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WORKING PAPER

Structured Finance Influence on Financial Market Stability – Evaluation of Current Regulatory Developments

by
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University of Lüneburg
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Structured Finance Influence on Financial Market Stability – Evaluation of Current Regulatory Developments

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In 2007 the world faced one of the biggest financial crises ever. It was the third important financial crisis in the last 12 years. Spillovers to the real economy and moral hazard behaviour of carpetbaggers resulted in enormous pressure on worldwide political institutions to approve a more rigorous regulation on financial institutions and predict financial crises via early warning systems. We analyzed the performance of structured finance ratings and structured finance issuance/outstanding to detect the main shortcomings of the subprime crisis. Afterwards we explain the behaviour of market participants with theoretical models and a survey of institutions involved in securitization. With the conclusions of this analysis we evaluate the EU regulation on credit rating agencies and current Basel II enhancements. Finally we can determine that most regulatory enhancements are in accordance with our analyzed shortcomings. Some approaches like the introduction of a leverage ratio are counterproductive and a danger for worldwide economic growth.

Key words: structured finance, ratings, regulation, subprime crisis, Basel II, leverage ratio

JEL-Code: G01, G21, G24, G28

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Abbreviations

ABS – Asset Backed Securities

ABCP – Asset Backed Commercial Paper

CCF – Credit Conversion Factor

CDO – Collateralized Debt Obligation

CEPS – Centre for European Policy Studies

CESR – Committee of European Securities Regulators

CMBS – Commercial Mortgage Backed Securities

CRA – Credit Rating Agency

EAD – Exposure at Default

ECAI – External Credit Assessment Institution

EU-Repo – European Sale and Repurchase Agreements

FSAP – Financial Services Action Plan

FSB – Financial Stability Board

GSE – Government Sponsored Enterprises

HUD – Department of Housing and Urban Development

IAA – Internal Assessment Approach

IOSCO – International Organization of Securities Commissions

IRB – Internal Ratings Based Approach

LGD – Loss Given Default

LTCM – Long Term Capital Management

LTV – Loan to Value

MBS – Mortgage Backed Securities

NBER – The National Bureau of Economic Research

NPL – Non-performing Loan

PD – Probability of Default

RMBS – Residential Mortgage Backed Securities

SEC – US Securities and Exchange Commission

SF – Structured Finance

SA – Standard Approach

SFA – Supervisory Formula Approach

US-Talf – US Term Asset-Backed Securities Loan Facility

VaR – Value at Risk

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1 Introduction

Since mid 2007 the world has faced one of the biggest financial crises ever. The subprime crisis was the third important financial crisis in the last 12 years. Due to the very complex and intransparent structure of structured finance products and their incalculable systemic relevance, large writedowns and ongoing mistrust is inherent in nearly all financial markets until today. This mistrust led to a drying-out of important treasury markets like the interbank money market or the secondary market. Even with massive bail-outs (€1.873 billion by mid-October 2008) and enhanced money market tender programs (like US-TALF or EU-Repo) a spillover to the real economy could not be avoided but lead to a partial stabilization of international financial markets and a temporary decrease of secondary market spreads. But as is noted in the CEPS Task Force Report (Lannoo (2008)) there was no European response to the crisis and from a national point of view this is comprehensible since the impact on European countries has been heterogeneous. Even if this crisis was not a European crisis, one of the hallmarks of the EU´s Financial Services Action Plan (FSAP) is questioned: disintermediation and therewith securitization which is a very important factor for the development of a mature capital market beside the financial intermediaries. The integration process of EU financial markets and financial intermediaries proceeds much faster than EU regulation and supervision. And as it was noted in Lannoo (2008) the EU realized this shortcoming ten years ago and reacted, beside of the start of the monetary union and the launch of the FSAP, with the implementation of Lamfalussy Committee proposals. But even if this reform brought some remarkable results, it was crafted during good market conditions and seems not to be capable of stormy times. More and more experts got the result that we have probably reached the limits of what is possible under the current system and that we need a major step in EU wide financial regulation and supervision reform. Also the politicians are under pressure to adopt a stronger banking regulation and foresee crises with early warning systems. We want to analyze the previous literature about early warning systems and especially have a look at the

developments for major structured finance markets in the last two crises. By documentation of the major shortcomings in the present regulatory framework which especially stand out through the last two years of financial distress we evaluate actual regulatory approaches and show the consequences for the world economy. In chapter two we define financial market stability and give a short literature review about early warning systems for financial crises. In chapter three we show in detail the rating behavior of US and European structured finance instruments and detect stylized rating facts. Afterwards we explore the US structured finance issuance and outstanding to detect possible moral hazard intentions that could be prevented through new regulatory approaches. In chapter four we take the findings of chapter two and three and try to find the motivation for the behavior of market participants to originate and invest in structured finance instruments. We do this with the Bearingpoint securitization survey (2009) and with theoretic economic approaches. In chapter five we summarize the findings of the three former chapters and evaluate the actual EU regulation on credit rating agencies, Basel II enhancements and the Basel III consultation paper to differentiate between necessary regulations and possible overregulation.

2. Financial market stability and early warning systems for financial crises

Before we start discussing the possibility of an early warning system to prevent financial crises it is useful to define financial market stability. We will do this by the negative proof. DeBandt and Hartmann (2002) define a "systemic crisis" as occurring when a shock affects "a considerable number of financial institutions or markets […], thereby severely impairing the general well-functioning (of an important part) of the financial system. The well functioning of the financial system relates to the effectiveness and efficiency with which savings are channeled into the real investments promising the highest returns. Financial market instability is inherent if major losses are realized during a short time period and if central money markets, like the interbank market, shut down and if systemic important banks struggle".

In the last 15 years the world mentioned three major financial crises. In 1998 the financial markets were shocked through the collapse of the hedge fund LTCM. Like often in financial crises the central bank, in this case the Federal Reserve, organized a $3.5 billion rescue package to prevent a more damaging spillover to systemic important banks and therewith at least also to the real economy. Only three years later, in 2001, the financial distress was due to the “dot-com bubble”.

Figure 1: Performance of the Nasdaq Composite Index based on calculations of Yahoo Finance

An incredible overheating of stock markets related to an incredible growth in the internet sector and related business.

After both crises the world economy slowly recovered and with initiatives like the rework of Basel I there were also initiatives to make the banking system less sensitive to financial crises. In 2007 the “subprime crises” appeared and is the most intense crisis since the Great Depression. Of course after every crisis there were impulsive actions to develop “early warning systems” consisting of lots of financial indicators to forecast future financial crises. Before we present a short literature review have a look at figure 1. Figure 1 shows the development of the Nasdaq Composite Index between 1994 and 2010. Three crisis, three different reactions of the Nasdaq. This should give us a first indication that every crisis is different and that it is very difficult to forecast financial crises. It is supported by Borio and Drehmann (2009) who noted that the construction of reliable quantitative tools to inform assessments of the build-up of risk in the financial system has proved

elusive. Davis (1995, 1999, 2002) mentioned that some features are common to all crises. Borio and Lowe (2002a,b) tested a lot of indicators focusing on the behavior of credit and asset prices. The in sample performance was quite good but has just limited advantages. Only if the same indicators perform as well out of sample they can be considered to indicate systematic risk. Borio and Drehmann (2009) tested the out of sample performance of the indicators to the subprime crisis but without special indicators for securitization. Barrel et al. (2009) used an early warning system with measures of bank capital and liquidity adequacy and of property price growth. They showed that they outperform traditional variables such as GDP growth, inflation and real interest rates. Davis and Karim (2008) used logit and binomial tree approaches that have been successful in predicting banking crises (Karim (2008)). Overall, the different early warning systems were just partially helpful to predict the subprime crisis. It shows that the sub-prime crisis was different compared to other crises and makes regulation even more difficult.

The challenge of this paper is to analyze the behavior of structured finance rating movements, issuance and outstanding. We want to detect stylized facts and reasons for the subprime crisis to evaluate actual regulatory approaches and show possible early warning indicators.

3. Stylized facts from structured finance rating behavior and issuance

As noted in Loeffler (2004) rating agencies are important for the stability of financial markets. Ratings are used to price risky debt, to compute economic and regulatory capital, or to calibrate internal ratings of banks. Ratings should give an orientation for default probabilities of the rated assets. They should be stable and assign the same default probability over all asset classes. But is this also true for financial innovations like structured finance instruments?

3.1 Structured finance ratings

It is important to understand that every structured finance product is just as good as the underlying assets. To understand the major losses due to structured finance products one step is to analyze if the ratings indeed correlate with the expected default probabilities for each rating category.

Standard and Poor´s (2010) calculated the Gini coefficients for different structured finance products. The higher the Gini coefficient the greater is the correlation between the ratings and the structured finance instruments default behavior. As can be seen in the next chart the Gini coefficients were in the 90% area for each product before 2006 which is a good indicator that the ratings matched the expected defaults.

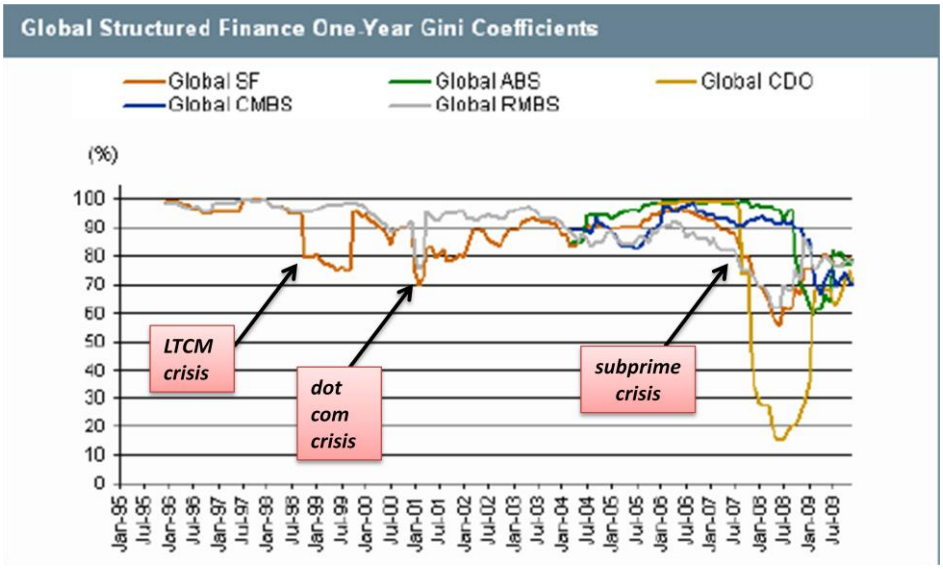

Figure 2: Based on calculations of S&P (2010)

The three financial crises (LTCM collapse, „dot com“ bubble, subprime crisis) marked in the chart led to lower Gini coefficients. But the decrease of the Gini coefficient due to the last crisis led to significant downturns. Especially the decrease of the Gini coefficient for CDOs to 15% in 2008 questions the ratings methodology. This has direct application to the financial market stability because the whole financial system (especially Basel II, rating trigger) is related to ratings. If the ratings expected default probability differs from the realized defaults enormous consequences for the whole financial system and its stability have to be considered. Ratings are based on a statistical database that no market participant could have in this detail. If market participants do not trust in ratings or in rating agencies they will reduce their interaction with market participants (see also chapter 4). After this first indication we want to analyze the rating transition behavior for structured finance instruments since the year 2000.

