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## FINANCIAL MARKET TURBULENCES – THE SITUATION IN GERMANY

The article studies the turbulences on the world financial markets, which were caused by the turnaround on the US mortgage market leading to a significant increase of default rates, the further turmoil on the markets for asset backed securities and serious liquidity troubles in the banking sector. The following paper tries to highlight some reasons for the turbulences on financial markets which seem to challenge the banking sector so much. Furthermore the impacts on the German banking sector and on the German economy at all are addressed.

*Key words: lenders, borrowers, default, loans, tranches, assets, liabilities.*

**1. Introduction.** At the G7-summit in April 2006 the President of Deutsche Bundesbank estimated the worldwide loss of financial institutes which will result from the US subprime crisis with a value of 225 billions of U.S. dollars. The following paper tries to highlight some reasons for the turbulences on financial markets which seem to challenge the banking sector so much. Furthermore the impacts on the German banking sector and on the German economy at all are addressed. Some broad conclusions about possible lessons for the future follow.

**2. The Turnaround on the US Mortgage Market.** During a period of very low interest rates, prices on the housing market in the United States raised strongly over the last decade. House prices in several regions sometimes doubled within a few years. Because of the low interest rates, the burdens for house owners were rather limited. Owning a house and financing it by mortgages became more and more attractive to all parts of the US population. The banking sector benefited from this development as well. High risky loans seemed to be good investments: Although the loan volume was in many cases at 100 percent of the real estate that served as collateral, the permanently rising house prices increased the value of the collateral and reduced the risk over time. Furthermore, financial innovations made the mortgage business more attractive. Different type of structured securities enabled banks to outsource risks to the markets. These transferred risks were no longer a burden for the balance sheets of the banks. However, after the turnaround of US house markets, these structured securities became the central issue in what is sometimes called the biggest financial crisis since fifty years.

Rising interest rates and a decline in US house prices during 2007 (see chart 1) led to a rapid growth of defaults on the US mortgage market.

All kind of mortgage loans, but especially the ones with lower quality standards (the subprime mortgage market segment) were affected by this

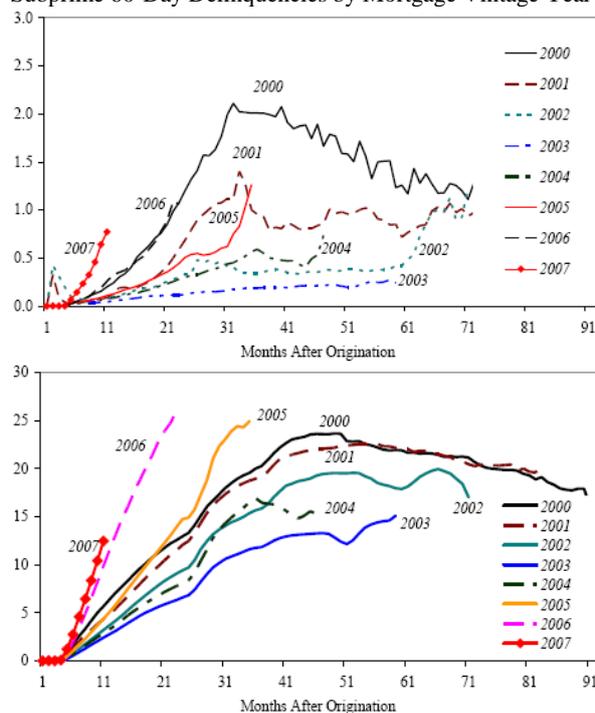
development. It resulted in a significant increase of default rates (see chart 2).



Source: ECB 2007a, 25

**Chart 1. US House Price Inflation**

Prime 60-Day Delinquencies by Mortgage Vintage Year  
Subprime 60-Day Delinquencies by Mortgage Vintage Year



Source: IMF 2008a, 4

**Chart 2. Loan Delinquencies of Prime and Subprime Mortgages (repayment problems, lasting more than 60 days up to 91 months after the origination)**

