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## CDOs – A Critical Phenomenon of the Financial System in the Crisis

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## **CDOs – A Critical Phenomenon of the Financial System in the Crisis**

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2<sup>nd</sup> draft

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## **1 Introduction**

The securitization of credit claims forms an essential element of the global financial system and the global financial crisis. In the last four decades securitization developed into a complex financial instrument. Its forms and contents have evolved over time, creating more complex and opaque financial products. The demand for these investment products seemed to be infinite prior to the financial crisis. Collateralized debt obligations (CDOs) symbolize this development in a unique way. They were eventually used to securitize credits from the US subprime mortgage market, which experienced a significant growth in the run-up to the financial crisis.

The decrease in U.S. housing prices suddenly ended this development and triggered a self-enforcing downward spiral on the financial markets. The financial crisis led to a collapse of securitization activities. The far-reaching loss of confidence in securitization reflects this collapse.

This paper aims at discussing the mechanisms which stand behind the loss of confidence in securitization. We argue that this development was caused by a specific type of securitization (ABS-CDOs). The creation of structured finance products (SFPs) out of mortgage-backed securities (MBS) had serious deficits. As Coval et al. (2009) point out, the models that were used by the rating agencies for SFPs (such as ABS or ABS CDOs) paved the way for a huge growth of the securitization market before the crisis. In this context, the adoption of rating classes that were used for rating the credit worthiness of corporations has to be judged critically. For investors, these rating labels suggested comparability for different types of investments, which proved to be fatal in the following crisis. Investors had to rely on ratings of SFPs from the very beginning.

Many aspects of the following analysis can be better understood by an examination of their historic origins. Securitization in general and the role of the rating agencies in particular can be described more adequately. Therefore, the second section shortly reviews the origins and the development of the mortgage and securitization market, which brought up those structures that were of central importance for the stated loss of confidence. The third section discusses advantages and disadvantages of securitization in general. Section four identifies the deficits of securitization and explains why they induced information losses for investors. The fifth section outlines the developments in the securitization market during the crisis and reflects on the corresponding loss of confidence. The paper concludes with a brief discussion of the findings.

## 2 The Evolution of the Securitization Market

At the beginning of the 1930s, the U.S. government set itself the political goal to facilitate the private housing sector which was back then relatively restricted. In doing so, it aimed at making housing available to more strata of society (Bertl 2004, 24).<sup>1</sup> For that goal, several institutional actors were initiated.<sup>2</sup> Furthermore, a secondary market for mortgages was established<sup>3</sup> and, as part of the reforms, the government also influenced the structuring of the mortgage agreements. Instead of a term of up to 5 years, high prepayments, final maturity and a variable interest rate, the mortgages now amortised steadily in a term of up to 30 years with fixed interest rates (Bertl 2004, 25f; McConnell and Buser 2011, 7). This set of policies was supposed to be successful. Since the 1940s, the result was a rapid growth of mortgages and private residential buildings. In 1965, the private home ownership rate had grown to 63.4%.<sup>4</sup>

Facing problems in the mortgage market since the 1960s (see Bertl 2004, 26ff), the U.S. government introduced numerous reforms and restructuring measures. Thus, Fannie Mae, among others, was privatized in 1968. Furthermore, in the same course, the state-owned GNMA (Government National Mortgage Association), also known as Ginnie Mae, was demerged from Fannie Mae. In 1970, the FHLMC (Federal Home Loan Mortgage Corporation), publicly known as Freddie Mac, was founded likewise as a private institution following the same concept operated by Fannie Mae.

In 1968, Ginnie Mae assisted the first “pass-through” securitization, as it provided a guarantee to a transaction of privately issued mortgage-backed securities (MBS) (McConnell and Buser 2011, 8).<sup>5</sup> To create a pass-through MBS, numerous mortgages were pooled and fractional claims were issued, whereas the payment of these assets then was transferred pro rata to the securities. Consequently, all securities were equally affected by payment defaults. In 1983, Freddie Mac issued the first structured securitization called collateralized mortgage obligation (CMO). In contrast to a simple pass-through security, the payments of a pool of mortgages were divided into distinct tranches differing in

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<sup>1</sup> In the course of the Great Depression home ownership fell from 47.8% in 1930 to 43.6% in 1940 (Bertl 2004, 26).

