A photograph of an American flag waving in front of a classical building with columns. The flag is on the left, and the columns are on the right. The image is partially obscured by a dark blue text box on the right side.

Ginnie Mae and the Secondary Mortgage Market: an Integral Part of the American Economic Engine

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Section I: Introduction

An important part of the American dream is to own a home. To help Americans realize this dream, the U.S. government has implemented policies that favor the homebuyer. For example, federal income tax provisions, which in part allow the postponement or elimination of taxes resulting from capital gains, have made homeownership an attractive investment. Provisions in the federal income tax law and non-tax legislative initiatives have also made buying a home more affordable: the law allows the interest portion of mortgage payments to be a deductible item, thereby reducing the after-tax cost of homeownership. Finally, federal policies have fostered the development of a strong housing finance market — a market where the availability of credit (money to lend) results in favorable lending terms for consumers (i.e., reasonable down payment and flexible, consumer-friendly mortgage instruments at highly competitive interest rates).

Prior to the Great Depression, because of onerous financial requirements that potential homebuyers faced, American homeownership rates were low. The terms of a typical mortgage loan required the borrower make a down payment of about 40 percent and repay the loan within three to five years. Very few Americans today could afford to buy a home under such financial conditions, particularly low- and moderate-income families who may be first-time homebuyers.

Today, the financial requirements for purchasing a home are nowhere near as strenuous, making home buying within reach of low- and moderate-income Americans. The typical homebuyer will make a down payment of between 10 percent and 20 percent, making it possible to accumulate the necessary funds in a shorter period of time. The term of the mortgage loan can be up to 40 years. Because the term of mortgage loans affects the amount of the monthly mortgage payment (specifically, the longer the term of the loan the lower the monthly mortgage payment), the homebuyer has the flexibility to select a mortgage term that will result in a monthly mortgage payment that is within his or her budget. This flexibility increases the affordability of housing to a wider segment of the American population. Finally, the interest rate on the mortgage loan can either be fixed for the life of the loan or it can be adjustable. If a potential homebuyer selects a fixed-interest-rate mortgage, the monthly mortgage payments are known, making household budgeting easier. But if a potential homebuyer believes that the prevailing mortgage rate at the time a home is purchased is high and is expected to decline in the future, the homebuyer can obtain an adjustable-rate mortgage.

Neither the dramatic change in the structure of mortgage designs available from the pre-Great Depression days to today nor the significant pool of funds available to make homeownership possible came about by accident. The obstacle that had to be overcome to develop the world's strongest housing finance market was to create a vehicle attractive to investors, particularly institutional investors (i.e., pension funds, mutual funds, central banks, insurance companies, and depository institutions) anywhere in the world. Just how that obstacle was overcome and the role of the Government National Mortgage Association ("Ginnie Mae") in this process are explained in this paper.

The paper is organized as follows: in Section II, the role of the secondary mortgage market and the effect of mortgage-backed securities (MBS) on financing housing in America are discussed. The role of Ginnie Mae in the secondary mortgage market through its MBS programs, and in particular its contributions toward financing affordable housing, is discussed in Section III. The secondary benefits of the MBS market — strengthening the balance sheets of America's lending institutions by transferring debt to investors and the advantages that a supply of safe, sound, dependable investment programs have meant to large numbers of pension funds, municipalities, individuals, and foreign governments — and Ginnie Mae's role are covered in Section IV. In Section V, we provide an analysis of the Ginnie Mae business model.



Section II: Role of the Secondary Mortgage Market and America's Housing Finance Market

Today the mortgage market is the largest sector of the global debt market, far exceeding the market for U.S. Treasury securities. Table 1 shows the amount of mortgages outstanding from 1994 to 2002. The key to the development of the American housing finance market has been the development of the American secondary mortgage market—today the most robust in the world.

To appreciate the important economic role of the secondary mortgage market, an understanding of the basic fixed-rate mortgage loan is necessary. By understanding the structure of this mortgage loan and its investment characteristics, we can look at the appeal of investing in individual mortgage loans by investors — both retail investors (e.g., individual investors) and institutional investors (e.g., pension funds, commercial banks, savings & loan associations, central banks, insurance companies, and mutual funds) — throughout the world.

Table 1

Mortgage Debt Outstanding (\$ Millions)

	1994	1995	1996	1997	1998	1999	2000	2001	2002*
Total Outstanding	4,392,794	4,603,982	4,868,297	5,204,119	5,715,556	6,320,508	6,885,323	7,589,578	7,965,275
By Type of Mortgage									
1 - 4 Family	3,355,485	3,510,319	3,718,683	3,973,692	4,365,968	4,790,601	5,203,674	5,732,523	6,040,743
Multifamily	271,748	277,002	288,837	302,291	331,602	369,251	406,530	454,715	473,950
Commercial	682,590	732,100	773,643	837,837	921,482	1,057,692	1,166,261	1,286,011	1,330,409
Farm	82,971	84,561	87,134	90,299	96,504	102,964	108,858	116,329	120,173
By Holder									
Commercial Banks	1,012,711	1,090,189	1,145,389	1,245,315	1,336,996	1,495,420	1,660,054	1,789,819	1,875,360
Savings Institutions	596,191	596,763	628,335	631,826	643,955	668,064	722,974	758,236	740,288
Life Insurance Cos	210,904	213,137	208,162	206,840	213,640	230,787	235,941	243,021	245,165
Federal / Agency	315,580	308,757	295,192	286,194	291,961	320,054	344,225	376,999	396,091
Mortgage Pools / Trusts	1,730,004	1,863,210	2,040,848	2,239,350	2,581,297	2,948,245	3,231,415	3,715,692	3,986,440
Individuals/Others	527,404	531,926	550,372	594,594	647,708	657,938	690,714	705,811	721,932

*As of June 30, 2002

Source: Bond Market Association

As noted below, the investment characteristics of mortgage loans are unappealing to most investors. The more unappealing, the higher the yield premium investors will require to induce them to invest in mortgage loans. (The “yield premium” is the spread investors require over the yield offered on U.S. Treasury securities.) A higher yield premium translates into a higher borrowing cost for homebuyers, thereby reducing the affordability of homeownership.

Before we discuss the basic fixed-rate mortgage loan, it is worthwhile to gain an understanding of how the mortgage market has developed by looking at the limitations of the early market.

Limitations of the Early Mortgage Market

In the first decades of the post-World War II period, the bulk of mortgage loans was originated and kept in the portfolios of depository institutions (and, to a lesser extent, portfolios of insurance companies). By 1950, depository institutions held nearly 50 percent of these loans, of which S&Ls held 20 percent; by the mid-1970s the share of depository institutions had grown to 64 percent, of which S&Ls held 37 percent.

