



## **CHAPTER 9**

# **MORTGAGE MARKETS**

# *Mortgage Markets*

- Mortgage loans are secured by the pledge of real property.
- Mortgage loans are made for varied amounts - no standard denomination.
- Relatively weak Secondary Market
  - Little standardization of contracts and terms.
  - Traditionally issued and held by lender.
  - Mortgage markets are highly regulated and supported by federal government policies. (but evidently not enough!)

# *Fixed Rate Mortgages (FRMs)*

- Fixed Rate Mortgages (FRM)
  - “note” is the borrowing agreement.
  - Payments amortized over time, with constant payment. (See **Exhibit 9.1**)
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- Mortgage lien
  - mortgage is a lien on the property used as collateral for the loan.
  - If mortgage contract is broken, lender may use property to pay the loan.
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- Adjustable rate mortgages – borrowers' costs (and payments) vary with short-term interest rates (and inflation...). Basis rate could be T-bill, LIBOR, Prime.
  - Interest rate risk borne by borrower, but sometimes “capped”.
  - **Payment caps** limit the max amount the payment can increase in any year.
  - **Interest rate caps** limit the increase in loan rate in any year.

## *MBS: Home Loan*

- Suppose that you are going to buy a house, and your loan terms are as follows:  
Loan = 100,000;  $r=8\%$  APR;  $T = 30$  yrs. What is your monthly payment?

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Suppose that you pay off the loan after 5 years. What would be the payoff amount?

- Payoff?

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- Is this a scam?

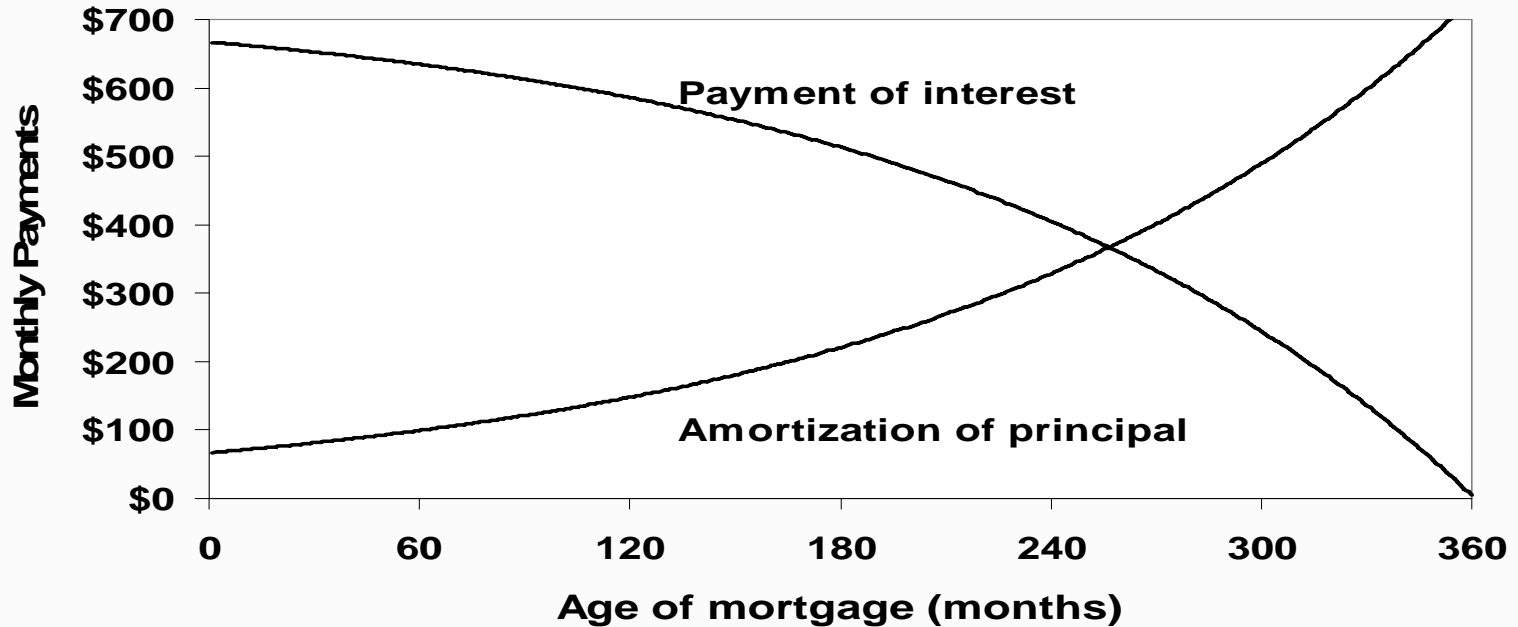
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Amortization Table					
	Rate	Term	Loan		
	0.67%	360	100000		
0	Beg Bal	Payment	Int Pd	Prin Pd	Ending Bal
1	100,000.00	733.76	666.67	67.10	99,932.90
2	99,932.90	733.76	666.22	67.55	99,865.36
3	99,865.36	733.76	665.77	68.00	99,797.36
4	99,797.36	733.76	665.32	68.45	99,728.91
5	99,728.91	733.76	664.86	68.91	99,660.01
6	99,660.01	733.76	664.40	69.36	99,590.64
7	99,590.64	733.76	663.94	69.82	99,520.82