<sup>2</sup> First of all, the Federal Home Loan Bank (FHLB) System consisting of 12 regional banks was established in 1932 to support thrifts, which were then the main actors in granting mortgages. In times of liquidity shortages, the FHLB granted credits to the thrifts ensuring the availability of mortgages. In 1933 and 1944, the Federal Housing Administration (FHA) and the Veterans Administration (VA) were established to guarantee the interest payments of the mortgagors. In 1938, the FNMA (Federal National Mortgage Association) was founded, better known as Fannie Mae.

<sup>3</sup> Thrifts were allowed to sell FHA and VA guaranteed mortgages to Fannie Mae with the intention to free funding for further mortgages.

<sup>4</sup> United State Census Bureau, <http://www.census.gov/housing/hvs/data/histtabs.html> [viewed 15.08.2013]

<sup>5</sup> In 1971 and 1981, Freddie Mac and Fannie Mae issued their first “pass-through” MBS. The two so-called government-sponsored enterprises (GSEs) pooled mortgages and issued securities, whereas Ginnie Mae only guaranteed privately-issued MBS.

priority, risk and interest.<sup>6</sup> This modification made securitizations increasingly more attractive to investors (Bertl 2004, 41f).<sup>7</sup>

By the end of the 1970s,<sup>8</sup> private actors had already extended the securitization technique to non-conforming mortgages,<sup>9</sup> whereas private-label MBS<sup>10</sup> only began to succeed after the mid-1980s due to several reasons. First of all, at the beginning of the 1980s, the predominant banking model, characterized as “originate-to-hold”, became unprofitable as the Federal Reserve had changed its monetary policy (Gorton and Metrick 2012b, 23). Due to this development and in combination with legal changes in the structure and design of special purpose vehicles (SPV) (ibid., 28ff), banks began to securitize and distribute loans. The “originate-to-distribute” model had emerged, for which the Basel Regulations provided further incentives (Pozsar 2008, 13).

During the mid-1990s, the origination and securitization of subprime mortgages started to appear in the U.S. (Bernanke 2007; McConnell and Buser 2011, 11). As the increment of home ownership rates was an explicit goal of the Clinton administration, as well as of the government under Bush Jr., securitizing subprime mortgages was politically approved and encouraged (FCIC 2011, 41). Furthermore, there were also changes in the design of mortgage contracts. Again, more and more mortgages now had a variable interest rate. As a consequence of these developments, private home ownership rates grew from 65% in 1995 to 69% in 2006.

In the course of the dynamic evolution of the securitization market,<sup>11</sup> a new form of structured finance products had emerged since the end of the 1980s. These were the so-called collateralized debt obligations (CDO). In 1987, they first appeared as collateralized bond obligations (securities based on corporate bonds which were called corporate CDOs). In 1989, collateralized loan obligations

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<sup>6</sup> According to the waterfall principle, claims of the tranche with the highest priority are met first, then those of the tranche with the second-highest priority and so on. On the other hand, the tranche with the highest priority receives the lowest interest.

<sup>7</sup> At first, the new market for agency MBS developed rather moderately. In 1979, the issuance of agency MBS accounted for only \$18.3 billion. Since the 1980s the market became more dynamical and the issuance rose continuously up to \$956.1 billion in 1993 and finally peaked at \$2.76 trillion in 2003.

<sup>8</sup> The first private MBS was issued by the Bank of America in 1977 (Benmelech and Dlugosz 2010, 166).

<sup>9</sup> Non-agency or private-label MBS – like residential mortgage-backed securities (RMBS) or commercial mortgage-backed securities (CMBS) – are usually based on non-conforming loans, which do not meet the criteria of the agencies.

