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Mortgage- and Asset-Backed Securities

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The Mechanics of Investing in Mortgage- and Asset-Backed Securities

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I. Introduction and Basics

The US mortgage-backed securities (MBSs) and asset-backed securities (ABSs) market[1] provides a large pool of liquid, high-credit fixed-income securities with attractive yield spreads over US Treasuries. In fact, the MBS/ABS market, currently about $3.2 trillion in size, is likely to overtake the Treasury market as the largest fixed-income sector in the world within the next year or two.

We start by providing a brief overview of these securities. A more detailed discussion of investment characteristics may be found in the March 1999 Salomon Smith Barney (SSB) publication *Guide to Mortgage-Backed Securities* (hereafter simply referred to as the *Guide*).[2]

What Are Mortgage- and Asset-Backed Securities?

In essence, MBSs and ABSs are securities entitled to the cash flows from a specified pool of assets. A majority of the market (roughly $2.5 trillion) consists of securities backed by residential mortgage loans; however, a large variety of other types of assets have been securitized, including commercial mortgage loans, car loans, credit card receivables, royalties, various types of leases, and so on. The cash flows from the assets can be channeled to investors in two ways: (1) they can simply be passed through to investors, after administrative or **servicing** fees are subtracted. This method produces a **pass-through security**, which comprises the bulk of MBSs; or (2) the cash flows can be allocated to investors according to specified rules, creating **structured securities**, such as **collateralized mortgage obligations** (CMOs).

Despite the variety of collateral types and cash flow allocation structures, most MBSs and ABSs share certain characteristics:

- In almost all cases, payments, both those received from the pool of assets and those paid to security holders, are monthly.
- The monthly payments from the assets typically consist of principal and interest. The principal can be **scheduled** and **unscheduled**.
- The scheduled principal reflects the **amortizing** nature of most consumer loans; in other words, the principal borrowed is paid back gradually over the term of the loan, rather than in one lump sum at the maturity of the loan.
- Unscheduled payments of principal, or **prepayments**, reflect the fact that most consumer loans can be paid off early, either in whole or in part. For example, most mortgage loans are paid off early because the borrower sells the house or refinances into a new, lower-rate mortgage.

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[1] In the United States, the term MBS is used to refer to securities backed by residential mortgage loans, while ABS denotes securities collateralized by other types of consumer loans, such as car loans. However, securities backed by home equity loans (HELs) or by manufactured housing loans (MHs) are usually labeled ABSs by convention. Outside the United States, the term ABS is used in a more general sense, with MBSs a subset of ABSs.

[2] Salomon Smith Barney has published numerous papers on various MBS/ABS topics; the *Guide* references many of these. A complete list of publications may be obtained from your salesperson or from the authors of this paper.

- Because when and how borrowers will make prepayments cannot be predicted with certainty, there is cash flow uncertainty for MBSs and ABSs. By comparison, cash flow uncertainty for traditional bonds arises from credit risk.[3]

As we discuss next, credit risk is not a significant concern for most MBSs and ABSs.

Credit Quality of MBSs and ABSs

It is a salient characteristic of the US MBS and ABS markets that the vast majority of the securities are of very high credit quality. Most MBSs are guaranteed by three **housing finance agencies** (see below),[4] which were created by the US government to facilitate the flow of mortgage capital and make it easier for potential homebuyers to obtain mortgages. The agencies support the secondary mortgage market by buying mortgage loans from lenders, ensuring that lenders have funds to make additional loans. The agencies can pay cash for the mortgages and hold them in portfolio (only Fannie Mae and Freddie Mac) or issue an MBS in exchange for pools of mortgages from lenders. MBSs provide lenders with a liquid asset that they can hold or sell to Wall Street dealers who will then trade these MBSs.

- **Ginnie Mae** (formerly known as the **Government National Mortgage Association**, or GNMA) is still a part of the US government, and MBSs guaranteed by Ginnie Mae carry the full faith and credit of the US government. Hence, like US Treasuries, Ginnie Mae MBSs are generally considered to have no credit risk.
- The other two agencies, **Fannie Mae (**formerly the **Federal National Mortgage Association**, or FNMA), and **Freddie Mac** (formerly the **Federal Home Loan Mortgage Corporation**, or FHLMC), are now private entities but maintain close ties to the US government.[5] Although Fannie Mae and Freddie Mac MBSs do not have explicit US government guarantees, they are not rated by any of the rating agencies, the implicit assumption being that they have negligible credit risk. The market also seems to assign very little credit risk to them, as they typically trade at similar levels to Ginnie Mae MBSs. These securities are sometimes described as having "quasi-government" guarantees.

Private-label MBSs (those not guaranteed by Ginnie Mae, Fannie Mae, or Freddie Mac) and ABSs have various types of credit enhancements to protect investors against losses due to defaults on the underlying assets. The most common type of enhancement is a **senior/subordinated** structure, in which the issue is structured into senior and junior classes, with the junior classes absorbing, to the extent

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[3] It has been said that the difference between mortgage securities and corporate bonds is that in the case of corporates, investors know when they are supposed to get the principal back but are not sure if they will, while in the case of MBSs, investors know that they will get the principal back, but are not sure when.

[4] To be precise, the agencies guarantee the timely payment of interest and principal to investors.

[5] These ties include a line of credit to the US Treasury, a number of board members being appointed by the US President, exemption from having to register publicly issued securities with the US Securities and Exchange Commission (which other private institutions have to do), and an exemption from all state and local taxes (except real property taxes). Fannie Mae, Freddie Mac, and a few other similar entities are now commonly called **Government-Sponsored Enterprises**, or **GSEs**.

possible, any losses from defaults.[6] The senior class typically carries a triple A rating from one or more major rating agencies. In fact, because in most cases the senior class represents 90% or more of the issue,[7] the vast majority of private-label MBSs and ABSs are rated triple A. Subordinated MBSs compose the one sector of the MBS and ABS markets in which credit considerations are important.

Why Do Investors Buy Mortgage and Asset-Backed Securities?

The US MBS/ABS market has grown exponentially over the past two decades, from a size of less than $100 billion in 1980 to more than $3 trillion today. This growth has been possible because of widespread investor sponsorship of these securities.[8] Several factors account for the popularity of MBSs and ABSs with institutional investors[9]:

- **Credit Quality**. As discussed, the majority of MBSs and ABSs are of triple-A or better quality.
- **Superior Returns**. MBSs and ABSs typically yield more than comparable-quality fixed-income instruments, with spreads over Treasuries, for example, usually well over 100bp. From the beginning of 1982 to October 31, 1999, the cumulative return on the SSB MBS Index was 619.4%, compared with 473.6% for the one- to ten-year AA/AAA Corporate Index and 407.9% for the one- to ten-year Treasury Index.
- **Liquidity.** The immense size of the market, trading volume (about $70 billion per day in 1998,[10] second only to US Treasuries), and the involvement of major dealers provide an active, liquid market for most MBSs and ABSs.
- **Choice of Investment Profiles.** Given the variety of MBSs and ABSs, this sector provides a wider range of investment characteristics than most other segments of the fixed-income market. For example, MBSs are available with negative, short, or very long durations. Prepayment sensitivities can range from low to very high. Coupons can be fixed (from 0% to more than 1,000%) or floating (directly or inversely with a range of indices).
- **Development of Analytic Tools.** Since the mid-1980s, many major dealers (and some buy-side firms) have devoted considerable resources to developing analytic models to evaluate MBSs and ABSs. These efforts have led to a better

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6 See the *Guide*, p. 46.

7 The amount that has to be subordinated for the senior class to be rated triple A is determined by the rating agencies and depends on the type of collateral, ranging from as little as 3%-5% for prime, high-quality residential loans to 15% or more for subprime and commercial mortgage collateral.

8 Obviously, issuers' recognition of securitization as an efficient balance sheet management tool has also played a major role. This is reflected in the increasing popularity of securitization outside the United States.

9 See the *Guide*, p. 6, for more discussion of some of these factors.

10 This figure is reported by the Federal Reserve Bank of New York and is exaggerated to some degree by double counting (both the buyer and seller may report a trade), but still illustrates the large amount of trading activity in the mortgage market.

understanding of mortgage cash flows and a higher level of comfort with the characteristics of mortgage securities.

Goals of this Paper

Despite their attractive characteristics and wide sponsorship among US institutional investors, some potential investors, especially those outside the United States, often perceive MBSs and ABSs as posing a challenge, because of their investment characteristics, which resemble those of callable bonds, but with some idiosyncrasies, and because of their cash flow and settlement mechanics (or "back-office" issues). This paper addresses the second of these problems, and we hope that describing several examples of trades will diminish investor concerns over back-office issues.[11]

First, we describe settlement procedures — including when and how money changes hands — and show how subsequent cash flows are calculated and paid to investors. This process is illustrated for several types of MBSs and ABSs. Next, we discuss the structure and conventions of the mortgage securities lending market, where as a result of their liquidity and credit quality, many types of MBSs and ABSs are used as collateral to secure cash financing at attractive rates. A final section describes clearance and settlement from a back-office perspective, and provides brief discussions of some of the intermediary administrative and operational service providers in the mortgage securities market. In the appendices of the paper we list useful telephone numbers and Web sites for MBS and ABS investors, provide a glossary of some of the terms used in these markets, summarize basic information on risk-based capital issues, and list the settlement date conventions used for different types of mortgage securities.

[11] As mentioned, a comprehensive discussion of investment characteristics may be found, for example, in the *Guide to Mortgage-Backed Securities*. This paper is a companion piece to the *Guide*.

II. Settlement Cash Flow Mechanics

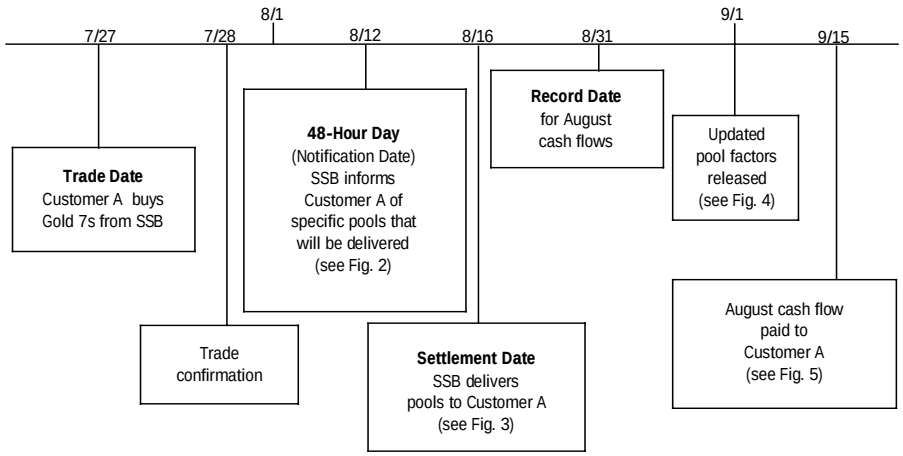
In this section, we give several examples of MBS and ABS trades. In each example, the trade is followed from initiation to when investors start to receive cash flows to illustrate the steps involved in the process.