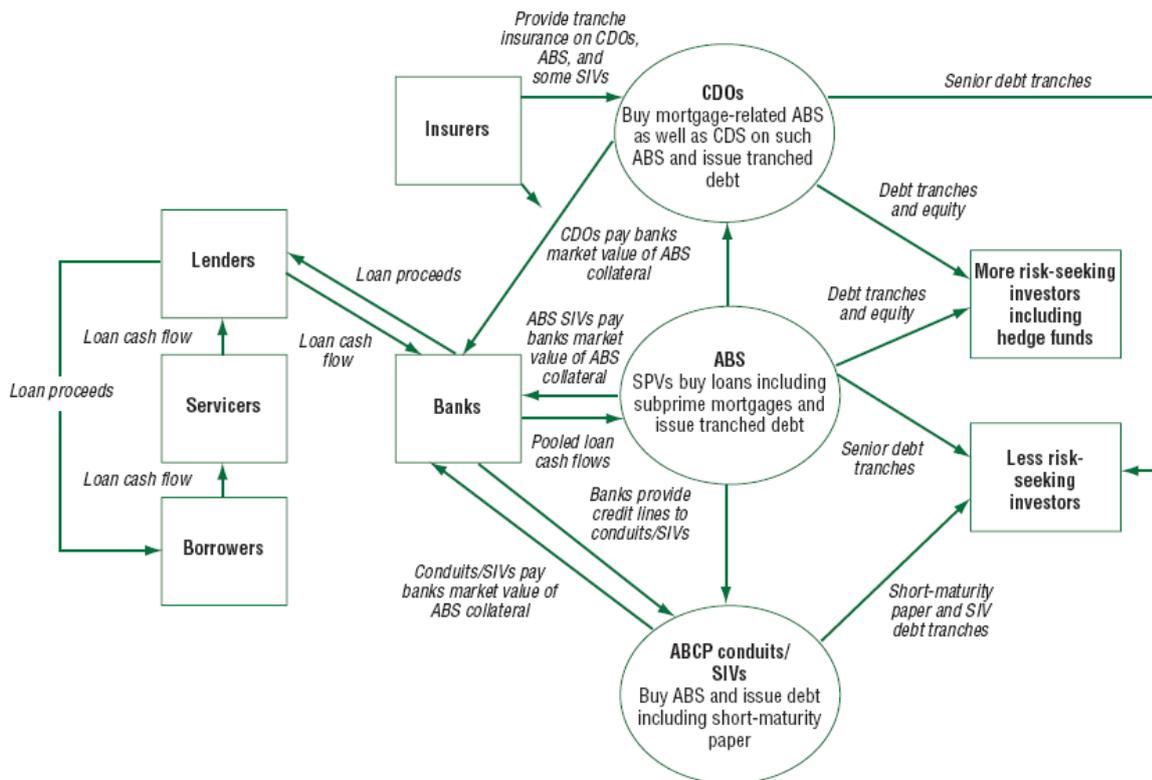
Nevertheless, the reason why this development is able to disrupt the financial system in the United States and worldwide, seem to follow a more complex plot where the market for asset backed securities comes to the centre of attention (for a chronological overview of the events see, e.g. Fender/Höhrdahl 2007, 4).

**3. The Turmoil on the Market for Asset Backed Securities**

Since the second half of the twentieth century the US mortgage market has been strongly characterised by the securitization of mortgages. The basic idea is to pool similar mortgages and sell securities that have claims on the mortgage payments from the pool. Normally, all the payments are passed through directly to the security holders. For this reason a special purposes vehicle (SPV) buys loans and mortgages and issues medium to long-term securities (ABS = Asset Backed Securities / MBS = Mortgage Backed Securities), collateralized by mortgages. These securities are purchased by other banks, institutional investors, individuals and also by the depository institutions themselves. Due to the securitization process, the mortgage originators are

able to remove credit, market and liquidity risks from their balance sheets by shifting them to the investors. Nevertheless, the sponsors are able to earn a fee income from their originating activities, because the majority of the issued securities has – due to portfolio effects, subordination and other credit enhancement techniques – a much better rating than the average loan in the pool. Further profits were offered by the idea to use the spread between long- and short-term interest rates by issuing short term securities based on long-term properties (ABCP Asset Backed Commercial Papers).

Due to an attractive yield, high liquidity and mainly good ratings the demand for such structured securities increased permanently. In that way, the US mortgage market gained access to a large capital source for financing additional loans. The increase in the overall mortgage volume triggered very often a laxer handling of credit standards. The whole process resulted in a substantial increase in high-risk subprime mortgages. Nevertheless, many of the subprime mortgage loans seemed to be much too risky to sell them directly to the broad public.



Note: ABS = asset-backed security; ABCP = asset-backed commercial paper; CDO = collateralized debt obligation; CDS = credit default swap; SIV = structured investment vehicle; SPV = special purpose vehicle.

