A Review of Basel II on Securitisation of SME Loans

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A Review of Basel II on Securitisation of SME Loans

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Note: Due to confidentiality issues several sections are left out of this public report.

Management Summary

Securitisation is a structured finance tool that enables a bank or other financial institution to sell cash flow producing assets from its balance sheet to another legal entity specially created for the transaction. This entity then issues notes that are sold to investors and are backed by the cash flows from the original assets and are therefore called asset-backed securities (ABS). One of the reasons this technique is frequently used is to lower the amount of regulatory capital that banks are required to hold on balance sheet, which makes securitisation an attractive tool. However, with the introduction of the new Basel II regulatory framework, the rules for regulatory capital and securitisation have changed.

This report presents a clear overview of the Basel II regulation for the determination of regulatory capital for loans to small and medium enterprises (SME); a relatively new and underdeveloped asset class. Additionally, the rules that are relevant for securitisation of SME loans are also discussed.

To empirically assess the impact of Basel II a case study was conducted in which the securitisation of a part of the SME portfolio of a large European bank was analysed. The regulatory capital that was required for the portfolio prior to securitisation was calculated. Consequently the regulatory capital required after securitisation was also studied. In order to compare the results of the above analyses, the situation under Basel I was also assessed.

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The case study showed that securitisation under Basel II is less attractive for the SME portfolio in this study. Moreover, it was not possible to include the SME firm size adjustment in this study, which will probably lower the amount of capital relief attainable under Basel II even further. It can be concluded that although the benefits are smaller and the relative cost have greatly increased by Basel II, it is still profitable to securitize the SME portfolio studied in this report.

Preface

This thesis is the result of my research at Hypoport conducted during the last nine months. It is the culmination of my period of studying at the University of Enschede. This thesis serves as the graduation project for my study Industrial Engineering and Management. It would not have been possible without the help of many people who I would like to thank in this preface.

First of all, I would like my two supervisors from the University of Twente, Mr. E. Emreizeeq and Dr. B. Roorda. My appreciation goes out to Mr. Imreizeeq for his helpful contributions, guidance and support throughout the process. I would also like to thank Dr. Roorda for his input which has proven very valuable and greatly aided me in the process of this thesis.

Secondly, I want to thank my company supervisor Mr. K. Boerendonk for offering me the possibility to do an internship at Hypoport. His guidance and help on finding the right direction and structure for my research and providing feedback were indispensable for this thesis.

I would also like to thank my colleagues at Hypoport who made me feel very welcome from the start. They made my time at Hypoport most enjoyable and enabled me to work on my thesis in a fun, friendly and professional environment.

Finally, I would like to thank my parents and friends for their support. Without my parents' mental and financial support over all these years none of this would have been possible. I want to thank them for always being there for me and always believing in me.

Iwen Legro,
Amsterdam, May 2009

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1 Introduction

Companies classified as small and medium-sized enterprises (SMEs) are officially defined by the EU as those with fewer than 250 employees and which are independent from larger companies. Furthermore, annual turnover may not exceed €50 million, or their annual balance sheet total may not exceed €43 million.[1]

By this widely adopted definition, small and medium enterprises account for 99% of the world's businesses and provide for two thirds of the private sector jobs in the European Union and half in the United States.[2] These numbers are even higher for the less developed regions of the world. It is therefore extremely important that this driving force behind the economy has good access to finance. This is where securitisation comes into the picture.

Securitisation is a structured finance tool which involves the pooling and repackaging of cash flow producing assets into securities, which are then sold to investors. If done properly, securitisation can help financial institutions utilize their capital more efficiently and by doing so increase the access to funding for borrowers. Furthermore it can enable other non-depository financial institutions to enter the lending business.

Until recently, the relatively small market for Small and Medium Enterprise (SME) securitisation transactions was growing steadily. Emerging as a new securitisation asset class in the 1990s, it grew steadily to a €25 billion asset class in 2004. However, recent developments have made the future of this assets class uncertain. The Basel II capital accord, which came into effect in 2008 and will be fully implemented in 2010, will undoubtedly have large influence on the securitisation of SME loans. Moreover, the subprime mortgage crisis will have an impact on the entire financial system of which the magnitude is hard to assess at this time. It goes without saying that this will also have large consequences for the securitisation of SME loans, at least on the short run. Whatever the angle, it is clear that SME securitisation and Basel II is a dynamic field and an interesting subject of study.

In this report the consequences of Basel II for SME securitisation will be analysed. Firstly, the theory behind SME securitisation and Basel II will be discussed. Consequently the theory will be tested on real data by looking at an SME securitisation transaction. These analyses will ultimately lead to an outlook on the future of SME securitisation.

1.1 Goal

The benefits of SME securitisation will change due to the introduction of Basel II accord. This report aims to assess the effects of the Basel II accord and the potential consequences for SME securitisation?

This leads to the following goal:

> "To determine the effect of the new Basel II framework for the securitisation of SME loans by doing a case study from which conclusions can be drawn about the future for SME securitisation."

1.2 Problem Definition and Research Questions

Research Questions

The above stated goal can be summarised into the following research question: How is securitisation of SME loans treated under the Basel II framework and what will be the consequences and future outlook for SME securitisation?

Sub-questions

In order to answer the above stated question several sub-questions have to be answered:

- What is asset securitisation?
- What is securitisation of SME loans?
- Why securitize SME loans?
- What is the current status of SME securitisation?
- How is SME securitisation treated under Basel II?
- What will be the consequences of Basel II for SME securitisation?
- What will the future hold for SME securitisation?

1.3 Report Structure

The above questions enable us to create the following general structure for this research. The starting point is an overview of securitisation and SME securitisation. The basics of a securitisation transaction will be discussed in Chapter 2 after which SME transactions in particular will be treated in more detail in Chapter 3. An overview of market size and growth opportunities will also be made.

After a basic understanding of SME securitisation has been achieved, the Basel II framework will be discussed in Chapter 4. The treatment of SME securitisation under Basel II will be the main focus of this chapter. In order to illustrate this, Chapter 5 will present a case study of a recent SME transaction. The economics of this transaction will be explained and the effect of Basel II will be tested in this case. The final chapter will include conclusions and further recommendations.

2 What is Securitisation?

Securitisation is defined by Kothari as:

> *"…a device of structured financing where an entity seeks to pool together its interest in identifiable cash flows over time, transfer the same to investors either with or without the support of further collaterals, and thereby achieve the purpose of financing."*[3]

For the purpose of this report securitisation is defined as a structured finance tool which in its most basic form allows an entity to sell cash flow generating assets it owns to another entity especially created for the transaction, which in turn issues notes from which the proceeds are used to acquire the assets. These notes are then sold to investors and are backed by the cash flows from the original assets and are therefore called asset-backed securities (ABS).

All assets that produce a predictable cash flow are in principle eligible for securitisation. This allows financial institutions like banks and insurance companies, or non-financial corporations to convert assets that are not readily marketable – like residential mortgages, commercial mortgages, credit card receivables, auto-loan contracts, trade receivables and bank loans – into rated securities that are tradable in the secondary market. The investors that buy these securities gain an exposure to these assets to which they would normally not have had access.[4]

The first securitisation transactions emerged in the United States in 1969 when the Government National Mortgage Association (Ginnie Mae) issued securities that were backed by a portfolio of mortgage loans.[5] Ginnie Mae began doing so as a way to increase homeownership: by buying banks' mortgage loans and selling them to investors, it provided the banks with fresh funds to write additional mortgages.[6] Securitisation was thus used as a means to attract additional funding. It has hence inter alia been employed as a balance sheet risk and asset and liability management tool.

From its early beginnings in the 1970s, asset securitisation has evolved into a vital funding source with an estimated outstanding of €6.50 trillion in the US and €1.42 trillion in Europe as of the second quarter of 2008. In 2007 ABS issuance amounted to €2,404 billion in the US and €454 billion in Europe.[7]

In this chapter, the basic principles of a securitization transaction will be discussed. After that the motivation for the issuer and the investor will be elaborated on. Synthetic securitisation, which is another type of securitisation structure, will be explained in Chapter 3. The discussion in this chapter will remain general whereas the details of securitisation of SME loans will be discussed later.

2.1 Basic Features of Securitisation Transaction

As said in the introduction, the obligation of the issuer of asset-backed securities to repay the note holders is backed by the value of financial assets it holds on balance sheet. These financial assets are loans or any other kind of cash flow producing assets, such as an account receivable. The issuer of asset-backed securities uses a pool of loans or receivables it owns (and thus expects future income from) as collateral for the debt instruments it issues. The financial assets used as collateral in a securitisation transaction are referred to as securitized assets.

With a traditional secured bond, it is the ability of the issuer to generate sufficient earnings that is necessary to repay the debt. If a company issues a mortgage bond in which the bondholders have a first mortgage lien on one of its properties, those bondholders will still primarily rely on the ability of the company to generate cash flow from all of its operations to repay the bonds.[4]

In a securitisation transaction however, the repayment source shifts from the cash flow of the issuer to the cash flow produced by the pool of assets or a third party that guarantees the payments to the note holders if the pool of assets fails to produce sufficient cash flow. For example, if a company issues debt which is backed by a pool of receivables, the payment of the investors that invested in this debt relies solely on the ability of the issuer to collect the receivables.

2.1.1 True Sale

A true sale transaction is the *plain vanilla* of securitisation; it is the most basic form of securitisation and was the first to be carried out. The workings are perhaps best explained through an example.

Consider a bank that extends a loan that must be repaid with a predetermined interest rate over a fixed period. The bank extends credit to the lender and in return receives monthly interest and (usually) principal payments. This loan appears as an asset on the bank's balance sheet since it represents an amount of money the bank is expected to receive in the future in the form of these monthly payments. Of course, in practice the average bank has thousands of cash flow producing assets on its balance sheet. As said before, these are in principal all eligible for securitisation.

Now suppose the bank needs to raise cash. It can do so by taking out a loan or issuing bonds. The price of both alternatives depends on the financial health and credit quality of the bank i.e. its ability to repay the loan or bonds. After all, the interest that the bank pays over the loans it takes out is a compensation for the risk that the bank cannot meet its obligation and repay the loan. For example, if the bank has a BB credit rating, the interest it will pay over a loan will (partially) be a reflection of this rating.

If the bank could find buyers, it could opt to sell some of the cash flow producing assets it holds directly, effectively converting a future income stream to cash. However, there is virtually no secondary market for this kind of individual transactions.[8]

Alternatively, a bank can use securitisation to convert cash flow producing assets into cash which has many benefits compared to traditional means of raising funds. The first step into securitising these assets is setting up a legal entity known as a special purpose entity or special purpose vehicle (SPV). This is an entity (usually a limited company of some type or, sometimes, a limited partnership) specially created for the transaction. Once an SPV is established, the bank can sell the assets it wants to securitize to the SPV, receiving cash in return. The originator has thus transferred the assets off its own balance sheet to that of the SPV. The SPV pays for these assets by issuing securities which are backed by these same assets (hence the name, asset backed securities or ABS) and selling these to investors. The interest and principal on the ABS bought by the investors are paid for by the proceeds from the underlying pool of cash flow producing assets now held by the SPV. This basic structure is depicted in Figure 1.

The asset-backed securities that are issued in a transaction can have different interest and principal repayment characteristics. These different types of bonds are called bond classes or tranches. The simplest transaction would consist of just one bond class. Suppose that in this hypothetical transaction the SPV issues 100,000 bonds of the same Bond Class A and each bond has a par value of €1000. This means that a bondholder that holds one Bond Class A note is entitled to 1/100,000 of the proceeds from the underlying assets that are used as collateral in this deal. To summarize: the borrowers that received a loan from the bank make monthly interest and principal payments to that bank. Since the bank sold these cash flow producing assets to the SPV, the cash flows stemming from these assets are directly transferred to the SPV. The SPV then uses these cash flows to pay the investors that bought the asset backed securities issued by the SPV.

