中南财经政法大学

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Financial Markets

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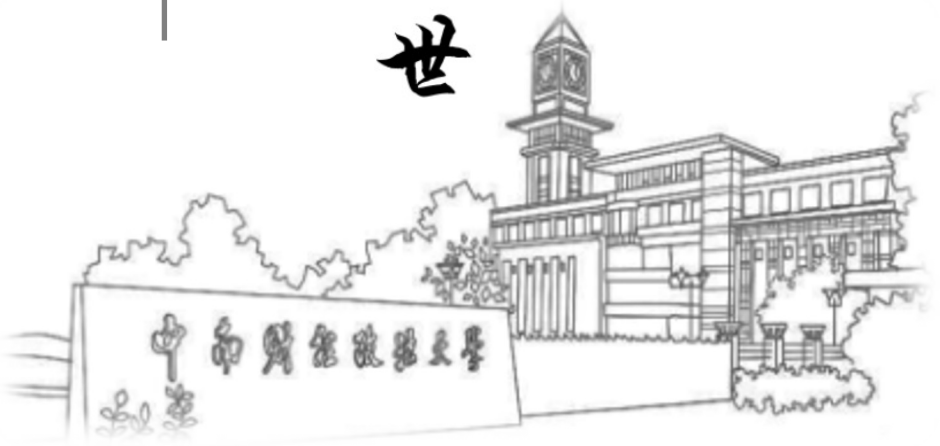


Chapter 14: The Mortgage Market

Chapter Preview

After getting a job, most of you will want to own your own home. But the average price of a home is well over $140,000 (and quite a bit higher in some areas, like Beijing, which is around $857,000). For most of us, home ownership would be impossible without borrowing most of the cost of a home.

In this chapter, we identify characteristics of typical residential mortgages and the usual term and types of mortgages available. We then review who provides and services the loans, along with the growth in the secondary mortgage market. Topics include:

Chapter Preview

- What Are Mortgages?
- Characteristics of Residential Mortgages
- Types of Mortgage Loans
- Mortgage-Lending Institutions
- Loan Servicing
- Secondary Mortgage Market
- Securitization of Mortgages

What Are Mortgages?

- A long-term loan secured by real estate.

- **Amortized loans**: the borrower pays it off over time in some combination of principal and interest payments that result in full payment of the debt by maturity.

- **Balloon loans**: relatively short-term loans (5-7 years). You only need to pay a small amount monthly payment. At the end of term, you need to pay the remaining principal balance.

What Are Mortgages? Mortgage Loan Borrowers

- The slide shows the total amount of mortgage debt outstanding in the U.S. during 2016. It further delineates by type of property.
- The table shows roughly $13 trillion outstanding.

TABLE 14.1 Mortgage Loan Borrowing, 2016

Type of Property	Mortgage Loans Issued ($ billions)	Proportion of Total (%)
One- to four-family dwelling	9,986	72.38
Multifamily dwelling	1,099	7.97
Commercial building	2,506	18.16
Farm	205	1.49

Source: http://www.federalreserve.gov/econresdata/releases/mortoutstand/current.htm.