The supply of funds to the mortgage market was therefore dependent on the ability of depository institutions, particularly S&Ls, to raise funds and hold the mortgage loans oriented in their loan portfolio. However, depository institutions were encouraged by legislation and regulation to confine deposit-seeking and lending activities to their local housing market. Under such constraints, a poor allocation of resources that could be committed to the mortgage market developed, as some regions had an excess supply of funds and low rates and others had shortages and high rates.

Enter a new participant — the mortgage banker. Unlike thrift and commercial bankers, mortgage bankers did not provide funds from deposit taking. Instead, they originated mortgages and sold them, not just to insurance companies but to thrifts in other parts of the country looking for mortgage investments — in essence providing a brokerage function. This seemed like an adequate market, bringing mortgage rates throughout the country closer together and reducing the shortage of mortgage money in high-demand regions of the country.

The mortgage market operated this way through the late 1960s, but it had a major flaw — it was dependent on the availability of funds from thrifts and banks, whether local or national. However, in the late 1960s — an economic period characterized by high and fluctuating inflation and interest rates — disintermediation (i.e., the withdrawing of funds from depository institutions), induced by ceilings on interest rates, led to a reduction in funds available to all depository institutions. To counter (or at least mitigate this problem), the country needed a mortgage market that was not dependent on deposit-taking institutions. This could only be accomplished by developing a strong secondary mortgage market in which financial institutions other than deposit-taking institutions and insurance companies would find it attractive to supply funds.

Investment Characteristics of Mortgage Loans

There are many types of mortgage designs available to homebuyers in the United States. In general, they are classified as either fixed-rate or adjustable-rate mortgages. Regardless of the type of design, they have three features unattractive to investors: credit risk, liquidity risk, and prepayment risk.

Credit risk is the risk that the homebuyer will fail to make contractual payments set forth in the mortgage loan agreement. *Liquidity risk* is the risk that an individual mortgage loan will not be able to be sold in the market at its true value. (We will see the role that Ginnie Mae and mortgage-backed securities play in eliminating credit risk and reducing liquidity risk in Section III.)

Prepayment risk arises because the homebuyer typically has the right to prepay a mortgage loan, in whole or in part, prior to the scheduled principal repayment date. From the perspective of the homebuyer, an attractive feature of the mortgage designs in the United States is the availability of long-term funds at fixed interest rates. However, long-term fixed-rate mortgage designs' investment characteristics do not appeal to institutional investors seeking to match asset cash flows to that of their liabilities. To understand why, we must understand the investment characteristics of the long-term fixed-rate mortgage design.



While there are various fixed-rate long-term mortgage designs, our discussion will focus on the most common design — one where the mortgage payments are level for the term of the mortgage. That is, the homebuyer makes equal monthly installments over the term of the mortgage. (This mortgage design is also the one most frequently used as collateral for a Ginnie Mae MBS.)

Each monthly mortgage payment for a level-payment fixed-rate mortgage loan consists of the following:

- interest of 1/12 of the fixed annual interest rate multiplied by the amount of the outstanding mortgage balance at the beginning of the previous month; and
- a repayment of a portion of the outstanding mortgage principal balance.

The difference between the monthly mortgage payment and the portion of the payment that represents interest is equal to the amount that is applied to reduce the outstanding mortgage balance.

Figure 1 shows the portion of the monthly mortgage payment that represents interest and principal repayment (i.e., amortization) over the life of a \$100,000, 7 percent, 30-year mortgage. Notice that the portion of the monthly mortgage payment applied to interest declines each month and the portion applied to reducing the outstanding mortgage balance increases. The reason for this is that as the outstanding mortgage balance is reduced with each monthly mortgage payment, the interest on the outstanding mortgage balance declines. Since the monthly mortgage payment is fixed, an increasingly larger portion of the monthly mortgage payment is applied to reduce the principal in each subsequent month. The monthly mortgage payment is computed so that after the last scheduled monthly mortgage payment is made, the amount of the outstanding mortgage balance is zero (i.e., the mortgage is fully repaid). This can be seen in Figure 2.

Figure 1

Interest and Principal Components of the Life of a 7%, 30-Year \$100,000 Mortgage Loan

