CHAPTER 1

Introduction to Securitization and Asset-Backed Securities

Perhaps the best illustration of the flexibility, innovation, and user-friendliness of the debt capital markets is the rise in the use and importance of securitization. As defined in Sundaresan (1997, page 359), securitization is "a framework in which some illiquid assets of a corporation or a financial institution are transformed into a package of securities backed by these assets, through careful packaging, credit enhancements, liquidity enhancements, and structuring."

The flexibility of securitization is a key advantage for both issuers and investors. Financial engineering techniques employed by investment banks today enable bonds to be created from any type of cash flow. The most typical such flows are those generated by high-volume loans such as residential mortgages and car and credit card loans, which are recorded as assets on bank or financial house balance sheets. In a securitization, the loan assets are packaged together, and their interest payments are used to service the new bond issue.

In addition to the more traditional cash flows from mortgages and loan assets, investment banks underwrite bonds secured with flows received by leisure and recreational facilities, such as health clubs, and other entities, such as nursing homes. Bonds securitizing mortgages are usually treated as a separate class, termed *mortgage-backed securities,* or MBSs. Those with other underlying assets are known as *asset-backed securities,* or ABSs. The type of asset class backing a securitized bond issue determines the method used to analyze and value it.

The asset-backed market represents a large and diverse group of securities suited to a varied group of investors. Often these instruments are the only way for institutional investors to pick up yield while retaining assets with high credit ratings. They are considered by issuers because they represent a cost-effective means of removing assets from their balance sheets, thus freeing up lines of credit and enabling them to access lower-cost funding.

Instruments are available backed by a variety of assets covering the entire yield curve, with either fixed or floating coupons. In the United Kingdom, for example, it is common for mortgage-backed bonds to have floating coupons, mirroring the interest basis of the country's mortgages. To suit investor requirements, however, some of these structures have been modified, through swap arrangements, to pay fixed coupons.

The market in structured finance securities was hit hard in the wake of the 2007–2008 financial crisis. Investors shunned asset-backed securities in a mass flight to quality. As the global economy recovered from recession, interest in securitization resumed. We examine the fallout in the market later in this chapter. First we discuss the principal concepts that drive the desire to undertake securitization.

THE CONCEPT OF SECURITIZATION

Securitization is a well-established practice in the global debt capital markets. It refers to the sale of assets, which generate cash flows, from the institution that owns them, to another company that has been specifically set up for the purpose, and the issuing of notes by this second company. These notes are backed by the cash flows from the original assets. The technique was introduced first as a means of funding for mortgage banks in the United States, with the first such transaction generally recognized as having been undertaken by Salomon Brothers in 1979. Subsequently, the technique was applied to other assets such as credit card payments and leasing receivables, and has been employed worldwide. It has also been employed as part of asset-liability management, as a means of managing balance sheet risk.

Reasons for Undertaking Securitization

The driving force behind securitization has been the need for banks to realize value from the assets on their balance sheet. Typically these assets are residential mortgages, corporate loans, and retail loans such as credit card debt. The following are factors that might lead a financial institution to securitize a part of its balance sheet:

- If revenues received from assets remain roughly unchanged but the size of assets has decreased, this will lead to an increase in the return on equity ratio.
- The level of capital required to support the balance sheet will be reduced, which again can lead to cost savings or allow the institution to allocate the capital to other, perhaps more profitable, business.

- The financial institution can obtain cheaper funding: Frequently the interest payable on ABS securities is considerably below the level payable on the underlying loans. This creates a cash surplus for the originating entity.

In other words, a bank will securitize part of its balance sheet for one or all of the following reasons:

- Funding the assets it owns
- Balance sheet capital management
- Risk management and credit risk transfer.

We consider each of these in turn.

Funding Banks can use securitization to (1) support rapid asset growth, (2) diversify their funding mix and reduce cost of funding, and (3) reduce maturity mismatches. All banks will not wish to be reliant on only a single or a few sources of funding, as this can be risky in times of market liquidity difficulty. Banks aim to optimize their funding between a mix of retail, interbank, and wholesale sources. Securitization has a key role to play in this mix. It also enables a bank to reduce its funding costs. This is because the securitization process separates the credit rating of the originating institution from the credit rating of the issued notes. Typically most of the notes issued by special purpose vehicles (SPVs) will be more highly rated than the bonds issued directly by the originating bank itself. Although the liquidity of the secondary market in ABSs is frequently lower than that of the corporate bond market, and this adds to the yield payable by an ABS, it is frequently the case that the cost to the originating institution of issuing debt is still lower in the ABS market because of the latter's higher rating. Finally, there is the issue of maturity mismatches. The business of bank asset-liability management (ALM) is inherently one of maturity mismatch, because a bank often funds long-term assets, such as residential mortgages, with short-asset liabilities, such as bank account deposits or interbank funding. This funding "gap" can be mitigated via securitization, as the originating bank receives funding from the sale of the assets, and the economic maturity of the issued notes frequently matches that of the assets.

Balance Sheet Capital Management Banks use securitization to improve balance sheet capital management. This provides (1) regulatory capital relief, in some cases (depending on the form of the transaction), (2) "economic" capital relief, and (3) diversified sources of funding. As stipulated in the Bank

for International Settlements (BIS) capital rules,[1] also known as the Basel rules, banks must maintain a minimum capital level for their assets, in relation to the risk of these assets. Under Basel I, for every $100 of risk-weighted assets a bank must hold at least $8 of capital; however, the designation of each asset's risk-weighting is restrictive. For example, with the exception of mortgages, customer loans are 100 percent risk weighted regardless of the underlying rating of the borrower or the quality of the security held. The anomalies that this raises, which need not concern us here, were partly addressed by the Basel II rules, which became effective from 2007. However, the Basel rules that have been in place since 1988 (and effective from 1992) were a key driver of securitization. Because an SPV is not a bank, it is not subject to Basel rules, and needs only such capital as is economically required by the nature of the assets it contains. This is not a set amount, but is significantly below the 8 percent level required by banks in all cases. Although an originating bank does not obtain 100 percent regulatory capital relief when it sells assets off its balance sheet to an SPV where it will have retained a first-loss piece out of the issued notes, its regulatory capital charge may be significantly reduced after the securitization.[2]

To the extent that securitization provides regulatory capital relief, it can be thought of as an alternative to capital raising, compared with the traditional sources of Tier 1 (equity), preferred shares, and perpetual loan notes with step-up coupon features. By reducing the amount of capital that has to be used to support the asset pool, a bank can also improve its return-on-equity (ROE) value. This will be received favorably by shareholders.

Risk Management Once assets have been securitized, the credit risk exposure on these assets for the originating bank is reduced considerably and, if the bank does not retain a first-loss capital piece (the most junior of the issued notes), it is removed entirely. This is because assets have been sold to the SPV. Securitization can also be used to remove nonperforming assets from banks' balance sheets. This has the dual advantage of removing credit risk and removing a potentially negative sentiment from the balance sheet, as well as freeing up regulatory capital as before. Further, there is a potential upside from securitizing such assets: If any of them start performing again, or there is a recovery value obtained from defaulted assets, the originator will receive any surplus profit made by the SPV.

[1]For further information on this, see Choudhry (2007).

[2]The "first loss" piece refers to the most junior tranche on the liabilities sides of the securitization (the issued notes), and is the tranche that is exposed to the first of any default losses suffered by the underlying asset pool. In other words, it carries the most performance risk for the investor.

Potential Benefits of Securitization to Investors

In theory there are a number of benefits available to investors from investing in ABS notes, centered mainly on the alternative sectors that they allow investors to diversify into. The potential attractions include:

- Ability to diversify into sectors of exposure that might not be available in the regular bond markets (for example, residential mortgages or project finance loans).
- Access to different (and sometimes superior) risk-reward profiles.
- Access to sectors that are otherwise not open to them.

A key benefit of ABS notes is the ability to tailor risk-return profiles. For example, if there is a lack of assets of any specific credit rating, these can be created via securitization. Securitized notes sometimes produce a better risk-reward performance than corporate bonds of the same rating and maturity. Although this might seem peculiar (why should one AA-rated bond perform better in terms of credit performance than another just because it is asset backed?), this occurs because the originator holds the first-loss piece in the structure.