Similar to proceeds from the portfolio, losses in the portfolio are also allocated to the bond investor. This will be discussed in more detail in section 2.3.

Securitisation structures are usually more complicated and often consist of multiple bond classes with a different priority of payment. One of the reasons this is done is that institutional investors require different interest, risk and price-volatility characteristics. To meet this requirement, different bond classes with different investment characteristics can be created which satisfy the needs of institutional investors. The process of creating classes is usually called tranching; the classes are called tranches. This will also be explained in further detail in section 2.3.

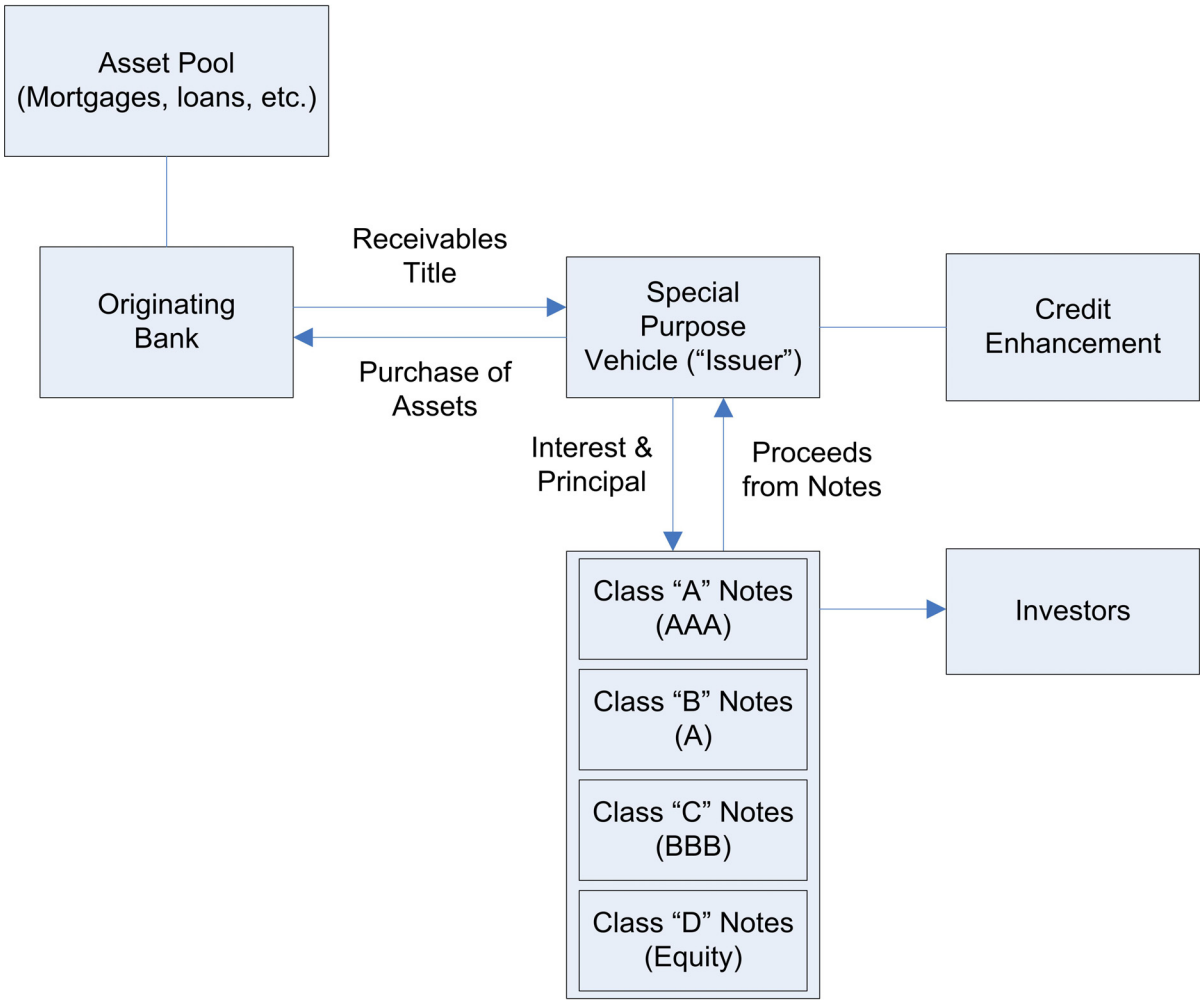

Figure 1: True Sale Securitisation[9]

The above figure shows the general structure of a securitisation transaction. In this case, there are four classes of notes. The first three classes have a credit rating ranging from AAA to BBB while the class of the least quality has no credit rating. This will be discussed in more detail in section 2.3.

2.2 Motives for Securitisation

In this section the motives for securitisation will be discussed. Firstly, the perspective of the originator will be analysed. Consequently, the benefits of securitisation for investors will be discussed. This section ends with a discussion of other, more indirect benefits of securitisation.

2.2.1 Motives for the Originator

2.2.1.1 Regulatory capital relief

One of the most important reasons banks engage in asset securitisation is regulatory capital relief. Regulators impose amounts of capital a bank has to hold for the credit risk they have on balance sheet. This regulatory capital is defined in the Basel II framework. By securitising loan portfolios, banks can move credit risk off the balance sheet. In this way, the securitising bank frees up regulatory capital since it

no longer has to hold regulatory capital for the credit risk. This subject will be discussed extensively from Chapter 4 onward.

2.2.1.2 Balance sheet management

Besides capital relief, the securitisation of assets is an efficient way of balance sheet risk management through reducing the amount of risky assets on the balance sheet, e.g. to improve solvency ratios. This benefit of securitisation is especially important for banks with stronger geographic or sector concentration, which is often the case for smaller banks.

2.2.1.3 Cheaper funding

Another motive is that asset securitisation (especially in true sale transactions) provides access to cheaper long-term funding. Normally, the terms on which a bank can attract financing are based on the risk profile of a bank, since the lender should be compensated for the risk that the borrower (in this case the bank) cannot meet its obligations. Asset securitisation gives the originating bank access to an amount of cheaper funding of up to 90% of the portfolio (depending on the portfolio structure). To see how this works, consider a BBB-rated bank that needs to attract long-term funding. Normally, the bank would for example issue bonds for which the coupon is dependent on the banks own rating, in this case BBB. Instead, the bank can securitize assets on its balance sheet to attract funding. Usually, the senior tranche of a securitisation transaction has an AAA-rating and comprises about 80%-90% of the securitized portfolio of assets. This means that the bank is able to refinance that proportion of the portfolio at AAA-terms. This is in almost any case, a more attractive rate than the banks could achieve based on its own rating.

2.2.2 Motives for the Investor

Besides the originator, the investors in ABS should naturally also reap the benefits of this kind of transactions.

2.2.2.1 Diversification

One motive for investors to invest in ABS is that it provides a much wider range of assets and thus enables the investor to better diversify. This in turn leads to a less risky portfolio of investments. Furthermore, ABS' are reasonably liquid, so that the investor can quickly adjust its portfolio when needed.

2.2.2.2 Satisfying different risk appetites

Another useful property of ABS is that is can satisfy a wide range of different risk appetites; from a very risky equity tranche to a very safe AAA-tranche. Next to tranching, the types of assets underlying the transaction also vary greatly which add another dimension to the risk properties. Furthermore, in the past, prior the economic crisis of 2008, ABS' offered better yields than many other assets e.g. AAA rated government debt.

2.2.3 Other considerations

As becomes clear from the above, there are many reasons for both originator and investor to enter to realm of asset securitisation. However, perhaps most important is to acknowledge the overall impact that securitisation has made on the financial world. It has changed the way banks look at lending completely. Lenders have been shifting away from an originate-to-hold model to an originate-to-distribute. Before the era of securitisation, banks were primarily engaged in balance-sheet lending, which means holding the loans on balance sheet until maturity. Securitisation enabled banks to originate loans and subsequently sell the loan on the secondary market. This meant that banks could originate far more loans without violating the safety margins put up by regulators. The investors in the securitized assets financed the banks' lending business, and in effect expanded the amount of funds available in the financial world overnight. This has made an enormous impact, and even in the light of recent events, it is hard to imagine a world without securitisation.

2.3 Credit Enhancement and Tranching

In section 2.1, the concept of tranching was introduced. To explain this in more detail, consider a structure that consists of three bond classes or tranches, Class A, B and C, and holds a total of €100 million worth of assets. Class A accounts for 90% of the transaction and thus has a par value of €90 million. Class B and C will together hold the remainder of the balance and will each account for 5% or €5 million. In this case, Class A has payment priority over Class B and C. This means that all the principal and interest payments coming from the underlying loans will be allocated to the investors of Class A until its €90 million has been fully repaid. This is why it is often called the senior tranche. Only when Class A has been fully repaid will Class B, or the mezzanine tranche, begin to receive payments. Class C is the last to receive payments and will start to receive payments when the other two tranches have been fully repaid. It is therefore also referred to as the subordinated or junior tranche. A bond of Class A is said to be a shorter term bond than a Class B bond.

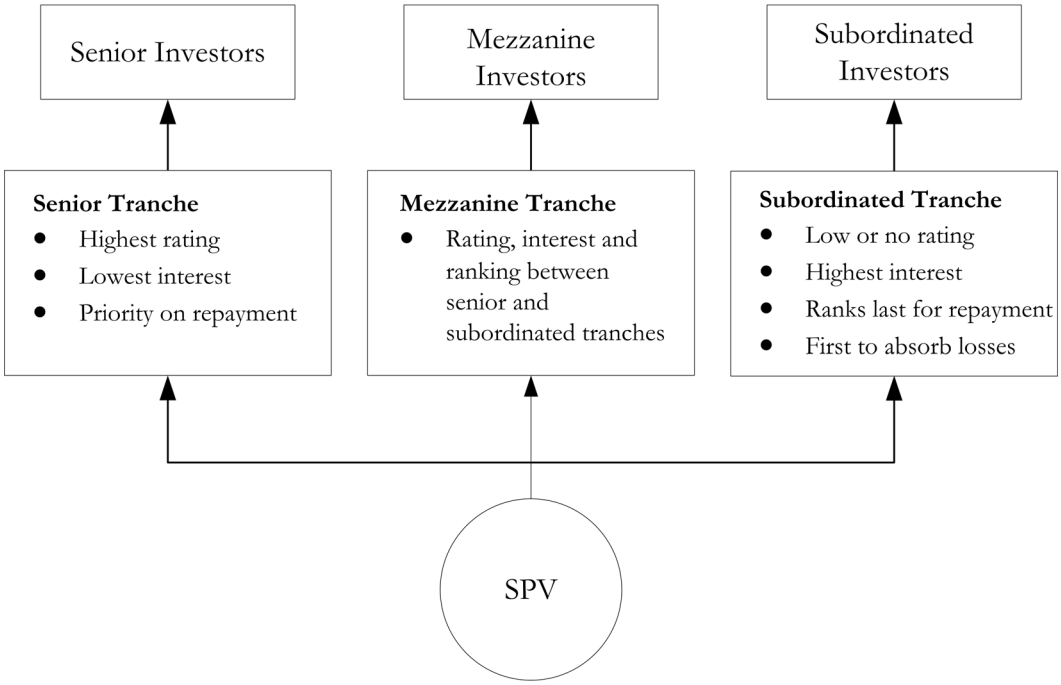

Figure 2: Tranching of securities[10]

The allocation of losses resulting from defaults in the underlying portfolio is usually the reverse of the priority of payment, i.e. the first to receive payments is the last to absorb losses. When a default occurs in the underlying portfolio, losses are firstly allocated to the subordinate classes. Only when the losses exceed the subordinate bond classes will the mezzanine classes and finally the senior class start to deteriorate. In the above example this means that losses will be firstly allocated to Class C. If the total amount of losses in the underlying pool of collateral over the life time of the transaction does not exceed €5 million, the investors in Class A and B will be fully repaid their investment. This structure is depicted in the Figure 2.