3.2 Structured finance ratings transition

As estimated by the NBER Business Cycle Dating Committee (2001, 2003, 2008) the US expansion ended in March 2001. After just eight months the trough marks the end of the recession and introduced an expansion of the US economy which last until December 2007. We should keep these business cycle facts in mind if we analyze the rating behavior.

Normally rating agencies use through-the-cycle ratings (Altman and Rijken (2005)) that are more resistant against business cycle fluctuations. Therewith we should expect nearly constant up- and downgrade probabilities for all rated financial instruments. Of course during an economic downturn there are more downgrades but they should not exceed a threshold value. But if you have a look at the downgrade frequency of Standard & Poor´s global structured finance ratings (S&P (2010)) we see in 2008 and 2009 two outliers with 38% and 54% that raise again the question if the rating methodology for structured finance instruments is correct.

In general we can determine that the structured finance ratings reacted in average with a one or two year lag in downgrades to the recession. As a crises threshold value we define in dependence on Fitch (2010) a 10 % downgrade rate. This threshold is based on the historical rating changes statistic for global financial institutions. A downgrade rate higher than 10% shows an extreme economic downturn. Another reason is that the rating methodology for corporates and corporate bonds is validated. Therewith an extreme exceeding of the 10% threshold in combination with a high spread between structured finance and corporate downgrades provides evidence that the structured finance rating methodology is inappropriate, i.e. a corporate “AAA” is not equivalent to a structured finance “AAA”. After this global structured finance rating overview we want to analyze the structured finance rating transition for the USA and Europe in more detail.

3.2.1 USA

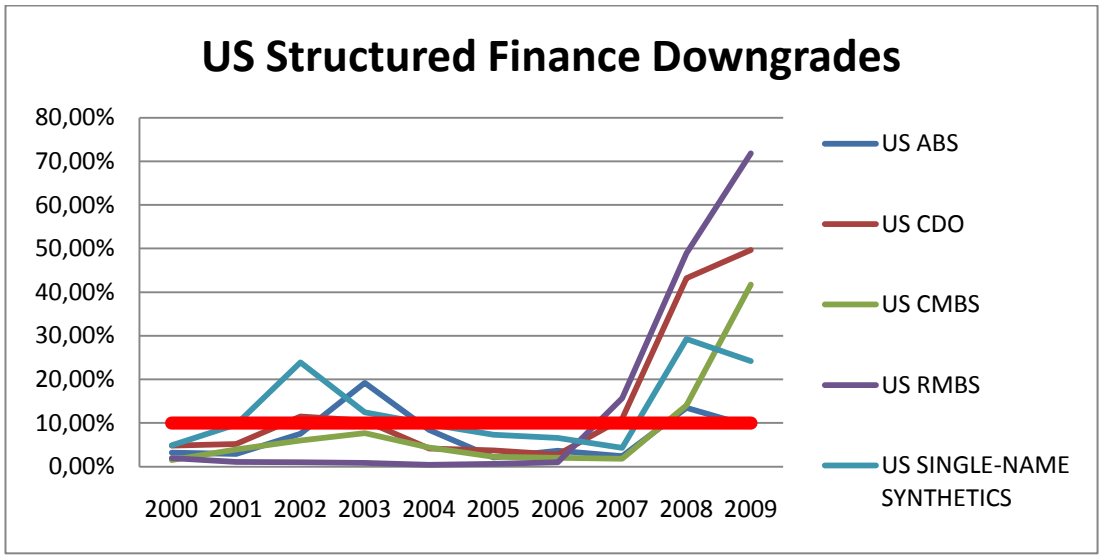

Figure 3: Based on calculations of S&P (2010)

The defined 10% threshold is violated in 2002/2003 with massive downgrades of US ABS and US Single-Name Synthetics. These downgrades are explainable through the “dot com” bubble, which was an economic crisis of the tertiary sector. The companies needed a lot of liquidity and the investors who provided liquidity wanted protection through single-name synthetics. As the bubble imploded the quality of the underlying deteriorate and therewith the single-name synthetics. A spillover to other sectors of the real economy, the rise of unemployment involved from 3.9% (Q4/2000) to 6.1% (Q3/2003), the 9/11 shock and the amazing advance in prices for crude oil beginning afterwards explain the weak performance of ABS underlyings leading to a 20% downgrade rate in 2003. As a first result we can determine:

- ***The performance of structured finance instruments depends enormous on the performance of the underlying assets. The time lag in downgrades depends on the economic crisis, the strength and the range of the shock.***
- ***The structured finance ratings reacted much stronger in the subprime crisis compared to the „dot com“ bubble.***
- ***Equivalent rating categories (e.g. “AAA”) for complex structured finance products, e.g. CDO², and for standard products like corporate bonds lead to an underestimation of the risk inherent in the structured financial instrument.***

- ***Structured finance ratings are more volatile and just limited comparable to ratings of other asset classes.***

At the beginning of the subprime crisis the most structured finance ratings stayed constant. The US CDOs and the US RMBS were even in 2007 massively downgraded. The US RMBS downgrades are related to the underlying mortgages that have floating interest components. Especially the large increase of the US Federal Funds rate starting in January 2005 led to an increasing default rate of US residential mortgages. The increase in CDO downgrades is explainable with CDOs with MBS as underlying also called resecuritisations. With the deterioration of the US economy the situation for US mortgage owners got worse and the downgrades for US RMBS and US CDOs increased in an unprecedented manner. The deterioration of the US economy led also to a decline of commercial real estate demand and therewith automatically to higher default rates in commercial mortgages resulting in higher downgrade rates. The commercial mortgage market seems to be more robust, explaining the one year lag in downgrades compared to US RMBS. One reason could be that corporates have higher reserves and could withstand economic downturns for a longer period.

Let us have a look to the US structured finance ratings in more detail.

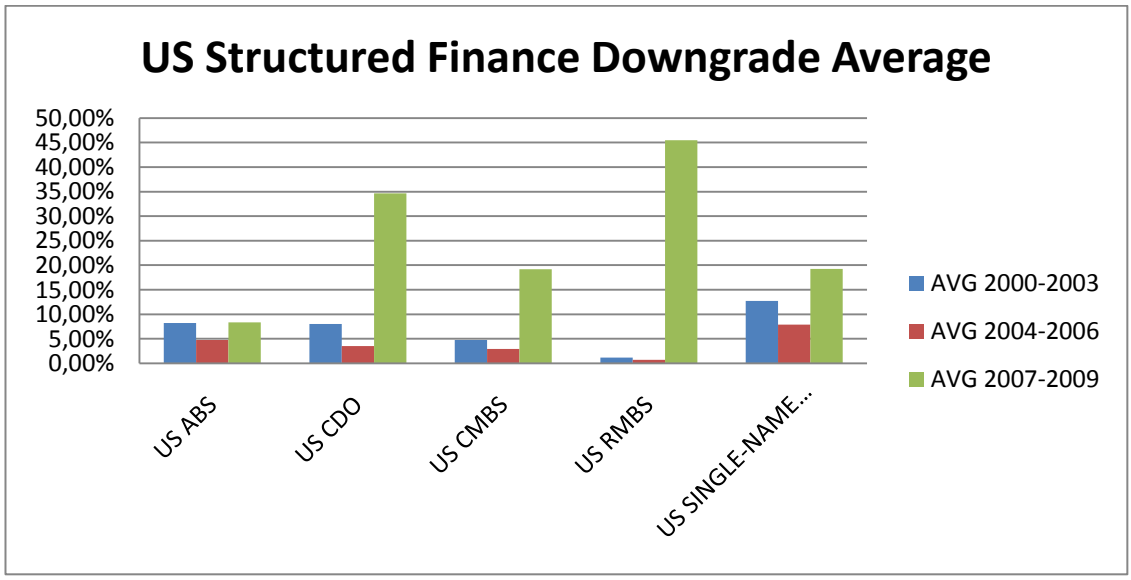

Figure 4: Based on calculations of S&P (2010)

In figure 4 we compare the US structured finance downgrade averages. The 2000-2003 average covers the “dot com” bubble. The 2004-2006 average shows an average for a period with good economic conditions and the 2007-2009 average describes the average for the subprime crisis. For US ABS the 2007-2009 average is nearly on the same level as for the period of 2000-2003. This gives us an indication that the US ABS were not hit harder in the subprime crisis than in the economic downturn in 2001. In contrast the US RMBS have very low downgrade rates between 2000 and 2006. In average there is no statistical significant difference of the 2000-2003 and the 2004-2006 average. But the 2007-2009 downgrade average marks the all time high for downturns. We can conclude:

- ***Structured finance ratings are not able to predict financial crises because ratings react with a time lag. The downgrade average of US RMBS between 2000-2006 gives no indication for the crisis. Important systemic assumptions of structured finance rating methodologies are wrong (e.g. correlation).***
- ***Long term structured finance ratings are highly volatile and have not the stability expected from a through-the-cycle rating.***
- ***The volatility of the structured finance ratings must be due to biased rating methodologies and to incentives to issue structured finance instruments. These incentives could led to moral hazard problems to generate enough underlyings.***

After we analyzed the US structured finance ratings behavior we want to compare the results with the European structured finance ratings.