A holding in an ABS also diversifies investor risk exposure. For example, rather than invest $100 million in an AA-rated corporate bond and be exposed to event risk associated with the issuer, investors can gain exposure to, for instance, 100 pooled assets. These pooled assets will, in theory, have lower concentration risk, although the experience of 2007–2008 showed that this theoretical diversification of concentration did not always occur in practice.

THE PROCESS OF SECURITIZATION

We look now at the process of securitization, the nature of the SPV structure, and issues such as credit enhancements and the cash flow waterfall.

Securitization Process

The securitization process involves a number of participants. First there is the *originator*, the firm whose assets are being securitized. The most common process involves an *issuer* acquiring the assets from the originator. The issuer is usually a company that has been specially set up for the purpose of the securitization, which is the SPV and is usually domiciled offshore. The creation of an SPV ensures that the underlying asset pool is held separate from

the other assets of the originator. This is done so that in the event that the originator is declared bankrupt or insolvent, the assets that have been transferred to the SPV will not be affected. This is known as being "bankruptcy remote." Conversely, if the underlying assets begin to deteriorate in quality and are subject to a ratings downgrade, investors have no recourse to the originator.

By holding the assets within an SPV framework, defined in formal legal terms, the financial status and credit rating of the originator becomes almost irrelevant to the bondholders. The process of securitization often involves *credit enhancements*, in which a third-party guarantee of credit quality is obtained, so that notes issued under the securitization are often rated at investment grade and up to AAA-grade.

The process of structuring a securitization deal ensures that the liability side of the SPV—the issued notes—carries lower cost than the asset side of the SPV. This enables the originator to secure lower-cost funding that it would not otherwise be able to obtain in the unsecured market. This is a tremendous benefit for institutions with lower credit ratings

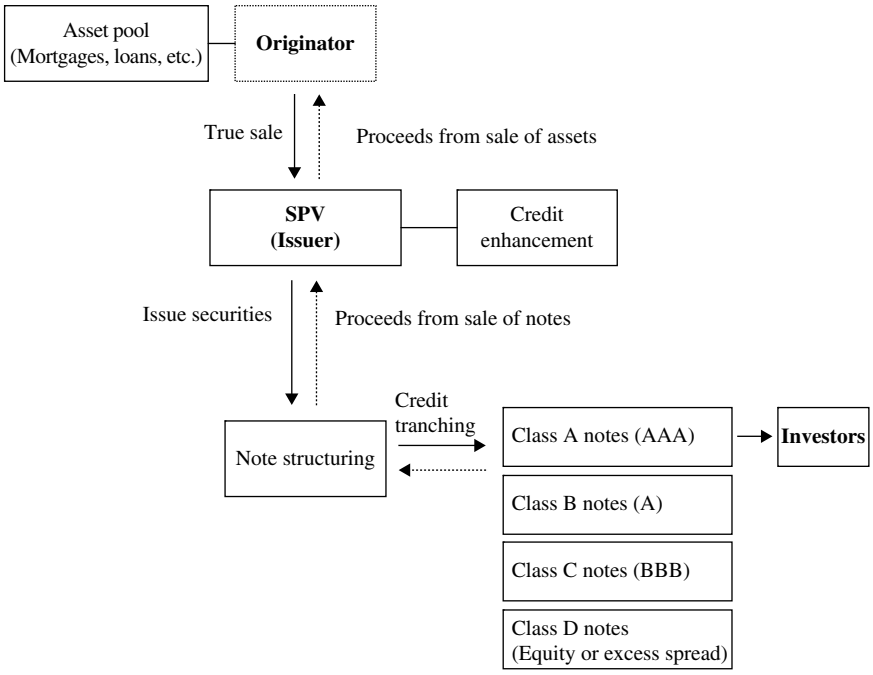
Exhibit 1.1 illustrates the process of securitization in simple fashion.

Mechanics of Securitization Securitization involves a true sale of the underlying assets from the balance sheet of the originator. This is why a separate legal entity, the SPV, is created to act as the issuer of the notes. The assets being securitized are sold onto the balance sheet of the SPV. The process involves:

- Undertaking due diligence on the quality and future prospects of the assets.
- Setting up the SPV and then effecting the transfer of assets to it.
- Underwriting of loans for credit quality and servicing.
- Determining the structure of the notes, including how many tranches are to be issued, in accordance to originator and investor requirements.
- The notes being rated by one or more credit rating agencies.
- The placing of notes in the capital markets.

The sale of assets to the SPV needs to be undertaken so that it is recognized as a true legal transfer. The originator will usually hire external legal counsel to advise it in such matters. The credit rating process will consider the character and quality of the assets, and also whether any enhancements have been made to the assets that will raise their credit quality. This can include *overcollateralization,* which is when the principal value of notes issued is lower than the principal value of assets, and a liquidity facility is provided by a bank.

EXHIBIT 1.1 The securitization process



A key consideration for the originator is the choice of the underwriting bank that structures the deal and places the notes. The originator will award the mandate for its deal to an investment bank on the basis of fee levels, marketing ability, and track record with assets being securitized.

Securitization Note Tranching As illustrated in Exhibit 1.1, in a securitization the issued notes are structured to reflect specified risk areas of the asset pool, and thus are rated differently. The senior tranche is usually rated AAA. The lower-rated notes usually have an element of *overcollateralization* and are thus capable of absorbing losses. The most junior note is the lowest rated or nonrated. It is often referred to as the *first-loss piece*, because it is impacted by losses in the underlying asset pool first. The first-loss piece is sometimes called the *equity piece* or equity note (even though it is a bond) and is usually held by the originator.

Financial Modeling The originator will construct a cash flow model to estimate the size of the issued notes. The model will consider historical sales values, any seasonal factors in sales, credit card cash flows, and so on. Certain assumptions will be made when constructing the model, for example growth projections, inflation levels, tax levels, and so on. The model will consider a number of different scenarios, and also calculate the minimum asset coverage levels required to service the issued debt. A key indicator in the model will be the debt service coverage ratio (DSCR). The more conservative the DSCR, the more comfort there will be for investors in the notes. For a residential mortgage deal, this ratio might be approximately 2.5 to 3.0; however, for an exotic asset class like an airline ticket receivables deal, the DSCR would be unlikely to be lower than 4.0. The model will therefore calculate the amount of notes that can be issued against the assets while maintaining the minimum DSCR.

Credit Rating It is common for securitization deals to be rated by one or more of the formal credit ratings agencies such as Moody's, Fitch, or Standard & Poor's. A formal credit rating will make it easier for the originator to place the notes with investors. The methodology employed by the ratings agencies takes into account both qualitative and quantitative factors, and will differ according to the asset class being securitized. The main issues in a typical ABS deal include:

- Corporate credit quality: These are risks associated with the originator, and are factors that affect its ability to continue operations, meet its financial obligations, and provide a stable foundation for generating future receivables. This might be analyzed according to (1) the issuer's historical financial performance, including its liquidity and debt structure; (2) its status within its domicile country, for example whether it is state-owned; (3) the general economic conditions for industry and for airlines; and (4) the historical record and current state of the airline—for instance its safety record and age of its airplanes.
- The competition and industry trends: the issuer's market share, the competition on its network.
- Regulatory issues, such as need for the issuer to comply with forthcoming legislation that would impact its cash flows.
- Legal structure of the SPV and transfer of assets.
- Cash flow analysis.

Based on the findings of the ratings agency, the arranger may redesign some aspect of the deal structure so that the issued notes are rated at the required level.

Above is a summary of the key issues involved in the process of securitization. Depending on investor sentiment, market conditions, and legal issues, the process from inception to closure of the deal may take anything from three to 12 months or more. After the notes have been issued, the arranging bank will no longer have anything to do with the issue; however, the bonds themselves require a number of agency services for their remaining life until they mature or are paid off. These agency services include paying agent, cash manager, and custodian.

SPV Structures

There are essentially two main securitization structures: amortizing (pass-through) and revolving. A third type, the master trust, is used by frequent issuers.

