**CHAPTER 9**

**MORTGAGE MARKETS**

**CHAPTER OVERVIEW AND LEARNING OBJECTIVES**

⮚ The mortgage market, tremendous in size, has always been the least efficient capital market. Mortgages, originated locally with heterogeneous contracts and terms, had a weak secondary market and major non-thrift investors bought mortgages only when the yields on other capital market securities were unattractive.

⮚ The mortgage market has received considerable public policy support over the years with both federal and state agencies lending, guaranteeing, and offering economic incentives to the private sector to make mortgage loans.

⮚ As you study this chapter, compare and contrast the mortgage contract with other capital market securities and note the variety in types of mortgages contracts available. The traditional fixed-rate contract may be appropriate for some borrowers, but other types make more sense for other borrowers.

⮚ Note also the development of the secondary market for mortgages, the tremendous growth in mortgage securitization, such as mortgage pools (largest source of financing in 1990's and 2000’s), and the increasing number of mortgage lenders and investors.

⮚ Cap off the chapter by studying the mortgage tables in the Flow of Funds Accounts (Federal Reserve Release Z1, [**http://www.federalreserve.gov/releases/Z1/**](http://www.federalreserve.gov/releases/Z1/)).

**CAREER PLANNING NOTE: THE GRADUATE SCHOOL OPTION**

One of the key strategies in career planning is flexibility. Your graduation date is totally independent of the state of the economy and the availability of positions in a specific firm or field. One alternative to an entry-level business position is pursuing a graduate degree such as a Masters of Business Administration (MBA), or programs in taxation, accountancy, or other specific fields. The graduate school option should be there sitting on the shelf just in case, but there are a couple of "small" considerations. One, the time lag in graduate school planning is just as long as a successful job search and, two, one must have sufficient credentials to be admitted to most worthwhile graduate programs.

Almost all graduate programs require pre-admittance exams, either the GMAT or GRE. In fact, many suggest that you take your pre-admittance exams as soon as possible even though you are not applying to graduate school immediately. While in college you are conditioned to taking exams and time away from the books is not likely to help your score.

Graduate schools may be selected by several factors:

1. Overall quality of the program - see published reviews or talk to several professors or alumni. Are they accredited by the AACSB? There are many good programs that are not, but find out why!

2. Quality of a specific program - not all universities have uniform quality among their programs.

3. Area of the country or specific city – for example, one way to get a job in Baltimore / Washington D.C. area is to attend schools in the University of Maryland system, Johns Hopkins University, Georgetown University, George Washington University, or another school in the area.

4. Source of graduate assistantships, which may pay tuition and possibly more.

All things being equal, select the school based on quality of the program. If you don't have the money, borrow it for a quality program! Those people thinking they may (just a chance) pursue a Ph.D. or are looking at the easy job their professor has, are advised to select a school with a doctorate program. If money is not available in the form of an assistantship, many quality programs have scholarship programs available if you do well in their programs the first or second semester.

Graduate study is not for everyone, nor is immediate graduate school entry right for some people. But if you are looking toward achieving a middle-management position in the future, you are likely to be sitting in an MBA program in several years, attending and studying at night while the spouse is nagging and the baby is crying. There are many options, but for many, a graduate program alternative adds flexibility and, often, simply looking finds opportunity! Here are a couple of web sites that provide information about graduate business programs:

[**http://www.businessweek.com/bschools/index.html**](http://www.businessweek.com/bschools/index.html)

[**http://www.usnews.com/usnews/edu/grad/rankings/mba/mbaindex\_brief.php**](http://www.usnews.com/usnews/edu/grad/rankings/mba/mbaindex_brief.php)

**READING *THE WALL STREET JOURNAL:* A DIFFERENT DOW JONES INDEX**

You probably already follow the Dow Jones Industrial Average, but you might also want to keep an eye on the Dow Jones Real Estate Index. Every Friday, the *Wall Street Journal* includes a section called the “Weekend Journal.” Within the “Weekend Journal” section, you will find the Dow Jones Real Estate Index, which provides information about home prices. In some weeks, it summarizes starter home prices. In other weeks, it may be elite home prices. It also provides summary information about mortgage interest rates.