The examples above can of course be extended to banks and financial institutions that have loans or other cash producing assets on their balance sheet.

2.3.1 Credit enhancement

Credit enhancement is a means to increase the credit quality of the transaction and allows for higher-quality debt to be issued relative to lower-rated underlying collateral. This in turn leads to a possible higher rating of the transaction by the credit rating agencies. There are many forms of credit enhancement and typically a couple of these forms are used in a single transaction.

The level of credit enhancement is determined relative to the specific rating desired by the issuer. Generally speaking one can state that the more credit enhancement a transaction has, the higher its rating will be. An originator usually has a certain tranching with corresponding ratings in mind and the exact amount of credit enhancement necessary to achieve these ratings will be determined by credit rating agencies.

Credit enhancements can be roughly subdivided into two broad categories: internal and external. Losses in the underlying portfolio will exhaust external credit enhancements first, before starting to deteriorate the tranches (internal credit enhancement) and will therefore be discussed first.[11]

2.3.1.1 External credit enhancement

Monoline insurance

Monoline insurance used to be one of the more common forms of external credit enhancement. Monoline insurance is issued by a specialized insurance company that provides credit guarantees for financial products such as asset backed securities. The first of them started out in the 1970s insuring municipal bonds, a debt security issued by a governmental body to finance its capital expenditures. The monolines' business has since then expanded into the insurance of other structured finance products, like collateralized debt obligations and the credit default swaps.

Insurance regulations prevent 'regular' insurance companies from offering insurance to financial products. The monoline insurance companies are the only entities allowed to provide insurances to the capital markets.[12] An ABS issue that is protected by a monoline insurer is said to be 'wrapped'. The highest rating a wrapped tranche can receive depends on the credit rating of the monoline insurer. The amount of enhancement that is required to achieve a certain rating is expressed as a multiple of the expected loss level. E.g. in order to receive an AAA-rating, a general rule is that the credit enhancement should cover five times the expected loss. In the case that the issuer fails to make the required payments, the monoline insurer agrees to the payment of interest and principal up to a specific amount.

Prior to the subprime mortgage crisis, no monoline insurer had ever been downgraded and tranches protected these monolines were regarded as very safe by investors.[13] However, in 2007 monoline insurers suffered losses from insurance of structured products backed by residential mortgages. *Within one year, the two largest monoline companies' share price fell by 90%-95%.*[14] Many large monolines suffered downgrades, which by the very nature of monoline insurances lead to the immediate downgrade of the bonds wrapped by these monoliners. Although it is uncertain what the role of monolines will be in the future, it is certain that a lot of things will have to change and its status has taken some serious blows.

Letter of credit

A letter of credit (LOC) is a form of credit enhancement that protects the issuing entity form shortfalls of cash flow in the securitised portfolio up to a predetermined amount. LOCs used to be a fairly common form of credit enhancement until the mid 1990s. The issuer of the LOC is paid a fee to provide a specified amount to compensate the ABS-issuing entity for any cash shortfalls from the collateral, up to the agreed credit support amount. The popularity declined when a lot of LOC-providing banks faced downgrades. Rating agencies apply the "weak link approach" in rating securitisation transactions, which means that the credit quality of a security is only as good as the weakest link in its credit enhancement scheme. Consequently, when a AAA-rating is sought, the transaction would require a credit enhancer that has itself

a AAA-rating. Since only a few banks nowadays have a AAA-rating, this form of credit enhancement is not as common as the aforementioned insurances.

2.3.1.2 Internal credit enhancement

Next to the tranching of a transaction, which provides credit protection for every tranche except for the most junior, there are several other forms of internal credit enhancement which will be discussed next.

Over-collateralisation

Over-collateralisation refers to a type of credit enhancement in which the portfolio of the issuer of securities contains collateral in excess of what is needed to adequately cover the repayment of the securities plus a reserve. To illustrate how over-collateralisation works, consider this example described by Standard & Poor's, in which a cash flow transaction involving the issuance of $80 million of rated senior debt supported by a collateral pool with a total par value of $100 million. This is therefore known as an '80/20' liability structure consisting of 80% of rated senior debt and 20% of unrated supporting debt or equity. The level of over-collateralisation is 125%, which equals the ratio of assets over liabilities.[15] During the lifetime of the transaction the level of over-collateralisation should be maintained at a certain level or the issuer might face rating downgrades from the credit rating agencies. This is tested through a par value test, and an interest coverage test. The par value test requires the total value of the issued notes to be equal to a minimum percentage of the underlying collateral. Notes with higher seniority require a higher over collateralisation percentage, e.g. the par value test may require 115% coverage in the case of the senior notes and 105% in the case of the mezzanine tranche. The interest rate coverage test measures whether the interest income from the collateral is sufficient to cover potential losses and required interest payments to note-holders. When the over-collateralisation test is not satisfied, the issuer is required to take measures usually within 10 business days, for example by buying extra collateral.

Reserve account

Issuers may deposit cash in a reserve account which can be used to meet interest and principal payments requirements when needed. Issuance proceeds, i.e. underwriting profits can also be deposited in this account and are usually reinvested in money market instruments. In many structures, the reserve account is for the benefit of the first loss investor only.

Excess spread

The excess spread is the current cash flow remaining after payment of coupons to investors, servicing fees and other expenses. This excess spread is allocated to the excess spread account on a monthly basis and can be used to pay for future losses. The account may be used for the benefit of all of the tranche investors to offset losses from assets in default.

2.4 Role of Rating Agencies

Credit ratings agencies play a crucial role in any securitisation transaction. Investors have no detailed insight into the credit quality of the assets that are included in the transaction and it is therefore very hard for them to determine the quality of the ABS. Although there is some degree of disclosure, it is impossible for any investor to have the same amount of information on the credit quality of the portfolio as the originating bank. This information asymmetry leads to a clear conflict of interest in the structure. For example, a bank may intentionally dump bad loans by selling them through a securitisation transaction while the purchasing party has no clear insight in what it is buying. Even if the intentions of the originator are just (which presumably is usually the case), the investor still needs some degree of insight into what he/she is buying. In an attempt to solve this situation (although recent events have shown that this is still a problem), credit rating agencies like Moody's, Fitch or Standard and Poor's are asked to rate the structure and provide an objective rating for the transaction. The rating agency evaluates the portfolio based on data supplied by the bank and on its own historical data of similar assets and uses this to determine the default risk of the portfolio. Then, taking into account the credit enhancements, it provides a credit rating for every single tranche in the structure; i.e. every bond has a credit rating according to the tranche it belongs to. Usually more than one rating agency is used in order to increase investor confidence, although this will also increase transaction costs.

In most cases the involvement of rating agencies goes beyond merely rating a transaction. Often, originators are aiming for a particular rating for the tranches that are created. The rating agencies act as a consultant in this process by helping the originator determine what structure is needed to obtain the desired rating. This involvement can present a conflict of interest, which is another reason why it is important to use more than one rating agencies to rate the transaction.

3 SME securitisation

As said in the introduction to this report SME securitisation can play a vital role in the economy since it is inter alia a means to increase the primary market supply of loans to SMEs. A recent study concludes that SME assets account for an average 15% of European bank assets, which amounts to approximately €3,300 billion.[16] Based on this assumption, a study for the European Commission estimated that between 1% and 2% of securitisable SME claims in bank balance sheets have been securitised.[17] Therefore, there is still considerable room for growth in this asset class in the years to come which makes it a very interesting subject of study. It is notable that the level of SME securitisation in Europe is substantially larger than the US. Therefore, the remainder of the report will focus on the European SME securitisation market.

3.1 Basic Features

The basic features of an SME securitisation transaction are more or less the same as any other transaction (see section 2.1). The main difference is that the underlying assets concerned are loans to SMEs. A frequently used form in securitisation of SME loans is synthetic securitisation which will be discussed next. Note that synthetic securitisation is by no means exclusive to SME securitisation but is merely an often utilised form within the field of SME securitisation.

3.2 Synthetic Securitisation

Since the first securitisation transaction was carried out many different varieties of securitisation which are often more complex than a standard true sale transaction have emerged. One popular variety that is also frequently used in SME securitisations is a synthetic structure, which was introduced to meet the need of originators for whom credit risk transfer was more important than funding considerations. Banks wanted to manage the credit risk in their loan portfolios without having to go through the administrative burden of a true sale transaction. As compared to a true sale transaction, in which the underlying assets are actually transferred to a separate legal entity, a synthetic securitisation transaction is structured in such a way so that the credit risk of the assets, and not the assets itself, is transferred by the originator of the transaction to the investors using credit derivative instruments such as credit default swaps (CDS). The originator is in effect the credit protection buyer and the investors are credit protection seller. This credit risk transfer can be achieved directly or via an SPV. By using synthetic securitisation, the assets are not necessarily moved off the balance sheet, so this form is often utilised when the primary objective of the transaction is risk transfer rather than balance sheet funding. It enables the removal of credit risk exposure without asset transfer and the associated administrative hassle, so it maybe the preferred approach for risk management purposes and regulatory capital relief.

A synthetic transaction can be fully funded, unfunded, or partially funded. In a fully funded transaction the entire credit risk of the reference portfolio is transferred through the use of credit-linked notes (CLN) or through providing collateral securing the protection seller's obligations under a credit default swap.

When using CLNs, any potential payment obligation of the protection seller (the investor) is paid for at the start of the transaction. CLNs will be discussed in more detail shortly. In case of an unfunded transaction, the structure is wholly comprised of credit default swaps and potential payment obligations are not paid for in advance or backed by collateral. The protection seller's obligation is only settled when a credit event occurs. In a partially funded transaction certain tranches of the credit risk of the reference portfolio are funded and others unfunded. Decision whether or not to adopt a funded, unfunded or partially funded structure mainly depends upon the objectives of the originator.

3.2.1 Generic Structure

For a partially funded structure, the largest part of the credit risk is typically the unfunded part and is transferred via the super-senior credit default swap. This swap is transacted with a swap counterparty but used to be sold to monoline insurance companies at a considerably lower spread over LIBOR compared with the senior AAA-rated tranche of true sale transactions. The super senior part of the transaction is called this because it will only start to deteriorate when all other tranches have fully defaulted; hence the low spread.

The remaining part which is in this case the funded part can be transferred directly or through an SPV (see section 3.2.4) to investors by issuing CLNs. In case an SPV is used, the SPV sells the originating bank credit protection usually through credit default swaps. The SPV then issues CLNs, usually in several tranches of different seniority. The most junior note, known as the "first-loss" piece may be retained by the originator. The proceeds from this note issuance are used by the SPV to purchase risk-free collateral such as Treasury bonds. The cash flow from this risk-free collateral together with the swap premium received from the originator is then used to pay the investors. When a credit event occurs in the reference portfolio, the most junior tranche will deteriorate and the value of the defaulted asset will be deducted from the value at maturity of the CLN. The CLN affected by this credit event will no longer receive interest payments, and the associated collateral can be sold in order to account for the losses coming from the credit event.