3.2.2 Europe

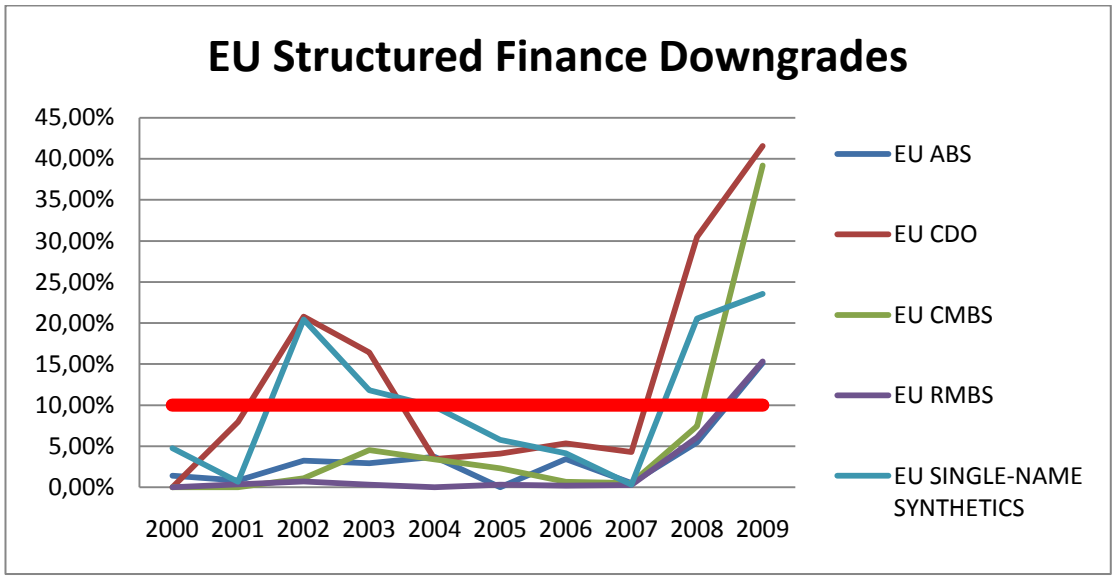

Figure 5: Based on calculations of S&P (2010)

In Europe we should expect lower downgrade rates because of a lower structured finance issuance. The assumption is based on a less developed market for securitization and therewith a higher screening of the securitized underlying. Keys et al. (2009) gives an indication that high issuance of structured finance instruments could lead to less monitoring effort and lax screening. In contrast to the USA the 10% threshold seems to be too high, nevertheless the 10% burden was exceeded in both crises. After the “dot com” bubble we see high downgrade rates for EU CDOs and EU single-name synthetics. The high downgrade rate for EU CDOs could be due to a high risk inherent in the underlying (maybe US structured finance instruments). There are no important downgrades for EU ABS which support the assumption that structured finance issuance is very restrictive and indicates a high underlying quality of the European assets.

The downgrades after the subprime crisis show some differences to the US. We see the highest downgrade rate for EU CDOs with more than 40% downgrades. This rate is the third highest compared to US downgrades. Interestingly the downgrade rate for EU CMBS is nearly on the same level as for the US. Also the downgrades for EU single-name synthetics are in the range of the US values. The rise of the EU RMBS downgrades is due to lax screening in the Spanish mortgage market.

- ***The higher developed the structured finance market the higher is the range of structured finance instruments and the risk of lax screening of the underlying.***

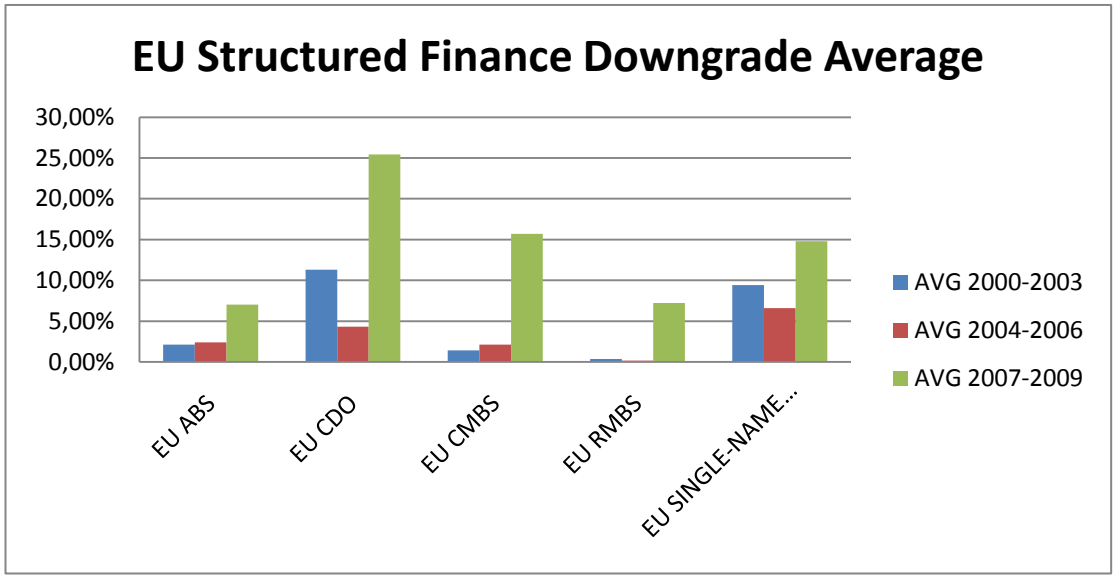

Figure 6: Based on calculations of S&P (2010)

European ABS performed well in the period 2000-2009. The EU CDOs and EU single-name synthetics show high rating volatility in both economic downturns. Remarkable is the amazing increase in downgrade rates for EU MBS. In the period 2000-2006 as in the USA nearly all European structured finance ratings give no indication for a financial crisis.

- ***The relatively low downgrade rates compared to the US structured finance market are due to less investor confidence in structured finance products.***
- ***One reason for the low European structured finance issuance is the high developed Pfandbrief market and the investor confidence in this instrument.***

3.2.4 Structured finance ratings summary

The low Gini coefficient for CDOs in the subprime crisis was a first indication that the structured finance rating methodology is wrong. Empirically this was supported by the huge downgrade rates for the US and European structured finance instruments. The structured finance ratings gave no indication for the

subprime crisis and reacted completely different compared to the „dot com“ bubble, which makes the development of an early warning system for financial crisis more complicated. Even in May 2007 Moody´s showed in their full-year 2006 report no expected changes for the securitization market (Moody´s (2007)). If we consider the enormous dependence of the banking system on ratings, financial stability is in danger if the banks´ dependence is high for structured finance instruments used for secondary market refinancing. Structured finance ratings react different compared to ratings of other asset classes. The European structured finance market seems to be more conservative and therewith gives an important indication that there have to be exogenous motivations for structured finance issuance. It is not just the simple completion of financial markets. Motivations like the decrease of regulatory capital, regulatory arbitrage or more general economic factors like monetary policy could have amplified the US structured finance issuance leading to the subprime crisis.

Therefore we want to analyze the issuance and outstanding to find the main motivations for the crisis and could therewith evaluate actual regulatory enhancements.

3.3 Structured finance issuance and outstanding

In the last chapter we analyzed the rating performance and behavior. International banking regulation frameworks, like Basel II, use external ratings as a proxy for risk and therewith for the determination of regulatory capital. As a next step we want to analyze the structured finance issuance and outstanding. This is necessary to draw conclusions why structured finance instruments were issued. Afterwards we complete the findings to show motivations for securitization.

3.3.1 USA

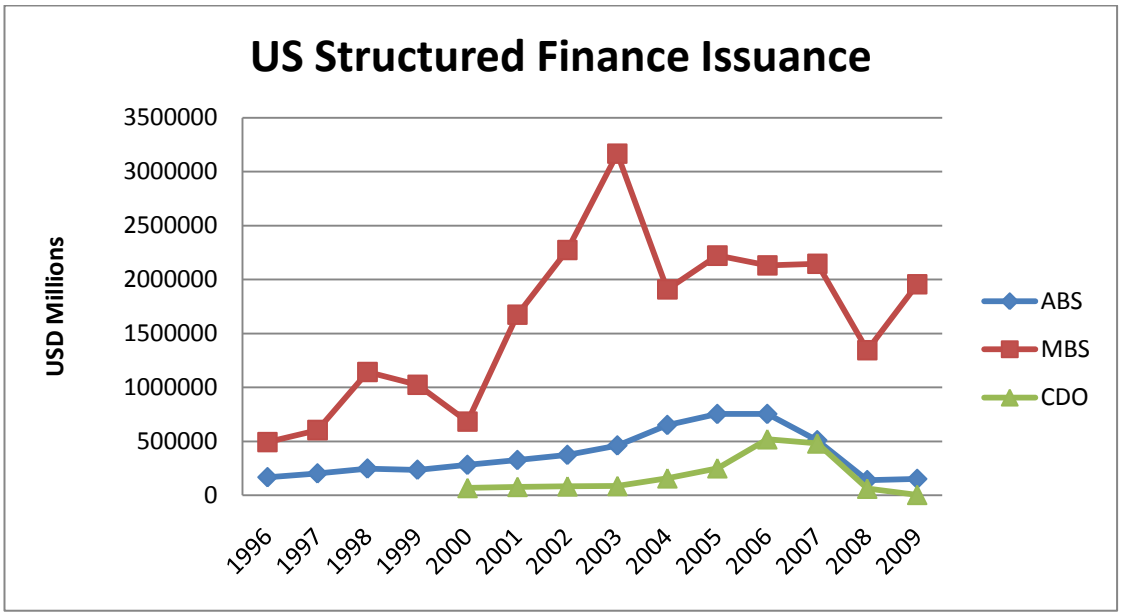

Figure 7: Based on calculations of SIFMA

The US structured finance market is the most developed in the world and the most complex structured finance instruments were issued in the USA. The subprime crisis is primary based on US structured finance instruments that were traded and repackaged all around the globe. If we analyze the structured finance issuance in more detail we see clear differences.