Mortgage Loan Borrowing

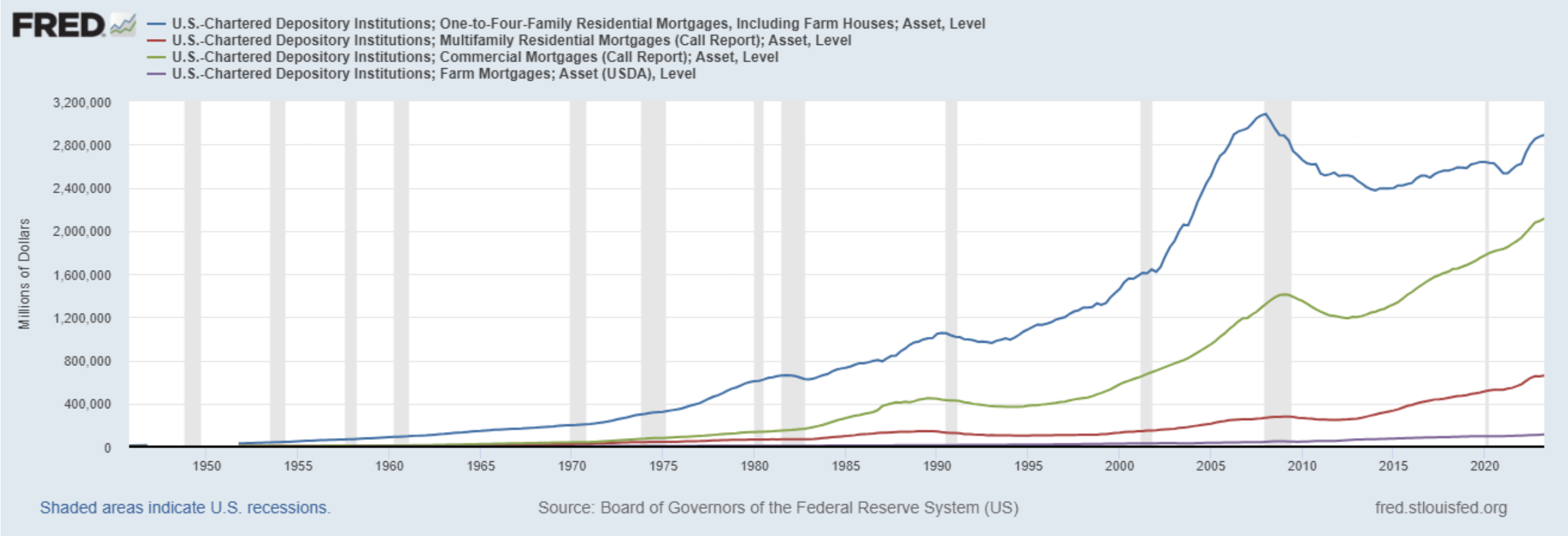
This table shows roughly $21 trillion outstanding in 2025:

Add to Data List | Add to Graph | Expand All | Collapse All | Q4 1945 | Q3 2024 | Q4 2024 | Q1 2025 | **Q2 2025**

Line	Name	Period	Value	Preceding Period	Year Ago from Period	Units
1	All holders	Q2 2025	21,129,161	20,959,522	20,530,489	Mil. of $
	By type of property					
2	One- to four-family residences	Q2 2025	14,523,007	14,407,946	14,128,265	Mil. of $
3	Multifamily residences	Q2 2025	2,352,200	2,323,558	2,245,655	Mil. of $
4	Nonfarm, nonresidential	Q2 2025	3,877,182	3,856,008	3,800,530	Mil. of $
5	Farm	Q2 2025	376,772	372,010	356,039	Mil. of $

Source: https://fred.stlouisfed.org/release/tables?eid=1192326&rid=52

What Are Mortgages? Mortgage Loan Borrowers



What Are Mortgages? History

- Mortgages were introduced in the 1880s. Mortgage bankers would gather a portfolio of mortgage contracts and use them as security for an issue of bonds that were sold publicly.
- Massive defaults in the agricultural recession of 1890 made long-term mortgages difficult to attain.
- Until post-WWII, most mortgage loans were short-term balloon loans with maturities of five years or less.
- Balloon loans, however, caused problems during the Great Depression. Typically, the lender renews the loan. But, with so many Americans out of work, lenders could not continue to extend credit
- As a part of the depression recovery program, the federal government assisted in creating the standard 30-year mortgage we know today.

Characteristics of the Residential Mortgage

- Mortgages can be roughly classified along the following three dimensions:

  - Mortgage Interest Rates
  - Loan Terms
  - Mortgage Loan Amortization

PART 1. Mortgage Interest Rates

- The stated rate on a mortgage loan is determined by three rates:

  - **Market Rates**: general rates on Treasury bonds
  - **Term**: longer-term mortgages have higher rates
  - **Discount Points**: interest payments made at the beginning of a loan.