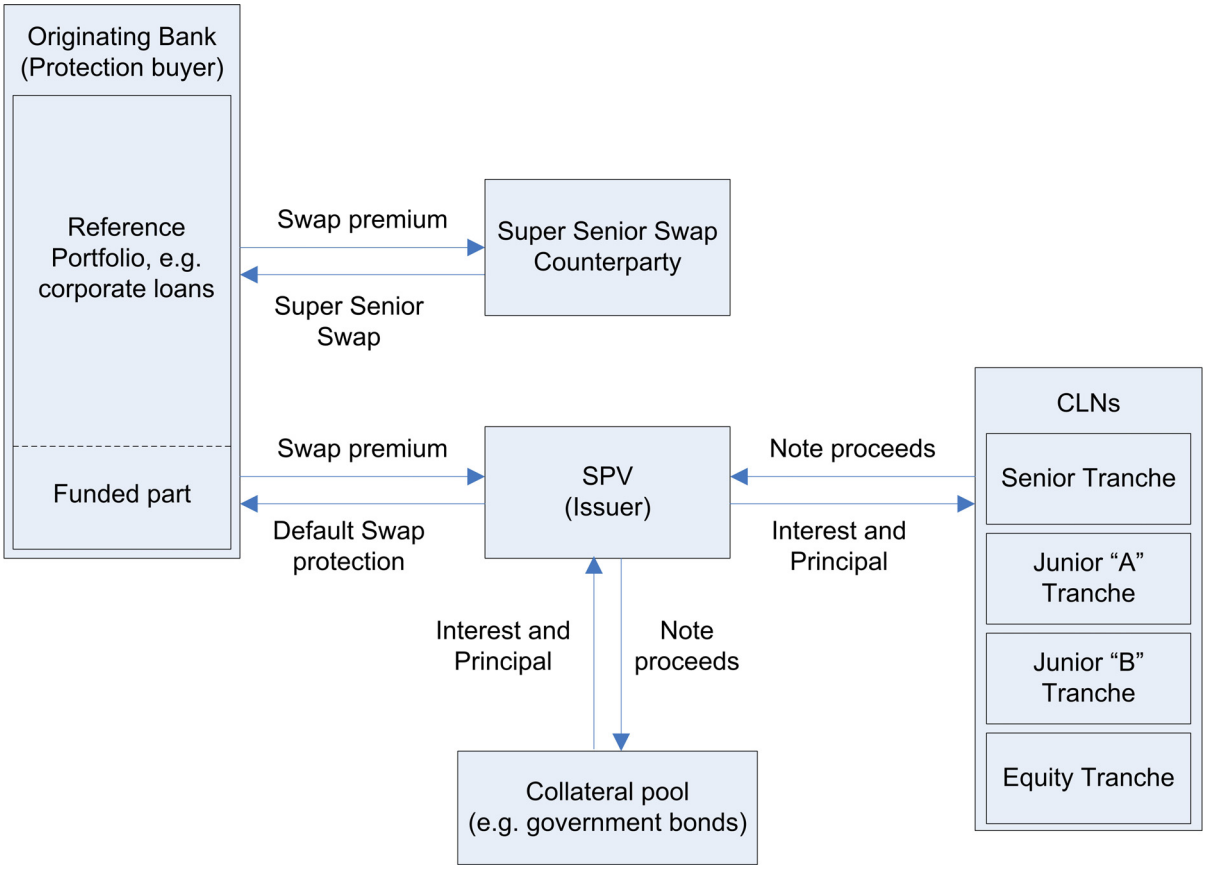

Figure 3: Generic Synthetic Structure[18]

The above picture illustrates a partially funded deal with SPV. The unfunded and largest part of credit risk is transferred using a Super-senior swap. The remaining funded part of the credit risk is transferred to an SPV using credit default swaps. This SPV issues CLNs and the proceeds from these notes are invested in risk-free collateral. When a credit event occurs, the most junior tranche will deteriorate resulting in a corresponding decrease in interest and principal payments to the junior note holder. Since the SPV entered into a default swap contract, it has to pay the originating bank for the loss from the credit event. The SPV pays for this by selling the part of collateral that is no longer needed to make interest payments to the junior CLN tranche, since it deteriorated.

For the sake of clarity and completeness, fully funded and unfunded structures will be discussed next.

3.2.2 Fully funded structure

In a fully funded structure the credit risk of the entire portfolio is transferred to the SPV via a credit default swap. In a fully funded synthetic transaction, the originator enters into a credit default swap contract with an SPV, which in turn issues CLNs equal to the entire value of the reference portfolio. The proceeds from this issue are invested in risk-free government debt or senior unsecured debt to use as collateral. If a credit event occurs on one or more of the underlying assets in the portfolio, the required amount of collateral is sold and the proceeds are used to compensate the originator. The principal repayment on maturity of the CLN will be the original notional less the losses on the underlying assets. The risk-free collateral naturally does not yield enough for the SPV to fully pay the investors. The

difference between the spread on the collateral and the coupon payments to the investors should be covered by the swap premium paid by the originating bank.

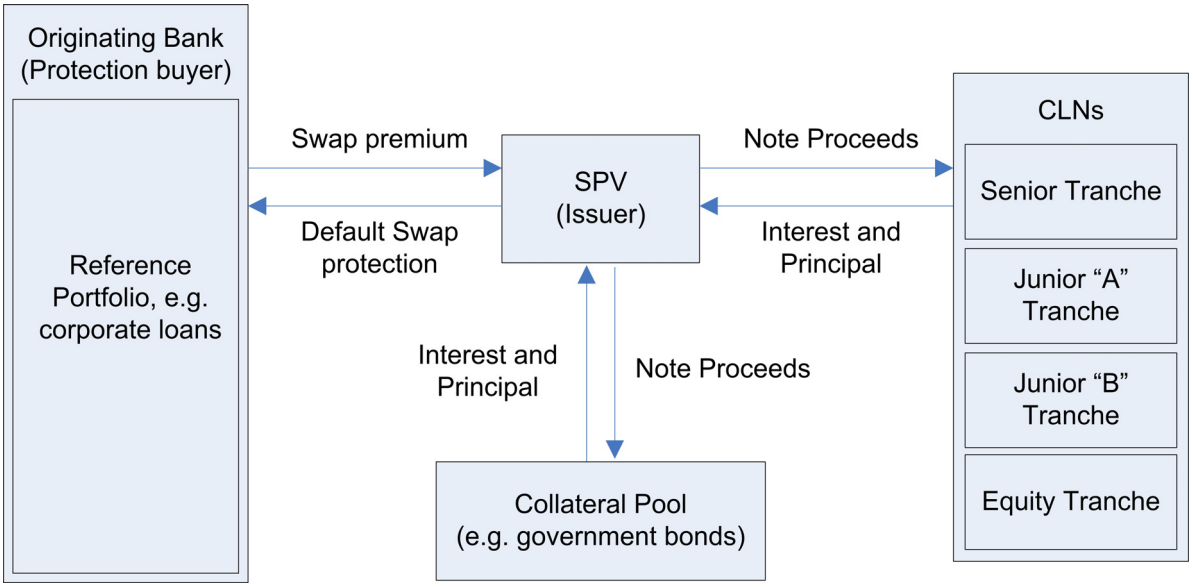

Figure 4: Fully Funded Synthetic Securitisation[19]

A fully funded structure is more expensive than a partially funded structure. This is because the swap premium paid on the unfunded part covered by the super-senior swap is lower than the amount required to cover the difference between the yield from the collateral and the coupon payments on the notes if it were funded. The upside is that the risk weight for regulatory capital purposes under fully funded transactions is lower.

3.2.3 Fully unfunded structure

In a fully unfunded structure credit risk is transferred by using only credit derivatives. The swaps are rated in a similar fashion as the notes in a funded transaction and there usually is an equity piece that is held by the originator. The rating of the swap tranches will depend on the quality of the reference portfolio and the correlation and diversity of the assets in this portfolio. The tranches usually consist of a super-senior tranche, a senior tranche, junior tranches and equity. The credit default swaps are not single name swaps but are attached to a specific class of debt.

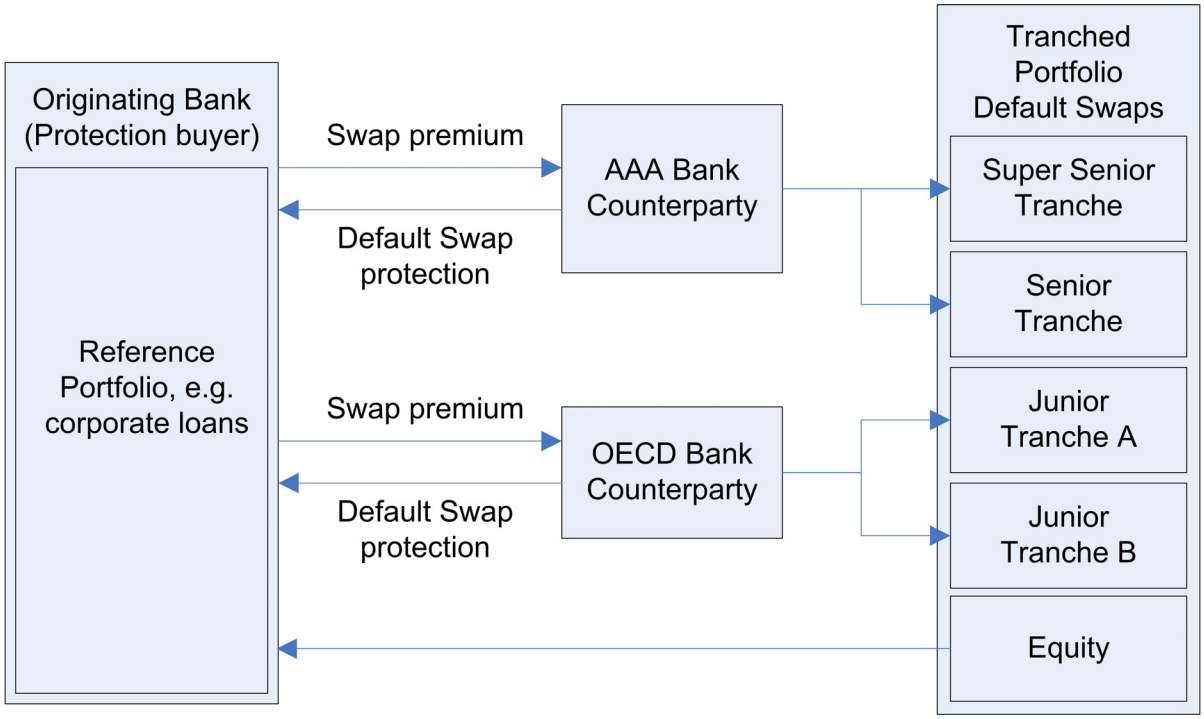

Figure 5: Fully unfunded synthetic structure[20]

3.2.4 Non-SPV structure

A structure can be set up with or without the usage of an SPV. When no SPV is used the originator and protection buyer directly enters into a default swap contract (as is the case in Figure 5) or issues CLNs to investors. The advantage of this approach is that the cost of setting up and administering an SPV is eliminated. The downside is that the rating of the notes is usually linked to the rating of the issuer of the notes (in the non-SPV case the originator), which could be a problem when the originating bank has a credit rating lower than the desired rating on the notes to be issued.

3.2.5 True sale versus synthetic securitisation

Compared to true sale, synthetic securitisation offers numerous advantages including the following:

- The time required to do a transaction is significantly shorter. The process from inception to closing can be as short as four weeks, with an average of six to eight weeks, compared to three to four months for a similar true sale transaction.
- There is no requirement to fund the super-senior part of the transaction.
- Transaction costs can be lower since there is no need to setup an SPV and administration costs and legal fees are lower.
- A larger variety of assets that would otherwise give rise to legal issues can be securitised.
- The use of credit derivatives enables greater flexibility to provide tailor made credit risk solutions.

- The cost of buying protection is often lower as there is little to no funding element and the credit protection price is lower than the equivalent note liability.

- Synthetic securitisation permits larger transactions.

This does not mean that true sale transactions lose their attraction. True sale still has several advantages over synthetic deals, including:

- True sale transactions have a larger potential investor base. Some financial institutions and investors have limitations on the degree of usage of credit derivatives. Therefore the number of counterparties available for true sale transactions is larger.