**TOPIC OUTLINE AND KEY TERMS**

**I. The Unique Nature of Mortgage Markets**

***A. Role of Market***

1. Individuals, business, and other economic entities use this market to help buy land and/or buildings – homes, apartment buildings, condos, office buildings, shopping malls, etc.

***B. Kinds of Mortgage Markets***

1. Home mortgages

2. Multi-family residential

3. Commercial

4. Farm

***C. Characteristics***

1. Mortgage loans are secured by the pledge of real property as collateral.

2. Mortgage loans are made for varied amounts - no standard denomination.

3. Issuers of mortgages are usually small family or business entities.

4. Weak Secondary Market

a Little standardization of contracts and terms

b. Traditionally issued and held by lender

5. Mortgage markets are highly regulated and supported by federal government policies.

**II. Types of Mortgages (See Exhibit 9.4)**

***A. Fixed Rate Mortgages (FRMs)***

1. The note is the borrowing agreement.

2. Payments amortized over time. (See **Exhibit 9.1** for example)

3. Interest is computed on the declining balance.

4. The mortgage is a lien on the property used as collateral for the loan.

5. If the contract is broken, the lender may use the property to pay the loan.

6. When a mortgage is fully paid, the lien is removed and the borrower obtains a clear title to the property.

***B. Adjustable Rate Mortgage (ARM)***

1. Fixed-rate mortgages are not attractive to lenders when inflation is expected to increase.

a. Borrowers save, lenders lose in inflation. Interest rate risk is borne by the lender.

b. Lenders are locked into fixed rates. As costs of funds rise, the value of fixed-rate loans falls.

2. With adjustable-rate contracts, borrowers' costs vary with interest rate levels. In other words, lenders shift interest rate risk to the borrower.

3. With adjustable rate mortgages (ARMs) the rate varies with market rates within a range.

a. Initial rate is set such that it stays fixed for a period of time that can vary from a year to 10 years.

b. Beyond the initial fixed period, the rate may vary according to the agreed upon frequency.

c. ARMs that have an initial fixed period of 3 years or longer are a hybrid of fixed and variable rate mortgages.

4. Methods of adjustment for ARMs

a. Rate varies within a prescribed range (caps). E.g., a 5/1 provision means that the rate cannot increase (decrease) by more than 5% over the life of the loan and by more than 1% in from one period to the next.

b. Payments, maturity, or principal may vary.

c. Rates may vary based on a previously determined interest rate index or the cost of the funds to the lender.

d. The market prices the extent of interest rate risk (impact of varying interest rates) assumed by borrower and lender. At origination, ARM rates are lower than similar fixed-rate mortgage rates because borrowers in ARMs take on some interest rate risk.

e. Common rate indices include Treasury rates, fixed rate mortgage indices, prime rate, and LIBOR (London Interbank Offered Rate). The index must be observable by both the borrower and the lender and the lender must not have any control over the index.

f. Rates can be adjusted over different periods at the discretion of the lender, but this has to be disclosed at the loan origination.

5. ARM Caps

a. While ARMs reduce the lenders’ interest rate risk, borrower default increases as rates increase and some borrowers cannot meet monthly payments.

b. Capped ARMs may have a “payment cap”, “rate cap”, or both.

c. **Payment caps** limit the maximum amount the payment can go up by in any year and over the life of the loan.

d. **Interest rate caps** limit the size of the increase in the loan rate in any year and over the loan’s life. Typically, the annual cap is 1-2 percent, and the lifetime cap is 5 percent.

