

Fixed Income Research

NOMURA

MBS Basics

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Key Theme: Prepayments

- Prepayment risk distinguishes MBS
- Comes from prepayment option in residential mortgage loans
- Gives MBS undesirable "negative convexity"
- Gives MBS higher yields than securities without prepayment risk

Ginnie Mae MBS Spread to 5-Year Treasuries
(basis points)



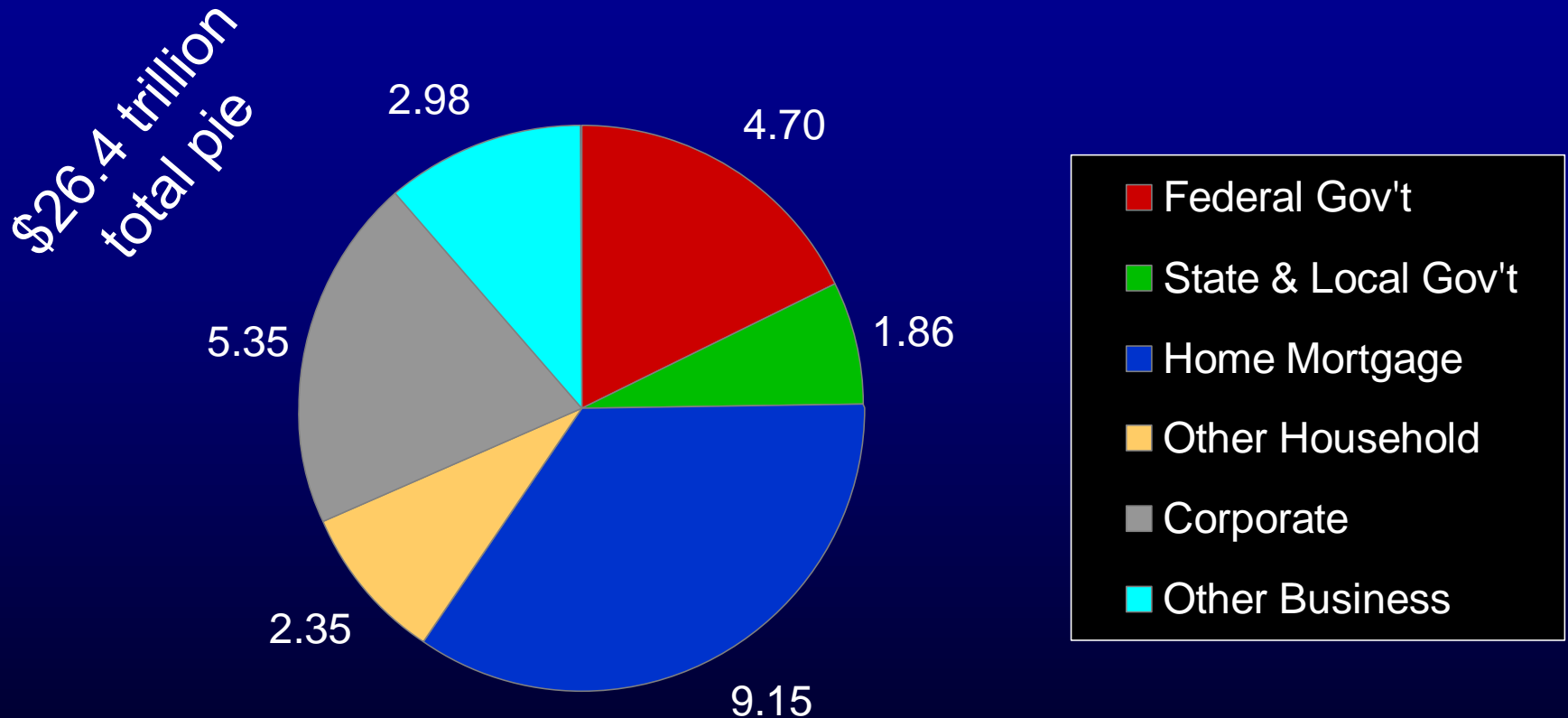
Source: Bloomberg MTGEGNSF, GT5

Why Focus on MBS

- Mortgages are a big slice of all U.S. debt
- MBS are a big slice of the bond market
- MBS are the biggest slice of the securitization market
- MBS is the original source of securitization technology
- Understanding MBS is helpful (often essential) to understanding other types of securitizations

Debt Outstanding: Domestic Non-financial Sectors

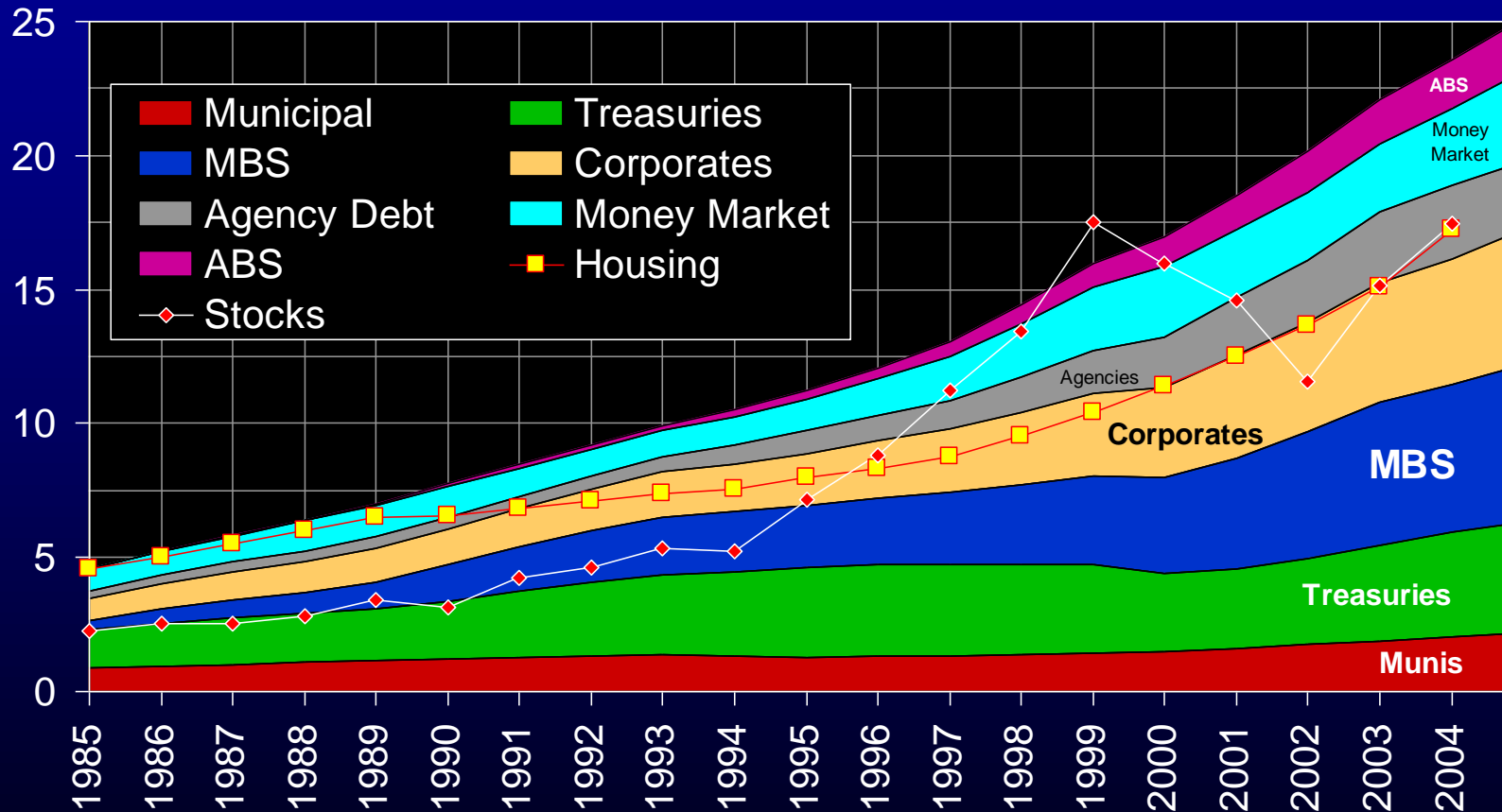
as of 31 Dec 2005 (\$ trillions)



Source: Federal Reserve

Fixed Income Capital Markets

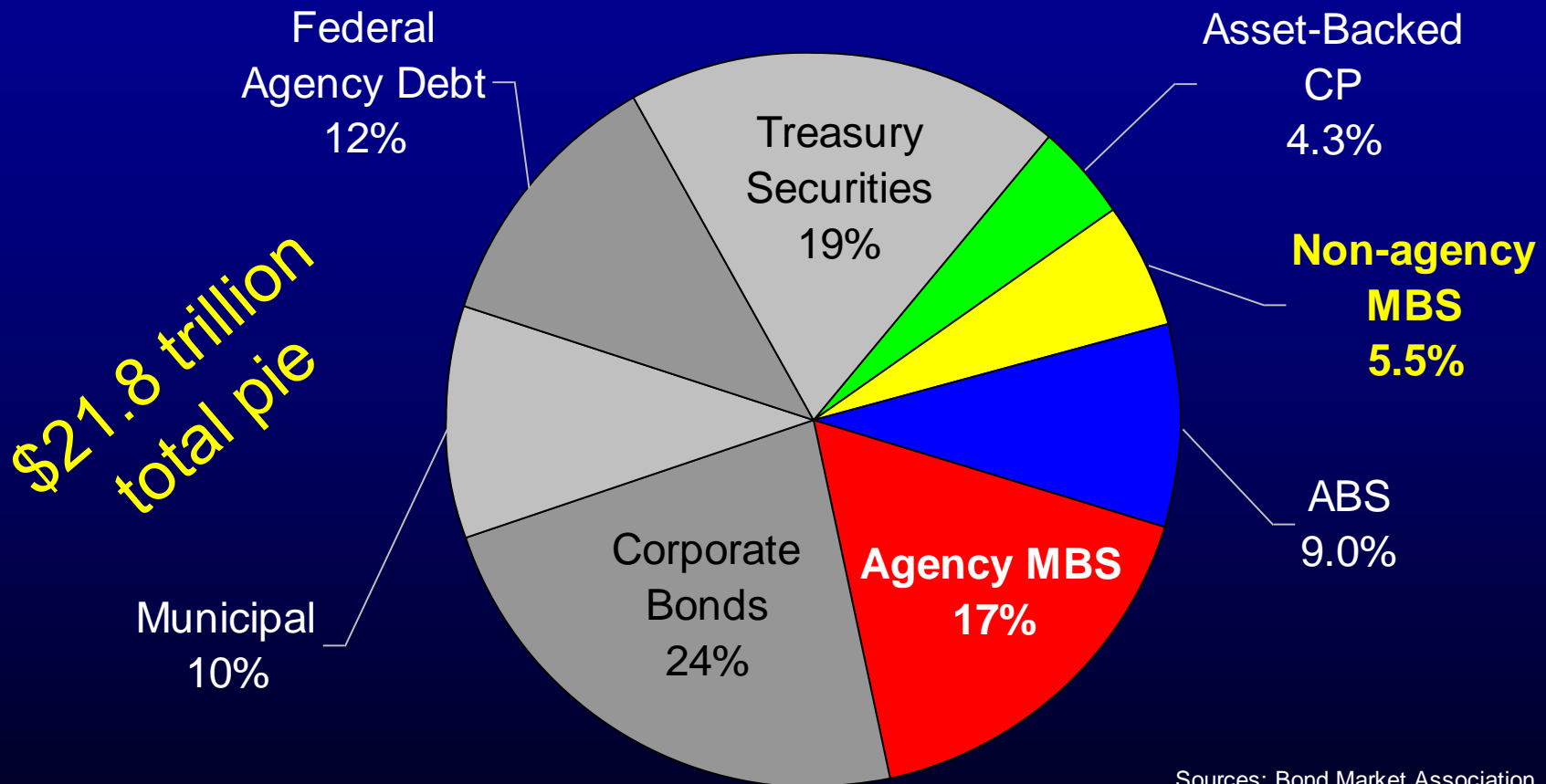
Outstanding Bond Market Debt (\$ trillions)