Amortizing Structures Amortizing structures pay principal and interest to investors on a coupon-by-coupon basis throughout the life of the security, as illustrated in Exhibit 1.1. They are priced and traded based on expected maturity and weighted-average life (WAL), which is the time-weighted period during which principal is outstanding. A WAL approach incorporates various prepayment assumptions, and any change in this prepayment speed will increase or decrease the rate at which principal is repaid to investors. Pass-through structures are commonly used in residential and commercial mortgage-backed deals (RMBS and CMBS) and consumer loan ABS.

Revolving Structures Revolving structures revolve the principal of the assets; that is, during the revolving period, principal collections are used to purchase new receivables that fulfill the necessary criteria. The structure is used for short-dated assets with a relatively high prepayment speed, such as credit card debt and auto loans. During the amortization period, principal payments are paid to investors in a series of equal installments (*controlled amortization*) or principal is "trapped" in a separate account until the expected maturity date and then paid in a single lump sum to investors (*soft bullet*).

Master Trust Frequent issuers under U.S. and UK law use *master trust* structures, which allow multiple securitizations to be issued from the same SPV. Under such schemes, the originator transfers assets to the master trust SPV. Notes are then issued out of the asset pool based on investor demand. Master trusts have been used by MBS and credit card ABS originators.

Credit Enhancement

Credit enhancement refers to the group of measures that can be instituted as part of the securitization process for ABS and MBS issues so that the credit

rating of the issued notes meets investor requirements. The lower the quality of the assets being securitized, the greater the need for credit enhancement. This is often by one of the following methods:

Overcollateralization: Where the nominal value of the assets in the pool is in excess of the nominal value of issued securities.

Pool insurance: An insurance policy provided by an insurance company to cover the risk of principal loss in the collateral pool. The claims-paying rating of the insurance company is important in determining the overall rating of the issue.

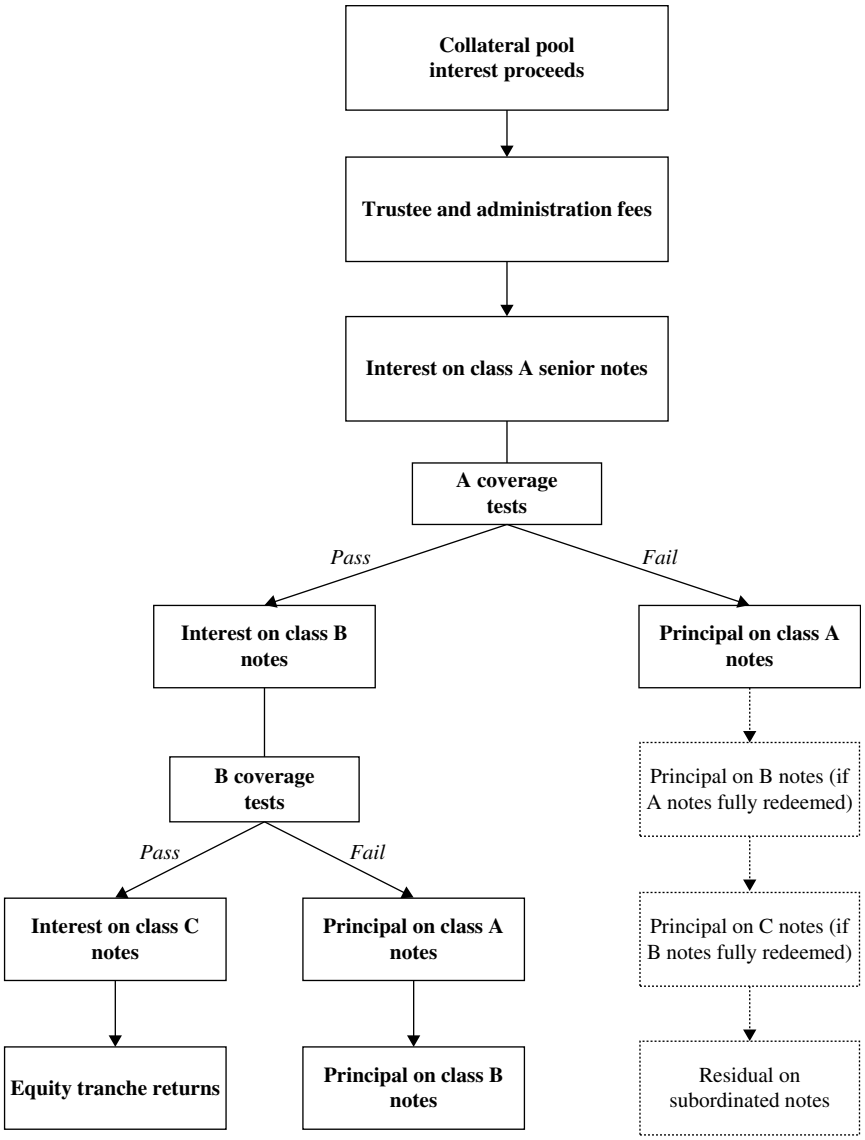
Senior/junior note classes: Credit enhancement is provided by subordinating a class of notes (class B notes) to the senior class notes (class A notes). The class B notes' right to their proportional share of cash flows is subordinated to the rights of the senior noteholders. Class B notes do not receive payments of principal until certain rating agency requirements have been met; specifically, satisfactory performance of the collateral pool over a predetermined period, or in many cases until all of the senior note classes have been redeemed in full.

Margin step-up: A number of ABS issues incorporate a step-up feature in the coupon structure, which typically coincides with a call date. Although the issuer is usually under no obligation to redeem the notes at this point, the step-up feature was introduced as an added incentive for investors and serves to imply from the outset that the economic cost of paying a higher coupon is unacceptable, and so the issuer will seek to refinance by exercising its call option.

Excess spread: This is the difference between the return on the underlying assets and the interest rate payable on the issued notes (liabilities). The monthly excess spread is used to cover expenses and any losses. If any surplus is left over, it is held in a reserve account to cover against future losses or (if not required for that) as a benefit to the originator. In the meantime, the reserve account is a credit enhancement for investors.

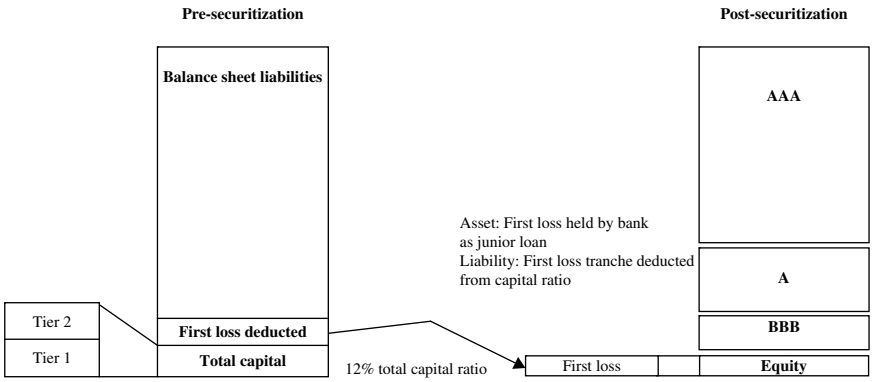
All securitization structures incorporate a *cash waterfall* process, whereby the cash that is generated by the asset pool is paid in order of payment priority. Only when senior obligations have been met can more junior obligations be paid. An independent third-party agent is usually employed to run tests on the vehicle to confirm that there is sufficient cash available to pay all obligations. If a test is failed, then the vehicle will start to pay off the notes, starting from the senior notes. The waterfall process is illustrated in Exhibit 1.2.

EXHIBIT 1.2 Cash flow waterfall (priority of payments)



EXAMPLE 1.1: IMPACT ON BALANCE SHEET

The exhibit in this example illustrates by a hypothetical example the effect on the liability side of an originating bank's balance sheet from a securitization transaction. Following the process, selected assets have been removed from the balance sheet, although the originating bank may have retained the first-loss piece. With regard to the regulatory capital impact, this first-loss amount is deducted from the bank's total capital position. For example, assume a bank has $100 million of risk-weighted assets and a target Basel ratio of 12 percent,[3] and securitizes all $100 million of these assets. It retains the first-loss tranche, which forms 1.5 percent of the total issue. The remaining 98.5 percent will be sold on to the market. The bank will still have to set aside 1.5 percent of capital as a buffer against future losses, but it has been able to free itself of the remaining 10.5 percent of capital.



