under pressure to conform their ratings to those of rival CRAs, as broker/dealers had the ability to “ratings shop” for the highest ratings across the oligopoly of the three main agencies, without declaring this to investors.

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[26] Herring (2009) points out that in the case of structured products, only about half a dozen issuers were responsible for most of the issuance—the gain or loss of a single issuer could have a significant impact on a CRA’s revenue base. This is different from the other rating markets, where the revenue base for CRAs is far more diversified, making an unhappy client less of an issue.

[27] Errors were compounded in some cases where borrowers had misrepresented (i.e., overstated) their incomes in mortgage applications.

[28] On a national basis, U.S. home prices had recorded just one negative year of growth in nominal terms since 1942 (based on the Case-Shiller Index of Nationwide Home Prices).

Excessive reliance on CRAs

Regulators around the world made credit ratings an integral component of credit risk assessment under the Basel framework, in particular for securitized products. For the latter, most banks had to use CRA ratings for the calculation of capital requirements for their ABS and RMBS holdings. As discussed below, the investment community also came to heavily rely on these assessments, in some cases excessively so.

The role of investors

In the context of highly accommodative monetary policy and abundant global liquidity, the "search for yield" on the part of both leveraged and institutional investors was a key contributor to the sharp increase in activity in complex structured credit markets in the years preceding the crisis.

Leveraged investors

With the growth of the securitization industry, new types of leveraged specialized investment entities emerged, including structured investment vehicles (SIVs), SIV-lites, and asset-backed commercial paper (ABCP) conduits.[29] These entities largely financed themselves in the CP and repo markets, with medium-term notes, mezzanine debt, and equity comprising additional sources of financing. Specialist hedge funds, focused on structured fixed-income products and usually employing leverage, also increased significantly in number. These leveraged entities typically accumulated assets with a weighted average life of around three years (two to five years was the common effective range of asset maturities), largely financed by debt with much shorter maturities. As asset quality started to deteriorate in early 2007 and concerns about counterparty risk began to emerge, the investment risk borne by SIVs was compounded by maturity mismatches and associated rollover risk—insolvency risk became difficult to distinguish from liquidity risk in the heat of the crisis. Once some of the more esoteric structured product offerings started to decline in price, a stigma quickly developed and contaminated nearly all securitized products (even those in which underlying loan performance remained solid). In some cases, declines in market prices of a SIV's assets could lead to a breach of triggers, necessitating either an infusion of additional liquidity or capital, or the unwinding of the investment structure. The lack of transparency in these products proved critical as a large uncertainty risk premium was

[29] All three entities held a significant portion of their assets in ABS (in addition to other assets deemed to carry low credit risk). The main differences between SIVs, SIV-lites, and ABCP conduits arose from their use of leverage, degrees of diversification, and back-up lines of credit from sponsoring banks. In terms of the differences between SIVs and SIV-lites, the latter generally had very concentrated asset holdings (largely subprime mortgages), a finite life (hence the "lite" reference), and were a relatively new innovation prior to the crisis. In contrast, SIVs held a variety of ABS and sometimes corporate bonds, had an open-ended or evergreen structure (they planned to stay in business indefinitely by buying new assets as the old ones matured, much like a bank), and had been in existence since the late 1980s.

applied to market valuations once broad market sentiment began to shift in 2007.[30] This contributed to fire sales and liquidity evaporating from the secondary market, exacerbating price declines in a self-reinforcing feedback loop. In many cases, banks were committed to activating emergency funding lines or bringing the SIV or conduit assets onto their balance sheets.[31] Worsening matters was the lack of consistency and transparency in the reporting of these exposures by financial institutions.

Bank capital requirements for securitized asset holdings

Under the Basel II framework, corporate bond and securitization exposures received the same risk weights for investment grade securities; however, for non-investment grade tranches, securitizations attracted much larger risk weights (Table 1). This fact, plus the strong investor demand for safe assets, encouraged broker/dealers to work closely with CRAs to maximize the proportion of securitization deals awarded investment-grade ratings, preferably AAA-ratings. Additionally, under Basel II, non-mortgage retail loans received a 75 percent risk weight, while mortgage retail loans could attract just a 35 percent weight in some cases. In securitized form, the risk weight for AAA-rated mortgage bonds could be 7 percent for banks applying an internal ratings-based (IRB) approach. This provided an incentive for the securitization of mortgage loans, and potentially other loan assets, and held them on-balance sheet in securitized form.

Institutional investors

Real money investors, mainly pension funds and insurers, had turned to structured credit in the years prior to the crisis in response to a combination of factors. First, government bond yields declined dramatically as major central banks adopted accommodative monetary policies and cut short-term rates to unusually low levels following the recession of 2001/02 (Greenspan, 2002). Second, emerging market foreign exchange reserves flooded into western capital markets—reflecting an excess of savings relative to domestic investment (Bernanke, 2005) as international reserves held by emerging market economies increased from an average of 12 percent to 20 percent of world GDP between 2000 and 2007 (IMF, 2012). Third, conventional corporate debt issuance collapsed by nearly 50 percent in both the United States and Europe as the corporate sector deleveraged following the debt-fueled investment excesses of the late 1990s (Figure 7). Finally, long-term pension investors increasingly pursued asset-liability matching strategies with a view of reducing the volatility of the reported funding status of their plans, following the damage inflicted on pension plans by the global equity downturn of 2000–02.[32]

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[30] The uncertainty was exacerbated by the fact that it was often difficult for investors to receive timely information on underlying loan performance and hence derive estimates of fair value.

[31] See footnote 18 for examples.

[32] For example, by 2006 the Financial Accounting Standards Board (FASB) in the United States announced it would require publicly traded companies to declare the up-to-date funding status of their pension and benefit plans at the end of their fiscal years. In the past, companies typically reported only smoothed measures of funding statuses in the footnotes of their form 10-K's.

This often entailed a significant increase in holdings of fixed-income securities, including structured credit, at the expense of equities.[33]

Table 1. Basel II Standardized Ratings-Based Risk Weights
(In percent)

Obligors [1/]	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to BB-	B+ to B-	Below B-	Unrated
Sovereigns	0	20	50	100	100	150	100
Banks (Option 1) [2/]	20	50	100	100	100	150	100
Banks (Option 2) [3/]	20	50	50	100	100	150	50
Banks (Option 2, short term)	20	20	20	50	50	150	20
Corporations	20	50	100	100	150	150	150
Securitization Tranches [4/]	20	50	100	350	Deducted	Deducted	Deducted
Retail Loans [5/ 6/]							75
Retail Mortgage Loans [6/]							35
Retail Mortgage Loans— 90+ days past due [6/]							100

Source: Bank for International Settlements (2004).

1/ In case of split ratings, the higher risk weighting applies, if the bank has two split ratings; if a bank has three ratings, the risk weighting is based on the two highest ratings.
2/ Option 1: Risk weight for a bank is derived from the external rating of the sovereign of the country in which the bank is incorporated.
3/ Option 2: Risk weight is determined by the bank's external credit rating.
4/ "Deducted" refers to subtraction from capital (in the numerator of the capital adequacy ratio).
5/ Not secured by real estate.
6/ Retail loans are generally not rated.

Excessive reliance on CRAs

Many investors became excessively reliant on external credit ratings (and eschewed their own due diligence responsibilities) for two principal reasons. First, the mandate of many investors explicitly referenced credit ratings as the basis for investment eligibility. Second, many investors did not have sufficient internal resources to conduct in-depth independent credit analysis across the broad spectrum of fixed-income products, particularly with regards to securitization. As such, some investors relied upon issuer-paid credit ratings as the primary (if not sole) determinant of credit worthiness.

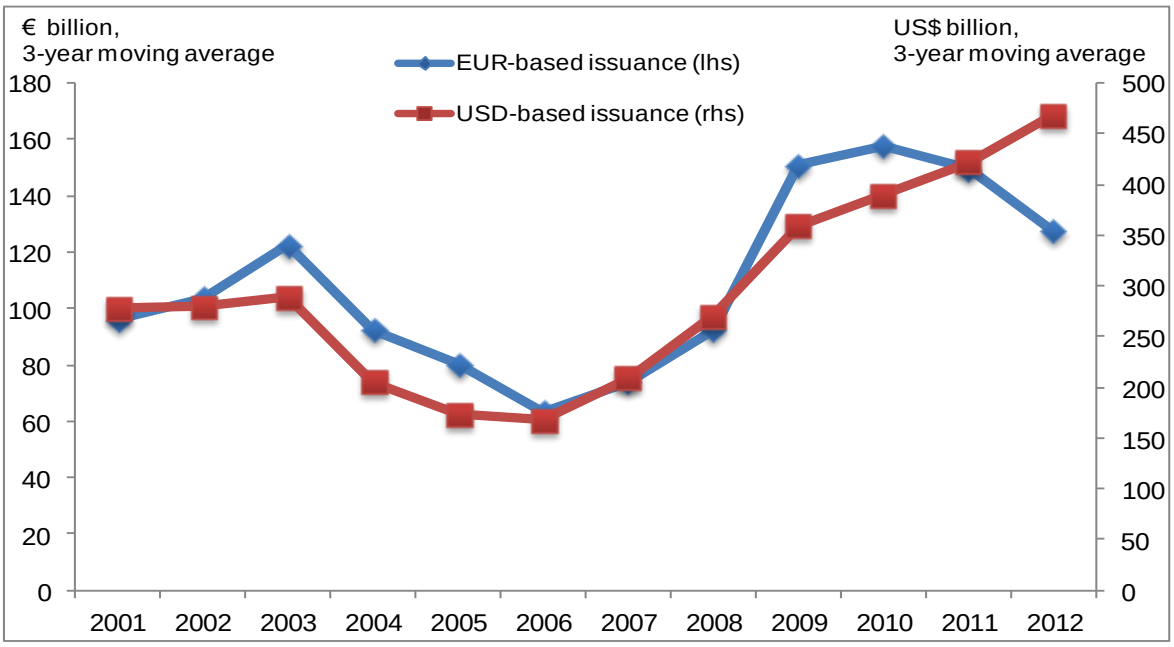
Misconception and mismeasurement of diversification properties

The performance of structured credit compared favorably to conventional corporate credit over the 1998–02 period and also fared well relative to equities over the 2000–03 period.[34] Moreover,

[33] In a high profile example, Boots Pensions Ltd., one of the top 50 pension funds in the United Kingdom, moved to a 100 percent bond allocation. A 2003 Harvard Business Review article entitled, "Pension Roulette: Have You Bet Too Much on Equities?" was symptomatic of the broad sentiment at the time (Stewart III, 2003).

in the case of U.S. residential home prices, there had been only a single calendar year in which nominal prices actually declined since 1942—by 1 percent in 1990.[35] This track record of sustained outperformance (during difficult periods for other asset classes) likely emboldened investors to step farther out along the risk and illiquidity spectrum. Additionally, volatility and correlation assumptions embedded in investors' internal risk measurement and asset allocation models proved overly optimistic.

Figure 7. Issuance of Investment Grade Corporate Debt:
The United States and Europe



Source: Dealogic, Deutsche Bank; and IMF staff.

[34] This also led some investors to turn to so called portable alpha investment approaches, with the aim of generating outperformance via short duration ABS and mortgage portfolio holdings.

[35] Based on the Case-Shiller Index of U.S. nationwide prices.

III. IMPEDIMENTS TO SECURITIZATION MARKETS—AFTER THE CRISIS

The shortcomings in the financial system brought to light by the global financial crisis have justifiably ignited a vigorous response from regulators and policymakers. In what is a difficult task, regulatory and other initiatives have made considerable progress in fostering a more stable global financial system.[36] However, for securitization to play a positive role in support of growth and financial stability, more remains to be done. This section identifies current obstacles in the rehabilitation of a healthy securitization market, as they relate to (a) recent regulatory proposals; (b) the operational infrastructure of securitization markets; and (c) official sector involvement in securitization markets.

A. Regulation

The task of re-regulating securitization markets is a complex one—new measures must strike a fine balance between preventing the accumulation of excesses on the one hand and unduly constraining securitization activity from supporting credit and economic growth on the other**.** While well-intentioned, there is a risk that some regulatory initiatives may fall short of achieving both of the aforementioned objectives. As discussed in greater detail below, three issues feature most prominently in this regard. First, some initiatives may give rise to incentives which inadvertently encourage leveraged product structures and capital arbitrage, contribute to the exploitation of "cliff effects," or possibly facilitate regulatory arbitrage. Second, the imposition of asymmetric capital charges, where relatively punitive charges apply to securitized assets vis-à-vis assets with similar characteristics, could result in the concentration of risk in other areas of the capital markets (such as covered bonds) in the coming years. And third, regulatory complexity and uncertainty continue to be cited by industry participants as significant obstacles to the resumption of growth-supportive securitization markets.

In response to the fallout from the financial crisis, several new regulatory initiatives have emerged in the area of bank capital requirements, some elements of which require further deliberation. In June 2012, U.S. regulators proposed a new approach for capital requirements—the simplified supervisory formula approach (SSFA)—as a response to problems caused by the reliance on external credit ratings by banks. Under the SSFA, banks are required to calculate the risk weights of securitization holdings without reference to external credit ratings.[37] Subsequent to this initiative, in December 2012 the Basel Committee on Banking Supervision (BCBS) proposed substantial revisions, in the form of a consultative document, to capital requirements associated with securitized assets (BCBS, 2012). The BCBS proposals attempt to build a comprehensive framework with the aim of ensuring capital requirements that are more prudent and risk-sensitive than was the case under the Basel II framework. The aims and distinguishing features of these approaches are presented in Box 2. Following the publication of the BCBS proposals, a vigorous

[36] For broad reviews on the status of reforms to the global financial system, see, for instance, IMF, 2012; Tarullo, 2012; and Carney, 2012

[37] By not relying on CRA ratings as inputs, the SSFA complies with Section 939A of the Dodd-Frank Act, which prohibits the use of external credit ratings for a number of statutory purposes.

industry response followed over a three-month window in the form of 42 separate submissions across a range of respondents, including banks, banking associations, mortgage lenders, securitization forums, credit rating agencies, and asset managers.[38] Based on its 2012 proposals, the BCBS has commissioned a quantitative impact study, which is currently ongoing; the discussion in this paper is meant to contribute to this ongoing dialogue.