***C. Other Mortgage Contracts***

**1.** **Balloon Payment Mortgages**

a. Traditional loan where interest is paid until a time when the principal is due.

b. Terms can be 3, 5, or 7 years.

c. Loan is amortized over 15 or 30 year period so that monthly payments are no different than a payment on an FRM of equal maturity.

d. Rate is fixed over the contract term.

e. Popular with borrowers who may either sell or refinance prior to maturity.

**2.** **Rollover Mortgage (ROMs)**

a. Refinanced at new rate every few years.

b. Adjustment period is longer than traditional ARMs.

c. Payment is fixed.

**3.** **Renegotiated Rate Mortgages (RRMs)**

a. Loan terms renegotiated periodically at terms prevailing in the market.

b. Adjustment period is longer than traditional ARMs.

c. Payment is fixed.

**4. Interest Only Mortgages**

a. Low payments in initial years (10 to 15 years) – only includes interest on borrowed amount.

b. After initial period, payments increase such that entire loan amount is amortized by the end of 30 years.

c. Borrower pays interest for a considerable period on the entire loan balance, but does not pay down balance in initial years.

**5. Construction-to Permanent Mortgages**

a. Bridge financing is provided by lender over the time frame required by the borrower to purchase land and construct the house.

b. Only interest payments are made until construction is completed.

c. Loan is financed in increments as construction payments have to be made.

d. Upon completion of the construction, loan balance is rolled over into the type of mortgage contract desired by borrower.

**6. Reverse Annuity Mortgages (RAMs)**

a. RAMs allow homeowners to borrow against the equity on their homes at low rates.

b. Typically obtained by older people who have paid off their mortgages but lack sufficient retirement income.

c. Typical term is no more than 20 years and could be for borrower’s lifetime as an annuity.

d. Homeowners’ equity declines by amount borrowed.

**7. Second Mortgages**

a.Extended at time of purchase or later as equity is borrowed from property.

b. Home equity lines of credit became popular after the 1986 federal tax law, which excluded all deductibility of personal interest expenses except those associated with a personal home.

c. Home equity loans and lines of credit allow home owners to borrow against the equity built up in their homes because of paying down the loan and/or because of the appreciation of the property.

d. These loans are considered to be second mortgages.

***D. Mortgage Qualifying***

**1. What it takes to qualify to buy a home!**

a. Several factors influence a home buyer’s ability to secure a mortgage loan. These include income level, amount available for a down payment, credit history, and other financial commitments.

b. ***Borrower Income*** from all sources gives the lender an idea of the ability of the borrower to meet the monthly mortgage commitment. This commitment includes not only the monthly interest and principal payment, but also the amount needed to pay property tax, homeowners insurance and any mortgage insurance.

c. ***Down Payment*** refers to the amount of cash the borrower contributes towards the cost of the house as their equity. Traditionally this has been 20 percent of the cost of the house with the remaining 80 percent being financed by a mortgage loan.

d. ***Mortgage Insurance*** is necessary for borrowers who are unable to come up with a 20 percent down payment.

🖍 Some federal agencies like the **Federal Housing Administration (FHA)** and the **Veterans Administration (VA)** guarantee loans to qualified home buyers for a small fee that covers the cost of the insurance.

🖍 Those loans that do not qualify for a federal guarantee are called **conventional loans**. Lenders may require a borrower to secure **private mortgage insurance (PMI)** if they cannot come up with a 20 percent down payment. See **Exhibit 9.5**.

**III. Mortgage-Backed Securities**

***A. Development of a Secondary Market***

1. The U. S. Congress initiated the development of a secondary market for mortgage loans in 1934 by creating the **Federal Housing Administration (FHA).**

2. In 1938, the **Federal National Mortgage Association (FNMA),** which was authorized to buy FHA insured loans, was created.

3. In 1968, FNMA was split up into two entities – **FNMA and GNMA (Government National Mortgage Association).** GNMA was authorized by Congress to guarantee mortgage pools insured by FHA, VA and other federal agencies.