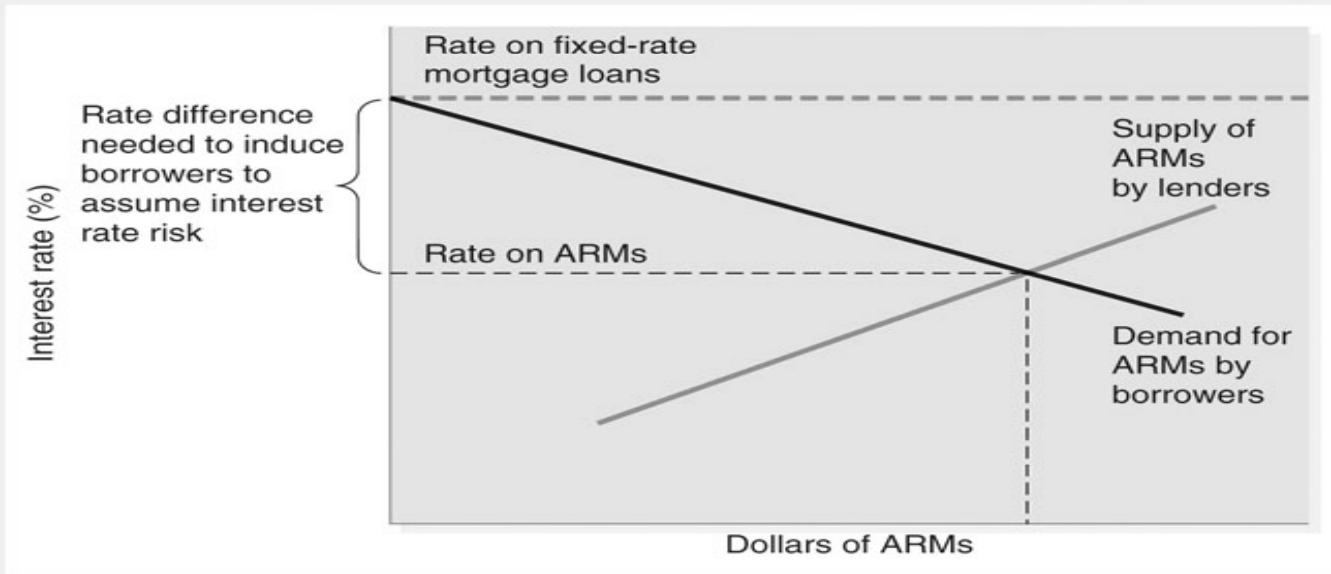
**Mortgage payment components  
(\$100,000 mortgage 8% financing rate)**