Source: IMF 2007, 11

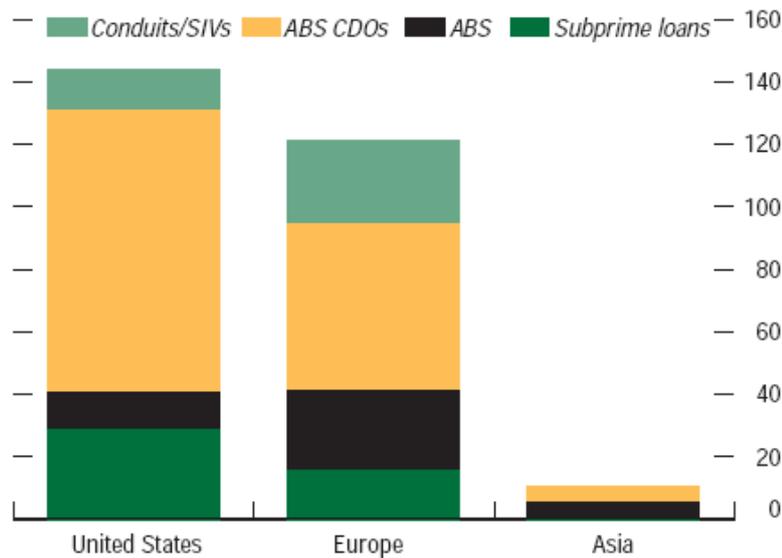
**Chart 3. Mortgage Market Flows**

Besides other credit enhancement techniques (e.g. credit default swaps, liquidity facilities) the main idea to move sub-prime mortgage debt through the market was to divide up the risk, creating a huge volume of low-risk securities and a much smaller proportion of high risk segments from the pool of mortgages (Dodd 2007, 17). The exact subordination differs and might be complex, but the main idea looks as follows: A part of an asset portfolio is pooled and used as a collateral for issuing securities (ABS, MBS and CDOs – Collateralized debt obligations), where the securitized claims on the pool's payments are carved into different tranches. The securities have a claim on principal and interest, where the least risky, senior tranches have the first claim on the payments from the underlying mortgages. These tranches usually have a high credit ranking (sometimes as high as AAA) and receive a relatively low interest rate payment. After these tranches are paid (at least to a special degree), the middle (mezzanine) tranches receive its payments which include an additional risk premium.

This tranches represent a higher risk level and usually receive a credit ranking that is below-

investment-grade. Only after these tranches are repaid fully or at least to a special degree, the equity tranche receives payments. Therefore, the equity tranche represents the highest risk and is usually unrated. This high risk is connected with the highest rate of return (Dodd 2007, 15-17). One of the outcomes of subordination is the risk of total default of some of the involved securities (equity and mezzanine tranche). Whereas a total default of an underlying loan portfolio seems to be very unlikely, a partial default of these loans might lead to a total default of lower rated debt tranches. This is an important reason for the collapse of the market prices of lower rated securities and the enormous need for depreciation of some banks during the turmoil. The next chart gives a broad illustration of the complex securitization structure where the main instruments which were causing the turbulences of the financial markets are shown.

Another group of instruments that seems to be of high importance for the following turbulences are the CDOs. As it can be seen in the next chart, CDOs are responsible for a large amount of bank losses during the subprime crisis.



Sources: Goldman Sachs; UBS; and IMF staff estimates.  
 Note: ABS = asset-backed security; CDO = collateralized debt obligation;  
 SIV = structured investment vehicle.