The **US ABS issuance** has a healthy growth rate between 1996 and 2003. The high increase between 2004 and mid 2007 is due to the economic recovery of the “dot com“ bubble and the investor acceptance of structured finance products. The growth in the ABS market did not lead to the international financial crisis. The reason is the diversified portfolio of ABS underlyings like leasing-, credit card- or student loan receivables.

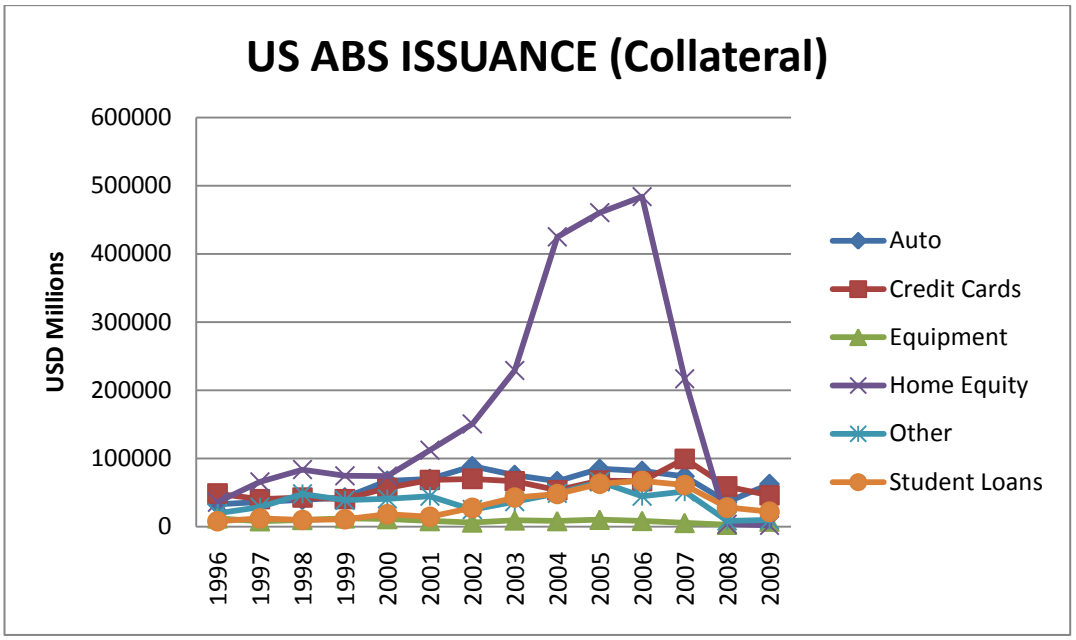

Figure 8: Based on calculations of SIFMA

The detailed **US ABS Issuance** figure shows normal growth rates for all securitized underlyings but home equity loans. The interaction of MBS, home equity loan ABS and resecuritisations amplified the granting of mortgages and home equity loans which became an important danger for financial market stability. Agarwal et al. (2006) noted that home equity loans are loans with home equity as collateral. The loans require a very good credit history and the magnitude of the loans is limited to the value of the home equity. It is often used as a short to mid term loan to finance major expenses like college education or home repair. The issuance of ABS with home equity collateral seems good protected against default risk because of the relevant credit history and the collateral itself. Amplified was the issuance also because of the rising real estate prices, e.g. the median sales prices of new homes sold in the US nearly doubled between 1995 and 2007 (Census (2010)).

- ***The US ABS issuance has normal growth rates for nearly all instruments but home equity ABS. These structured finance instruments had no significant impact for the formation of the worldwide financial crisis.***
- ***The investor trust in home equity loan ABS amplified the issuance of home equity loans and home equity loan ABS in an unprecedented manner. The issued volume increased from $74.4***

billion in 2000 to $483,9 billion in 2006, i.e. a growth of more than 650% in 6 years!

- ***Due to the rising real estate prices the home owners with good credit history could get additionally to their mortgage a home equity loan. The rising US interest level led to increased defaults in home equity loans and therewith also in mortgages in the Alt-A and A scoring worsening the situation on the MBS market.***

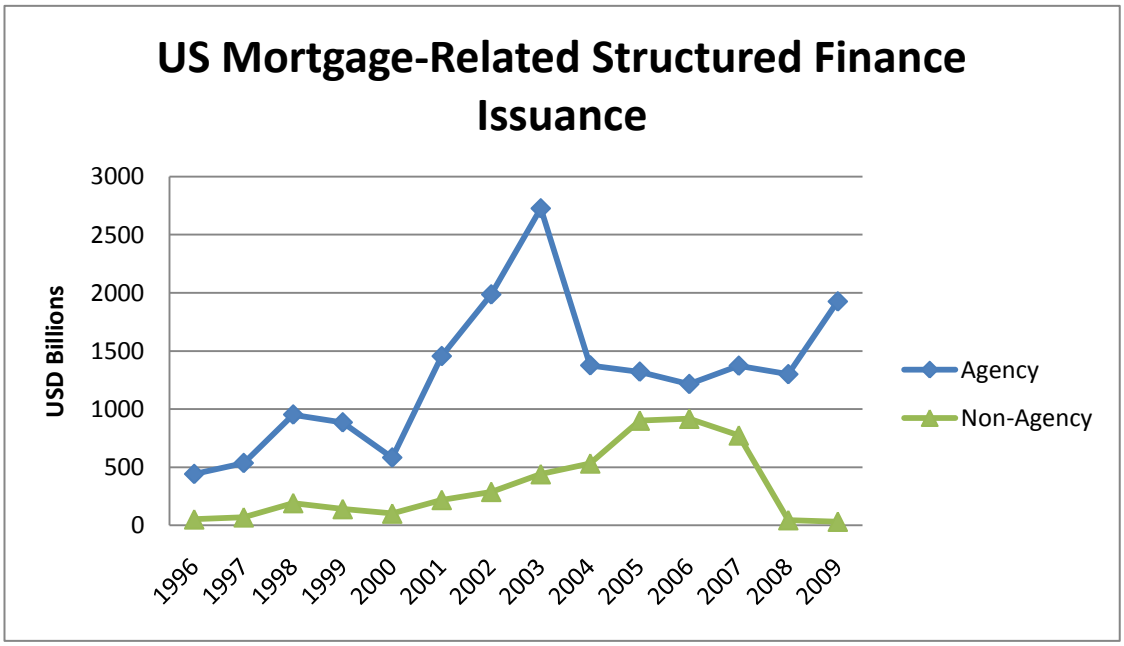

Figure 9: Based on calculations of SIFMA

If we have a look at the **US mortgage-related structured finance issuance** we see an important activity through US agencies. Even if the non-agency issuance nearly doubled between 2004 and 2005, which is clearly incompatible with an economic related growth rate, it must be primarily CMBS issuance, since the US agencies issued an enormous volume of RMBS. This thesis is supported because the downgrade rates of the CMBS are more resistant against economic fluctuations than RMBS. The dominant players in the agency sector were government-sponsored enterprises (GSE) like Fannie Mae, Freddie Mac and the Federal Home Loan Bank. Of course, one reason for the high issuance was the investor overreliance on high rated structured finance instruments. According to Holmes (1999) we believe that the main reason was the policy the GSE were restricted to through the US Department of Housing and Urban Development (HUD). Since the early

1990s the HUD relaxed the conditions for the allocation of mortgage loans until in 2006 the HUD directed the GSEs that 56% of their loans have to be provided to borrowers with income below the median in their area. Additionally the HUD restricted that 12% of the GSEs mortgage financing have to be special affordable loans. These loans were provided to borrowers with an income less than 60% of their median´s income. The yearly agency MBS issuance was in the range of $440 billion. The peak was reached in 2003 with an issued agency MBS volume of over $2.7 trillion.

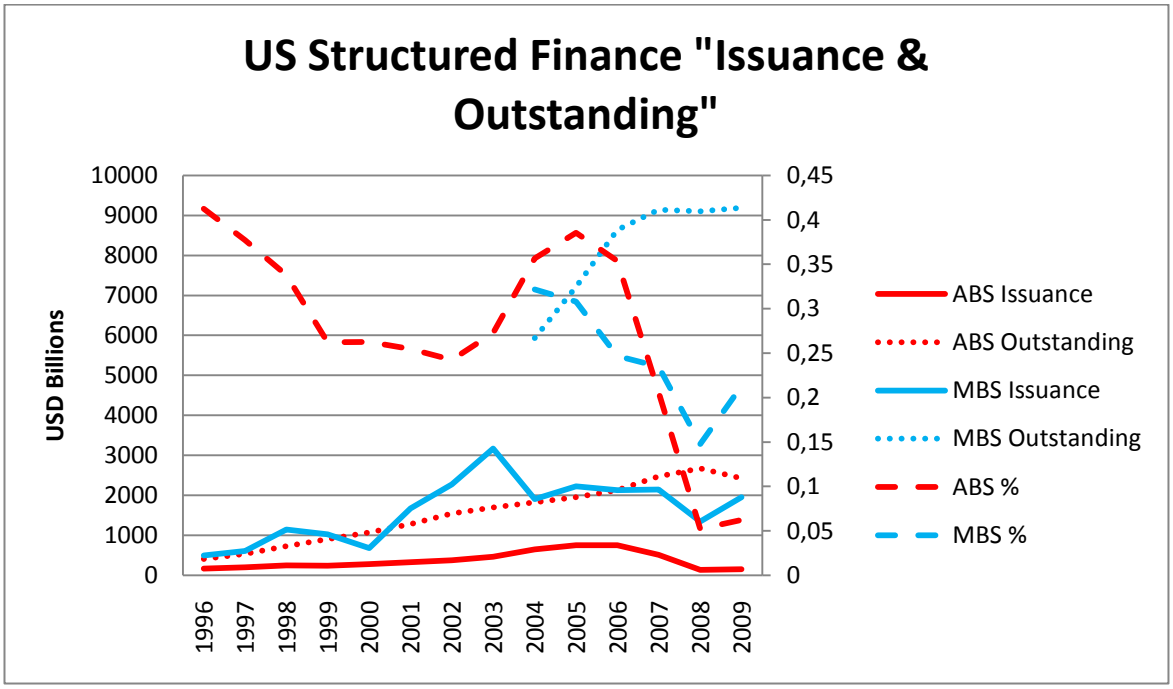

Figure 10: Based on calculations of SIFMA

This led to an increasing outstanding volume of MBS with its peak in 2009 with nearly $9.2 trillion. As noted before the ABS (beside of home equity loans) issuance and also the ABS outstanding have normal growth rates, beside of the fact that the difference increased over the years. The difference could be seen as indicator for systemic risk and possibly be integrated into early warning systems. Less structured finance issuance means that economic conditions dampened or the investors trust in structured finance instruments worsen. If there is additionally a high structured finance outstanding, the default probability could increase with not predictable effects to collateral default correlation and systemic risk observed in the subprime crisis. For the sake of completeness we see the ratio of structured finance

issuance and outstanding as indicator for repayment speed or revolving frequency. Even if the agency MBS issuance was worrisome the immense MBS outstanding is even more. The magnitude of $9.2 trillion MBS outstanding indicates that enormous positions must be held by investors all around the globe. It was grossly negligent from investors risk management to disregard these indicators and careless from the worldwide regulation authorities.