Mortgage Interest Rates & Market Rates

The figure shows the relationship between mortgage rates and long-term treasury rates. As can be seen, mortgage rates are typically higher than Treasury rates, but the spread (difference) between the two varies considerably.

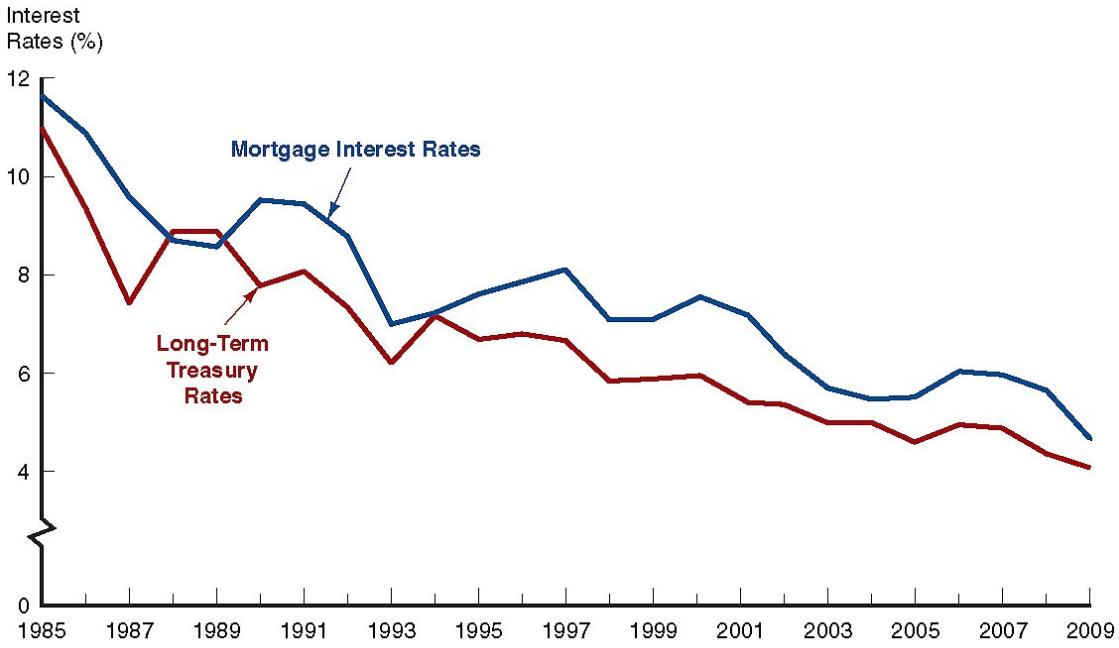


FIGURE 14.1 Mortgage Rates and Long-Term Treasury Interest Rates, 1985–2009

Source: Federal Reserve Bulletin, various issues, Table 1.53 Line 7 and Table 1.35 Line 23.

Mortgage Interest Rates & Discount Points

In considering whether to pay discount points (cash upfront) in exchange for a lower interest rate on the mortgage. Borrowers must determine whether the reduced interest rate over the life of the loan fully compensates for the increased up-front expense.

Suppose you had to choose between a 12% 30-year mortgage or an 11.5% mortgage with 2 discount points. Which should you choose? Assume you wished to borrow $100,000.

Mortgage Interest Rates & Discount Points

(1) examine the 12% mortgage. Using a financial calculator, the required payments:

- $n = 360$, $i = 12/12$, $PV = \$100{,}000$
- Calculate the PMT. PMT = \$1,028.61

(2) examine the 11.5% mortgage. Using a financial calculator, the required payment:

- $n = 360$, $i = 11.5/12$, $PV = \$100{,}000$,
- Calculate the PMT. PMT = \$990.29

Paying the points will save you \$38.32 / month. But, you have to pay \$2,000 upfront.