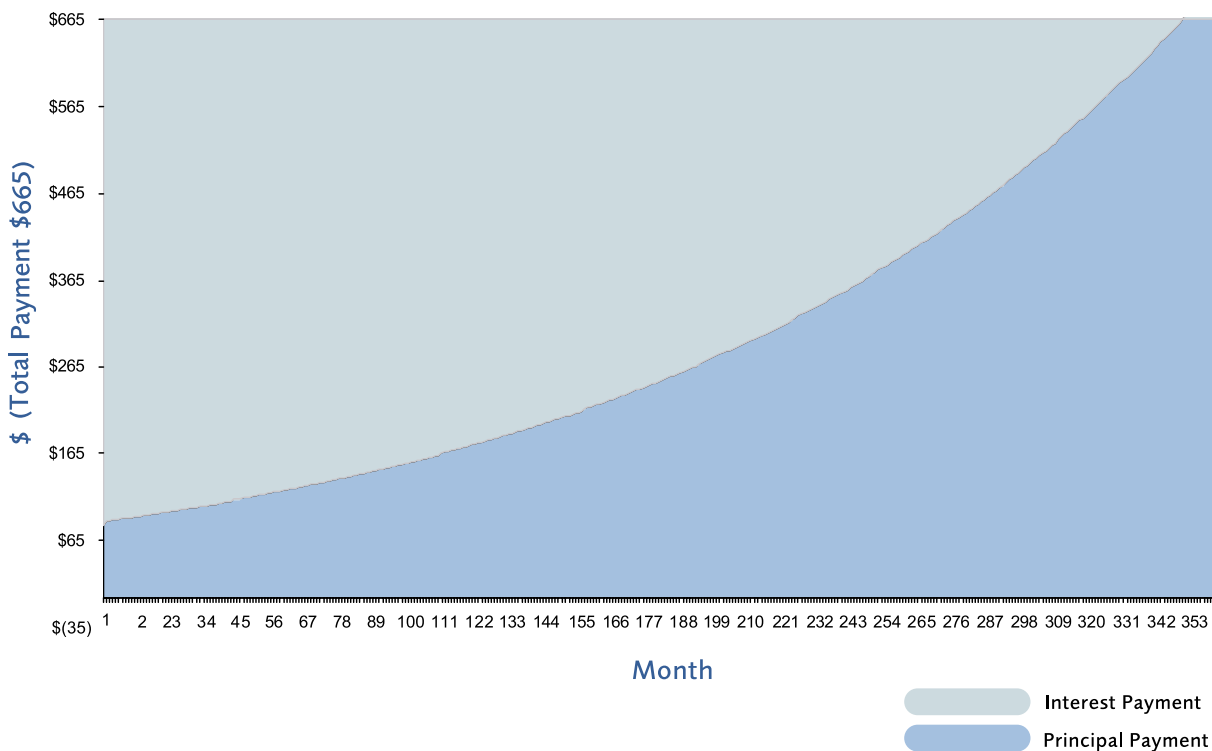
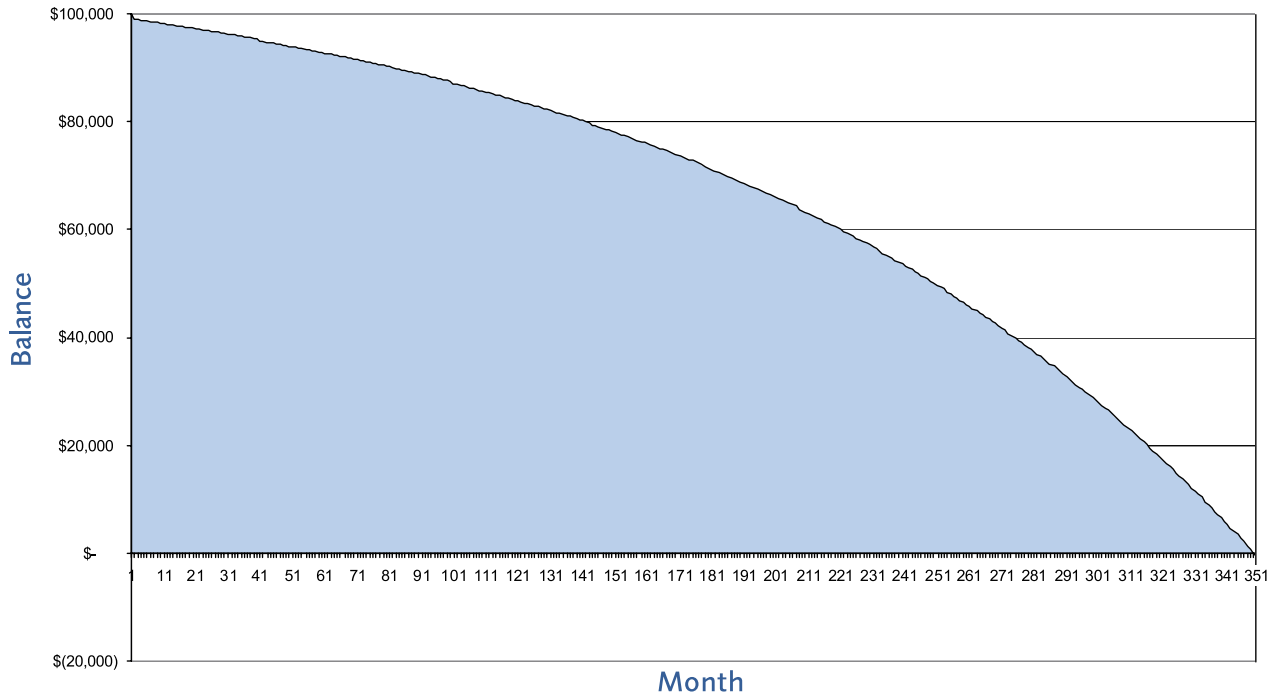


Figure 2

Outstanding Mortgage Balance over the Life of a 7%, 30-Year \$100,000 Mortgage Loan



The description of this mortgage design assumes that the homebuyer does not pay off any portion of the outstanding mortgage balance prior to the scheduled due date. But homebuyers often do pay all or part of the outstanding mortgage balance prior to the scheduled date. Payments made in excess of the scheduled principal repayments are called prepayments.

Prepayments occur for many reasons. The major concern from the perspective of an investor is a homebuyer refinancing the mortgage loan to take advantage of a decline in the mortgage rate available in the market relative to the rate on the loan. An investor who invests in a mortgage loan therefore cannot predict the cash flow from that loan. This risk—the cash flow uncertainty due to prepayments—is what results in prepayment risk. Figure 3 shows how the mortgage balance outstanding differs depending on the rate of prepayment for a pool of mortgage loans; Figure 4 shows how the principal and interest is allocated for the same pool of mortgage loans based on different prepayment rates.

Figure 3

Outstanding Principal Balance with Varying Levels of Prepayment
 \$1,000,000, 7% Fixed Rate Pool