<sup>10</sup> In the course of the following three decades, the securitization technique was applied to a set of other types of claims like car loans, credit card receivables, consumer loans or student loans. In 1985 the first European institutions discovered securitization.

<sup>11</sup> Whereas in 1996, private-label U.S. MBS to the amount of \$52.6 were issued, its issuing multiplied in the following years and peaked at \$882.7 billion in 2005. Other U.S. ABS accounted for about \$62.2 billion in 1990 and peaked at \$753.9 billion in 2006. For Europe, a similar development can be observed, though delayed and at a lower level. Between 2000 and 2008, the issuing of all securitizations rallied from \$87 billion to \$1.2 trillion.

(securities based on corporate loans, called CLOs) were sold to investors, and finally, in 1995, structured finance (SF) or asset-backed (ABS) CDOs emerged. The main feature of ABS-CDOs was their backing by (a combination of) RMBS, CMBS or ABS (Lucas et al. 2006, 4).<sup>12</sup> From 2002 onwards, ABS CDOs experienced a rapid growth in global issuance, increasing from \$17.5 billion in 2002 to \$307.7 billion in 2006. Especially mezzanine tranches of subprime MBS were purchased and resecuritized by CDO managers, because they could hardly be sold to investors. By such a resecuritization, new, high-quality securitizations for risk-averse investors were created. Theoretically speaking, this process of resecuritization had no limit. In fact, the so-called “Matryoshka CDOLs” (Pozsar 2008, 15), CDO squared and CDO cubed respectively did exist (as resecuritizations of ABS CDO tranches). Eventually, these ABS CDOs ultimately enabled and increased the origination of further subprime mortgages: “In effect, the CDO became the engine that powered the mortgage supply chain.” (FCIC 2011, 129)

Agency MBS were considered secure due to their quality and their implicit government guarantee. Therefore, rating agencies did not rate them. In contrast to agency MBS, the market for structured private-label securitizations was a “rated market” from its very beginning (Coval et al. 2009, 4). The rating agencies simply applied their rating classes to SFPs. Assisted by mathematical valuing models, these agencies rated the various SFPs. The senior or AAA-rated tranche normally covered between 70% and 85% of the whole pool of securities (Benmelech and Dlugosz 2010, 165). This dimension of triple-A ratings was in turn essential for regulatory reasons because specific investors were only allowed to invest in securities with appropriate ratings. The incentive structure for rating agencies changed. Beside other moments, like the remuneration of rating agencies through the issuers of securities, the rating process had contributed to a tendency of declining rating qualities (Lucas et al. 2008). For rating agencies, however, these developments opened up a new and lucrative field of business.<sup>13</sup>

### 3 Securitization in Theory

Studies on securitization and the financial crisis often discuss the theoretic advantages of market-based credit intermediation and the functional role of securitization as one of its constituents.<sup>14</sup> Important keywords or concepts connected to the field of securitization are risk transfer, regaining of

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<sup>12</sup> Actually, ABS CDOs are resecuritizations. In contrast to MBS or ABS issuing SPVs, CDOs are vehicles with an active management aiming at arbitrage profits. In academic literature, the term CDO is used differently. Sometimes, already structured securitizations (like most private-label ABS) are labeled CDOs, whereas ABS CDOs are already seen as CDO squared.

<sup>13</sup> In 2006, 44% of Moody’s turnover arose from the rating of SFPs (Coval et al. 2009, 4). In the years prior to the financial crisis both of the two large rating agencies lowered their rating standards in order to gain market share (Bloomberg 2008).

<sup>14</sup> See for example Pozsar (2008), Pozsar et al. (2012) and Luttrell et al. (2012).

liquidity, distribution of risks and a greater range of investment possibilities, which allows investors to choose between different levels of yields and risks.