You can see that the decision depends on **how long** you want to live in the house, keeping the same mortgage.

Mortgage Interest Rates & Discount Points

- How to calculate the effective rate?

The effective rate measures the opportunity cost. Because of the compounding, the effective annual rate is greater than the simple annual rate.

(1) If we do not pay the discount points

Effective annual rate = $(1.01)^{12} - 1 = 0.1268 = 12.68\%$

(2) If we do pay 2% discount points upfront

Now the PV we actually get is \$100,000 - \$100,000*2% = \$98,000

PMT is \$990.29, N=30*12, so we can calculate the actual monthly rate is 0.9804%

Effective annual rate = $(1.009804)^{12} - 1 = 0.1242 = 12.42\%$

Mortgage Interest Rates & Discount Points

TABLE 14.2 Effective Rate of Interest on a Loan at 12% with 2 Discount Points

Year of Prepayment	Effective Rate of Interest (%)	Year of Prepayment	Effective Rate of Interest (%)
1	14.54	6	12.65
2	13.40	7	12.60
3	13.02	10	12.52
4	12.84	15	12.45
5	12.73	30	12.42

Mortgage Interest Rates & Discount Points

Many mortgage lenders will point to the 30-year effective rate of interest, and argue that the points are a good deal. However, this may be misleading.

You need to determine when the present value of the savings ($38.32) equals the $2,000 upfront. Using a financial calculator, this is:

i = 1%, PV = -2,000, PMT = 38.32

Calculate n = 74 months, or about 6.2 years.

So, if you *think* you will stay in the house and not refinance for at least 6.2 years, paying the $2,000 for the lower payment is a sound financial decision. Otherwise, you should accept the 12% loan.

PART 2. Loan Terms

Mortgage loan contracts contain many legal terms that need to be understood. Most protect the lender from financial loss.

- **Collateral**: usually the real estate being financed
- **Down Payment**: a portion of the purchase price paid by the borrower
- **Private Mortgage Insurance (PMI)**: insurance against default by the borrower
- **Borrower Qualifications**: includes credit history, employment history, etc., to determine the borrowers ability to repay the mortgage as specified in the contact

Loan Terms

Lenders usually also order a credit report from one of the credit reporting agencies.

- The score reported is called the FICO.
- The range is 300 to 850, with 660 to 720 being average.
- Payment history, debt, and even credit card applications can affect your credit score.

Q: Do we have something similar in China?

Credit Score System

PART 3. Loan Amortization

Mortgage loans are **amortized loans**. This means that a fixed, level payment will pay interest due plus a portion of the principal each month. It is designed so that the balance on the mortgage will be zero when the last payment is made.

The table shows a typical amortization table for a 30-year mortgage at 8.5%.

TABLE 14.3 Amortization of a 30-Year, $130,000 Loan at 8.5%

Payment Number	Beginning Balance of Loan	Monthly Payment	Amount Applied to Interest	Amount Applied to Principal	Ending Balance of Loan
1	130,000.00	999.59	920.83	78.75	129,921.24
24	128,040.25	999.59	906.95	92.66	127,947.62
60	124,256.74	999.59	880.15	119.43	124,137.31
120	115,365.63	999.59	817.17	182.41	115,183.22
180	101,786.23	999.59	720.99	278.60	101,507.63
240	81,046.41	999.59	574.08	425.51	80,620.90
360	991.77	999.59	7.82	991.77	0

Extra: Equal Principal Mortgage Loan (等额本金) VS. Equal Payment Mortgage Loan (等额本息)

Types of Mortgage Loans

- **Insured Mortgages**: originated by banks or other mortgage lenders and are guaranteed by some institutions.

- **Conventional Mortgages**: Mortgages that are not guaranteed by any institutions. If the down payment is less than 20%, insurance is usually required.

- **Fixed-Rate Mortgages**: the interest rate is fixed for the life of the mortgage

- **Adjustable-Rate Mortgages**: the interest rate can fluctuate within certain parameters

Q: who prefer fixed-rate and who prefer adjustable-rate mortgages?