- ***A main reason for the incredible growth rate in the MBS market was the policy driven MBS issuance by US GSEs with a maximum of $2.7 trillion.***
- ***A higher spread (outstanding vs. issuance) indicates less investor confidence and market uncertainty.***
- ***The issuance/outstanding ratio could be seen as indicator for the revolving speed of structured finance instruments.***
- ***The systemic risk due to US agency MBS issuance was grossly neglected by the worldwide supervision authorities and in the regulation frameworks.***

And even more dangerous the picture become if we see the enormous and disproportional issuance of US CDOs backed by structured finance instruments: $307.8 billion.

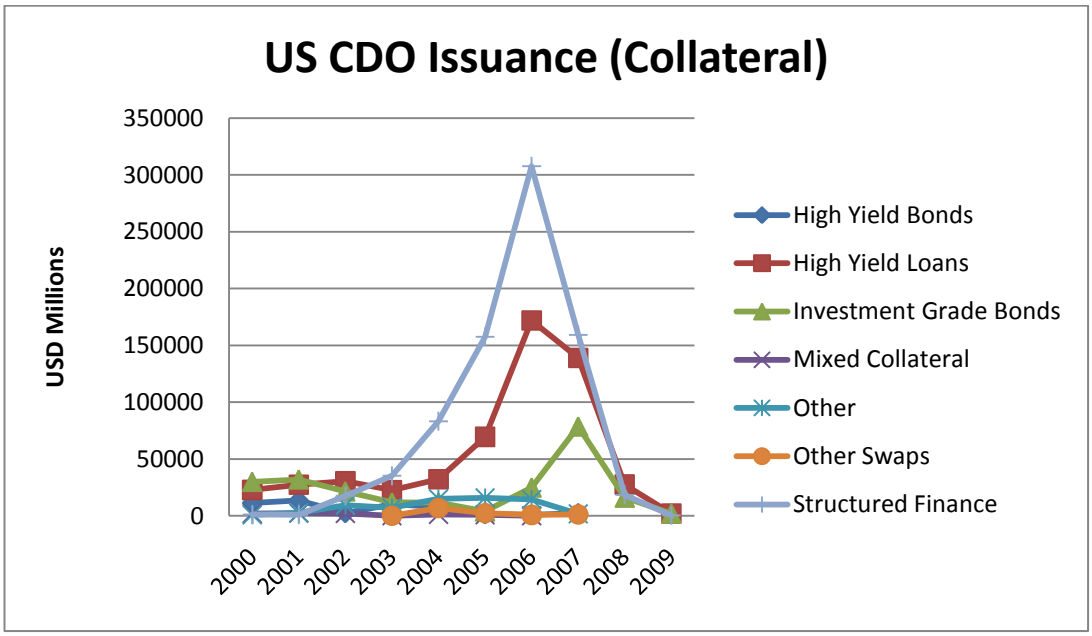

Figure 11: Based on calculations of SIFMA

3.3.2 US structured finance issuance and outstanding summary

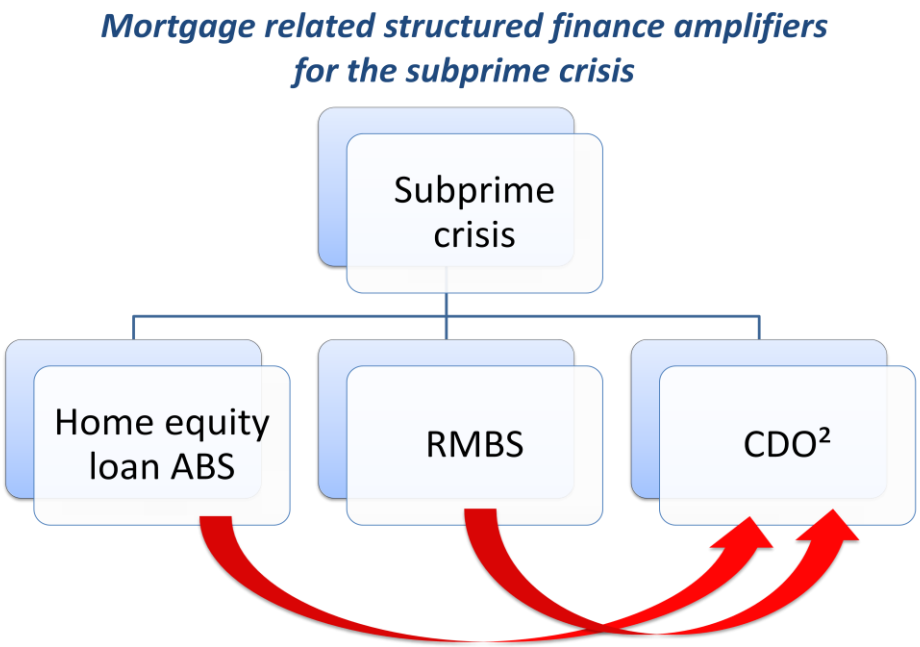

Figure 12

If we neglect for this chapter the question why financial institutions invested in structured finance instruments, we see clear differences in structured finance issuance. We can state that there is dependence between high issuance and high downgrades. This fact may be random for structured finance instruments but reveal the former noted rating methodology failures. According to that we could determine clear motivations for structured finance issuance, especially for mortgage related instruments. Due to the combination of low US interest rates, social policy, the economic recovery of the “dot com” bubble and the apparently unlimited demand for structured finance instruments, the mortgage supply also seems unlimited. Figure 10 describe the interaction that leads to the crisis. Home equity loan ABS and RMBS were the main underlyings for CDOs (figure 9). If they stagger the CDOs also will stagger. The RMBS with subprime underlyings staggered as the FED increased the main interest rates. But for most of the high quality RMBS this increase was not dramatic. It became dramatic because additionally many people also had home equity loans. Due to that home equity loan ABS, bad and good quality RMBS and CDO² struggle and the

crisis was perfect. Together with important failures of the rating methodologies for structured finance instruments and the drying-out of the important interbank markets the world faced one of the biggest financial crises ever.

As a consequence we could say that with a regulation of credit rating agencies, higher risk weights, better banking supervision on risk- and liquidity management and more intensive banking due diligence the crisis could have been prevented. Before we evaluate if the mentioned aspects are incorporated in actual regulatory enhancements or consultation papers, we want to analyze if the banking behavior was rational although the facts and failures were so obvious.

4. Was banking behavior rational?

The Bearingpoint securitization survey from December 2009 shows valuable insights into the motivation of securitization. Before the subprime crisis one main motivation was the control of assets on the balance sheet to release regulatory capital. It was also possible to gain regulatory arbitrage due to the change to the securitization framework. Other important reasons were better conditions compared to unsecured refinancing, risk transfer and the diversification of liquidity channels. We will support the study by some theoretical approaches.

Due to structured finance issuance a bank had the advantage of possible regulatory gains, gains from securitization and the sale of the tranches, lower refinancing costs risk transfer and balance sheet flexibility.

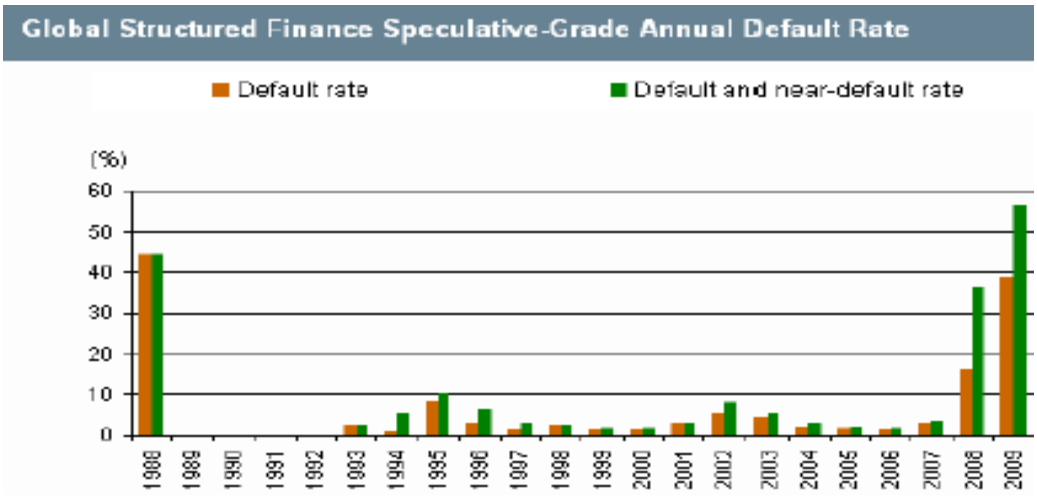

Figure 13: from S&P (2010)

The first theoretical approach describes a cycle that explains the "originate-to-distribute" behavior of banks and the nearly unlimited investor demand for structured finance instruments. If we have a look at the low default rates of speculative grade structured finance instruments before the subprime crisis in figure 11 and the enormous issuance due to nearly unlimited investor demand, it was rational on a micro-level to originate structured finance instruments. The reasons for the nearly unlimited investor demand for structured finance instruments will be explained later. Nevertheless the risk of a too capital market orientated refinancing strategy was neglected. The worldwide supervision authorities ignored that and underestimated the risks and complexity of structured finance instruments for banks and for the whole financial system.