These advantages are more or less compared to a series of problems or “deficits” which are supposed to occur in traditional banking activities. The release of liquidity, for example, is connected to the argument that the originator is freed from the risk of maturity transformation. However, regardless of the specific credit intermediation system, a bank will always make use of its available financial resources and a release of liquidity allows for additional investments. Under *ceteris paribus* conditions, the release of capital from existing investments only leads to a higher leverage of the whole financial system. Risks are forwarded to market participants who often keep very low or even no liquidity reserves because they are not subjected to regulatory rules while credit originators can create additional contracts. This process is self-enforcing in a fee-based system because profits rely on the disposal of credit contracts. From this perspective, a free amount of capital will rather facilitate a higher return on investment instead of being held by banks to protect against systemic or unforeseen risks.

Another argument in favour of securitization is the emergence of “clump risks” or “Klumpenrisiken” (Konjetzky and Leis, 2011, 37) – of unforeseeable risk accumulation in traditional banking. Selling single credit contracts redistributes accumulated risks on several investors. The accumulation of risks of one bank can be reduced whenever it contributes to the risk diversification of another financial agent’s credit portfolio. The pooling of credit contracts is assumed to compensate losses of credit defaults with payments from non-defaulting contracts. This effect is supposed to increase with the amount of contracts within a credit pool. By tranching a credit pool, different classes of yields and risk levels are created (Figure 1). Tranching has to be regarded as the essential attribute of SFPs, which helps to address a wider range of investors with different degrees of risk aversion.<sup>15</sup>

These advantages of securitization exist as long as losses only affect the equity and lower mezzanine tranches. Of crucial importance for this is the quality of the underlying credit contracts which has a huge impact on the default probability of structured finance products. Pozsar et al. (2012, 12) however, uncritically remark that loan pools of lower quality have to be “polished up” by prolonging the intermediation chain until the resulting SFP finally attracts investors.

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<sup>15</sup> According to Pozsar (2008, 16) the losses from mezzanine and equity tranches have been well diversified on different investors. Senior tranches, however, were only held by a small group of banks and monoliners. Archaya et al. (2011) demonstrate empirically that risk transfer did not work as it was predicted by theory. A large quantity of SFPs was held off-balance in special purpose vehicles, which had been founded by the banks. Furthermore, it has to be stated that credit default swaps were bought in large quantities to protect against losses from the supposedly risk-free senior tranches. Default risks were thus re-accumulated in systemically relevant dimensions by a small group of financial institutions such as AIG and certain monoliners (for example MBIA and AMBAC).



Hellwig (2010, 15), on the other side, rejects strongly the economic usefulness of resecuritization. In accordance with Hellwig, it has to be stated that resecuritization has only one major effect. Certain shares of tranches which are resecuritized indeed receive better ratings, while the quality of the underlying loans and their default probabilities remain unchanged (Figure 2). As Coval et al. (2009, 7) point out, the additional senior tranches receive a lower default probability than the underlying bonds. This effect emerges from the redirection of cash flows and a further slicing. It has to be regarded as an important theoretical advantage: if only a small quantity of contracts (for example within a loan pool) defaults, senior tranches become less and less affected by losses. However, if the number of defaulting contracts increases within the same loan pool, the effect is compensated because the smaller shares on defaulting contracts can add to significant losses in total. If default correlation between credit contracts increases, or, if this correlation has been estimated incorrectly before, as it is emphasized by Coval et al. (2009, 7 and 10f), losses will also affect the senior tranches of resecuritized financial products.

#### **4 Securitization in Reality**

At this point it becomes obvious how much investors depend on proper ratings for SFPs. According to the report of the Financial Crisis Inquiry Commission (FCIC 2011, 130 and 147), the rating agencies were hardly able to rise to the challenge of rating SFPs that based on (subprime) mortgages. The FCIC report comes to unequivocal conclusions concerning ABS CDOs (CDO, CDO squared and synthetic CDOs). From its reflection on the different kinds of debts that had been securitized and structured since the late 1980s, only corporate bonds seem to be excluded from an explicit negative judgement (FCIC 2011, 129f). According to the report, the pooling and tranching of debts of different origins, such as aircraft ABS, consumer credits and mortgages to ABS CDOs (multisector CDOs), resulted in significant losses because the supposed diversification turned out to be only a conglomeration of risks. The increasing focus on mortgage securitization has to be regarded in this context. In contrast to multisector CDOs, the mortgage market was expected to be better understood (FCIC 2011, 130) by analysts and the financial institutions. As it turned out, the geographic diversification of risks in the mortgage market was not as reliable as the distribution of risks over different industries. Instead, the degree of risk diversification depended on the economic development, as it had been the case with multisector CDOs.<sup>16</sup>