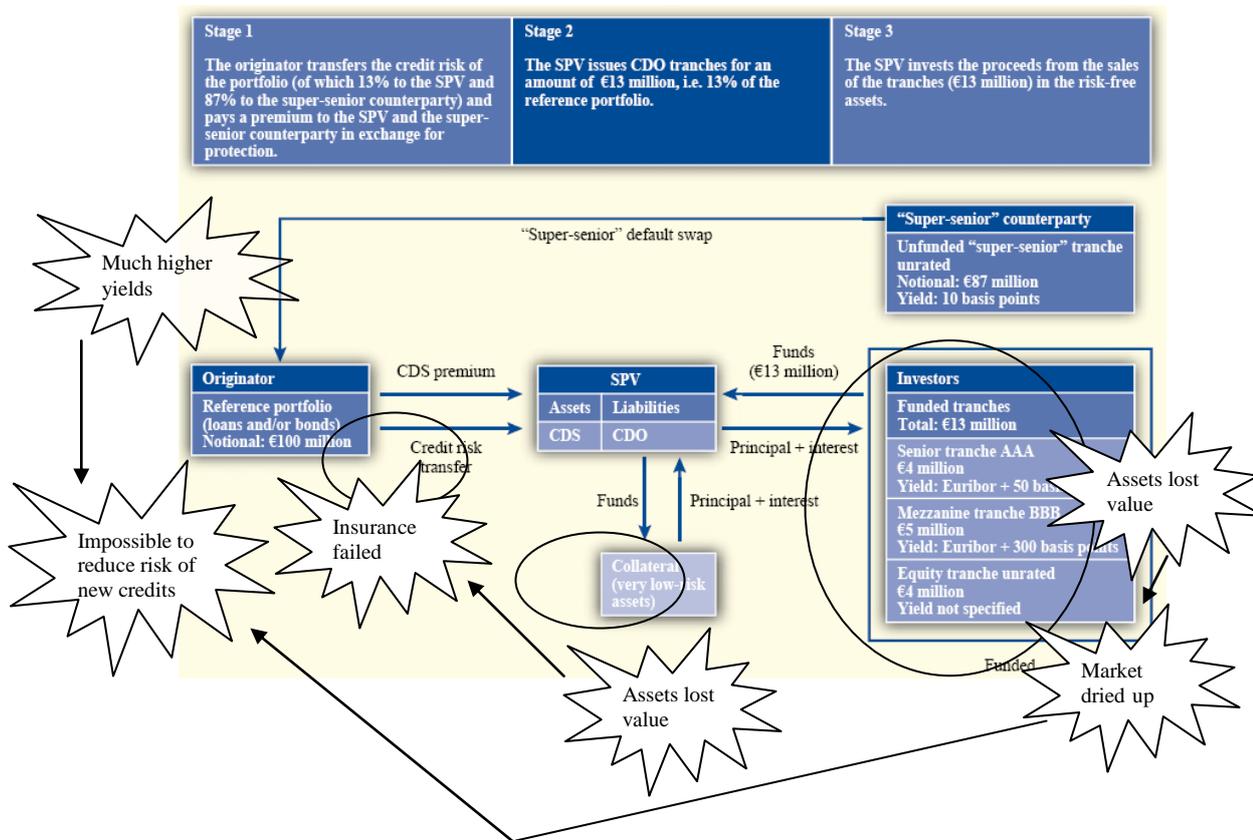
Source: IMF 2008c, 13

**Chart 4. Expected Bank Losses as of March 2008 (in billions of U.S. dollars)**

The issuing process of a CDO usually starts with a high risky, undiversified portfolio (e.g. locally concentrated subprime mortgages) owned by the originator (again we have to mention, that we only describe the main idea behind the construction of CDOs, in reality the mechanisms are manifold). The originator separates the portfolio and the risk of one portion of the portfolio (the so-called unfunded portion) is directly transferred via a credit default swap (CDS) to a super-senior counterparty. This super-senior counterparty

(usually a highly rated bank or insurance company) acts as a protection seller. For typically at least 80% of the underlying portfolio it commits to pay a compensation for defaults to the originator which in return pays a premium to the counterparty. This risk for the super-senior counterparty was usually seen as very small because (in the 80% example) at least 20% of the credit portfolio has to default before the originator could draw on its insurance. That's why the premium for such insurances is very low. The rest of the portfolio (the funded part) is much riskier and therefore the originator uses other mechanisms to protect himself against the risk. He transfers the claims on principal and interests to a SPV and in return he receives claims on interest and payments from a much lower risky and more diversified portfolio. How does it work? The SPV uses the claims on interest and payments of the risky portfolio to issue different tranches of CDOs, which receive these rights. The tranches are sold to investors, which use them in a diversified portfolio and therefore don't face the original concentration risk. For these investors the CDOs serve a similar function like other ABS: They have a claim on interest and payments of an underlying credit portfolio. The SPV now uses the money from the placement of the CDOs to buy other assets (usually other ABS or CDOs) and as a result they build a more diversified, less risky collateral portfolio. The interest and principal payments are then passed to the originator who receives a much more protected cash flow than it was the case in his original undiversified portfolio.

On the other hand it becomes clear why especially the CDO market was hit by the crunch in the mortgage market. What happened? Due to the downgrades of the CDOs the market for these assets dried up and the originators weren't able to secure their loan portfolios as they did before. The payments from the SPV to the originator were sharply reduced, because the portfolios of the CDOs mainly consisted of other CDOs and ABS. Furthermore the payments to the super-senior counterparties became much more expensive which made it even more difficult to protect a loan portfolio.



Source: ECB 2008, 84, comments by the authors.

**Chart 5. Exemplary Structure of a CDO and Market Failures**

Unlike publicly traded securities a number of these securities and credit derivatives are traded on over-the-counter (OTC) markets. Usually the originators are selling the securities in a intransparent way to institutional investors and hedge funds, which are capable to take these high risk investments. For this reason there is no market to determine prices for these assets and the lack of public markets means, that there is no institutional setting to ensure liquidity for the assets.

It was into this increasingly complex and intransparent framework that the crunch in August 2007 hit the market for subprime asset backed securities. A broad re-evaluation of mortgage-related products by rating agencies triggered a wave of downgrades in mid-2007. The majority of mortgage-related ABS as well as CDOs were downgraded three to four notches (rating grades), some even more. These downgrades were followed by a sharp decline in the value of these assets.