4. In 1970, the **Federal Home Loan Mortgage Corporation (FHLMC)** was created to help develop a secondary market for conventional mortgages.

***B. Advantages of Mortgage-backed Securities over Individual Mortgages***

1. **Mortgage-backed securities (MBS)** are pools of mortgages used as collateral for the issuance of debt securities in the secondary market. Many MBS are commonly referred to as "***pass-through***" certificates because the principal and interest of the underlying loans is "passed through" to investors.

2. MBS have many characteristics that help them to be more marketable than individual mortgage loans:

a. Issued in standardized denominations and are negotiable.

b. Issued by quality borrowers.

c. Usually insured and highly collateralized.

d. Repayment schedules vary, but many are similar to bonds.

***C. Ginnie Mae Pass-Throughs***

1. Guaranty issued by the **Government National Mortgage Association (GNMA).**

2. GNMA guarantees the timely payment of principal and interest on MBS backed by federally insured or guaranteed loans.

3. Interest and principal from borrowers are passed through to investors.

4. “Federally insured” implies mortgage loans guaranteed by the FHA, VA, and other authorized federal agencies.

5. GNMA pass-throughs are secured by mortgage pools originated by mortgage banks, commercial banks, or other mortgage lending institutions.

6. Ginnie Mae I are pass-throughs secured by a mortgage pool consisting of the same type of mortgage loans.

a. Have the same interest rate.

b. Are originated by the same lender.

c. The minimum pool size is $1 million.

d. Payments on Ginnie Mae I MBS have a stated 14-day delay (payment is made on the 15th day of each month).

7. Ginnie Mae II pass-throughs are also secured by a mortgage pool consisting of the same type of mortgage loans, but are different in other aspects.

a. They may be issued by multiple lenders.

b. Interest rates may vary over the portfolio of loans by as much as 75 basis points (or 0.75 percent).

c. The minimum pool size is $250,000 for multi-lender pools and $1 million for single-lender pools.

d. Ginnie Mae II MBS have an additional five-day payment delay because issuer payments are consolidated by a central paying agent (payment is made on the 20th day of each month).

8. GNMA charges issuers of pass-throughs a fee ranging from 0.25 percent to 0.75 percent for its guarantee.

9. Investors in Ginnie Mae securities will earn a lower yield reflecting a lower default risk because of the dual guarantee by GNMA on the MBS and the FHA/VA guaranty on the original loans.

***D. Freddie Macs PCs***

1. Issued by the Federal Home Loan Mortgage Corporation (FHLMC).

2. Participation certificates (PCs) are issued by the FHLMC and ***conventional*** loans are purchased from S&Ls and other mortgage lenders.

3. PCs are different from GNMA securities.

a. Include conventional mortgages as collateral.

b. Mortgages are not federally insured.

c. Mortgages are pooled by FHLMC, not by private-sector originators.

d. Interest rates among pooled mortgages vary.

e. Larger individual mortgages.

4. Mortgage originators service the mortgages (collect payments) for a fee.

***E. FNMA Pass Throughs***

1. Issued by FNMA.

2. Offers securities similar to FHLMCs' PC.

3. Can issue pass-throughs for either conventional or federally insured mortgage loans.

***F. Privately Issued Pass-Throughs (PIP)***

1. First issued in 1977 by Bank of America.

2. PIPs are issued by private institutions or mortgage bankers.

3. They are similar to “Ginnie Maes” except that they are backed by conventional mortgages that do not qualify for FHA or VA guarantees.

4. Typically used to securitize large, non-conforming mortgage loans called jumbo loans (currently in excess of $417,000).