An Agency Pass-Through Trade

Most agency pass-through trading occurs on a **to-be-announced (TBA)** basis. In a TBA trade, the buyer and seller agree on general trade parameters, such as agency, type, coupon, par amount, and price (for example, $100 million of Ginnie Mae 30-year 7% pass-throughs at a price of 98-14[12]), but the buyer does not know the specific pools that will be delivered until two business days before the settlement date, when the seller is obligated to provide the information. However, the pools have to satisfy **good delivery** requirements (see "48-Hour Day and Good Delivery Requirements").

TBA trading is the norm in the agency pass-through market for several reasons. It greatly improves market liquidity, allowing trades of large size to take place (most MBS pools are relatively small, typically less than $10 million). It also helps mortgage lenders to hedge interest rate exposure after a borrower locks in a rate.[13] Between the lock-in date and the loan closing date, the lender has interest rate exposure on a future loan that the lender is committed to making, but that has not yet been finalized.[14] As an example, we follow a TBA trade for $2 million face value of Freddie Mac Gold 30-year 7% pass-throughs. Figure 1 shows a time line of the steps in the process.

Figure 1. A TBA Freddie Mac Gold 30-Year 7% Trade



Source: Salomon Smith Barney.

[12] 98 and 14/32nds, or, in decimal terms, $98.4375 per $100 of face or par value.

[13] When a bank decides to loan money to a homeowner, the borrower does not have to commit immediately to take out a loan at that day's mortgage rate. Instead, the borrower typically has a period of time (for example, 60 days) during which he has a one-time option to "lock in" the current mortgage rate.

[14] For example, if interest rates fall, the borrower may not want to close at the locked-in rate. This risk of a loan not closing is called **fallout risk**.

Trade and Confirmation Dates

On Tuesday, July 27, 1999, a portfolio manager at Customer A tells his salesperson at SSB that he wishes to purchase $2 million face value of 30-year Gold 7s.[15] The salesperson checks with the desk and quotes a price of 98-03 for standard August settlement. The customer accepts, and a **trade confirmation** is sent out within one day of the trade date (in fact, the trade confirmation is normally sent out immediately).

48-Hour Day and Good Delivery Requirements

TBA trades normally settle according to a monthly schedule set by the Bond Market Association, a trade group of fixed-income dealers (formerly called the Public Securities Association, or PSA). For Gold 7s, the August 1999 settlement date is Monday, August 16, 1999 (see Appendix D). The buyer has to be notified as to which pools will be delivered before 3 p.m., two business days prior to the settlement date, or Thursday, August 12, in this case. This is the **48-hour rule**; hence, the **notification date** is often called the **48-hour day**.

The pools have to satisfy requirements for **good delivery** established by the Bond Market Association. These requirements have changed over time, but at present, for each $1 million **lot** (trades are usually transacted in terms of $1 million units, called lots), the following constraints apply:

- A maximum of three pools per lot[16]; and
- **Variance** refers to the difference between the face amount of the pools delivered and the agreed-upon face amount. Some variance is allowed in recognition of the fact that the face amount of a pool, which is the sum of the current balances of the underlying mortgage loans, is unlikely to be a nice round number, such as $1 million. The allowable variance is 0.01% per lot (that is, for a $1 million lot, the sum of the par amounts of the pools in each lot should be within 0.01% of $1 million, or between $999,900 and $1,000,100).

On Thursday August 12, Salomon Smith Barney notifies Customer A of the pools that will be delivered, sending the information shown in Figure 2.

Figure 2. 48-Hour Day — Notification of Pools to be Delivered for $2 Million Freddie Mac Gold 7% TBA Trade

Lot 1. Freddie Mac Gold Pool #111		
Issue Date	June 1, 1999	
Original Face	$1,020,000	
Current Factor	0.98044118	
Current Face	= Original Face * Current Pool Factor = $1,020,000 * 0.98044118 = $1,000,050	
Lot 2. Freddie Mac Gold Pools #222 and #333		
	Pool #222	**Pool #333**
Issue Date	August 1, 1999	August 1, 1999
Original Face	$499,910	$500,000
Current Factor	1.0000000	1.0000000
Current Face	$499,010	$500,000

Note: Current factors and face amounts as of August 1, 1999.
Source: Salomon Smith Barney.

[15] Although TBA trades are typically larger than $2 million, we have used a small amount for simplicity's sake.

[16] Slightly more liberal good delivery requirements are allowed for very old pools. See the Bond Market Association's *Uniform Practices* manual for complete details, or contact your SSB salesperson.

Settlement Calculations

Figure 3 shows financial details of the settlement, which takes place on Monday, August 16, 1999. Account A pays Salomon Smith Barney an amount equal to the current face amount times the agreed-upon price of 98-03, plus accrued interest from the beginning of the month. Accrued interest is computed on a 30/360 basis.

Figure 3. $2 Million Gold 30-Year Trade: Settlement

Current Face Amount	= $1,000,050 + $499,910 + $500,000 = $1,999,960
Accrued Interest	= Current Face Amount * Coupon Rate * (Settlement Day of Month – 1)/360 = $1,999,960 * 7% * (16 – 1)/360 = $5,833.22
Total Amount Due	= Current Face Amount * (Price / 100) + Accrued Interest = $1,999,960 * (98.09375 / 100) + $5,833.22 = $1,967,668.98

Source: Salomon Smith Barney.

Clearing Trades

The clearing process refers to the mechanism by which trades are settled, i.e., how money is exchanged and changes in ownership of the securities are recorded. Almost all trades are now settled electronically, or **book-entry**; **physical delivery**, in which certificates of ownership are delivered, is now rarely used. In Section IV we provide a detailed description of the clearing and settlement process from more of a back-office perspective.

Record Date

The owner of an agency pool on the last day of a month (the **record date**) is entitled to the cash flows for that month. For August, the record date is August 31, 1999. Account A is recorded as the owner of the three pools shown in Figure 2 and, hence, will receive the August cash flow, consisting of interest and principal for the month. As Figure 1 indicated, the August payment is actually made in September. Payments for most Ginnie Mae and Freddie Mac MBSs are made on the 15th of each month, and for Fannie Mae MBSs, on the 25th of each month (see the definition of **delay** in the glossary in Appendix B).

Pool Factor Updates and Principal and Interest Calculations

Interest due to investors for the month of August is based on the principal balance at the beginning of August and is determined on a 30/360 basis. The principal payment is calculated by comparing the pool factors on August 1 and September 1. All three agencies release updated factors for their pools near the beginning of each month according to a set schedule, shown in Figure 4.

Figure 4. Agency Pool Factor Monthly Release Schedule

	Factors Released on	Factors Incorporate Prepays
Freddie Mac	Evening of Last Business Day of Month	Up to 15th of Month
Fannie Mae	Evening of 4th Business Day of Month	Up to End of Previous Month
Ginnie Mae	Morning of 5th Business Day of Month	Up to End of Previous Month

Source: Salomon Smith Barney.

In our example, Freddie Mac releases an updated pool factor at the end of the last business day of August. This is termed the **September 1 factor**, even though it reflects prepayments received between July 16 and August 15. This factor is used to calculate payments due to the investor for the month of August and to be paid on September 15. Figure 5 shows details of the calculations. For Fannie Mae, which releases pool factors on the evening of the fourth business day of each month, and Ginnie Mae, which releases pool factors on the morning of the fifth business day of each month, the September 1 factors incorporate prepayments received during the calendar month of August. Updated pool factors are posted on MBS analytic systems such as Salomon Smith Barney's Yield Book™.

Figure 5. $20 Million Gold 30-Year Trade: Interest and Principal Payments for August (Paid on 15 Sep)

Principal Paydown	= Original Face Amount * (Previous Pool Factor – New Pool Factor)
Interest Payment	= Face Amount as of Aug 1 * Coupon Rate / 12
Pool A	Sep 1 Factor = 0.97941177, Aug 1 Factor = 0.98044118
Principal Paydown	= $1,020,000 * (0.98044118 – 0.97941177) = $1,050.00
Interest Payment	= $1,000,050 * 7% / 12 = $5,833.63
Pool B	Sep 1 factor = 0.99500000, Aug 1 factor = 1.0000000
Principal Paydown	= $499,910 * (1.00000000 - 0.99500000) = $2,499.55
Interest Payment	= $499,910 * 7% / 12 = $2,916.14
Pool C	Sep 1 factor = 0.99500000, Aug 1 factor = 1.0000000
Principal Paydown	= $500,000 * (1.00000000 - 0.99500000) = $2,500.00
Interest Payment	= $500,000 * 7% / 12 = $2,916.67
Total Payment Received by Investor on 15 Sep 99	= $1,050.00 + $2,499.55 + $2,500.00 + $5,833.63 + $2,916.14 + $2,916.67 = $17,715.99

Source: Salomon Smith Barney.

TBA Trade "Fail"

In a TBA transaction, the seller does have the costly option to be late (or "fail") in delivering securities to the buyer. For example, if collateral is needed for new CMO deals, this additional demand could cause a temporary shortage of the coupon being used to back the new deals. However, in the case of a "fail," the buyer benefits by not having to pay the seller until the securities are delivered. The price of the securities, including accrued interest that is to be paid, does not change. Therefore, the buyer receives both of the following:

- ➤ interest on the money that was to be paid for the security; and
- ➤ interest (as well as principal if a record date is passed) on the security that will eventually be delivered.

To summarize, although the security has not been delivered, the buyer does "own" the security in the sense that cash flows that would have gone to the buyer (if a "fail" had not occurred) still must be passed to the buyer by the seller. And the buyer receives the "extra" of interest earned on the funds that were to be paid to the seller (compensation for the inconvenience of the "fail").