# Which is the better Choice – FRM or ARM?

## EXHIBIT 9.2

### Rate Difference Needed for Borrowers to Take the Risk of an Adjustable-Rate Mortgage

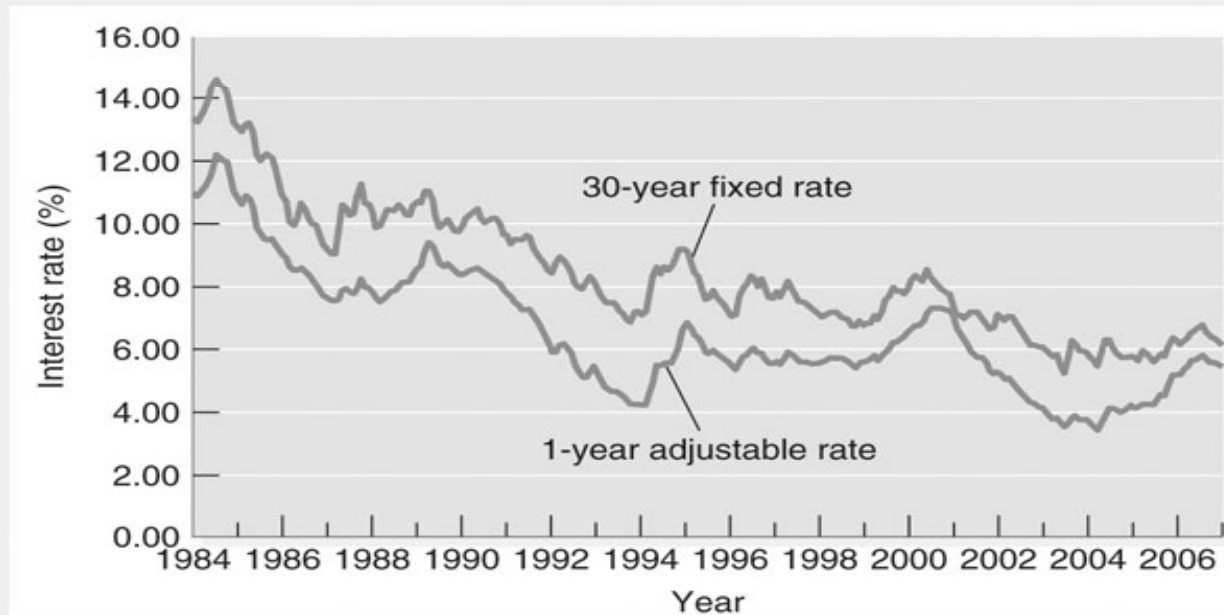


Typically, lenders offer rates on ARMs that are marked up by a certain percentage (usually 2 to 3 percent) over a short-term index rate. One popular type of ARM charges a rate equal to the 1-year T-bill rate plus 2.754 percent. Consumer demand determines the maximum markup lenders can obtain.

*Note:* When ARM rates equal rates in fixed-rate mortgage loans, it is assumed that the demand will be zero, because the borrower will receive no compensation for taking on the extra risk. As the ARM rate falls further below the fixed-rate loan rate, however, the demand for such loans will increase. At the same time, the supply of ARMs falls when lenders must give up more to reduce their risks.

# *Fixed and Adjustable Mortgage Rates*

**EXHIBIT 9.3**  
**Fixed and Adjustable Mortgage Rates**



Note how fixed rates on mortgages began declining in June 2000 in anticipation of the 2001–2002 recession. Meanwhile, note that ARM mortgage rates rose in the early part of 2000, which was a period when monetary policy kept short-term interest rates high. As the Fed forced short-term interest rates lower during 2001, however, ARM mortgage rates fell. By March 2004, both fixed and adjustable rates were at near-historic lows, but have risen since then.

Source: Federal Home Loan Mortgage Corporation.

## *Other Mortgage Instruments*

- Balloon Payment Mortgages
  - Traditional loan where interest is paid until time when principal is due.
  - Terms can be 3, 5 or 7 years, with fixed rate equal to 15- or 30-yr rates.
  - Popular with borrowers who may either sell or refinance prior to maturity.
- Rollover Mortgage (ROMs) – Refinanced at new rate every few years.
  - Adjustment period is longer than traditional ARMs.
- Renegotiated Rate Mortgages (RRMs) – Loan terms renegotiated periodically at terms prevailing in the market, but payment is fixed.
  - Adjustment period is longer than traditional ARMs.
- Interest-Only Mortgages
  - Low payments in initial years (10 to 15 yrs), includes only interest.
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  - Borrower pays interest for a considerable period on the entire loan balance, but avoids having to pay down balance in initial years.

## *Other Mortgage Instruments (continued)* 9

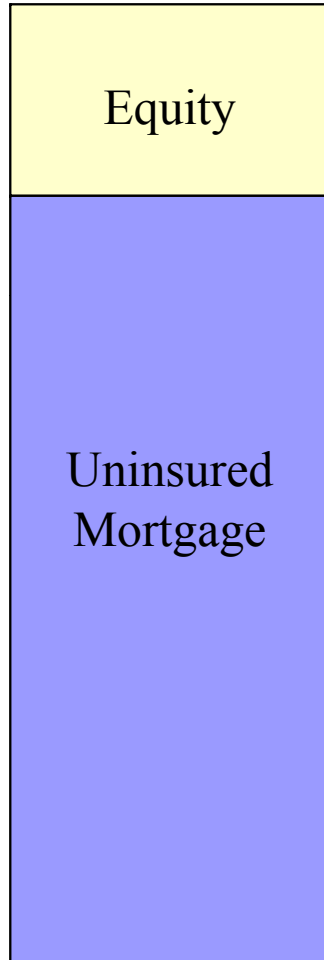
- Construction-to-Permanent Mortgages – Bridge financing provided by lender over time frame required by borrower to purchase land and construct house.
  - Only interest payment is made until construction is completed.
  - Loan financed in increments as construction payments have to be made.
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- Reverse Annuity Mortgages (RAMs) – Allow homeowners to borrow against the equity on their homes at lower rates, in return for an annuity.
  - Typically obtained by elderly with home equity but need income.
  - Term usually less than 20 yrs and, or as lifetime annuity.
  -
  
- Second Mortgage - homeowners borrow against equity in their homes.
  - Extended at time of purchase or later as equity is borrowed from property.
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- Boom years (2002-07): “Negative amortization” or “Option-ARM” loans.
  - Initial payment low (less than interest due) for 2-3 yrs. Principle increases.
  - After initial term (2-3 yrs) borrowers subject to “payment” and “rate” shock.