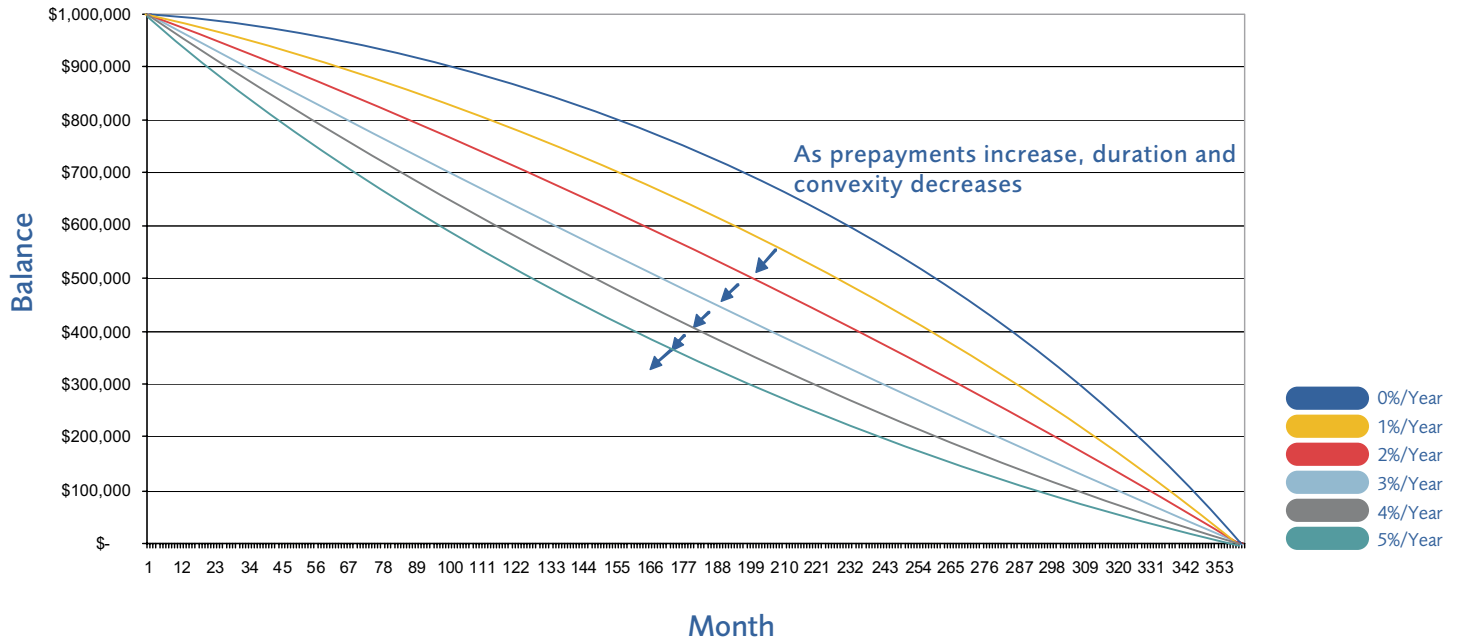
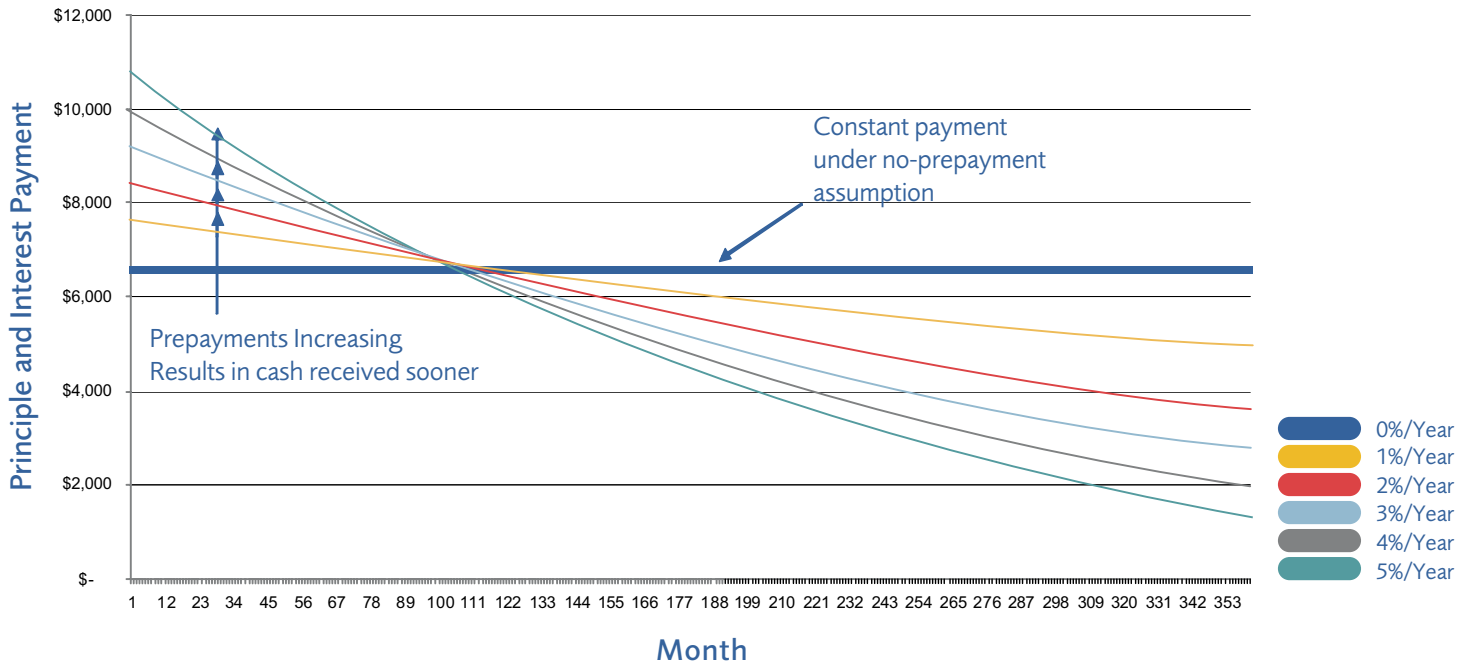


Figure 4

Monthly Principal and Interest Payment with Varying Levels of Prepayment
 \$1,000,000, 7% Fixed Rate Pool



To understand prepayment risk, suppose an investor acquires a mortgage with a 9 percent mortgage rate. Consider what will happen to prepayments if mortgage rates decline to, say, 5 percent. There will be two adverse consequences. First, the price of a fixed-income instrument that is not prepayable will rise. But in the case of a fixed-rate mortgage loan, the rise in price will not be as large as that of a fixed-rate instrument that is not prepayable, because a decline in interest rates increases the homebuyer's incentive to prepay the mortgage loan and refinance it at a lower rate. This results in the same adverse consequence faced by holders of callable corporate and municipal bonds. As in the case of those instruments, the upside price potential of a fixed-rate mortgage loan is truncated because of prepayments. (Investors refer to this property as “negative convexity.”) This should not be surprising because a mortgage loan effectively grants the homebuyer the right to call the loan at par value. The second adverse consequence of a prepayment attributable to a decline in interest rates is that the unscheduled principal repayment must be reinvested at a lower rate. These two adverse consequences, when prevailing mortgage rates decline below the rate on the mortgage loan, are referred to as *contraction risk*.

Now look at what happens if mortgage rates rise to 11 percent. The price of a fixed-rate mortgage loan, like the price of any fixed-rate instrument that is not prepayable, will decline. But the fixed-rate mortgage loan will decline more because the higher rate in the market will tend to slow down the rate of prepayment, in effect increasing the amount invested at the mortgage rate (which is lower than the prevailing market rate). Prepayments would be expected to slow down because homebuyers will not refinance or partially prepay their mortgages when mortgage rates are higher than the loan's rate of 9 percent. Of course, this is just the time when investors want prepayments to speed up so that they can reinvest the prepayments at the higher market interest rate. This adverse consequence of rising mortgage rates is called *extension risk*.

Prepayment risk therefore encompasses contraction risk and extension risk. Even in the absence of credit risk and liquidity risk, prepayment risk makes long-term fixed-rate mortgage loans unattractive for certain financial institutions from an asset/liability perspective. The following reasons detail why two particular institutional investors—depository institutions and pension funds—would find long-term fixed-rate mortgage loans unattractive even if credit risk and liquidity risk could be eliminated:

1. **Depository institutions** (i.e., commercial banks, savings and loan associations, savings banks, and credit unions) seek to lock in a spread over their cost of funds. For example, if the funding cost of a depository institution is 5 percent per annum and the return on an asset in its portfolio is 7 percent per annum, the spread is 2 percent (200 basis points).

Depository institutions raise funds on a short-term basis. If they invest in long-term fixed-rate mortgage loans, they will be mismatched because of the characteristics of these assets. When interest rates and mortgage rates rise, a depository institution's spread over its funding cost will decrease because the return on its investment (the mortgage loan) would be unchanged but its borrowing cost would increase. For example, suppose a depository institution invests in a long-term fixed-rate mortgage loan with a 7 percent rate and can obtain an initial funding cost of 5 percent by issuing a one-year certificate of deposit. Suppose further that five years later interest rates rise such that to be competitive the depository institution must pay 6.7 percent on one-year certificates of deposit. The spread on the mortgage loan has thus declined from 200 basis points to 30 basis points (7 percent minus 6.7 percent). If in the next year interest rates rise further such that the cost of a one-year certificate of deposit exceeds 7 percent, the spread on the mortgage loan becomes negative. In addition to the reduction in the spread due to a rise in interest rates,

the long-term fixed-rate mortgage loan may be outstanding longer than anticipated when the loan was acquired because prepayments would be expected to slow down. Clearly, depository institutions are exposed to extension risk when they invest in long-term fixed-rate mortgage loans.