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<sup>16</sup> Only corporate bonds seem to be reliable in terms of risk diversification. Defaults of certain bonds can be compensated by the performance of bonds from other industries. This field of securitization, however, is never capable of reaching those dimensions that were achieved by pooling and tranching mortgages.

In retrospect, the insufficient reliability of ratings and the models that were used by the rating agencies strongly contributed to the boom and bust of the securitization market. Coval et al. (2009) discuss the basic factors and relations which exert a strong influence on the default probabilities of SFPs (ABS, ABS CDO, CDO squared) in detail. According to them, the models used for the ratings failed to consider possible changes in the default correlation of mortgages. In other words, investors could only rely on the ratings in case of a totally stable economic development. Whenever an economic downturn occurred, senior tranches would cease to be risk-free.

Some of the consequences of these findings are not explicitly mentioned by Coval et al. (2009). The volume of issuance of senior-tranches could only reach such huge extents because risk was not properly estimated. The demand for senior tranches of SFPs would also have been considerably lower if the risks they actually contained had not remained hidden from investors. The rating models relied on the efficiency market hypothesis (EMH) which did not qualify for empirical developments because it made use of some questionable theoretical assumptions (see Fahey 2013).

Securitization in the real world went different paths. Risks and yields were distributed to equity and senior tranches such that the demand for both was excessive in retrospect. Both tranches were distorted in terms of investment incentives. As far as equity tranches were concerned, some obvious arguments exist for how they were designed. Because they contained larger risks, one could argue, they should also achieve higher yields. Pozsar (2008, 13f) denotes equity tranches as overleveraged instruments, whereas senior tranches are underleveraged in his opinion. But what does this mean exactly? If equity tranches could be sold or met a high demand, this was established by offering higher yields. The higher yields could be offered, because they were redistributed from other tranches. Senior tranches promised a safe investment with much lower yields, which still were above the yields of other investment products with an AAA-rating. The risks that these senior tranches contained, however, were not compensated properly (Coval et al. 2009, 19). If the yield of the senior tranches would have reflected the real risks, this would clearly have indicated that they were too huge to receive an AAA-rating. Equity tranches in turn would have faced a lower demand because yields can only be distributed between the tranches that are created out of a securities pool. A solid rating of SFPs would have limited the securitization of subprime mortgages. The demand for these products would have been lower if transparent information had been available.

Furthermore it has to be stated, that the reliability of ratings was illusionary due to other factors. Coval et al. (2009, 4) emphasize that “issuers created an illusion of comparability with ‘single name’ securities.” As it was mentioned before, the labels denoting different risk classes originated from the valuation of corporations and their creditworthiness. To make use of one and the same label for totally different investment products suggested that yields and risks could be compared easily.

However, a huge amount of SFPs received top ratings, whereas only a few corporate bonds qualified for them.<sup>17</sup> It has to be questioned why this constellation did not lead investors to reflect their decision making. The assumption that every top-rated investment product bore risks entirely comparable has obviously been widespread among investors and financial institutions.