Other Types of Pass-Through Trading

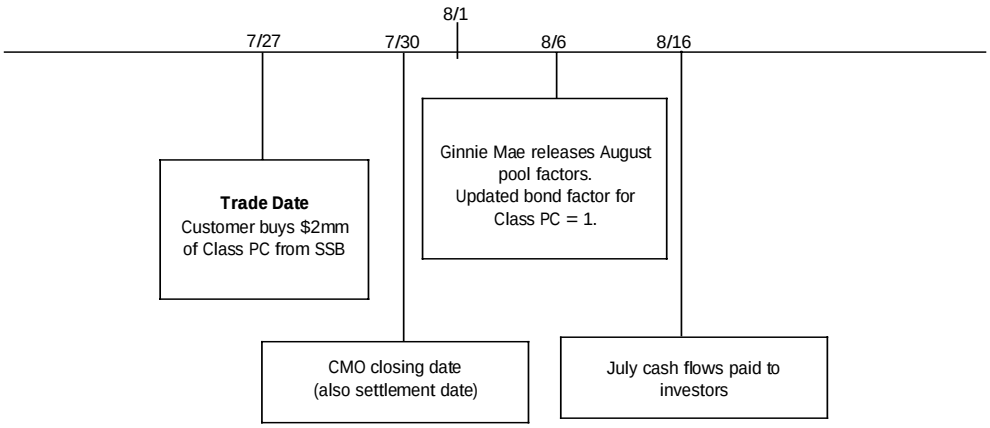
Although the bulk of trading in agency pass-throughs is done on a TBA basis, there are other types of trades. An investor can request specific characteristics that are deemed desirable, such as a loan origination year — for example, 1993 Ginnie Mae 30-year 7s (this is the so-called **TBA vintage market**). An investor may do this if he feels that seasoned 1993 Ginnie Mae 7s have more desirable prepayment characteristics than the new Ginnie Mae 7s that are likely to be delivered in a standard TBA trade. In addition, of course, there is an active market in **specified** (usually seasoned) pools, where the investor knows at the time of the trade the exact pools that will be purchased.

A New-Issue CMO Trade

On June 10, 1999, Salomon Smith Barney priced Ginnie Mae REMIC 1999-25, a $1.3 billion collateralized mortgage obligation (CMO) deal backed by Ginnie Mae 7% and 7.5% pass-throughs. The CMO closing date (i.e., the day on which the CMO settles) is July 30, 1999. Among the bonds in this deal is Class PC, a four-year planned amortization class (PAC) bond with a coupon of 7%.[17] On July 27, 1999, a customer agrees to buy $2 million face value of Class PC at a price of 101-00.

Figure 6 shows a timeline of the trade.

Figure 6. New-Issue CMO Bond — Ginnie Mae REMIC 1999-25, Class PC: Purchase and Settlement



Source: Salomon Smith Barney.

Settlement Date

Newly issued CMOs normally settle when the deal settles (issue date). (In secondary trading of CMO classes, the settlement is **T+3**, or three business days after the trade date.) The **accrual date** for agency CMOs — that is, the date from which interest starts to accrue on the bonds — is, as with agency pass-throughs, the first of each month, or July 1, 1999, in this case.

[17] See the *Guide*, pp. 39-41, for a description of PAC bonds.

Settlement Calculations

Because this is a new issue, the current **bond factor** is 1.0, so the current face is equal to the original face of $2 million. Since the accrual date is July 1, 1999, the accrued interest is:

Accrued Interest = Current Face * Coupon Rate * (Day of Month - 1)/360
= $2,000,000 * 7% * (30-1)/360 = $11,277.78

Hence, the total amount due from the investor is:

Total Amount Due = Current Face * (Price / 100) + Accrued Interest
= $2,000,000 * (101 / 100) + $11,277.78
= $2,031,277.78

Record Date

The record date is the last business day of the month, or July 30, 1999, in this case (July 31 is a Saturday). The customer is noted as the owner of $2 million of Class PC and, hence, entitled to July interest and principal payments, which are paid with a delay in August.

Updated Pool and Bond Factors and Investor Cash Flow Calculations

As shown in Figure 4, Ginnie Mae releases updated pool factors — which are as of August 1, 1999 in this case — on the morning of the fifth business day of the month, or August 6, 1999, in this case. The CMO deal trustee uses these pool factors, which reflect principal payments on the underlying loans in July, to calculate principal payments due to the various classes in the CMO, according to the principal allocation rules specified in the deal prospectus and, hence, to calculate updated (or current) bond factors for each class. In this case, all of the July principal payments were allocated to other classes in the deal, so the updated bond factor for Class PC remains at 1.00 (signifying that none of the principal backing this class has yet paid down). In other words, Class PC is not yet in its principal payment window.

Calculation of July Cash Flow for Class PC

Payment dates for agency CMOs usually correspond to the payment dates for the underlying pass-throughs. For Ginnie Maes, the payment date is the 15th of the month. However, because August 15, 1999, is a Sunday, the investor receives the July principal and interest on Monday, August 16, 1999. The interest paid is:

Interest Payment = Face Amount (as of July 1, 1999) * Coupon Rate / 12
= $2,000,000 * 7% / 12 = $11,666.67

Because the updated bond factor for Class PC is one, it receives no principal (principal payments on the collateral are directed to other bonds in the deal, as specified in the prospectus).

A Secondary Market ABS Trade

On February 22, 1999, Salomon Smith Barney priced Citibank Credit Card 1999-2, a $798 million ABS deal backed by Citibank credit card receivables. Senior Class A is a triple A rated bond with a fixed coupon of 5.875% (Figure 7 provides some details about this bond). Even though the cash flows from the assets (credit card payments) are monthly, this bond is structured as a traditional semiannual pay bullet security.

Figure 7. Citibank Credit Card 1999-2, Senior Class A

Issue Date	February 25, 1999
Rating	AAA (S&P), AAA (Fitch), Aaa (Moody's)
Coupon	5.875% (30/360 basis)
Frequency of Payments	Semiannual, on September 10 and March 10
Initial Accrual Date	February 25, 1999
Principal Payments	Soft Bullet Payment on March 10, 2009[a]

[a] Under certain circumstances, it is possible for principal to be paid earlier or later.
Source: Salomon Smith Barney.

Trade Date

On Tuesday, July 27, 1999, a customer buys $2 million face of Class A at a price of 102-00. Trade confirmation is normally sent out immediately.

Settlement Date

As with CMOs, secondary trades of ABS classes settle **T+3**, that is, three business days after the trade date. Hence, the trade settles on Friday, July 30, 1999.

Settlement Amounts

Accrued interest is calculated from the issue date of February 25, 1999. After the first coupon period, the accrued interest would be calculated from the previous payment date (September 10 or March 10). A 30/360 basis gives 155 days from February 25, 1999, to the settlement date of July 30, 1999, so the calculation is as follows:

Accrued Interest = Current Face * Coupon Rate * 155/360
= $2,000,000 * 5.875% * 155/360
= $50,590.28

Total Amount Due = Current Face * (Price / 100) + Accrued Interest
= $2,000,000 * (102 / 100) + $50,590.28
= $2,090,590.28

Record Date (As specified in the prospectus)

The record date is one day before a payment date, or September 9, 1999, in our example. The owner of the security on this date receives semiannual interest.

Payment to Investor

The investor receives interest on September 10, 1999 (payment dates depend on the issuer and deal, and are specified in the prospectus). The semiannual interest payment usually would be:

Normal Interest Payment = Current Face * Coupon Rate / 2
= $2,000,000 * 5.875% / 2 = $58,750.00

However, for the first interest payment, the accrual period begins on the issue date, February 25, 1999, so the first interest payment on September 10, 1999 is:

First Interest Payment = $2,000,000 * 5.875% * 195 / 360 = $63,645.83

III. Mortgage Securities Lending

Securities lending markets, which in essence involve the temporary exchange of cash for securities, are huge and extremely active. For example, the Federal Reserve Bank of New York estimates the average **daily** amount of outstanding reverse repurchase and repurchase transactions in US government securities was about $2.5 *trillion* as of June 30, 1999. The mortgage securities lending market, in particular, is very active because of the high credit quality and liquidity of most MBSs. In this section we explain the mechanics of the transactions that take place in this important market.

Although there is a fair amount of variation in the transactions that are characterized as securities lending activity, mortgage securities lending essentially occurs through two channels: **repurchase transactions** and **dollar rolls**. We provide more precise definitions of these activities later, but in the broadest terms, repurchase transactions are securities transactions in which one party agrees to sell securities to another in return for cash, with a simultaneous agreement to repurchase the same securities at a specific price at a later date. At the termination of the transaction, the securities are resold at the predetermined price plus a previously determined interest rate. A dollar roll is analogous to a repurchase transaction except that the party borrowing the securities does not have to return the same securities, but can instead return "substantially similar" ones.

Why would two parties participate in such transactions? There is no single answer to this question because there are a number of participants in securities lending markets and their motivations may vary. The key point is that because the lending activity is secured by collateral, the borrowing rate is typically lower than the interbank short-term uncollateralized lending rate. So, for example, a hedge fund that wishes to increase its leverage may loan its securities for cash to finance its positions cheaply. An institutional investor, such as a pension fund, may lend out securities from its portfolio to boost income or to defray custodial fees. A broker-dealer may borrow and lend securities as part of its market-making activities. Such activities might include borrowing securities to cover a short position or simultaneously borrowing and lending securities to earn a higher rate on the securities loaned versus the securities borrowed.

Securities lending activities are a vital part of today's capital markets and provide an important source of liquidity and flexibility to all market participants. The factors that fueled the growth of these activities in the past — an increase in the amount of outstanding securities, the development of custodial and securities lending departments, and the active short-term cash management strategies employed by investors — should continue to provide a strong impetus into the future.

Repurchase Transactions

A **repurchase agreement** (**repo**) is an agreement between a **seller** and a **buyer**, in which the seller sells securities to the buyer with a simultaneous agreement to repurchase the securities at an agreed-upon price (**repurchase price**) at a future point in time (**repurchase date**).[18] The seller is charged interest (at the **repo rate**) for the use of funds and, typically, pays these interest costs at the maturity of the repo. The buyer of the securities is said to have entered into a **reverse repurchase** (**reverse repo**) agreement.

[18] The **seller** is also referred to as the **borrower** (of funds), and the **buyer** is also referred to as the **lender** (of funds).