- The originator is subject to a lower degree of counterparty risk. The default of a counterparty would mean the termination of the credit default swap and thus potentially the loss of credit event protection payment.

3.3 Motivation

In section 2.2 several motivations for securitisation were discussed. For the SME asset class there are some additional reasons why securitisation might be interesting. The following section discusses different motivations that count for SME securitisation in particular.

Especially in SME financing, a lot of SME loans are extended by smaller regional banks. Securitisation provides these smaller banks access to the capital markets. These banks usually do not have the same kind of access to the international capital markets as the larger credit institutions. By pooling their assets with other smaller banks and securitising this portfolio, these banks can receive funding at competitive rates, in the same way as discussed in section 2.2. This in turn enables these banks to provide larger loans without breaching credit policy and concentration restrictions.

Furthermore, these smaller banks often cope with the risks of geographic and sector concentrations in the loan portfolio. Securitisation as a balance sheet management tool can be applied to mitigate this risk.

For the investors in ABS backed by SME loans, these products are particularly interesting since they exhibit limited correlation with the more 'traditional' instruments available at the capital markets. An investor would normally not invest in a single SME since this is often quite risky and costly. Therefore, a pool of well diversified SME loans in which the investor can invest through assets securitisation provides a fine alternative.

Securitisation can also yield benefits for borrowers, i.e. the actual SMEs. Securitisation transactions are rated by credit rating agencies and are priced by market forces, which can serve as feedback to the originating banks about their origination process. Over time, the banks can use this information to

improve the pricing and management of their loans. The more market oriented pricing process may benefit better performing SME borrowers.

Securitisation becomes easier when the products in the underlying portfolio are more standardised. This provides an incentive for banks aiming to securitize their assets to standardise their origination process, which in turn leads to lower costs for borrowers although some flexibility might be lost.

3.4 Obstacles to the growth SME securitisation

The current securitisation market for SME loans has not matured when compared to other asset classes and as discussed in the introduction to this chapter there is a lot room for growth. There are several reasons of varying nature for this suboptimal utilisation of potential.

SME loans are more heterogeneous than other asset classes i.e. there is more diversity in a typical SME loan portfolio than for example, a mortgage portfolio. As said before, potential investors have a lot less information about the quality of underlying assets than the originating bank. In order to overcome this discrepancy in information rating agencies are used to analyse the portfolio in order to increase investor confidence. The rating agencies use historical loss and default data in combination with their own historical data to assess the credit quality of the portfolio. The quality of the assessment depends heavily on the amount and quality of portfolio data available. The less extensive or reliable the information or data are, the higher the safety margins that the rating agencies apply in assigning the ratings will be. Because the companies that are given loans are often small and possibly very young starting businesses, there is not a lot of data available on its financial performance and their future is often uncertain. This is indeed a large difference from for example large public companies that have historical stock performance data and public ratings readily available for use in data analysis.

The above example gives one explanation as to why SME portfolios are harder to securitize than other more homogeneous asset classes. The literature identifies several characteristics of SME portfolios that make securitisation of this asset class more difficult:[21]

- The size of the companies to which loans are extended vary greatly in size, from sole-proprietorship with almost no management structure to well organized medium sized companies.
- The legal form of the borrower differs from company to company
- The collateral for the loans can be very diverse; e.g. mortgages, machinery, private guarantees.
- The type of loan extended also varies greatly, including senior loans, subordinated loans, overdrafts, trade finance, loans with guarantees etc.

- Different types of loans also mean different maturities and payback schemes e.g. bullet loans, amortising loans, etc.

- Loans in a portfolio are typically extended to a wide variety of industries and regions

Many of the above aspects are in some respect also advantages of ABS backed by SME loans, as will discussed in section 3.3. However, it is not hard to see that this variance makes the rating and thus securitisation of SME loans very difficult.

Another factor slowing the growth of the SME asset class is that market entry costs are high. A lot of data is required for securitisation, and it is unlikely that smaller banks will have the IT infrastructure in place that enables securitisation right away. Apart from the infrastructure any securitisation comes with fees that have to be paid for rating agencies, legal advice, IT structuring, trustees and the possible SPV. Because in some countries SME lending is primarily done by smaller banks, the barriers of entry are relatively high and it is harder for these banks to securitize their assets. Some transactions have such a level of complexity that the portfolio that will be securitised has to be at least a few hundreds of millions Euros in order for the transaction to be cost efficient.

Furthermore, the markets' relative immaturity is not beneficial for growth. When a bank plans on issuing SME-ABS they can profit from the experience the market has made with current or past SME-securitisation deals. This also goes for rating agencies, legal advisors, etc. Of course, also investors will benefit from a more mature market and more experience with the assets class. When they are familiar with the product they will be more willing to invest and are most likely to accept lower spreads. This phase of development is of course something every new product or service goes through but is nonetheless something that hampers the growth of the SME securitisation market, at least at this moment.

Last but not least, the recent earthquake that shook the financial landscape brought the already difficult market for SME securitisation to a near complete stop. Investors are very reluctant to invest in any securitised product including SME assets. Confidence in ABS has dropped to an all time low, and investors have a hard time trusting the ratings extended by rating agencies, considering what happened with AAA-rated securities in other asset categories (most notably sub-prime mortgages).

3.5 Current Status of SME Securitisation Market

Although the total issuance amount of asset backed securities is much higher in the United States compared to Europe, the SME securitisation market is much more developed in Europe. In 2007, new ABS issuance amounted to approximately €2.6 trillion in the US compared to €490 billion in Europe. However, new issuance of securities backed by SME loans was €16.9 billion in Europe compared with US$2.9 billion (€2.5 billion) in the US.[22]

So far, the European market has been dominated by RMBS (residential mortgage backed securities) with a share of 59% of the European ABS market. CMBS (commercial mortgage backed securities) have a share of 14% and collateralized debt obligations (CDOs) and collateralized loan obligations (CLOs) of 11% together. In contrast to this, the market share of

SME-ABS is only 3%. SME securitisation is thus still of minor importance if compared to other asset classes (see Figure 6: ***European asset classes (2006)***).

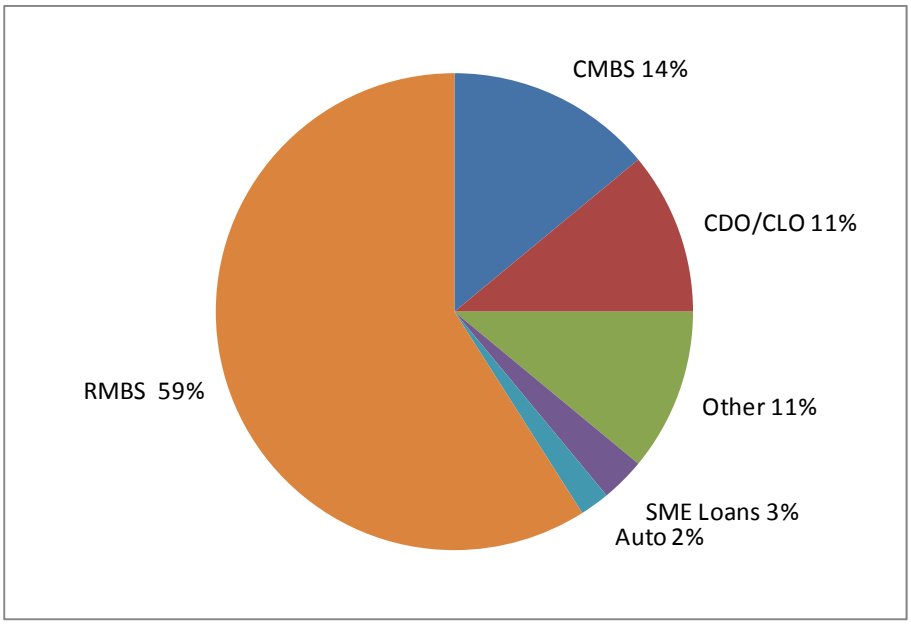

Figure 6: *European asset classes (2006)*[23]

As mentioned in the introduction the volume of SME securitisation is not only small compared to other asset classes but also compared to the total volume of SME loans outstanding. The 1%-2% of outstanding SME loans securitised is small when comparing it to the amount of residential mortgages securitised, of which around 10% of the total volume of outstanding loans was securitised in the European Union.[24]

From Figure 7, which presents the share of different EU Member States with respect to the annual notional amount of SME loans securitised, it can be seen that the market is dominated by Spain and Germany. Other relevant players are the Netherlands, Switzerland, Portugal and Belgium. The recent large growth of the European SME securitisation market is clearly visible from this figure.

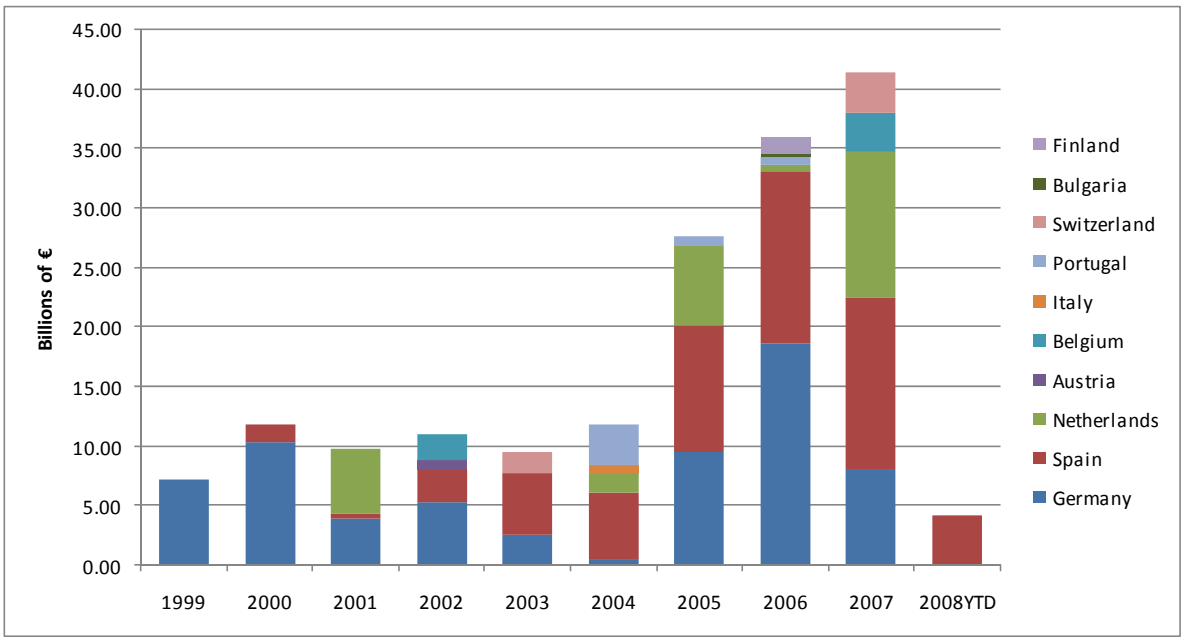

Figure 7: European yearly SME ABS issuance - notional amount by country[25]

4 The Basel II Capital Accord

As explained in Section 2.2, one of the motives for securitisation is regulatory capital relief. This chapter will discuss the regulation leading to this capital requirement and how this capital requirement is calculated.

4.1 Introduction: Basel I

Prior to 1988 bank regulators in different countries tended to regulate bank capital by setting minimum levels of the ratio of capital to total assets. However these "rules" varied from country to country.