2. There are various types of **pension plans** in the United States. One type is a defined benefit plan, in which the sponsor agrees to make payments to beneficiaries after their retirement. The obligations of a pension sponsor are its liabilities. Consider a pension sponsor that wants to satisfy long-term liabilities by locking in prevailing interest rates. It would seem that a long-term fixed-rate mortgage loan would be a natural candidate for purchase because both the liability and the asset are long-term. However, this is not the case. Buying a long-term fixed-rate mortgage loan exposes the pension fund to the risk that prepayments will speed up and the maturity of the investment will shorten considerably. Prepayments speed up when interest rates decline, thereby forcing reinvestment of prepayments at a lower interest rate. In this case, the pension fund is exposed to contraction risk.

We can see that some institutional investors are concerned with extension risk and others with contraction risk when they invest in a long-term fixed-rate mortgage loan.

As will be seen, it is possible to create mortgage-backed securities that alter the cash flow of a pool of long-term fixed-rate mortgage loans so as to reduce the contraction risk and extension risk for institutional investors.

Mortgage-Backed Securities

Given that residential mortgage debt is the largest debt market in the world, and given the highly undesirable investment property of long-term fixed-rate mortgage loans for U.S. and non-U.S. institutional investors (even in the absence of credit and liquidity risk), the challenge is to create a more appealing investment product. This can be done by taking the individual mortgage and using it to create various mortgage-backed security products. The two major products are pass-through securities and different types of bonds created from collateralized mortgage obligations.

1. Pass-Through Securities

A pass-through security is created when one or more holders of mortgage loans form a collection (pool) of mortgage loans and sell shares or participation certificates in the pool. A pool may consist of several thousand or only a few mortgage loans. (When a mortgage loan is included in a pool of mortgages that is used as collateral for a mortgage-backed security, the mortgage loan is said to be “securitized.”) Every month, a certificate holder is entitled to a pro rata share of the cash flow generated by the pool of mortgage loans.

The first mortgage-backed pass-through security was created by Ginnie Mae in 1968. Ginnie Mae has continually issued pass-throughs since 1970: for the fiscal year ending September 30, 2002, Ginnie Mae securitized \$174.9 billion. Because Ginnie Mae MBS are backed by the full faith and credit of the United States government, investors need not be concerned with credit risk.

Investors prefer investing in a fraction of a pool of mortgage loans to investing in a single mortgage loan, just as investors prefer to hold a diversified portfolio of stocks rather than an individual stock. Individual mortgage loans expose an investor to unique (or unsystematic) risk and systematic risk. The risks are that the homeowner will prepay the mortgage loan when interest rates decline and/or that the borrower may default on the loan.

Unsystematic prepayment risk is the risk of an adverse change in the speed at which prepayments are made that is not attributable to a change in mortgage interest rates. Systematic prepayment risk is an unfavorable change in prepayments attributable to a change in mortgage interest rates. Systematic risk in the case of default rates represents widespread default rates, perhaps because of severe economic recession. Investing in a diversified pool of mortgage loans in the form of a pass-through security reduces most unsystematic risk, leaving only systematic risk. Another important advantage of a pass-through security is that it is considerably more liquid than an individual mortgage loan or an unsecuritized pool of mortgage loans.

By reducing liquidity risk and eliminating credit risk, Ginnie Mae made investing in the mortgage sector of the fixed income securities market attractive to investors. The creators of broad-based bond market indexes — Lehman Brothers, Salomon Smith Barney, and Merrill Lynch — fostered the demand for pass-through securities because these securities constituted the mortgage sector of the broad-based bond market indexes. Thus, even though an asset manager does not have an exposure to liabilities but manages a portfolio whose benchmark is a broad-based bond market index, that asset manager would effectively be required to invest in the mortgage market or face the risk of being mismatched against its benchmark.

Table 2 shows the total outstanding volume of agency mortgage-backed securities from 1980 to 2002. The agencies include Ginnie Mae, Fannie Mae, and Freddie Mac. Also shown in Table 2 is the outstanding volume of agency mortgage-backed securities relative to U.S. Treasury securities. As of 2002, agency mortgage-backed securities were almost equal to the amount of U.S. Treasury securities outstanding. If U.S. Treasury bills are eliminated, the amount of agency mortgage-backed securities outstanding well exceeds U.S. Treasury notes and bonds outstanding.

Table 2

Outstanding Volume of Agency MBS (\$ Billions)

	GNMA	FNMA	FHLMC	Total	Treasury as % of US Treasury Securities Outstanding
1980	93.9	-	17	110.9	
1981	105.8	0.7	19.9	126.4	
1982	118.9	14.4	43	176.3	
1983	159.8	25.1	59.4	244.3	
1984	180	36.2	73.2	289.4	23.20%
1985	212.1	55	105	372.1	25.88%
1986	262.7	97.2	174.5	534.4	33.01%
1987	315.8	140	216.3	672.1	38.97%
1988	340.5	178.3	231.1	749.9	41.17%
1989	369.9	228.2	278.2	876.3	45.04%
1990	403.6	299.8	321	1,024.40	46.65%
1991	425.3	372	363.2	1,160.50	46.95%
1992	419.5	445	409.2	1,273.70	46.25%
1993	414.1	495.5	440.1	1,349.70	45.15%
1994	450.9	530.3	460.7	1,441.90	46.13%
1995	472.3	583	515.1	1,570.40	47.48%
1996	506.2	650.7	554.3	1,711.20	49.46%
1997	536.8	709.6	579.4	1,825.80	52.82%
1998	537.4	834.5	646.5	2,018.40	60.15%
1999	582	960.9	749.1	2,292.00	69.86%
2000	610.5	1,057.80	822.3	2,490.60	83.95%
2001	589.5	1,290.40	948.4	2,828.30	95.31%
2002	536.2	1,538.30	1,082.10	3,156.60	98.49%

Source: Bond Market Association



Even after reducing liquidity risk and eliminating credit risk, there was still one risk to deal with when the pool of mortgage loans are long-term fixed-rate mortgage loans — prepayment risk (contraction and extension risk). This problem still existed despite the pooling of mortgage loans.

2. Collateralized Mortgage Obligations (Multi-class Securities)

As explained earlier, when investing in pass-through securities in which the underlying pools are comprised of long-term fixed-rate mortgage loans, some institutional investors are concerned with extension risk while others must deal with contraction risk. These issues were mitigated for certain institutional investors by (1) pooling pass-through securities; and (2) redirecting the cash flows of a pool of pass-through securities to different bond classes, called *tranches*, to create securities with different exposure to prepayment risk. These securities would therefore have different risk/return patterns than the pass-through securities from which they were created.