Box 2. Overview of the BCBS Proposals on Capital Charges

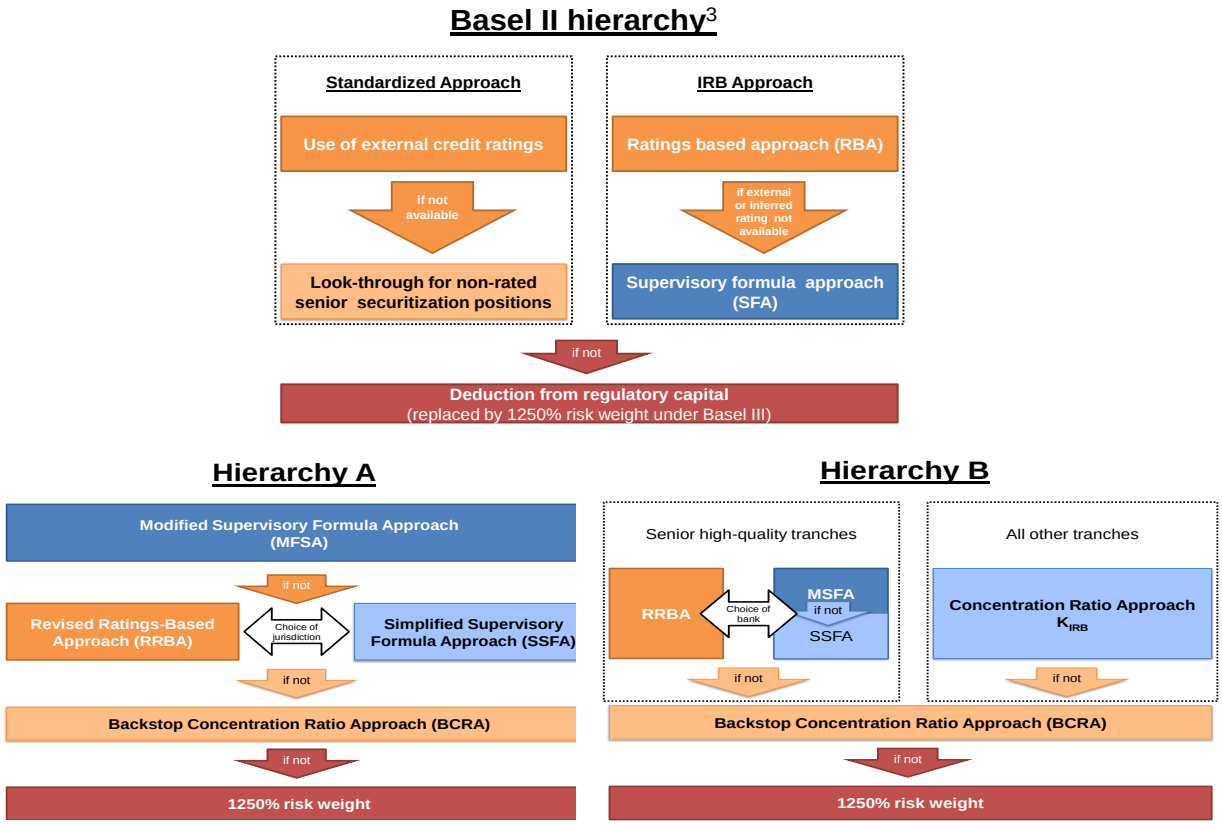
This box presents a brief overview of the different methodologies to be used in the calculation of capital charges as part of the BCBS (2012) proposals.

In December 2012, the BCBS published a consultative document "Revisions of the Basel Securitization Framework," aiming to make capital requirements more prudent and risk-sensitive and to reduce the reliance of the industry on external credit ratings. The new concept builds on the Basel II securitization framework by introducing more methodologies for use in the calculation of capital charges. Each approach differs slightly in terms of its benefits, suitability, complexity, and limitations.

The BCBS proposes replacing the existing Basel II standardized approach (SA) and the IRB approach to risk-weighting relevant to securitization, with two alternative hierarchies (A and B). Banks continue to be offered a degree of choice in terms of the methodology used in the calculation of capital charges, though the technical details differ (and generally result in more punitive capital charges for securitization) compared to Basel II. Under Hierarchy A, banks which can use the IRB approach (IRB-banks) shall use the modified supervisory formula approach (MSFA) to the extent possible.[1/] The MSFA requires very comprehensive and detailed loan-level data and is generally considered by industry participants to be highly technical in nature. When a bank does not employ the MSFA, the bank will then have to use either the RRBA or the SSFA, with the latter excluding the use of external credit ratings (the framework to be used will depend on the risk-weighting method chosen by the jurisdiction where the bank operates).[2/] If the RRBA or the SSFA cannot be applied, a fallback option is available in the form of the backstop concentration ratio approach (BCRA).[3/] Under the other broad option available to banks, known as hierarchy B, the RRBA can be employed, or, depending on the choice of the jurisdiction in question, the MSFA, or the SSFA. However, in order to limit model risk, these options are only available for high-quality senior tranches. For all other tranches, IRB-banks need to use the broad-based concentration ratio approach, based on their calculated capital requirements for the underlying securitized assets.

[38] Submissions can be found at: http://www.bis.org/publ/bcbs236/comments.htm.

New Hierarchies Proposed by the BCBS



The MFSA uses highly granular, loan-level data for the calculation of capital charges. Banks using the MFSA need comprehensive information about the underlying portfolio. It modifies Basel II's supervisory formula approach (SFA) by taking into account potential future credit deterioration of the underlying pool due to longer-maturity obligations. In addition, the calculation of capital charges depends on the degree of credit enhancement and tranche thickness. The information required to estimate parameters for every underlying exposure includes estimates of asset value correlations, the probability of default (PD), exposure at default (EAD), and loss given default (LGD), all of which are used to determine the capital requirements for the underlying pool of securitized assets (K_{IRB}). All in all, the approach is very detailed and calibrated more conservatively than the SFA of Basel II; however, it implies additional complexity. In addition, a specific proportion of the junior tranches of any securitization have to carry a 1,250 percent risk weight. This specific proportion of junior tranches subjected to this risk weight is a function of the capital charges of the underlying collateral assets derived by the investors' internal risk models.

The new RRBA replaces both the ratings based approach (RBA) and SFA under Basel II. In contrast to the RBA, the RRBA requires at least two eligible credit ratings for securitization exposures. In addition, the RRBA incorporates two new factors in order to fine-tune capital charges, namely (i) the seniority and maturity of a tranche; and (ii) the size of a tranche, or tranche "thickness," relative to the other tranches in a securitization. Loan pool data are not used as a determinant in capital requirements, in contrast to the MFSA.

The SSFA calibrates capital requirements based on the weighted-average capital requirement of the underlying exposure, using the capital charges applied under the SA. Risk weights are assigned according to the subordination level, tranche thickness (adjusted for delinquencies), and a calibration parameter to reduce cliff effects. In addition, part of the junior tranches of any securitization has to carry a 1,250 percent risk weight. The proportion is a function of the risk weights of the underlying collateral assets.

The BCRA is a fallback approach that banks may use before the maximum risk weight of 1,250 percent would be imposed. As a relatively simple method, capital charges for the underlying pools are used as determined under the SA and reflect the senior or non-senior position of a tranche.

The new framework employs further adjustments. Inferred ratings of subordinated tranches may be applied to unrated senior securitizations positions. At the same time, the maximum capital charge for retained securitization exposure is not supposed to exceed the exposures generated by the pool of underlying assets. "Retained securitization" refers to a securitization which remains 100 percent with the originating bank; no part of any tranche is sold to a third party in this case.

1/ IRB banks apply their own credit analysis and models to the credit evaluation process, for which they need supervisory approval. This is usually the case for larger and more sophisticated banks. IRB-banks usually end up with total risk-weighted assets (RWA) lower than RWA computed using other approaches

2/ IRB banks apply their own credit analysis and models to the credit evaluation process, for which they need supervisory approval. This is usually the case for larger and more sophisticated banks. IRB-banks usually end up with total risk-weighted assets (RWA) lower than RWA computed using other approaches

3/ The BCRA calculates the capital charge as the minimum of either (i) 1,250 percent or (ii) the underlying pool's capital charge under the standardized approach, divided by the "detachment point" (the percentage threshold at which credit losses would result in a total loss of the principal of each tranche), in order to mitigate the issue of leverage.

Perverse Incentives

Leverage and capital arbitrage

The securitization framework of Basel II allowed the structuring of highly leveraged transactions. This was due to (i) significant differences in capital requirements between junior and senior tranches and (ii) the scope for engineering specific ratings for individual tranches, allowed securitization originators to maximize leverage.[39]

[39] Leverage is achieved because the capital charge applied to the most junior (equity or non-rated) tranche is many multiples of that applied to the highest-rated tranche, with the precise multiple differing from one deal to the next. As deals with a thicker equity tranche can attract a much higher aggregate capital charge, originators have an incentive to

(continued)

Incentives for leverage under the SSFA, MFSA, and BCRA proposed by the BCBS (2012) have been reduced but not fully eliminated. The approaches proposed under the BCBS (2012) impose a requirement of a risk weight of 1,250 percent on a fixed proportion of the junior tranches, with this proportion changing under the alternative approaches. This largely eliminates the possibility to exploit differences in risk weights at the bottom of the capital structure. It is worth to note that the RRBA offers the highest potential for structuring highly leveraged transactions. Table 2 shows how capital requirements for junior tranches under the RRBA change depending on the seniority, maturity, and thickness of the tranches in the structure.

Capital arbitrage in tranche structures might still be possible. Although incentives for leverage have been reduced, a possibility exists for originators to arbitrage capital in the structure above the tranches subjected to the maximum risk weight of 1,250 percent. Sufficiently large differences in capital charges between senior and junior tranches may provide incentives to originators to optimize tranche sizes, hence minimizing capital charges, while selling junior tranches to non-bank investors. As seen in Table 2, under the SSFA, moving one level beyond the most senior tranche leads to a 28-fold increase in risk weight, from 20 to 567 percent.

Cliff effects

The nature of "cliff effects" affecting the capital charges under BCBS (2012) versus Basel II have changed considerably, depending on the methodology, with their magnitude being generally reduced. It should be noted that the SSFA and the MFSA do not incorporate ratings as inputs and employ continuous functions; hence, cliff effects are mitigated under these approaches because small changes in input parameters will lead to smooth changes in capital charges.[40] The RRBA is still dependent on CRA ratings, which may have the potential for sudden, large changes to risk weights when ratings are modified. Nevertheless, under the RRBA approach, cliff effects are mitigated through preferential treatment of senior tranches; hence, a downgrade of senior tranches does not imply as significant an increase in capital charges as for non-senior tranches. Tables 2 and 3 show that under RRBA the relative changes in risk weights between letter ratings are generally smaller amongst the non-senior tranches than under the SA.[41] An example of how capital charges under the alternative approaches change when moving from AAA to AA ratings and from BB to non-rated status is provided in Figure 8. While the new RRBA results in smaller cliff effects than the approaches under Basel II when moving down one letter rating from the BB-

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minimize the size of this tranche and hence decrease the subordination protection offered to investors higher up the capital structure.

[40] For the SSFA, any changes in the capital requirements of a bond (tranche) occur only in line with delinquencies or losses occurring in the underlying pool, which will lead to changes in the structure of the securitization. With the data underlying the SSFA to be updated at least at a quarterly frequency (in the United States), the capital requirements of a particular tranche will change with its attachment point, its detachment point, its thickness, and to changes in the capital charges applicable to the non-defaulted collateral.

[41] At shorter maturities, we sometimes observe higher relative changes under RRBA than under SA. See Tables 2 and 3, RRBA (maturity = 1).

rated tranche to the non-rated tranche, a more notable cliff effect exists under the new proposals when moving from the AAA-rated tranche to the AA-rated tranche.

Table 2. Illustrative Calculation of Bank Capital Requirements under Basel II and the New BCBS Proposals (U.S. High-Quality Mortgage Deal) 1/ 2/
(In percent)

Tranche	Credit Rating	Tranche Thickness	Basel II				BCBS proposals							
			SA		IRB		SSFA		RRBA (maturity=1) 3/		RRBA (maturity=5) 3/		BCRA	
			RW	CCR [4]	RW	CCR [4]	RW	CCR [4]	RW	CCR [4]	RW	CCR [4]	RW	CCR [4]
A1	AAA	92.95	20	1.49	7	0.52	20	1.49	20	1.49	49	3.64	50	3.72
B1	AA	2.65	20	0.04	8	0.02	567	1.20	67	0.14	281	0.60	1,250	2.65
B2	A	1.40	50	0.06	12	0.01	1217	1.36	220	0.25	422	0.47	1,250	1.40
B3	BBB	1.15	100	0.09	60	0.06	1,250	1.15	609	0.56	707	0.65	1,250	1.15
B4	BB	0.80	350	0.22	425	0.27	1,250	0.80	1,181	0.76	1,250	0.80	1,250	0.80
B5	NR	1.05	1,250	1.05	1,250	1.05	1,250	1.05	1,250	1.05	1,250	1.05	1,250	1.05
Weighted Average Risk-Weight			37		24		88		53		90		135	
Total Capital Charge ($mn) on $100mn Deal				2.95		1.93		7.05		4.24		7.21		10.77
Multiple of Capital Charge on Deal vis-à-vis if Loans Held On-Balance Sheet			0.74		0.48		1.76		1.06		1.80		2.69	

Source: Fitch Ratings; and IMF staff.

1/ A US$100 million transaction involving high-quality U.S. mortgages is assumed.

2/ The risk weight of the underlying loans is set at 50 percent, implying a total capital charge for the underlying loans of 4 percent (i.e., 50 percent of 8 percent), or US$4 million.

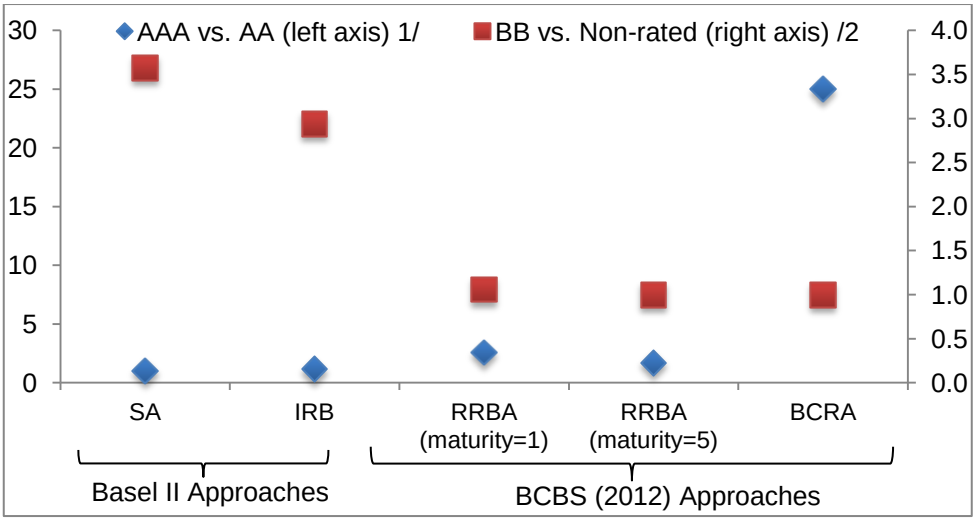
3/ At origination, mortgages will usually have a maturity closer to five years than to one year. The RRBA formula resulting in the higher risk weights and capital charges would therefore apply.

4/ Contribution to Capital Requirement (CCR) denotes the U.S. dollar amount that each tranche contributes to the capital requirement of the whole deal, based on a US$100 million securitization.

Regulatory arbitrage

The inconsistency between the SSFA and the RRBA also raises the possibility of regulatory arbitrage among jurisdictions that choose between the two approaches. In some circumstances the SSFA could result in higher capital charges than RRBA—particularly for mezzanine tranches—even if the underlying asset quality is the same. The BCBS has acknowledged that capital charges for similar exposures could vary substantially depending on the methodological choice (BCBS, 2012).

Figure 8. Proportional Increase in Risk-Weights When Moving Down One Letter Rating 1/



Source: Fitch Ratings; and IMF staff.

1/ Relative increase in capital charges when moving from an AAA-rated tranche to a AA-rated tranche.

2/ Relative increase in capital charges when moving from a BB-rated tranche to a non-rated tranche.