Sources: Bond Market Association, Federal Reserve, NYSE, NASD

U.S. Debt Capital Markets

Selected Components, as of 2005Q4 (\$ trillions)

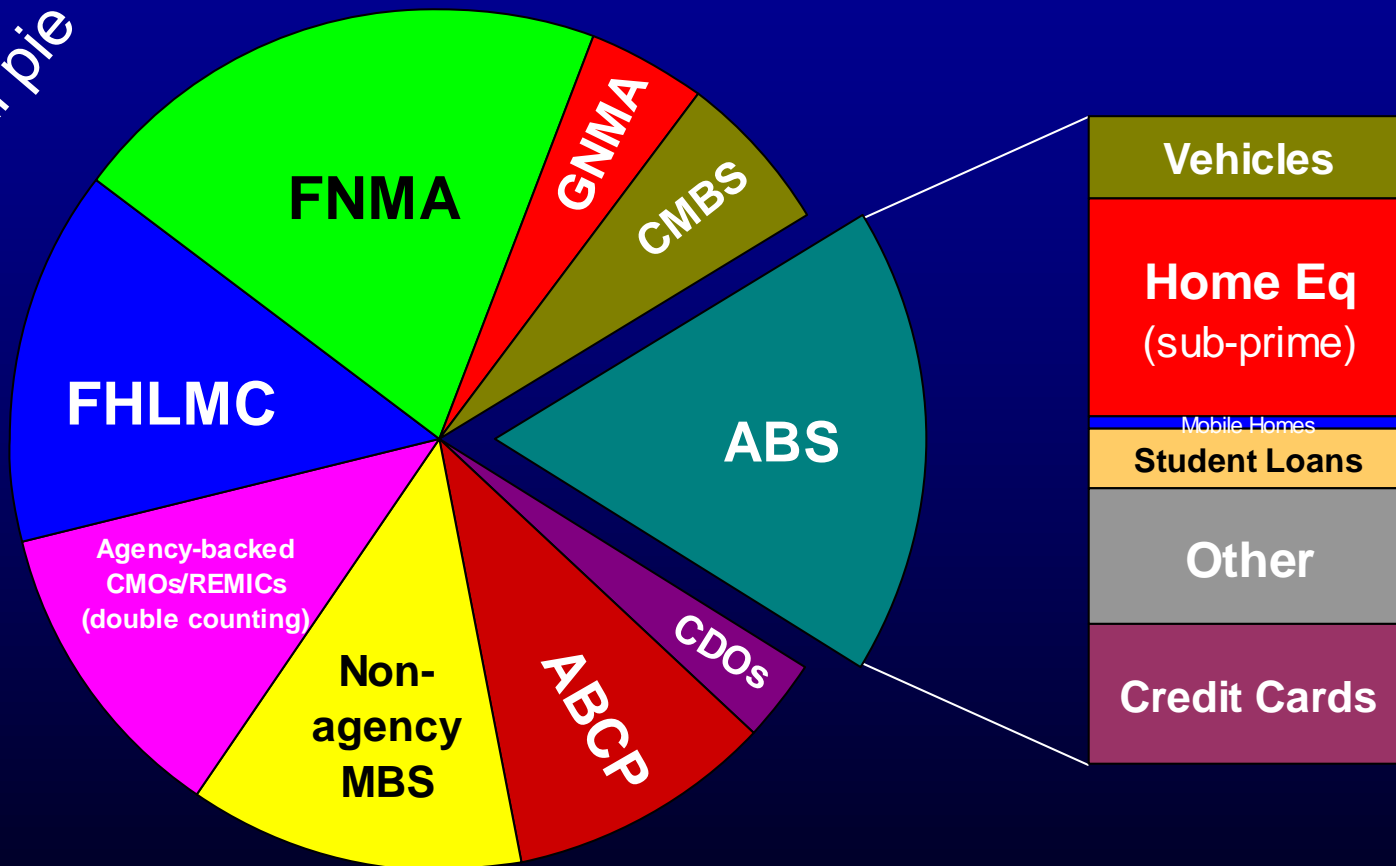


Sources: Bond Market Association, Asset Backed Alert, Bloomberg

Securitization Marketplace

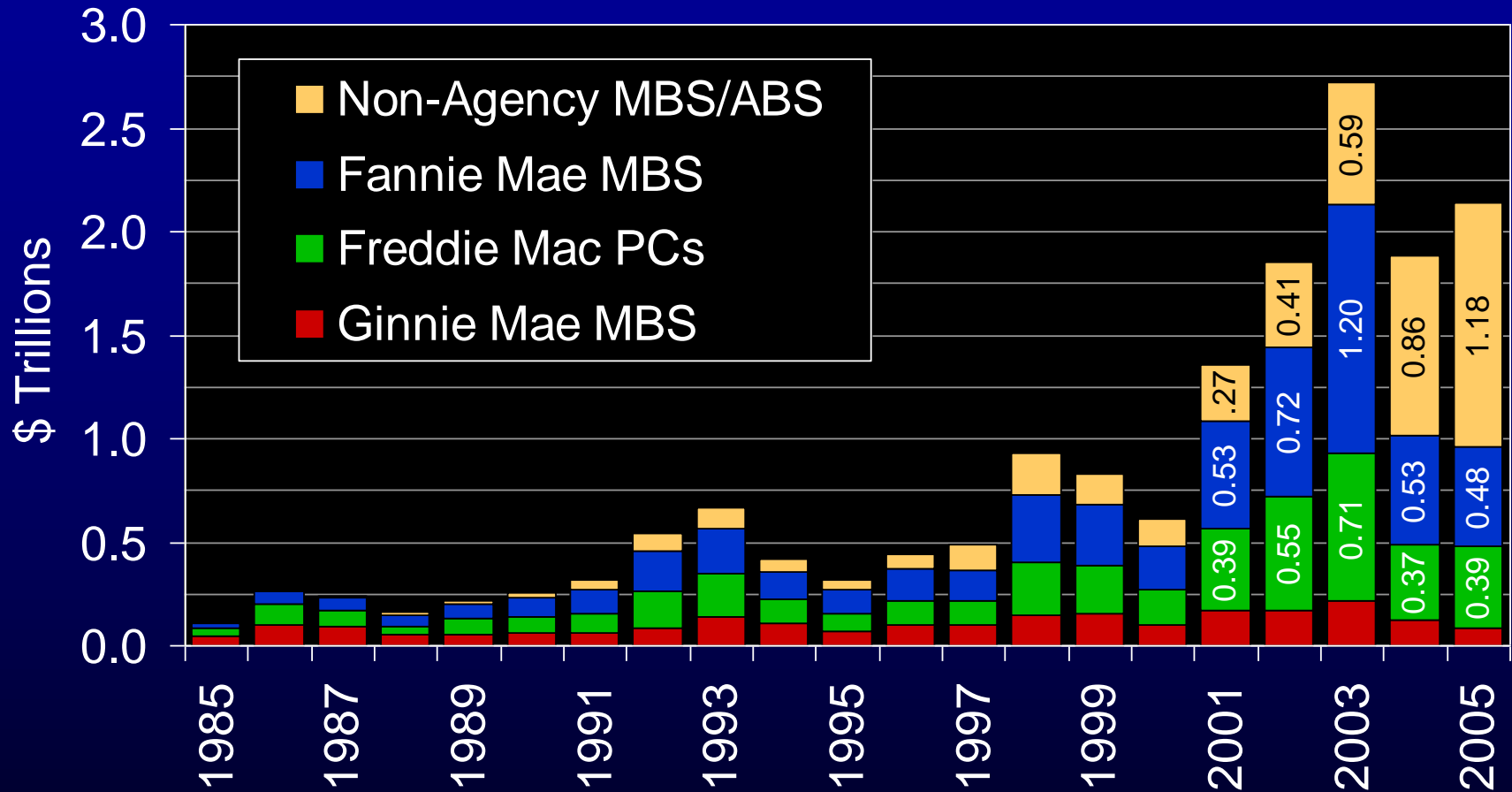
Outstandings as of 31 Dec 2005

\$9.45 trillion
total pie



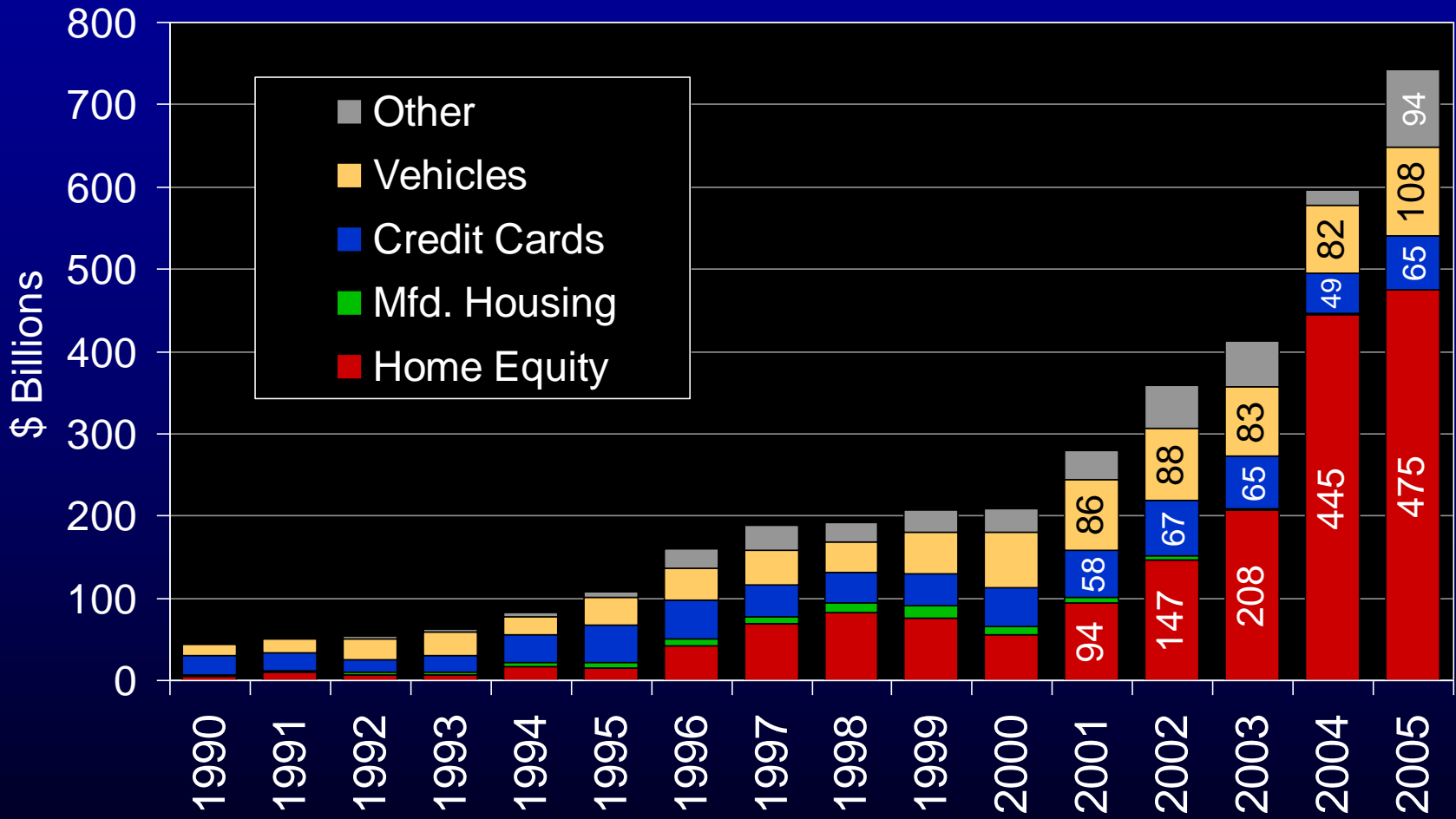
Sources: Bond Market Association, Asset Backed Alert, Bloomberg, Trepp