## *Factors in obtaining mortgage*

- ***Borrower's Income (documented)*** from all sources determines ability of borrower to meet the monthly mortgage commitment.
- ***Down Payment*** refers to the amount of cash the borrower can contribute towards the cost of the house as their equity.
- ***Private Mortgage Insurance*** is usually necessary for borrowers who are unable to come up with a 20 percent down payment. PMI premiums added to mortgage payments until balance of mortgage is less than 75% of property's value.
- During the boom
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- Conventional mortgages represent lending/borrowing in the private markets.
  - Insured and guaranteed mortgages supported by federal and state agencies.
  - Federal Housing Administration (FHA)
  - Veterans Administration (VA).

# Private Mortgage Insurance

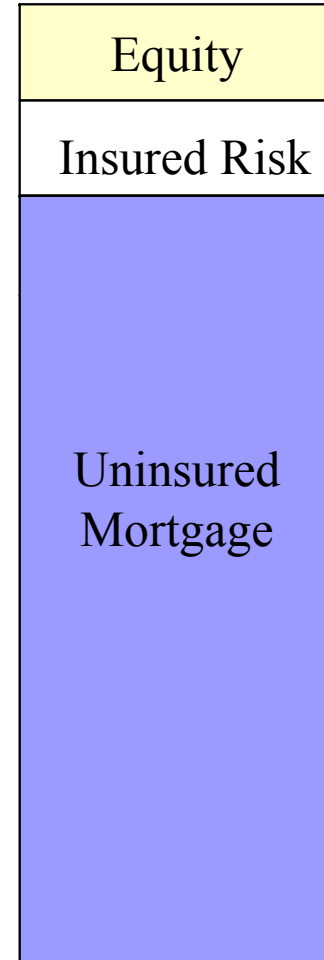
Uninsured conventional mortgage



\$25,000 down payment

\$100,000 mortgage at 10% APR.

Privately Insured conventional mortgage



\$12,500 down payment

\$12,500 mortgage insurance

\$112,500 mortgage at 10% plus insurance premium = 10<sup>1</sup>/<sub>4</sub> to 10<sup>1</sup>/<sub>2</sub>% APR on \$112,500 balance