Highly leveraged investors who used these assets, especially hedge funds, needed to adjust positions or trade out of losing positions and the market became suddenly illiquid (Dodd 2007, 19). Surprised by sharp decrease of the value of all kinds of mortgage-related products which followed, also institutional investors and issuers of CDOs stopped buying these assets. As a result the demand for the assets which were used in CDOs, especially ABS and ABCP, decreased further making these market segments illiquid too.

#### **4. Liquidity Troubles in the Banking Sector**

The crisis of the banking sector can be divided into three different stages: In the first few months of the crisis (after August 2007), the aspect of liquidity in the banking sector was in the centre of attention. Since November 2007 the discussion about decreasing profits and increasing losses in the banking sector and their impacts on the real sector of the economy, come to the fore (Weber 2008a, 10). The third wave reached the financial markets in February/March 2008, when a massive deleveraging in the global financial system take place (Weber 2008b, 3). Especially the last wave raised concerns about the impact of the financial market turbulences on the real sector of the economy.

Let us first turn to the liquidity aspect: The banking sector nowadays is characterized by rising interdependences of banks and capital markets. Banks rely much more on liquidity supply from financial markets and from interbank markets than in former times when customer deposits played a more important role. For this reason banks nowadays are more vulnerable to disruptions on

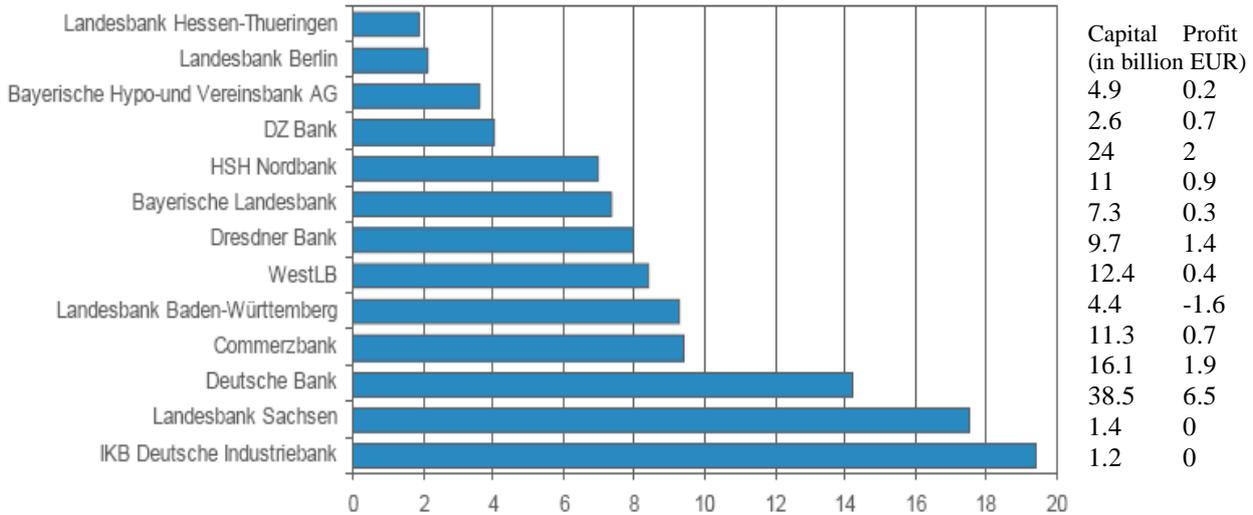
financial markets (for details see Praet/Herzberg 2008).

Due to the growing risk of mortgage-related products, it was increasingly difficult to find investors for those ABS and CDOs. Therefore the sponsors drew the liquidity lines for their asset-backed-commercial-paper-programs and forced banks to buy those products. For some banks these liquidity outflows were too high, and as a result, they faced serious solvency problems and increasing liquidity needs.

At the same time the possibilities for short-term refinancing over the interbank market decreased sharply. The result was a dramatic liquidity problem for a number of banks worldwide. Main causes of the troubles on interbank markets were a lack of transparency and confidence (Schönwitz 2007). The intransparency of the OTC market aggravated the problem, because investors did not know who was – and was not – exposed to the subprime risk (Dodd 2007, 19). Suddenly the risk of default was a serious problem even with former highly rated banks being the counterparty. The financial market participants reacted with a high level of risk aversion, which hit especially the interbank market for unsecured short-term loans. The reaction of banks was to either reduce or cancel credit lines for other banks as soon as possible. In the light of uncertainty connected with the solvency of other banks it seemed appropriate to hold liquidity in cash rather than taking high risks on interbank markets for a limited level of credit margin. Large parts of the credit market and especially the interbank lending market dried up and risk premia increased sharply (Remsperger, 2007, for detailed data see e.g. Deutsche Bundesbank 2008a, 23).