MBS Issuance Volume



Sources: Inside MBS & ABS 1/6/06. Note: Non-Agency MBS/ABS includes jumbo, alt-A, and subprime mortgage products.

Public ABS Issuance Volume



Sources: Moody's, Bloomberg, Asset Securitization Report

Mortgage Loan Basics

- Traditional loan is 30-year, fixed rate, fully amortizing, payable monthly, and prepayable at any time
- Variations
 - 15-year, 20-year
 - adjustable interest rate (ARMs)
 - index
 - caps
 - hybrid (fixed/adjustable)
- Affordability features: interest only, negative am., 40-year
- Specialty mortgage products: alt-A, sub-prime

Refinancing: A Valuable Option

■ Fixed rate loans

- When interest rates fall, a borrower can refinance his loan at a lower interest rate
- When interest rates rise, a borrower has the benefit of having locked-in a lower rate in the past

■ Floating rate loans

- When hybrid loan resets borrower can refinance to new hybrid or to fixed
- When interest rates fall, a borrower has the ability to "permanently" lock-in the benefit of the low rates by refinancing into a fixed rate loan

Mortgage Loan = A Bond minus an Option

- Bond portion: obligation to pay principal and interest in monthly installments
- Option portion: opportunity to "call" (purchase) the bond at a price of par, at any time
- Lender is long the bond and short the option
- Borrower is short the bond and long the option
- Jargon: Mortgage loan contains an embedded short option
- Value of a mortgage loan is the value of the bond minus the value of the option
- Valuing the option is hard to do

MBS Basic Features (GSE MBS)

- Pass-through security
 - Monthly collections of interest and principal, including prepayments, "passed through" to investors
 - Servicer collects payments from borrowers (for a fee)
 - GSE guarantee protects investors from credit risk on loans
- Pass-through rate is like an interest rate on the MBS
 - Lower than the interest rates on the loans
 - Difference is the servicing fee plus the guarantee fee
- Loans backing an MBS are generally similar
 - Interest rates
 - Loan maturities

Basic MBS Cash Flow

Homeowners make monthly payments of principal and interest at the mortgage rate.

The servicer retains a portion of the interest component of each monthly payment as the "servicing fee."

The pass-through rate is the mortgage rate net of the servicing fee rate.

Homeowners

\$ ↓ Monthly P&I at the mortgage rate (e.g. 6.5%)

Servicer

\$ ↓ Monthly P&I at the pass-through rate (e.g. 6.0%)

Investors

Ginnie Mae – GNMA

- Guarantees securities issued by banks and mortgage banks that participate in Ginnie Mae programs
- Part of HUD
- Loans have federal insurance or guarantees (e.g. FHA or VA; usually low- or moderate income borrowers)
- Full faith and credit guarantee
- 0% risk weight for bank capital
- GN I: All loans have same interest rate
- GN II: Loan rates in 0.75% band
- Competes with sub-prime mortgage ABS for loans

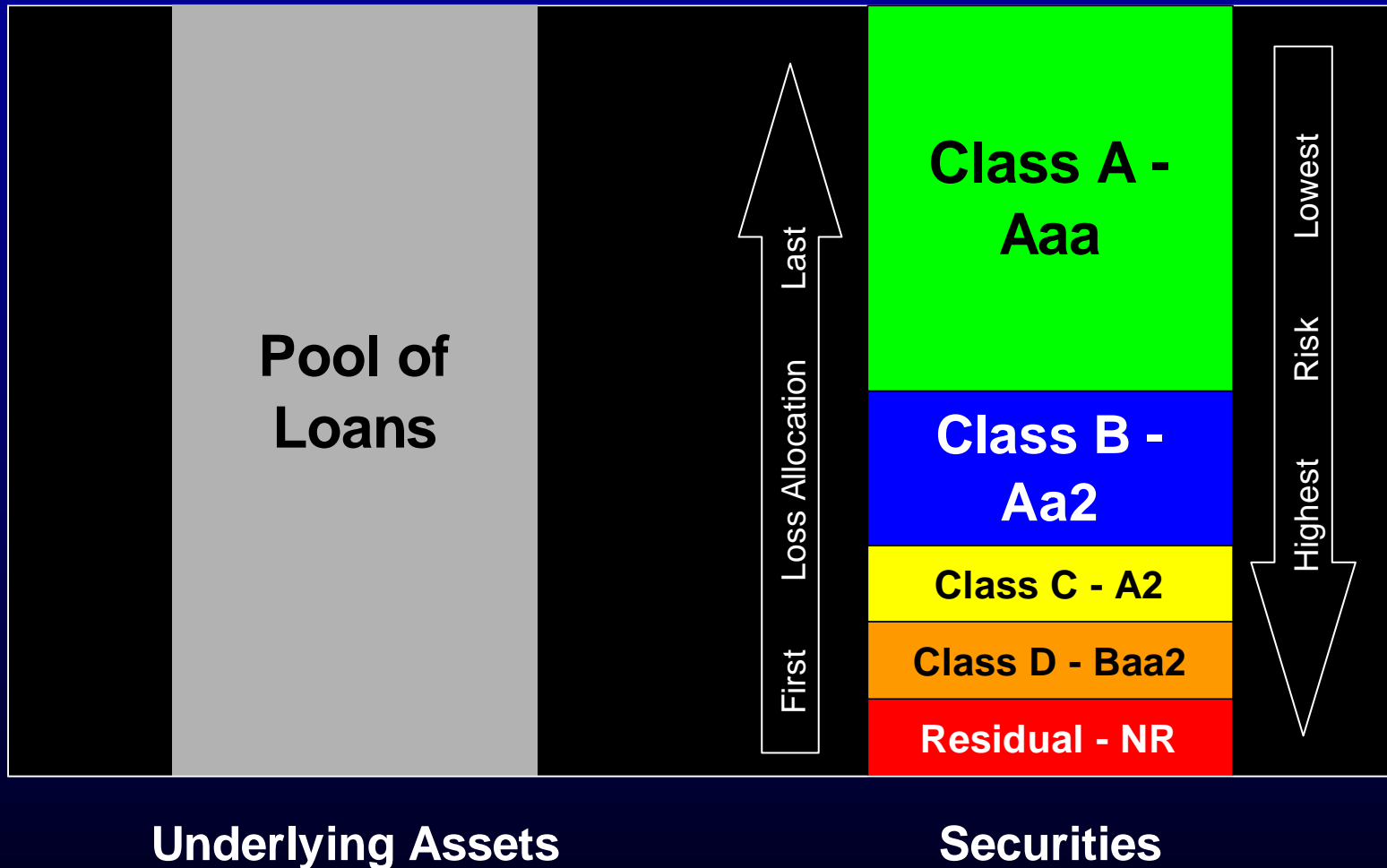
Fannie Mae (FNMA) & Freddie Mac (FHLMC)

- Private corporations, federally chartered & regulated
- Directly issue MBS
- Accept conventional mortgage loans < \$417,000
- Cash and swap programs for lenders
- Regular and special servicing
 - with and without recourse; most sellers choose without
- Guarantees its own MBS against credit losses on the underlying loans
- Guarantee is not backed by the government
- 20% risk weight
- Loan Interest rates usually in 1.75% band

Private-Label MBS

- Issued by private companies
- No GSE guarantee
- Rated securities w/ credit support
 - Subordinate tranches absorb losses before senior tranches
 - Mortgage loan credit quality:
 - Collateral – loan-to-value ratio (LTV)
 - Credit – credit score (FICO)
 - Capacity – debt-to-income ratio (DTI)
- Jumbo: loans above conforming limit
- Alt-A: loans that contain non-standard features but which have borrowers of "A" creditworthiness
- Securities backed by sub-prime mortgage loans are classified as "home equity ABS" rather than MBS

Reallocating Credit Risk – Tranching



More on Credit Enhancement

■ Subordination

■ Six pack structure (jumbo and "true" alt-A)

- Prepayment lockout: seven years or 2× subordination, phase-out, triggers

■ Excess spread/OC structure (sub-prime and weak alt-A)

- Use ES to cover current losses and build OC (turbo)
- Surplus ES to residual class
- Principal lockout w/ triggers (3 years or 2×)