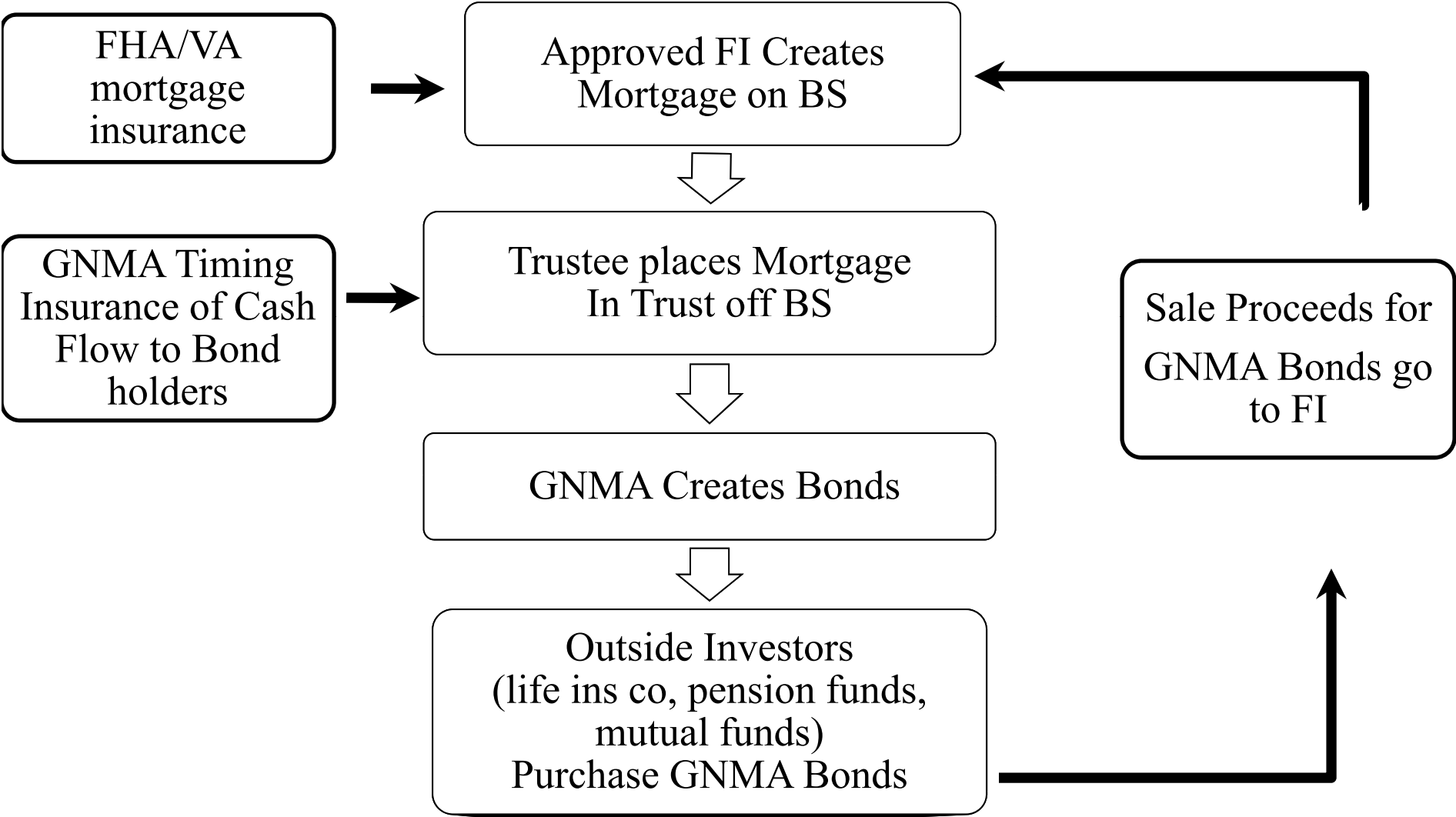
# *Mortgage-Backed Securities (MBS)*

- Secondary market for mortgages
  - Mortgage *pass-through securities* pass through payments of principal and interest on pools of mortgages to holders of MBS.
  - Other MBS use pools of mortgages as collateral for debt securities.
  - Advantages
    - Issued in standardized denominations and are negotiable.
    - Issued or backed by quality borrowers.
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- Development of secondary mortgage mkt
  - **1934:** U. S. Congress initiated development of secondary market for mortgages by creating Federal Housing Admin (FHA).
  - **1938:** Federal National Mortgage Assoc (FNMA) created; authorized to buy FHA insured loans.
  - **1968:** FNMA was split up into FNMA and GNMA (Government National Mortgage Assoc). GNMA authorized to guarantee mortgage pools insured by FHA, VA, and other federal agencies.
  - **1970: Federal Home Loan Mortgage Corp (FHLMC)** created to help develop secondary market for conventional mortgages.

## ***MBS: GNMA Pass throughs***

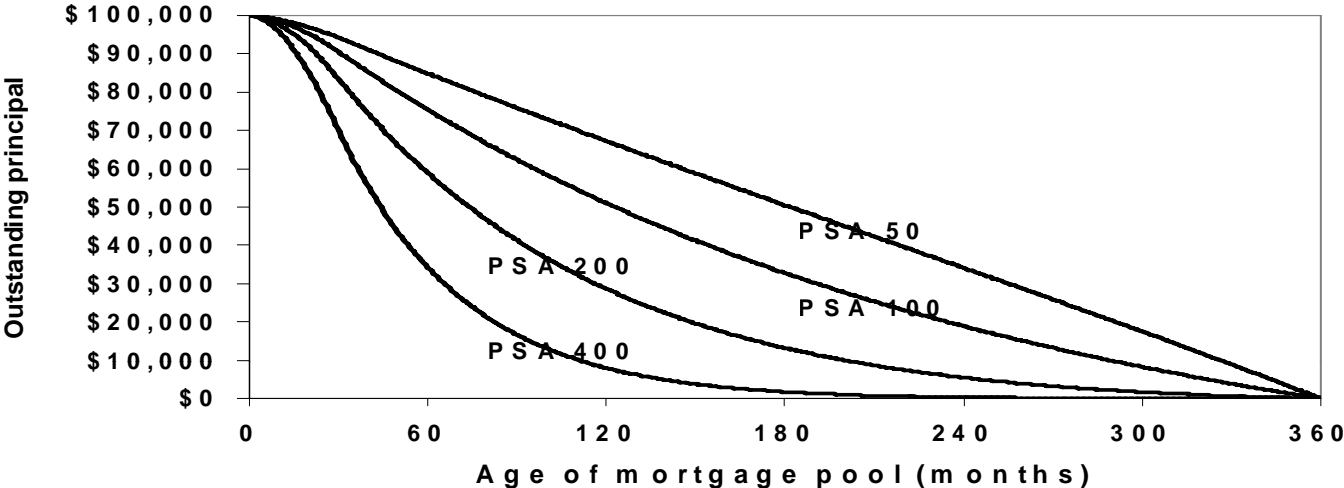
- ***Ginnie Mae Pass-Throughs*** - pools of government insured mortgages.
  - GNMA guarantees timely payment of principal and interest on MBS backed by federally insured or guaranteed loans.
  - GNMA charges issuers of pass-throughs fee ranging from 0.25 % to 0.75 % to offer its guarantee.
  - Investors earn lower yield reflecting a lower default risk because of dual guarantee by GNMA on MBS and FHA/VA guaranty on the original loans.
- **Ginnie Mae I** - pass-throughs secured by mortgage pool of same type of mortgage loans. Minimum pool size is \$1 million.  
lender .
- **Ginnie Mae II** –pass-throughs secured by mortgage pool of same type of mortgage loans, but different in other aspects (e.g., lenders).
  - Min pool size is \$250,000 for multi-lender pools and \$1M for single-lender.
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# Creation of Pass Through Security