Especially the risk increased due to the high demand for securitizations because banks could not generate enough underlyings with their standard business procedures. The consequence was a reduction of bank lending standards. Kiff and Mills (2007) showed that securitization could lead to lax screening and less monitoring effort. Franke (2005) mentioned that beside the moral hazard problem also the danger for adverse selection rises. Together with the high motivation of hedge funds to invest in structured finance instruments a dangerous cycle started. But why had hedge funds and other market participants such a high demand for structured finance instruments?

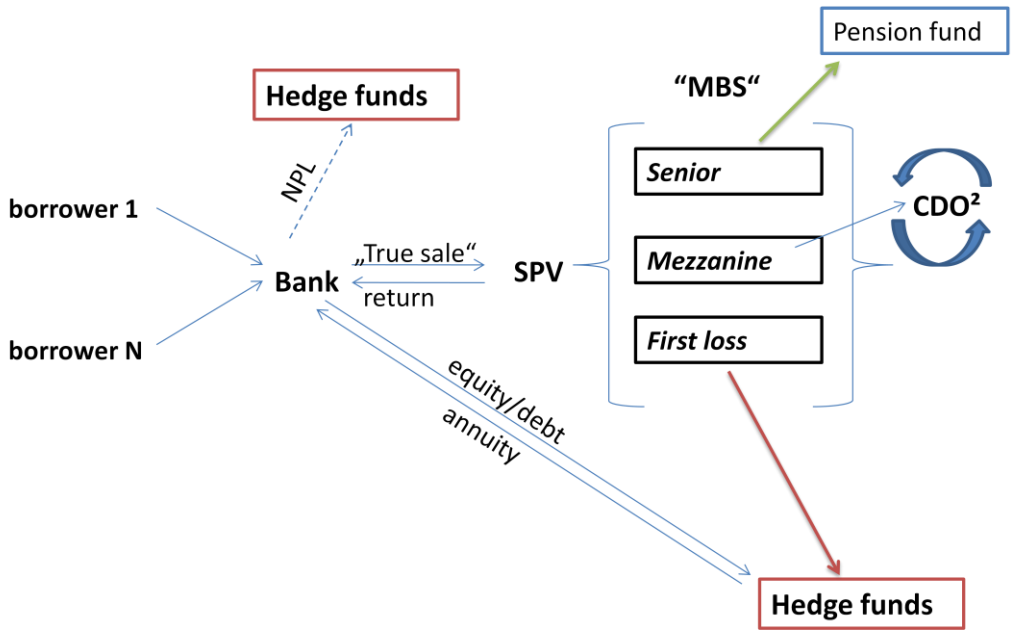

Figure 14: "originate-to-distribute" securitization subprime cycle

Cole, Feldberg and Lynch (2007) showed that hedge funds managed over $1.426 trillion in 2006. Since 1995 this was an incredible growth rate of more than 700%. From an economic point of view the growth of the hedge fund industry led to decreasing returns per fund. To reach the required returns hedge funds had to use higher leverage and invest in more risky financial instruments (Papademos (2007)). Therewith hedge funds bought non-performing loans directly from banks, invested in junior structured finance pieces or bought mezzanine structured finance tranches and originated resecuritisations (CDO²).

Bundesbank (1999) mentioned that the high demand for hedge funds is explainable because hedge funds have no investment restrictions and therewith complement the portfolio of institutional investors. The cycle ends with the shareholder of hedge funds: the institutional investors. So, banks are shareholder of hedge funds and expected high returns. Due to the enormous growth of the hedge fund industry the accepted risks increased. The hedge fund demand for structured finance instruments increased and banks generated enormous underlyings with less and less due diligence to fulfill the demand (figure 14). Amplified was the cycle with the high ratings of credit rating agencies that suggest default protection and cheap money due to low US interest rates. The behavior was rational to invest in hedge funds, to

originate structured finance instruments and to use more capital market orientated funding from a bank point of view.

From a macro perspective this had to lead to a financial crisis. As the crisis occurred in 2007 the demand for structured finance instruments dried up, the banks had to provide liquidity facilities, fulfill margin calls and guarantee for the hedge fund losses which ended in a liquidity crunch. These systemic risks were predictable and a main failure of worldwide supervision and regulation authorities. The reasons for the drying-out are shown in the liquidity crunch cycle in figure 15. Banks relied to heavy on cheaper secondary market funding. As the subprime crisis started the ABCPs of the banks own conduits were bought by the originating banks to avoid the draw of liquidity facilities. As this was not enough the liquidity facilities were drawn which led to rating triggers and downgrades for the structured finance instruments and for the originating bank. Both traditional funding and secondary market funding got more expensive or temporary impossible leading to a liquidity crunch. The banks dependence on secondary market funding via structured finance instruments depends on the incorporation of future gains and losses.

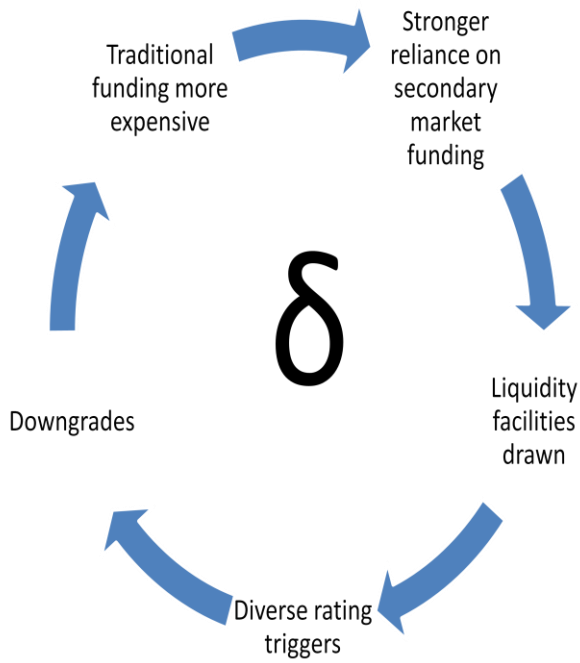

Figure 15: liquidity crunch based on too strong reliance on secondary market funding

To prevent future crises it is necessary that banks see the origination of structured finance instruments not as a one-time game that lead to moral hazard behavior. If they see the origination as an infinitely repeated game they also have to incorporate future gains and losses into their decision and will support financial stability with their more conservative behavior. In the actual discussion about banking regulation the regulator has to reduce the bank dependence on secondary market funding in a way that the cycle shown in figure 15 will not be critical for the liquidity positions of banks. As explained before the discount factor of future gains and losses influence the decision of banking behavior. Many banks struggled in the subprime crisis with liquidity problems which could easily be explained with game theory.

Especially the uncertainty due to biased structured finance ratings led to a drying-out of the interbank market. The behavior of the banks could be easily explained with game theoretic approaches like the prisoner´s dilemma (Gibbons (1992)).

Bank 1 (vertical axis) /Bank 2

	lending	not lending
	ß, ß	δ, α
	α, δ	γ, γ

with $\alpha > ß > \gamma > \delta$.

figure 16: prisoners dilemma from Gibbons (1992).

If there is high uncertainty in the interbank market banking group one and two play maximin strategies to prevent losses and reach the equilibrium (γ, γ). This “not lending” behavior lead to higher spreads and in extreme to a situation where all banks do this tradeoff. The result is a complete drying-out of the interbank market (Brunnermeier (2009)). This has already enormous consequences for systemic risk and financial stability but will be amplified if

this game is also played between banks and investors regarding commercial paper sales. If also the commercial paper market is close to a drying-out there is no other chance to prevent a collapse of the financial system with state guarantees and central bank initiatives. This phenomenon could be observed since the financial crisis 2007.

Analyzing the banking behavior we could determine that banking behavior was rational on a micro-level and in short to mid-term. Three conclusions follow: it is important that banks´ dependence on secondary market liquidity and the regulatory disregarding of off-balance sheet positions are limited. Rating agencies should be regulated with an international framework to guarantee that the expected default probabilities are highly correlated with the realized defaults. All three aspects are very important to restore confidence in financial markets. Before we evaluate actual regulatory approaches regarding these aspects, we give a short introduction to banking regulation.

5. Banking regulation and structured finance enhancements

Financial market stability is very important for a growing real economy. But strong international competition, shadow banking and moral hazard behavior make financial markets more complex and interdependent. For prevention banking regulation is very important.

Banking regulation restricts the financial markets and because of that every regulation initiative has to be well considered. Regulation is adequate if depositors and states are prevented from losses. It is important to understand that the goal of regulation is not to prevent losses in general, but to prevent moral hazard behavior. Bhattacharya et al. (1998) provides a good overview of regulation literature. Some aspects to highlight are the possibility for passive money creation which has direct effects to the money supply of an economy and to price stability. Some authors are of the opinion that the banking system has a tendency for instability. In this context keywords like “gambling for resurrection”, “too big to fail” or “lender of last resort” support the instability hypothesis especially if we look at the last three crises.

We have to question why the last three crises could not be prevented or at least led to lower defaults. One reason is the innovation speed. In the last 30 years the technical possibilities and the international dependence increased with an amazing rate, leading to a stronger competition worldwide. The pressure for higher returns led to a lot of financial innovations like hedge funds or securitization that of course have positive effects for financial markets but could also lead to serious problems like the LTCM crash in 1998 or the subprime crisis beginning in 2007. These new players and instruments are often not regulated or fall out of the existing regulatory framework. The key question is whether the structured finance instruments complete financial markets and rise financial market efficiency of if they just circumvent regulation and are moral hazard intended. Another problem is that the international regulation reacts heterogeneous and with a high time lag to these innovations. Regulation could lead to lower returns and so the banking system tries to circumvent the regulation. This is a normal profit maximizing behavior and not critical if the regulation authorities respond fast. But the last crisis showed that there were lots of problems that are not implemented in actual regulation frameworks (e.g. resecuritisations). First of all the regulatory structure pictures the state of three independent financial sectors: banks, securities firms and insurance companies. Even if there is the tendency to merge the three supervising authorities to one supervision authority on a national level (Masciandaro et al. (2009)), regulators find that their jurisdiction does not match the activities of the entities they are regulating.