Regulatory capital impact of securitization

SECURITIZING MORTGAGES

A mortgage is a long-term loan taken out to purchase residential or commercial property, which itself serves as security for the loan. The term of the loan is usually 20 to 25 years, but a shorter period is possible if the borrower, or *mortgagor,* wishes one. In exchange for the right to use the property during the term of the mortgage, the borrower provides the lender, or *mortgagee,* with a *lien,* or claim, against the property and agrees to make regular

[3]The minimum is 8 percent, but many banks set aside an amount well in excess of this minimum required level.

payments of both principal and interest. If the borrower defaults on the interest payments, the lender has the right to take over and sell the property, recovering the loan from the proceeds of the sale. The lien is removed when the debt is paid off.

A lending institution may have many hundreds of thousands of individual residential and commercial mortgages on its books. When these are pooled together and used as collateral for a bond issue, the result is an MBS. In the U.S. market, certain mortgage-backed securities were backed, either implicitly or explicitly, by the government. A government agency, the Government National Mortgage Association (GNMA, known as Ginnie Mae), and two government-sponsored agencies, the Federal Home Loan Mortgage Corporation and the Federal National Mortgage Association (Freddie Mac and Fannie Mae, respectively), purchased mortgages to pool and hold in their portfolios and, possibly, securitize. The MBSs created by these agencies traded essentially as risk-free instruments and were not rated by the credit agencies. Following the 2007–2008 financial crash, Fannie Mae and Freddie Mac were taken under explicit government control.

Mortgage-backed bonds not issued by government agencies are rated in the same way as other corporates. Some nongovernment agencies obtain mortgage insurance for their issues to boost their credit quality. The credit rating of the insurer then becomes an important factor in the bond's credit rating.

Growth of the Market

We list the following features of mortgage-backed bonds:

- Their yields were traditionally higher than those of corporate bonds with the same credit rating. In the mid-1990s, mortgage-backed bonds traded around 100 to 200 basis points above Treasury bonds; by comparison, corporates traded at a spread of around 80 to 150 for bonds of similar credit quality. This yield gap stems from the mortgage bonds' complexity and the uncertainty of mortgage cash flows. At the height of the structured finance market in 2007, MBS securities rated AAA paid a comfortable 20 to 30 bps over government security. That this was underpriced is reflected in spreads post-2008, which remain higher by some margin over equivalent rated conventional securities.
- They offer investors a wider range of maturities, cash flows, and security collateral to choose from.
- The market is large and until the 2007 crash was very liquid; agency mortgage-backed bonds had the same liquidity as Treasury bonds. Post-2008 the liquidity reduced considerably.

- Unlike most other bonds, mortgage-backed securities pay monthly coupons, an advantage for investors who require frequent income payments.

EXAMPLE 1.2: SECURITIZATION TRANSACTION

We illustrate the impact of securitizing the balance sheet under original Basel I regulatory rules using a hypothetical example from ABC Bank PLC.

The bank has a mortgage book of £100 million, and the regulatory weight for this asset is 50 percent. The capital requirement is therefore £4 million (that is, 8 percent × 0.5 percent × £100 million). The capital is composed of equity, estimated to cost 25 percent, and subordinated debt, which has a cost of 10.2 percent. The cost of straight debt is 10 percent. The ALM desk reviews a securitization of 10 percent of the asset book, or £10 million. The loan book has a fixed duration of 20 years, but its effective duration is estimated at seven years, due to refinancings and early repayment. The net return from the loan book is 10.2 percent.

The ALM desk decides on a securitized structure that is made up of two classes of security, subordinated notes and senior notes. The subordinated notes will be granted a single-A rating due to their higher risk, whereas the senior notes are rated triple-A. Given such ratings the required rate of return for the subordinated notes is 10.61 percent, and that of the senior notes is 9.80 percent. The senior notes have a lower cost than the current balance sheet debt, which has a cost of 10 percent. To obtain a single-A rating, the subordinated notes need to represent at least 10 percent of the securitized amount. The costs associated with the transaction are the initial cost of issue and the yearly servicing cost, estimated at 0.20 percent of the securitized amount (see the accompanying summary information).

ABC Bank PLC mortgage loan book and securitization proposal

Current funding	
Cost of equity	25%
Cost of subordinated debt	10.20%
Cost of debt	10%
Mortgage book	
Net yield	10.20%
Duration	7 years
Balance outstanding	£100 million
Proposed structure	
Securitized amount	£10 million

Senior securities:	
Cost	9.80%
Weighting	90%
Maturity	10 years
Subordinated notes:	
Cost	10.61%
Weighting	10%
Maturity	10 years
Servicing costs	0.20%

A bank's cost of funding is the average cost of all the funds it employed. The funding structure in our example is capital 4 percent, divided into 2 percent equity at 25 percent, 2 percent subordinated debt at 10.20 percent, and 96 percent debt at 10 percent. The weighted funding cost F therefore is:

$$\begin{aligned} F_{\text{balance sheet}} &= (96\% \times 10\%) + [(8\% \times 50\%) \times (25\% \times 50\%) + (10.20\% \times 50\%)] \\ &= 10.30\% \end{aligned}$$

This average rate is consistent with the 25 percent before-tax return on equity given at the start. If the assets do not generate this return, the received return will change accordingly, because it is the end result of the bank's profitability. As currently the assets generate only 10.20 percent, they are performing below shareholder expectations. The return actually obtained by shareholders is such that the average cost of funds is identical to the 10.20 percent return on assets. We may calculate this return to be:

$$\begin{aligned} \text{Asset return} = 10.20\% = (96\% \times 10\%) + (8\% \times 50\%) \\ \times (\text{ROE} \times 50\% + 10.20\% \times 50\%) \end{aligned}$$

Solving this relationship we obtain a return on equity of 19.80 percent, which is lower than shareholder expectations. In theory, the bank would find it impossible to raise new equity in the market because its performance would not compensate shareholders for the risk they are incurring by holding the bank's paper. Therefore, any asset that is originated by the bank would have to be securitized, which would also be expected to raise the shareholder return.

The ALM desk proceeds with the securitization, issuing £9 million of the senior securities and £1 million of the subordinated notes. The bonds are placed by an investment bank with institutional investors. The outstanding balance of the loan book decreases from £100 million to £90 million. The weighted assets are therefore £45 million. Therefore, the capital requirement for the loan book is now £3.6 million, a reduction from the original capital requirement by £400,000, which can be used for expansion in another area, a possible route for which is given here.

Impact of securitization on balance sheet

Outstanding balances	Value (£m)	Capital required (£m)
Initial loan book	100	4
Securitized amount	10	0.4
Senior securities	9	Sold
Subordinated notes	1	Sold
New loan book	90	3.6
Total assets	90	
Total weighted assets	45	3.6

The benefit of the securitization is the reduction in the cost of funding. The funding cost as a result of securitization is the weighted cost of the senior notes and the subordinated notes, together with the annual servicing cost. The cost of the senior securities is 9.80 percent, whereas the subordinated notes have a cost of 10.61 percent (for simplicity here we ignore any differences in the duration and amortization profiles of the two bonds). This is calculated as:

$$(90\% \times 9.80\%) + (10\% \times 10.61\%) + 0.20\% = 10.08\%$$

This overall cost is lower than the target funding cost obtained from the balance sheet, which was 10.30 percent. This is the quantified benefit of the securitization process. Note that the funding cost obtained through securitization is lower than the yield on the loan book. Therefore, the original loan can be sold to the structure issuing the securities for a gain.

ABS STRUCTURES: A PRIMER ON PERFORMANCE METRICS AND TEST MEASURES

This section is an introduction to the performance measures on the underlying collateral of the ABS and MBS product. These would be of most interest to potential investors in ABS notes, but would also be noted by (amongst others) ratings agencies.

Collateral Types

ABS performance is largely dependent on consumer credit performance, so typical ABS structures include trigger mechanisms (to accelerate

amortization) and reserve accounts (to cover interest shortfalls) to safeguard against poor portfolio performance. Though there is no basic difference in terms of the essential structure between CDO and ABS/MBS, some differences arise by the very nature of the collateral and the motives of the issuer. Interestingly, whereas a CDO portfolio may have 100–200 loans, ABS portfolios will often have thousands of obligors, in theory providing the necessary diversity in the pool of consumers.