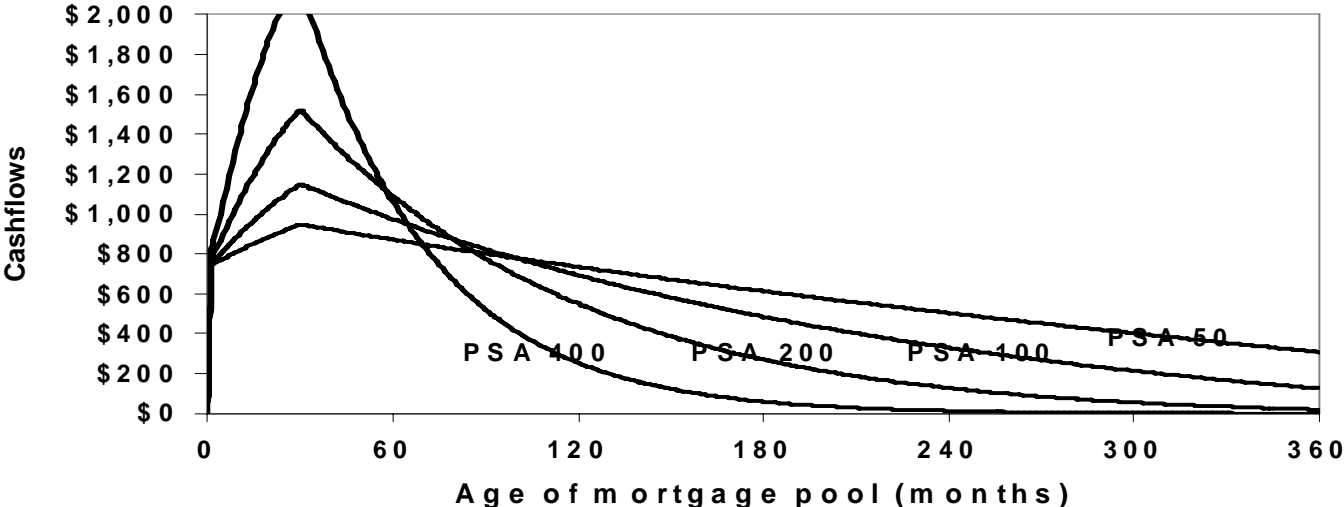


# Cash Flows of GNMA Pass-throughs (2/2)

**GNMA bond principal**  
 (\$100,000 par value 30-year 8% bonds)



**GNMA bond cashflows**  
 (\$100,000 par value 30-year 8% bonds)

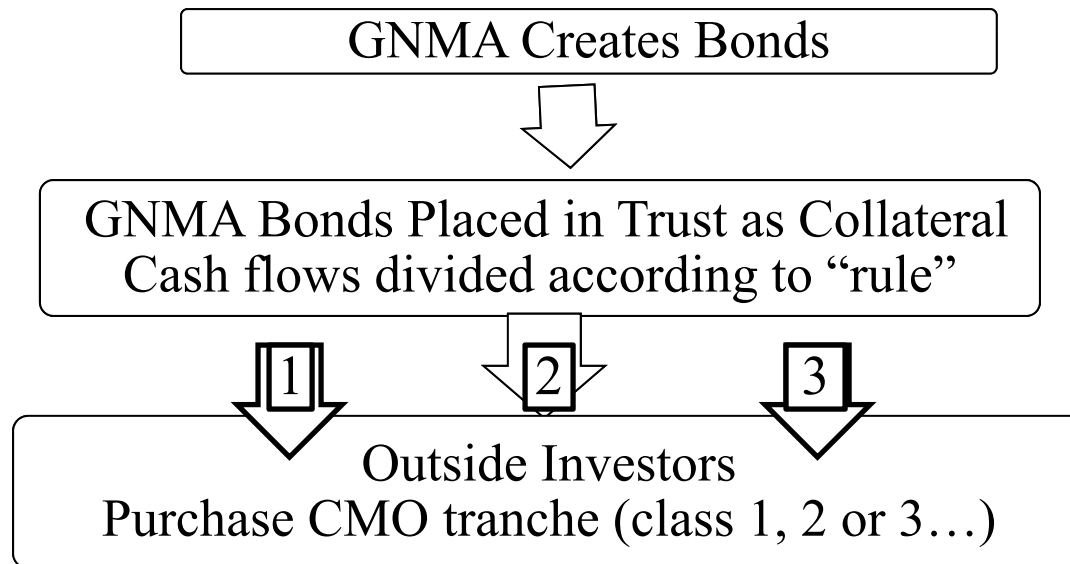


## *Types of MBS - Freddie Macs PCs*

- ***Freddie Mac Participation Certification*** - pools of conventional mortgages.
  - Participation certificates (PCs) are issued by the FHLMC and ***conventional*** loans are purchased from S&Ls and pool by FHLMC.
  - Include conventional mortgages as collateral, not federally insured.
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- ***Fannie Mae pass-throughs*** – MBS from pools of mortgages issued by FNMA.
  - Securities are similar to FHLMCs' PC.
  - May issue pass-throughs for conventional or federally insured mortgages.
- ***Privately Issued Pass Throughs (PIP)*** - issued by private institutions.
  - First issued in 1977 by Bank of America.
  - Similar to “Ginnie Maes” except backed by conventional mortgages.

# *CMOs - overview*

- Collateralized Mortgage Obligations (CMOs) - Securities (bonds) created by splitting a mortgage pool cash flows according to specific allocation rules.
  - A multiclass pass-through created with a number of different bond holder “classes” differentiated by order in which each is paid off.
  - Why issue CMOs? Sum of parts is greater than the whole. I.e., gain in value from issuing best (AAA?) “class” of CMO more than offsets loss in value from lower classes.
  - *CMOs* mostly sold by FHLMC; but also by other GSEs and private issuers.
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## ***Types of MBS (CMOs - Continued) and MBB***

- ***Real Estate Mortgage Investment Conduit (REMIC) – type of CMO.***
  - Differs from CMOs only in how they are set up legally.
  - Legal structure created with TRA 1986.
- ***Stripped Mortgage Backed Securities (SMBS) - type of CMO.***
  - *Interest Only (IO)* - cash flows only from interest payments on mortgage pool. Cash flows decline as mortgage loans in pool paid down.