In 2009 and 2010 there was and still is enormous international political pressure to implement as soon as possible new regulation frameworks like the “European regulation on credit rating agencies”, “Basel II enhancements” or the “Basel III consultation paper”. These enhancements and consultations are necessary but the danger is that proposals are discussed that were developed too fast. The whole Basel regulation was developed and implemented within 5-10 years. Of course there are failures that are obvious which could be corrected in a very simple way, but there are other interdependencies that are not seen today, leading to possible overregulation that did not prevent crises but have important consequences for economic growth. Especially the “Basel III consultation paper” have to be seen very

critical. Therefore we want to have a look at actual regulation consultation papers and evaluate it with respect to the findings of the last chapters.

5.1 EU-regulation on credit rating agencies

As noted before credit rating agencies (CRA) have a high systemic relevance. Therefore the European Parliament and the Council of the European Union passed the regulation (EC) No 1060 in September 2009 on CRA [EU 2009]. The regulation is based on the proposal of the Commission and the opinion of the European Economic and Social Committee and the European Central Bank to guarantee credit ratings that are independent, objective and of adequate quality. We show you the main characteristics of the proposal.

The regulation tries to prevent blind trust in credit ratings and to encourage the banks own due diligence procedures. There are explicit remarks that no financial institution should only invest in financial instruments that have a rating according to this regulation.

If a prospectus is published for a security the prospectus should contain detailed information that the CRA is registered under this regulation. But this is a minimal requirement and should not prevent CRAs to offer more and detailed information about the security. So the CRAs have also self-interest in the short to mid-term to restore confidence and therewith stabilize their own business. To support this, the regulation suggests the CRAs to apply to the IOSCO Code. This voluntary suggestion is obligatory for the CRAS because the Committee of European Securities Regulators (CESR) monitors the compliance with the IOSCO Code and report back to the Commission annually.

In general the European Parliament wants to set quality standards and demarcate CRAs and ratings within the EU and provide additional requirements for CRAs and ratings in third countries. Ratings issued outside of the EU could also be used for regulatory purposes, but only if they comply with the requirements of the regulation 1060/2009. The CRA has to monitor if the ratings of this third country CRA are as stringent as those provided for the EU regulation. The effective monitoring should be guaranteed by the full and

unconditional responsibility for the credit ratings through the EU CRAs. More detailed information about the criteria that third country CRAs have to meet or the certification process, could be found in the regulation, but is over the scope of this paper.

Basel (2009b) mentioned that the rating agencies had an incentive to produce good ratings and neglect cliff risks. To prevent this possibly dangerous behavior the CRA are not allowed to provide consultancy or advisory services. This means especially the recommendations for the architecture of structured finance instruments that could create potential conflicts of interest with the issuing of credit ratings.

As shown in the second chapter the expected and realized structured finance defaults differ in a significant way. Basel (2009a,b) provide enhancements to the existing regulation framework to strengthen banks due diligence activities. Complementary this framework regulates that CRAs do their own due diligence. They should use rating methodologies that are rigorous, systematic, continuous and be subject to validation (back-testing). The issued ratings should be monitored and reviewed in frequent manner. Also CRAs have to provide now information about their rating methodologies and their changes (also mathematical or correlation assumptions) with an amount adequate for an investor to understand the credit ratings and to perform their own due diligence. Of course the disclosure should not contain sensitive business information, but ratings should be easily comparable between different CRAs.

If a rating could not fulfill the requirements due to a lack of reliable data or the complexity of the structure, the CRAs should not provide a credit rating or withdraw an existing credit rating. To rise transparency and disburden the investors due diligence CRAs should use own rating categories for structured finance instruments and mark them specially.

To restore confidence in CRAs the CESR should maintain a central repository where information on the past performances of CRAs and information about credit ratings issued in the past should be kept. The CESR

should write an annual report and publish summarized information on the main CRA developments.

To prevent moral hazard behavior the regulation prescribes intensive compliance policies. To avoid potential conflicts administrative board members should not get business dependent compensation. Analysts and other employees of CRAs should rotate to guarantee a gradual change in analytical teams and credit rating committees. CRAs are subject to registration (CESR is receiving applications) in order to ensure a high level of investor and consumer confidence (additional to Directive 2006/48/EC). CESR subcommittees should be established for each asset class rated by CRAs to identify possible risks at an early stage. Also the CRAs were supervised by colleges like in the European banking supervision and should share on supranational base information with other European supervision authorities. The CESR should ensure coherence in the application of the regulation. Even if this regulation approach is a step in the right direction, the current supervisory structure should not be considered as a long-term solution. In order to achieve the necessary level of European supervisory convergence and cooperation we refer to the findings of the “De Larosiere Report (2009)”.

The regulation on CRAs is in force since the mid of December 2009. Nearly all credit institutions have to use EU credit ratings for regulatory purposes. This regulation shall apply from 7 December 2010. If a registered CRA wants to endorse a rating from a third country, the CRA of the third country have to be registered and supervised in that country. Additionally the third country CRA have to be independent. The third country supervision authority has to ensure comprehensive cooperation arrangements. These regulations shall apply from 7 June 2011.

The EU Commission should report to the European Parliament and to the Council the progress of this regulation application and the regulatory reliance on credit ratings. Also a report should be submitted to the European Parliament and to the Council to discuss alternative approaches to the `issuer pays´ model. One alternative is the creation of a public Community CRA. Concluding a report should be submitted assessing developments in

the regulatory and supervisory framework of third countries and evaluate the effects of those developments to the actual supervision framework and financial markets stability.

Summarizing the regulation of CRAs is a step in the right direction and picked up the weaknesses showed in the third chapter. Maybe the subprime crisis could not have been avoided but at least attenuated. More supervision, transparency and disclosure covenants are necessary to regain investor confidence and strengthen financial stability. The EU regulation is in line with the new regulation of CRAs in the USA proposed by the US Securities and Exchange Commission (SEC). Positive is the coordinating function of the CESR. It has ensured that the EU regulation is in line with the revised Basel frameworks for the recognition as external credit assessment institution (ECAI). One aspect is very critical: the non-providing of ratings for new financial instruments. If the historical data is not adequate ratings should not be provided. This is overregulation and prevents innovation and growth in the financial industry. We propose a new rating category for financial innovations which could be linked with higher risk weights. Then institutional investors could decide whether they want to invest in these new financial instruments.

5.2 Basel II enhancements

After we evaluated the regulation of CRAs, we want to have a look at the regulation initiatives of the Basel Committee. As a first reaction to the financial crisis the Basel Committee presented “Enhancements to the Basel II framework” (Basel 2009a) in July 2009. Banks should comply with the revised requirements by 31 December 2010. We summarize the main changes.

In the actual credit risk securitisation framework is no differentiation between securitisations and resecuritisations under the IRB approach. So paragraph 541 (i) was supplemented. Basel (2009a) defined that “even if only one of the underlying exposures is a securitisation exposure, any tranched position exposed to that pool is considered a resecuritisation exposure”. This is also in force for credit derivatives or ABCP programmes which is a debatable extension. As a result the resecuritisation exposures got own risk weights for the IRB approach that are higher than for standard securitisation exposures.

Based on the empirical work for the estimation of IRB resecuritisation risk weights also standardised approach (SA) resecuritisation risk weights were introduced. The SA risk weights are in the average of the risk weight bands for the IRB approach and in line with the philosophy of the standard Basel II approach.

Another important safety net is margin calls. Ratings have direct consequences to rating triggers and are directly linked to reputational risk. Brunnermeier (2009) showed the liquidity drying-out in the last crisis. This drying-out was an enormous problem for many conduits that refinanced their exposures via short term ABCP programmes. Instead of drawing the conduits liquidity facility the originating bank decided to buy by itself the ABCPs and paradoxical availed from that opportunity. Basel (2009a) noted that the bank "benefited from the external rating on the commercial paper when assigning a risk weight to that paper, even though the rating was due in large part to the bank´s own support of the conduit in the form of the liquidity facility". Banks should not benefit any more from lower risk weights due to self guarantees because there is no additional support that legitimate that lower minimal capital requirements, i.e. just regulatory arbitrage. The Basel Committee added therefore paragraph 565(g)(i), 565(g)(ii) and 565(g)(iii).

As shown before the banks securitisation due diligence was fragmentary. Now banks have to verify their understanding of their securitisation exposures. Basel (2009a) added the paragraphs 565 (i,ii,iii,iv) and limited the use of the securitisation framework to banks that provide key risk data for off-and on balance sheet securitisation exposures. On one hand detailed information like default rates, prepayment rates, ltv, or geographic diversification are needed. On the other hand also structural information has to be provided like waterfall-related triggers or credit enhancements. The parameters must also be collected for the original underlying exposures of resecuritisations to better estimate the risk characteristics of complex structured finance instruments.

To estimate the EAD for traditional off-balance sheet commitments a credit conversion factor (CCF) is needed. For short/long term commitments the CCF is 20% / 50%. This was also the case for securitisation commitments

like liquidity facilities. Now the paragraph 579 was changed so that for short and long term facilities the CCF is 50%. This is valid for the SA. If a bank uses the IRB approach liquidity facilities are treated as any other securitisation exposure and receive a CCF of 100%. As noted before the bank could also use an external rating for a liquidity facility if it is no self guarantee. Basel (2009a) mentioned that most of the guarantees have no rating. The bank then has to apply either the IAA or the SFA if the necessary data is available or has to deduct it completely. Additional explanations were added to paragraph 613 (c) as clarification. In the Basel II framework guarantees that could be drawn only in the case of market disruptions were preferred with a 0% CCF under the SA securitisation framework or 20% under the SFA in the IRB securitisation framework. Paragraph 580 and 638 were eliminated.