We discuss briefly some prominent asset classes.

Auto Loans Auto loan pools were some of the earliest to be securitized in the ABS market and still remain a major segment of the U.S. market. Investors traditionally have been attracted to the high asset quality involved and the fact that the vehicle offers an easily sellable, tangible asset in the case of obligor default. In addition, because a car is seen as an essential purchase and a short loan exposure (three to five years) provides a disincentive to refinance, no real prepayment culture exists. Prepayment speed is extremely stable and losses are relatively low, particularly in the prime sector.

Performance analysis:

- **Loss Curves** show expected cumulative loss through the life of a pool and so, when compared to actual losses, give a good measure of performance. In addition, the resulting loss forecasts can be useful to investors buying subordinate classes. Generally, prime obligors will have losses more evenly distributed, while nonprime and subprime lenders will have losses recognized earlier and so show a steeper curve. In both instances, losses typically decline in the latter years of the loan.
- The **Absolute Prepayment Speed** (also abbreviated as APS)[4] is a standard measure for prepayments, comparing actual period prepayments as a proportion to the whole pool balance. As with all prepayment metrics, this measure provides an indication of the expected maturity of the issued ABS and, essentially, the value of the call option on the issued ABS at any time.

Credit Cards For specialized credit card banks, particularly in the United States, the ABS market has become the primary vehicle to fund increases in the volume of unsecured credit loans to consumers. Credit card pools are different from other types of ABSs in that loans have no predetermined term. A single obligor's credit card debt is often no more than six months, so the structure has to differ from other ABSs in that repayment speed needs to be controlled either through scheduled amortization or the inclusion of a

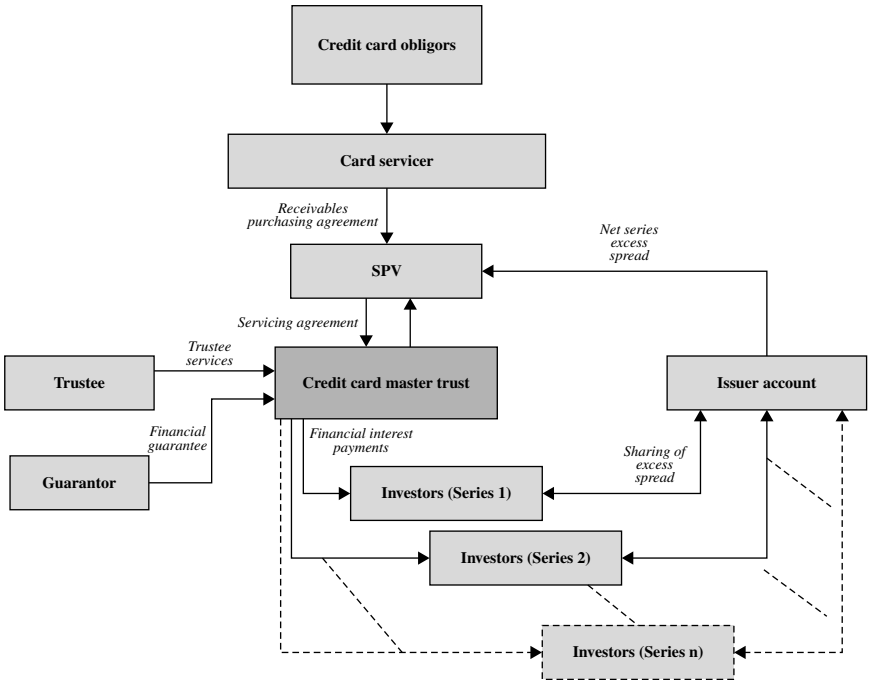
[4]First developed by Credit Suisse First Boston.

revolving period (where principal collections are used to purchase additional receivables).

Since 1991, the stand-alone trust has been replaced with a master trust as the preferred structuring vehicle for credit card ABS. The master trust structure allows an issuer to sell multiple issues from a single trust and from a single, albeit changing, pool of receivables. Each series can draw on the cash flows from the entire pool of securitized assets with income allocated to each pro rata based on the invested amount in the master trust.

Consider the example structure represented by Exhibit 1.3. An important feature is excess spread, reflecting the high yield on credit card debt. In addition, a financial guarantee is included as a form of credit enhancement, given the low rate of recoveries and the absence of security on the collateral. Excess spread released from the trust can be shared with other series suffering interest shortfalls.

EXHIBIT 1.3 Master trust structure



Performance analysis:

- The **Delinquency Ratio** is measured as the value of credit card receivables overdue for more than 90 days as a percentage of total credit card receivables. The ratio provides an early indication of the quality of the credit card portfolio.
- The **Default Ratio** refers to the total amount of credit card receivables written off during a period as a percentage of the total credit card receivables at the end of that period. Together, these two ratios provide an assessment of the credit loss on the pool and are normally tied to triggers for early amortization and so require reporting through the life of the transaction.
- The **Monthly Payment Rate (MPR)**[5] reflects the proportion of the principal and interest on the pool that is repaid in a particular period. The ratings agencies require every non-amortizing ABS to establish a minimum as an early-amortization trigger.

Mortgages The MBS sector is notable for the diversity of mortgage pools that are offered to investors. Portfolios can offer varying duration as well as both fixed and floating debt. The most common structure for agency MBS is pass-through, where investors are simply purchasing a share in the cash flow of the underlying loans. Conversely, nonagency MBS (including CMBS), have a senior and a tranched subordinated class with principal losses absorbed in reverse order.

The other notable difference between RMBS and CMBS is that the CMBS is a nonrecourse loan to the issuer as it is fully secured by the underlying property asset. Consequently, the debt service coverage ratio (DSCR) becomes crucial to evaluating credit risk.

Performance analysis:

- **Debt Service Coverage Ratio (DSCR)** is given by net operating income/debt payments, and so indicates a borrower's ability to repay a loan. A DSCR of less than 1.0 means that there is insufficient cash flow generated by the property to cover required debt payments.
- The **Weighted Average Coupon (WAC)** is the weighted coupon of the pool, which is obtained by multiplying the mortgage rate on each loan by its balance. The WAC will therefore change as loans are repaid, but at any point in time, when compared to the net coupon payable to investors, it gives us an indication of the pool's ability to pay.

[5]This is not a prepayment measure because credit cards are non-amortizing assets.

- The **Weighted Average Maturity** (**WAM**) is the average weighted (weighted by loan balance) of the remaining terms to maturity (expressed in months) of the underlying pool of mortgage loans in the MBS. Longer securities are by nature more volatile, so a WAM calculated on the stated maturity date avoids the subjective call of whether the MBS will mature and recognizes the potential liquidity risk for each security in the portfolio. Conversely, a WAM calculated using the reset date will show the shortening effect of prepayments on the term of the loan.

The **Weighted Average Life** (**WAL**) of the notes at any point in time is

$$s = \sum t \cdot \mathrm{PF}(s)$$

where

$$\mathrm{PF}(s) = \text{Pool factor at } s$$
$$t = \text{Actual}/365$$

We illustrate this measure using the example shown in Exhibit 1.4.

It is the time-weighted maturity of the cash flows that allows potential investors to compare the MBS with other investments with similar maturity. These tests apply uniquely to MBS because principal is returned through the life of the investment on such transactions.

Forecasting prepayments is crucial to computing the cash flows of MBS. Though the underlying payment remains unchanged, prepayments, for a given price, reduce the yield on the MBS. There are a number of methods used to estimate prepayment; two commonly used ones are the constant prepayment rate (CPR) and the PSA method.

The CPR approach is:

$$\mathrm{CPR} = 1 - (1 - \mathrm{SMM})^{12}$$

where **Single Monthly Mortality** (**SMM**) is the single-month proportional prepayment.

An SMM of 0.65 percent means that approximately 0.65 percent of the remaining mortgage balance at the beginning of the month, less the scheduled principal payment, will prepay that month.