We previously discussed the economic rationale for a repo. To reiterate, because the repo is a form of secured lending it may provide a relatively inexpensive source of funding compared with other short-term money-market instruments of similar duration. In general, the following factors primarily determine the repo rate: (1) the credit quality of the underlying collateral; (2) the maturity of the repo; and (3) the liquidity of the collateral. In addition, to provide a buffer against a loss in the market value of the security, the lender of funds usually requires a **margin** amount. In practice, the margin amount is established by lending out a sum of money less than the market value of the underlying collateral. The difference between the market value of the collateral and the dollar proceeds lent out is called a **haircut**.

Mechanics

Collateral. A variety of collateral types are allowed in a repo, including agency pass-throughs (Ginnie Mae, Fannie Mae, Freddie Mac), agency REMICs, double A and triple A nonagency CMOs, double A pass-throughs, and whole loans. The seller receives the *identical* collateral back at the maturity of the repo.

Haircut. The haircut deducted in a repo is used to set up a margin account that the buyer (i.e., the lender of funds) will use as a hedge against a decline in the market value of the securities. Haircuts range from 1% to 10%, but can be as high as 25%-50% if the securities are perceived to have high price volatility or low liquidity. The haircut can also depend on the fiscal strength of the borrower (i.e., the seller of securities). The securities are typically **marked-to-market** on a daily basis. A decline in the market value of the securities can result in a **margin call**, whereas an increase will result in a payment to the borrower of funds. Margin calls must be settled promptly; **T+0** is typical.

Term. The length of a repo can extend from one day (**overnight repo**) to more than one day (**term repo**), or be **open**. An **open repo** is equivalent to a series of overnight repos on the same security, with the repo agreement effectively being renewed each day at a new rate. Term repos cover specified periods rarely extending beyond three months, with 30 days the most common term.

Title. The party entering into the repo (i.e., the borrower of funds) loses title to the security over the repo period. However, all payments of principal (scheduled or unscheduled) and interest are forwarded to the original owner. The transfer of title allows the buyer (i.e., the lender of funds) to now "repo out" the securities (i.e., sell the securities and, thus, borrow money) if it so desires. This activity of combining repos and reverse repos is commonly known as a "repo book."

Repo Calculations

Repo calculations are straightforward. The **repo principal** (the funds provided to the borrower) is simply the market value of the collateral obtained by the lender, reduced by the haircut. The interest cost of the loan (**repo interest**) is obtained by applying the repo rate to the repo principal. Figure 8 provides a sample calculation.

Figure 8. Sample Repo Calculation

Repo $52.6 Million Freddie Mac CMO 2180 Class G for 30 Days at 5.34% With a 5% Haircut on 11 Nov

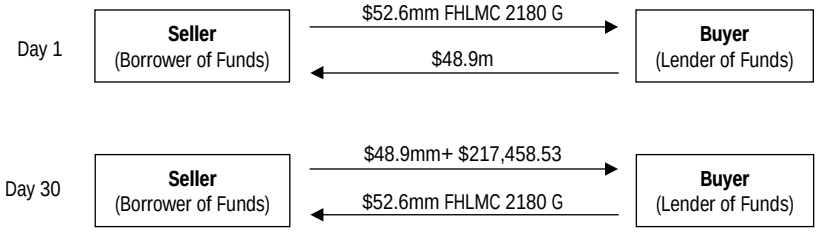
Repo Principal	= Par Amount * Factor * ((Bid Price + Accrued) / 100) * (1 – Haircut)
	= $52,555,848 * 1.000 * ((97-22 + 0-06) / 100) * (1 – 0.05)
	= $48,867,084.42
Repo Interest	= Repo Principal * Repo Rate * Repo Term in Days/360
	= $48,867,084.42 * 5.34 / 100 * 30/360
	= $217,458.53

Source: Salomon Smith Barney.

We note two points about the calculation in Figure 8. First, the bid price of the security is for cash settle (**T+0**). Second, the cash flow characteristics of the repoed bond are *not* relevant to the transaction because the buyer (the lender of funds) does not retain any coupon or principal payments, but passes them on to the seller (the borrower of funds). Of course, the second observation is not strictly true in the sense that the repo rate and the haircut charged are influenced, to some extent, by how volatile the cash flows of the MBS are, because this volatility, in turn, will affect how the market value of the security fluctuates.

Figure 9 illustrates the flows of cash and securities in a representative repurchase transaction.

Figure 9. The Repo Transaction

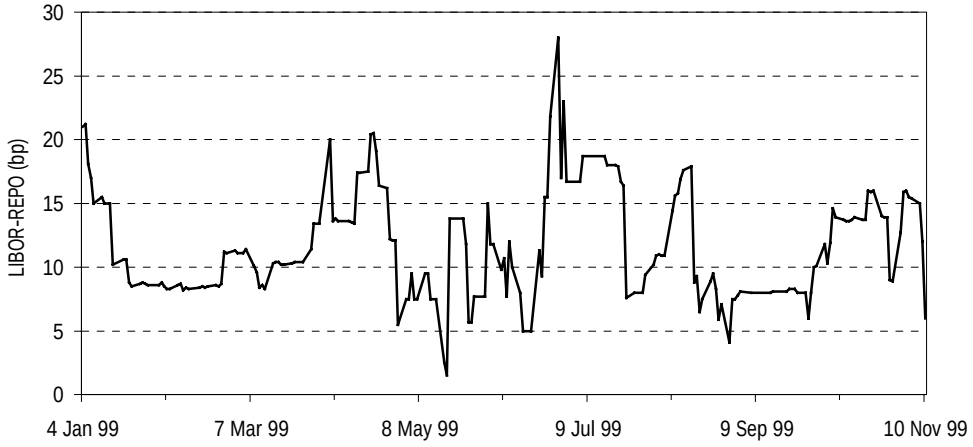


Source: Salomon Smith Barney.

Cost of Carry

As discussed, repos constitute a form of secured lending, and as a result, repo rates are typically lower than other short-term (unsecured) borrowing rates. For example, Figure 10 shows that the one-month mortgage repo rate has on average been about 10bp lower than one-month LIBOR over the past year. In other words, a mortgage investor could have earned an incremental return of approximately 10bp per year by funding his mortgage securities through repos versus simply holding them (assuming interim cash flows are invested in one-month LIBOR). This measure of determining the advantage of the funding position is often called the **cost of carry**.

Figure 10. The Repo Funding Advantage: One-Month LIBOR — One-Month Mortgage Repo



Source: Salomon Smith Barney.

Risks

Credit Risk. Credit risk refers to the possibility that one of the parties to a repo transaction may default, which in turn may result in the loss of the full value of the securities borrowed or funds loaned. For example, if the borrower of funds defaults, the lender can liquidate the collateral but may still not be able to recoup the full amount of the repo principal. To hedge against this particular risk, the lender charges the haircut. In addition, both parties usually evaluate the credit quality of their counterparties before entering into a repo transaction. Whatever the hedge employed, it should be kept in mind that hedge ratios often break down in extreme market conditions.

Liquidity Risk. A market disruption, such as a squeeze, may result in the lender's being unable to deliver the securities back to the borrower at settlement. This qualifies as a failed transaction, rather than a default, because the lender will typically be able to settle the transaction at a later date.

Market Risk. The repo position may suffer because of an adverse move in the market prices of assets or interest rates. For example, a borrower locked into a fixed-term repo financing arrangement is subject to interest-rate risk, which is the risk that an initially attractive borrowing rate may become very costly if short-term interest rates fall substantially over the course of the repo.

Settlement Risk. Both parties to a repo may risk the loss of the full value of the securities or funds if the exchange of securities for funds is not completed in both legs of a repo transaction. For example, such a situation may occur if it is possible to complete delivery of funds without simultaneously receiving delivery of collateral. To avoid these situations, settlement of a repo transaction usually takes place on a DVP delivery-versus-payment (DVP) basis, where delivery of securities takes place if and only if payment of cash occurs at the same time.

Dollar Rolls

Dollar rolls are another way to obtain financing via the mortgage market. Repurchase agreements do not involve the transfer of a security's cash flows; principal and interest continue to be sent to the original owner. In contrast, in a dollar roll transaction, the original owner gives up principal and interest to the temporary holder of the securities (assuming record dates are passed during the period of the roll). In addition, the returned security does not have to be exactly the same as the original security, but instead should be "substantially similar" to qualify as a financing transaction (rather than a sale and purchase). "Substantially similar" has been defined in the American Institute of Certified Public Accountants *Statement of Position 90-3* as meaning that the original and returned security should be of the same agency/program, original maturity, and coupon (for example, 30-year Freddie Mac Gold 7.5s) and both should satisfy good delivery requirements. The dollar roll can be thought of as two simultaneous transactions, one buy and one sell order, for the same TBA security for different settlements.

For an investor with a long position in pass-throughs for forward settlement who wants to avoid actually taking delivery of bonds (and subsequently receiving principal and interest payments), rolling the position forward each month can be attractive from a financing as well as operations perspective. By continually rolling the position forward, he stays invested in mortgages, but never reaches settlement for receiving bonds and often obtains an attractive financing rate on the funds obtained during each roll period. Figure 11 compares the main features of repos and dollar rolls.

Figure 11. Repo (Repurchase Agreement) Versus Dollar Roll

	Repo	Dollar Roll
Security Type	Any	Pass-through
Financing Rate	Usually related to general collateral	Often lower than repo rate (at times, substantially lower)
Principal and Interest	Goes to original owner	Goes to holder on each record date
Used for Short Covering	No	Yes
Haircut	Yes	No
Identical Securities Returned	Yes	No
Prepayment Risk	No	Yes

Source: Salomon Smith Barney.

A Sample Dollar Roll Computation

Suppose an SSB pass-through trader "buys $2 million of the November/December roll" for Freddie Mac Gold 7s down 5/32nds ("the drop") from an investor. If the price for Bond Market Association November settlement is 98-20, then the trader is simultaneously buying $2 million Gold 7s for November settlement (November 15, 1999) at a price of 98-20 and selling $2 million for December settlement (December 13, 1999) at a price of 98-15 (= 98-20 - 0-05). This transaction gives the trader a long position from November 15 to December 13, which could be used to collateralize a CMO deal settling at the end of November, for example. (The trader would subsequently need to go long to cover his short position for December settlement.) Figure 12 shows the mechanics of the roll for the trader and investor. Figure 13 shows the net proceeds for the trader and investor (for the cases of rolling and not rolling).