The potential for significantly higher capital charges assigned to a pool of assets in securitized form across different methodologies is illustrated in Table 3. For instance, , the total capital charge for the US$100 million securitization deal under the BCBS (2012) proposals could range from US$10.26 million to US$34.86, 1.7 and 5.8 times higher than on the underlying loans ($6 million). This large difference in capital charges can give rise to regulatory arbitrage. In addition, such significant additional capital charges would potentially make the holding of securitizations uneconomical for many banks. Regulators may want to introduce a greater degree of consistency on the capital charges imposed at the transaction level under the different approaches.[42]

U.S.-based banks are bound with a minimum capital charge floor defined by the SA; the SSFA will likely become the main method employed for computation of bank capital charges in the United States. The Collins Amendment to the Dodd-Frank Act imposes a floor for capital charges, defined by the SA. Therefore, this amendment discourages the use of IRB-approaches, since the benefits of lower capital charges that would normally exist under these approaches will be void. Therefore, the SSFA might become the most important approach for the calculation of securitizations' capital charges at the global level. The non-U.S. offices and subsidiaries of banks

[42] The BCBS (2012) acknowledges this by making *retained securitizations* under any of the proposed risk-weight calculation approaches subject to the same capital charge as the underlying loan portfolio. (BCBS, 2012, p. 32). This is often referred to as "capital equivalence" (see also Gordian Knot, 2013; Credit Suisse, 2013; and GFMA, 2013). "Retained securitization" refers to a securitization which remains 100 percent with the originating bank; no part of any tranche is sold to a third party in this case.

operating under the umbrella of the Dodd-Frank Act will have to use the more conservative approach (among the approaches proposed under the BCBS) for the determination of capital charges, further impacting holdings of securitizations (as well as potentially other products) detrimentally.

Table 3. Illustrative Calculation of Bank Capital Requirements under Basel II and New BCBS Proposals (Hypothetical Consumer Deal)
(In percent)

Tranche	Credit Rating	Tranche Thickness	Basel II				BCBS proposals							
			SA		IRB		SSFA		RRBA (maturity=1)		RRBA (maturity=5)		BCRA	
			RW	CCR[3]	RW	CCR[3]	RW	CCR[3]	RW	CCR[3]	RW	CCR[3]	RW	CCR[3]
A1	AAA	15.39	20	0.25	7	0.09	20	0.25	20	0.25	112	1.38	75	0.92
B1	AA	15.73	20	0.25	8	0.10	20	0.25	67	0.84	209	2.63	177	2.23
B2	A	25.87	50	1.03	12	0.25	20	0.41	166	3.44	246	5.09	218	4.51
B3	BBB	24.48	100	1.96	60	1.17	20	0.39	333	6.52	387	7.58	349	6.83
B4	BB	5.94	350	1.66	425	2.02	61	0.29	1,021	4.86	1,177	5.60	810	3.85
B5	NR	12.58	1,250	12.58	1,250	12.58	861	8.67	1,250	12.58	1,250	12.58	1,192	12.00
Weighted Average Risk-Weight			222		203		128		356		436		379	
Total Capital Charge ($mn) on $100mn Deal				17.74		16.22		10.26		28.49		34.86		30.34
Multiple of Capital Charge on Deal vis-à-vis if Loans Held On-Balance Sheet			2.96		2.70		1.71		4.75		5.81		5.06	

Source: Fitch Ratings and IMF staff.

1/ A US$100 million transaction involving U.S. consumer loans is assumed.

2/ The risk weight of the underlying loans is set at 75 percent implying a total capital charge for the underlying loans of 6 percent (i.e., 75 percent of 8 percent), or US$6 million.

3/ Contribution to Capital Requirement (CCR) denotes the U.S. dollar amount that each tranche contributes to the capital requirement of the whole deal, based on a US$100million securitization.

Asymmetric capital charges

Markedly different capital treatment of securities with similar risk characteristics could lead to unintended consequences, including the concentration of risk in new areas and regulatory arbitrage. Regulatory initiatives in the banking and insurance industry, particularly in Europe, treat securitized assets asymmetrically vis-à-vis other asset classes (such as covered bonds) which may have similar risk characteristics (as defined by a combination of credit, duration, and

liquidity).[43] By encouraging a significant increase in bank cross-holdings of assets such as covered bonds, this could exacerbate interdependence among banks, thus amplifying risk concentration in the banking system.[44] Banks may also attempt to benefit from regulatory arbitrage when capital (and liquidity) charges differ markedly across securities with similar duration, credit, and liquidity risk.

Examples of asymmetric treatment arise between securitized products and covered bonds in the EU Capital Requirements Directive for banks, and the EU Solvency II proposal for insurers. The directive stipulates that covered bonds meeting certain criteria attract a 10 percent risk weight—just half of the minimum risk-weight floor under the Basel framework.[45] This risk weight is significantly lower than the risk weights applied to comparable securitization exposures.[46] The proposed EU Solvency II capital requirements for the insurance sector are also heavily skewed in favor of covered bonds over securitized products with similar credit, duration, and liquidity risk characteristics.[47] For instance, spread-risk factors under Solvency II (one of three determinants of capital charges) for AAA–rated securitized tranches and covered bonds are 7 and 0.7 respectively, for bond durations of five years or less. As a result, even in instances where the market value and duration of both products are equivalent, the capital requirement for securitized assets would be ten times higher than for covered bonds. These requirements are likely to reduce the potential size of the investor base for the asset class in Europe.[48,49] This is undesirable given insurance companies typically have a medium- to long-term investment horizon and an appetite for a

[43] While the dual-recourse nature of covered bonds may offer a higher degree of security than securitizations, a number of risk factors exist which reduce this potential advantage. Appendix IV discusses the similarities and differences between the two asset classes.

[44] Elevated bank cross-holdings plagued the Japanese banking system in the 1990s, and interconnectedness across institutions has been identified as a systemic risk factor by regulators and analysts.

[45] Bonds that comply with Article 52 (4) of the Undertakings for Collective Investment in Transferable Securities Directives (2009/65/EC) are eligible.

[46] It is possible that the "effective" capital requirement for covered bonds may be higher than it appears at first glance, once the capital charge on collateral comprising the cover pool is taken into account. This collateral varies from one country (and one covered bond) to the next, but typically comprises loans secured on real estate, loans to municipalities, and loans guaranteed by the state, among some other asset types.

[47] Solvency II will introduce economic risk-based capital requirements for insurance companies, wherein the capital requirement is calculated as a product of three components—market value, duration, and spread-risk factor. The spread-risk factor is a predetermined parameter that varies according to credit rating (a high rating results in a lower spread-risk factor) and different asset classes (European Insurance and Occupational Pensions Authority, 2012).

[48] S&P (2012a) reports that European insurance companies doubled their allocation to covered bonds while (marginally) reducing securitization in their fixed-income asset allocation over the 2007–11 period, due at least in part to the adverse treatment expected to be leveled on securitized assets under Solvency II.

[49] Market participants estimated that at least 15 percent of securitizations in Europe were placed with insurers before the crisis.

moderate amount of credit risk, which makes them well-suited as potential homes for quality securitized assets.[50]

Proposed calculation methodologies for the liquidity coverage ratio (LCR) also afford more favorable treatment for covered bonds relative to securitized assets with similar risk characteristics.[51] In January 2013, the BCBS agreed that certain RMBS would be included in the calculation of the LCR, as part of the adequate stock of unencumbered high-quality liquid assets (HQLA) (BCBS, 2013).[52] While this move has been welcomed by market participants, the differential treatment between covered bonds and securitized assets remains an issue. For instance, the LCR classifies covered bonds with a AA-rating or higher as a Level 2A asset (second only to cash reserves and sovereign debt), thereby attracting a haircut of just 15 percent. By contrast, RMBS are classified as Level 2B assets, in which case a 25 percent haircut applies. Moreover, to be classified as a Level 2B asset, RMBS need to meet a number of conditions, including full recourse for mortgages and loan-to-value (LTV) ratios at or below 80 percent for each loan. However, high-quality RMBS usually have at least some high-LTV mortgages backing them (including most Dutch RMBS). In addition, mortgages are rarely full recourse in many U.S. states. As a consequence, in both instances these RMBS are ineligible for inclusion in the LCR.

The net stable funding ratio (NSFR) also effectively incentivizes the issuance of covered bonds relative to securitizations. The NSFR is calculated as the proportion of long-term assets that are funded by long-term and stable funding (such as customer deposits). In order to calculate "long-term assets" for NSFR purposes, highly rated (i.e., above AA) covered bonds and corporate bonds receive a 20 percent weight, while similarly rated securitizations are subject to a 100 percent charge (BCBS, 2010).

High capital and liquidity charges compared to other financial assets can lead to a migration of certain securitized assets into the non-bank financial system. A case in point is the recent

[50] If the capital charges allocated to both the issuing bank and the investing banks are aggregated, the difference in terms of capital charges between securitizations and covered bonds will decrease. The securitized assets are off-balance sheet, whereas the assets inside the cover pool still attract the capital charge pertaining to the underlying assets. In most cases, the cover-pool assets consist of high-quality mortgage loans, which would attract a 50 percent risk weight in the United States. The bank-wide risk weights for such a covered bond add up to 60 percent (10 percent add-on for being a covered bond), implying a capital requirement of 4.8 percent, versus 7.05 percent in the securitization represented in Table 2. Although the differences between the capital charges of a securitization and a covered bond derived from the same collateral will differ on a case-by-case basis, the covered bond in most cases will likely attract lower total capital charges than the securitization, based on the proposals in the BCBS (2012).

[51] This applies to the BCBS proposals and not those made by the U.S. Federal Reserve.

[52] LCR requires banks to hold a sufficient buffer of HQLA to cover net liquidity outflows during a 30-day period of stress. The stock of HQLA (numerator) should include assets of high credit-quality and liquidity. The stress scenario to determine the net cash outflows (denominator) reflects both institution-specific and systemic shocks. The LCR will be introduced by 2015 after an observation period. A general requirement for banks to maintain appropriate liquidity coverage begins in 2013.

mortgage securitizations originated by Redwood Trust, a mortgage REIT. Redwood purchased the bulk of the mortgages from third parties and securitized them with the help of an investment bank. Redwood, a non-bank, serves as the originator and retains the equity tranches. Although it has "skin-in-the-game," a number of the subprime originators were organized as REITs before the crisis and owned the equity tranches in the deals. This seemingly did not have a positive effect on the quality of their originations or on the securitizations. Risk-appropriate regulation and supervision of such shadow-banking entities might be in order.[53]

Regulatory complexity and uncertainty

Regulatory complexity and uncertainty have been cited by industry participants as key factors preventing securitization markets from functioning efficiently. It should be acknowledged however that the complexity of the international financial system makes associated regulation a difficult task, and inevitably some measures will be less than optimal. Nevertheless, in the ongoing quest by authorities to ensure regulation is as efficient and timely as possibly, we offer the following suggestions.

In its present form, some aspects of the Volcker Rule in the United States could substantially increase legal and regulatory risk, as well as the costs of straightforward securitization transactions designed to help finance the real economy.[54] The Volcker rule includes SPVs and ABCP conduits under the "covered fund" designation, which also includes hedge funds and private equity funds, and significantly restricts banks and their affiliates from sponsoring or having ownership interests in them.[55, 56, 57] Even if a particular securitization transaction is not adversely affected by this ownership restriction, the strict compliance and recordkeeping provisions required by the Volcker Rule are likely to increase origination costs, possibly substantially (PwC, 2012, and Cadwalader, 2012). In addition, banks and their affiliates are

[53] The issue as to whether a securitization's originator should retain skin in the game in the form of a horizontal or a vertical slice becomes relevant in this context. A vertical slice, which encompasses proportional shares of each tranche, will be much cheaper for an originating bank, from a capital perspective, versus a vertical slice, usually involving the junior tranche, which carries a 1,250 percent charge,

[54] The Volcker Rule is a specific section of the Dodd-Frank Wall Street Reform and Consumer Protection Act (2010), which regulates various aspects of investment banking activity, including securitization. The Vickers (2011) and Liikanen (2012) proposals for the United Kingdom and EU, respectively, differ from the Volcker Rule in principle, in that they suggest the separation of investment and retail banking activities. The impact on securitization from these proposals is uncertain.

[55] A covered fund is defined as any company that is exempt from regulation under the Investment Company Act of 1940. Hedge funds, private equity funds, enhanced cash funds, and many SPVs make use of these exemptions.

[56] Within the realm of ABCP conduits, we refer to single- and multi-seller conduits, which mostly finance nonfinancial firms via the securitization of trade receivables.

[57] Regulated institutions can own up to three percent of the capital of covered funds, but must satisfy further restrictions.

prohibited from providing loans, letters of credit, or guarantees to such funds.[58] These factors are likely to increase legal and regulatory risk and costs and, in turn, discourage the origination of straightforward securitizations and single- and multi-seller ABCP conduits.

Overlapping regulatory measures can increase the regulatory complexity and compliance costs associated with the efficient functioning of securitization markets. In the United States, the Dodd-Frank Act extends the Commodity Futures Trading Commission (CFTC) regulations regarding commodity pools under the Commodity Exchange Act (CEA) to essentially all entities that use over-the-counter (OTC) swaps, including securitization vehicles.[59] At the same time, the CFTC has rescinded the exemption from the CEA for highly sophisticated investors. SPVs will have to register with both the CFTC and the SEC, which will increase compliance costs significantly. In the second half of 2012, some securitization vehicles were exempt from the regulations applicable to commodity pools, but synthetic securitizations, CDOs, collateralized loan obligations (CLOs), ABCP conduits, and covered bonds continue to be subject to the new CFTC rules (Sweet and Springer, 2012a, and Sweet, Sterling, and Springer, 2012b).

Banking and insurance regulatory frameworks remain subject to considerable uncertainty in many jurisdictions, and this continues to hamper a revival in securitization markets. While market consultation over the Basel III proposal concluded in mid-March 2013, finalization and implementation of the rules is likely to extend over a long period. Further, the finalization and implementation of the Solvency II directive has been subjected to repeated delays, with January 2016 given as the most recent target date.

Important elements of the Dodd-Frank Act remain undecided, including the final classification of the qualified residential mortgage (QRM). The QRM will define mortgages that can be securitized without the 5 percent risk retention requirement imposed by the Dodd-Frank Act on an RMBS issuer. The publication of the formal definition of QRM has been expected for some time. Market participants have also expressed concern that the QRM standards could be inconsistent with the European risk retention rule if not appropriately crafted. Additional details on QRM can be found in Appendix V**.**

The lack of guidance in the BCBS (2012) as to which approach to follow to define tranche maturity may give rise to significant uncertainty**.** The time-tranching inherent in most securitizations leads to very different expected maturities across the various tranches of a securitization. One way to compute the expected maturity of each tranche of a deal is to use the

[58] Covered transactions are defined in the Federal Reserve Act's (FRA) Section 23A, which includes loan provisions, letters of credit, and guarantees (see also Board of Governors of the Federal Reserve, 2012, and Dodd-Frank Act, Section 619, Subsection f.1.). Notably, the Volcker Rule's Super 23A goes beyond the existing Section 23A of the FRA by not only constraining the size and scope of covered transactions, but prohibiting them outright.