In this situation central banks reacted by supplying the money market with a high level of liquidity (for an overview of central bank actions worldwide see e.g. Borio/Nelson 2008, the reaction of the European Central Bank is described in ECB 2007b and Papademos 2008). This led to an easing of tension on the money markets. The volatility and the spreads between uncollateralized and collateralised loans started to tend to a more normal level at the beginning of 2008.

When addressing the problems in the German banking sector resulting from the subprime crisis, a possible starting point is the total exposure of single bank to subprime risks. From the side of financial instruments the highest impact on German banks resulted from ABCP programs. The next chart shows the volume of outstanding ABCP of different German banks.



Source: Moody's International Structured Finance: EMEA ABCP Market Summary - June 2007  
 \*Including MTN. Data as of June 2007.

Source: Moody's (2007), 4 / Latest available data from cooperate websites.

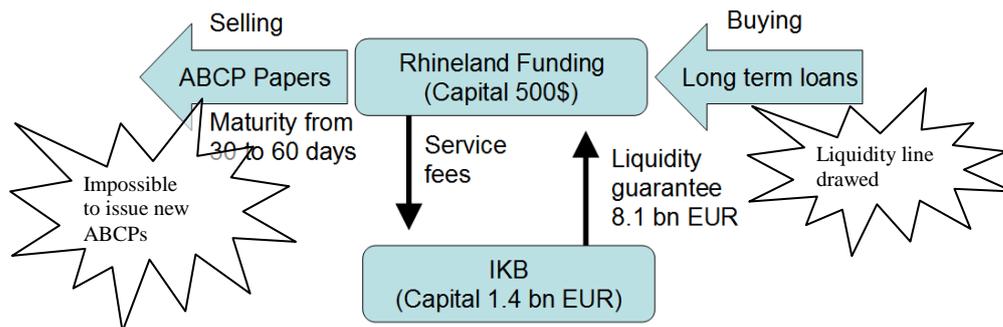
**Chart 6. ABCP Outstanding by Sponsor (in billion U.S. dollars)**

It is remarkable, that a number of medium sized banks have an equal or even higher engagement in the ABCP programs than the biggest German banks. And this is the root of the problem in Germany: The big German banks had an more or less acceptable engagement in this market which raised some challenges to overcome the crisis but mainly resulted in a decrease of profits only. In contrast to the main players some medium sized banks like IKB and other banks from the group of state owned Landesbanken were strongly over engaged. These banks were in a number of cases not capable to solve the resulting problems on their own.

An outstanding example for a crisis caused by liquidity problems in Germany is the case of the middle sized bank IKB (*Industriekreditbank*). In mid 2007 it shocked the market with the announcement of large financial losses due to problems on the US subprime market. Their main shareholder, the state owned Bank for Reconstruction (Kreditanstalt für Wiederaufbau - KfW), had to guarantee for a number of liquidity facilities for the ABCP vehicle

Rhineland Funding which was owned by the IKB. More than 3.5 billion EUR from the government and from other banks were needed to save the IKB from bankruptcy. More help in form of almost 6.5 billion EUR from the government and the Bank for Reconstruction followed in spring 2008.

What had happened to IKB? The ABCP vehicle Rhineland Funding bought large amounts of long term loans including subprime mortgages. These assets were refinanced by issuing short-term asset backed commercial papers. To ensure that the Rhineland Fund with a capital of only 500 US-\$ was able to pay back the outstanding debts, the IKB guaranteed liquidity lines of 8.1 billion EUR. Because of the problems on the US subprime market, the Rhineland Funding wasn't able to sell their ABCPs any more, and had to draw down the liquidity line of IKB. This in turn overstrained IKB with a capital of only 1.4 billion EUR and led together with liquidity squeezes on the money market to the described rescue operation.



**Chart 7. Problems of the IKB**

A number of state-owned banks in Germany, namely the Sachsen LB and West LB, faced more or less similar problems. These events led to rising concerns about the stability of the banking sector in Germany.

**5. Financial Losses in the Banking Sector**

Further troubles for banks came up with the marking-to-market of mortgage related product

portfolios, which resulted in severe write-off-losses on their balance sheets. Under the countries with the highest losses, Germany is seen on rank three after the United States and Switzerland. Up to April 2008 German banks have depreciated around 30 billions of U.S. dollars. The following table gives an overview of estimated bank losses due to the subprime crisis.