When the cash flow of pass-through securities are redistributed to different bond classes, the resulting securities are called *collateralized mortgage obligations* (CMO) or *multi-class securities*. The creation of a CMO cannot eliminate prepayment risk; it can only distribute the various forms of this risk among different classes of bondholders. The CMO's major financial innovation is that the bond classes created are more appealing to global bond investors because (1) certain bond classes more closely satisfy the asset/liability needs of investors and (2) certain bond classes are more efficient for investors seeking to take an aggressive position in the mortgage market by taking advantage of anticipated movements in interest rates and prepayments. The bottom line is that the bond classes created in a CMO broadened the appeal of mortgage-backed products to traditional fixed-income investors.

CMOs issued by Ginnie Mae, Fannie Mae, and Freddie Mac are referred to as agency CMOs. CMOs not issued by one of these three entities are referred to as non-agency CMOs. Table 3 shows the amount outstanding of agency CMOs and the issuance volume from 1987 to 2002.

Table 3

3a. Outstanding Volume

Outstanding Volume and Issuance of Agency CMOs (\$ Billions)

	GNMA	FNMA	FHLMC	Total
1987	-	0.9	-	0.9
1988	-	11.6	10.9	22.5
1989	-	47.6	47.6	95.2
1990	-	104.3	83.4	187.7
1991	-	193.3	143	336.3
1992	-	276.9	217	494
1993	-	323.4	264.1	587.6
1994	-	315	263.7	578.7
1995	-	294	247	540.9
1996	-	283.4	237.6	521
1997	17.5	328.6	233.6	579.7
1998	29	311.4	260.3	600.8
1999	52.5	293.6	316.1	662.1
2000	63.2	291.8	309.1	664.1
2001	81.7	346.1	373.5	801.3
2002	105	346.7	474.3	926

Source: Bond Market Association

Table 3 (cont'd)
3b. Issuance of Agency

Outstanding Volume and Issuance
of Agency CMOs
(\$ Billions)

	GNMA	FNMA	FHLMC	Total
1987	-	0.9	-	0.9
1988	-	11.2	13	24.2
1989	-	37.6	39.8	77.3
1990	-	60.9	40.5	101.4
1991	-	101.8	72	173.8
1992	-	154.8	131.3	286.1
1993	-	168	143.3	311.3
1994	3.1	56.3	73.1	132.6
1995	1.9	8.2	15.4	25.4
1996	9.5	26.6	34.1	70.2
1997	7.9	74.8	84.4	167
1998	13.6	76.3	135.2	225.1
1999	29.6	50.6	119.6	199.7
2000	18.6	33.6	48.2	100.4
2001	46.3	192.4	123.5	362.2
2002	65.3	143.9	331.7	540.9

Source: Bond Market Association

While there are many different types of bond classes that have been created within a CMO structure, we will look briefly at four: sequential-pay bond classes, accrual bond classes, floating-rate/inverse floating-rate bond classes, and planned amortization class bonds¹.

Sequential-pay bond classes: The first CMO, created in 1983, was structured so that each bond class would be retired sequentially. For example, suppose that a CMO had four bond classes, A, B, C, and D. The rules for the distribution of the cash flow to each bond class each month would be as follows: with respect to the interest received from the collateral, interest is paid to each bond class based on the par value outstanding in the previous month. The distribution of all principal (both the regularly scheduled principal payment and prepayments) would be made as follows:

- principal is distributed to bond class A until the par value for that bond class is fully paid off;
- after bond class A is paid off, principal is distributed to bond class B until the par value for that bond class is fully paid off;
- after bond class B is paid off, principal is distributed to bond class C until the par value for that bond class is fully paid off; and
- after bond class C is paid off, principal is distributed to bond class D until the par value for that bond class is fully paid off.

¹For a more detailed discussion of these bond classes, see Frank J. Fabozzi and Chuck Ramsey, *Collateralized Mortgage Obligations: Structures and Analysis* (New Jersey: John Wiley & Sons, 1999).

The bond classes created in this structure are referred to as sequential-pay bond classes.

The result of the above distribution rules for the principal from the collateral was that short-, intermediate-, and long-term securities were created, each appealing to institutional investors seeking fixed-rate securities with the desired term. There is no guarantee that the bonds created would not extend or contract, but the rules for distribution of the principal payments received from the collateral mitigated the prepayment risk that an institutional investor sought to avoid. This innovation induced players in the fixed-income market who shunned mortgage investments and pass-through securities to become participants in the mortgage market sector.

Accrual bond classes: The next innovation was the inclusion of an accrual bond class in a CMO structure. An accrual bond class is a bond class whose interest accrues and is eventually paid when the bond class is retired.

For example, consider our previous CMO with four bond classes, A, B, C, and D. Suppose that the distribution rules are changed to make bond class D the accrual class. The distribution rules for the interest payments would be to pay interest to bond classes A, B, and C based on the par value outstanding in the previous month; for bond class D, the interest is accrued. The distribution of the principal payments from the collateral and the interest that would have been paid to bond class D would then be distributed first to bond class A until it is paid off and then sequentially to each of the other bond classes. Bond class D is not only paid its principal but its accrued interest after bond D class is paid off.

First, shorter-term bond classes and a longer-term bond class are created compared to the previous CMO structure whereby interest is currently paid to each bond class. The short-term bond classes had appeal to institutional investors seeking even shorter-term classes that were created in a sequential-pay CMO structure but without an accrual bond class. The accrual bond class itself has appeal to investors (particularly insurance companies) concerned with the reinvestment risk associated with contraction risk. Since there are no coupon payments to reinvest, reinvestment risk is eliminated until all the other bond classes are paid off.

Floating-rate bond classes: Institutional investors interested in floating-rate securities first found an attractive product in mortgage pass-through securities backed by a pool of adjustable-rate mortgages. However, some institutional investors sought even shorter-term instruments than pass-through securities backed by adjustable-rate mortgages. Moreover, these investors sought floating-rate securities where the interest rate index used was not tied to U.S. Treasury rates but rather a rate more closely tied to their funding costs. For example, the most common popular interest rate index for the cost of funds for most institutional investors who borrow is the London interbank offered rate (LIBOR). For savings and loan associations, an important interest rate index is the Eleventh District Cost of Funds (COFI).

In response to this investor demand, then, CMO bond classes were created that had a floating rate based on LIBOR or COFI. This was done by taking a bond class with a fixed rate and dividing it into a floating-rate bond class and an inverse floating-rate bond class. For example, consider bond class C in the two hypothetical CMO structures discussed earlier. Bond class C's par value can be split into two bond classes: a floater-rating bond class and an inverse floating-rate bond class. The creation of these two bond classes carved out of bond class C would be such that the interest payments to both are exactly equal to the amount that would have been paid to bond class C. The introduction of this type of floating-rate bond class succeeded in bringing more institutional investors into the mortgage market.