[59] Specifically, many professionals who are involved in commodity pools must now be registered as either commodity pool operators (CPOs) and/or commodity trading advisors (CTAs). CPO refers to an operator of pooled funds that trade futures contracts, while the CTA classification refers to a person or entity providing trading advice to a commodity pool.

legal final maturity of the underlying assets, and then apply this maturity to the tranches according to the prospectus. However, many of the assets underlying securitizations allow borrowers to prepay their obligations; this is the general case with U.S. mortgages, with credit cards, or with many corporate loans. In such cases, the BCBS (2012) is not clear as to what methodology should be used to estimate maturities.[60] This affects MFSA and RRBA. In addition, the BCBS (2012) applies a minimum maturity of one year and a maximum of five years. Applying a minimum maturity of one year, although appearing to be a more conservative approach at first glance, will discourage the holding of tranches with shorter residual lives by banks. With such short durations, they will generally have limited risk, yet be more likely to be held outside the banking system given the higher minimum capital requirements under the proposal.

B. The Operational Infrastructure of the Securitization Markets[61]

The operational infrastructure of securitization markets showed clear deficiencies during the crisis. These need to be improved as a necessary condition for the development of healthy securitization markets.

Operational infrastructure

Insufficient resources for servicers and trustees

Servicers and trustees, both of which comprise key components of the operational infrastructure of the U.S. mortgage market, were overwhelmed during the housing crisis. The servicer has the responsibility of collecting payments from borrowers, transferring them to the trustees of the SPV, and taking remedial action in the event a payment is late (including foreclosing on a property in case of default). The trustee represents the interests of investors by establishing the SPV, administering it, and receiving and distributing payments from the servicer. Given the small profit margins involved, servicers and trustees were resource constrained and thus had business models that were calibrated to "normal times" of low defaults, rather than periods of heightened stress. Once the U.S. mortgage crisis intensified, it quickly emerged that both servicers and trustees were insufficiently resourced to efficiently address the flood of foreclosures that ensued.[62]

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[60] The BCBS (2012) relies on BCBS (2006), paragraph 320. The effective maturity is defined as the time-weighted average of "cash flows (principal, interest payments and fees) contractually payable by the borrower in period *t*."

[61] Although the discussion below is centered on the U.S. market, many elements of the operational framework for securitization markets are similar across countries.

[62] It has been alleged by some investors that, in addition to being inadequately resourced, conflicts of interest between the owners of some of the servicers and the investors led to the servicers disregarding the interests of investors. The largest servicers in the United States are owned by the largest commercial banks, which had hundreds of billions of second lien mortgages outstanding, serviced by the same servicers. Those second liens were largely worthless if a borrower defaulted; hence, incentives existed for defaults to be underreported and their realization to be delayed. The main assertion by investors is that the servicers' management and employees put the interest of their bank-owners ahead of the interests of the investors in the (first lien) mortgage loans.

Mortgage Electronic Registration Systems, Inc. (MERS) was another weak operational link in the securitization industry**.** From an originating mortgage broker to the eventual issuer of the RMBS, mortgages can change hands a number of times. In 1995, banks and other entities involved in the origination and securitization of mortgages, together with Fannie Mae and Freddie Mac, established MERS as both the beneficial owner of the mortgage and the title-holding entity with the local property registrar. The true economic owner of the corresponding mortgage note was registered in MERS's database, and the mortgage note could then be transferred among different owners—including securitization trusts—without costly and time-consuming paperwork.[63] However, that meant the owner of the mortgage note was not the registered owner of the mortgage. In some cases, legal rulings were delivered in favor of borrowers whose homes had been foreclosed upon under MERS; in others, the ownership of the mortgage note could not be fully established (for instance, because the requisite paper work was lost). Many MERS-related lawsuits were related to the fact that foreclosures were initiated in the name of MERS, a practice which has since been discontinued.[64]

Credit rating agencies

In some cases, CRAs seem to have taken an excessively risk-averse approach in their ratings of securitizations**.** CRAs have come under intense scrutiny from policymakers, regulators, analysts, and investor's post-2008.[65] Unfortunately, these pressures, in some cases, appear to have pushed CRAs to modify requirements for counterparties and cash depositories in a very stringent manner, making securitizations more difficult and costly than justified by the risk characteristics of the structures. With many investors and a number of regulations still relying on CRA ratings, the following items are of particular importance:

Sovereign-ratings caps on securitizations. The credit rating assigned to securitizations generally is capped at a few notches above that of the sovereign. This is particularly an issue in the European periphery, where several sovereigns have suffered multi-notch downgrades.

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[63] In the United States, the term "mortgage" (or "deed of trust") refers to the document that secures the loan with the house; separate from it is the promise by the homeowner to make the contractually agreed upon payments. The latter is called the "mortgage note" (or "promissory note"), and repeated non-payment of such obligation constitutes default. The owner of the mortgage note has the economic interest in the payments and the right to make the decision about course of action in the case of default, including foreclosure or principal reduction.

[64] Germany's refinancing register, established in 2005, and France's legislation from 1993, regarding the transfer of mortgages to securitization vehicles, provide examples of systems of cost-efficient transfer of mortgages fully supported by legal frameworks. Similar practices are followed in other countries. In the German case, the mortgage originator acts as a trustee for the mortgages that have been transferred to a SPV. The SPV legally owns the mortgages in a bankruptcy-remote manner. This is another route by which a cost-efficient and secure ownership chain of mortgages and mortgage notes can be established.

[65] There have been a number of regulatory developments on both sides of the Atlantic (see Appendix VI for more details).

Minimum ratings of swap counterparties. After the crisis, CRAs imposed tougher requirements on original swap counterparties. For instance, derivatives counterparties rated by S&P cannot be rated more than four notches below the rating of the supported security if no collateral is posted (S&P, 2012). This will make securitization origination more difficult and costly.[66]

Minimum ratings of cash depositaries. CRAs have tightened the credit rating requirements for banks holding the cash balances of securitization vehicles.

Bond insurance

Solvency of monoline bond insurers

In the United States, private bond insurance was used to improve the ratings of many ABS and CDO tranches so that banks and asset managers, restricted to holding securities with high credit ratings, could hold more of them. The specialized companies that provided this type of insurance, so called monoline bond insurers, found themselves overwhelmed as the crisis escalated and, in many cases, proved to be undercapitalized and unable to meet the claims made against them.[67]

C. Official Sector Intervention in the ABS Markets

Since 2007, a broad set of policy measures designed to ease strains in global credit markets has been undertaken by governments and central banks. While a thorough review of these measures is beyond the scope of this paper, two particular aspects have impacted securitization markets.

Asset purchase programs and quantitative easing

Several major central banks have engaged in asset purchase programs since the crisis to support the housing market.[68] The purchase of agency MBS by the U.S. Federal Reserve was featured in the U.S. Federal Reserve's various programs of quantitative easing (QE). The Federal Reserve

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[66] By up to 25 bps per annum according to estimates by market participants.

[67] The so called monolines derived their name from the fact that they exclusively provided bond insurance and in an unconditional manner (i.e., contrary to a generic insurance contract with no conditions attached). The largest bond insurers were Ambac Financial Group (AMBAC) and MBIA Insurance Corporation; numerous others represented the next tier.

[68] A number of central banks, most notably the European Central Bank (ECB) (Covered Bond Purchase Program), the Bank of England (BoE) (Asset Purchase Facility), and the Bank of Japan (Asset Purchase Program), have phased out purchases of ABS in recent times. In addition, some direct intervention programs in the U.S. securitization markets have now expired. For instance the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) and the Commercial Paper Funding Facility (CPFF) were closed in February 2010. The U.S. Federal Reserve closed the Term Asset-Backed Securities Loan Facility (TALF) for new loan extensions against newly issued CMBS in June 2010 and for new loans against all other types of collateral in March 2010. TALF loans extended by the Federal Reserve Bank of New York during this program will mature by March 2015. Market participants frequently cited TALF as a particularly important support mechanism for the stabilization of ABS markets..

had undertaken purchases of US$40 billion of agency MBS in the QE3 program of September 2012, to which monthly purchases of US$45 billion of treasury bonds were added in December 2012. The QE4 program is conditionally open-ended (i.e., it will remain in place until certain economic thresholds are met) and is intended to provide support to the housing market by dampening both treasury yields and MBS spreads.

Asset purchase programs and the distortion of price discovery

Market participants have expressed some concern that the non-profit-maximizing buying by the U.S. Federal Reserve has distorted the price discovery process (and thus, perhaps crowded out private capital). This in turn may be impeding the return of a healthy private-label MBS market. Indeed, in 2012 private-label MBS issuance accounted for just 0.7 percent of total MBS issuance, having averaged 17 percent throughout the 1990s (see Figure 5). While it is difficult to precisely isolate the impact that a lack of investor trust, regulatory uncertainty, and central bank asset purchases have each had on this trend, it is clear that the cost/benefit trade-off inherent in these interventions will change through time and needs to be closely monitored (Stein, 2013).

Discount window facilities and haircuts

Inconsistent treatment of securitized assets at discount window facilities

The inconsistent treatment of securitized assets at the discount window of major central banks reduces incentives for banks to invest in securitized assets. While the U.S. Federal Reserve, ECB, and BoE each impose somewhat different eligibility criteria for various types of pledgeable assets at their respective discount window facilities, one common characteristic across these central banks is the inconsistent treatment of securitized assets vis-à-vis other assets with similar ratings and duration:

In the United States, 5–10 year duration covered bonds, in the AA to BBB range, (jumbo) German *Pfandbriefe,* and corporate bonds receive a 7 percent haircut; however, ABS with the same duration and credit rating are subject to a 14 percent haircut.

In the euro area, 0–1 year duration jumbo covered bonds, covered bank bonds, and conventional corporate debt, all in the A to AAA rating category, are subject to a 1 percent haircut. In contrast, eligible ABS with the same maturity and credit rating receive a 10 percent haircut.

In the United Kingdom, 1–3 year duration covered bonds in the A-minus or above category are subject to a 14 percent haircut, vis-à-vis a 17 percent charge for ABS backed by credit cards, student loans, consumer loans, and auto loans, and a 27 percent haircut for commercial mortgage-backed securities (CMBS) of similar rating and duration.

The use of securitizations at the discount window of major central banks has reduced sharply in recent times. For instance the share of ABS in total repo activity within the ECB has declined from 28 percent in 2008 to 16 percent in 2012; and in the two years to end-2012, the volume of ABS used in repos with the ECB declined 21 percent in absolute terms, while the use of covered

bonds as collateral increased 72 percent. In recognition of the issue, and following the biennial review of its risk control framework applied in Eurosystem monetary policy operations, the ECB Governing Council recently announced initial steps to ensure a more level playing field between securities with comparable risks. These steps included a reduction in the haircuts applicable to ABS eligible under the permanent and temporary Eurosystem collateral framework (for instance, from 16 to 10 percent in the example listed above) and a tightening in the risk control measures for retained covered bonds (European Central Bank, 2013). It remains to be seen whether additional measures will follow by the ECB or other major central banks.

IV. POLICY RECOMMENDATIONS

A broad suite of 29 policy recommendations—or "core principles"—is presented below to address the factors that either contributed to the crisis (Section A, covering 16 of them), or that may currently be posing obstacles to the resumption of a robust securitization market (Section B, enveloping the remaining 13 recommendations). These "core principles" are guided by the objective of preserving the beneficial features of securitization, while mitigating those that are potentially harmful. While we readily acknowledge that regulatory and other initiatives have made considerable progress in addressing some of the issues raised in this paper, more remains to be done to create an environment for a vibrant, stable, and sustainable securitization market in the years ahead. It should also be stressed that owing to the highly interconnected nature of the various elements in the securitization chain, future regulatory initiatives will be most effective when they reinforce existing or proposed measures along other points in the chain.

A. Mitigating the Risk of Another Adverse Self-Reinforcing Cycle

Loan origination practices

1. Measures to improve the quality of underlying loan origination practices are to be encouraged. Some of the initiatives proposed under the Dodd-Frank Act in the United States may be applicable in other jurisdictions (notwithstanding the unique aspects of domestic consumer-lending markets). Risk-based frameworks defining regulatory provisions and capital could provide incentives that reinforce solid origination practices.

2. We welcome the establishment of the Consumer Financial Protection Bureau (CFPB) with comprehensive powers not only to regulate, but also to supervise. This pertains particularly to certain nonbanks whose activities the CFPB has reasonable cause to determine pose risks to consumers, allowing it to essentially put under its umbrella all of the previously unregulated lenders.

3. The definition of QM in the United States is a welcome regulatory initiative that directly addresses the issue of underlying loan quality, the general principles of which may have applicability in other jurisdictions. QM aims to protect consumers from being sold inappropriate loans or assuming debt burdens that are unlikely to be serviceable. The ineligibility of certain types of loans for the QM designation (e.g., balloon, negative amortization, exotic loan products),

as well as explicit limits on credit metrics (such as debt-to-income ratios), should help to ensure that the performance of such loans is satisfactory.

4. Some of the provisions in the Dodd-Frank Act, designed to enhance supervision of the home appraisal process, should also be considered by authorities in other countries. Having loan officers (rather than mortgage brokers) select appraisers and maintain records on appraiser performance via a property value registry (with a focus on identifying consistently inflated valuations) should assist in restoring integrity to the appraisal process.

5. Prudential policies could aim to ensure that collateral accepted as the basis for additional forms of new borrowing emphasize cash and income relative to unrealized capital gains in asset prices. Much larger haircuts should apply to collateral based on unrealized asset price gains given the relatively higher volatility of asset prices vis-à-vis cash and income.

Securitization origination

6. While ensuring loan originators retain a semblance of skin in the game may well prove helpful in aligning incentives, it is not a panacea for ensuring a healthy functioning securitization market—regulatory attention should be focused on the broader issue of incentives across the entire securitization chain. The experience in Europe demonstrates that countries in which banks retained virtually all of the underlying risk were not insulated from significant financial turmoil (e.g., Spain). Clearly and consistently enforced RWs can represent a mechanism to ensure skin in the game. The recently instituted RW clauses and other similar measures adopted by Fannie Mae and Freddie Mac will help to improve clarity around loan put-back terms.

7. Regulators should ensure that investors in synthetic and highly complex structured products are highly sophisticated and able to absorb possible losses, particularly if they are banks or other entities of systemic importance. The relatively smooth functioning of securitization markets over the 1970–99 period demonstrates that securitizations based on good collateral, simplicity, and transparency can withstand significant adverse events.

Credit rating agencies

8. Regulators should de-emphasize the role of conventional credit ratings in general. The legal commitments of both the EU (under the EU Regulation on CRAs initiative) and the United States (in the Dodd-Frank Act) to remove statutory references to CRA ratings are welcome steps.

9. The broader issue of flawed incentives in CRA business models remains to be addressed. The issuer-pays model, with its inherent conflicts of interest, continues to dominate the industry, but there are, as of yet, no clear alternatives addressing the full range of associated issues (e.g., enforced rotation of CRAs).

10. Regulators should consider improving transparency of business relationships between issuers and CRAs, as well as compliance by means of separating analysts and sales departments. CRAs could be required to publish revenue shares for each rated entity, which could be done in buckets, (e.g. below 0.5 percent, 0.5–2 percent, 2–5 percent, and above). The same holds for the

ratings processes and remuneration schedules of the CRA employees involved in the ratings process. Data vendors should be encouraged to disseminate this information. Compliance rules to reduce conflicts-of-interest should provide for isolation of the analysts from the revenue decisions and sales relationships. We furthermore welcome the revised European CRA regulation requiring issuers or related third parties to engage at least two different CRAs for the provision of credit ratings on structured finance instruments.