***G. CMOs and REMICs***

1. ***Collateralized Mortgage Obligations (CMO)*** are mostly sold by FHLMC; other government-sponsored agencies and private issuers can also issue CMOs.

a. CMOs are like serial bonds. The pool of mortgages that backs these CMOs is divided, for example, into short-term, intermediate term, and long-term groups. First, cash flows from the pool are directed to the group (tranche) of securities maturing first. After the short-term tranche has been paid, the payments from the pool are directed to the intermediate tranche, and finally to the long-term tranche.

b CMO issues have between 3 and 10 classes (tranches).

c. Investors can choose the tranche that matches their maturity preference.

d. CMOs are sometimes split into **“*interest only*” (IO)** and **“*principal only*” (PO)** classes.

e. CMOs have a major disadvantage because they can create tax problems for the originators.

2. ***Real Estate Mortgage Investment Conduits (REMIC)*** are similar to CMOs except for their tax treatment.

a. Result of a 1986 Tax law change that allowed REMICs to be treated as a trust that could pass through all interest and principal payments before taxes.

b. Differs from CMOs only in how they are set up legally.

***H. Stripped Mortgage Backed Securities (SMBS)***

1. Like pass-throughs in that SMBS pass on all payments of principal and interest to investors.

2. Two kinds – Interest Only (IO) and Principal only (PO).

3. Investors in IO receive cash flows only from the interest payments on the mortgage pool. Cash flows decline as mortgage loans in the pool are paid down.

4. Holders of POs receive all cash flows from the principal payments on the mortgage pool.

5. IO and PO investors have opposite reactions to interest rate changes. PO investors like declining rates and high mortgage prepayments (refinancing) associated with them because this leads to principal cash flows arriving sooner. IO investors dislike high prepayments because it reduces the total amount of interest payments on the underlying mortgage pool.

***I. Mortgage-Backed Bonds***

1. Federal agencies like FNMA and FHLMC issue bonds to raise funds using the mortgage loans they own as collateral. These are referred to as “Fannie Mae” bonds and “Freddie Mac” bonds respectively.

2. Private institutions and investor groups also issue mortgage backed bonds using the pool of mortgage loans they own.

a. Typically use higher than 100 percent of mortgage pool as collateral.

b. Maturities range from 5 to 10 years.

c. Often are rated AAA, thus lowering the required yield.

3. State and local government housing agencies also can issue similar securities to fund low income housing development.

a. Exempt from federal income tax because they are munis.

***J. Mortgage Prepayment Risk***

1. Mortgages guaranteed by Agencies have yields above U.S. Treasury Bonds, indicating some risk besides default risk.

2. Prepayment risk, the risk that the borrower will repay (call) the debt before maturity causing the yield to be different from expected, is likely to explain the premium over Treasuries.

3. When interest rates decline, homeowners (borrowers) refinance, paying off their old mortgage and creating a new one. The mortgage investor then receives their principal back when interest rates are lower.

4. When rates are high and rising, homeowners will be slow to refinance or trade homes, thus extending the length of their mortgage financing, keeping the rates to the mortgage lender below market rates. This extension risk keeps the lender's return below current market yields.

5. Prepayment and extension risk causes the actual return of mortgage investors to vary from the expected return.

**IV. Participants in the Mortgage Markets (See Exhibit 9.8)**

***A. Thrifts*** - dominated and increased share of market until 1970s.

***B. Banks*** - Increased share of market and increased powers to make mortgage loans.

***C. Insurance*** ***Companies and Pension Funds***

1. Once a major holder of mortgages

2. Less participation in 1960s as corporate yields relative to mortgages improved.

3. Invest in more marketable pass-throughs as liquidity needs have increased.

***D. Pools*** - Pass-through certificates have become an important source of funds. Pools represented the largest component of mortgage investment in 1990s and 2000s.

***E. Government Holdings*** - All Levels of Government

1. FNMA, FHLMC, Federal Land Banks, Farmers Home Administration

2. State and local housing authorities issue bonds and buy subsidized, lower-rate mortgages, often for first-time homebuyers.