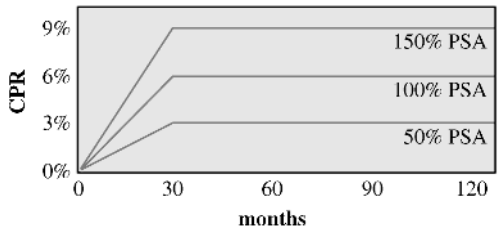
The CPR is based on the characteristics of the pool and the current expected economic environment, as it measures prepayment during a given month in relation to the outstanding pool balance.

The **Public Securities Association** (**PSA**) has a metric for projecting prepayment that incorporates the rise in prepayments as a pool seasons. A pool of mortgages is said to have 100 percent PSA if its CPR starts at 0 and increases by 0.2 percent each month until it reaches 6 percent in month 30. It is a constant 6 percent after that. Other prepayment scenarios can be

EXHIBIT 1.4 Sample weighted average life (WAL) calculation

IPD	Dates	Actual Days (a)	PF(t)	Principal Paid	O/S	a/365	PF(t)*(a/365)
0	21/11/2003	66	1.00		89,529,500.00	0.18082192	0.18082192
1	26/01/2004	91	0.94	5,058,824.00	84,470,588.00	0.24931507	0.23522739
2	26/04/2004	91	0.89	4,941,176.00	79,529,412.00	0.24931507	0.22146757
3	26/07/2004	91	0.83	4,823,529.00	74,705,882.00	0.24931507	0.20803536
4	25/10/2004	91	0.78	4,705,882.00	70,000,000.00	0.24931507	0.19493077
5	24/01/2005	91	0.73	4,588,235.00	65,411,765.00	0.24931507	0.18215380
6	25/04/2005	91	0.68	4,470,588.00	60,941,176.00	0.24931507	0.16970444
7	25/07/2005	91	0.63	4,352,941.00	56,588,235.00	0.24931507	0.15758269
8	24/10/2005	92	0.58	4,235,294.00	52,352,941.00	0.25205479	0.14739063
9	24/01/2006	90	0.54	4,117,647.00	48,235,294.00	0.24657534	0.13284598
10	24/04/2006	91	0.49	4,000,000.00	44,235,294.00	0.24931507	0.12318314
11	24/07/2006	92	0.45	3,882,353.00	40,352,941.00	0.25205479	0.11360671
12	24/10/2006	92	0.41	3,764,706.00	36,588,235.00	0.25205479	0.10300784
13	24/01/2007	90	0.37	3,647,059.00	32,941,176.00	0.24657534	0.09072408
14	24/04/2007	91	0.33	3,529,412.00	29,411,765.00	0.24931507	0.08190369
15	24/07/2007	92	0.29	3,411,765.00	26,000,000.00	0.25205479	0.07319849
16	24/10/2007	92	0.25	3,294,118.00	22,705,882.00	0.25205479	0.06392448
17	24/01/2008	91	0.22	3,176,471.00	19,529,412.00	0.24931507	0.05438405
18	24/04/2008	91	0.18	3,058,824.00	16,470,588.00	0.24931507	0.04586606
19	24/07/2008		-	16,470,588.00	-	-	-
						WAL	2.57995911

specified as multiples of 100 percent PSA. This calculation helps derive an implied prepayment speed assuming mortgages prepay slower during their first 30 months of seasoning.



$$\text{PSA} = [\text{CPR}/(.2)(m)] * 100$$

where

m = number of months since origination

Summary of Performance Metrics

Exhibit 1.5 lists the various performance measures we have introduced in this chapter, and the asset classes to which they apply.

SECURITIZATION: FEATURES OF THE 2007–2008 FINANCIAL CRISIS[6]

Following rapid growth in volumes during 2002–2006, during 2007 the securitization market came to a virtual standstill as a direct impact of the subprime mortgage default and the crash in asset-backed commercial paper trading. Investors lost confidence in a wide range of parameters. The liquidity crunch in money markets led to the credit crunch in the economy and worldwide recession. Globalization and integrated banking combined with the widespread investment in structured credit products to transmit the effects of U.S. mortgage defaults worldwide. A result of the now globalized nature of the financial market was that the securitization market, in the form of asset-backed securities such as collateralized debt obligations (CDOs), was a major contributor in transmitting and magnifying the impact of poor-quality loan origination in the U.S. mortgage market.

In light of the decline in securitization volumes since 2007, we consider the factors that contributed to the fall in confidence in the market.

[6]This section was coauthored with Gino Landuyt, YieldCurve.com.

EXHIBIT 1.5 Summary of ABS analysis and performance metrics

Performance Measure	Calculation	Typical Asset Class
Public Securities Association (PSA)	PSA = [CPR/(.2) (months)]∗100	Mortgages, home equity, student loans
Constant prepayment rate (CPR)	$1 - (1 - \text{SMM})^{12}$	Mortgages, home equity, student loans
Single monthly mortality (SMM)	Prepayment / Outstanding pool balance	Mortgages, home equity, student loans
Weighted average life (WAL)	$\sum(\text{a}/365) \cdot \text{PF}(s)$ where PF(s) =	Mortgages
Weighted average maturity (WAM)	Weighted maturity of the pool	Mortgages
Weighted average coupon (WAC)	Weighted coupon of the pool	Mortgages
Debt service coverage ratio (DSCR)	Net operating income / Debt payments	Commercial mortgages
Monthly payment rate (MPR)	Collections / Outstanding pool balance	All non-amortizing asset classes
Default ratio	Defaults / Outstanding pool balance	Credit card
Delinquency ratio	Delinquents / Outstanding pool balance	Credit card
Absolute prepayment speed (APS)	Prepayments / Outstanding pool balance	Auto loans, truck loans
Loss curves	Show expected cumulative loss	Auto loans, truck loans

Impact of the Credit Crunch The flexibility and wide application of the securitization technique, though advantageous to banks that employed it, also contributed to its misuse in the markets. By giving banks the ability to move assets off the balance sheet, ABS became a vehicle by which low-quality assets such as subprime mortgages could be sold on to investors who had little appreciation of the credit risk they were taking on.

1. The shadow banking system
   In a classic banking regime there is no detachment between the borrower and the lender. The bank does its own credit analysis, offers the loan to its client, and monitors the client over the life of the loan. In securitization, however, the link between the borrower and the bank is disconnected. The loan is packaged into different pieces and moved onto an unknown client base. As a consequence, there is less incentive for the arranger to be risk conscious.

   This becomes a potential negative issue when banks set up a parallel circuit, now termed the "shadow banking" system, where they are not bound by a regulatory regime that normal banks must adhere to. For instance, in a vanilla banking regime banks must keep a certain percentage of deposits against their loans, but this does not apply if they fund themselves via the commercial paper market, which is uninsured by a central bank's discount window.

   As a consequence, the shadow banks' major risk is when their commercial paper investors do not want to roll their investment anymore and leave the shadow bank with a funding problem. As a result, they might need to tap into the outstanding credit lines of regulated banks or sell their assets at fire sale prices. This is what happened in the asset-backed commercial paper (ABCP) crash in August 2007.
2. The amount of leverage
   The shadow banking system in the form of special investment vehicles (SIVs) was highly leveraged. Typically the leverage ratio was around 1:15, but in some cases, as the search for yield in a bull market of tightening credit spreads intensified, the leverage ratios for some SIVs reached 1:40 and even 1:50. To put this into perspective, the hedge fund Long Term Capital Management (LTCM) was running a leverage of 1:30 at the time of its demise and created significant disruption of the markets in 1998 all by itself. In effect, what happened in 2007–2008 was hundreds of LTCMs all failing, all of which used a higher leverage ratio and were all setting up the same trade.

   The leverage factor in some of the products reached very high levels. After CDOs, more leverage was sought with CDO^2, which were CDO structures investing in other CDOs. At the end of 2006, ABN AMRO

Bank introduced the ultimate leverage product by issuing the constant proportion debt obligation (CPDO). This product was based on the constant proportion participation investment (CPPI) technique, but did the exact opposite. In a CPPI, a leveraged position is dynamically managed, and if the net asset value (NAV) decreases the structure will deleverage. In the CPDO, one does the opposite and increases the leverage if the NAV decreases.