Additionally, incentives to maximize the issuance of senior tranches must have existed. The reason for this was that mezzanine tranches could not be sold to investors because they did not offer an attractive yield to risk ratio. In this context the so called “prolongation of the intermediation chain” should be reflected. Through resecuritizing, mezzanine tranches are partly eliminated by being transformed into new equity and senior tranches which have a higher leverage of yields and risks from the underlying loan portfolio(s). It is important to bear in mind, that securitization and resecuritization redirect the cash flows of the underlying loans to the newly created senior tranches. The qualitative difference of the new tranches is wholly artificial, i.e. independent from the underlying loans and the real or expected cash flows. The latter are separated from the specific claims of a pool of securities. The default probability of the underlying loans, whether estimated correctly or not, remains the same. Cash flows are leveraged into the new senior tranches, which is the essential reason for the top-ratings of ABS CDO and CDO squared. The result of a prolonged intermediation chain can be regarded as a string of several senior tranches which differ in their quality, i.e. default rates and leveraging of a credit pool’s underlying cash flows. The difference can hardly be noticed by investors, who expected the comparability of risks because of equal ratings.

## 5 The Loss of Confidence in Securitization

The turnaround in the U.S. real estate market in 2006 led to a remarkable increase in delinquency rates, especially of nonprime mortgages (see for example IMF 2009, 23f; Fed Richmond 2011).<sup>18</sup> This had negative consequences for securities backed by these mortgages.<sup>19</sup> Based on the deficits in the models of the rating agencies described above, it was expectable that the market for ABS CDOs was firstly affected (Bengtsson 2013, 583; ECB 2008, 93). Since the summer of 2007 also other subprime-related securities were subject to mark-to-market and payment losses respectively. Figure 3 refers to impaired AAA-rated tranches of ABS CDOs and MBS, issued between 2005 and 2007. At the end of 2009 10% of Alt-A and 4% of subprime MBS originally rated triple-A were impaired, but almost all

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<sup>17</sup> Luttrell et al. (2012, 11) emphasise that “only four corporations retained AAA corporate bond ratings following the 2007-09 crisis, down from 15 corporations in 2000 [...]”

<sup>18</sup> The crisis of the U.S. mortgage market has had negative effects on home ownership, which was decreased from 69% to 65% between 2007 and the second quarter of 2013.

<sup>19</sup> A total of about \$2.5 trillion subprime mortgages were originated from 2001 to 2006, whereby almost half of it in the years 2005 and 2006. About 80% of these subprime mortgages originated during the last two years were funded via securitization (Gorton and Metrick 2012a, 430).

lower-rated MBS. As the performance of ABS CDOs depends on the performance of lower-rated MBS, the former were much more affected. As Figure 3 indicates, more than 90% of the initially Aa thru B rated CDOs and 71.3% of AAA CDOs were ultimately impaired (FCIC 2011, 228f). The rating agencies, on their side, downgraded a considerable amount of these SFPs.<sup>20</sup> Large quantities of previously AAA-rated tranches were even downgraded to junk.

From an investors' perspective, these developments in 2007 have proved that AAA-rated mortgage-related tranches do no longer qualify for a top rating when moderate changes affect their economic environment. Correspondingly, during the financial collapse, even AAA-rated tranches of ABS-CDOs and other subprime-related securities defaulted in huge numbers. As investors were not aware of the different "default impacts" of SFPs, many of them lost their confidence in private-label securitizations in general. AAA-tranches of asset backed CDOs which had suffered losses were regarded as representative for all private-label SFPs. From our perspective, this is the driving mechanism behind the far-reaching loss of confidence in securitization.

This loss of confidence is reflected to some extent in the fire sales that followed. As financial institutions ought to value the securities mark-to-market, the problems in subprime mortgages triggered a broad deleveraging of their balance sheets. Due to the far-reaching loss of confidence in securitization, all kinds of SFPs were sold leading to fire sale prices in all of these asset classes (Shleifer and Vishny 2011). Furthermore and in combination with a set of other reasons, a widespread decline in the issuance of SFPs set in. Not only ABS CDOs and other subprime-related securities slumped but also securitizations of other U.S.-related asset classes experienced a severe drop.<sup>21</sup> Moreover, even in Europe, nearly all segments of the securitization market plummeted. Still today numerous fields of the global securitization market have hardly, or only to a limited extent, recovered (see Table 1 in the Appendix).