Figure 12. Dollar Roll Example Per $100 Face (Period for Dollar Roll is 28 Days: 15 Nov–13 Dec)

Date	Transaction	Trader	Investor
Nov 15	Trader buys from investor	Pays 98-20 + accrued interest = $98.897 for bonds.	Receives 98-20 + accrued interest = $98.897 for bonds and invests $98.897 in money market near Fed funds rate at 5.20%.
	Investment	$98.897 (in securities).	$98.897 (in cash).
Dec 13	Investor buys back from trader	Receives 98-15 + accrued interest = $98.702 for bonds.	Pays 98-15 + accrued interest = $98.702 for bonds (reestablishing original long position).
		Also pays for 0.5% of 100 for Dec to make up for expected paydown (price is 98-15 + accrued interest = $98.702, transaction done simultaneous to dollar roll).[a]	Receives proceeds of 98.897 * (1 + 0.052 * 28/360) = $99.297 on money market investment.
Dec 15		Receives payment corresponding to November payment period, principal paydown 0.5% and one month of interest. (These cash flows are present valued back to December 13 to obtain net proceeds in Figure 13.)	

[a] Because of principal paydowns, the trader will not have the same amount of bonds to give back to the investor and so must purchase additional bonds to make up for these paydowns. In practice, this is not a concern.
Source: Salomon Smith Barney.

Figure 13. Dollar Roll Example: Net Proceeds Per $100 Face

Date	Scenario	Trader	Investor
Dec 13	If investor does roll	(1 – 0.005) * 98.702 + (0.5 + 7.0 / 12) / (1 + 0.052 * 2 / 360) = $99.292, which implies (99.292 / 98.897 - 1) * 360 / 28 = 5.13% financing rate (annualized)	99.297 – 98.702 = $0.595
	If investor does not roll		-0.005 * 98.702 + (0.5 + 7.0 / 12) / (1 + 0.052 * 2 / 360) = $0.590

Source: Salomon Smith Barney.

The investor can roll his position (as shown on the right side of Figure 12), or the investor can choose not to roll his bonds. In this case, the investor receives the principal paydown and coupon interest and pays for 0.5% of bonds to make up for the principal paydown (this 0.5% purchase just serves to make it easier to compare the two cases of rolling and not rolling bonds). As shown in Figure 13, the proceeds from not rolling ($0.590) are almost the same as those in the case of choosing to roll the bonds ($0.595). Put another way, the implied financing rate of 5.13% (calculated in Figure 13 under the Trader column) is very close to the 5.20% investment rate available. There is no significant advantage to rolling the Gold 7s in this example (the roll for these bonds is said to be "trading at or near carry"). Note that prepayment risk, which enters through the principal paydown, was not considered.[19]

[19] It was assumed that the principal paydown could be forecast perfectly accurately in the example. In practice, there is always some uncertainty about what the paydown will turn out to be. For a more comprehensive look at dollar rolls, see *A Review of Mortgage Dollar Rolls*, Salomon Smith Barney, September 1988.

IV. Clearance and Settlement in the Back Office

The MBS and ABS market participants that typically receive the most attention are primary market originators, institutional investors, and broker-dealers such as Salomon Smith Barney that facilitate the flow of capital between originators and investors by establishing secondary markets. Missing in this picture are the roles played by other securities market service providers such as primary brokers, custodians, and clearing and settlement organizations. The back-office services provided by these entities — portfolio administration, risk management, "netting" trades, among others — considerably ease the administrative and operational complexities involved in securities lending and trading.

Clearance and settlement refer to the mechanics of the exchange of funds and securities resulting from trading activities. Completing a securities transaction involves the interaction of back-office departments, banks, clearing corporations, other depositories, and funds transfer systems. This section provides more of a back-office perspective on how money and securities are transferred between these organizations in consummating a trade. It also provides brief descriptions of some of the major organizations involved in clearing and settling MBS and ABS trades.

Our discussion is by no means definitive – the continued growth and globalization of securities markets, technological advances, and an increasing focus by investors on "putting their money to work" continue to alter the landscape of back-office services. In particular, modern financial institutions such as Salomon Smith Barney can assume multiple back-office roles, and offer their institutional clients a number of portfolio administration (clearing, custody, financing, and lending) and portfolio allocation services.

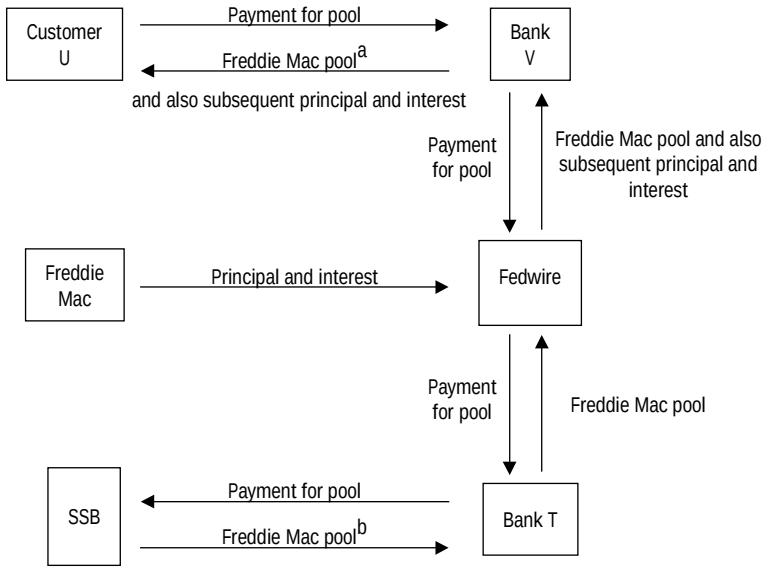
Clearing and Settling a Specified Pool Pass-Through Trade

To directly use a clearing organization such as Fedwire[20] which is operated by the US Federal Reserve (or "Fed"), membership in that clearing organization is normally required. In the case of Fedwire, banks and other depository institutions that are members of the Federal Reserve System have direct access, but other financial institutions such as broker-dealers do not. So, to trade securities that only clear through certain organizations like Fedwire, a nonmember, such as a broker-dealer, must use an intermediary **clearing agent** (normally a bank).

Suppose Customer U, which uses bank V as its clearing agent, buys a specified Freddie Mac pool from broker-dealer SSB, which uses Bank T as its clearing agent. (Freddie Mac and Fannie Mae pools clear through Fedwire.) Figure 14 shows how the funds/securities are transferred.

[20] For further details about Fedwire, see "Clearance and Settlement Providers."

Figure 14. Payment for a Security



[a] Bank V holds the Freddie Mac pool on behalf of Customer U, the beneficial owner.
[b] SSB's clearing agent, Bank T, holds the Freddie Mac pool (prior to the trade) on behalf of SSB, the original beneficial owner.
Source: Salomon Smith Barney.

On the settlement date:

1. Customer U instructs bank V to (a) receive the pool from Broker-Dealer SSB via SSB's clearing agent Bank T (the pool is taken from Bank T's Fedwire account), and (b) make the appropriate payment to Bank T.
2. Bank T, acting on instructions from Broker-dealer SSB, transmits a message to Fedwire authorizing delivery of the Freddie Mac pool to Bank V's Fedwire account versus payment of the agreed-upon price.
3. The Federal Reserve executes these instructions by making the appropriate security and cash entries to the Fed accounts of Banks V and T. More specifically, Bank V's account is debited with cash, and credited with securities, while the opposite flows are recorded for Bank T.
4. Bank V in turn makes the appropriate entries to Customer U's account, and Bank T does the same for SSB.

As far as Freddie Mac and the Federal Reserve are concerned, Bank V is the holder of the security and should receive payments of principal and interest on it. Customer U is the beneficial owner (i.e., the true owner) of the pool through its Clearing Bank V. Therefore, principal and interest from the pool is received first by Bank V and is subsequently credited to Customer U's account.

If Bank T and Bank V happen to be the same clearing bank (denoted as Bank TV for clarity), then Fedwire is not directly involved in the trade. Instead, Bank TV clears the trade internally by crediting to Customer U's account securities obtained by debiting Broker-Dealer SSB's account. In addition, cash is debited from Customer U's account and credited to Broker-Dealer SSB's account. There is no need to change anything in Bank TV's Fed accounts because Bank TV's security/cash position at the Fed is unchanged.

Special Considerations for TBA Pass-Through Trades

The previous section describes the settlement process for specified pool pass-through trades. The description also applies to TBA pass-through trades. However, particularly in the case of TBA trades, several additional activities often take place between the trade date and the settlement date. Because trades often settle forward (on one of the Bond Market Association settlement dates), there is a relatively long time between the trade date and settlement date. This means that there is a relatively longer period of time during which a trade should be monitored to guard against one party's not fulfilling its trade obligations.

Assuming both parties in a trade are participants of the Mortgage-Backed Securities Clearing Corporation (MBSCC)[21] and the trade is executed through MBSCC, the trade is marked to market on a daily basis because both parties must meet daily margin requirements, which help to ensure that the trade is completed. MBSCC, to some extent, acts as a huge back office for its participants. It nets the trade activity for each participant involved in a TBA trade category (such as 30-year Freddie Mac Gold 7s for October settlement, for example) and provides a summary net position to each of its member participants. For example, a firm with offsetting long and short positions (possibly with different counterparties) has no net security position and can settle its position by paying or receiving cash depending on the prices at which the offsetting trades were executed.

For participants with net securities positions, MBSCC matches net sellers with net buyers and provides a service, called Electronic Pool Notification, that helps the matched parties exchange pool information in preparation for delivery of securities. When settlement is reached, net positions are paid off and pools must be delivered. This happens as discussed in the previous subsection.

When outstanding trades are marked to market or must satisfy margin requirements, as in cases in which MBSCC is involved, for example, the basic cash flow mechanics presented in Section II become more complicated. For a trade that is marked to market, cash will be paid or received in all likelihood prior to the settlement date. On the settlement date, payment is made **net** of all the prior cash paid or received due to margin requirements. When MBSCC is involved, the final price paid at settlement is further complicated by the netting process (which averages out prices across different trades in determining the price to be paid on the settlement date).

Clearance and Settlement Providers

Here we provide brief descriptions of the various organizations that clear MBS and ABS trades.