  - *Principal only (PO)* - receive all cash flows from principal payments on mortgage pool.
- Other forms of mortgage securities:
- Mortgage-Backed Bonds – Differ from pass-throughs and CMOs:
  - MBBs normally remain on the balance sheet
  - cash flows paid to MBBholders not directly connected to payments on mortgages.
  - Instead, mortgages are held as collateral against MBB that is sold.

# *CMOs: Sequential CMOs (1/2) Example*

- Sequential CMOs - Creates securities with various (unknown) maturities.
  - E.g, \$100,000 bond divided into 4 tranches, A-30K, B-30k, C-30k, Z-10k.
- Rule 1: Mortgage Principal Payments
  - All payments to principal (incl early) first applied to A-tranche.
  - After principal from A-tranche is paid, principal pymts applied to B- etc.
- Rule 2: Interest Payments
  - All tranches receive interest proportional to existing principal.
  - Principal on A-tranche (then B,C) is exchanged for interest payment on Z-.
  - Z-tranche has longest maturity but greatest variation, depending on prepays.
- Example with \$100,000 bond;  $r=8\%$  ( $0.667\%/mo$ );  $T=360$  months.
  - First pymt is  $733.76 = 67.10$  (principal) +  $666.67$  (interest)
  - A, B, C receive interest of  $.08/12*30k=\$200$ ; Z receives interest of  $\$66.67$ .
  - A reduces principal by  $\$67.10$  plus  $\$66.77$  from Z-tranche
  - Z-tranche outstanding principal increases by  $\$66.77$
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# *Risk in Mortgage Securities: Prepayment Risk* <sup>20</sup>

- *Prepayment risk* - the risk that the borrower will repay (call) the debt before maturity causing the realized yield to be different from expected. This is a primary risk associated with mortgage loans and MBS.
  - If interest rates decline, borrowers refinance, paying off old mortgage. Mortgage investor then receives principal when interest rates are lower.
- *Extension risk*
  - If interest rates increase, borrowers slow to refinance or trade homes, thus extending length of their mortgage financing, keeping rates to lender low.

