



*Mälardalen University*

# **Mortgage-backed Securities**

## **ABSTRACT**

In this project we will get some understanding about Mortgage-Backed Securities. What is Mortgage-Backed securities, how does it work and what are the risks are some of the questions we will answer in this report. We are also going to present three agencies from United States and see some different types of MBS.

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## **1. INTRODUCTION**

The first pass-through mortgage security was issued in 1970, with a guarantee by Ginnie Mae. Soon Freddie Mac and Fannie Mae began issuing mortgage securities as well. The development of CMO in 1983 expanded the market for mortgage securities by appealing to investors with various investment timeframes and cash flow needs.

As a result of increasing investor interest in these investments, the mortgage securities market is one of the largest financial markets in the world.

## 2. SECURITIZATION

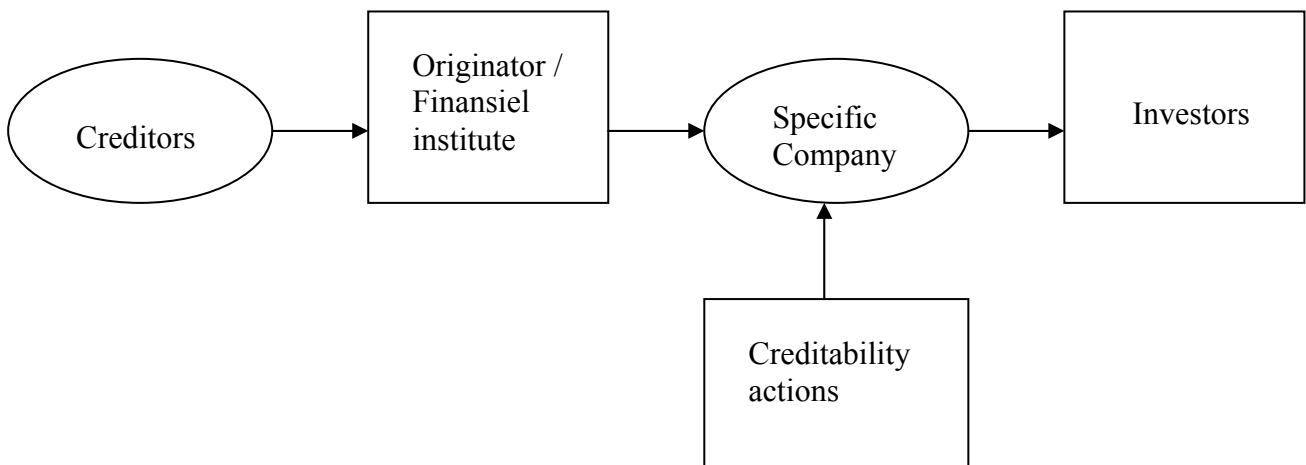
Securitization is the process of aggregating similar instruments, such as loans or mortgages, into a negotiable security.

The initial meaning of securitization is that a financial institution or another company (originator) sells an asset or an amount of assets to a specific company or agency who has only one mission, that is to own the asset and who financing the affair by issuing bonds or similar securities.

The assets who is usually used for securitization is mortgages, credit debts and repayment debts. In purpose of reinsure the creditability of the agency or specific company the investors often demand some sort of creditability actions for example that an insuring company acts like a guaranty.

It is usual that the originator does the administration in the Specific Company so that the originator can remain the contacts with the customers.

Securitization can be described by a schedule in the following way:



A securitization is demanding a lot of work and is costing a lot, whereby the total amount of assets who are sold to cover up must be big enough to cover the costs.

For the special company to be able to issue the security one condition that has to be fulfilled is that the investor believes in credit worthiness.

### **3. MORTGAGE SECURITIES**

#### ***3.1 Mortgage Loans***

Mortgages are written as contracts between two parties, for example, a homeowner and a bank. In standard mortgages, equally monthly payments are made by the creditor.

#### ***3.2 Mortgage Backed Securities***

Mortgage backed securities, also known as "mortgage pass-through." was issued in 1970 with a guarantee by Ginnie Mae. After a while Freddie Mac and Fannie Mae began issuing mortgage securities as well.

Mortgage backed security (MBS) is a security that is based on a pool of underlying mortgages and is usually based on mortgages that are guaranteed by a government agency for payment of principal and a guarantee of timely payment. The analysis of MBS concentrates on the nature of the underlying payment stream, particularly the prepayments of principal prior to maturity.

When you invest in a mortgage backed security you are lending money to a homebuyer or business. An MBS is a way for a smaller regional bank to lend mortgages to its customers without having to worry if the customers have the assets to cover the loan. Instead, the bank acts as a middleman between the homebuyer and the investment markets. Mortgage prepayments are most often made because a home is sold or because the homeowner is refinancing to a new mortgage, presumably with a lower rate or shorter term.

