

Recent Development in Mortgage-Backed Securities

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The Midway Group

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Agenda

1. Mortgage Market
2. Refi Wave 2003
3. Valuation
4. Portfolio Management
5. Challenges and Open Problems

1. Mortgage Market

- Primary market
 - Mortgage origination
 - Purchase
 - Refinance
- Secondary market
 - Securitization
 - Secondary trading

Mortgage Products

- Conforming
 - Fixed 30 Yr, 20 Yr, 15 Yr, 10 Yr
 - ARMs
 - Hybrid 3/1, 5/1, 7/1 ARMs
- Non-Conforming
 - Alt-A
 - Jumbo

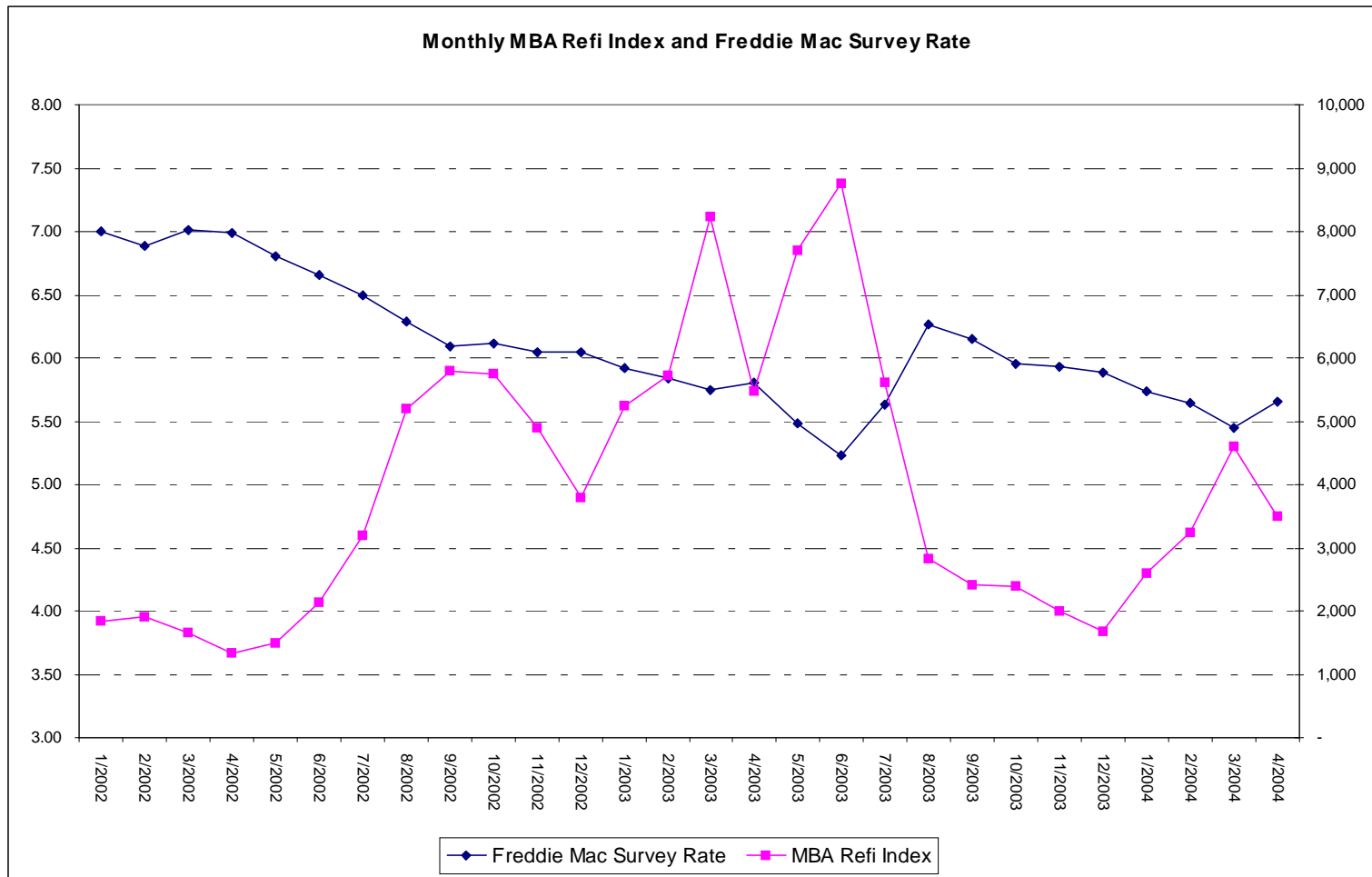
Market Players

- GSEs (FNMA, FHLMC)