The **Mortgage-Backed Securities Clearing Corporation (MBSCC)** deals primarily with TBA transactions. Although the MBSCC does not act as the

[21] See "Clearance and Settlement Providers."

counterparty guaranteeing a trade, it does provide TBA trade position reports, netting services, margin protection, and Electronic Pool Notification.

Fedwire, operated by the Federal Reserve Banks, settles Freddie Mac and Fannie Mae pools and CMOs. Fedwire collects and distributes interest and principal on these securities. Note that in addition to clearing securities, it serves as a funds transfer system, acting as an intermediary for large-dollar wire transfers.

Depository Trust Company (DTC) settles asset-backed securities and non-agency CMOs. DTC collects and distributes interest and principal on these securities. DTC is a private sector service company owned by members of the financial industry.

Participants Trust Company (PTC) settles Ginnie Mae securities (pools and CMOs backed by Ginnie Mae collateral). PTC collects and distributes interest and principal on these securities. PTC recently became the Mortgage-Backed Securities Division of DTC.

Euroclear and **Cedel** settle internationally traded securities. For example, Citibank Credit Card 1999-2 can be held with Euroclear and Cedel, as well as DTC.[22] Note that settlement practices may differ for these international depositories. For example, according to the Citibank Credit Card 1999-2 prospectus, secondary trading between investors holding securities through Euroclear and Cedel should be conducted in accordance with conventional Eurobond practices.

The above institutions interact with one another. For example, DTC maintains securities accounts at the Federal Reserve Bank of New York, holding Fedwire-eligible securities for transfers against payment on DTC's system.

Custodial and Prime Broker Services

Custodial banks and Prime Brokers are among the chief intermediaries involved in the securities trading and lending markets. We give brief descriptions of the various services provided by these entities.

Custodial banks have historically been the chief intermediary service provider for institutional investors. The administrative, accounting, and operational complexities of the mortgage securities market require a significant amount of costly infrastructure. Many firms do not have the resources to invest in this infrastructure and, therefore, prefer to outsource these services to a custodial service. Although custodians are essentially portfolio administrators, they will also arrange trades, provide collateral management services, and basically manage all operational and administrative aspects associated with mortgage securities trading and lending.

Prime Brokers provide a range of clearance, custodial, financing, and reporting services for large retail and institutional accounts. The idea behind prime brokerage is that the customer can centralize at one broker (namely, the "prime" broker) the administrative tasks associated with maintaining his trading account, while

[22] Euroclear and Cedel do not actually hold Citibank Credit Card 1999-2 securities directly, but through the accounts of banks that are DTC participants.

executing trades through several brokers. This strategy leads to competitive execution and helps disguise trading strategies.

Accounts at Salomon Smith Barney

A new customer must go through a credit check to start trading. Customers who have a bank clearing agent to handle transfers of funds and securities processing should provide SSB (the broker-dealer) with a tax identification number, various account numbers including that of their bank clearing agent, an address to which confirmations and statements are to be sent, and clearing instructions. Clearing instructions specify the entities (DTC, PTC, Fedwire, see "Clearance and Settlement Providers") through which trades are to be cleared.

Investors concerned about the back-office issues associated with investing in MBS and ABS can open a custodial account with a prime broker such as SSB. The prime broker will manage all administrative aspects of maintaining the investor's trading account. In particular, SSB's Fixed Income Prime Broker leverages the firm's proprietary fixed-income technology infrastructure to provide clients with flexible clearance, custody, financing, and reporting for all trading activity. Moreover, SSB's Prime Broker has developed a niche for servicing funds that employ strategies that invest in mortgage pass-through securities. For these clients, Prime Broker can arrange for accounts at the Mortgage Backed Securities Clearing Corporation (MBSCC) to take advantage of netting and electronic pool notification services. In addition, the Prime Broker works with clients to optimize allocation strategies. Contact information for SSB Prime Broker is provided in Appendix A.

Appendix A. Resources for MBS and ABS Investors

In this appendix, we compile some key sources of information on mortgage securities for investors. In particular, Fannie Mae, Freddie Mac, and Ginnie Mae have a number of knowledgeable professionals available to answer questions about their own securities. For ease of reference, we have listed some of the resources they offer in this regard. In addition, commercial vendors, such as Bloomberg®, serve as sources of information on agency and nonagency securities.

As a pioneer in the trading and development of valuation models for mortgage- and asset-backed securities, SSB offers investors unmatched expertise in these areas. The SSB section touches on just some of the facilities that we offer investors. For further details, please contact your salesperson or one of the authors.

Salomon Smith Barney

- **Prime Broker.** SSB's Fixed Income Prime Broker effectively serves clients in all sectors of the US fixed-income market, including US Treasuries, agencies, mortgage- and asset-backed securities, high yield bonds, and credit-sensitive securities. SSB Prime Broker also provides clearing, custody, and financing services for sovereign and corporate debt in many major and emerging markets. For further information regarding SSB Fixed Income Prime Broker, please call (212) 723-2846.
- **Salomon Smith Barney DIRECT®.** SSB DIRECT® is an institutional fixed-income communication tool created to deliver research, trade ideas/color, market coverage, and bond offerings to customers over the Internet. All our research publications and manifolds (including the Key Issue Package MB725) are available on DIRECT®. Call your salesperson for a password to SSB DIRECT®, or contact (212) 723 9474 or +44-[0]171-721-2920.
- **Trade Processing and Settlement.** For queries about operational issues, please send e-mail to mbsoperations@ssmb.com.
- **Yield Book™ (http://yieldbook.com/).** The Yield Book™ is SSB's delivery system for fixed-income analytics, and supports our industry standard mortgage prepayment and valuation models. All SSB mortgage- and asset-backed research may be accessed on the Yield Book™. The Yield Book™ is the premier fixed-income analytics system and is used by all of the top ten US fixed-income money managers and by 80 of the top 100. For more information, look at the Web site, call (212) 816-7120, or e-mail Sales@YieldBook.com.

Fannie Mae

- **Fannie Mae on Bloomberg®.** *MBSenger*® is an electronic newsletter published by Fannie Mae and available on Bloomberg®. It can be accessed by typing *MBSN <GO>*. The newsletter reports on economic, housing, and mortgage market news, among other areas of interest to investors.

- **Helplines.** This service provides answers to nonroutine questions about Fannie Mae securities (9:00 a.m. to 5:00 p.m., Eastern time, every business day). Call (800) BEST-MBS, or (202) 752-6547.[23]
- **MORNET® MBS Bulletin Board.** MORNET®, Fannie Mae's electronic mail system, allows investors to receive information and exchange messages with other subscribers. Through the MORNET® Bulletin Board, MBS investors have access to information about MBS settlements, new issues, auctions, SMBS factors, Fannie Majors® pools, and ARMs. For more information contact the MORNET® Hotline at (800) 752-6440, or (202) 752-6000.
- **PoolTalk®.** Investors in Fannie Mae MBSs have 24-hour access to pool information (CUSIPs, pool factors, WACs, WAMs, etc.) through PoolTalk®, Fannie Mae's voice response information system. An account can be set up by calling (800) BEST-MBS, or (202) 752-6547.
- **Web Site (http://www.fanniemae.com).** This Web site contains useful information about Fannie Mae and its mortgage and debt securities programs.

Freddie Mac

- **Freddie Mac on Bloomberg®.** Freddie Mac Almanac on Bloomberg® (Type *FMAC <GO>*) contains housing news, the *Securities Bulletin* newsletter, and a variety of other financial and product information.
- **Investor Inquiry**. This service provides answers to questions about Freddie Mac securities and disclosure (9:00 a.m. to 5:00 p.m., Eastern time, every business day). Call (800) 336-3672, or e-mail Investor_Inquiry@ freddiemac.com.
- **Mortgage Securities Marketing.** This department is available to answer nonroutine questions about Freddie Mac securities. Please contact (703) 903-3805, or e-mail patricia_hand@freddiemac.com.
- **Web Site (http://www.freddiemac.com).** Freddie Mac has special sections of its Web site devoted to mortgage securities and debt securities. The mortgage securities site contains, among other things, Freddie Mac's monthly *Securities Bulletin* newsletter, product information, offering circulars, new-issue announcements, and all single-class and multi-class disclosure for Freddie Mac PCs and REMICs. Freddie Mac's debt Web area also contains product literature and announcements, offering circulars, and disclosure information. The *Financial Research News* (http://www.freddiemac.com/news/finance) section of the Web site contains a number of very useful economic data series for mortgage market participants. In particular, the site contains a weekly survey of mortgage rates (PMMS), a home price index, an economic housing forecast, and a housing refinance survey. It also contains *Secondary Mortgage Markets*, a highly regarded Freddie Mac publication that offers analysis of key business, economic, and public policy issues affecting the housing and mortgage finance markets. Freddie Mac's Web site is accessible 24 hours a day, seven days a week, with no password or access restrictions.

[23] Routine questions, such as inquiries about pool CUSIPs and factors, are answered through PoolTalk®.

Ginnie Mae

- **Capital Markets.** This service provides answers to questions about Ginnie Mae securities (9:00 a.m. to 6:00 p.m., Eastern time, every business day). Call (212) 668-5180, or (202) 401-8970.
- **Factor Information.** An automated pool factor information service can be accessed at (212) 638-6509. For REMIC factors (and questions about operational issues) contact (800) 234-GNMA.
- **Ginnie Mae on Bloomberg®.** Investors can access information about Ginnie Mae Platinum® securities, Multiple Issuer Pools, REMICs, and Callable Trusts on Bloomberg® by typing *GNMA <GO>*. The information provided on Platinum® pools is particularly comprehensive and includes an overview of the program, a fee schedule, and a list of all Platinum pools issued.
- **Web Site (http://www.ginniemae.gov).** The *Ginnie Mae Guides* are among the most useful resources available on the Web site. The *Guides* provide an in-depth description of the Ginnie Mae I and Ginnie Mae II programs. Changes to Ginnie Mae programs (and, therefore, to the *Guides*) are usually announced by *All Participants Memoranda*, which can also be found on the Web site.

The Bond Market Association

The Bond Market Association represents securities firms and banks that underwrite, trade, and sell debt securities (including mortgage- and asset-backed securities) domestically and internationally. The association speaks for the bond industry and advocates its positions. The association also keeps members informed of relevant legislative, regulatory, and market-practice developments.