3. Lack of transparency
   Some of these products became extremely complex and started to look like a black box that was difficult to analyze by outside parties who sought to make an assessment on the value of the investment. For instance, the mark-to-market value was not only related to credit spread widening of the tranche, but also changes in correlation risk within the credit portfolio, which had different impacts on different tranches in the structure. As a matter of fact, default correlation is a statistic that cannot be observed in the market, so any pricing model that uses it as an input parameter is, to a certain extent, subjective.
4. Credit rating agencies (CRA)
   The CRAs publicized their rating methodologies, which had the cachet of statistical logic but were not understood by all investors; moreover, they were in hindsight overly optimistic in issuing ratings to certain deals in which the models used assumed that the likelihood of a significant correction in the housing market on an (inter)national scale was virtually zero. The favorable overall economic conditions and the continuous rise in home prices over the past decade provided near-term cover for the deterioration in lending standards and the potential ramifications of any significant decline in asset prices.[7]
5. Accounting and liquidity
   The liquidity of most of these assets was overestimated. As a consequence, investors believed that AAA-rated securitized paper would have the same liquidity as plain vanilla AAA-rated paper and could therefore be easily funded by highly liquid commercial paper. A huge carry trade of long-dated assets funded by short-term liabilities was built up, and once the first losses in the subprime market started to make an impact, SPVs had to start unwinding the paper. Fund managers realized that there was a liquidity premium linked to their assets that they had not taken into account.

   The mark-to-market accounting rules accelerated the problem by creating a downward spiral of asset values as the secondary market dried

[7]SIFMA, *Survey on Restoring Confidence in the Securitization Market*, December 2008.

up. Banks had to mark ABS assets at the market price, unconnected with the default performance of the underlying portfolios; however, in a flight-to-quality environment all structured credit products became impossible to trade in the secondary market and values were marked down almost daily, in some cases down to virtually zero. The accounting rules force banks to take artificial hits to their capital without taking into account the actual performance of the pool of loans.

As a result of the interaction of all the preceding factors, following the U.S. mortgage market fallout and general investor negative sentiment, the new-issue securitization market came to a virtual standstill. As a technique, though, it offers considerable value to banks and investors alike, and its intelligent use can assist in general economic development.

In-House Securitization Transactions

Following the July–August 2007 implosion of the asset-backed commercial paper market, investor interest in ABS product dried up virtually completely. The growing illiquidity in the interbank market, which resulted in even large AA-rated banks finding it difficult to raise funds for tenures longer than one month, became acute following the collapse of Lehman Brothers in September 2008. To assist banks in raising funds, central banks starting with the U.S. Federal Reserve and European Central Bank (ECB), and subsequently the Bank of England (BoE), relaxed the criteria under which they accepted collateral from banks to whom they were advancing liquidity. In summary, the central banks announced that asset-backed securities, including mortgage-backed securities and other ABS, would now be eligible as collateral at the daily liquidity window.

As originally conceived, the purpose of these moves was to enable banks to raise funds from their respective central bank, using existing ABS on their balance sheet as collateral. Very quickly, however, the banks began to originate new securitization transactions, using illiquid assets held on their own balance sheet (such as residential mortgages or corporate loans) as collateral in the deal. The issued notes would be purchased by the bank itself, making the deal completely in-house. These new purchased ABS tranches would then be used as collateral at the central bank repo window.

This activity continued well beyond the period immediately after the 2008 crash and it is still common. In an effort to create assets that are eligible for use as collateral at central bank funding facilities, banks may elect to undertake an in-house securitization.

Structuring Considerations Essentially, a central bank deal is like any other deal, except that there is no buyer for the notes. Of course the issued notes

must be structured such that they are eligible as collateral at the central bank where they are intended to be placed as collateral. There are also haircut considerations and the opportunity to structure it without consideration for investors. To be eligible for repo at the ECB, for example, deals have to fulfill certain criteria. These include:

Minimum requirements

- Public rating of triple-A or higher at first issue.
- Only the senior tranche can be repoed.
- No exposure to synthetic securities. The ECB rules state that the cash flow in generating assets backing the asset-backed securities must not consist in whole or in part, actually or potentially, of credit-linked notes or similar claims resulting from the transfer of credit risk by means of credit derivatives. Therefore, the transaction should expressly exclude any types of synthetic assets or securities.
- Public presale or new issue report issued by the agency rating the facility, either listed in Europe (e.g., the Irish Stock Exchange) or with book entry capability in Europe (e.g., Euroclear, Clearstream).

Haircut considerations

- Collateralized loan obligation (CLO) securities denominated in euro will (taking effect from March 2009) incur a haircut of 12 percent regardless of maturity or coupon structure.
- For the purposes of valuation, in the absence of a trading price within the past five days, or if the price is unchanged over that period, a 5 percent valuation markdown is applied. This equates to an additional haircut of 4.4 percent.
- CLO securities denominated in USD will incur the usual haircuts but with an additional initial margin of between 10 percent and 20 percent to account for foreign exchange (FX) risk.

Other considerations

- Can incorporate a revolving period (external investors normally would not prefer this).
- Can be a simple two-tranche setup. The junior tranche can be unrated and subordinated to topping off the cash reserve.
- Off-market swap.
- One rating agency (the BoE requires two).
- There can be no in-house currency swap (this must be with an external counterparty).

The originator also must decide whether the transaction is to be structured to accommodate replenishment of the portfolio or whether the portfolio

should be static. ECB transactions are clearly financing transactions for the bank and as such the bank will wish to retain flexibility to sell or refinance some or all of the portfolio at any time should more favorable financing terms become available to it. For this reason there is often no restriction on the ability to sell assets out of the portfolio, provided that the price received by the issuer is not less than the price paid by it for the asset (par), subject to adjustment for accrued interest. This feature maintains maximum refinancing flexibility and has been agreed to by the rating agencies in previous transactions.

Whether or not replenishment is incorporated into the transaction depends on a number of factors. If it is considered likely that assets will be transferred out of the portfolio (in order to be sold or refinanced), then replenishment enables the efficiency of the CDO structure to be maintained by adding new assets rather than running the existing transaction down and having to establish a new structure to finance additional or future assets. However, if replenishment is incorporated into the transaction, the rating agencies will have to carry out diligence on the bank to satisfy themselves on the capabilities of the bank to manage the portfolio. Also, the recovery rates assigned to a static portfolio will be higher than those assigned to a manager portfolio. The decision on whether to have a managed or static transaction will have an impact on the documentation for the transaction and the scope of the bank's obligations and representations.

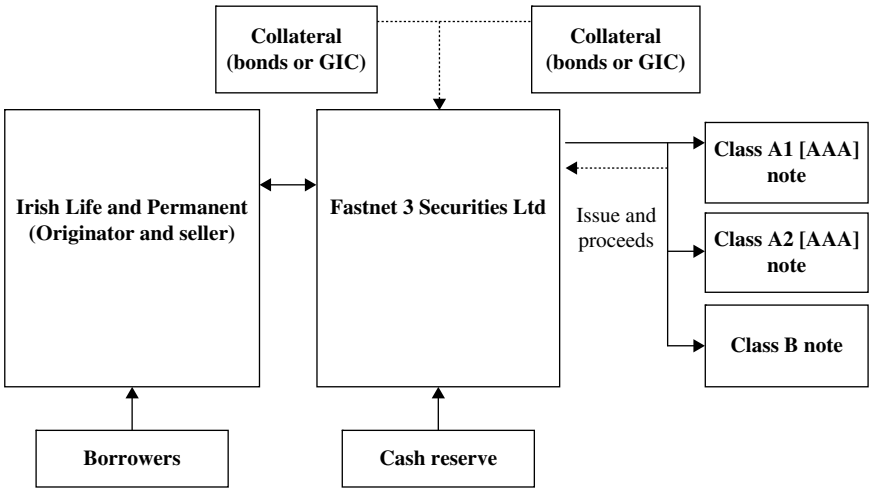
Example of In-House Deal During 2007–2009 over 100 banks in the European Union undertook in-house securitizations in order to access the ECB discount window, as funding sources in the interbank market dried up.[8] A United Kingdom banking institution, the Nationwide Building Society, acquired an Irish banking entity during 2008 it was rumored solely in

[8]The entire business model of a large number of banks as well as shadow banks such as structured investment vehicles (SIVs) had depended on available liquidity from the interbank market, which was rolled over on a short-term basis such as weekly or monthly and used to fund long-dated assets such as RMBS securities that had much longer maturities and that themselves could not be realized in a liquid secondary market once the 2007 credit crunch took hold. This business model unraveled after the credit crunch, with its most notable casualties being Northern Rock PLC and the SIVs themselves, which collapsed virtually overnight. Regulatory authorities responded by requiring banks to take liquidity risk more seriously, with emphasis on longer-term average tenor of liabilities and greater diversity on funding sources (for example, see the UK FSA's CP 08/22 document at www.fsa.org). We discuss liquidity management in *Bank Asset and Liability Management* (John Wiley & Sons Limited, 2007) and *The Principles of Banking* (John Wiley & Sons Limited, 2012).