Summarizing the rest of the enhancements there were also changes to Pillar 2 and Pillar 3 guidance. As noted in Basel (2009a) Pillar 1 capital requirements are minimum requirements and should be supplemented with Pillar 2 capital support to strengthen banks against unanticipated shocks. Additionally there were also lots of changes to banks risk management procedures in the supervisory review process and disclosure requirements in the context of securitisation that are over the scope of this paper. Obvious failures occurred by the development of Basel II, shown trough the subprime crisis, were corrected. The enhancements are necessary and not disputable. They will prevent possible cycles like shown in figure 12 but will not affect the standard structured finance issuance. The enormous policy pressure to develop more rigorous banking supervision frameworks is dangerous. In the subprime crisis regulatory faults were used to create regulatory gains. This was still possible despite the long development time of Basel II. Therefore actual regulatory consultation papers have to be considered and evaluated carefully.

5.3 Basel III consultation paper

After the financial crisis begun in mid 2007 the Basel Committee started to develop a comprehensive reform package. The enhancements to the existing

Basel II framework and the actual consultation paper are set up in coordination with the developments endorsed by the Financial Stability Board (FSB) and the G20 leaders. BIS (2009b) mentioned that the proposed introduction of these regulatory enhancements will be implemented by end 2012. This is very fast if we see the development time of Basel II. Hopefully the proposed changes are based on empirical evidence and not only on political pressure.

As noted in BIS (2009b) the consultative document presents the Basel Committee´s proposals to strengthen global capital and liquidity regulations with the goal of promoting a more resilient banking sector. One main goal is to make the financial system more shock resistant and to prevent systemic important crises. But also risk management procedures and supranational supervisory structures were discussed.

BIS (2009b) summarized the main problems of the financial crisis. Many banks in many countries had built up excessive on- and off-balance sheet leverage. This was amplified by a worsening quality of the capital base and insufficient liquidity buffers. As described before in the game theoretic interbank market approach, the market loss confidence in the solvency and liquidity of many banking institutions. This resulted in a unique bail-out from public sectors worldwide and large spillovers to the real economy that have to be prevented in the future.

BIS (2009b) abstract the five important areas of change to the Basel II framework that are in consultation.

1.) The quality, consistency, and transparency of the capital base will be raised.
2.) The risk coverage of the capital framework will be strengthened. As showed before in BIS (2009a) for the risk coverage from trading book and securitization exposures.
3.) Introduction of a leverage-ratio.
4.) Introduction of a series of measures to promote the build up of capital buffers in good times to reduce the existing Basel II procyclical behavior.

5.) A 30-day liquidity coverage ratio and a longer-term structural liquidity ratio will be introduced to guarantee a global minimum liquidity standard.

After we introduced the main areas of regulatory changes we want to go now a step further and evaluate the approaches regarding structured finance instruments.

To strengthen the quality of tier 1/2 capital to absorb losses, certain securitization exposures which are currently deducted 50% from Tier 1 and 50% from Tier 2 should receive a 1250% risk weight. BIS (2009b) mentioned that the advantage of this regulation is a more transparent and easier definition of capital, particularly in the application of limits.

- ⇨ Securitization exposures should not be implemented in Tier 1/2 capital to absorb losses though a 1250% risk weight. This is adequate and should have been done with the implementation of Basel II.

To address counterparty credit risk in a better way BIS (2009b) promotes the approach to “create a separate supervisory haircut category for repo-style transactions using securitization collateral and prohibit resecuritisations as eligible financial collateral for regulatory capital treatment purposes”

- ⇨ The crisis showed that structured finance instruments react in another way to financial distress as for example standard debt instruments, e.g. structured finance instruments have much higher price volatility. Many reasons could be found like wrong rating methodologies, less due diligence, lax screening of underlyings and the waterfall payment structure. Therefore the creation of a separate supervisory haircut category for repo-style transactions using securitization collateral is essential. The crisis showed a drying-out for important markets of resecuritised financial instruments. Resecuritisations are even more unpredictable and so they should not serve as financial collateral. A concluding evaluation is not possible as we do not know the extent of the new haircut category.

- ⇨ This new rule is specified for the supervisory haircuts method, the own estimates of haircut method, the repo VaR method and the internal model method in a new paragraph 145 (i) in the Basel text.

In addition, the Committee is proposing also a separate supervisory haircut category for securitization exposures. The new haircuts would double the corporate debt haircuts.

- ⇨ In the beginning of the subchapter the BIS (2009b) noted that these proposals are grounded in observations from the crisis, empirical work and industry surveys. Nevertheless the simple doubling of haircuts is not traceable and even if the tendency of the haircut rising is alright, the extent is questionable. Formally this change resulted in a revised version of paragraph 151.

Additionally Basel (2009b) mentioned that the Committee is reviewing the revised securitization framework. Again the basic question is whether these products complement financial markets or if they were moral hazard intended to gain regulatory arbitrage. The former Basel II framework invited the banks to play a “one-period” game, to disregard the necessary due diligence and to neglect the possible future development of systemic risk. The rating agencies had an incentive to produce good ratings. Banks had therewith a lower minimum capital requirement and more possibilities how to deal with these structured finance exposures. The same risk existed for cliff effects.

Basel (2009b) noted that two possible extreme approaches are conceivable now. The first approach would be a risk insensitive weight (like Basel I), which is clearly not desirable. The other approach would be the use of bank internal models to derive estimates like LGD or PD. It is the wrong way because a single bank does not have enough data (quantitative and qualitative) to provide strong estimates for these regulatory important ratios.

One discussed alternative is the introduction of a leverage ratio. As noted in Basel (2009b) the Basel Committee announced in 2009 its intention to introduce a leverage ratio. It is in consultation if it will be a supplemental Tier 2 ratio or a hard Tier 1 ratio. The basic idea of a leverage ratio is to constrain leverage with the intention to stabilize the financial system. It is defined in

Basel (2009b) as a “simple, non-risk-based “backstop” measure based on gross exposure”. Frenkel and Rudolf (2010) formalized the proposed Basel II leverage ratio = total assets/Tier 1 capital. The design of the leverage ratio consists of high quality capital, which should be measured with international accounting standards (also for securitization exposures). Additionally collateral could not reduce on-balance sheet exposures and netting is not allowed. Especially in the context of this paper the following elements are interesting: off-balance sheet items get a flat 100% CCF and written credit protection is included at notional value (Basel (2009b)).

As shown earlier in this paper enhancements of the existing regulatory framework are without question necessary. Approaches like the introduction of a leverage ratio are enhancements in the wrong direction. First of all the basic idea of Basel II is risk-dependent regulatory capital. With a “simple, non-risk-based” leverage ratio the Basel II principle is lead ad absurdum and guarantees just little protection against future crises. The performance of the early warning systems and the analysis of the stylized structured finance facts clarified that every crisis is different and that the moral hazard behavior of the subprime crisis has impulsive exogenous factors. The introduction of a leverage ratio which will not prevent future crises but has important negative consequences for the world economy. Frenkel and Rudolf (2010) estimated additional capital requirement by €85 billion for the German economy. This could lead to a reduction in lending in the range of €1.7 trillion and has important consequences for economic growth. The American Securitization Forum (ASF (2010)) estimates 15 times higher capital costs with the introduction of a leverage ratio. Standard & Poors (2009) expects further capital requirements in the range of €300 billion. Especially because a leverage ratio is a “simple, non-risk-based” measure it would reduce the risk sensitivity of the banking systems and fails to reduce financial instability. Frenkel and Rudolf (2010) mentioned that it is unrealistic to increase the required equity in the short term. As a compromise the Basel Committee should think about partial ratios that measure for example the dependence on capital marked based refinancing or about higher risk weights if certain thresholds are exceeded. Other ratios like the balance sheet duration of possible securitization assets or a ratio for off-balance sheet positions are

also conceivable. Without question the banking systems needs a higher level of equity but to constrain banks with a leverage ratio is the wrong way and dangerous for worldwide economic growth.

6. Summary

In 2007 the world faced one of the biggest financial crises ever. It was the third important financial crisis in the last 12 years. Spillovers to the real economy and moral hazard behaviour of carpetbaggers resulted in enormous pressure on worldwide political institutions to approve a more rigorous regulation on financial institutions and predict financial crises via early warning systems. As shown in chapter two the development of an early warning system is still elusive and most models did not incorporate structured finance indicators. We showed that every financial crisis is different and analyzed the behaviour of structured finance ratings and structured finance issuance and outstanding in detail. Failures in rating methodologies are evidently and most of the structured finance instruments had normal growth rates. The combination and supply of home equity loan ABS, RMBS and CDO^2 based on structured finance instruments are one important catalyst of the subprime crisis and mainly driven by exogenous factors like low US interest rates, social policy and failures in Basel II. Afterwards we showed that banking behaviour was rational on a micro-level but must lead to a systemic crisis on a macro-level tightening with the drying-out of the liquidity markets. We found evidence in the Bearingpoint securitization survey (2009) and in two theoretical approaches shown in figures 14 and 15. As conclusion we see three important areas for regulatory changes. The bank dependence on secondary market funding must be limited and measured. Off-balance sheet positions must be supervised and could not be Tier 1 capital any more. CRAs have to be regulated to restore confidence in financial markets and to raise the reliance on ratings used for regulatory purposes. With this background we evaluated three important regulatory approaches. The EU regulation of CRAs acts on our topics and is a step in the right direction if it is implemented with international coordination. Nevertheless we see the non-providing of ratings for financial instruments with a low historical database as critical and propose a separate rating category for new financial instruments

together with higher Basel II risk weights. The Basel II enhancements from July 2009 were a first reaction to the crisis and solved the main regulatory problems shown in the subprime crisis. With discomfort we evaluated some aspects of the Basel III consultation paper. Many aspects are disputable and are in the right direction, but the introduction of a leverage ratio is false. Of course, the banking system needs a higher level of equity but this goal should not be achieved via a leverage ratio. A leverage ratio has significant impact for the worldwide economies and will reduce economic growth for years. Additionally, a risk insensitive leverage ratio will not prevent financial crises and animate banks to have higher risks on their balance sheet. As a compromise we propose partial ratios that measure for example the dependence on capital marked based refinancing (like a liquidity ratio), the balance sheet duration of possible securitization assets or a ratio for off-balance sheet positions.

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