***F. Mortgage Insurers***

1. Developed in 1930s to enhance acceptability of mortgages and to encourage more risky low equity-to-loan lending.

2. FHA guaranteed payment to lender in case of default.

3. Loan size restrictions and interest rate caps have restricted insured lending at times.

4. VA insurance (1944) for mortgage loans to veterans

5. Private mortgage insurance covers low down payment conventional mortgages.

6. Mortgage insurance has enhanced the development of secondary markets.

***G. Mortgage bankers***

1. Mortgage bankers originate mortgages, collecting fees for origination.

2. Mortgage bankers do not fund mortgages. They sell them.

3. Mortgage bankers often retain the service rights to the mortgage, collecting payments, taxes, and collecting delinquent payments.

4. Mortgage banking and loan servicing are very competitive with technology applications decreasing expenses with time.

5. Mortgage lending involves three different value activities that can be unbundled: origination, servicing, and funding (investing).

**V. Relationship of Mortgage Markets to the Capital Markets**

A. Mortgage rates generally move with other capital market securities.

B. Mortgage rates are higher relative to top-grade corporate debt yields.

1. Less marketable.

2. Have a prepayment option. This is similar to a call option on a bond and dictates a lower yield.

**COMPLETION QUESTIONS**

1. The mortgage market was traditionally a (local/national) primary market with little or no \_\_\_\_\_\_\_\_ market.

2. A mortgage is a \_\_\_\_\_\_\_\_ on real property, which accompanies the \_\_\_\_\_\_\_\_ and the deed, which transfers \_\_\_\_\_\_\_\_ to the property.

3. Fixed-rate mortgage loans benefit (lenders/borrowers) when interest rates increase.

4. Adjustable-rate mortgages transfer interest rate risk to the (lender/borrower).

5. While most mortgage loans are paid with periodic payment or are \_\_\_\_\_\_\_\_, some may require all or a part of the principal to \_\_\_\_\_\_\_\_ at the end.

6. The development of secondary markets, insurance, and mortgage pools are likely to (increase/decrease) mortgage rates.

7. GNMA provides a \_\_\_\_\_\_\_\_ market for \_\_\_\_\_\_\_\_ mortgages whereas \_\_\_\_\_\_\_\_ purchases conventional mortgages from \_\_\_\_\_\_\_\_.

8. Pass-through certificates provide (variable/fixed) returns to investors whereas mortgage-backed bonds provide (variable/fixed) returns.

9. The largest private depository institution investors in mortgages are \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_.

10. Combining mortgages in \_\_\_\_\_\_\_\_ is called \_\_\_\_\_\_\_\_.

**TRUE-FALSE QUESTIONS**

T F 1. The volume of fixed-rate mortgages will be higher than variable- rate mortgages if interest rates are expected to increase in the future.

T F 2. Mortgage insurance encourages lenders to make loans with high loan-to-property value ratios.

T F 3. CMO residual tranches have less risk than the debt obligation tranches.

T F 4. Second mortgage lenders will probably lend up to 100 percent of the value of a residence.

T F 5. Most pass-through mortgage securities pass through the risk of default to the borrower.

T F 6. An ARM, compared to an FRM, shifts the interest rate risk from the borrower to the lender.

T F 7. In a conventional mortgage agreement the borrower owns the mortgaged home; the lender takes a lien against the home.

T F 8. Fixed-rate mortgage interest rates are higher than adjustable-rate mortgage interest rates with the difference representing a premium paid to protect the lender from default risk.

T F 9. Mortgage-backed securities have improved mortgage liquidity for homebuyers.

T F 10. REMIC securities are a form of collateralized mortgage obligation that provide tax-free income to investor.

**MULTIPLE-CHOICE QUESTIONS**

1. A savings and loan foresees lower interest rates in the future. What type of mortgage loans is it likely to market?

a. fixed-rate loans

b. adjustable-rate loans

c. long maturing loans

d. reverse annuity loans

2. Which of the following istrue about **Reverse Annuity Mortgages (RAMs)**?

a. RAMs allow homeowners to borrow against the equity on their homes at low rates.

b. Typically obtained by older people whose home loans have been paid off, but can use income of the real estate investment they own.

c. Typical term is no more than 20 years and could be for borrower’s lifetime as an annuity.

d. Homeowners’ equity declines by amount borrowed.

e. all of the above are true.