Table 1

**Global Bank Losses as of March 2008 – Estimations of the IMF (in billions of U.S. dollars)**

Country/Region	Total Reported Losses	Estimated Losses on U.S. Subprime/Alt-A Loans	Estimated Losses on ABS	Estimated Losses on CDOs	Estimated Losses on Conduits/SIVs	Total Estimated Subprime-Related Losses	Remaining Subprime-Related Losses Expected
Europe	80	16	27	53	27	123	43
<i>Of which:</i>							
United Kingdom	19	16	1	12	11	40	22
Switzerland	23	0	7	15	1	23	0
Scandinavia	0	0	0	0	1	1	1
Euro area	33	0	10	20	15	45	12
Unallocated	5	0	9	6	0	14	9
United States	95	29	12	90	13	144	49
Asia excluding Japan	1	0	3	0	0	4	3
<i>Of which: China</i>	1	0	3	0	0	3	2
Japan	10	0	5	5	0	10	0
Asia	11	0	9	5	0	13	3
Canada	7	0	2	5	0	7	0
Gulf Cooperation Council	1	0	1	1	0	1	0
<b>Total</b>	<b>193</b>	<b>44</b>	<b>50</b>	<b>153</b>	<b>40</b>	<b>288</b>	<b>95</b>

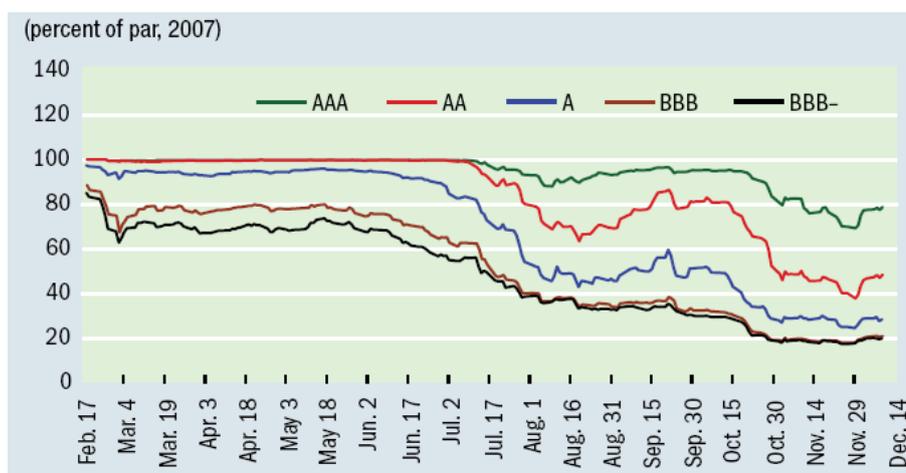
Sources: Goldman Sachs; UBS; and IMF staff estimates.

Note: Bank allocation to asset-backed securities (ABS) in Table 1.1 includes estimated losses on ABS and conduits/SIVs. CDO = collateralized debt obligation; SIV = structured investment vehicles.

Source: IMF 2008c, 52

Again intransparency is one of the key issues: This time not as the starting point of the troubles, but as an important reason for the long-lasting diagnostic process. Even today there is no clear picture of the individual losses of a number of banks. As it can be observed in the following chart,

the value of mortgage related securities decreased sharply since mid 2007. It is quiet obvious that due to the subprime crisis, there was a considerable need for depreciation in the banking sector especially for those credit institutes running big portfolios of low rated securities.



IMF 2008b, 25

**Chart 8. Value of mortgage related securities according to the ABX indices**

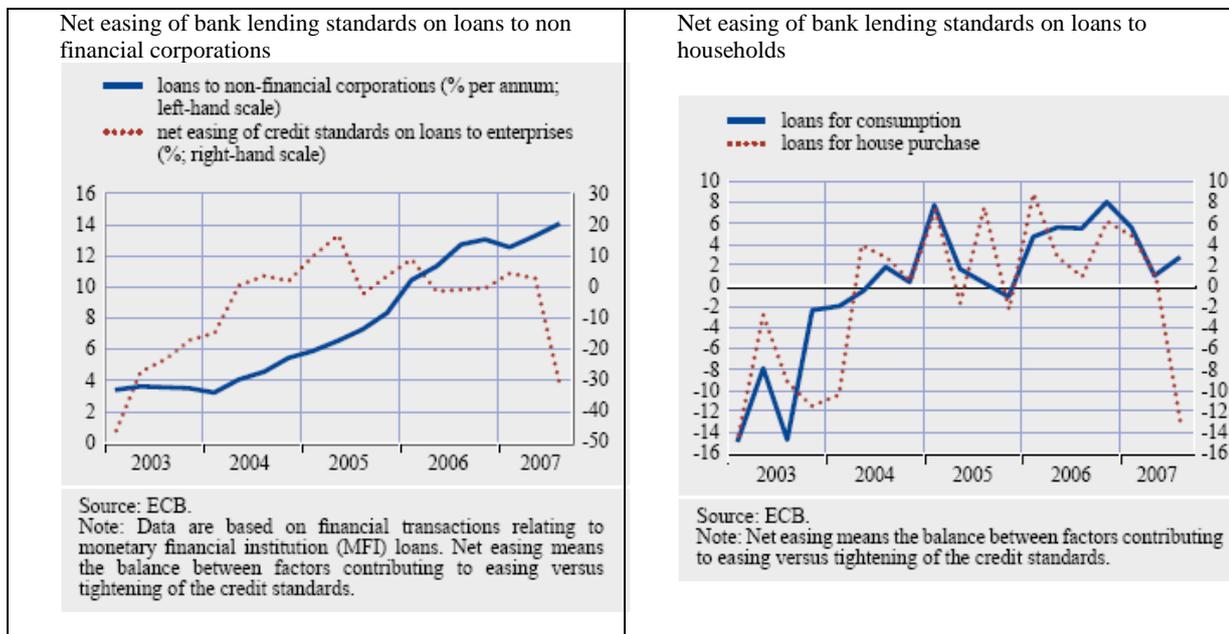
Because of the intransparency of OTC markets it's not a trivial task for a single bank to calculate the