A by-product of creating the floating-rate bond class was the creation of an inverse floating-rate bond class. As its name implies, an inverse floating-rate bond's coupon rate changes in the opposite direction of the change in interest rates. That is, if LIBOR increases, the coupon rate on the inverse floating-rate bond class decreases; if LIBOR decreases, the coupon rate on the inverse floating-rate bond class increases. The inverse floating-rate bond class attracted two types of institutional investors into the mortgage market: (1) investors who sought to use inverse floating-rate bond classes to hedge against a decline in interest rates; and (2) hedge fund managers interested in speculating on a decline in interest rates.

Planned amortization class bonds: The CMO innovations discussed above attracted many institutional investors who had previously either avoided investing in mortgage-backed securities or allocated only a nominal portion of their portfolio to this large sector of the fixed-income securities market. Still, while some traditional corporate bond buyers shifted their allocation to CMOs, a majority of institutional investors remained on the sidelines, concerned about investing in an instrument they continued to believe posed significant prepayment risk despite the innovations designed to reduce it.

Potential demand for a CMO product with less cash flow uncertainty increased in the mid-1980s because of two trends in the corporate bond market. First came the increased event risk faced by investors, highlighted by the RJR Nabisco leveraged buyout in 1988. Second was a decline in the number of triple-A rated corporate issues. Traditional corporate bond buyers thus sought a CMO structure with both the characteristics of a corporate bond (either a bullet maturity — a single principal payment at maturity — or a sinking-fund type schedule of principal repayment) and high credit quality.

In 1987, a bond class was created such that if the prepayments are within a specified range, the principal payments are known. These bond classes are called *planned amortization class bonds* (PAC bonds). The greater predictability of the principal payments for these bond classes occurs because there is a principal repayment schedule that must be satisfied. PAC bondholders have priority over all other bond classes in the CMO structure in receiving a schedule of principal payments from the underlying collateral.

This greater certainty comes at the expense of the non-PAC bondholder, called support or companion bonds. Investors in the support bond classes absorb the prepayment risk for PAC bonds. Because PAC bonds have protection against both extension risk and contraction risk, they are said to provide “two-sided prepayment protection.” The creation of the PAC bond classes drew even more corporate bond buyers into the mortgage market; the support bond classes, in turn, brought in the hedge fund managers who felt they could enhance return by effectively betting on prepayments.

PAC bonds are the most common type of bond class in Ginnie Mae multi-class security structures.

Summary and Conclusions

The key role mortgage-backed securities played in the development of the American housing finance market is clear. Via the process of securitization, an attractive financing instrument for homebuyers (i.e., the long-term fixed-rate mortgage loan) was used to create securities that appeal to institutional investors throughout the world. The economic fortunes of the previously major investors in the mortgage market — depository institutions, including savings and loan associations — no longer play the same role. While at one time the investor in a mortgage-related product was the local savings and loan association, today it is just as likely to be a non-U.S. institutional investor.



Section III: Role of Ginnie Mae in the Secondary Mortgage Market

Now let's look at the role Ginnie Mae has played in the development of the secondary mortgage market, the foundations of which can be traced back to the Great Depression. Congress' response to the Great Depression's effects on financial markets was to establish several public-purpose agencies. The Federal Reserve was created to provide better liquidity for commercial banks through the Federal Reserve discount window. Liquidity for thrifts was provided by the creation of the Federal Home Loan Banks, which were granted the right to borrow from the United States Treasury.

Congress also founded the Federal Housing Administration (FHA), created by the National Housing Act of 1934. The FHA was authorized to provide programs to help construct, acquire and/or rehabilitate single-family and multifamily properties. Following World War II, its role expanded to programs for urban renewal projects, hospitals and nursing homes. To meet its obligation, the FHA did two things². First, it reduced credit risk for investors by offering insurance against mortgage defaults. Not all mortgages could be insured, however: the mortgage applicant had to satisfy the underwriting standards established by the FHA. The FHA was thus the first to standardize mortgage terms. While this may be taken for granted today, standardization was essential to the development of a secondary mortgage market. Later, the Department of Veterans Affairs (VA) also began insuring qualified mortgages.

Second, in the process of insuring mortgages, the FHA developed and promoted a mortgage design that would be more palatable to homebuyers. Previously, only short-term mortgages loans had been available. At the maturity date of the mortgage loan, the original loan balance had to be repaid. The proceeds for repayment would typically be from another mortgage loan. This mortgage design increased the possibility of default, as homeowners, for a variety of reasons, were not able to pay off the balloon payment.

The FHA developed and promoted the long-term self-amortizing fixed-rate mortgage loan, discussed earlier. This mortgage design provided for continual repayment of the principal balance, making the balloon payment unnecessary. But who would invest in these mortgages? One answer was thrifts, which had, at the time, tax incentives to do so. But these investments would be illiquid in the absence of a market in which they could be traded. Congress therefore created another government-sponsored agency, the Federal National Mortgage Association ("Fannie Mae") to provide liquidity. Fannie Mae was charged with creating a liquid secondary market for mortgages by buying FHA mortgages.

Despite the presence of Fannie Mae, the development of a secondary mortgage market continued to face impediments. During periods of tight money, Fannie Mae could do little to mitigate the housing crisis. In response to this problem, Congress divided Fannie Mae into two organizations in 1968: (1) the current Fannie Mae (a government-sponsored enterprise); and (2) the Government National Mortgage Association ("Ginnie Mae"). At the time of its creation, part of Ginnie Mae's mission is to use the "full faith and credit of the U.S. government" to support the FHA and VA mortgage markets. Two years later, in 1970, Congress created the Federal Home Loan Mortgage Corporation ("Freddie Mac") to support conventional mortgages (i.e., those not insured by the FHA, VA or the Rural Housing Service).

For more than 30 years, Ginnie Mae has accomplished its objective by guaranteeing securities issued by eligible entities who pool mortgage loans and use the pool of mortgage loans as collateral for a

²The FHA was made part of the Department of Housing and Urban Development in 1965.

mortgage pass-through security. Like U.S. Treasury securities, securities guaranteed by Ginnie Mae are backed by the full faith and credit of the United States. Effectively, Ginnie Mae securities have the same credit risk as U.S. Treasury securities but offer a higher yield as compensation for prepayment risk. Moreover, as a result of the absence of credit risk, a zero weighting is assigned to Ginnie Mae securities for purposes of credit-risk-based capital requirements for depository institutions. In contrast, a weighting of 20 percent is assigned to mortgage-backed securities issued by Fannie Mae and Freddie Mac, neither of which offer the full faith and credit guarantee of the United States government.