# *Participants in the Mortgage Markets*

- **Lenders**
  - Thrifts - dominated and increased share of market until 1970s.
  - Banks - increased mkt share and powers to make mortgage loans.
  - Insurance Companies and Pension Funds.
  
- **Government Sponsored Enterprises and Agencies**
  - FNMA, FHLMC, Federal Land Banks, Farmers Home Administration.
  - State and local housing authorities issue bonds and buy subsidized, lower-rate mortgages, often for first-time home-buyers.
  
- **Mortgage Insurers** – Developed in 1930s to encourage mortgage lending.
  - FHA guaranteed payment against default to lender for low income borrowers.
  - VA insurance (1944) for mortgage loans to veterans.
  - Private mortgage ins covers low down pymts on conventional mortgages.
  
- **Mortgage Bankers** – Originate mortgages, collect fees for origination.
  - Do not fund mortgages but sell them (e.g., to GNMA).
  - Often retain servicing rights to mortgages, collecting payments, taxes, etc..
  - Mortgage banking and loan servicing are very competitive as technology applications decreasing expenses.

# Mortgages Outstanding

**EXHIBIT 9.8**  
**Mortgages Outstanding by Holder (1958–2005)**

	1958	1968	1978	1985	1995	2005
<b>Amount Outstanding (\$ in billions)</b>	\$172.5	\$412.5	\$1,169.4	\$2,312.3	\$4,602.7	\$11,942.2
<b>Percentage Held</b>						
Thrift institutions	39.9%	44.6%	45.1%	33.1%	13.0%	9.6%
Commercial banks	14.8	15.9	18.3	18.6	23.7	24.8
Insurance companies and pension funds	22.4	19.3	10.1	8.8	5.3	2.6
U.S. government	2.5	2.3	2.4	2.3	1.3	0.7
Government agencies (GSEs)	2.0	3.2	6.2	5.9	5.4	4.0
Mortgage pools, government agency	0.1	0.6	6.0	16.0	34.1	30.8
Mortgage pools, private	—	—	—	0.6	6.4	18.0
Households	16.6	11.8	8.7	5.4	2.5	1.5
State and local governments	0.6	0.8	1.4	3.2	2.5	1.2
REITs	0.2	0.2	0.5	0.3	0.3	1.4
Credit unions	—	0.2	0.3	0.5	1.4	2.1
Finance companies	—	—	—	1.2	1.6	2.4
Other	0.9	1.1	1.0	4.1	2.5	0.9

The rapid growth of mortgage pools has reduced thrifts' and life insurance companies' direct holdings of mortgages, as these institutions have substituted more marketable mortgage-backed securities for individual mortgages in their portfolios.

# *Subprime Mortgage Crisis*

- *Subprime* borrowers are those with low credit scores (650 and lower).
  - Interest rates are higher due to higher default risk.
  - Subprime mortgages took off in 2003 due to (or caused) low interest rates and rapid appreciation of real estate.
  - Volume more than tripled to \$625 bln. between 2002 and in 2005.
- Subprime borrowers may be abused through *predatory lending* practices:
  - Excessively high interest rates and fees; Abusive terms and conditions
  - Discouraging borrowers from questioning or challenging terms of the loan
  - Not using prudent lending standards (low doc, no down payment).
  - Appraisers inflating property values
  -
- Many subprime mortgages are ARMs
  - ARM rates increased with market interest rates in 2005 and 2006.
  - Payment shock and rate shock.
  - Delinquency rates tripled between October 2005 and August 2007.
  -

# *Subprime Mortgage Crisis (cont.)*

## – **Impact of the Subprime Crisis**

- Borrowers may have little incentive to make payments on a mortgage with balance > house value.
- Many originators went bankrupt or distress
  - New Century Financial, Countrywide Financial, Washington Mutual
- Holders of MBS have to revalue their portfolios downward
  - Citigroup, Credit Suisse, Merrill Lynch
- Fed and European Central Bank injected liquidity to mitigate credit crunch and market panic and effect of financial sector on aggregate employment.