In 1988 the Basel capital accord (or Basel I or BIS I as it is often referred to) was created by the Basel Committee on Banking Supervision. This committee was formed under the supervision of the Bank of International Settlements (BIS), an international organisation of central banks which "fosters international monetary and financial cooperation and serves as a bank for central banks."[26] The Basel I Accord basically was a set of minimal capital requirements for banks. Its basic goals were to strengthen the stability of international banking system and to set up a fair and a consistent international banking system in order to decrease competitive inequality among international banks. The accord lead to significant increases in the amount of capital held by banks, and greatly improved the stability of the global banking system. However, the financial landscape is always changing very rapidly and the framework was deemed inadequate within a couple of years. One of the main criticisms was that the framework was not sophisticated enough mainly because of the lack of risk sensitivity; it was deemed too simple and somewhat arbitrary. All loans were subject to the same capital requirement, irrespective of the ability of the borrower to repay the loan which in turn provided an incentive for regulatory arbitrage. For example, a loan to a corporation with a AAA credit rating is treated the same way as one to a corporation with a B credit rating. See Appendix 2 for more information on Basel I.

The criticisms on the framework have led to the creation of a new Basel Capital Accord, known as the International Convergence of Capital Measurement and Capital Standards, or Basel II for short.

4.2 Basel II: overview

In 1999 the Basel Committee proposed new rules that have become known as Basel II. A number of revisions were done and quantitative impact studies (QISs) were carried out to assess and test the impact of the new rules. A final set of rules was agreed on by all members of the Basel Committee in 2004. Since then, a number of further QIS have been carried out and several amendments have been made to the accord. The implementation of the Basel II Capital Accord started in 2007 and it is expected to be fully implemented in 2010.

This chapter will shortly discuss the general characteristics of the Basel II framework after which the relevant parts for securitisation will be looked into in more detail.

The Basel II Capital Accord is based on three "pillars" which are presented in Table 1.

BASEL II		
Pillar 1: Minimum Capital Requirements	*Pillar 2: Supervisory Review*	*Pillar 3: Market Discipline*
Credit Risk - Standardised Approach - Foundation IRB Approach - Advanced IRB Approach **Operational Risk** - Basic Indicator Approach - Standardised Approach - Advanced Measurement Approach **Market Risk** - Standardised Approach - Internal VaR models	**Regulatory Framework for Banks** - International Capital Adequacy Assessment Process (ICAAP) - Risk Management **Supervisory Framework** - Evaluation of internal systems of banks - Assessment of risk profile - Review of regulation compliance - Supervisory Measures	**Disclosure requirements** - Transparency for market participants - Comparability of banks performance

Table 1: The Three Pillars of Basel II[27]

The remainder of this chapter will focus on Pillar I since it is the most relevant for securitisation.

4.3 Pillar I: Regulatory Capital and Credit Risk

Pillar I focuses on three risk categories: operational risk, market risk and credit risk. Operational risk is the risk arising from running a company and comprises human error, IT failure, fraud, legal risk, environmental risk, etc. Market risk refers to risks stemming from interest rate related instruments and equity in the trading book, and foreign exchange risk and commodities risk throughout the bank. Credit risk is the risk that an obligor fails the meet its payment obligation on a loan or another line of credit. It is the most relevant risk category in the context of securitisation and will be the focus of the remainder of this chapter.

4.3.1 Regulatory Capital under Basel I

Under Basel I the calculation of regulatory capital for credit risk was relatively straightforward. On balance sheet assets would fall in one of four assets categories with risk weights ranging from 0% to 100%. These risk weights were then multiplied by the amount on balance sheet, yielding the risk weighted assets (RWA). The regulatory capital requirement under Basel I was set equal to 8% of RWA.

The regulatory capital itself is subject to a leverage ratio requirement. Capital consists of what is called Tier 1 and Tier 2 capital. The amount of Tier 2 capital that is eligible for recognition as regulatory capital is limited to 100% of Tier 1 capital. The Tier 1 capital is considered the key element of capital and consists of equity capital and disclosed reserves. It is regarded by the Basel committee as the basis of regulatory capital since it is considered to be of higher quality and must therefore represent at least 50% of regulatory capital. Regulators have allowed several other instruments other than common stock, to count in Tier 1

capital. These instruments are unique to each national regulator, but are always close in nature to common stock. These are commonly referred to as upper tier one capital.

Tier 2 capital is composed of what is called supplementary capital. In the Basel I accord, these are categorized as undisclosed reserves, revaluation reserves, general provisions, hybrid instruments and subordinated term debt. The exact rules and definitions of Tier 2 capital differ per country. For more information on regulatory capital under Basel I see Appendix 2. There are also rules in place for the treatment of off-balance sheet items, but since these are not relevant in the context of this report these will not be discussed in further detail.

4.3.2 Regulatory Capital under Basel II

The calculation of regulatory capital under Basel II is far more sophisticated than under Basel I. The basic rule of 8% of RWA still applies, and the Tier 1 and Tier 2 ratio requirement remains largely the same. However, for the determination of RWA for credit risk purposes banks now have three choices under Basel II:

1. The standardised approach
2. The foundation internal ratings based (IRB) approach
3. The advanced internal ratings based approach

These three approaches will be discussed next in more detail. A focus will be on the determination of minimum regulatory capital required for (SME) loans to corporations.

4.3.3 The Standardised Approach

As its name suggests the standardized approach is the simplest of the three approaches. It is used by banks that in the regulator's view are not sophisticated enough or do not have the resources to use the IRB approaches. Since the focus of the remainder of the report will be on the more sophisticated IRB approach the standardised approach will not be discussed in further detail. For more information on the standardised approach refer to Appendix 3 on page 63.

4.3.4 The Internal Ratings Based Approach

The Internal Ratings Based (IRB) Approach is the more advanced way to determine the minimum capital requirement for credit risk. The calculation of the RWA is based on the principle of expected and unexpected loss. Its basic formula is:

$$RWA = 12.5 \times EAD \times LGD \times (WCDR - PD) \times MA$$

$$RC = 0.08 \times RWA$$

Where EAD = Exposure at Default
LGD = Loss Given Default
WCDR = Worst case default rate[1]
PD = Probability of Default
MA = Maturity Adjustment

Exposure at default

The exposure at default is an estimation of the value of the exposure in the event of, and at the time of, that counterparty's default. It is a measure of potential exposure in currency as calculated by the Basel Credit Risk Model for the period of one year or until maturity, whichever is soonest. Under Basel II a bank needs to provide an estimate of the exposure amount for each transaction, commonly referred to as Exposure at Default (EAD), in banks' internal systems. All these loss estimates should seek to fully capture the risks of an underlying exposure.[33]

Loss given default

The loss given default is the percentage of the total exposure that will be lost in the event of default, i.e. after deduction of what can be recovered through for example sale of the collateral. The amount of collateral thus directly influences the loss given default.

Worst case default rate

This is the rate of default that with 99.9% certainty will not be exceeded in one year, i.e. the level of loss that will occur only once every thousand years. It is used as a measure for the required capital, i.e. the 99.9% worst case loss should be equal to the risk weighted assets.

Probability of Default

Probability of default is the probability that a loan on average will default in the coming year.

Maturity Adjustment

The Maturity Adjustment is an adjustment factor for loans with longer maturities. When a loan lasts longer that one year, there is a bigger chance that the counterparty will default of will suffer from a downgrade in credit worthiness. The Maturity Adjustment is used to account for this fact.

When looking at the above formula now, it becomes intuitively clear why the formula is as it is. The EAD is the starting point; it is the amount of money at stake in case of a credit event. However, it can be backed by some form of collateral, or losses can be recovered otherwise, which is why the real amount at stake is the EAD times the LGD. Now let's take a look at the probabilities. The potential losses a bank

1 Worst case default rate is not an official term from the Basel II accord, but is derived from: Hull, J.C., Risk Management in Financial Institutions, Pearson Prentice Hall, 2007, New Jersey

can suffer consist of an expected loss (EL, with is represented by the PD) part and an unexpected loss part. The expected loss (derived from PD) should be normally covered by a bank by the way it prices its products. The WCDR already incorporates the EL, thus in calculating the capital required to cover for excess of the 99.9% worst-case loss over the expected loss the PD should be subtracted from the WCDR, in order to avoid double counting. The unexpected loss indeed seems to be a reasonable amount to hold as safety margin.

The biggest difference between the foundation and the advance approaches is the way in which the inputs are determined. Under the foundation approach, banks must provide their own estimates of PD associated with each of their borrower grades, but must use supervisory estimates for the other relevant risk components. The other risk components are LGD, EAD and M. Under the advanced approach, banks must calculate the effective maturity (M) and provide their own estimates of PD, LGD and EAD.[28] This will be discussed next.

4.3.4.1 Exposure at default

Calculation of exposure at default (EAD) differs under foundation and advanced approach. Under the foundation approach calculation is largely guided by regulators and takes into account the under lying asset, forward valuation, facility type and commitment details. For on-balance sheet transactions, EAD is identical to the nominal amount of exposure. On-balance sheet netting of loans and deposits of a bank to a corporate counterparty is permitted to reduce the estimate of EAD under certain conditions. Netting is the off-setting of positive and negative obligations with counterparty.

Under the advanced approach the bank itself determines the appropriate EAD to be applied to each exposure. A bank wishing to use its own estimates of EAD will need to demonstrate to its supervisor that it can meet additional minimum requirements pertinent to the integrity and reliability of these estimates. In most cases, EAD is equal to the nominal amount of the exposure but for certain exposures – e.g. those with undrawn commitments – it includes an estimate of future lending prior to default.

4.3.4.2 Loss given default

Under the foundation approach, Basel II prescribes fixed loss given default (LGD) ratios for certain classes of unsecured exposures. Senior claims on corporates, sovereigns and banks not secured by recognized collateral receive a 45% LGD. For all subordinated claims on corporates, sovereigns and banks attract a 75% LGD. For claims backed by collateral a so-called haircut methodology is used. This is discussed in Appendix 4.

Under the advanced approach, the bank itself determines the appropriate LGD to be applied to each exposure, on the basis of robust data and analysis. The analysis must be validated both internally and by supervisors. Thus, a bank using internal LGD estimates for capital purposes might be able to differentiate LGD values on the basis of a wider set of transaction characteristics (e.g. product type, wider range of

collateral types) as well as borrower characteristics. These values would be expected to represent a conservative view of long-run averages. A bank wishing to use its own estimates of LGD will need to demonstrate to its supervisor that it can meet additional minimum requirements pertinent to the integrity and reliability of these estimates.

4.3.4.3 Worst case default rate

The worst case default rate (WCDR) is the same for both approaches and is based on the one-factor Gaussian Copula and is calculated as follows:

$$WCDR = N\left[\frac{N^{-1}(PD) + \sqrt{\rho}N^{-1}(0.999)}{\sqrt{1-\rho}}\right]$$

Where N is the cumulative distribution function for a standard normal random variable and N-1 is the inverse cumulative distribution function for a standard normal random variable. ρ is the correlation coefficient and is given by:

$$\rho = 0.12\frac{1-e^{-50PD}}{1-e^{-50}} + 0.24\left(1-\frac{1-e^{-50PD}}{1-e^{-50}}\right)$$

where PD is the probability of default. This implies a range for the correlation coefficient from 0.12 for PD =1 to 0.24 for PD =0. There is thus an inverse relation ship between the correlation and the PD. The reason for this inverse relationship is that as the loan's probability of default increase it becomes more idiosyncratic and is less affected by overall market conditions.

4.3.4.4 Probability of default

The probability of default (PD) is usually calculated using one or more of a couple common techniques. One way to determine the PD is based on internal default experience using historical data to assess the PD. Another common form is default mapping. Banks may associate or map their internal grades to the scale used by a credit rating agency and then attribute the default rate observed for the credit rating agency's grades to the bank's grades. A bank may also use a simple average of default-probability estimates for individual borrowers in a given grade, where such estimates are drawn from statistical default prediction models. Irrespective of the used method, the bank must always demonstrate that they have taken into account all relevant factors and must justify their choices in models.