absolute need for depreciation accurately. Therefore a large number of banks have yet to mark their assets to genuine transaction prices (IMF 2008b, 25).

### 6. Deleveraging in the Financial System

During the last few months a strong tendency to reduce the ratio of debt financing can be observed in the financial system worldwide. The basic concerns are that this development might lead to a squeeze in

borrowing possibilities for companies and private households. From this side the financial market crisis might have an impact on the real sector in form of rising refinancing costs for companies. This could lead to a lower level of investments (Weber 2008a, 10). Recent data (chart 9) show that banks indeed raise their lending standards, but currently without strong impacts on the lending volume.



Source: ECB 2007a, 107/110

**Chart 9. Loan Volumes and Lending Standards**

But what seems to be harmful for economic growth might be the beginning of a necessary readjustment process, because lending standards eroded over several years (at least from 2004 to 2007). As we have seen the high risk taking behaviour of many banks was not sustainable.

### 7. Some Conclusions

The crisis in the German banking sector is mainly a crisis of a small number of banks, which had a – in relation to their capital – too high engagement in the U.S. mortgage market. These medium sized banks are mostly state owned institutes, especially from the group of Landesbanken. The impact on these banks was accelerated by their lack of profitability which raised concerns about their business models for a longer time. The banking system in Germany as a whole has proven to be highly stable in its core (Weber 2008c, 9). Even it is clear that the crisis is far from over, there are some signs that at least the worst is over (Weber 2008b, 3).

Concerns about strong impacts on the overall economy in Germany seem to be not justified from a domestic perspective (Weber 2008c). A

possible reduction of US growth will have an impact on the European and German economy, although the results are supposed to be limited (Weber 2008a, 11). Furthermore there are a number of signs that the Euro area might be capable to disentangle itself from a possible economic downturn in the United States (Weber 2008b).

The recent experience with the subprime crisis and its impact on the banking system as well as financial markets suggests a number of broad conclusions:

1. The information value of credit rankings made by rating agencies is limited. They cannot constitute a full substitute for a careful own risk analysis (Weber 2008a, 14). Changes in the role and uses of credit ratings are necessary for the future (FSF 2008, 4)
2. For a final discussion about the system of banking supervision it is still too early. We should wait for the full and worldwide introduction of the Basel II accord, which will lead to a number of improvements

- (Weber 2008a, 14). Especially the capital adequacy framework in relation to the treatment of securitisation and off-balance sheet exposures will be improved. Nevertheless there are already some changes defined, that should improve the Basel II accord (FSF 2008).
3. Many market participants underestimated the interdependencies between different market segments (e.g. money, mortgage, bond markets), as well as the interplay between the real economy (house price crisis) and the financial markets.
  4. The president of the ECB and also the Financial Stability Forum suggest a significant change of culture. More transparency is needed to avoid contagion and herd-behaviour in financial markets and the banking sector (Trichet 2008, FSF 2008).

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### *Анотація*

Дана стаття досліджує дестабілізацію на світових фінансових ринках, яка була викликана кризовими явищами на іпотечному ринку США і привела до різкого зростання дефолтів, хаосу на ринку цінних паперів, забезпечених активами, а також проблем з ліквідністю у банківському секторі.

У статті розглядаються причини турбулентності на фінансових ринках, їх вплив на банківський сектор Німеччини, а також всю економіку цієї країни.

*Отримано 03.11.2008*