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<sup>20</sup> "[...] as of August 2009, 63 percent of AAA-rated straight private-label residential mortgage-backed securities issued from 2005 to 2007 had been downgraded, and 52% were downgraded to BB or lower." (IMF 2012, 86).

"[By August 2008], Moody's had downgraded 90 percent of all asset-backed CDO investments issued in 2006 and 2007, including 85 percent of the debt originally rated AAA [...]. S&P has reduced 84 percent of the CDO tranches it rated, including 76 percent of all AAAs." (Bloomberg 2008)

<sup>21</sup> An exception in the U.S. were agency MBS, whose issuance grew significantly since 2006. After the crush of the private-label securitization market the banks continued passing their prime mortgages along to the agencies, and even more frequently. In 2007 agency MBS accounted for 41% of all issued securities, whereas in the years 2008 to 2012 in total 88% of the newly issued securitizations were agency MBS.

## 6 Conclusion

It is difficult to judge whether the loss of confidence can still be regarded as an eminent factor for the persisting limited recovery. However, there are laments from market actors regarding the onholding investors' general scepticism towards securitized instruments.<sup>22</sup> For us, it is therefore conceivable that the loss of confidence in securitization is still quite persistent. One could argue that the loss of confidence remains widespread among investors.

Securitization as a financial instrument has to be clearly distinguished from the various forms of SFPs that base on it. From our perspective, resecuritization is a very questionable financial operation which was used to achieve better ratings for those parts of securitized loans, which otherwise could not have been sold to investors. Furthermore, resecuritized financial products have to be regarded as responsible for a wide range of problems during and after the crisis.

This paper focussed on several of these problems. It tried to shed some light on the developments on the securitization markets and some of those factors that contributed to the financial crisis. Although the rating agencies shall not be blamed in general, it has to be stated that they played an important role for the growth of SFP and their demand. Investors had to rely on the ratings. The models that were used based on problematic assumptions which proved to be fatal in the crisis. Resecuritized financial products defaulted first. Their default affected the credibility of other SFPs. Many investors withdrew from the whole range of securitized products, although there were huge differences in the credit performance.

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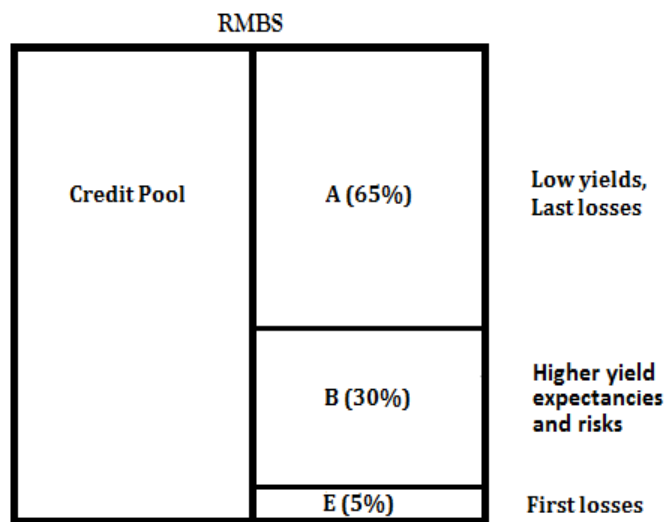
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<sup>22</sup> "The difficulty we now face [...] is that all securitizations are tarred with the same brush as the US subprime market." (Hopkin 2013)