4.3.4.5 Maturity adjustment

The maturity adjustment (MA) is given by the following formula:

$$MA = \frac{1+(M-2.5)b}{1-1.5b}$$

Where $b = \left[0.11852 - 0.05478 \times \ln(PD)\right]^2$ and M is the effective maturity.

For banks using the foundation approach for corporate exposures, effective maturity (M) will be 2.5 years. Under the advanced approach, the effective maturity is given by:

$$M = \max\left[1, \sum_t t\left(\frac{CF_t}{\sum_t CF_t}\right)\right]$$

Where CF_t denotes the cash flows (principal, interest payments and fees) contractually payable in period t. If a bank is not in position to calculate the effective maturity as given by the above formula it is allowed to use a more conservative measure, which is usually equal to the nominal maturity, again with a floor of 1 year. The maturity adjustment does not apply to retail loans.

4.4 Additional rules for SME loans

Basel II has additional rules for SME loans; the firm-size adjustment for small- and medium-sized entities. As mentioned in section 4.3.4, the aim of regulatory capital under the Basel II accord is to protect banks from unexpected losses on their loan portfolio, as opposed to expected losses. SMEs are usually associated with higher expected losses than large corporate borrowers, but these expected losses are already taken into account by higher interest rates and lower risk ratings for these loans. There is, however, evidence that SME borrowers are exposed to more idiosyncratic risk.[29] This means that the default correlation for SME loans is lower than for corporate borrowers. The Basel II accord acknowledges this fact by including a correlation adjustment for SMEs which reduces the correlation according to the size of the firm, which in turn leads to lower regulatory capital charges. Under the IRB approach for corporate credits, banks are thus permitted to distinguish exposures to SME borrowers from those to large firms.

The adjusted formula is as follows:

$$\rho = 0.12\frac{1-e^{-50PD}}{1-e^{-50}} + 0.24\left(1-\frac{1-e^{-50PD}}{1-e^{-50}}\right) - 0.04\left(1-\frac{(S-5)}{45}\right)$$

S is the total annual sales in millions of euros with a minimum of €5 million. The SME definition used in the Basel II accord is the same as the EU definition, i.e. companies with annual sales up to €50 million are considered SMEs. Therefore sales cannot exceed €50 million in this definition.

4.5 Treatment of securitisation transactions under Basel II

One of the most important parts in the context of securitisation is the calculation of regulatory capital. Securitisation is often used to reduce regulatory capital charges, so the starting point is the determination

of this capital. However, it is perhaps equally important to know what the rules of Basel II say about regulatory capital after securitisation. Exposures banks hold in asset backed securities are subject to regulatory capital charges. This is of course of concern to banks that invest in ABS, but also to originating banks because in many transactions a part of the total issuance is retained by the originating bank. This is especially true for synthetic securitisation, where credit derivatives are frequently used and for any transaction that involves retaining part of the portfolio on balance sheet. We will briefly look at these next.

4.5.1 Basel I

Under Basel I there are no specific guidelines for securitisation transactions. However, the situation after securitisation is in can be assessed under Basel I rules. Usually the credit risk of the portfolio (or the portfolio as a whole in case of true sale) is sold off the balance sheet. Therefore, this portfolio is no longer subject to regulatory capital charges.

Frequently, parts of the transaction are held by the originating bank itself. These are subject to capital charges, and in case of rated notes, they are treated as normal obligations to e.g. banks, as described in Appendix 2. Equity (first loss piece or FLP) held on balance sheet is subject to full deduction of Tier 2 capital and thus in effect increases the Tier 2 capital required by its full dollar value.

4.5.2 Basel II

For internal ratings based (IRB) banks there are three approaches banks can take to determine the regulatory capital for holding securitisation exposures:

1. Ratings based approach (RBA)
2. Supervisory Formula (SF)
3. Internal Assessment Approach (IAA)

The RBA is used for rated exposures and exposures where ratings can be inferred and will be discussed below. The SF is used to determine capital requirements for unrated securitisation exposures for which no rating can be inferred, whereas IAA relates to transactions with asset backed commercial paper. The latter two methods will not be discussed in further detail since they have limited relevance in the context of the remainder of this report.

Under the RBA approach the risk weights for rated ABS are divided into three weight categories depending on tranche seniority and effective number of exposures.

External rating	*Risk weights for senior positions*	*Base risk weights*	*Risk weights for tranches backed by non-granular pools*
AAA	7%	12%	20%
AA	8%	15%	25%
A+	10%	18%	35%
A	12%	20%	
A-	20%	35%	
BBB+	35%	50%	
BBB	60%	75%	
BBB-	100%		
BB+	250%		
BB	425%		
BB-	650%		
Below BB- and unrated	Deduction		

Table 2: Risk weights for securitisation exposures under IRB approach[30]

Banks may apply the lowest weighting category (column 2 in Table 2): "Risk weights for senior positions" if the effective number of underlying exposures is 6 or more and the position is senior as defined below. The effective number of exposures (N) is calculated using the formula:

$$N = \frac{\left(\sum_i EAD_i\right)^2}{\sum_i EAD_i^2}$$

where EAD_i represents the exposure-at-default associated with the i_{th} instrument in the pool. For purposes of the IRB, a securitisation exposure is treated as a senior tranche if it is effectively backed or secured by a first claim on the entire amount of the assets in the underlying securitised pool.

When the claim cannot be considered senior but does have an effective number of exposures larger than 6 the "base risk weights" apply (column 3 in Table 2). For claims with an effective number of exposures smaller than 6 the "risk weights for tranches backed by non-granular pools" apply.

Where a bank is required to deduct an exposure from regulatory capital, the deduction must be taken 50% from Tier 1 and 50% from Tier 2.

As an example, consider a true sale transaction with an equity piece of 4% retained on balance sheet. The largest part of the portfolio is transferred to investors and thus no longer subject to any regulatory capital

charge. The 4% retained on balance sheet is unrated and so full deduction must be applied. This amounts to a total capital charge of 8% x 4% x 1250% = 4%.

Alternatively, consider a fully funded synthetic transaction for which the bank retains a first loss piece (FLP) of 3%. Furthermore, the bank retains the most senior note (AAA) which represents 80% of the portfolio, and the effective number of exposures is bigger than 6. The FLP is subject to full deduction and thus leads to a 3% capital charge. The 80% senior note retained is weighted by using the risk weights for senior positions which leads to a capital charge of 80% x 7% x 8% = 0.45%. The total capital charge for the originating bank after securitisation is thus 2% + 0.45% = 2.45%.

5 Case Study: SME securitisation

In the previous chapters the workings of SME securitisation and the new Basel II accord have been discussed. In this chapter a recent synthetic SME securitisation by a large European bank will be used as a case study. Due to confidentiality, the bank will be referred to as Bank X and the transaction will be called SME CASE. The Basel I and Basel II regulatory capital requirements of the portfolio that was securitised will be calculated. Consequently, the structure and cost of the deal will be discussed and the capital relief after securitisation will be calculated. In doing so, conclusions can be drawn about what the influence of the Basel II accord will be.

5.1 Deal characteristics

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6 Conclusion and recommendations

In the previous chapters an overview of securitisation and SME securitisation was given. Consequently, the Basel II regulation for SME securitisation was discussed. This was followed by a case study in which a recent SME securitisation transaction was analysed. In this chapter conclusions of this analysis will be discussed and recommendations for further research will be given.

6.1 Conclusion

The aim of this report was to assess the effect of Basel II on SME securitisation. The analysis of Basel II in Chapter 4 showed that the new framework is a lot more complicated than Basel I. The new framework incorporates a far more sophisticated method of determining the amount of regulatory capital required. The IRB approach in particular (as opposed to the standardised approach) recognises the fact that every asset has different risk characteristics and determines regulatory capital requirements by taking these characteristics into account.

In Chapter 5 a case study was presented in which a recent SME transaction was analysed to test the effects of Basel II. First, the situation before securitisation under Basel I and Basel II was assessed. It was found that the amount of regulatory capital required for the SME portfolio in this study was significantly smaller under Basel II than under Basel I.

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However, one should take into account that the SME firms size adjustment of Basel II was not included in this study. It was demonstrated that this adjustment has the potential of significantly lowering the amount of capital relief attainable.

The finding that securitisation under Basel II is less profitable corresponds with the expectations. Basel II was inter alia conceived to better take into account the risks associated with the individual loans. This in turn means assets are weighted in closer correspondence with their actual risk and regulatory capital arbitrage provides fewer benefits. All of this indicates that SME securitisation will be less attractive under Basel II.

However, several issues merit further research. First, this study only analyses one case particular case which is too little to yield any conclusive evidence. Furthermore, the structure studied in the case is a fully funded synthetic securitisation and as discussed in Chapter 3 a lot of different structures can be used to securitize an SME portfolio. To be able to say something about other types of securitisation, these structures should be studied as well. Moreover, the accuracy of the data used should be kept in mind. Especially the LGD figure, for which no internal data was available, ideally needs a better estimate. Finally, as indicated before, to improve the analysis of the case study in this report annual sales figures are needed to take to SME firm size adjustment into account.

Concluding, SME securitisation will most likely become less interesting because of Basel II. The regulatory capital relief motive has become a lot less interesting because regulatory capital charges are a lot lower. Although this is not the only reason for securitisation, it is an important consideration and will negatively influence SME securitisation. Furthermore things have become even less attractive because of the recent credit crunch. The cost of a securitisation transaction is largely dependent on the spreads on the notes issued. The widening credit spreads of last year result is a much higher cost of securitisation up to the point where it might become prohibitively expensive. However, when the economy stabilises in the future and spreads return to normal levels, SME securitisation might still be a profitable financing technique.

6.2 Recommendations

It is very hard, if not, impossible to make a single closing statement about the influence of Basel II on SME securitisation. In order to draw more exact conclusions, research on this subject has to be narrowed down into fully funded, partially funded and unfunded structures as well as true sale transaction.

The tranching and external versus internal placement of these tranches is another variable that might show different result. Tranche sizing and whether or not it is placed externally has a big influence on the amount of regulatory capital relief as well as the cost of the structure. This is another factor that should be taken into account. By analysing different tranching scenarios and performing sensitivity analyses, a more accurate and complete picture of the influence of Basel II on SME securitisation can be obtained.

Finally, the data used should be more accurate. As mentioned in the conclusion, especially the accuracy of the LGD data used in this study is questionable. If this data is not available for future research as well, the LGD should be estimated from a full business cycle of a representative portfolio in the country of the bank in the study. SME sales data should be estimated from a similar data set and should also be incorporated in the research.

7 Appendices

Appendix 1 Glossary[31]

Arranger/Structurer

The manager of an issue provides the usual capital market functions of arranging all aspects of ABS issuance. Perhaps the key part of the role is determining the appetite investors will have for a new issue and pricing the transaction so that both the issuer's and investor's requirements are satisfied. For arrangers, securitisation is a combination of fee based corporate finance work, and sales and trading activity carrying with it balance sheet risks. Profits from securitisation are closely linked to the number and volume of transactions executed and the position of the firm in the new issuance league tables, on which both issuers' and investors' perceptions of the expertise of the firm are based. The collective interest amongst these participants is to see volumes increase, the number of originators and investors added to, and the type of assets used in ABS broadened as much as possible. To this end, they aggressively market securitisation products.

Asset Pools/Portfolios

In order to increase cost efficiencies and diversify the credit risk (so that there is no undue concentration on a limited number of obligors), assets securitised are generally grouped into homogenous portfolios with well defined eligibility criteria that enable the risks and the expected cash flows to be clearly identified and quantified.

Investor

Most ABS instruments are held by wholesale institutions such as banks, insurance companies, pension and mutual funds. ABS offers diversification benefits for Investors, enabling them to choose tailored investment profiles according to return, risk and liquidity requirements. Rating agency statistics demonstrate that the ABS sector as a whole has superior rating and price stability as compared with corporate bonds. Furthermore, ABS assets enjoy deep and liquid markets ensuring maximum investor flexibility.