EXAMPLE 1.3: FASTNET SECURITIES 3 LIMITED

Fastnet Securities 3 Limited

Class	Balance	% of total	Rating (S&P)	WAL (years)	Legal final	Basis	Margin (bp)
A1	1,920,000,000	24%	AAA	2.91	Nov-2049	1-mo Euribor	40
A2	5,040,000,000	63%	AAA	3.15	Nov-2049	1-mo Euribor	45
B	1,040,000,000	13%	n/r	3.08	Nov-2049	1-mo Euribor	200
	8,000,000,000						
Cash reserve	400,000,000	5%					
Swap spread							150
Timing							
Cut-off date	12/5/2007						
Final OC	12/17/2007						
Settlement	12/17/2007						
First payment date	2/11/2008						
Key terms							
Issuer	Fastnet Securities 3 Ltd						
Originator	Irish Life and Permanent						
Sole arranger	Deutsche Bank AG						
Trustee	Deutsche Trustee Company Ltd						
First payment date	Monday, February 11, 2008						
Day count	Actual/360						
Listing	Irish Stock Exchange						
Settlement	Euroclear/Clearstream						
Legal maturity date	Thursday, November 11, 2049						
Asset pool							
Mortgage pool	Residential mortgages originated by Irish Life in the Republic of Ireland						
Number of obligors	35,672						
Aggregate balance	EUR 8,319,049,200.22						
Average balance	EUR 226,190						
Largest mortgage	EUR 8,502,202						
Weighted average Loan-to-Value Ratio (LTV)	83%						
Weighted average seasoning	21 months						
Weighted average remaining term	27.3 years						
Longest maturity date	2-Nov-47						



Note that this transaction was closed in December 2007, a time when the securitization market was essentially moribund in the wake of the credit crunch. An ABS note rated AAA could be expected to be marked to market at over 200 bps over LIBOR. Because the issued notes were purchased in entirety by the originator, who intended to use the senior tranche as collateral to raise funds at the ECB, the terms of the deal could be set at a purely nominal level; this explains the "40 bps over Euribor" coupon of the senior tranche.

order to access the ECB's discount window (a requirement for which was to have an office in the eurozone area).

One such public deal was Fastnet Securities 3 Limited, originated by Irish Life and Permanent PLC. Example 1.3 shows the deal highlights.

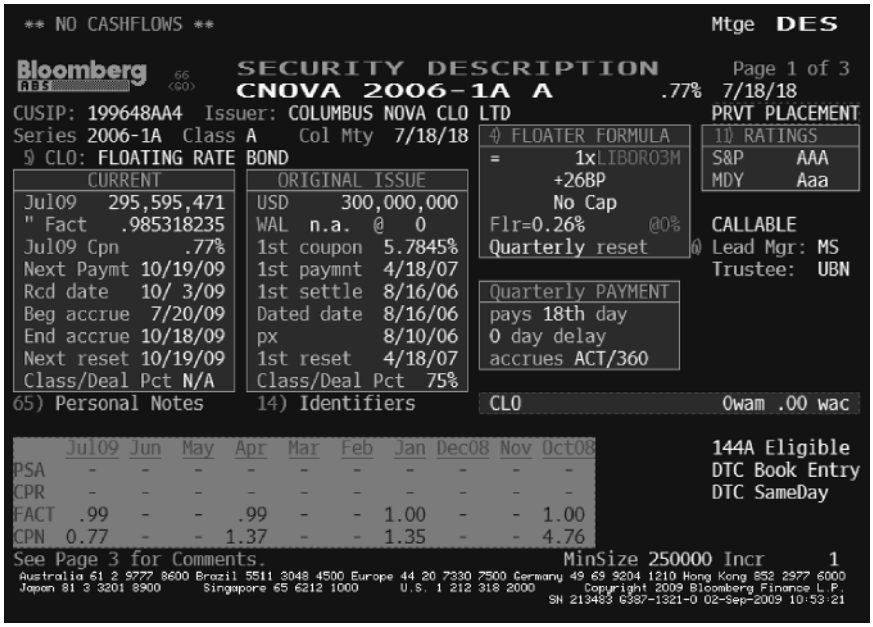
Market Yields and Prices Post Credit Crunch

During July and August 2009 a secondary market began to reemerge in European markets as investors began to pull back from the flight to quality exhibited during 2007–2008.

As an example of the yields that were trading during this time, see Exhibit 1.6. This shows the Bloomberg page DES for Columbus Nova, a CLO transaction closed in August 2006. At issue: The senior tranche of this deal, which was rated AAA, paid 26 bps over three-month LIBOR, and was priced at par. At the start of September 2009, the tranche was being offered at 87, over 400 bps over LIBOR. It was still rated AAA.

We consider postcrash developments in the market in Chapter 2.

EXHIBIT 1.6 Columbus Nova CLO DES page



Source: Bloomberg LP. Reproduced with permission.

SUMMARY AND CONCLUSIONS

Securitization is a long-established technique that enables banks to manage their balance sheets with greater flexibility and precision. By employing it, a bank can work toward ensuring optimum treatment of its assets for funding, regulatory capital, and credit risk management purposes. In addition, in the postcrash era the securitization tool continues to be used to create tradable notes that can then be used as collateral at the central bank.

The primary driver behind the decision to securitize part of the asset side of the balance sheet is one or more of the following:

- Funding: Assets that are unrepo-able may be securitized, which enables the bank to fund them via the capital market, or by creating notes that can be used as collateral at the central bank.
- Regulatory capital: This is a rarer reason driving securitization in the postcrash, Basel III era, however it is still possible to structure a deal that

reduces regulatory capital requirement, principally if "significant risk transfer" has taken place.

- Risk management: Assets on the balance sheet expose the originator to credit risk, and this can be managed (either reduced, removed, or hedged) via securitization.

A secondary driver is client demand: The process of securitization creates bonds that can be sold, and investor demand for a note of specified credit risk, liquidity, maturity, and underlying asset class may well cause a bond to be created, via securitization, to meet this specific investor requirement. Whether a transaction is demand driven or issuer driven, it will always be created to meet at least one of the preceding requirements.

The mechanics of closing a securitization deal, which we cover in detail in subsequent chapters, can take anything from a few months to up to a year or more. The most important parts of the process are the legal review and drafting of transaction documents, and the rating agency review. The involvement of third parties, such as lawyers, trustees, agency services providers, and the rating agencies, is the key driver behind the cost of closing a securitization deal, and these costs are covered either by the deal itself or directly by the originating institution.

A wide range of asset classes can be securitized, with the most common being residential mortgages and corporate loans. Other asset classes include auto loans and credit card receivables. When assessing the risk exposure and performance of different types of ABS, investors will consider the behaviors and characteristics of the specific type of underlying asset. Some performance metrics are of course common to all types of assets, such as delinquency rate or the percentage of nonperforming loans.

A type of securitization unknown before the 2008 crash but now common is the in-house transaction. In this process, the originating bank will undertake all the usual steps to structure the deal, but will buy the ABS notes itself. These notes, which would be rated by a rating agency in the normal way, are then available to the bank to use as collateral, either in a repo transaction or to place with the central bank. The deal has thereby transformed illiquid assets on the bank's balance sheet into liquid notes that can then be used to raise funding.

REFERENCES

Choudhry, M. 2007. *Bank Asset and Liability Management*. Singapore: John Wiley & Sons Limited.

Sundaresan, S. 1997. *Fixed Income Markets and Their Derivatives*. Cincinnati, OH: South-Western Press.