## **4. PLAYERS ON THE SECONDARY MARKET**

In the United States there are three federal agencies; The Federal National Mortgage Association (FNMA), The Government National Mortgage Association (GNMA) and the Federal Home Loan Mortgage Corporation (FHLMC). These three agencies buy mortgage loan portfolios and put them together into pools to create MBS to sell to investors.

### **4.1 GNMA**

Ginnie Mae MBS are fully modified pass-through securities guaranteed by the full faith and credit of the United States government. Despite of whether the mortgage payment is made, investors in Ginnie Mae MBS will receive full and timely payment of principal and interest. Ginnie Mae MBS are created when qualified mortgage loans (those insured or guaranteed by FHA (Federal housing administration), the VA (Departments of veteran affairs), RHS (Rural Housing Service) or PIH (Office of Public and Indian Housing) are pooled by accepted issuers and securitized. Ginnie Mae MBS investors receive a pro- rata share of the resulting cash flows.

Ginnie Mae MBS require all the mortgages in a pool to be the same type and have a first payment date no more than 48 months before the issue date of the securities. Each mortgage have to be, and should remain, insured or guaranteed by FHA, VA, RHS or PIH. In addition, the mortgage interest rates have to be equal and the mortgages must be issued by the same issuer.

Ginnie Mae is the only agency that is “backed-up” by the government, while Fannie Mae and Freddie Mac is chartered by congress, but owned by stockholders.

### **4.2 FNMA**

Fannie Mae was founded in 1968. Fannie Mae is a private, shareholder-owned company. They do not lend money directly to home buyers. Instead, FNMA work with lenders (fe.banks) to make sure they don't run out of mortgage funds.

An investor in a Fannie Mae MBS owns an entire interest in a pool of mortgages that serves as the underlying asset for the security. As a Fannie Mae MBS holder, this investor receives a pro-rata share of the cash flows from the pool of mortgages.

### **4.3 FHLMC**

Freddie Mac and Fannie Mae have the same charters, Congressional mandates and regulatory organization. Nevertheless, the two companies have different business strategies.

Freddie Mac is also a stockholder-owned corporation chartered by Congress in 1970 to keep money flowing to mortgage lenders in support of homeownership and rental housing.

As Fannie Mae, Freddie Mac does not lend money directly to consumers. FHLMC buys mortgages from lenders.

## 5. DIFFERENT TYPES OF MBS

### 5.1 Collateralized mortgage obligations

Collateralized mortgage obligations (CMOs) are a type of mortgage-backed security, which are bonds that represent claims to specific cash flows from large pools of home mortgages. The streams of principal and interest payments on the mortgages are distributed to the different classes of CMO interests, known as tranches, according to a complicated deal structure. Each tranche may have different principal balances, coupon rates, prepayment risks, and maturity dates (ranging from a few months to twenty years).

CMOs are often highly sensitive to changes in interest rates and any resulting change in the rate at which homeowners sell their properties, refinance, or otherwise pre-pay their loans. Investors in these securities may not only be subjected to this prepayment risk, but also exposed to significant market and liquidity risks.

Collateralized mortgage obligations (CMOs) were introduced in 1983, it is also known as Real Estate Mortgage Investment Conduits (REMICs). The tax Reform Act of 1986 allowed CMOs to be issued in the form of Real Estate Mortgage Investment Conduits (REMICs), creating certain tax and accounting advantages for issuers and for certain large institutional and foreign investors. Today almost all CMOs are issued in REMIC form. CMOs were developed to offer investors a wider range of investment time frames and greater cash flow certainty than had previously been available with mortgage pass-through securities, or in some cases mortgage loans themselves, and uses them as collateral for a multiclass security offering.

The different classes of securities in a CMO offering are known as “tranches”.

Types of CMO Tranches:

- Sequential pay Tranches
- Planned Amortization Class (PAC) Tranches.
- Targeted Amortization Class (TAC) Tranches
- Companion Tranches
- Z-Tranches
- Principal-Only (PO) Securities
- Interest-Only (IO) Securities
- Floating-Rate Tranches

With a CMO, the ultimate borrower is the homeowner who takes on a mortgage loan. Because the homeowner’s monthly payments include both interest and principal, the mortgage security investor’s principal is returned over the life of the security, or “amortized”, rather than repaid in a single lump sum at maturity. CMOs provide monthly or quarterly payments to investors, which include varying amounts of both principal and interest. As the principal is repaid or prepaid, interest payments become smaller, because they are based on a lower amount of outstanding principal. Most CMO tranches have a stated maturity based on the last date on which the principal from the collateral could be paid in full. This date is theoretical, because it assumes no prepayments on the underlying mortgage loans. If prepayment speeds are faster than expected, the average life of the CMO will be shorter than the original estimate, if prepayment speeds are slower, the CMOs average life will be extended.