11. Regulators should require CRAs to substantially improve the consistency of disclosure practices associated with the rating of securitized assets. CRAs need to be fully transparent about the methods employed in the ratings process for particular investment products, and openly declare their potential weaknesses. This would include: (i) improved transparency in the use of CRA models, including the assumptions used in deriving model output; (ii) clear disclosure of the difference in methodologies for ratings of conventional fixed-income securities (sovereigns, municipals, and corporate bonds) and securitizations; and (iii) encouragement of CRAs to publish all non-confidential information underlying the rating, including, where applicable, the results of any stress tests. Similarly, appropriate disclosure of all loan-relevant data by the loan originators and securitization arrangers should take place on an ongoing basis.

12. Full transparency over ratings and quality control measures are needed to instill confidence. Ratings agencies and quality control firms should communicate freely with potential investors and, for example, be required to disclose whether substantial numbers of loans were rejected, the nature of material deficiencies, and other issues likely to be relevant for investors. Historical loan performance data for specific originators and issuers should be made freely available to investors.

13. Issuers of securitized products should be required to declare to investors why they have chosen a particular CRA for rating determination purposes, especially in instances where the issuer had initially sought the input of another CRA, prior to proceeding to the formal rating stage. In addition, issuers should have to inform investors of the nature of any preliminary assessments conducted by CRAs (particularly those that may not have been favorable to the issuer). Improved disclosure in this regard should help reduce the incentive for issuers of securitized products to "ratings shop" unbeknown to investors.

14. In an attempt to reassure regulators and investors about the quality of securitizations, the prime collateral securities (PCS) labeling initiative in Europe could be further examined. This initiative establishes a set of standardized definitions of characteristics of securitization transactions based on underlying asset quality, transparency, structural simplicity, and liquidity features. The PCS initiative provides a degree of capital relief for banks holding high-quality securitized assets and is intended to encourage regulators to allow such assets to be included in bank liquidity buffers (PCS, 2013). However, the cost/benefit trade-off of this approach relative to the prevailing CRA approach requires further analysis. There is also a question as to whether the initiative may lead to the unequal treatment of securities that involve similar elements of risk.

Investors

15. Regulators should strive for homogenous reporting standards for SIVs and related entities, with a particular focus on the disclosure of associated funding and credit risks. Disclosure practices related to the reporting of contingent funding exposure should be standardized across firms in order to facilitate cross-firm comparisons by investors.[69] The SIVs and conduits, and their sponsors/asset managers, should be fully transparent about business and other types of relevant relationships between equity holders, founders, and sponsors of such vehicles.

16. Investors should also be encouraged to reduce their reliance on credit ratings. This could be achieved by revising investment mandates to de-emphasize the role of credit ratings as the key criteria distinguishing what is included in the permissible investment universe and to eliminate the forced selling of securities in the event of a credit downgrade. In line with the International Organization of Securities Commissions' (IOSCO) recommendations and the Financial Stability Board's (FSB) work, regulators should consider ways to give investors means to make informed decisions based on issuer disclosure of the securitization structure's performance, (e.g. a comprehensive data set of the structure and underlying risks (IOSCO, 2012)). For instance they also could help empower investors by requiring market participants to have access to detailed loan-by-loan data for securitization transactions.

B. Addressing Impediments to a Healthy Securitization Market

New regulatory initiatives

17. While it is envisaged that the RRBA will become obsolete in the medium term, regulators in jurisdictions where this approach still applies should continue to mitigate counterproductive incentives. This particularly applies to instances were the use of credit ratings might incentivize leveraged structures and permit cliff effects.

18. The complexity and uncertainty associated with new regulatory measures in the United States and Europe continue to pose obstacles to the resumption of a vibrant, growth-supporting securitization market. For instance, U.S. authorities should consider exempting standard securitization vehicles from the covered fund designation under the Volcker Rule. The proposed designation would classify them (for regulatory purposes) alongside hedge funds and private equity investments, which would render U.S. bank support for standard securitizations problematic. Additionally, the CFTC should closely examine reinstating all or part of the CEA exemptions for highly sophisticated investors. For non-synthetic securitizations, in particular for single- and multiseller ABCP conduits, the CFTC should reconsider an exemption from the commodity pool regulations.

19. Efforts should be focused on consistency of capital charges across different regulatory computational approaches for capital charges. This would reduce the risk of regulatory arbitrage

[69] Prior to the crisis, contingent funding exposures were sometimes recorded in footnotes of annual reports.

and put market participants in different jurisdictions on a more level playing field, while reducing disincentives for securitizations.

20. A more symmetric treatment of securitization exposures and covered bonds with similar risk characteristics should be established across various regulatory frameworks, including capital and liquidity regulations for banks and Solvency II for European insurance companies. Application of markedly different capital treatment to securities with similar credit, duration, and liquidity risk may give rise to regulatory arbitrage and result in additional interconnectedness and the pooling of risk in new areas, such as covered bonds.

21. The complexity and uncertainty associated with new regulatory measures in the United States and Europe continue to pose obstacles to the resumption of a vibrant, growth-supporting securitization market. For instance, U.S. authorities should consider exempting standard securitization vehicles from the covered fund designation under the Volcker Rule. The proposed designation would have them classified (for regulatory purposes) alongside hedge funds and private equity investments, which would render U.S. bank support for standard securitizations problematic. Additionally, the CFTC should closely examine reinstating all or part of the CEA exemptions for highly sophisticated investors. For non-synthetic securitizations, in particular for single and multiseller ABCP conduits, the CFTC should reconsider an exemption from the commodity pool regulations.

22. Regulatory reforms should proceed as swiftly as reasonably possible so as to eliminate regulatory uncertainty. In particular, the capital requirement rules under Solvency II (for European insurers) are essential in restoring support for securitized assets in Europe, and the formal instatement of the QRM rule is similarly important for securitization markets in the United States.

23. The definition of tranche "maturity" under the BCBS (2012) proposals should be clarified by regulators. Lack of clarification could give rise to regulatory arbitrage by market participants (utilization of inappropriate maturities), whereas assumptions that may be far removed from the cash flow behavior expected from the assets underlying a securitization (like legal final maturity) could effectively exclude banks from very low-risk investment opportunities. Many market participants already employ relatively simple models, which are available on data and analytics platforms used throughout the investment and banking industry. Regulators could derive maturities for securitization tranches based on conservative assumptions regarding defaults and prepayment behavior, utilizing such industry-standard models. Alternatively, the BCBS could develop its own approach for modeling securitization cash flows, which then could be applied by regulators and supervisors in individual jurisdictions.

Operational infrastructure

24. The legal foundation for a modern, electronic mortgage registration system should be strengthened in the United States (and in other jurisdictions where appropriate). This would minimize legal ambiguities and associated litigation costs.

25. CRA practices regarding derivatives counterparty ratings, sovereign rating caps, and depository ratings have all been identified by market participants as impediments for securitization. Although it may not be realistic to expect investors to follow an approach completely free of credit ratings, additional transparency by CRAs on how these elements influence the ratings of specific transactions could be helpful, particularly when the credit quality of the underlying transaction would itself merit a higher rating, but these additional factors have imparted a lower rating on the deal.

26. Securitization in parts of the euro area is being impeded by sovereign rating caps that keep transaction ratings below what they otherwise would be (see Box 3 for details). A useful contribution by the official sector could be a limited pan-European guarantee scheme, covering only the elements of sovereign risk affecting the transaction (essentially currency redenomination risk). Such a structure could be general or targeted to specific types of transactions (e.g., SME securitizations) deemed to be important in facilitating the resumption of new credit to worthy borrowers.

Official sector intervention

27. The costs and benefits associated with intervention by global central banks in asset-backed and mortgage securities markets need to be evaluated on an ongoing basis, particularly where these actions impede the private sector and distort the price discovery mechanism. More generally, we encourage governments to carefully examine the costs and benefits associated with various forms of public involvement in the mortgage market. While this involvement may confer benefits in terms of deepening capital markets and achieving broader social objectives, these benefits need to be closely weighed against the potential for impeding the natural price discovery process and, moreover, contributing to financial instability (stemming from excess credit accumulation, asset bubbles, and contingent liabilities).

28. Central banks should examine more closely whether the relatively severe treatment of securitized assets (vis-à-vis assets with similar risk characteristics) at the discount window can be justified. Very recent steps by the ECB Governing Council to ensure a more level playing field between securities with comparable risks is a welcome development in this regard, and one that may offer guidance to other major central banks.

Box 3. Securitization and Complimentary Policy Measures to Ease Credit Conditions for SMEs in Europe

This box presents an example of how securitization and the implementation of complementary policy measures could potentially help ease credit conditions for SMEs in Europe.

Securitization could be a useful tool to either free up bank balance sheets for new lending or to reduce bank funding costs and/or capital charges:

1. **A healthy primary and secondary market for securitization of SME loans.** Currently, most securitized assets in large continental European markets are not sold to third-party investors, but room for bank balance sheet expansion could be made should this restriction be eased. There are a number of reasons why a healthy secondary market for securitized SME assets should be possible: SME loans have relatively short amortization schedules; the introduction of national government SME loan guarantee funds has led to a significant improvement in data collection and processing standards for SME loans in some countries (e.g., Spain); as SMEs are wholly reliant on bank financing (they do not have access to capital markets for funding), they have strong incentives to avoid default (lest they be shut off from all financing options); and large portfolios of SME loans that are diversified across regions and sectors would reduce concentration risk for potential investors.

2. **There are at least two ways in which a healthy secondary market for SME securitization could be encouraged:**

   Addressing the asymmetric treatment of securitized assets vis-à-vis other assets with similar risk characteristics. Please see Section III. A. "Asymmetric capital charges."

   Introducing a double-tier guarantee scheme for SME securitizations to encourage private capital inflows. The first layer of credit risk protection could be provided via national governments to cover for credit risk, reinforced with a second layer of protection which guarantees sovereign risk. The aims of this approach would be first to remove the binding sovereign rating caps currently in force, and second, to provide a credit enhancement feature which would improve the expected risk-adjusted returns of these assets. This approach could serve to attract ratings-constrained investors. Such a guarantee could perhaps be provided through the European Investment Bank or another pan-European agency.

3. **The establishment of asset management companies addressing non-performing non-real estate–related assets.** While asset management companies (AMC) have been established in some European countries to support banks divesting real estate-related assets, banks currently have few options for the divestment of other troubled assets.
   Broadening the scope of established AMC or establishing an AMC focused on non-real estate assets could leverage specialist private sector capital (in the form of distressed debt investors) that focuses largely on recovery values of non-performing assets.

4. **Regulation and standardization of information for proper risk evaluation. Which could positively impact loan origination, and therefore securitizations and the full self-reinforcing credit intermediation channel** (as depicted in Figure 6).

Table 4. Summary of Recommendations

ISSUES	RECOMMENDATIONS	REFERENCE	STATUS
REVISITING THE ROLE OF SECURITIZATION IN THE CRISIS			
Misaligned Incentives and the Self-Reinforcing Cycle of 2000–2007	**Mitigating the Risk of Another Adverse Self-Reinforcing Cycle**		
The role of loan origination	***Loan origination practices***		
Deterioration in loan origination practices and lending standards.	Comprehensive supervision from loan origination to eventual securitization and capital provisioning.	Dodd-Frank Act (USA).	Enabled since January 2013.
Previously unregulated origination of mortgages and other consumer debt.	Authority with comprehensive powers to regulate and supervise non-bank activities that pose risks to consumers. The CFPB regulates and supervises retail mortgage origination consistently across bank and non-bank originators.	Dodd-Frank Act (USA) • CFPB regulations.	Enabled since January 2013.
Compensation practices and (un)suitability: • High fee products (predatory lending).	Improve consumer protection with respect to predatory lending.	Dodd-Frank Act (USA) • Qualified Mortgage.	Qualified Mortgage instituted by CFPB in January 2013; in force as of January 1, 2014.
• Mortgage originators selected appraisers.	Enhanced supervision of the home appraisal process; maintenance of records on appraiser performance.	Dodd-Frank Act (USA).	Enabled since January 2013.
Interconnectedness between credit and asset price cycles.	Binding limits on credit metrics/serviceability (especially of second mortgages).	Dodd-Frank Act (USA) • Qualified Mortgage. • Ability-to-Repay (ATR) rule.	Qualified Mortgage and ATR rule instituted by CFPB in January 2013; in force as of January 1, 2014.
	Counter-cyclical macroprudential policies to de-emphasize unrealized capital gains as collateral for new borrowing in asset price upswings.	IMF staff.	Proposal.
The role of securitization	***Securitization origination***		
Originate-to-Distribute.	"Skin in the game" retention rules may have a role in aligning incentives, but are not a panacea. Regulatory attention should be focused on incentives across the entire securitization chain.	IMF staff.	Proposal. Dodd-Frank Act (USA) enabled since January 2013; implementation of CRD IV (EU) in progress.

ISSUES	RECOMMENDATIONS	REFERENCE	STATUS
Financial engineering and increased demand for low-quality loans.	Promotion of simple, generic, and standardized financing vehicles over esoteric, synthetic, and speculative investment structures. Investments in synthetic and highly complex structured products to be held to higher regulatory and capital standards than simple structures. Conservative capital requirements for loans of lower quality.	BSBC. IMF staff.	Proposal.
Representations and warranties (RW) and the role of quality control firms.	Clearly formulated RWs with a strong legal foundation represent another form of "skin in the game."	IMF staff.	Proposal.
The role of credit rating agencies	***Credit rating agencies***		
Misaligned incentives.	Regulators should de-emphasize or remove statutory references to credit ratings and discourage excessive reliance by market participants on credit ratings.	FSB, Dodd-Frank Act (USA), EU Regulation on Credit Rating Agencies.	Partially enacted; in progress.
Misaligned incentives.	CRAs operating "issuer-pays" business models to be held more accountable in cases where there are systematic and large divergences between ratings-implied default probabilities and realized defaults.	EU Regulation on Credit Rating Agencies, Dodd-Frank Act (USA).	Partially enacted; in progress.
Misaligned incentives.	Improve transparency of commercial interconnectedness between issuers and CRAs, separate analysts from sales departments internally, and engage two different CRAs for the rating of structured finance instruments.	IMF staff. EU Regulation on Credit Rating Agencies.	Proposal; partially enacted; in progress
Non-robust methodologies for complex structured securities coupled with improved disclosure practices.	Improved disclosure of model and assumptions underlying the ratings of securitizations, differences in methodologies relative to conventional fixed-income securities, and results of stress tests and sensitivity analysis.	BoE, ECB, SEC (authorized by Dodd-Frank Act), EU Regulation on Credit Rating Agencies, IMF staff.	Enacted; proposal.
Improved disclosure practices.	Ongoing and timely disclosure of underlying loan-level data between quality control firms/CRAs and investors.	BoE, ECB, SEC (authorized by Dodd-Frank Act).	Enacted.
Issuer interaction with CRAs.	Improved disclosure of "ratings shopping" by issuers.	IMF staff.	Proposal.
Concentration of and CRA dependence on revenue from ratings of structured product.	Disclose ratings derived from specific issuers in ranges.	IMF staff.	Proposal.