■ Fast pay, no pay

■ Reserve Fund

■ Bond Insurance, guarantees

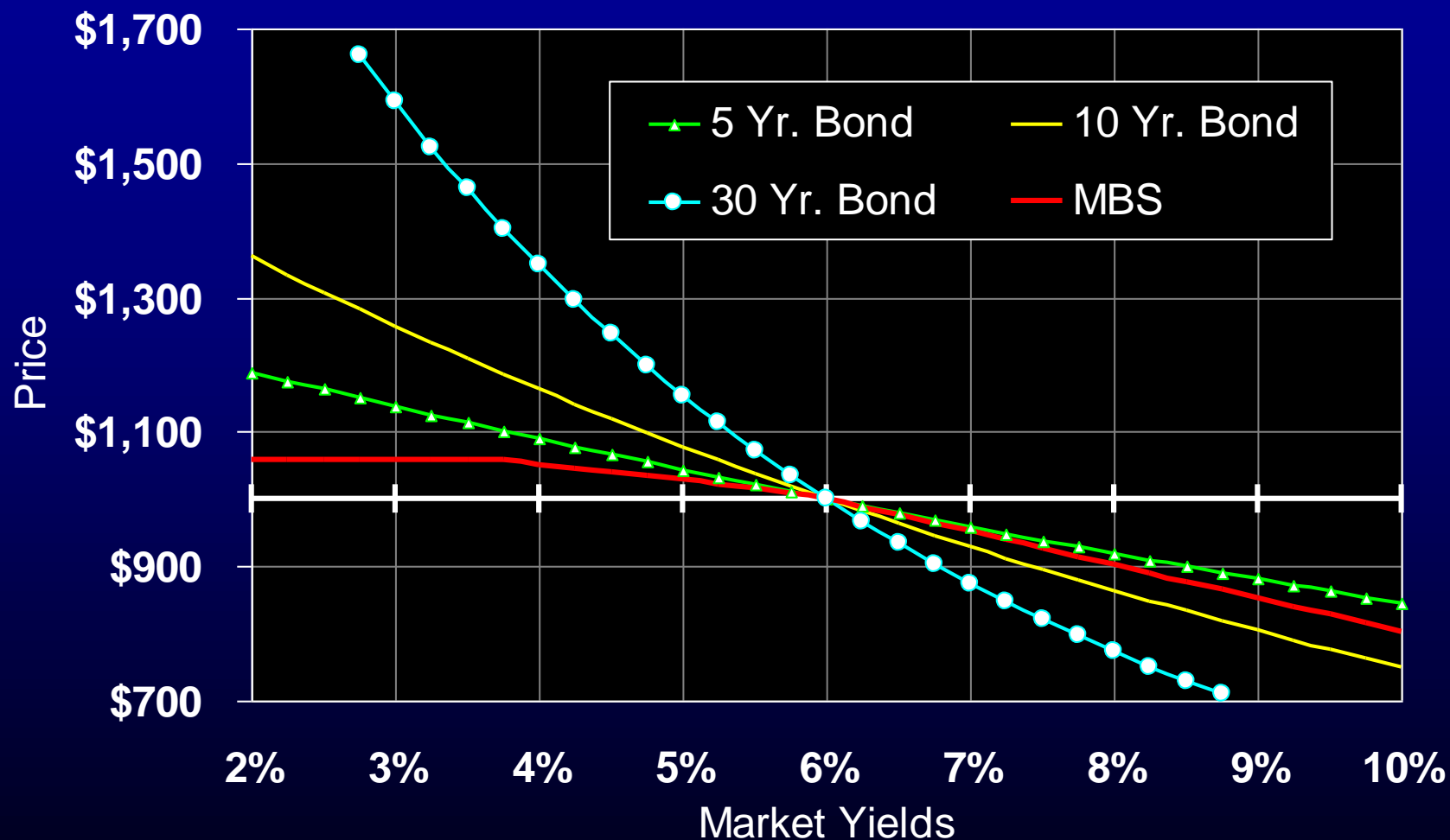
MBS Trading

- TBA (to be announced) pools traded generically
- Coupon stack
- Cheapest to deliver strategy
- Specified pools – investor knows exactly what he will get but he must pay more and can pick only from what is available
- BloombergSM system provides much information
- The whole GSE MBS market settles trades according to a fixed monthly cycle

MBS Valuation

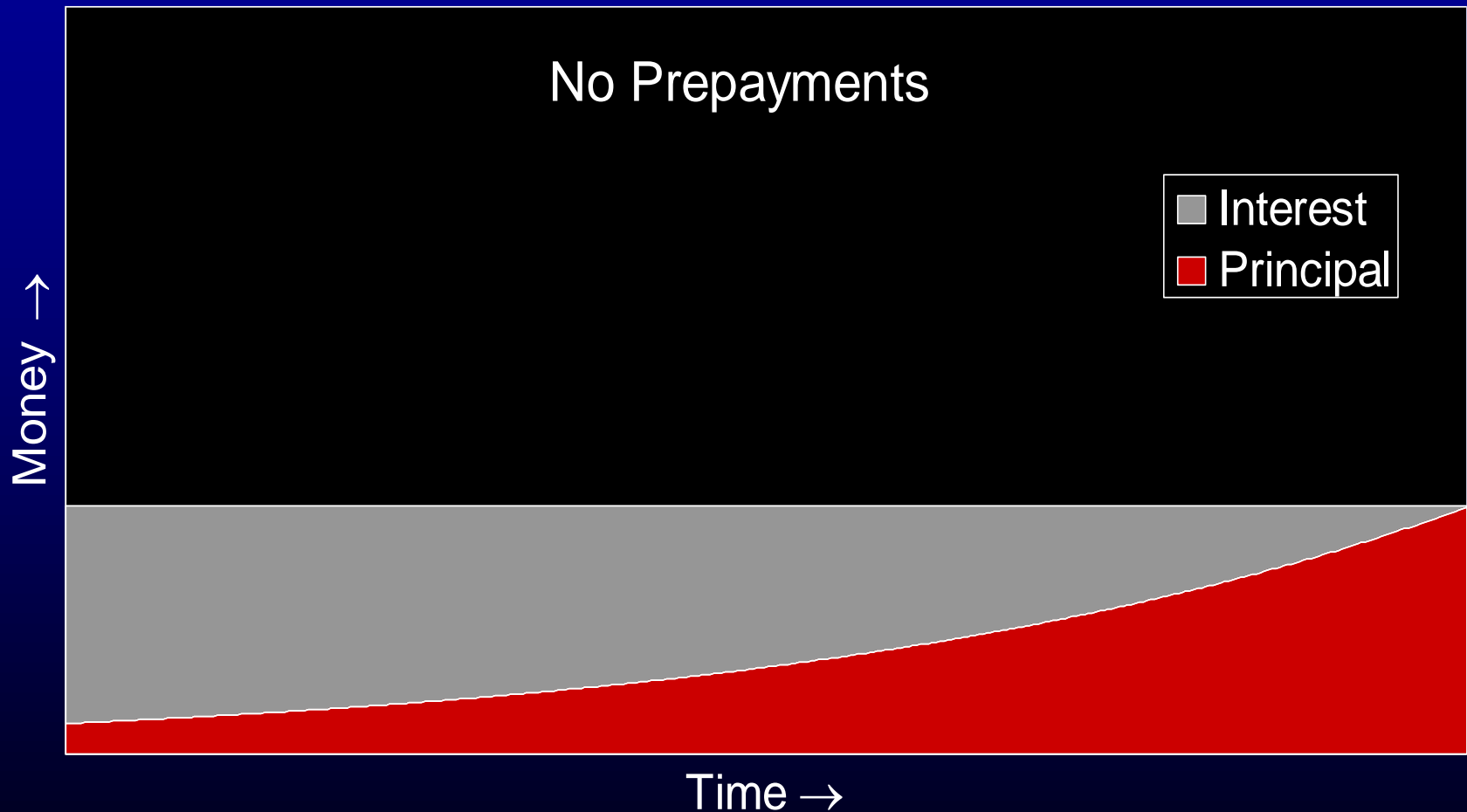
- Dynamic analysis
- Prepayment models and assumptions
- Interest rate simulations
- Option adjusted spread (OAS) analysis:
 - Applies a fixed spread over benchmark interest rates to calculate a simulated price for the security under each scenario, as well as the average of the simulated prices across all scenarios
 - Adjusts the fixed spread and repeats the calculation process until the average of the simulated prices across all scenarios converges to the actual market price
 - Reported OAS is the fixed spread that equates the average of the simulated prices to the actual market price of the security
- MBS values falls when interest rates are more volatile
- Private label also must consider credit risk

Positive vs. Negative Convexity



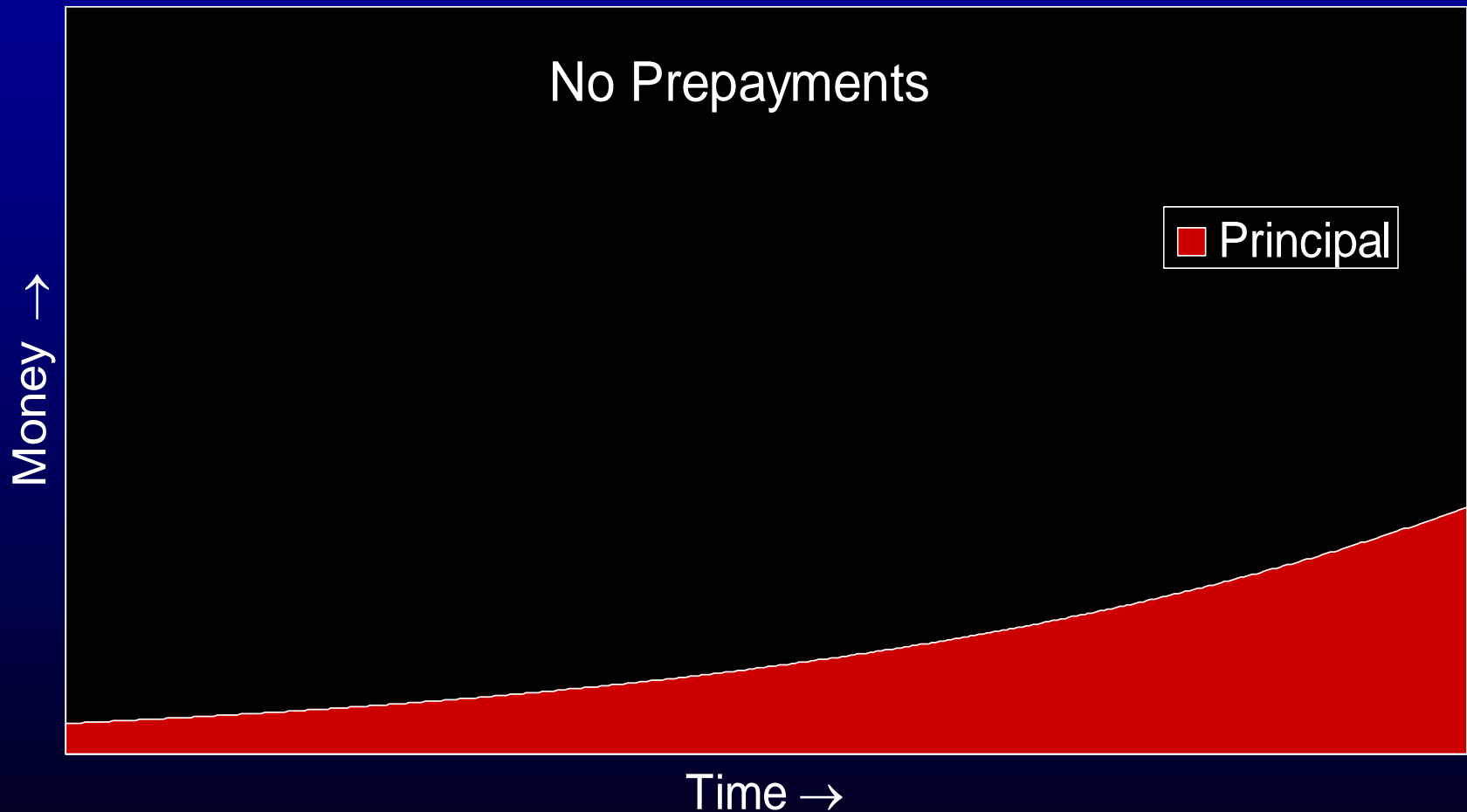
Structure: Prepayments (1)