The interest rates paid on CMOs will be lower than the interest rates paid on the underlying mortgage loans, because the issuer retains a portion of the interest paid by the mortgage borrower as a “servicing fee” for creating the security and for collecting and distributing the monthly payments to investors. Still, newly issued mortgage securities carry higher estimated yields than comparable Treasury securities. In part, this is because the interest rates paid by homebuyers are higher than the interest rates paid by the U.S. government. However, the higher interest rates on mortgage securities also reflect compensation for the uncertainty of their average lives.

As with any bond, the yield on a CMO depends on the purchase “price” in relation to the interest rate and the length of time the investor’s principal remains outstanding. CMO yields are often quoted in relation to yields on Treasury securities with maturities closest to the CMOs estimated average life. The estimated yield on a CMO reflects its estimated average life based on the assumed prepayment rates for the underlying mortgage loans.

## ***5.2 Stripped Mortgage-Backed securities***

Stripped mortgage-backed securities were first introduced in 1986. In stripped MBS, the cash flows from the underlying mortgage loans are divided to create two or more new securities. Each security has a percentage of principal payments, interest payments or a combination of the two. The principal payments are linked into the class of security PO, while all the interest payments are channeled to IO; consequently there are two types of classes of stripped mortgage-backed securities, principal-only (PO) and interest-only (IO).

To invest in IOs and POs is risky since they are very sensitive to fluctuations in prepayment rate and interest rate. As prepayment rates increase, a PO turns out to be more valuable and an IO becomes less valuable. Likewise when prepayment rates decreases, the opposite scenario happens.

The investor will receive a fixed amount of principal but at an undecided time with a PO, while with an IO the total of the cash flow received is uncertain.

## 6. VALUING MORTGAGE BACKED SECURITY

“Mortgage backed securities are usually valued using Monte Carlo simulation. Either the HJM or LIBOR market models can be used to simulate the behavior of interest rates month by month throughout the life of an MBS.”<sup>1</sup>

## 7. RISK

### 7.1 Prepayment Risk

The option to prepay the mortgage makes it difficult to estimate cash flows from the mortgage pools and the MBS. Several factors can affect the homeowners’ payments. For example the homeowner will prepay the mortgage loan by selling the property or it can be that the rate is decreasing and the creditors are refinancing the mortgage.

Most mortgage pass-through securities are based on fixed-rate mortgage loans with an original maturity of 30 years, but experience shows that most of these mortgage loans will be paid off much earlier.

Determining prepayment can be done with the help of the Public Securities Association Standard Prepayment Model (PSA), this model shows a schedule of payment, a curve, that assumes the prepayment will occur at a rate of 0, 2 % CPR (constant prepayment rate) in the first month and will increase an additional 0, 2 % CPR each month until the 30<sup>th</sup> month and will prepay at a rate of 6% CPR thereafter. This model is also called standard 100% PSA

### 7.2 Average life

When talking about the maturity date of Mortgage securities, we are talking about the average life of the security.

Technically, the average life is defined as the average time to receipt of each dollar of principal, weighted by the amount of each principal payment. In simpler terms, the average life is the average time that each principal dollar in the pool is expected to be outstanding, based on certain assumptions about prepayment speeds.

$$Average\ Life = \frac{1}{12} \sum_{t=1}^T t \frac{principal\ received\ at\ t}{total\ principal}$$

Example<sup>2</sup>

The average life for 30-year MBS, \$100 M, 8% mortgage pool with a 100% PSA, is 11.86 years:

$$Average\ Life = \frac{1}{12} \frac{1(\$83,769) + 2(\$100,878) + \dots + 360(\$123,470)}{\$100,000,000} = 11.86\ years$$

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<sup>1</sup> Options, Futures, and Other Derivatives, John C. Hull, Fifth edition side 588

<sup>2</sup> Example taken from <http://janroman.net.dhis.org/> file about MBS

### **7.3 Market Risk**

The market risk is the risk that the price of the security may fluctuate over time. For the Mortgage backed securities (MBS) prepayment risk and market risk are closely linked. Interest rates movements have greater impacts on MBS than traditional fixed-income investments, because they affect prepayment rates which affect the average life and yield of an MBS as well as returns from reinvested principal.

## **8. CONCLUSION**

The mortgage backed securities gives the small banks or other small financial institutes the opportunity to lend out money to creditors in a larger width. This kind of investment seems to be a really good alternative to a regular corporate bond for an investor who wants a little more risk but also a possible more yield.

## 9. REFERENCE

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