- Originators
- Servicers
- Dealers
- Investors
- Others

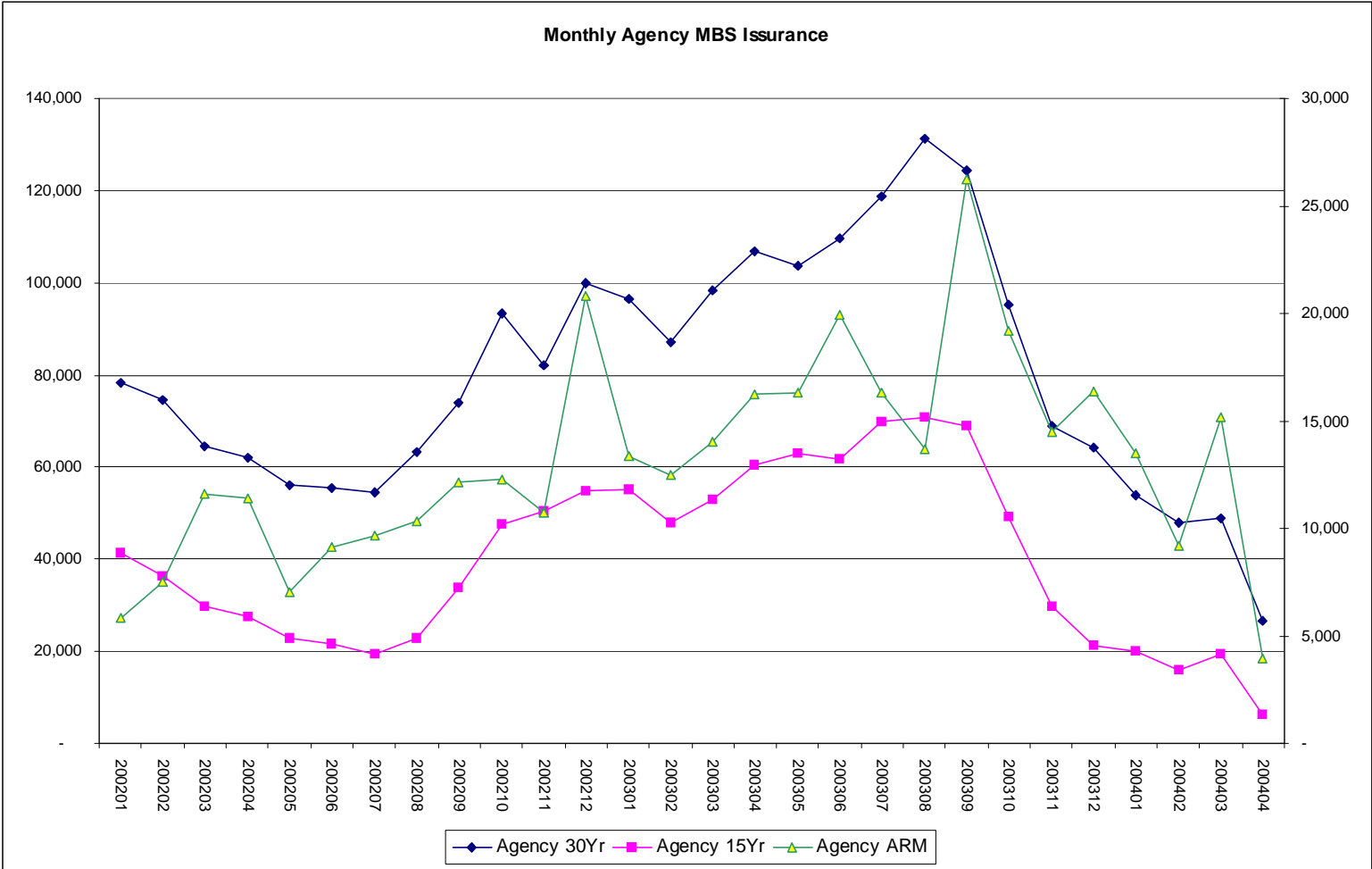
Agency MBS Market

Orig / Cpn	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	Grand Total
2003	481	460	102	12	3				1,058
2002	78	166	170	95	24	3	1		537
2001	2	23	72	80	29	5	2		211
2000					6	9	7	2	23
1999		4	29	33	14	6	2		87
1998		5	36	40	14	2			96
1997			1	3	8	5	2		19
1996		0	2	5	6	4	3		20
1995			0	2	4	3	1		11
1994			3	7	6	2	2	1	20
1993		1	6	13	12	4	1		37
1992				0	3	4	3	1	11
Grand Total	561	658	421	290	128	47	22	3	2,131

2. Refi Wave 2003



Refi Wave 2003



Top Originators

Top Residential Funders in 2003 And their Company 'Types' (\$ in billions)