Types of Mortgage Loans

- Other Types
  - Graduated-Payment Mortgages (GPMs)
  - Growing Equity Mortgages (GEMs)
  - Second Mortgages
  - Reverse Annuity Mortgages (RAMs)
  - Option ARMs

- The following table lists additional characteristics on all the loans.

Types of Mortgage Loans

TABLE 14.4 Summary of Mortgage Types

Conventional mortgage	Loan is not guaranteed; usually requires private mortgage insurance; 5% to 20% down payment
Insured mortgage	Loan is guaranteed by FHA or VA; low or zero down payment
Adjustable-rate mortgage (ARM)	Interest rate is tied to some other security and is adjusted periodically; size of adjustment is subject to annual limits
Graduated-payment mortgage (GPM)	Initial low payment increases each year; loan amortizes in 30 years
Growing-equity mortgage (GEM)	Initial payment increases each year; loan amortizes in less than 30 years
Second mortgage	Loan is secured by a second lien against the real estate; often used for lines of credit or home improvement loans
Reverse annuity mortgage	Lender disburses a monthly payment to the borrower on an increasing-balance loan; loan comes due when the real estate is sold

Mortgage-Lending Institutions

Originally, thrift institutions were the primary originator of mortgages in the U.S. and, therefore, the primary holder of mortgage loans.

Thrift institutions are also called Saving & Loan Associations (S&Ls). It represents a type of financial institution that specializes in offering savings accounts and originating home mortgages for consumers.

Mortgage-Lending Institutions

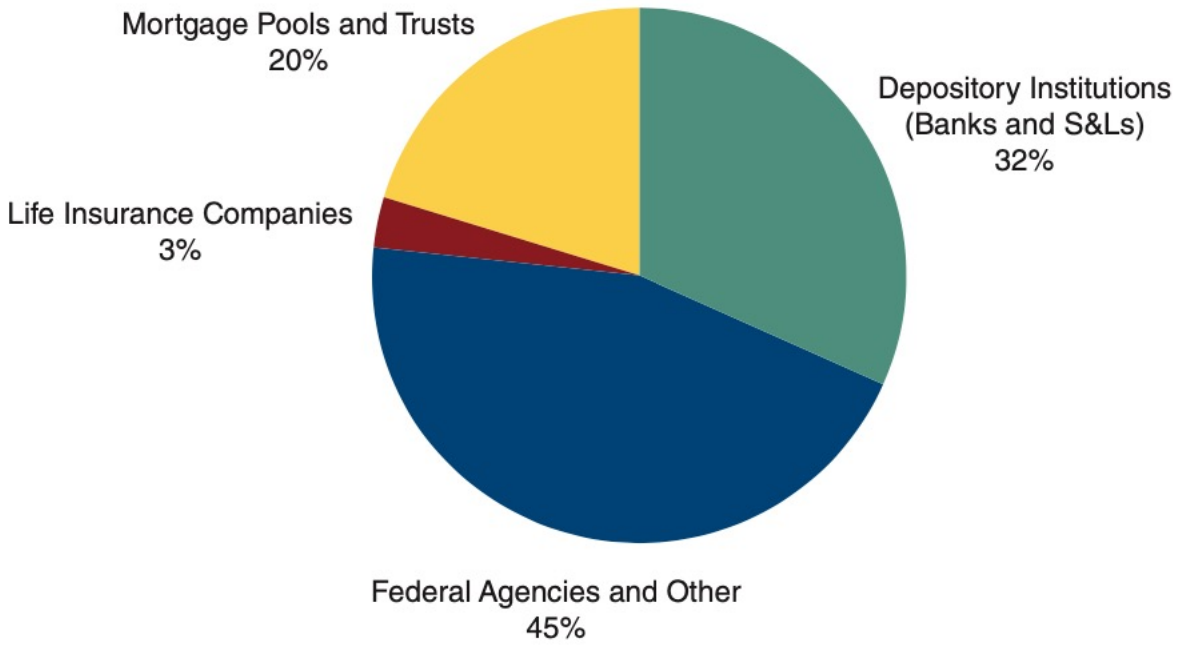


FIGURE 14.2 Share of the Mortgage Market Held by Major Mortgage-Lending Institutions

Source: http://www.federalreserve.gov/econresdata/releases/mortoutstand/current.htm.