3. All of the following are advantages of the development of mortgage-backed bonds ***except***:

a. standardized denominations.

b. standardized rates or yields.

c. issued by quality borrowers.

d. usually insured and highly collateralized.

4. Governments have provided all of the following to mortgage markets ***except***:

a. extended loans.

b. insurance.

c. control of the secondary market.

d. regulation of the consumer/lender credit relationship.

5. Which of the following is ***true*** about Ginnie Mae I pass through securities?

a. Ginnie Mae I are pass-throughs secured by a mortgage pool consisting of the same type of mortgage loans.

b. Have the same interest rate.

c. Are originated by the same lender.

d. all of the above.

6. Which of the following statements about FHA and VA mortgages is *false*?

a. They are insured by the government.

b. They charge for their insurance.

c. They have low down payments.

d. The borrower is protected in case of default.

7. A savings and loan with a very low capital position would take which action?

a. invest in conventional fixed-rate loans

b. invest in variable rate loans

c. originate and sell eligible loans to the FHLMC

d. seek more deposits for rapid growth

8. What is the monthly payment on a home costing $100,000, with 30 percent down, and the balance mortgaged for 25 years at 10 percent?

a. $636.09

b. $524.72

c. $194.00

d. $677.82

9. With reference to #8 above, how much interest was paid by the borrower the first month?

a. $579.25

b. $429.78

c. $497.97

d. $583.33

10. A savings and loan making ARMs and expecting mortgage interest rates to decrease in the future, would want:

a. an interest rate "cap" on their loans.

b. a second mortgage on the home.

c. to lengthen the "adjusting" time period.

d. no limits on the variability of the rates.

**SUPPLEMENTARY MATERIAL**

**COMPUTING MORTGAGE RATES AND BALANCES**

**1. Solving for Monthly Payments**

Most mortgage loans are amortized over their term with interest computed on the declining balance. With a fixed rate loan, the monthly payment is fixed throughout the term and can be solved with the equation below:



Payment = Monthly payment

PV = Original loan amount

i = Monthly interest rate (e.g., for a 10% mortgage, it is 0.1/12 = 0.0833)

n = Number of monthly payments *left* (e.g., 15\*12 = 180 for a new 15-year mortgage)

**2. Solving for Remaining Balance**

With adjustable rate mortgages the interest rate changes periodically and a new payment must be computed. One must first determine the current balance owed. Or, one often wants to determine the remaining balance of a loan after so many payments. Here's a formula that quickly will make anyone reach for his or her PV calculator. We are solving for the future value of a PV annuity with a balloon.

where:

Balance = Remaining balance

PMT = Monthly payment

n = Number of monthly payments *left*

i = Monthly rate (decimalized): annual rate/12

**3. Example with Calculator Solution**

A. A $50,000 loan financed for 25 years at 10 percent would require what monthly payment to meet the interest obligation and pay the principal in 25 years? Using the equation above:



Or, use a financial calculator: $50,000 PV 25 x 12 = N 10/12 = I

Solve for PMT = $454.35

B. What is the amount of principal reduction the first month?



PMT $454.35

***Less***: Interest 416.67

First month principal reduction **$ 37.68**

C. After twelve months, the ARM rate is adjusted to 9 percent. Compute the new monthly payment for the 13th month.

Solve for the remaining balance:



*Note that we used 288 remaining payments (24 years times 12 payments per year).*

Or, use a financial calculator (solve for FV):

$50,000= PV 10/12 = I 12 = n $454.35 = PMT

Solve for FV = $49,526.49

With a remaining balance of $49,526.49 and a new 9 percent rate for 24 remaining years, the new payment is:

$49,526.49= PV 24 x 12 = 288 = N 9/12 = I

Solve for PMT = **$420.31**

**SUPPLEMENTARY ASSIGNMENTS**

A. Compute the monthly payment for an $80,000 fixed-rate mortgage loan for 25 years at 9 percent. What is the remaining balance after 60 months?