Basic Cash Flows, 30 Year, 7% Mortgage Loan



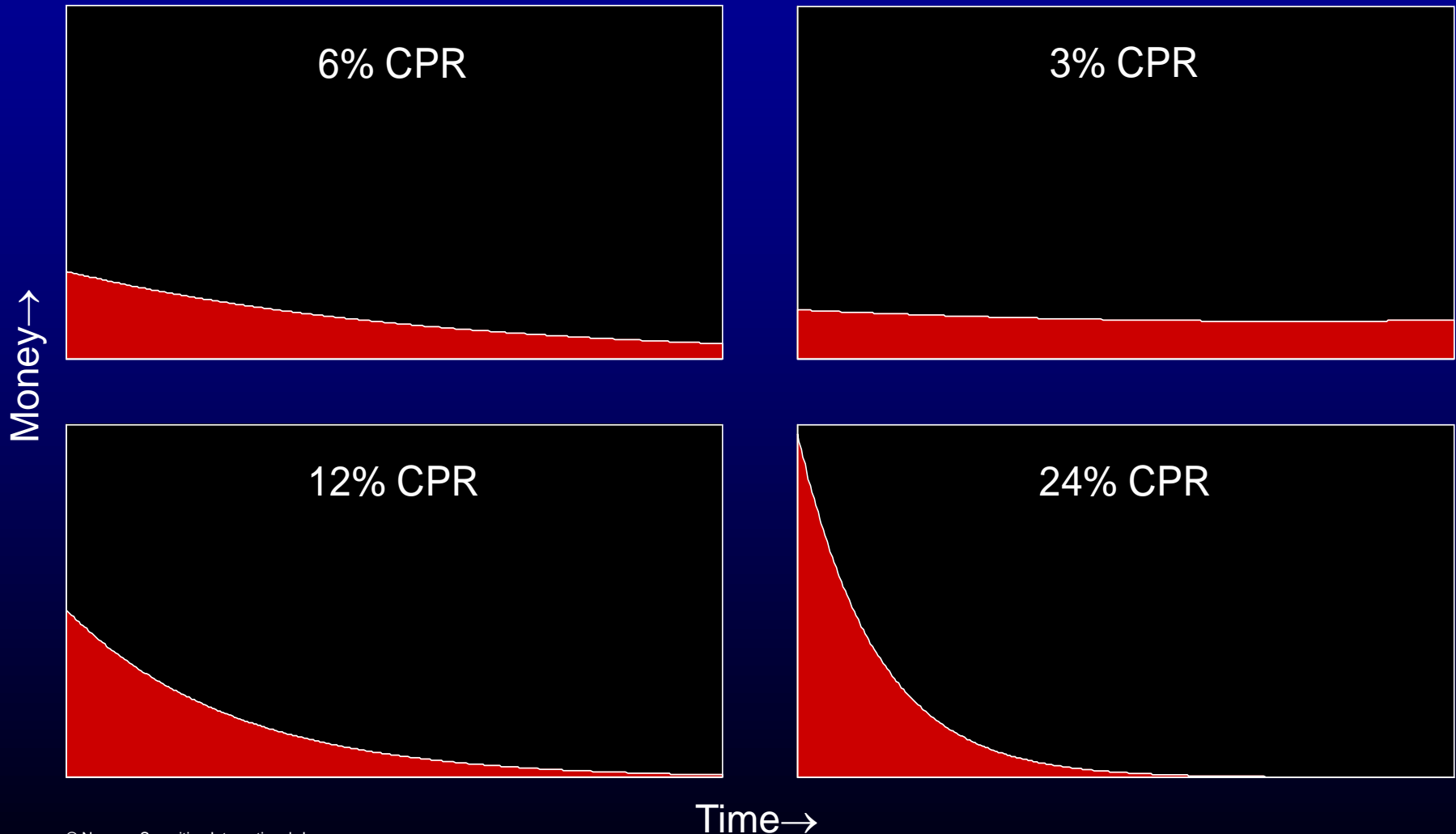
Structure: Prepayments (2)

Principal Cash Flows, 30 Year, 7% Mortgage Loan



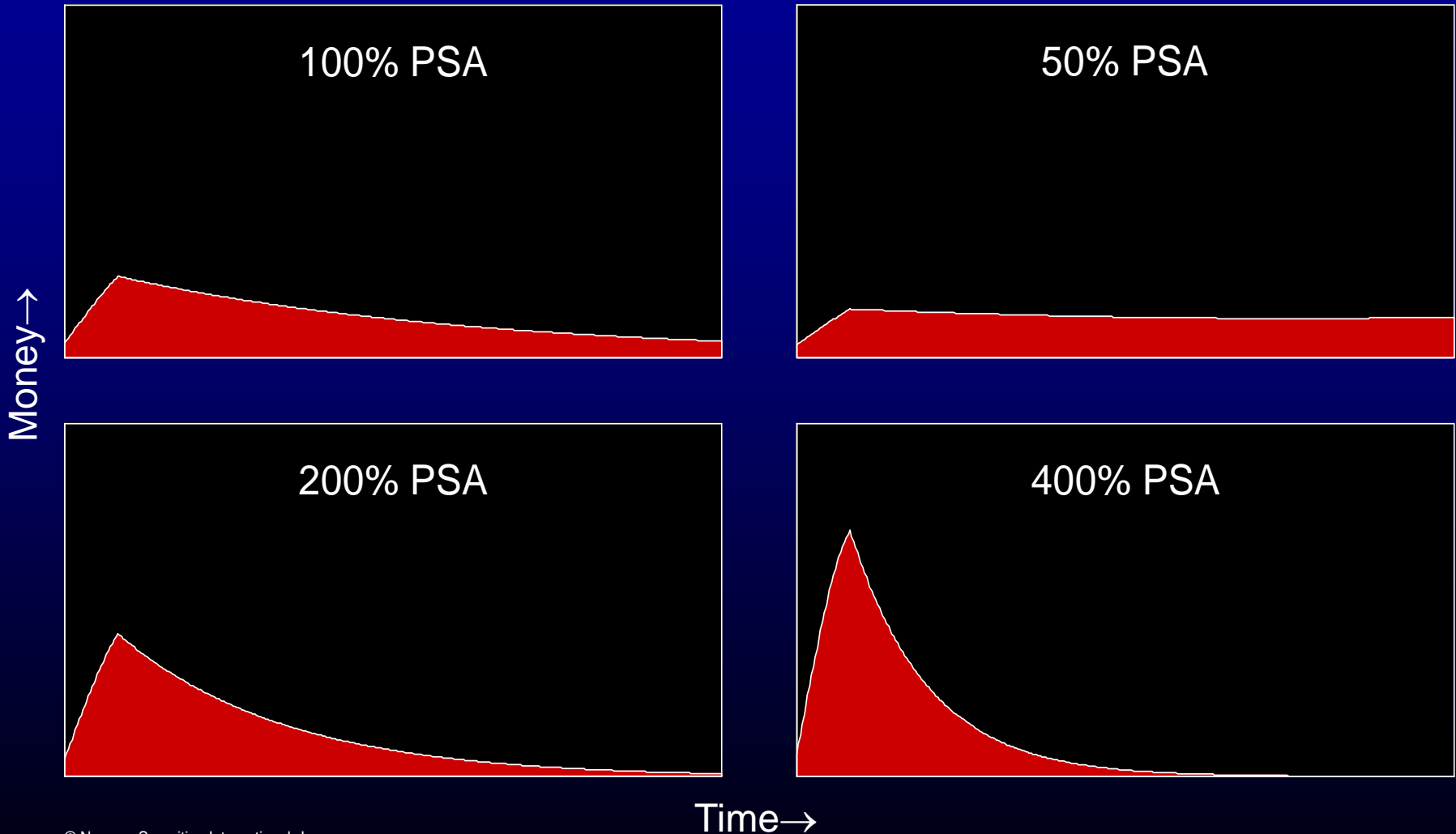
Structure: Prepayments (3)

Principal Cash Flows, 30 Year, 7% Mortgage Loans



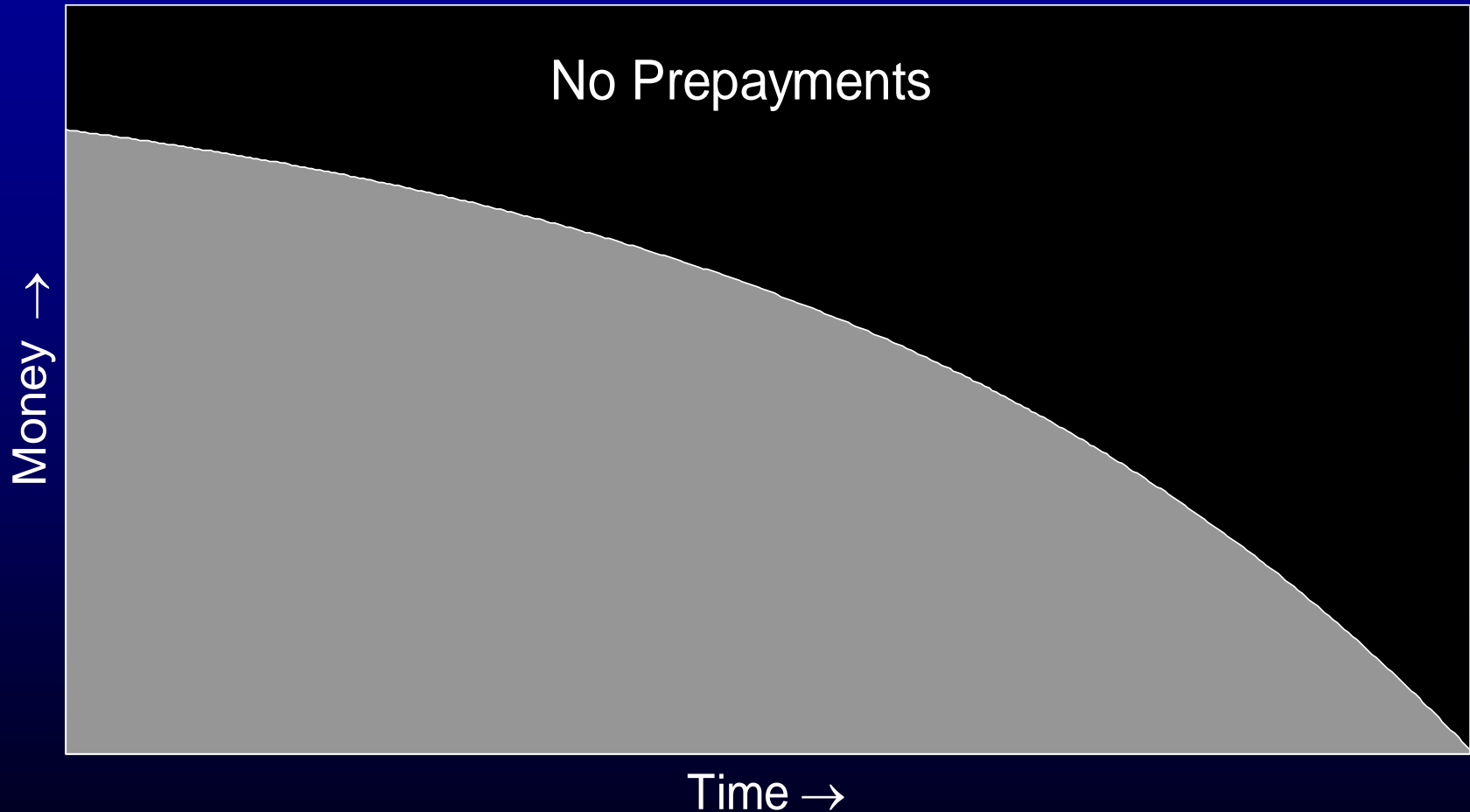
Structure: Prepayments (4)