ISSUES	RECOMMENDATIONS	REFERENCE	STATUS
Excessive reliance on CRAs.	Standardized definitions of characteristics of securitization transactions based on underlying asset quality, transparency, structural simplicity, and liquidity features.	PCS, IMF staff.	Proposal.
The role of investors	***Investors***		
Leveraged investors—Lack of consistency/ transparency in reporting of contingent liabilities/exposure to SIVs and conduits.	Homogenous reporting standards for SIVs and related entities to be encouraged, with a particular focus on the disclosure of associated funding and credit risks by funding-line providers. Also, full transparency regarding business and other types of relevant relationships between equity holders, founders, and sponsors of such vehicles.	IMF staff.	Proposal.
Excessive reliance on CRAs.	Investors to reduce their mechanistic reliance on credit ratings. Investors to have access to timely/detailed loan-by-loan data for securitizations.	FSB, EU Regulation on Credit Rating Agencies, IOSCO, IMF staff.	In progress; partially enacted.
IMPEDIMENTS TO SECURITIZATION MARKETS—AFTER THE CRISIS			
Regulation	***New regulatory initiatives***		
Incentives for leveraged structures and capital arbitrage still exist. Cliff effects have been reduced. The inconsistency between SSFA and RRBA raises the possibility of regulatory arbitrage between methodologies and jurisdictions.	Conduct further analysis of proposed capital charges on securitizations.	IMF staff.	Proposal.
The capital charges for securitizations can substantially differ across different regulatory formulae, potentially incentivizing regulatory arbitrage.	Efforts should be focused on consistency of capital charges across different regulatory computational approaches for capital charges. This would reduce the risk of regulatory arbitrage and put market participants in different jurisdictions on a more level playing field, while reducing disincentives for securitizations.	IMF staff.	Proposal.

ISSUES	RECOMMENDATIONS	REFERENCE	STATUS
Unfavorable treatment for securitizations compared to covered bonds as securities with similar risk characteristics could lead to unintended consequences, including the concentration of risk in new areas and regulatory arbitrage. Examples: Capital requirements under the Capital Requirements Directive IV for banks and Solvency II for insurers; Calculation methodologies under the new liquidity coverage ratio (LCR) favor covered bonds relative to securitized assets with similar duration, credit ratings, and liquidity risk; Net stable funding ratio (NFSR) effectively incentivizes the issuance of covered bonds relative to securitizations with similar risk characteristics.	A more symmetric treatment of securitization exposures and covered bonds should be established across the relevant regulatory frameworks.	IMF staff.	Proposal (implementation of Basel III until 2018; Solvency II (delayed at least until January 2016); initial introduction of the LCR in 2015; introduction of the NSFR in 2018.
Certain elements of the Volcker Rule could substantially increase legal and regulatory risk, as well as the costs of even straightforward securitization transactions. Overlapping regulatory measures can lead to increased regulatory complexity and compliance costs.	Reconsideration of the "covered fund" designation under the U.S. Volcker rule is encouraged (exempt plain vanilla securitization vehicles). CFTC to consider exemptions from the commodity pool regulations for non-synthetic securitizations.	IMF staff.	Proposal.

ISSUES	RECOMMENDATIONS	REFERENCE	STATUS
Banking and insurance regulatory frameworks remain subject to considerable uncertainty in many jurisdictions. Finalization and implementation of Basel III rules likely to extent over a long period. Solvency II has been subject to repeated delays. Important elements of the Dodd-Frank Act remain undecided, including the final classification of the QRM.	Regulatory reforms should proceed as swiftly as reasonably possible so as to eliminate regulatory uncertainty. The Basel capital and other rules, the rulemaking related to the Volcker rule, and the definition of the QRM, should be issued as soon as possible.	IMF staff.	Proposal.
The vague definition of tranche maturity for purposes of risk-weight calculation under the BCBS (2012) provides another source uncertainty.	The definition of tranche "maturity" should be clarified; regulators should test simple models often-used by market participants, based on conservative assumptions for their applicability to maturity calculations.	IMF staff.	Proposal.
Operational Infrastructure of the U.S. mortgage markets	***Securitization market infrastructure***		
Mortgage Electronic Registration Systems, Inc. (MERS) was a weak operational link in the securitization industry.	Minimize legal ambiguities and associated uncertainties and litigation costs with a strong legal foundation for modern electronic mortgage and loan registration systems.	IMF staff.	Proposal.
The impact of CRA's sovereign rating caps on securitizations.	Require CRAs to disclose details of the impact of derivatives counterparty ratings, sovereign rating caps, and depository ratings on the overall credit rating of securitizations.	IMF staff.	Proposal.
Credit rating agencies • Sovereign rating caps on securitizations.	Government insurance schemes for securitizations (or tranches thereof) and pan-government insurance schemes to be considered where economic uncertainty and sovereign rating caps may be exacerbating tight credit conditions in one country (preferably in a countercyclical fashion).	IMF staff.	Proposal.

ISSUES	RECOMMENDATIONS	REFERENCE	STATUS
OFFICIAL SECTOR INTERVENTION IN THE ABS MARKETS			
Asset purchase programs and quantitative easing			
Central banks have engaged in asset purchase and loan programs.	The costs and benefits associated with asset purchase and loan programs by global central banks need to be evaluated on an ongoing basis, particularly where these actions distort the price discovery mechanism or lead to the build-up of additional risks. Policymakers should carefully examine the costs and benefits associated with various forms of sustained public involvement in the mortgage market (designed to increase the availability and decrease the cost of credit).	IMF staff.	Proposal.
Discount window facilities and haircuts			
The inconsistent treatment of securitized assets at the discount window of major central banks reduces incentives for banks to invest in securitized assets.	Central banks to revisit whether the relatively severe treatment of securitized assets (vis-à-vis assets with similar risk characteristics) at the discount window can be justified.	IMF staff.	Proposal; some measures enacted by ECB in July 2013.

APPENDIX I. SECURITIZATION: THE FIRST 30 YEARS

This appendix explains the key developments in securitization markets in the United States, the United Kingdom, and continental Europe over the 1970–1999 period.

The securitization industry was born in 1970 following the first pass-through security sponsored by the Government National Mortgage Association (GNMA, or "Ginnie Mae"). As part of the U.S. Federal Housing Administration (FHA), Ginnie Mae guaranteed mortgages made to eligible families (e.g., first time homeowners) on behalf of the federal government; its securities are the only MBS backed by the full faith and credit of the U.S. government. In addition to Ginnie Mae, the Federal Home Loan Mortgage Corporation (FHLMC or "Freddie Mac") began securitizing U.S. residential home mortgages in 1971, followed by the Federal National Mortgage Association (FNMA or "Fannie Mae") in 1981 (Kothari, 2006). Fannie Mae was founded in 1938 as part of the New Deal, with the aim of supporting the housing market following the Great Depression. It purchased and retained mortgages from originating banks and was privatized in 1968. Freddie Mac was created to introduce competition in the mortgage loan market in 1970. Both Fannie Mae and Freddie Mac are government-sponsored enterprises (GSEs), chartered by the U.S. Congress to enhance the flow of credit to the residential real estate market. Fannie Mae and Freddie Mac purchased eligible mortgages from banks while also providing a guarantee against borrower default. Mortgage purchases were securitized by shifting the legal ownership of the mortgages to a special purpose entity, against which securities were issued. Those securities were repaid from the interest and principal of the underlying mortgages. Both have also been shareholder-owned companies for more than 40 years, though they enjoy special tax privileges and individual credit lines with the U.S. Department of the Treasury (DoT).

Historically, the securitization industry was U.S. mortgage market-centric, driven largely by the financing needs of the GSEs and the FHA. It was not until 1985 that the first private-label ABS deal was issued by Sperry Univac Corporation, though the first private-label mortgage pass-through deal was issued by Bank of America in 1977. Until the 1986 U.S. tax act, taxation-related issues rendered the tranching of RMBS deals uneconomical in the United States (United States, Securities and Exchange Commission, Department of the Treasury, and Office of Federal Housing Enterprise Oversight, 2003). Auto-related securitizations dominated the U.S. ABS market in its first few years, but the securitization of credit card receivables grew rapidly after the first issue in 1987, and other asset classes emerged shortly thereafter.

The securitization industry in the United States preceded that across the Atlantic by 15 years (United Kingdom) and 20 years (continental Europe) respectively. The United Kingdom's first mortgage securitization was launched in 1985; however, the securitization industry on the continent was slower to develop as a result of a more complicated legal environment. France laid the legal foundation for securitization on the continent in 1988, with consumer loan ABS issued subsequently, followed by the first RMBS transaction in 1991. Thereafter, securitization-related vehicles became popular in Spain, Belgium, the Netherlands, and other countries. In the Dutch case, ABS amounted to almost €270 billion at end-2007, or 50 percent of Dutch GDP (almost two-thirds of which were comprised of RMBS; Chaudron, 2008). Germany's government-owned

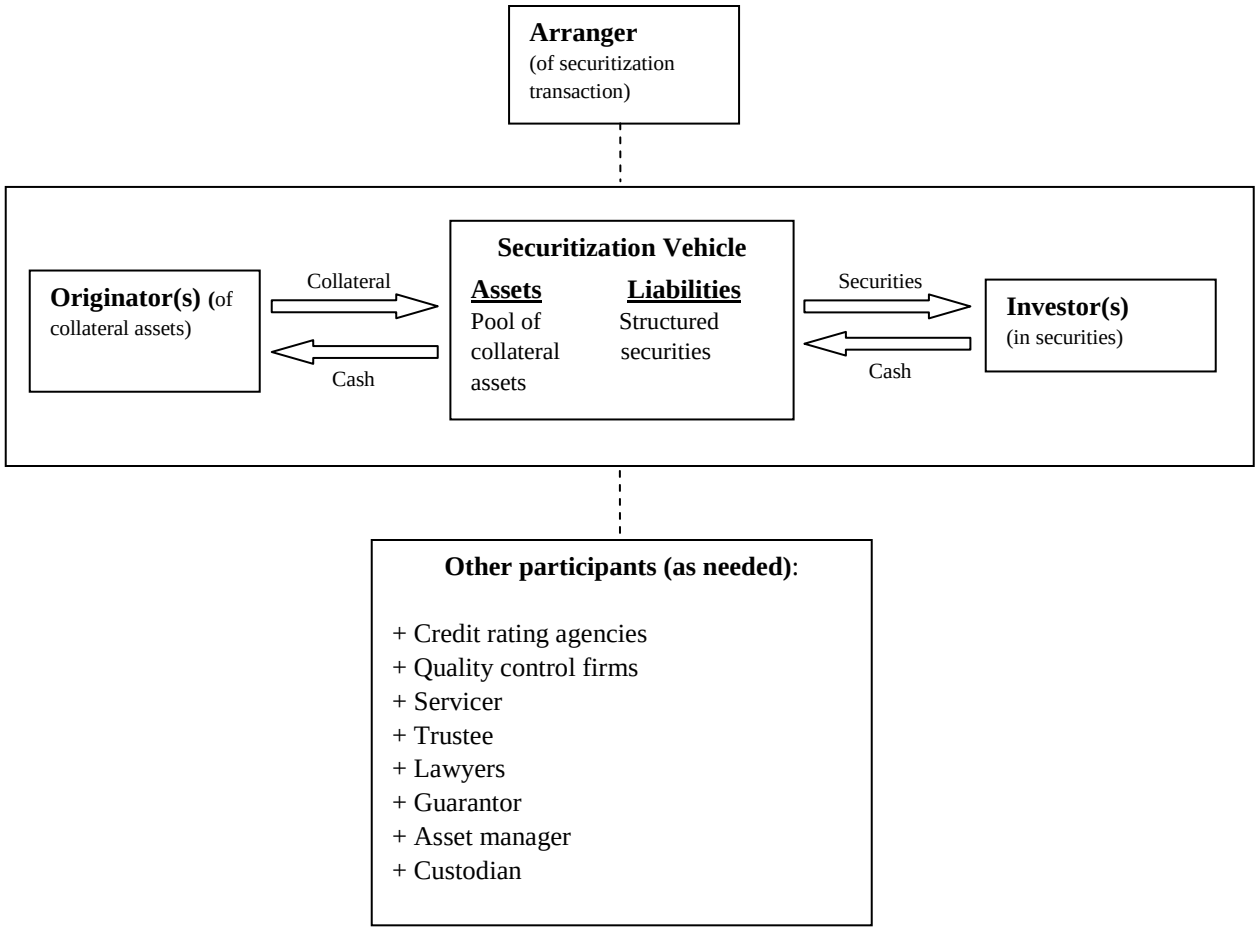
development bank, Kreditanstalt für Wiederaufbau (KfW), also issued €125 billion of RMBS and small- and medium-sized-enterprise (SME) securitizations between 2000 and 2008, with the collateral for the former sourced from across the European Union (KfW, undated; Kaiser and Axford, 2006).

The financial engineering foundation central to the GFC, in terms of instruments and markets, was largely in place by the year 2000. Subprime securitizations had become a regular fixture of the U.S. ABS market in the early 1990s. The issuance of collateralized debt obligations (CDOs) commenced in the late 1990s. Credit default swaps (CDSs) were developed and applied to corporate debt in the 1990s and first adopted to ABS in the late 1990s.

APPENDIX II. THE BASICS OF SECURITIZATION—AN OVERVIEW

The securitization process begins with the origination and subsequent pooling of assets, which are transferred to a balance sheet that is legally separate from that of the originator's balance sheet. This is generally a bankruptcy-remote SPV. The balance sheet, which holds the pooled assets as collateral, is funded via the issuance of securities (ABS, RMBS, CMBS, etc.). Figure 9 illustrates the basic mechanics of the securitization process and lists the main participants. The basic characteristics associated with the origination and pooling of assets and the structuring and issuing of liabilities are discussed below.

Figure 9. The Mechanics of Securitization



Source: IMF staff.

Origination of assets

While the assets that are pooled and securitized can in principle be any assets that have cash flows that can be modeled with some reliability, typically the collateral assets are securities, loans or other types of claims such as lease payments, expected fee or royalty income, or credit card receivables. The securitization of assets provides balance sheet and capital relief to originators,

allowing them to originate new loans and improve the flow of credit to the real economy. Securitized assets may be seasoned loans that were originated before the securitization process started and therefore have a proven track record of repayment characteristics and credit risk statistics, or they may be new loans originated for the purpose. Some originators extend credit to borrowers with the intent of transferring the loans to a securitization vehicle.

The business model of the originator is a key consideration when analyzing the alignment of incentives of originators and arrangers with those of investors. In the aftermath of the crisis, regulations have been proposed that require the retention by the originator and/or arranger of a portion of the risk of the underlying assets (IMF, 2009).

Asset pools

The pool of assets in a securitized structure is not always static. Securitizations of credit card receivables or auto dealer floor plans typically have a revolving period in which payments received are used by a trust to purchase new receivables. In other structures, there are explicit provisions that allow for the substitution of assets in the pool under certain conditions. Finally, some structures, such as CDOs or CLOS, appoint an asset manager who actively manages at least a part of the pool of underlying assets and who therefore play a key role in the ultimate performance of the securitizations.

Structuring and issuing securities

The liabilities of the securitization vehicle are typically securities with risk characteristics that accommodate targeted investor appetites. Credit- and time-tranching are the principal structuring techniques.

Credit-tranching results in high quality (often also highy rated) senior or super-senior tranches with a priority claim on incoming cash flows. The lower-rated mezzanine and equity tranches absorb losses on the underlying asset pool and provide protection for the more senior tranches. Time-tranching techniques are closely connected to credit-tranching, since the more senior tranches, from a credit perspective, will also be first in line in receiving interest and principal payments. The first time-tranched securitizations were collateralized mortgage obligations (CMOs) introduced by the two GSEs and Ginnie Mae (see Appendix I). Payments were sequenced according to their expected maturities, and securities with the longest-expected maturities also carried the bulk of the prepayment risk. Other means of credit enhancement are overcollateralization or financial guarantees. In addition, securitization structures can also make use of derivatives such as interest rate or currency swaps to hedge certain risks.