Loan Servicing

- Most mortgages are immediately sold to another investor by the originator. This frees cash to originate another loan and generate additional fee income.

- The mortgage originators (i.e. commercial banks, thrifts, and etc.) make money through the fees that they earn by packaging loans for other investors to hold.

- Hence, someone has to collect the monthly payments and keep records. This is known as loan servicing, and servicers usually keep a portion of the payments received to cover their costs.

Loan Servicing

In all, there are three distinct elements in mortgage loans:

- The originator packages the loan for an investor
- The investor holds the loan
- The servicing agent handles the paperwork

E-Finance: Shopping for a Mortgage Via the WWW

Mortgages used to originate from a local bank. But the web is well-suited to handle online mortgage origination:

- This is a financial product—nothing really needs to be delivered
- Mortgages are fairly standardized. There is no product differentiation to consider.
- Little bank loyalty for borrowers
- Online lenders have low overhead, and so lower fees.

Secondary Mortgage Market

- The secondary mortgage market was originally established by the federal government after WWII when it created Fannie Mae to buy mortgages from thrifts.

- Standardization was an important factor in the growth of the secondary market for mortgages.

- The market experienced tremendous growth in the early to mid-1980, and has continued to remain a strong market in the U.S.

Securitization of Mortgages

The securitization of mortgages developed because of problems dealing with single mortgages:

- Individual mortgage loans are usually too small to be wholesale instruments.
- Many mortgages are not standardized.
- Mortgage loans are relatively costly to service.
- Mortgages have unknown default risk.

These problems inspired the creation of the **mortgage-backed security**, a.k.a. **securitized mortgage**.

Securitization of Mortgages

The *mortgage-backed security* (MBS) was created.

Mortgage pools including hundreds of mortgages were gathered, and the rights to the cash flows generated by the mortgages were sold as separate securities.

Mortgage pass-through is the most common type of mortgage-backed security.

Securitization of Mortgages: The Mortgage Pass-Through

Definition: A security that has the borrower's mortgage payments pass through the trustee before being disbursed to the investors

This design did eliminate idiosyncratic risk, but investors still faced *prepayment risk.*

As the next figure shows, the value of mortgages held in pools is reaching nearly $8.0 trillion near the end of 2009.

The securities compete for funds along with all other bond market participants.