Prior to 1994, Ginnie Mae could not guarantee CMOs (multi-class securities). However, Ginnie Mae pass-throughs were used as collateral to create CMOs issued by Fannie Mae and Freddie Mac. Table 3 shows Ginnie Mae's participation in the CMO market since 1994 when it was authorized to guarantee multi-class securities. As can be seen, Ginnie Mae multi-class securities issuance increased from \$3.1 billion in 1994 to \$65 billion in 2002.



Section IV: Secondary Benefits of the MBS Market and the Role of Ginnie Mae

Other than providing Americans with housing opportunities, a strong mortgage-backed securities market can be said to offer two other major benefits—strengthening the balance sheet of depository institutions and providing a credit spread product for institutional investors seeking incremental returns over U.S. Treasury securities.

In the 1970s, with high and variable interest rates, S&Ls with fixed-rate mortgage loans in their portfolio found that the loans' market value was less than their liabilities. Coupled with financial disintermediation, S&Ls therefore faced a liquidity problem. While the securitization of mortgage loans would not bring assets in line with liabilities, it did give S&Ls the opportunity to improve liquidity by allowing them to efficiently access the capital market. This was done by allowing S&Ls to swap their portfolio of mortgage loans for pass-through securities backed by the same mortgage loans. An S&L could then keep the pass-through securities in its investment portfolio and/or sell the pass-through securities to obtain funds for liquidity purposes. As a result, the balance sheet of S&Ls was strengthened.

Today, the same flexibility is afforded mortgage lenders seeking liquidity that have a portfolio of qualified (conforming) mortgage loans. From its inception, Ginnie Mae has allowed individual lending institutions to create pass-through securities via its Ginnie Mae I MBS Program. To provide liquidity for smaller lending institutions that cannot meet minimum dollar pool requirements, Ginnie Mae in 1983 began to offer the Ginnie Mae II MBS Program, which allows several lending institutions to participate in the issuance of a pass-through security (i.e., multiple issuers). Smaller lending institutions could thereby become Ginnie Mae issuers. In addition, the Ginnie Mae II MBS Program provided lending institutions the opportunity to more effectively manage their pipeline risk.

From the perspective of investors, then, mortgage-backed securities offer an alternative “spread product” — a bond that offers a spread over U.S. Treasury securities. Prior to the creation of mortgage-backed securities, available spread products were primarily corporate bonds—which exposed investors to credit risk and call risk, the latter being equivalent to prepayment risk.

While an investor could earn a potential spread from credit risk and call risk by investing in a callable corporate bond, he had to accept both risks. That is, there was no separation of credit risk and call risk except by buying a non-callable corporate bond. All of this changed with the introduction of Ginnie Mae pass-through securities: investors could now earn a spread for accepting prepayment risk—without having to accept credit risk.

The situation for investors in spread products was further improved in 1994, with the introduction of the Ginnie Mae multi-class securities. As explained earlier, investors now had the choice of accepting different degrees of prepayment risk.

These developments are significant because in different economic cycles, as investors seek to reduce their allocation to spread products with credit risk, Ginnie Mae products offer an opportunity to enhance return over a Treasury security by accepting prepayment risk without being forced to accept credit risk. Furthermore, for depository institutions, Ginnie Mae products offer the opportunity to more efficiently utilize regulatory capital because of their zero credit-risk-based capital requirement.

Section V: The Ginnie Mae Operating Model

In previous sections we have described how Ginnie Mae has accomplished its mission of expanding affordable housing in America by successfully linking global capital markets to the U.S. housing market. There are three strategies employed by Ginnie Mae to achieve this objective: (1) market positioning; (2) servicing cost efficiencies; and (3) product enhancement(s). In turn, to successfully execute these three strategies, it is vital that Ginnie Mae utilize the correct operational and business model.

Centralized Management Concept

Today, Ginnie Mae is built on a centralized management concept, which evolved from its original business model—a decentralized management concept where Ginnie Mae did all work in-house, and did not use vendors. This change in operational models came about primarily because of the tremendous success of the Ginnie Mae mortgage-backed securities program, introduced in 1970.

When an entity uses the centralized management concept, it limits the extent of authority it delegates, its internal operations remain limited in scope, and it conducts its management activities from a relatively small geographical area. The result is that a relatively small group of people can manage a large number of outsourced projects. The Office of Management and Budget (OMB) Circular A-76 supports the idea of a government agency using a centralized management concept for this very reason. Government policy dating back to 1955 decrees that the federal government will only provide services that its citizens (i.e., the private sector) cannot. Hence, the purpose of Ginnie Mae's centralized management approach is rooted in the firm belief that the federal government should not compete with its citizens.

Recognized benefits of the centralized management concept include better control and coordination, resulting in:

- greatly improved quality, timeliness, and consistency the work assigned to the vendor;
- compliance with OMB A-76 policy and procedures, minimized bias, and a fair and equitable process for both private industry and government employees; and
- consistency of program implementation and policy interpretation from organization to organization and from installation to installation.

Ginnie Mae's Business Model

In the fiscal year ending September 30, 2002, Ginnie Mae employed 73 people to successfully control and coordinate the following:

- the securitization of \$174.9 billion;
- the financial wherewithal and compliance of 343 issuers;
- deals and comfort letters;
- the monthly collections, disbursements and financial risks of a \$550 billion mortgage portfolio;
- the transfers of pools and securities;
- the security registry;
- servicing costs;



- new products and product enhancements;
- the production of reports for the required legislators and agencies; and
- the evaluation and maintenance of current and proposed IT equipment and software.

Within a centralized management operation, the use of funds as a principal on an operating basis are very difficult to responsibly outsource. Consequently, Ginnie Mae does not buy or sell MBS for its own account. The effects of Ginnie Mae not buying or selling MBS for its own account are that Ginnie Mae:

- has no long-term debt on its balance sheet;
- does not hedge since it faces no interest rate risk; and
- does not use derivatives since no hedging is required.

Section VI: Conclusions

For more than three decades, since it pioneered the first mortgage-backed security, Ginnie Mae has successfully accomplished its mission. It has shifted the funding of American's mortgage market from local lending institutions to the world's investor base. Today, investors throughout the world view Ginnie Mae pass-throughs through the same lens as U.S. Treasury securities, allowing for return enhancement by accepting prepayment risk. The result of Ginnie Mae's efforts is that the agency has guaranteed more than \$2 trillion in MBS, providing affordable financing for more than 28 million low- and moderate-income households. At the same time, Ginnie Mae has become a beacon of dependability and responsibility within the federal government, accomplishing its mission with minimal credit risk to the government—all the while requiring no tax dollars to conduct its operations.

As it moves into the future, Ginnie Mae programs continue to develop and evolve, as the agency seeks new ways to provide value to issuers and investors alike, with the ultimate goal of helping more Americans gain access to affordable housing.



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