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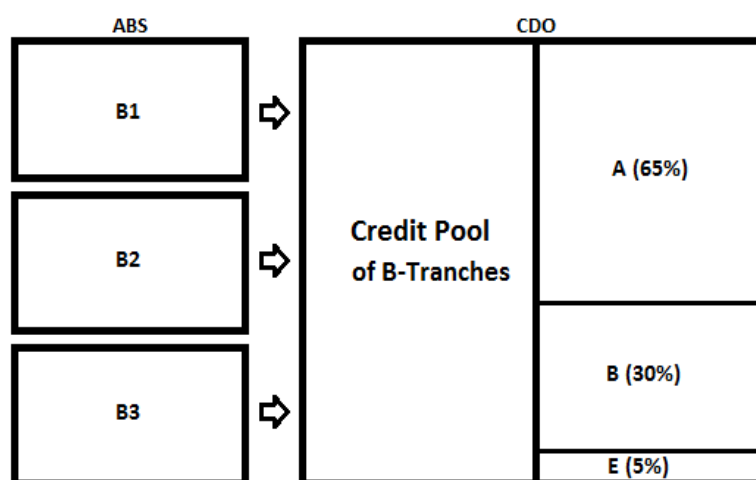
## Appendix

Figure 1: Creating Tranches of Securities



Source: Own illustration

Figure 2: Elimination of Mezzanine-Tranches through Resecuritization

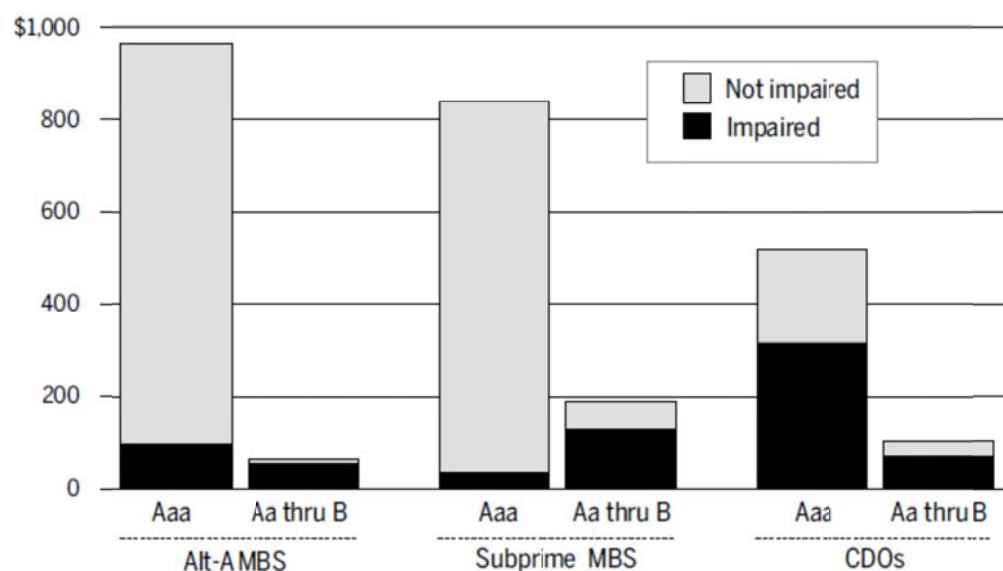


Source: Own illustration

**Figure 3: Impaired Securities**

*Impairment of 2005-2007 vintage mortgage-backed securities (MBS) and CDOs as of year-end 2009, by initial rating. A security is impaired when it is downgraded to C or Ca, or when it suffers a principal loss.*

IN BILLIONS OF DOLLARS



Source: FCIC (2011, 229)

**Table 1: Issuance in 2012 in percent of pre-crisis high**

<i>Europe<sup>a)</sup></i>		<i>U.S.</i>	
Asset Class	Recovery (%)	Asset Class	Recovery (%)
RMBS	8	Non-agency RMBS	< 1
CMBS	19	Non-agency CMBS	16
CDO	14	Home Equity ABS	< 1
Auto ABS	200	Auto ABS	85
Consumer ABS	44	Credit Card ABS	40
Credit Card ABS	59	Student Loan ABS	39

Source: SIFMA

<sup>a)</sup> A special feature of the European market is that the Eurosystem accepts a wide range of structured securities as collateral. This prevented an even more severe decline, as European banks started in 2007 to retain structured securities. In the years 2008 to 2012, almost 87% of all newly issued securitizations were retained as collateral, in 2009 at times even 100%.