- **Publications.** The association publishes books, brochures, manuals, and other educational materials. Investors who are new to the ABS and MBS markets will find the following publications especially useful: (1) *Uniform Practices for the Clearance and Settlement of Mortgage-Backed Securities and Other Related Securities*; (2) *An Investor's Guide to Asset-Backed Securities (ABS)*; (3) *An Investor's Guide to Collateralized Mortgage Obligations (CMOs)*; (4) *An Investor's Guide to Mortgage-Backed Securities*; (5) *Standard Formulas for the Analysis of Mortgage-Backed Securities and Other Related Securities.* For information about ordering these publications, contact Publications at (212) 440-9430, or look at the organization's Web site.
- **Web Site (http://www.bondmarkets.com).** The BMA Web site is a mine of useful information on regulatory, legislative, and market-practice developments relevant to all US fixed-income sectors. However, some parts of the Web site are only accessible to BMA members. Other useful items include a list of MBS settlement and notification dates, and helpful publications for new investors in mortgage- and asset-backed securities.

Commercial Vendors

Several commercial vendors serve as a source of data and news on mortgage securities. Perhaps the best known is Bloomberg®; others include Telerate (a division of Bridge Information Systems) and Reuters.

Appendix B. Glossary of Common Terms

ABS. In addition to being an acronym for **asset-backed security**, this term is used to denote **absolute prepayment rate**, a prepayment measurement convention used to price ABS deals backed by car loans. As opposed to SMM and CPR, which measure prepayments in terms of the current remaining balance, ABS measures prepayments as a percentage of the *original* balance; thus, 1.5% ABS means that 1.50% of the original balance prepays each month.

Amortization. The repayment of principal over the term of a loan, rather than in one lump sum at maturity. For a fixed-rate mortgage loan, the (constant) monthly payment is calculated so that the loan is fully paid off over the loan term.

Adjustable Rate Mortgage (ARM). In the United States, the coupon on an ARM typically resets once a year, usually at a specified spread over the one-year Treasury rate, subject to periodic caps (usually 100bp or 200bp) and a lifetime cap (usually 500bp or 600bp) above the coupon at origination.

Average Life. See **WAL**.

Bond Market Association (BMA). A trade association of fixed-income securities dealers, formerly known as the Public Securities Association (PSA). The BMA establishes rules for fixed-income settlement procedures (such as good delivery requirements), deals with issues that affect the bond markets, and publishes brochures on fixed-income securities (see Appendix A for some examples).

Book-Entry Securities. Book entry securities are also known as wireable securities. US Treasury and agency securities (including Fannie Mae and Freddie Mac MBSs) are book-entry securities that are transferred from one entity to another through Fedwire. Ginnie Mae MBSs are wireable through the Participants Trusts Company system.

Bounce. This operational term refers to sending securities back to where they were originated on the trade date because (a) cash was not received; (b) the dollar amount was not the same as expected; (c) the seller switched the securities; or (d) there is discrepancy in trade information.

Buy-In. The process of repurchasing a security previously bought from a customer or broker-dealer who failed to deliver the security to the purchaser within 60 calendar days of the settlement date. Any losses incurred in closing the original transaction are passed along to the original seller who failed to deliver. (Also see **Fail**.)

Callout Date. The callout date is also referred to as **48-hour day**. In a TBA trade, information about the actual pools that will be delivered from the seller to the buyer is only provided two days before the actual settlement date (by 3:00 p.m.).

Carry. The spread between the yield on a MBS and the rate at which money is borrowed to finance the MBS equals the cost to "carry" the security. When the financing rate is greater than the yield, the security has **negative carry**. When the financing rate is less than the yield, the security has **positive carry**.

Clearing Agent. An organization that provides various services for customers and customers' accounts, such as holding inventory positions, receiving and delivering securities, and disbursing funds.

Collateralized Mortgage Obligation (CMO). A common term for a structured mortgage security and used interchangeably with **REMIC**. See Appendix B of the *Guide to Mortgage-Backed Securities* for definitions of common CMO bond types, such as PACs (planned amortization classes).

Conforming Loans. Mortgage loans that satisfy (or conform to) agency underwriting criteria, in terms of maximum loan balance, loan-to-value (LTV) ratio, debt-to-income requirements, and so on.

Conventional Loans. Mortgage loans that are *not* insured by the US government (i.e., by the FHA or VA). Conventional loans can be **conforming** or **nonconforming**.

Constant Prepayment Rate (CPR). An annualized prepayment rate assuming monthly compounding. It is the fraction of the current principal balance, after accounting for scheduled amortization, that would be prepaid over the next 12 months for a given constant monthly prepayment rate (see also **SMM**).

Current Face. The current principal balance on a security. It is equal to the original balance times either the current pool factor (for pass-throughs) or bond factor (for structured MBSs).

CUSIP. A unique nine-digit identification number for each publicly traded security. CUSIP also stands for the Committee on Uniform Securities Identification Procedures, which assigns the numbers.

Custodian. In the clearing process, an organization that holds securities under its own name or under its control on behalf of its customers. In addition to custody, custodians also offer their clients cash management and securities lending services. For example, custodians can help their institutional clients earn incremental income on their portfolios by lending securities from this portfolio to broker-dealers who wish to borrow them. (See Section IV for more details.)

Delay. The principal and interest payments due on an MBS are passed through to investors with a delay to allow servicers time to process mortgage payments. For example, the stated delay on a Ginnie Mae pool is 45 days; thus, the principal and interest for September is paid on October 15, rather than October 1. (See the *Guide*, pp. 11-12, for more details.)

Dollar Roll. In a dollar roll transaction, a pass-through investor agrees to sell securities in the current month and buy back the same amount of substantially similar securities in a forward month at a second, lower price. The second price is specified as a difference, or **drop**, from the first price. The investor forgoes principal and interest payments over the term of the roll and is compensated by the interest earned on the cash proceeds of the initial sale and by the lower repurchase price at the future date. The transaction is favorable to the investor when the drop is large enough to reduce the implied financing rate below short-term reinvestment rates. (See Section III for more details.)

Factor. The fraction of the original balance that is still outstanding. For example, a factor of 0.65 means that the current balance is 65% of the original; that is, scheduled principal payments (amortization) and prepayments have led to 35% of the original balance being paid down. For bonds in structured MBSs and ABSs, the term **bond factor** denotes the remaining principal balance of the bond as a fraction of the original. Collateral and bond factors are updated each month and used to determine principal payments to investors. The three agencies update pool factors near the beginning of each month. Figure 4 shows when agency pool factors are updated each month.

Fail. A failure to deliver securities versus payment on the settlement date. The originator of the delivery is held liable.

Fannie Mae (the former **Federal National Mortgage Association**, or **FNMA**). A private corporation originally created by the US government to facilitate the flow of mortgage capital by purchasing and creating a secondary market in such loans. It still has close ties with the US government (see footnote 5) and is usually referred to as an **agency** or a **Government-Sponsored Enterprise** (**GSE**). (See its Web site **http://www.fanniemae.com** for more details.)

Fedwire. Connects the Federal Reserve offices, depository institutions, the US Treasury, and other government agencies. Fedwire is typically used to transfer large dollar payments and book-entry securities electronically from one institution to another on behalf of investors.

Freddie Mac (the former **Federal Home Loan Mortgage Corporation**, or **FHLMC**). A private corporation originally created by the US government to facilitate the flow of mortgage capital by purchasing and creating a secondary market in such loans. It still has close ties with the US government (see footnote 5) and is usually referred to as an agency or a **Government-Sponsored Enterprise** (**GSE**). (See its web site **http://www.freddiemac.com** for more details.)

Ginnie Mae (formerly known as the **Government National Mortgage Association**, or **GNMA**). An agency of the US government that securitizes mortgages insured by the US government agencies, the **Federal Housing Administration**, the **Veterans Administration**, and the **Rural Housing Service**. Ginnie Mae MBSs carry the full faith and credit of the US government and, hence, have the same credit quality as US Treasuries. (See its Web site **http://www.ginniemae.com** for more details.)

Haircut. A percentage of the price of a security used to establish a margin account. This margin account is used to provide the cash lender with a hedge against a decline in the market value of the security. Haircuts are commonly used in repurchase (repo) transactions.

IO. An **interest-only** structured MBS, which is entitled to interest payments only from the collateral cash flows (see also **PO**).

Netting. When two parties enter into offsetting trades (a pair-off), there is no need to receive/deliver securities. Instead, only the net gain/loss needs to be accounted for. Netting takes this one step further by performing a similar function with many participants simultaneously. For example, if A sells a security to B and B already has a sell position to C for the same amount of the same security, then B has no resulting net position and does not need to receive/deliver any securities for these transactions.

Pair-Off. See **Netting**.

Par Amount. The principal balance of an MBS at issuance. Used synonymously with **face amount**.

Percent PSA. A prepayment measurement convention. 100% PSA means that the prepayment rate increases linearly from 0% CPR at loan age 0 to 6% CPR at loan age 30 months, and then remains at 6% CPR, while 150% PSA means that the CPR is 1.5 times the CPR at a 100% PSA, and so on (see the *Guide* for more details). CMO deals are usually priced at a percentage of PSA.

PO. A **principal-only** structured MBS that is entitled to principal payments only from the collateral cash flows (see also **IO**).

Pool. A collection of individual mortgages that are grouped together by primary lenders (banks, thrifts, mortgage bankers) to constitute the collateral for an MBS.

Prime Broker. Prime brokers facilitate the clearance and settlement of securities trades. Prime brokerage involves three parties:

- ➤ The customer, typically a substantial retail or institutional investor,
- ➤ The executing broker, which executes the trade for the customer,
- ➤ The prime broker, which settles, clears, and finances the customer trades executed by one or more executing brokers.

Prime brokerage allows the customer to utilize the services of several executing brokers, while maintaining one account (with the prime broker) and receiving one consolidated account statement. (See Section IV for more details.)

Public Securities Association (PSA). See **Bond Market Association**.

Record Date. The date used to note ownership of a security, to determine the distribution of the next payment. For agency MBSs, it is the last day of the month; on this date, the owner receives the principal and interest payment for the month (usually paid the next month). For other MBSs and ABSs, the prospectus specifies the record date.

Real Estate Mortgage Investment Conduit (REMIC). A tax vehicle used to issue structured MBSs, but now the term is used synonymously with **CMO** to denote such securities.

Repurchase Transaction (Repo). Repurchase transactions are securities lending transactions in which one party agrees to sell securities to another party against the transfer of funds, with a simultaneous agreement to repurchase the same securities at a specific price at a later date. (See Section III for more details.)