APPENDIX III. MAIN FEATURES OF THE U.S. AND CONTINENTAL EUROPEAN MORTGAGE SECURITIZATION MARKETS

This appendix explains key features of U.S. and continental European mortgage securitization markets, including the role of the GSEs, the Originate-to-Distribute Model, the development of asset-backed security-collateralized debt obligation (ABS-CDO) markets, and the distinct legal frameworks.

The two GSEs, Fannie Mae and Freddie Mac, along with Ginnie Mae, dominate the U.S. mortgage market. While Ginnie Mae securities have always carried an explicit U.S. federal government guarantee, securities backed by GSE-guaranteed collateral were generally considered by investors to be implicitly guaranteed by the U.S. government. When the two GSEs were taken over by the U.S. government in September 2008, their obligations moved a step closer to becoming outright obligations of the government. The Federal Housing Administration (FHA), the U.S. Department of Veterans Affairs, and the Farmers Home Administration (until 1994) insure mortgages, which are issued under the Ginnie Mae label, against default, whereas the two GSEs buy so-called conforming mortgages from loan originators. Conforming mortgages must be below a certain size (currently US$417,000 with some regional variations) and fulfill a number of quality requirements. The remaining mortgages, which cannot be insured by a government agency or bought by the GSEs, are retained by the originating institution, sold to another investor, or securitized with the help of an arranger. Kickstarted by Ginnie Mae and the GSEs, the United States was the first economy to emerge with a liquid securitization market (see Appendix I).

The Originate-to-Distribute Model marks a key difference between U.S. and European securitization markets. The Originate-to-Distribute Model consists of originating loans for resale via securitization. By the mid-2000s, most mortgages in the United States were originated by mortgage brokers or nonbanks (including internet origination). Sixty-eight percent of all U.S. mortgage loans were originated by brokers in 2004, and 72 percent of all subprime loans in the second half of 2006 (Highbeam, 2013). In continental Europe, securitization of residential mortgages on a large scale did not take place, with the exception of Spain and the Netherlands (Dutch RMBS were issued mainly for funding purposes, not for purposes of risk transfer; see Bronzwaer, 2012). The PROVIDE program of Germany's development bank, KfW, removed some of the mortgage-related risks from the balance sheets of German banks, as well as from banks based in the United Kingdom, the Netherlands, and other European countries. However an Originate-to-Distribute culture never took hold in Europe. Loan origination stayed principally within the banking system.

The issuance of arbitrage ABS-CDOs was also largely a U.S. phenomenon. These securities tended to have (mostly subprime) ABS as collateral or were structured as synthetic CDOs, using CDS on ABS tranches (usually subprime bonds) as collateral. CDOs made up the second largest sector of the U.S. ABS market after subprime bonds in 2006, at US$315 billion (of which 54 percent were ABS-CDOs). Cash ABS-CDO volumes reached US$109 billion by 2006, while synthetic CDOs expanded from US$14 billion to US$54 billion in the same year, an increase of 276 percent. Largely due to the lack of appropriate high-spread collateral, the issuance of

arbitrage CDOs was essentially nonexistent in Europe; however, numerous European banks invested in U.S. securitized products, including CDOs, frequently via structured investment vehicles (SIVs) established in Ireland. Many of these SIVs were later bailed out by their parents, including SIVs managed by IKB, Sachsenbank, HSH Nordbank, and West LB (Thompson and others, 2007).

Distinct legal, tax, and accounting frameworks also led to differences in the development of continental European securitization markets relative to the United States. An interesting case study in this regard was Germany. In 1997, the German banking regulator allowed banks to securitize assets by defining requirements for the sale and securitization of loans to meet the banks' calls for regulatory capital relief. Accounting requirements for true-sale securitizations were outlined in 2002 (Krauss, 2005), and it was not until 2004 that a number of German tax laws that impeded securitizations were finally removed. In addition, Germany significantly automated the process of transferring mortgages with the introduction of its Refinancing Register in 2005, allowing a special purpose vehicle (SPV) to be the sole legal owner of a mortgage if the transfer of the title to the house serving as collateral was registered with the mortgage servicing company (usually the originating bank). KfW's PROVIDE transactions circumvented the taxation-related impediments by housing the SPVs underlying its mortgage securitizations in Ireland (Krauss, 2005; Kaiser and Axford, 2006). In short, many of the changes to the relevant laws in Europe were instituted only a short time before the GFC, preventing the European market from having sufficient time to mature and grow to a size comparable to that of the United States.

APPENDIX IV. COVERED BONDS AND SECURITIZATIONS—HOW DO THEY DIFFER FROM EACH OTHER?[70]

The earliest recorded issuance of covered bonds dates back to Prussia in 1769 (the first *Pfandbriefe*). This was followed by issuance of covered bonds in Denmark after the Great Fire of Copenhagen in 1795. While the covered bond market has been a prominent source of financing in Europe for more than two centuries, only in recent years have covered bonds appeared in other countries such as the United States (2006), Australia, and New Zealand (both 2010). Although the first securitization-like structures appeared in the United States in the later parts of the nineteenth century, modern securitization emerged in the United States with the pooling of home mortgages by GSEs in the 1970s (see Appendix I).

Although covered bonds and securitization both involve securities backed by pools of assets, they fundamentally differ from one another in a number of important ways.

Balance sheet structure and legal cover

Covered bonds are debt obligations of the issuer secured by a cover pool of segregated assets, but these assets remain on the balance sheet of the issuer as long he is not insolvent. In contrast to a securitization, where the assets are transferred from the outset to an SPV, whereas investors in covered bonds have dual recourse, usually first against the cover pool and, if the assets in the cover pool prove insufficient, against the estate of the insolvent financial institution. Such secondary claims usually enjoy the same or senior status compared to senior unsecured bonds. Covered bonds usually do not accelerate after insolvency, contrary to senior unsecured obligations.[71] Also, the claims represented by covered bonds are not accelerated in the case of insolvency of an issuer bank.

Cash flows

Covered bond issuers are fully liable for all interest and principal payments without regards to the cover pool. In the case of securitization, however, cash flows to investors are generated solely from the underlying asset pool, and bonds are subject to tranching. The tranching embedded in a securitization results in the waterfall-like priority of cash flows, with the tranches bearing more credit risk—usually lower-rated—first in line to absorb any losses from defaults. The time tranching that usually occurs in a securitization, too, determines which tranches receive cash flows first.

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[70] See also ECB, 2008a; Kothari, 2008; and IMF, 2009.

[71] The main difference between most collateralized corporate bonds and covered bonds is that the collateral backing corporate bonds usually consists of large, nonfungible objects—a power plant, commercial buildings, or equipment—while covered bonds are supported by a large pool of loans upon which bondholders have a priority claim in the event of bankruptcy.

Dynamic cover pools and static ABS collateral pools

Prepayments, defaults, or impairments in the quality of loans in cover pools does not affect investors in covered bonds as the issuer must replace any loans that have left the cover pool, or have experienced significant quality deterioration, with new loans of permissible quality characteristics to previously specified levels of overcollateralization. In the case of securitizations however, the asset pool is usually static, and the default and prepayment risk of the underlying loans is transferred to investors.

Credit enhancement of existing issues

Overcollateralization is the typical means by which credit quality is enhanced for covered bonds, while in the case of securitizations, credit tranching typically provides credit support for the more senior tranches. Overcollateralization and reserve accounts may provide additional support in securitizations.

Ratings independence vis-à-vis the issuer

Owing to the quality of the cover pool and the dual recourse feature, covered bonds typically receive ratings higher than that of the issuer (the "ratings uplift"). Usually the credit quality (rating) of the issuing institution will play a role in the rating of covered bonds.[72] In securitization, ratings typically reflect only underlying asset quality and the degree of subordination of a tranche. A maximum uplift for both securitizations and covered bonds is determined by the sovereign rating of the country where the bond is issued (and the collateral resides).

Motivation for issuers

Issuers use covered bonds as a means of attracting relatively cheaper sources of funding than conventional bond issues. Issuers of securitizations may be attracted by cheaper sources of funding, in addition to the implications for risk management, liquidity, and reduction in risk-weighted assets achieved by moving assets off-balance sheet.

Given the dual-recourse nature of covered bonds, for an identical collateral pool, a covered bond seems to contain far less risk than an ABS. However, a number of risk factors exist which reduce this seeming advantage of covered bonds.

[72] There are exceptions to this; for example, Fitch (2013) notes that only the cover pool is relevant for its ratings decisions with regards to Spanish covered bonds. All three large credit rating agencies (CRAs) apply the ratings-cap methodology, in which the rating on a covered bond or a securitization cannot exceed the senior unsecured rating of the issuer and/or the rating of the sovereign by a specified number of notches.

Asset encumbrance

This term describes the fact that the cover pool assets are legally segregated from the other assets on a bank's balance sheet. This can have two different effects: (i) if covered bond issuance encompasses a large share of the eligible universe of cover assets, a scarcity of replacement collateral might ensue in case of a significant deterioration in the underlying market (International Financing Review, 2012); (ii) the encumbrance of bank assets from the covered bond side, and/or the commercial repo and central bank refinancing operations, could lead to an insufficient asset pool left to satisfy uninsured depositors in case of a bank failure. This could lead to supervisors giving uninsured depositors preference over senior unsecured bondholders and covered bond holders who may be left with very little in assets to satisfy their claims. The potential for excessive asset encumbrance is the reason why U.S. and Canadian authorities have limited the amount of covered bonds that a bank can issue.

Bail out/bail in

In the case of bank debt, market participants may harbor the belief that important financial institutions will be bailed out by the home or host governments in times of stress. Although this confidence has been shaken by the events in Cyprus during the spring of 2013, it seems more prevalent with regards to covered bonds (International Financing Review, 2012, and International Monetary Fund, 2011). Kofner (2009) describes the bailout of the large German Pfandbriefe issuer, Hypo Real Estate, which entailed continued payment on the bank's outstanding Pfandbriefe, and declarations by the German authorities in support of the Pfandbrief market. Similarly, the aforementioned issues related to asset encumbrance have seen some market participants questioning the residual claims of covered bond holders potentially being subordinated to uninsured depositors. The individual liquidations and restructuring laws of most EU countries provide a high level of protection to covered bond holders (Barclays, 2013); the Netherlands deviates from the majority of EU countries in that they do not provide explicit protection to covered bond holders.

Liquidity

The Jumbo Pfandbriefe within the covered bond markets have traditionally been viewed as highly liquid, due to commitments by designated market makers to provide quotes in size. Post-Lehman, the dealers' ability to commit to those quotes was severely tested and the system of market maker commitment was eventually abandoned.[73] Pfandbriefe now trade on an idiosyncratic basis, with issuer and other variables impacting their spread and liquidity. Their liquidity is considered by many market participants to be similar to the liquidity of large, well-protected ABS tranches (Siewert and Vonhoff, 2011).

[73] Jumbo Pfandbriefe are generally subject to a minimum outstanding of €1 billion and have to fulfill other conditions. Each issue should also be supported by five market makers, who are obligated to provide two-way quotes for at least €10 million throughout the day.

Covered bond resolution: untested

The apparent success of covered bonds, illustrated by the fact that there has not been a default since 1865, points a weakness. With the transfer of assets to a type of SPV never having been consummated, there is no experience as to how it would work in practice or how investors would react. The fact that the cover pool is dynamic will lead to investors becoming aware of what is in the cover pool at the time of the insolvency or resolution of the issuer. Many covered bond investors, who bought the bonds for their high quality, are unlikely to be equipped to analyze the specific risks inherent in the cover pools. Thus, the distinct possibility exists for fire sales of claims on the segregated cover pools.

APPENDIX V. NEW U.S. MORTGAGE REGULATIONS: QUALIFIED MORTGAGES AND THE ABILITY-TO-REPAY

The Consumer Financial Protection Bureau (CFPB) issued two central regulations for the U.S. mortgage market in early January 2013: the ability-to-repay (ATR) rule and the qualified mortgage (QM). Given their importance for the U.S. mortgage market, this appendix briefly discusses the core elements of both and how they aim to address abuses and conflicts of interest in the run-up to the crisis. Key aims for the QM and ATR are to prevent predatory lending and the negative effects of home foreclosures.

ATR rule

The CFPB amended Regulation Z, which implements the Truth in Lending Act. The new rule applies to all mortgages and implements the pertinent provisions of the Dodd-Frank Act, requiring creditors to make a reasonable, good faith determination of a consumer's ability to repay a mortgage loan. It excludes reverse mortgages or other nonstandard types of debt collateralized by a house or condominium. The rule requires a mortgage lender to consider the following issues before extending a loan: (i) current or reasonably expected income or assets; (ii) current employment status; (iii) the monthly payment on the covered transaction; (iv) the monthly payment on any simultaneous loan; (v) the monthly payment for mortgage-related obligations; (vi) current debt obligations, alimony, and child support; (vii) the monthly debt-to-income ratio or residual income; and (viii) the prospective borrower's credit history. Creditors must use reliable third-party records to verify the information they use to evaluate these factors and must retain evidence of compliance with the rule for three years after a covered loan has closed. The CFPB proposes exemption of the FHA and the GSEs from the requirements of the rule for up to seven years. Additional details can be found in CFPB (2013).

QM definition

The CFPB finalized the definition of a QM in January 2013. A QM must meet a number of standards outlined by both the Dodd-Frank Act and the ATR rule described above, in addition to features listed below. A QM provides the mortgage originator either safe harbor from lawsuits (in instances where foreclosure proceedings are initiated against the borrower) or the benefit of rebuttable presumption for loans made at the prevailing prime rate plus 1.5 percent orbelow. Under rebuttable presumption, the borrower would have to prove the lender had good cause to expect her/him to be unable to afford mortgage repayments. The following standards have to be met for mortgages to be deemed a QM: (i) no excessive upfront points and fees; (ii) no toxic loan features (interest only, negative amortization, term beyond 30 years, or balloon repayment); and (iii) limits on debt service-to-income ratios (currently 43 percent). It should be noted that consumers can still sue their lenders under provisions of other federal consumer protection laws (Qualified Mortgage, 2013).

APPENDIX VI. REGULATORY REFORM OF CREDIT RATING AGENCIES

CRAs have come under intense scrutiny from policymakers, regulators, analysts, and investors in the aftermath of the GFC. In response, regulators and policymakers in the United States and Europe are attempting to reduce statutory references to ratings and have successfully adopted some measures aimed at increased regulatory oversight of the CRAs. Regulators are also examining different approaches in the rating of securitized products. The Financial Stability Board (FSB) has also urged regulators to reduce reliance on CRA ratings (FSB, 2010).

In the United States, the SEC has had statutory authority to regulate CRAs since 2006 (see Credit Rating Agency Reform Act, 2006). This act created an Office of Credit Ratings at the SEC, designed to hold rating agencies accountable and protect investors and businesses. In order to help de-emphasize the role of CRAs, Section 939A of the Dodd-Frank Act prohibits the use of credit ratings for a number of statutory purposes (Martin and Franker, 2011). Furthermore, the Dodd-Frank Act rescinded the exemption of CRAs from civil litigation if their ratings were part of prospectuses (which would allow for civil remedies against CRAs). The SEC has exempted ABS offerings from this provision as other SEC regulations required the disclosure of ratings in prospectuses (see Martin and Franker, 2011). The U.S. Federal Reserve is promoting the use of its SSFA for determining capital weights for securitizations (see Section III.A.).