Value of Mortgage Principal Held in Mortgage Pools

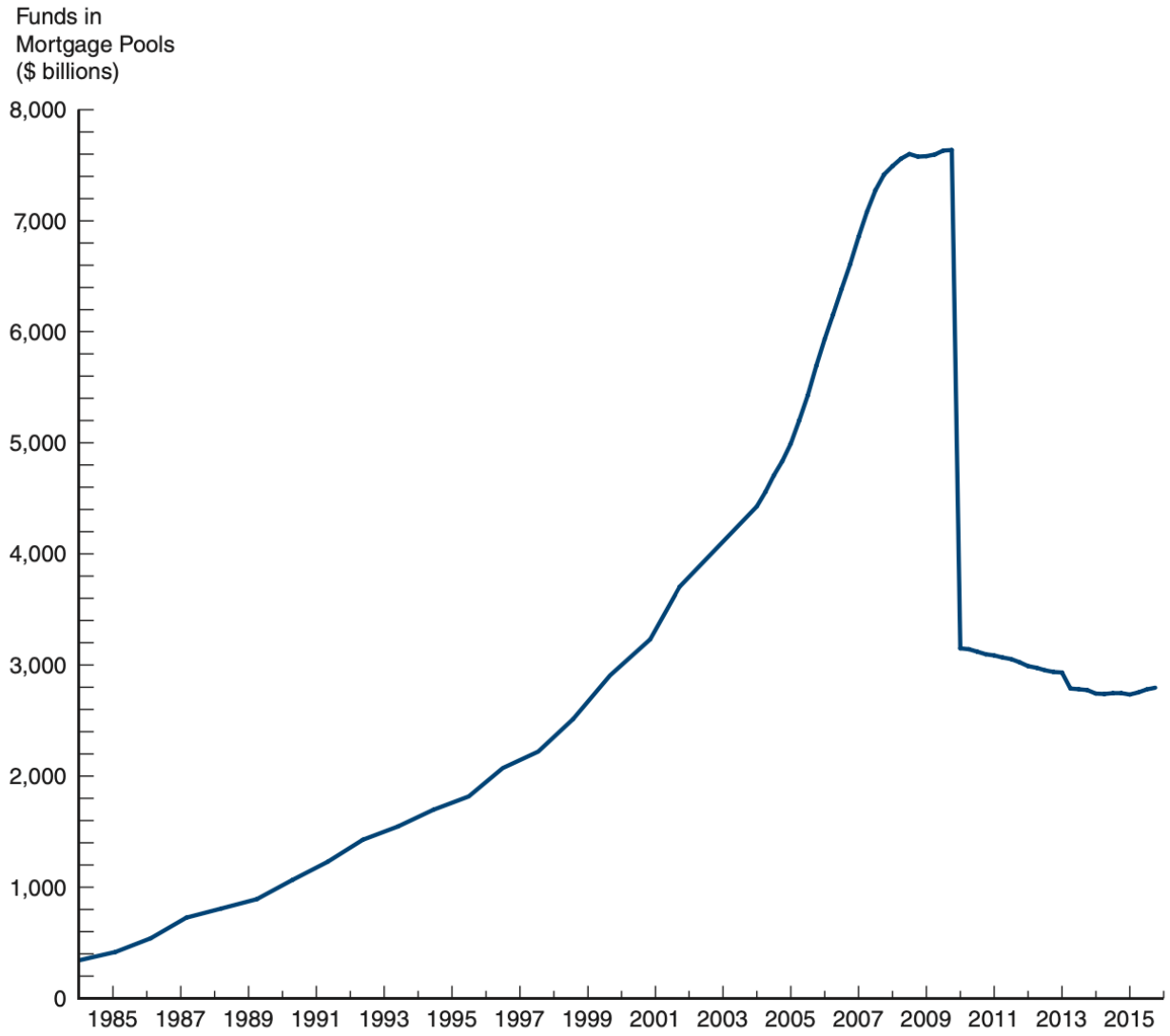


FIGURE 14.3 Value of Mortgage Principal Held in Mortgage Pools, 1984–2016

Source: http://www.federalreserve.gov/econresdata/releases/mortoutstand/current.htm.

Securitization of Mortgages: Types of Pass-Throughs

There are a variety of different types of pass-through securities. We will briefly look at three:

- GNMA Pass-Throughs
- FHLMC Pass-Throughs: CMO
- Private Pass-Throughs

Securitization of Mortgages: GNMA Pass-Throughs

Ginnie Mae began guaranteeing pass-throughs in 1968.

- GNMA mortgages can be originated by many different financial institutions.
- GNMA aggregates the mortgages and issues pass-throughs with rights to interest and principle.
- GNMA also offers default insurance on the mortgages in the pools.

Securitization of Mortgages: FHLMC Pass-Throughs

Freddie Mac buys mortgages and packages them for resale in MBSs.

- FHLMC pools contain mortgages that are not guaranteed, and may have different rates, etc.
- Pass-through securities issued by Freddie are called *participation certificates.*
- *Collateralized Mortgage Obligation:* A CMO is a structured MBS, it divides the mortgage pool into tranches based on maturity terms.
- This design is structured to mitigate the *prepayment risk.* Some tranches had little prepayment risk, while other had a lot.
- Freddie Mac helped originate these structures, and continues to innovate new tranche designs.