Principal Cash Flows, 30 Year, 7% Mortgage Loans



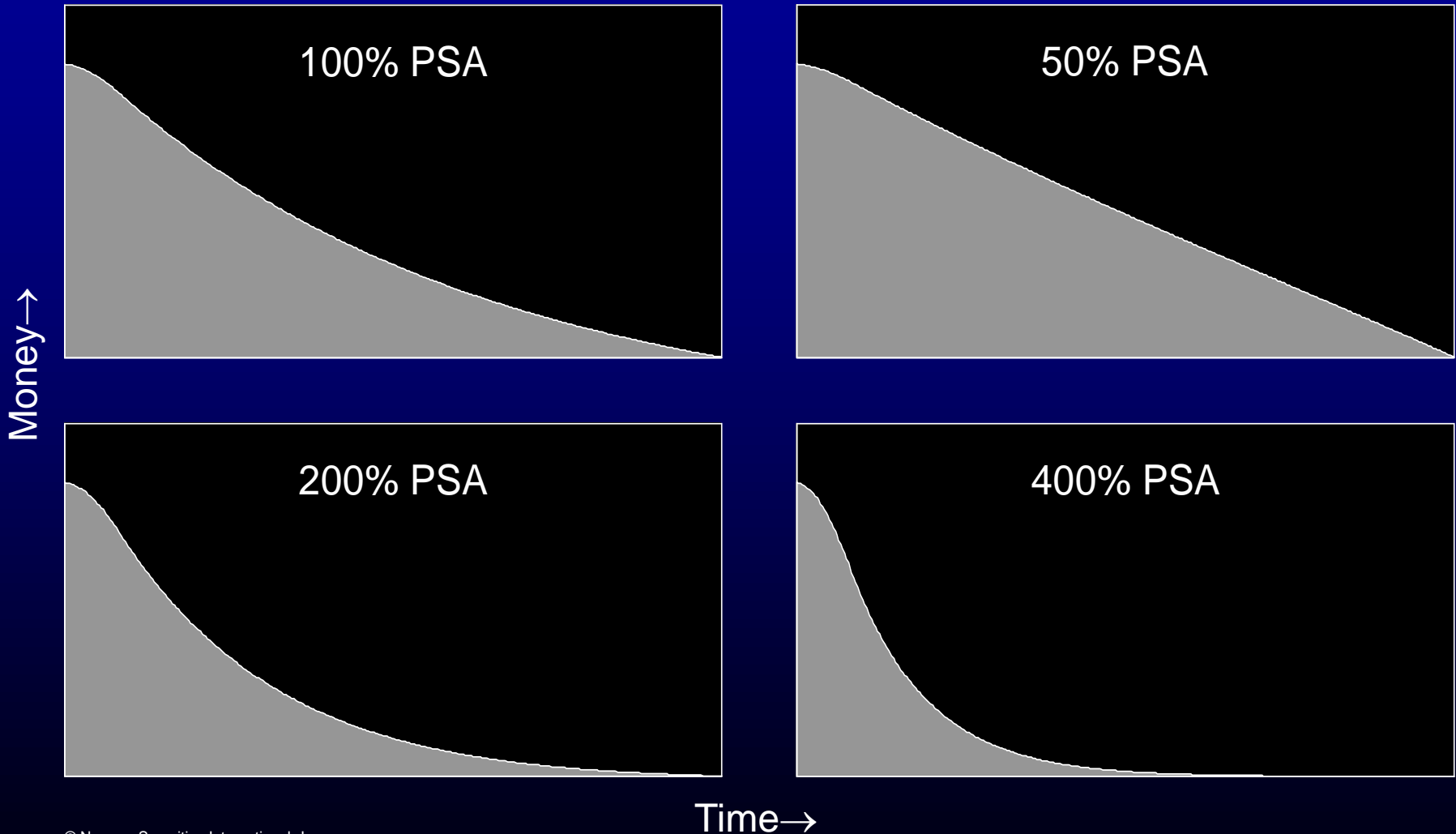
Structure: Prepayments (5)

Interest Cash Flows, 30 Year, 7% Mortgage Loan



Structure: Prepayments (6)

Interest Cash Flows, 30 Year, 7% Mortgage Loans

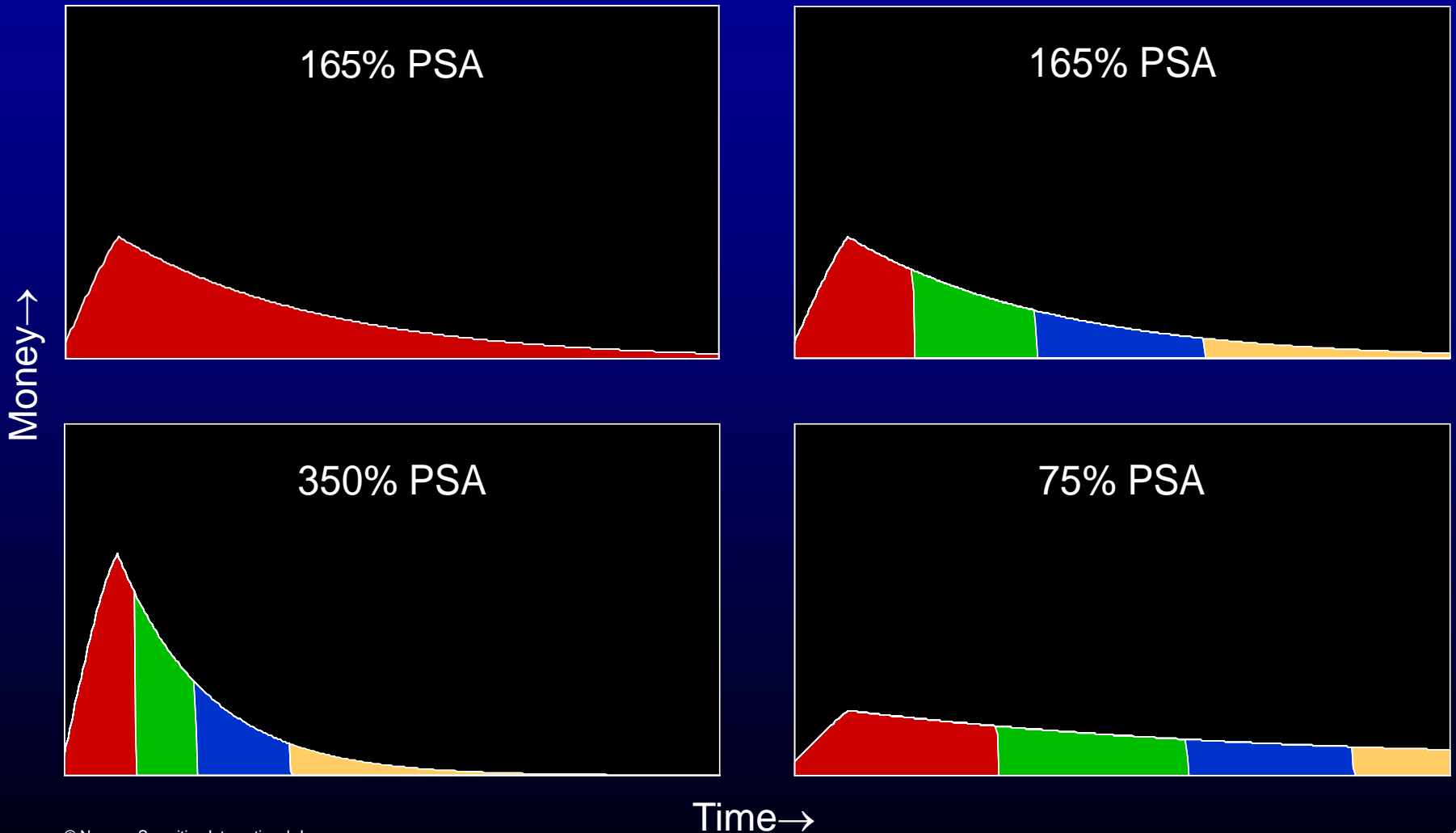


CMOs/REMICs

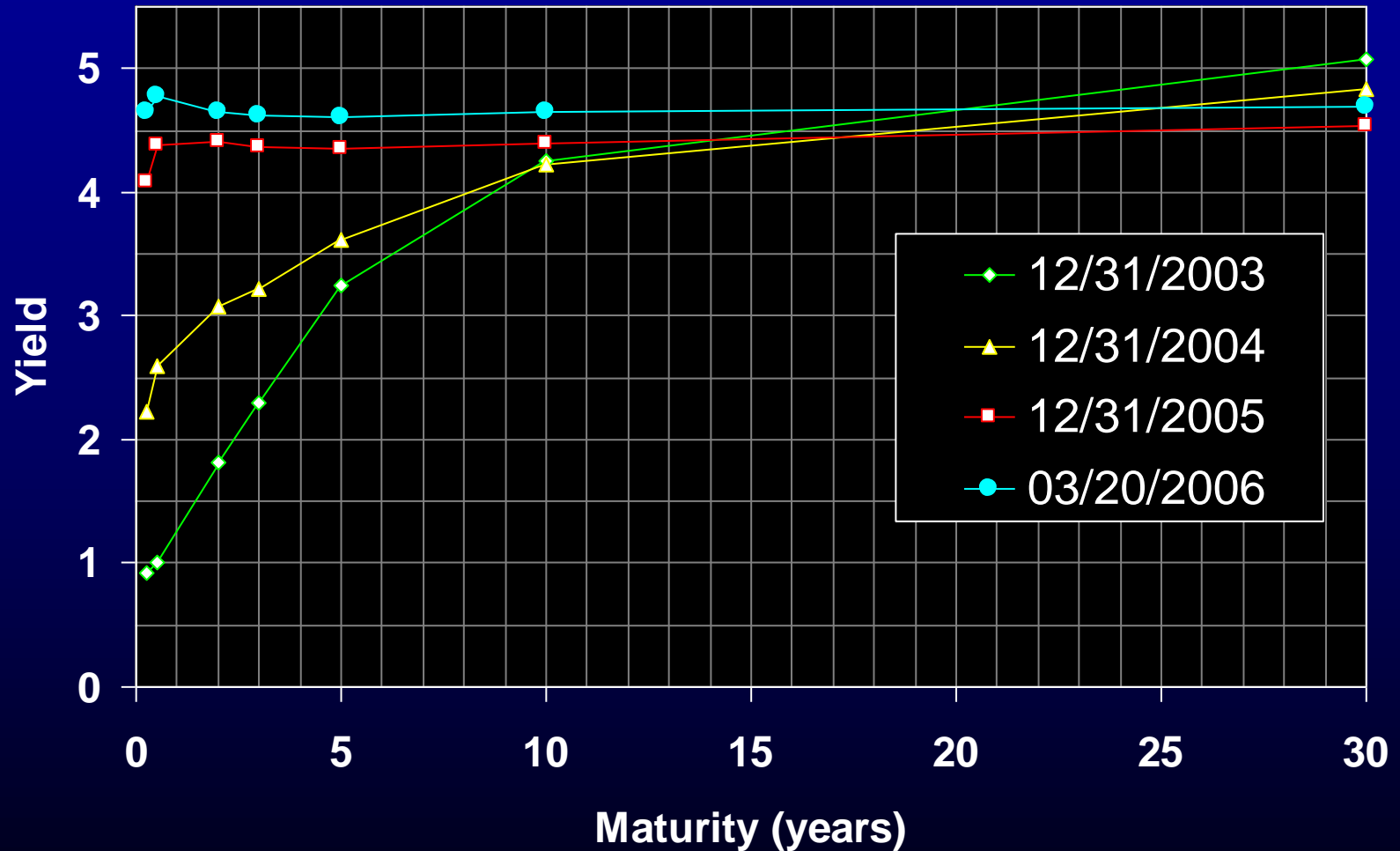
- Time-tranching of cash flows
- Underlying assets can be GSE MBS, raw mortgage loans, or other REMIC securities
- GSEs issue CMOs/REMICs
- Private MBS issuers typically structure all their deals as CMOs/REMICs