In Europe, a number of related initiatives have been proposed. In early 2011, the EU established an independent authority known as the European Securities and Markets Authority, tasked with regulating the activities of CRAs according to EU standards (Council on Foreign Relations, 2013). Meanwhile, a revision of the European CRA regulations has recently been approved by the European Parliament. It generally provides for a mandatory rotation of issuer-paid ratings for re-securitizations every four years, in an attempt to avoid systematic errors in deal appraisals by a single agency. Issuers paying for their ratings are required to engage at least two different CRAs, acting independently of each other, for the rating. Moreover, a civil liability regime is introduced under which a CRA, if infringing regulations intentionally or with gross negligence and consequently causing damages, can be held accountable before civil courts, regardless of whether there is a contractual relationship between the parties.

REFERENCES

Association for Financial Markets in Europe, 2013, *Securitisation Data Report Q3:2012* (London).

———, 2012, *The Economic Benefits of High Quality Securitization to the EU Economy* (London).

Bank for International Settlements, 2004, *International Convergence of Capital Measurement and Capital Standards* (Basel).

Barclays Bank PLC, 2013, *The AAA Handbook 2013* (London).

Bank for International Settlements, 2011, *Securitization is Not That Evil After All*, No.341 (Basel).

Basel Committee on Banking Supervision, 2006, "International Convergence of Capital Measurement and Capital Standards - A Revised Framework - Comprehensive Version" (Basel).

———, 2010, "International framework for liquidity risk and monitoring tools" (Basel), December.

———, 2012, "Revisions to the Basel Securitisation Framework," Consultative Document (Basel).

———, 2013, "Basel III: The Liquidity Coverage Ratio and Liquidity Risk Monitoring Tools" (Basel).

Benmelech, Efraim; Jennifer Dlugosz, and Victoria Ivashina, 2012, "Securitization Without Adverse Selection: The Case of CLOs," *Journal of Financial Economics*, Vol. 106, Issue 1, October.

Bernanke, Ben, 2005, "The Global Savings Glut and the U.S. Current Account Deficit," Sandridge Lecture, Virginia Association of Economists, Richmond, Virginia, March 10.

———, 2008, "Fostering Sustainable Homeownership," National Community Reinvestment Coalition Annual Meeting, Washington, D.C., March.

Blinder, Alan, 2009, "Six Errors on the Path to the Financial Crisis," *The New York Times*, January 24. Available via the Internet: www.nytimes.com/2009/01/25/business/economy/25view.html?_r=0.

Bordo, Michael, 1986, "Some Historical Evidence 1870-1933 on the Impact and International Transmission of Financial Crises," NBER Working Paper 1606.

Bronzwaer, Max, 2012, "Dutch RMBS," *The Journal of Structured Finance*, Vol. 17, No. 4 (winter), pp. 134-137.

Brunnermeier, Markus, 2009, "Deciphering the Liquidity and Credit Crunch of2007 –2008," *Journal of Economic Perspectives*, Vol. 23, Issue 1, pp. 77–100.

Cadwalader, 2012, "Impact of the Volcker Rule on Markets and Market Participants."

Carney, Mark, 2012, "Some Current Issues in Financial Reform," Speech to the Canadian Club of Montréal, Montréal, Quebec, November.

Chaudron, Raymond, 2008, "How to capture securitization and structured debt instruments," IFC Workshop on "Challenges to improve global comparison of securities statistics," Washington, D.C., March.

Coffee, John C., 2008, "Analyzing the Credit Crisis: Was the SEC Missing in Action?" *New York Law Journal*, December.

Cohan, William, 2012, "How We Got the Crash Wrong," *The Atlantic*, June.

Coker, Don, 2012, "Repurchase & Buyback Demands, Representations and Warranties Claims in Residential Mortgage-Backed Securities."Available via the Internet: www.hgexperts.com/article.asp?id=24951.

Council on Foreign Relations, 2013, "The Credit Rating Controversy," updated February 2013.

Credit Rating Agency Reform Act, 2006. Available via the Internet: www.govtrack.us/congress/bills/109/s3850.

Credit Suisse, 2013, "Response to the Consultative Paper on Revisions to the Basel Securitization Framework," (Zurich).

Day Pitney, 2010, "Treatment of Trust Preferred Securities Under Dodd-Frank," (Washington, D.C.), July.

Duffie, Darrell, 2007, "Innovations in Credit Risk Transfer: Implications for Financial Stability," Working Paper (Stanford University, Graduate School of Business).

Eavis, Peter, 2012, "Can Securitization Live With Volcker?" *New York Times Dealbook* (New York: New York Times).

Eichengreen, Barry, and Kris Mitchener, 2003, "The Great Depression as a Credit Boom Gone Wrong," BIS Working Paper No. 137 (Basel: Bank for International Settlements).

European Central Bank, 2008a, "Covered Bonds in the EU Financial System," (Frankfurt am Main).

———, 2008b, "The Incentive Structure of the 'Originate and Distribute' Model," (Frankfurt am Main).

———, 2013, "ECB further reviews its risk control framework allowing for a new treatment of asset-backed securities," Press release, July 18. Available via the Internet: www.ecb.int/press/pr/date/2013/html/pr130718.en.html.

European Insurance and Occupational Pensions Authority, 2012, "Revised Technical Specifications for the Solvency II valuation and Solvency Capital Requirements calculations (Part I)." Available via the Internet: eiopa.europa.eu/consultations/qis/insurance/long-term-guarantees-assessment/technical-specifications/index.html.

Financial Stability Board, 2010, "Principles for Reducing Reliance on CRA Ratings," (Basel).

Fitch Ratings, 2013, "Spanish Covered Bonds Not Affected by Residual Claims," April 8. Available via the Internet: www.fitchratings.com/gws/en/fitchwire/fitchwirearticle/Spanish-Covered-Bonds?pr_id=787704.

Germany, Kreditanstalt für Wiederaufbau, undated, "SME securitization by KfW—a decade in review" (Frankfurt).

Global Financial Markets Association, 2013, "GFMA Response to the Consultative Document on Revisions to the Basel Securitization Framework," March 18.

Ghosh, Atish R., Jonathan D Ostry, and Charalambos Tsangarides, 2012, "Shifting Motives: Explaining the Buildup in Official Reserves in Emerging Markets since the 1980s," IMF Working Paper 12/34 (Washington: International Monetary Fund).

Gordian Knot, 2013, "A Return-Allocated Capital-Equivalence Approach for Securitisations," Bank for International Settlements (Basel).

Gorton, Gary, and George Pennacchi, 1995, "Banks and Loan Sales: Marketing Non-marketable Assets," *Journal of Monetary Economics*, Vol. 35, pp.389–411.

Greenspan, Alan, 2002, "Issues for Monetary Policy," Economic Club of New York, New York City, December 19.

Herring, Richard J., 2009, "Policy Issues Concerning the Reform of the Credit Rating Agencies," Pew Financial Reform Project, Briefing Paper #14.

Highbeam, 2013, "Loan Brokers," Industry report, *Highbeam Business Report*, The Gale Group, Inc. Available via the Internet: business.highbeam.com/industry-reports/finance/loan-brokers.

International Financing Review, 2012, "Covered Bond Roundtable 2012," Thomson Reuters (June). Available via the Internet: http://edition.pagesuite-professional.co.uk/Launch.aspx?EID=858b8dee-8fb7-4048-88c6-a3c156c40a1a

International Monetary Fund, 2009, "Restarting Securitization Markets: Policy Proposals and Pitfalls" Chapter 2 in *Global Financial Stability Report*, World Economic and Financial Surveys (Washington).

———, 2011, *Germany: Financial Sector Stability Asssessment*, IMF Country Report No. 11/169 (Washington). Available via the Internet: http://www.imf.org/external/pubs/ft/scr/2011/cr11169.pdf.

———, 2012, "The Reform Agenda: An Interim Report on Progress Toward a Safer Financial System," Chapter 3, *Global Financial Stability Report*, World Economic and Financial Surveys (Washington).

International Organization of Securities Commissions, 2012, *Global Developments in Securitisation Regulation*, Final Report (Madrid).

Kaiser, Bernhard, and Stuart Axford, 2006, "Principal Legal Issues of German True Sale Securitization," Chapter 23 in *Securitizations: Legal and Regulatory Issues/With Update*, ed. by Patrick D. Dolan and C. van Leer Davis.

Keys, Benjamin, Tanmoy Mukherjee, Amit Seru and Vikrant Vig, 2010, "Did Securitization Lead to Lax Screening? Evidence From Subprime Mortgage Loans," *Quarterly Journal of Monetary Economics*, Vol.125, Issue 1 (January).

Kindleberger, Charles, 1978, *Manias, Panics, and Crashes: A History of Financial Crises*, (New York: Basic Books).

Kofner, 2009, "The German Pfandbrief system facing the financial crisis," Institute for Transformation, Housing and Social Spatial Development, International Housing Conference, June 28–July 1.

Kothari, Vinod, 2006, *Securitization. The Financial Instrument of the Future* (Singapore: John Wiley & Sons (Asia) Pte Ltd).

———, 2008, “The Name is Bond. Covered Bond.” Working Paper.

Krauss, Stefan, 2005, “Synthetic Securitization Platforms Established by KfW,” in *Securitizations of Derivatives and Alternative Asset Classes: Yearbook 2005,* ed. by Jan Jod de Vries Robbé and Paul Augustine Usman Ali.

MarketWatch, 2007, “Citigroup says it will absorb SIV assets,” December 13. Available via the Internet: www.marketwatch.com/story/citi-plans-to-absorb-49-billion-in-siv-assets-onto-balance-sheet.

Martin, David, and Matthew Franker, 2011, “Rating Agency Regulation after the Dodd-Frank Act: A Mid-Course Review,” *Insights*, December.

Mian, Atif, and Amir Sufi, 2009, “The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis,” *The Quarterly Journal of Economics*, Vol.124, Issue 4, pp.1449–1489.

Moody’s, 2012a, “Default & Loss Rates of Structured Finance Securities: 1993-2011,” *Special Report* (New York).

———,2012 b, “CLOs and the Simplified Supervisory Formula Approach (SSFA),” Research/White Paper (New York).

Muolo, Paul, and Mathew Padilla, 2008, *Chain of Blame* (Hoboken, NJ: John Wiley & Sons, Inc.).

New York Times, 2013, “Accuracy of Appraisals Is Spotty, Study Says,” May 8.

OECD, 2010, “Competition and Credit Rating Agencies,” Hearing, Competition Committee (Paris).

Principal Collateral Securities Secretariat, 2013, “Europe in Transition: Bridging the Funding Gap,” Working Paper, March.

Qualified Mortgage, 2013, "Definition of a Qualified Mortgage (QM)." Availablevia the Internet: http://www.qualifiedmortgage.org/definition/.

Rajan, Raghuram, 2005, "Has financial development made the world riskier?" *Proceedings*, Federal Reserve Bank of Kansas City, Aug. Issue, pp. 313–369.

Schularick, Moritz and Alan M. Taylor, 2012, “Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870-2008,” *American Economic Review*, American Economic Association, Vol. 102 (2) (April), pp. 1029–61.

Siewert, Jan B., and Vonhoff, Volker, 2011, "Liquidity and Credit Risk Premia in the Pfandbriefe Market," January 15.

Shivdasani, A., Yihui Wang, 2011, "Did Structured Credit Fuel the LBO Boom?" *The Journal of Finance*, Vol. 66, Issue 4 (August), pp. 1291–1328.

Standard & Poor's, 2012, "Solvency II Could Push European Insurers Away From Securitizations," *Rating Direct* (London).

State Street, 2009, "State Street Announces Common Stock Offering," Press Releases, May 15 (Boston). Available via the Internet: pr.statestreet.com/us/en/20090518_1.html

Stein, Jeremy, 2013, "Overheating in Credit Markets: Origins, Measurement, and Policy Responses," remarks at "Restoring Household Financial Stability after the Great Recession: Why Household Balance Sheets Matter." A Research Symposium sponsored by the Federal Reserve Bank of St. Louis, St. Louis, Missouri, February.

Stewart III, G. Bennett, 2003, "Pension Roulette: Have You Bet Too Much on Equities?" *Harvard Business Review* (June). Available via the Internet: http://hbr.org/2003/06/pension-roulette-have-you-bet-too-much-on-equities/ar/1.

Stiglitz, Joseph E., 2009, "Capitalist Fools," *Vanity Fair* (January).

Sweet, Charles A., and William R.B. Springer, 2012a, "CFTC Issues Broader Interpretive Exclusion From Commodity Pool Regulation for Certain Securitizations, and Temporary Registration Relief for Securitizations and Other Swap-Based Commodity Pools," *Bingham.com*, Legal Alerts, October. Available via the Internet: www.bingham.com/Alerts/2012/10/CFTC-Issues-Exclusion-from-Commodity-Pool-Regulation.

———, Joshua B. Sterling, and William R. B. Springer. 2012b, "CFTC Issues Broader Interpretive Exclusion From Commodity Pool Regulation for Securitizations, and No-Action Advice 'Grandfathering' Some Securitizations and Extending Temporary Registration Relief Until March 31, 2013," *Bingham.com*, Legal Alerts, December. Available via the Internet: www.bingham.com/Alerts/2012/12/CFTC-Issues-Broader-Interpretive-Exclusion-From-Commodity-Pool-Regulation-for-Securitizations.

Tarullo, D.K., 2012, "Regulatory Reform Since the Financial Crisis," Speech at the Council on Foreign Relations, New York, New York, May 2.

Thompson, Anthony, Elen Callahan, Conor O'Toole, and Ganesh Rajendra, 2007, "Global CDO Market: Overview and Outlook," Deutsche Bank (Frankfurt).

United States of America, Board of Governors of the Federal Reserve System, 2012, *Credit and Liquidity Programs and the Balance Sheet*, Federal Reserve Board, updated July 30 (Washington). Available via the Internet: www.federalreserve.gov/monetarypolicy/bst_lendingother.htm.

United States of America, Federal Bureau of Investigation, 2004, *Financial Institution Fraud and Failure Report* (Washington). Available via the Internet: www.fbi.gov/stats-services/publications/fiff_04.

United States of America, Federal Deposit Insurance Corporation, 2006, "Challenges and FDIC Efforts Related to Predatory Lending," *Audit Report* (Washington: Office of Inspector General).

United States of America, Government Accountability Office, 2004, *Securities and Exchange Commission: Alternative Net Capital Requirements for Broker-Dealers That Are Part of Consolidated Supervised Entities* (Washington).

United States, Securities and Exchange Commission, 2012, *Annual Report on Nationally Recognized Statistical Rating Organizations* (Washington).

United States, Securities and Exchange Commission , Department of the Treasury, and Office of Federal Housing Enterprise Oversight, 2003, *A Staff Report of the Task Force on Mortgage-Backed Securities Disclosure* (Washington).

Westlaw, 2013, "State Of North Carolina, ex rel. Roy Cooper, Attorney General, Plaintiff, v. The McGraw-Hill Companies, Inc. and Standard & Poor's Financial Services LLC, Defendants," Superior Court of North Carolina, Superior Court Division, (Wake County), February 5.