Securitization of Mortgages: Private Pass-Throughs

- In addition to the agency pass-throughs, intermediaries in the private sector have offered privately issued pass-through.

- BankAmerica offered the first private pass-through in 1977.

- Non-agency issuers are free to incorporate any type of mortgages into their MBSs, including jumbo loans, Alt-A loans, and other non-traditional mortgages.

Q: What are jumbo loans? Alt-A loans?

Jumbo loans & Alt-A loans

- **Jumbo Loan**

A type of mortgage that exceeds the limits set by government-sponsored enterprises (GSEs) such as Fannie Mae and Freddie Mac.

Jumbo loans are typically used to finance more expensive properties. Due to the larger loan amount, jumbo loans often have stricter qualification requirements, including higher credit scores, lower debt-to-income ratios, and larger down payments.

The interest rates on jumbo loans are usually high because they pose a greater risk to lenders.

Jumbo loans & Alt-A loans

- **Alt-A loan**

Alt-A loan, short for "Alternative-A," is a type of mortgage loan that falls between prime and subprime loans in terms of risk and creditworthiness.

Alt-A loans are considered to be riskier than prime loans but less risky than subprime loans.

Interest rates on Alt-A loans can be higher than prime loans but lower than subprime loans, reflecting the increased risk associated with these loans.

Subprime Mortgages and CDOs

- Subprime loans are loans to borrowers who have poor credit ratings or other issues with collateral, etc.

- In 2000, only 2% of mortgages were subprime. This climbed to 17% by 2006.

- The average FICO score was 624 for subprime borrowers. Prime mortgage borrowers were 742.

- However, these mortgages were hailed by politicians and bankers alike. They helped less-then-perfect borrowers secure the “American Dream” of owning a home. And since real estate prices can’t fall (right?), there is little risk involved.

Subprime Mortgages and CDOs

Several factors lead to this dramatic increase in subprime lending:

- New mortgage products (2/28 ARMS, Option ARMS, NoDoc loans) made expensive houses "affordable" (sort-of).

- The creation of the **Collateralized Debt Obligation** (CDO) helped create deal flow to continue lending in subprime markets.

- CDO: similar to the CMO (Collateralized Mortgage Obligation, offered by Freddie Mac), except that rather than slice the pool of securities by maturity as with the CMO, the CDO usually creates tranches based on risk class.

- When house prices were increasing, subprime borrowers had an out if problems arose.

The Real Estate Bubble

Between 2000 and 2005 home prices increased an average of 8% per year. The run up in prices was cause by two factors:

- The increase in subprime loans created new demand for housing
- Real estate speculators

In the aftermath of the financial meltdown, lending policies have largely returned to selecting capable borrowers:

- CDO issuance peaked in 2006 at $520b, but in 2009 fell to $4.2b.
- New legislation, such a Frank-Dodd, may require mortgage originators to hold a part of the mortgages they create.

Chapter Summary

- What Are Mortgages? Loans made for the purchase on real property, and usually collateralized by the purchased property.

- Characteristics of Residential Mortgages: includes the length of the mortgage, the terms, and the rate charges for the loan

- Types of Mortgage Loans: includes conventional, insured, fixed and variable rate, and a variety of other designs.

- Mortgage-Lending Institutions: the primarily originator and holder of mortgages is no longer thrift institutions as other attempt to generate fees

Chapter Summary

- Loan Servicing: the fees generated by collecting, distributing, and recording payments

- Secondary Mortgage Market: the active market for mortgages after the mortgage has been originated

- Securitization of Mortgages: growing in popularity, causing mortgages to complete with both Treasury and corporate debt. But also clearly a part of the problem in the Housing Bubble and Financial Crisis of 2007–2009.

Acknowledgment

Slides here are adopted from the official slides published by Pearson Education Ltd