Issuer

ABS securities are usually issued by special purpose vehicles, usually incorporated in tax neutral jurisdictions.

Originator

The party who originally created the claims securitised. Occasionally, this may be a third party who buys the pool with the intention to securitize it thereafter, in which case, they are sometimes referred to as "sponsors".

Rating Agency

The assessment of an ABS issue by the credit rating agencies is crucial in the successful execution of a securitisation, since, as a general rule, only investment grade rated debt is purchased by the majority of funds, pension funds and retail investors. The overall cost of the financing or risk transference provided by the transaction will depend on the relative amounts of the securities issued which are highly rated and can therefore be sold to risk averse investors at small margins. The rating of the tranched securities is done by a small number of well-known and respected rating agencies who have gathered considerable expertise, data and modelling skills in assessing the expected losses of debt securities. They are paid large fees per issue depending on complexity (rather than on size). The independence and reputation of the agencies is a crucial aspect of the role.

When assessing the credit of a securitisation issue, the rating agency will look at all relevant factors, the main ones being:

- The quality of the pool assets in terms of repayment ability, maturity diversification, expected defaults and recovery rates;
- Cash flow timings and any mismatches, plus the impact of defaults;
- Any price risks arising from currency movements and any interest rate risks from the required payments on the issued securities;
- Legal risks in the structure, such as the effectiveness of transfer of title to the assets;
- Insulation from bankruptcy; and
- The ability of the asset manager to manage the portfolio;

The nature and levels of credit enhancement, which would be stress tested by modelling the impact of severe credit losses and interest rate movements. Rating agencies also play a key role in assessing periodic performance data on each ABS pool performance. When trends in the pool merit it, tranches of the ABS issue may be upgraded or downgraded.

Servicer

The party managing the portfolio of assets on the part of the investors, collecting payments due, restructuring and collecting problem/defaulted assets, and periodically reporting on the portfolio to investors. The servicer is almost invariably the originator, but there are standby mechanisms in securitisation transactions that enable the servicer to be substituted should its own weakening financial status potentially threaten investors' interests.

Trustees

An independent third party, generally a specialist trust company appointed by the arranger to act on behalf of the investors and protect their interests. The trustee is responsible for ensuring that the servicer discharges all of its responsibilities, holds all requisite security documents, etc.

Appendix 2 Credit risk under Basel I

This appendix discusses the treatment of credit risk under Basel I. Under the Basel I rules, the minimum capital requirement was determined by multiplying the amounts on balance sheet with a risk weight in order to come by the so called risk-weighted assets. The asset categories and associated risk weights are depicted below.

Risk Weight (%)	*Asset category*
0	Cash, gold, bullion, claims on OECD governments such as Treasury bonds or insured residential mortgages
20	Claims on OECD banks and OECD public sector entities such as securities issued by US government agencies or claims on municipalities
50	Uninsured residential mortgage loans
100	All other claims, such as corporate bonds and less-developed country debt, claims on non-OECD banks, real estate, premises, plant, and equipment

Table 3: Risk weights under Basel I[32]

Banks were required to hold at least 8% of these risk weighted assets as capital. For example, a security issued by an OECD government was considered as riskless since it has a risk weight of 0%. In contrast, a loan to a corporation carries a risk weight of 100% which means that for every dollar lent the bank must hold 8¢ as capital.

Appendix 3 The standardized approach under Basel II

Under the standardised approach exposures receive a risk weight depending on the type of counterparty and the credit rating of that counterparty. This is indeed a big step forward from Basel I where exposures were given the same weight, regardless of their credit quality. The weights range from 0% for claims on AAA to AA- rated countries to 150% for claims on entities rated lower than B-.[33] The table below gives an overview of the standardized approach for the calculation of credit risk capital under Basel II. For exposures to countries (sovereigns) and banks the OECD status of a country is no longer relevant, as opposed to Basel I. The risk weight for exposures to a country ranges from 0% to 150% and to banks and corporations it ranges from 20% to 150% (see Table 4).

	AAA to AA-	*A+ to A-*	*BBB+ to BBB-*	*BB+ to BB-*	*B+ to B-*	*Below B-*	*Unrated*
*Sovereign**	*0*	*20*	*50*	*100*	*100*	*150*	*100*
Banks (option 1)	*20*	*50*	*100*	*100*	*100*	*150*	*50*
Banks (option 2)	*20*	*50*	*50*	*100*	*100*	*150*	*50*
Corporations	*20*	*50*	*100*	*100*	*150*	*150*	*100*

* Includes exposures to central banks

Table 4: Risk Weights under Basel II's standardised approach

For claims on sovereigns the risk weights are as depicted in Table 4: Risk Weights under Basel II's standardised approach. An exception is that supervisors are allowed to apply lower risk weights (20% instead of 50%, 50% instead of 100%, etc.) when exposures are to a bank's country of incorporation or to that country's central bank.

For bank exposures, rules are a bit more complicated. National supervisors will apply one of two options which will apply to all banks in their jurisdiction. Under the first option, the weight applied is one category less favourable than that assigned to claims on the sovereign of that country with a cap of 100% on BB+ to B-. Under the second option claims are as depicted in Table 4: Risk Weights under Basel II's standardised approach. For claims with a maturity of three months or less a risk weight one category more favourable applies, with a floor of 20% and with the exemption of claims rated lower than B-. For claims on corporations, the weights are as depicted above, under the condition that the risk weight for unrated corporations is never higher than the sovereign of its incorporation.[33]

The standard rule for retail lending is that a risk weight of 75% is applied, as compared to 100% in the old Basel I accord. When claims are secured by a residential mortgage, the risk weight is 35%. The risk weight for claims secured by commercial real estate is 100%, because of poor historical loss performance.

Adjustments for collateral

There are two ways banks can adjust risk weights for collateral: the simple approach and the comprehensive approach. Banks may choose which approach to use in the banking book but must use the comprehensive approach for calculating capital for counterparty credit risk in the trading book. Under the

simple approach, the risk weight of the counterparty is simply replaced by the risk weight of the collateral for the part of the exposure that is covered by the collateral. For the remaining part of the exposure not covered by the collateral, the risk weight of the counterparty is used. The minimum risk weight for collateral is 20%, and the collateral must be pledged for the life of the exposure and revalued every six months. Under the comprehensive approach, banks adjust the value of their exposure upward to allow for potential increases and adjust the value of their collateral downward for potential decreases. The adjustment applied to the exposure and collateral can be calculated using rules specified in the Basel II accords or, with regulatory approval, by using a bank's internal models. The adjustment of the exposure is not likely to be necessary for loans, but is relevant for e.g. over-the-counter derivatives. When adjustments have been made, a new "virtual" exposure is calculated by taking the excess of the adjusted exposure of the adjusted collateral. The counterparty's risk weight is then applied to this newly calculated exposure.

Treatment of securitisation Exposures

Rules to the treatment of securitisation exposures under Basel II differ for the standardised and the internal ratings based (IRB) approach. Under the standardised approach, the charges on securitisation exposures and retained portions are again determined by using risk-weights. The risk-weighted asset amount of a securitisation exposure is computed by multiplying the amount of the position by the appropriate risk weight determined in accordance with the following table.

External Credit Assessment	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to BB-	B+ and below or unrated
Risk Weight	20%	50%	100%	350%	Deduction

Table 5: Risk weights for securitisation exposures under standardised approach

These are the basic risk-weights for securitisation exposures held by banks under the standardised approach. For originating banks retaining parts of the transaction on balance sheet slightly different rules apply; originating banks must deduct all retained securitisation exposures rated below investment grade (i.e. BBB-).

Deduction means that the amount concerned must be deducted from the regulatory capital the bank holds, in effect increasing the required regulatory capital by the notional amount. This is the same as a risk-weighted asset charge of 1250% on these positions, since 8% of 1250% is 100%. 50% of the deductable amount should be deducted from Tier 1 capital and 50% from Tier 2.

Appendix 4 Haircut methodology for determining LGD under the foundation approach of Basel II

For claims backed by collateral the effective loss given default (LGD*) can be expressed as

$$LGD^* = LGD \times \left(\frac{E^*}{E} \right)$$

Where LGD is that of the senior unsecured exposure before recognition of collateral (45%), E is the current value of the exposure and E* should be calculated based on the following formula:

$$E^* = \max \left\{ 0, \left[E \times (1 + He) - C \times (1 - Hc - Hfx) \right] \right\}$$

Where:

E* = the exposure value after risk mitigation

E = current value of the exposure

He = haircut appropriate to the exposure

C = the current value of the collateral

Hc = haircut appropriate to the collateral

Hfx = haircut appropriate for currency mismatch between the collateral and exposure (The standard supervisory haircut for currency risk where exposure and collateral are denominated in different currencies is 8%)

The He and Hc can be found in the following table:

Issue rating for debt securities	*Residual Maturity*	*Sovereigns*	*Other issuers*
AAA to AA-	≤ 1 year	0.5	1
	> 1 year, ≤5 years	2	4
	> 5 years	4	8
A+ to BBB and unrated securities	≤ 1 year	1	2
	>1 year, ≤ 5 years	3	6
	> 5 years	6	12
BB+ to BB-	All	15	
Main index equities and Gold		15	
Other equities listed on a recognised exchange		25	
UCITS/Mutual funds		Highest haircut applicable to any security in which the fund can invest	
Cash in the same currency		0	

Table 6: Standard supervisory haircuts

Under certain special circumstances the supervisors, i.e. the local central banks may choose not to apply the haircuts specified under the comprehensive approach, but instead to apply a zero haircut.

Appendix 5 Data used for calculation of LGD

Authors	*Country*	*Years*	*Recovery rate*	*Observations*
Asarnow and Edwards (1995)	USA	1970-1993	0.75	81
Asarnow and Edwards (1995)	USA	1970-1994	0.84	689
Carty and Lieberman (1996)	USA	1989-1995	0.79	229
Carty and Lieberman (1996)	USA	1989-1996	0.71	58
Grossman et al. (1997)	USA	1991-1997	0.82	60
Grossman et al. (1997)	UK	1991-1997	0.68	14
Carty (1998)	USA	1986-1997	0.87	200
Hamilton and Carty (1999)	USA	1982-1997	0.70	98
Hamilton and Carty (1999)	USA	1982-1998	0.85	195
van de Castle et al. (1999)	USA	1987-1997	0.85	258
Bartlett (2000)	UK	1996-2000	0.77	55
Gupton et al. (2000)	USA	1989-2000	0.70	181
van de Castle et al. (2000)	USA	1987-1996	0.84	264
O'Shea et al. (2001)	USA	1997-2000	0.73	35
Bos et al. (2002)	USA	1988-2001	0.84	528
Hamilton et al. (2004)	USA	2003	0.86	21
Keisman (2003)	USA	1988-2003	0.79	750
Franks et al. (2004)	UK	1984-2003	0.75	1418
Franks et al. (2004)	France	1984-2003	0.86	586
Franks et al. (2004)	Germany	1984-2003	0.71	276
Weighted average			0.81	

Table 7: Empirical studies concerning the recovery rate of loans [34,2]

2 Data for Latin America and Mexico have been left out of consideration since the SME market and credit quality in these regions is assumed to be significantly different from Europe.

Appendix 6 Accuracy of exponential PD formula

The formula for the approximate relation between the lower bound per bucket and the PD is given by

$$PD = 0.000441e^{0.402573x}$$

To demonstrate the accuracy of this formula, the original PD data has been compared with the PD data resulting from this formula in

Table 8. As can been seen from the table, the formula very closely matches the original PD percentages.

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Table 8: Comparison of original PD data and PD estimate by formula

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