Single Monthly Mortality (SMM). The percentage of remaining principal that, after accounting for scheduled amortization, pays down in a month. The annualized value of the SMM is the **CPR**. (See Appendix A of the *Guide* for a mathematical definition.)

Weighted-Average Coupon (WAC). The average coupon on the loans in a pool, weighted by the loan balances. The difference between the WAC and the pass-through coupon paid to investors is termed the **servicing spread**.

Weighted-Average Life (WAL). A measure of the investment life of a fixed-income security that returns principal over a period of time, rather than in one lump sum at maturity. It is the average time until a dollar of principal is returned. (See Appendix A of the *Guide* for a mathematical definition.)

Weighted-Average Loan Age (WALA). The average age of the loans in a pool, weighted by the loan balances.

Weighted-Average Maturity (WAM). The average time until maturity of a pool of loans, weighted by the loan balances.

Appendix C. Risk-Based Capital Standards[24]

Institutional investors need to be cognizant of their supervisory agencies' capital standards before investing in MBSs and ABSs. These capital requirements will likely be based on standards for capital adequacy that were initially formalized in the 1988 Basle Accord. The Accord was established by the Basle Committee on Banking Supervision of the Bank for International Settlements. The committee consists of senior representatives of bank supervisory authorities and central banks from the Group of Ten (G-10) countries.[25]

The 1988 Accord was primarily concerned with credit risk and instituted a **minimum ratio** of capital to assets for internationally active banks. The Accord takes into account the relative risk of an asset by relating capital requirements for a particular asset to the credit risk of this asset. Assets are assigned to five different risk buckets with weights of 0%, 10%, 20%, 50%, and 100%. Figure 15 shows the four risk categories used in the US risk-based regulatory regime.

Figure 15. Depository Risk-Based Capital Standards

Risk Weight	Financial Instrument Characteristics	Examples
0%	Unconditionally backed by the national government in one of 30 economically developed countries	Cash, US Treasuries, Ginnie Mae pass-throughs
20%	Low default risk, easily liquidated	Freddie Mac, Fannie Mae mortgaged-backed securities; federally insured banking deposits
50%	Low to moderate default risk, well collateralized	Many private-label mortgage-backed securities, single-family mortgages with down payments of 20% or, if less, mortgage insurance.
100%	Ineligible for lower risk-weight categories	Single-family mortgages with down payments of less than 20% and no mortgage insurance, some second mortgages, commercial loans, asset-backed securities

Source: Federal Reserve Board, Office of Thrift Supervision. Adapted from "Risk-Based Ratios: Getting Closer," Edward L. Golding and Carol A. Wambeke, *Secondary Mortgage Markets*, July 1998, pp. 29-31.

Total risk-weighted assets are calculated by assigning balance-sheet assets (such as those listed in Figure 15) to specified categories and multiplying the amounts by risk weights used for the category. In general, banks and thrifts are required to maintain a capital to risk-weighted asset ratio of at least 8%. Figure 16 illustrates the capital reserves calculation for Fannie Mae and Ginnie Mae pass-throughs.

Figure 16. Capital Reserves for Fannie Mae and Ginnie Mae Pass-Throughs

Security	Risk-Weight	Risk-Weighted Assets	Required Capital Reserves
$100 Fannie Mae Pass-Throughs	20%	20% * $100 = $20	8% * $20 = $1.6
$100 Ginnie Mae Pass-Throughs	0%	0% * $100 = $0	8% * $0 = $0

Source: Salomon Smith Barney.

[24] The authors gratefully acknowledge the invaluable contributions of Scott Benedict of Cleary, Gottlieb, Steen, & Hamilton and Steve Rehm at Salomon Smith Barney in putting this Appendix together.

[25] The Group of Ten (sic) countries consists of Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States.

Since 1988, the Basle Committee has amended the capital accord several times. In particular, in January 1996, the Accord was supplemented with a "market risk measure" that calculates capital requirements separately for the trading portfolios of banks with large equity, debt, foreign exchange, or commodity operations. In June 1999, the Basle Committee published a consultative paper, *A New Capital Adequacy Framework*, which provides a framework for replacing the 1988 Accord. The new capital framework consists of three "pillars," minimum capital requirements,[26] a supervisory review process, and the "effective use of market discipline."

Banking supervisors of each of the participating G-10 countries — as well as several countries that are not members of the Basle Committee — interpret and apply the Accord standards through their own regulations and directives. In the United States, two years after the Accord and in the aftermath of the thrift crisis, the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) required thrifts to adopt a risk-based capital ratio that was based on the Basle recommendations. Currently, the Federal Reserve System (Fed) and other federal banking regulators[27] apply these standards to all US banks, thrifts, and (although not mandated by the Basle Accord) bank holding companies.[28]

Figure 17 summarizes international risk-based capital credit risk weights for securities held in the banking book. Positions held in trading portfolios are not risk-weighted separately, but are included in portfolio-wide market risk capital calculations. This summary also assumes that there has been no transfer with recourse by the investing bank or thrift. We have left a few risk weights in brackets because the text of the written UK, EU, and Japanese capital regulations that we have been able to find are just not clear on these items.

[26] The current risk-weighting system will be replaced by a system that relies on external credit ratings.

[27] Namely, the Federal Deposit Insurance Corporation (FDIC), the Office of the Comptroller of the Currency (OCC), and the Office of Thrift Supervision (OTS).

[28] In addition to the Basle Accord standards, US institutions are required to maintain non-risk-weighted "leverage ratios" (Tier I capital divided by balance-sheet assets) of at least 3%-4%. Tier I capital refers to the permanent equity capital of a bank, consisting of equity capital and disclosed reserves. Equity capital includes cumulative preferred stock, noncumulative perpetual preferred stock and other instruments that cannot be redeemed at the option of the holder.

Figure 17. International Risk-Based Capital Weights

Security Type	US Banks	US Thrifts	UK Banks	EU Banks	Japanese Banks	Example of Mortgage Pool or CMO/ABS Trust
Ginnie Mae Pass-Throughs	0[a]	0[a]	0	0	0	Ginnie Mae Pool #482736
CMOs Backed by Ginnie Mae Collateral	20[a]	20[a]	[20][b]	[20]	[20][c]	Fannie Mae CMO 1992-G35
Fannie Mae/Freddie Mac Pass-Throughs	20[a]	20[a]	20	[20]	20	Freddie Mac Pool #181991
Fannie Mae/Freddie Mac CMOs	20[a]	20[a]	20	[20]	20	Freddie Mac CMO 1758
Qualifying Residential Mortgage Loans[d]	50[a]	50	50	50	50	
Nonagency MBSs	50[a]	20 if SMMEA; otherwise 50[a]	50	50	50[c]	NASCOR 1998-12
Asset-Backed Securities	100	100	100	100	100	Citibank Credit Card 1999-2

[a] Except for IO and PO strips, residuals and subordinated classes, which are assigned a 100% risk weight regardless of issuer or guarantor. However, the OTS is in the process of deciding whether lower risk weights may be appropriate for agency IOs and POs.
[b] The UK Financial Services Authority (FSA) assigns a 10% risk weighting to OECD government securities (and CMOs backed by GNMA or other government collateral) that have (i) a fixed rate and one year or less left to maturity, or (ii) a floating rate (and any remaining maturity).
[c] As of the time of publication, the Japanese Ministry of Finance capital regulations are not clear on these specific securities. Japan's large banks tend to follow US risk-based capital regulations by analogy.
[d] The regulations are not completely precise on this point, but most current residential mortgage loans with LTVs of 80% or less or backed by approved mortgage insurance if their LTVs are higher would fall in this category. Nonqualifying mortgage loans include those with LTVs greater than 80% and no private mortgage insurance. These loans are assigned a risk weight of 100%. FHA-insured or VA-guaranteed loans are exceptions to both of these rules and are assigned risk weights of 20% by US banks and thrifts.
Source: Salomon Smith Barney.

Recommended Introductory References

Investors should find the following publications useful in understanding some of the intricacies involved in risk-based capital management and regulation:

"Special Issue on Capital," *Secondary Mortgage Markets*, July 1998, Vol. 15, Nos. 1 and 2, Freddie Mac.

"A New Capital Adequacy Framework," Consultative paper published by the Basle Committee on Banking Supervision, Basle, June 1999. (http://www.bis.org/publ/)

Appendix D. **Settlement Dates**

TBA Agency Pass-Throughs

There are four categories in the Bond Market Association settlement date schedule.

- **Class A**. 30-year conventional
- **Class B**. 15-year conventional
- **Class C**. 30-year Ginnie Mae
- **Class D**. Balloons, ARMs, other

Figure 18 provides examples of some actual settlement dates.

Figure 18. Examples of BMA Settlement Dates

	Dec 99	Jan 00
Class A	13th (Mon)	19th (Wed)
Class B	16th (Thu)	24th (Mon)
Class C	20th (Mon)	25th (Tue)
Class D	22nd (Wed	26th (Wed)

Source: Salomon Smith Barney.

The BMA generally publishes the settlement dates about six months in advance. No formula is used to determine the dates, but general guidelines are that the dates must be after pool factors become available, should not occur too close to the end of the month, and should not fall on a Friday (to help avoid a fail occurring over a weekend).

CMOs/ABSs

CMOs and ABSs traded in the secondary markets use **corporate settlement**. These securities settle three days after the trade date (**T+3**). Exceptions to this might occur if securities are held through the depositories Cedel or Euroclear. New issues normally settle when the deal settles (issue date).

Interest-Only/Principal-Only Strips (Secondary Trading)

The settlement date convention for strips is a little more complicated. The settlement convention for strips is given by the following three rules:

1. First part of the month before the 48-hour day is reached, use TBA settlement date (for current month).
2. On the 48-hour day, when TBA settlement date coincides with skip-day settlement (settlement two days after the trade date [**T+2**]), convert to skip-day settlement at this point and for most of the rest of the month (see 3).
3. Very near the end of month, when skip-day settlement falls into the next month, switch to next month's TBA settlement date and continue with 1.

Figure 19. Examples of IO/PO Settlement Dates (Dec 99)[a]

Trade Date	Settlement Date
Dec 1–9	Dec 13 (Mon)
Dec 10–29	Skip-Day (T+2)
Dec 30–31	Jan 19 (Wed)

[a] December 13 and January 19 are BMA TBA settlement dates.
Source: Salomon Smith Barney.

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