B. Using the Flow of Funds Accounts: Assets and Liabilities Outstanding update Exhibit 9-8 in the text. List the major trends occurring.

C. Flow of Funds Accounts: Study the flow of funds (changes each year) through the mortgage market for the last five to seven years. What specific economic events had the greatest impact on mortgage flows during the period? Study the following tables:

1. Total Mortgages

2. Home Mortgages

3. Multi-Family Residential Mortgages

4. Commercial Mortgages

5. Farm Mortgages

D. Treasury Bulletin: Find the quarterly Treasury Bulletin in the periodical section (usually) of the library or on the U.S. Treasury’s web site at [***http://www.fms.treas.gov/bulletin/***](http://www.fms.treas.gov/bulletin/). Research the table titled "Financial Agencies Financial Reports - Direct and Guaranteed Loans." List the total amount of direct loans and/or the amount of insurance or guarantees outstanding for the federal government agencies studied in this chapter. Note the general areas where the federal government assists the private sector. The "Business and Financial Statistics" appendix of any Federal Reserve Bulletin also publishes a table of Government Agency and Government-Sponsored Agency securities outstanding.

**SOLUTIONS TO COMPLETION QUESTIONS**

1. local; secondary

2. lien; note or loan; title

3. borrowers

4. borrower

5. amortized; balloon

6. decrease

7. secondary; insured; FHLMC; S&Ls

8. variable; fixed

9. commercial banks (see **Flow of Funds Accounts**: Assets and Liabilities Outstanding, Annually)

10. pools; securitization

**SOLUTIONS TO TRUE-FALSE QUESTIONS**

1. T Long-term (fixed-rate) rates reflect investors' expectations of future short-term (variable rate) rates.

2. T High loan/value ratios or low borrower equity loans have higher default rates. The insurance transfers the risk of default to the private or public insurer.

3. F The residual tranche is the last claim or priority on the mortgage pool cash flows, thus having more risk.

4. F Not if they are conservative, perhaps 80-85 percent, leaving some cushion for quick-sale price decreases if default occurs.

5. T Defaults affect the returns of the ultimate investors, unless insurance or guarantees are involved.

6. F ARM shifts the interest rate risk to the borrower.

7. T The mortgage establishes a lien on specific property and actions permissible in case the loan contract is broken.

8. F The fixed-rate borrower will pay more to have the lender assume the risk that future interest rates will vary.

9. F Improved liquidity for primary lenders.

10. F Investors are paid from pre-tax income, but their earnings are not tax-free.

**SOLUTIONS TO MULTIPLE CHOICE QUESTIONS**

1. a Most S&Ls probably would choose "a" and fixed-rate lending, increasing their negative GAP position, maximizing short-run profits, and assuming more interest rate risk. The GAP position can be improved with selected ARMs.

2. e All of the statement s are true.

3. b The yield will vary with market rates.

4. c Governments do not control the secondary market. In many ways government efforts initiated the secondary markets and now allow the private sector to dominate.

5. d All of the statements are true.

6. d The lender is protected against default, not the borrower.

7. c With a low capital position, it would be difficult to make and hold added loans, for it would require more capital or put increased pressure on the firm to raise more capital. It is likely to sell their loans.

8. a Solve for the payment related to the present value of a regular annuity. Get out your calculator and enter:

70,000= PV 25 x 12 = N 10/12 = i

Solve for PMT = **$636.09**

(Assuming monthly computation, not actual days)

9. d Interest in the first month is $70,000 \* (.10/12) = **$583.33**

Payment $636.09

- Interest 583.33

**$ 52.76** applied to principal

10. c To lock in the higher rate for a longer period of time.