Structure: Prepayments (7)

Slicing Principal Cash Flows over Time: Building a CMO



Treasury Yield Curves



Example of Complexity (GM 4L65-E)



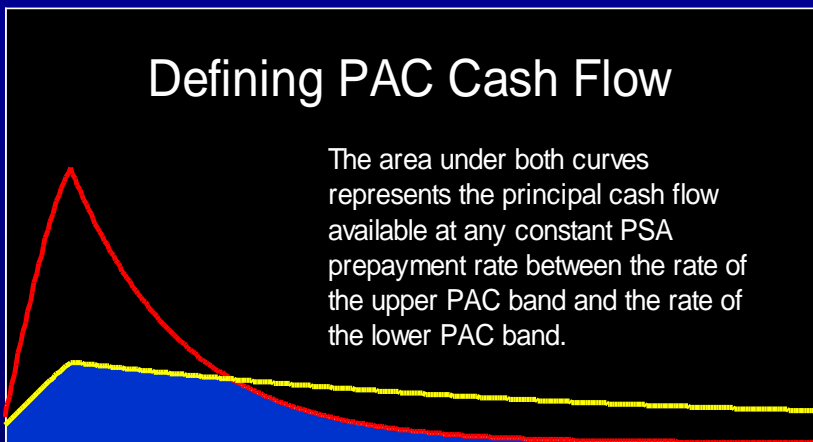
Structure: Prepayments (8)

Shifting Prepayment Risk: Building PAC Classes in a CMO

Defining PAC Cash Flow

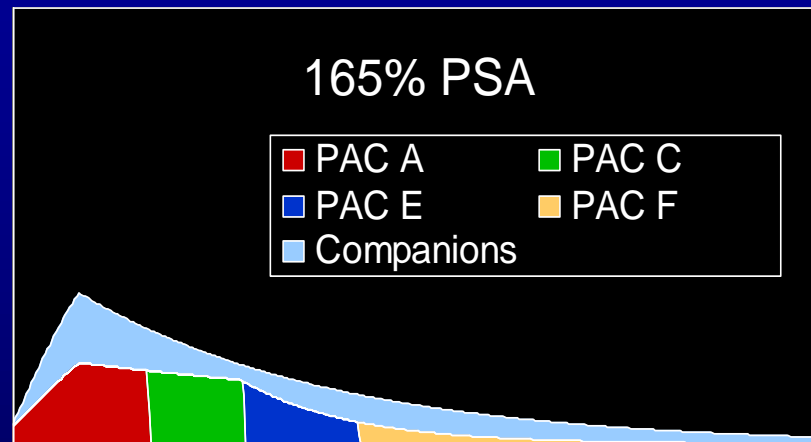
The area under both curves represents the principal cash flow available at any constant PSA prepayment rate between the rate of the upper PAC band and the rate of the lower PAC band.

Money →

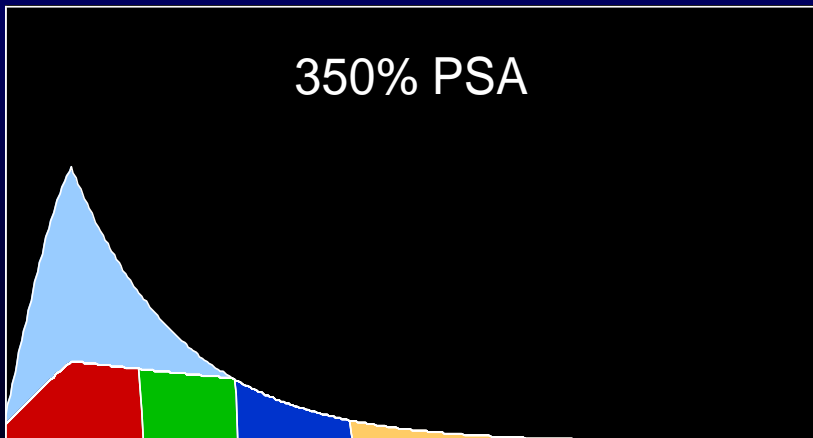


165% PSA

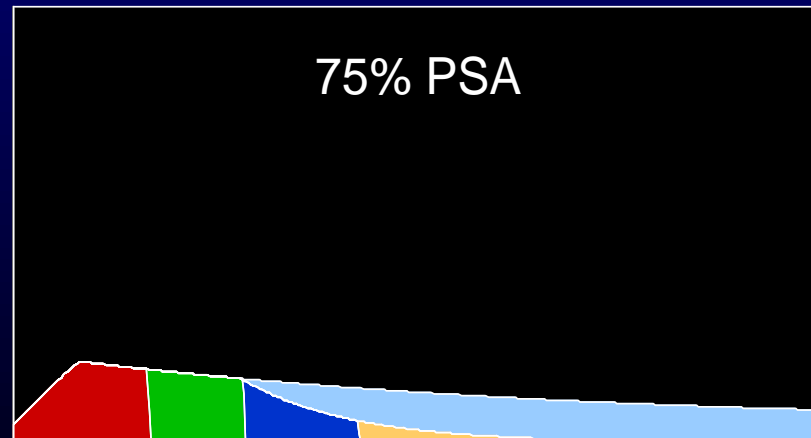
- PAC A
- PAC C
- PAC E
- PAC F
- Companions



350% PSA



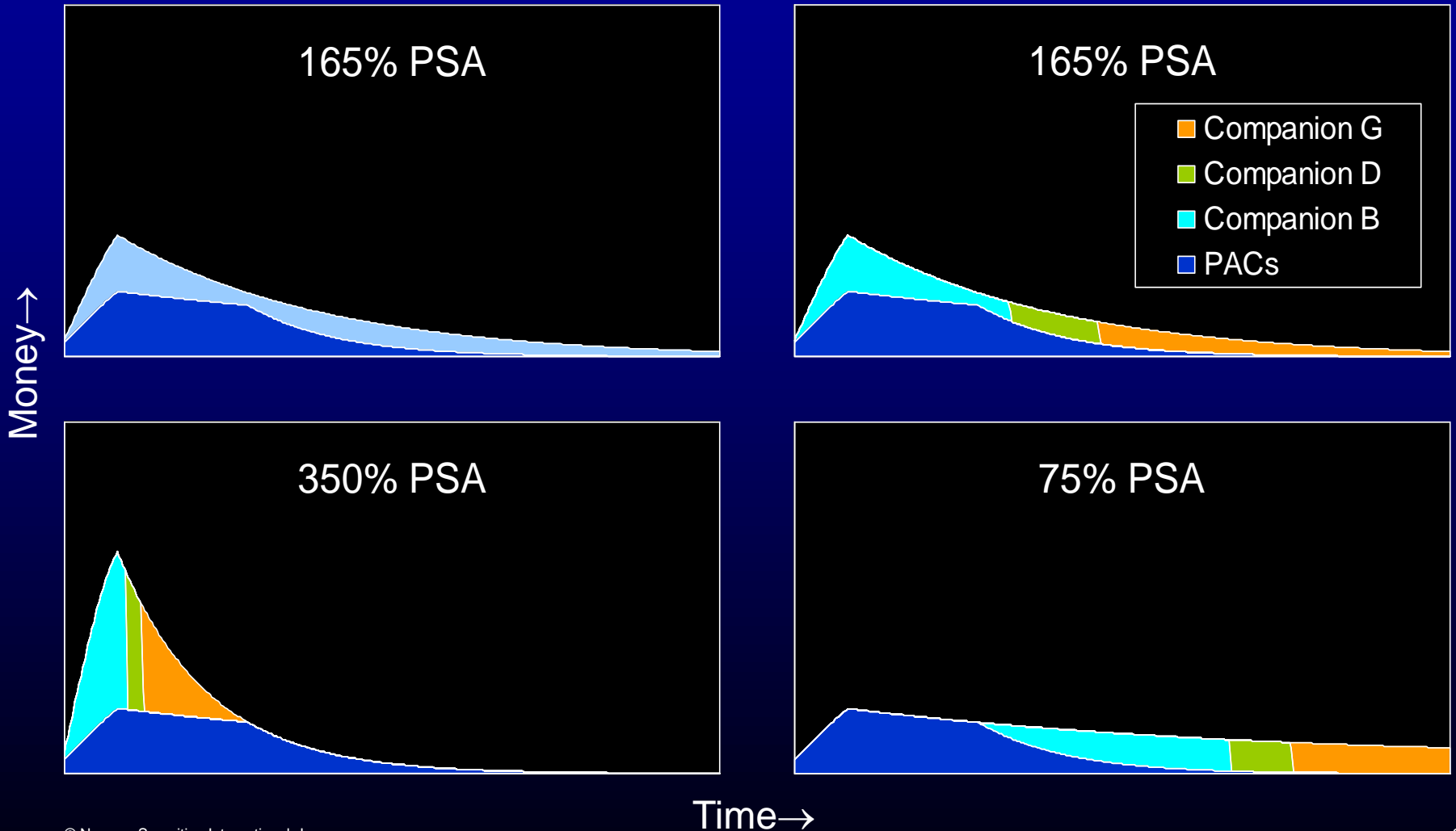
75% PSA



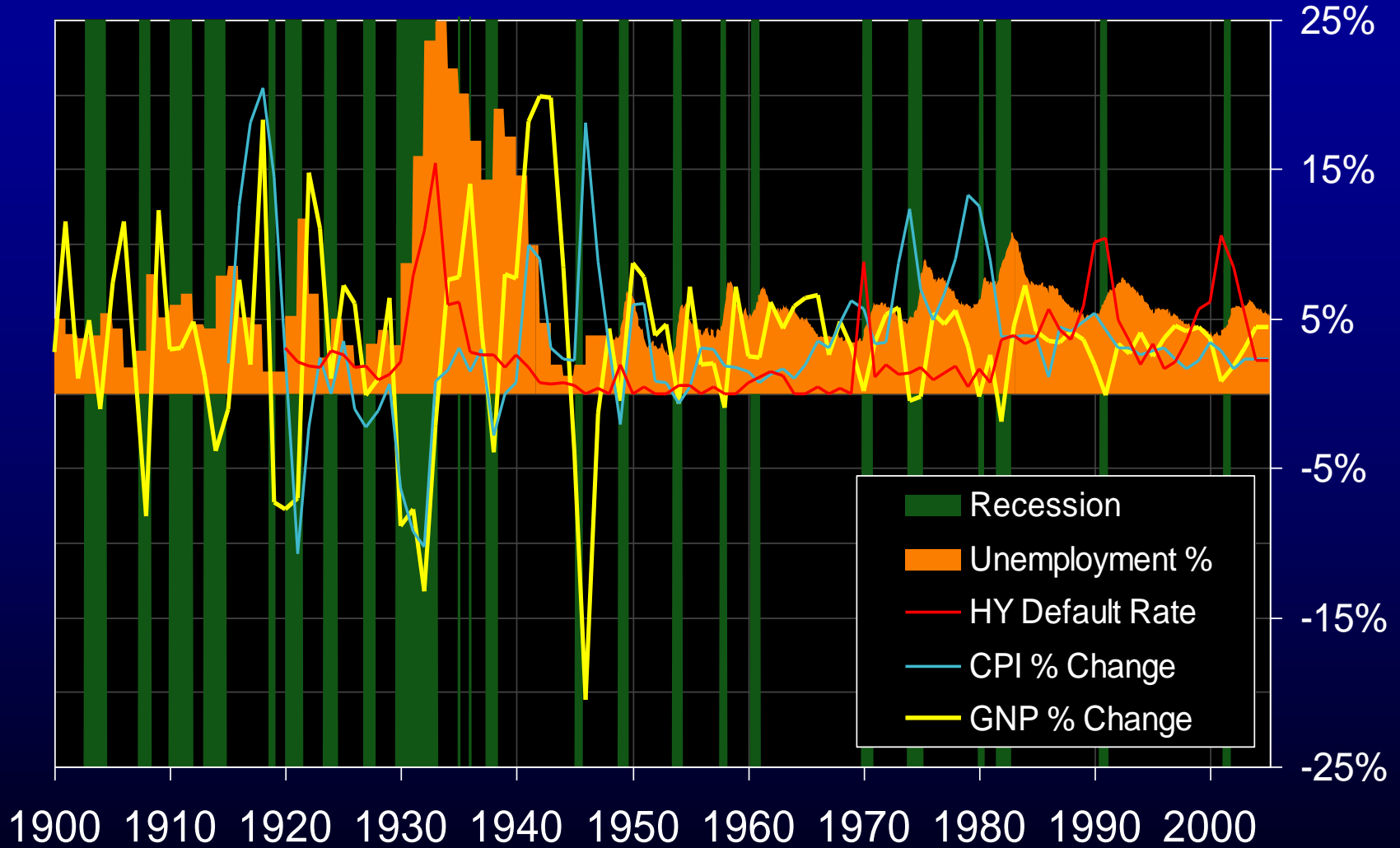
Time →

Structure: Prepayments (9)

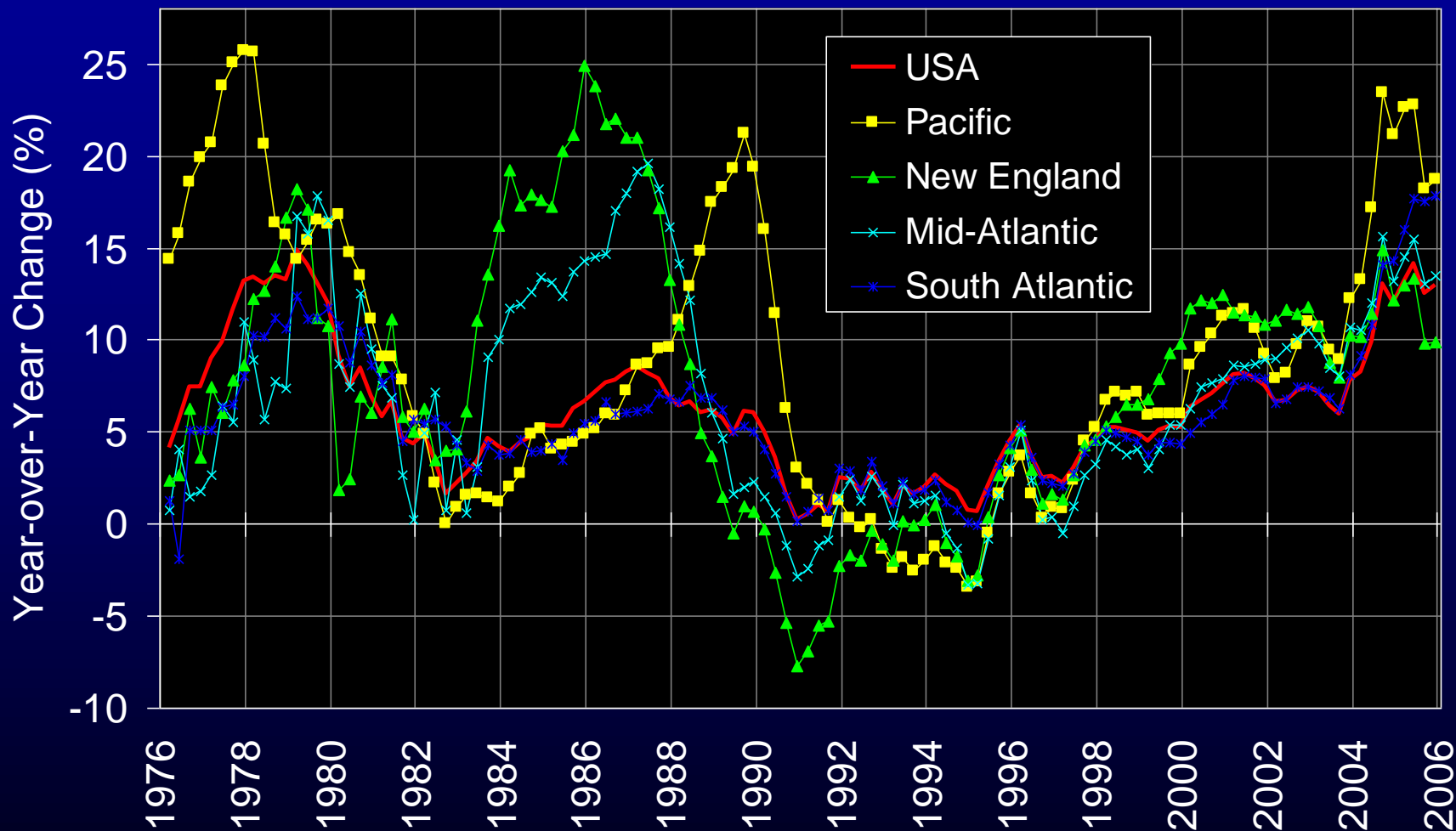
Shifting Prepayment Risk: Sensitivity of Companion Classes



Recent Times Have Been Good...



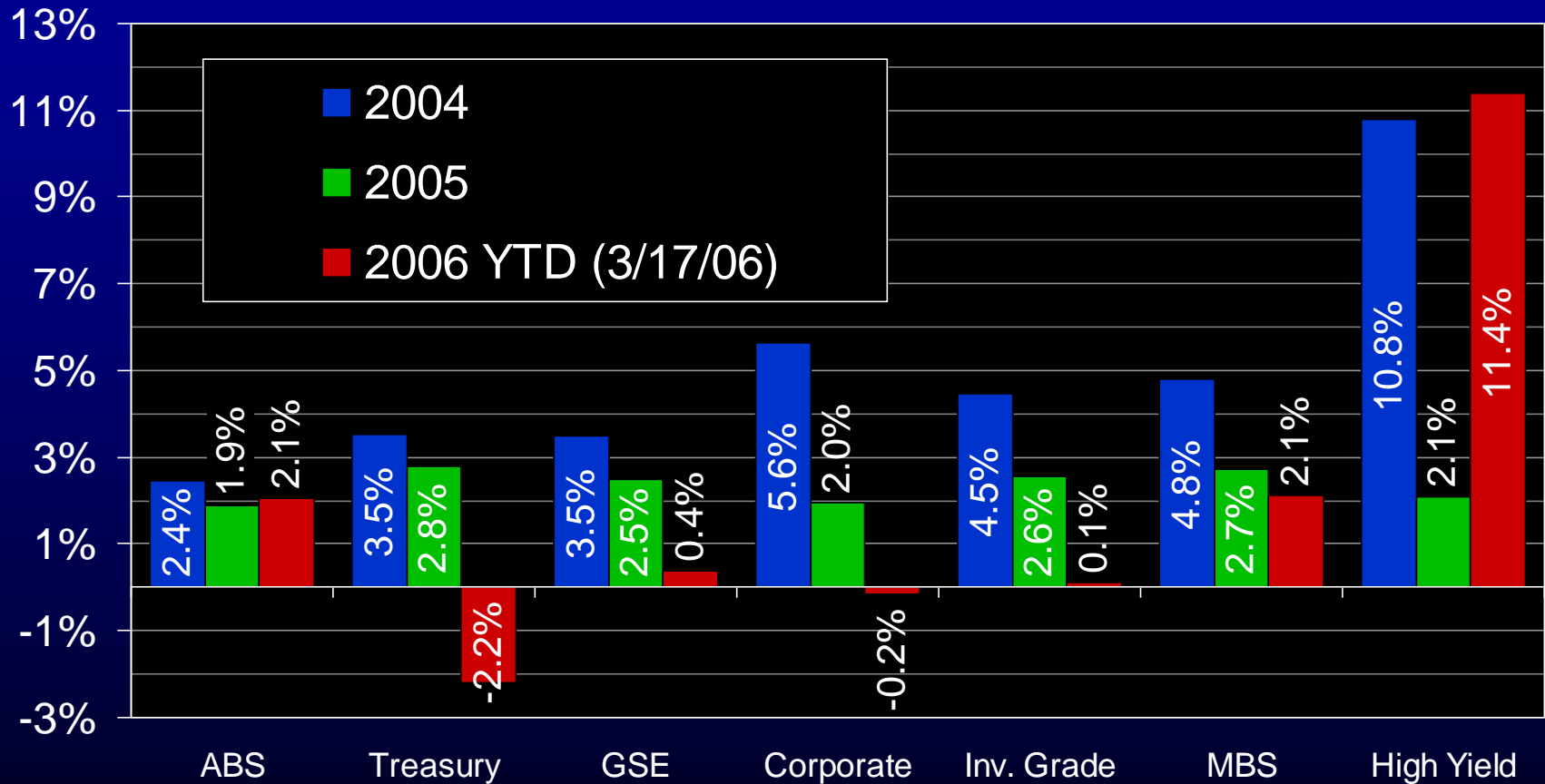
...But House Prices Are Overheated



Source: Bloomberg (HPI)

Annualized Total Returns by Sector

from Citigroup Fixed Income Indices



Source: Bloomberg SBACAAB <index>, SBGT <index>, SBGS <index>, SBCRP <index>, SBBIG <index>, SBMT <index>, SBHYMI <index>.

Conclusion

- Prepayments are the key to understanding MBS cash flows, performance and valuations
- MBS represent a large portion of all fixed income activity in the U.S.
- MBS represent the largest portion of securitization activity in the U.S.
- No fixed income professional can afford to be ignorant about MBS

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