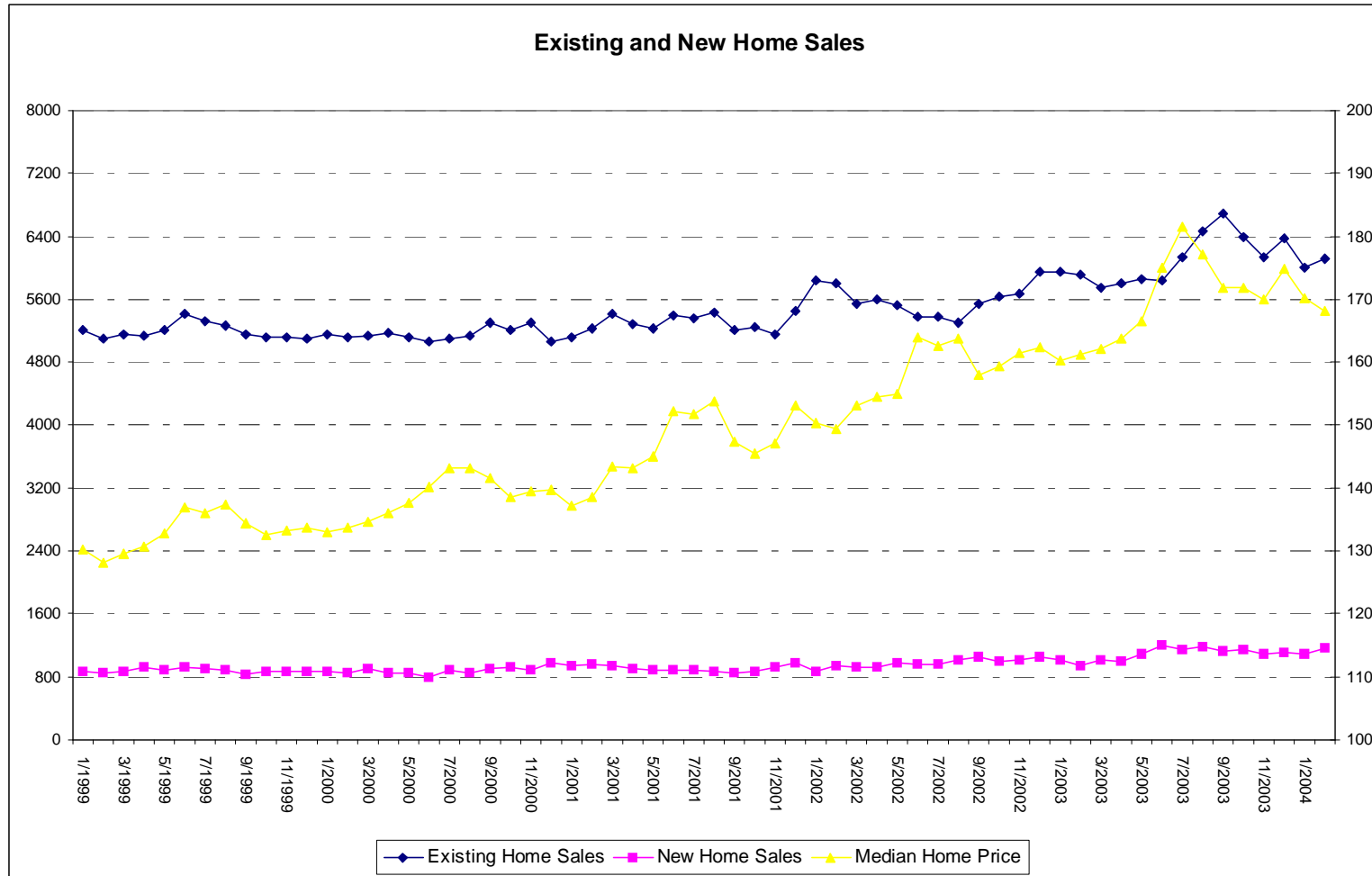
Lender name	Co. Type	'03 Vol	% Chg. Prev Year	Mkt. Share
Wells Fargo	bank	\$470.10	41%	12.01%
Washington Mutual	thrift	\$435.40	40%	11.12%
Countrywide Fin.	bank	\$434.90	73%	11.11%
Chase Home Fin.	bank	\$284.30	83%	7.26%
Bank of America	bank	\$130.90	49%	3.34%
ABN Amro	bank	\$124.00	5%	3.17%
GMAC Mortgage	non-dep.	\$114.50	60%	2.92%
CitiMortgage	bank	\$108.40	106%	2.77%
National City	bank	\$105.60	33%	2.70%
Cendant Mortgage (1)	non-dep.	\$83.70	41%	2.14%

Notes: This ranking excludes subprime specialists though some of these lenders engage in subprime lending. Fundings include loans produced through three loan channels: retail, wholesale and correspondent. Market share based on estimated loan production of \$3.915 trillion in 2003. All data culled by NMN. (1) Cendant is currently for sale. Its investment banker is Goldman Sachs & Co.

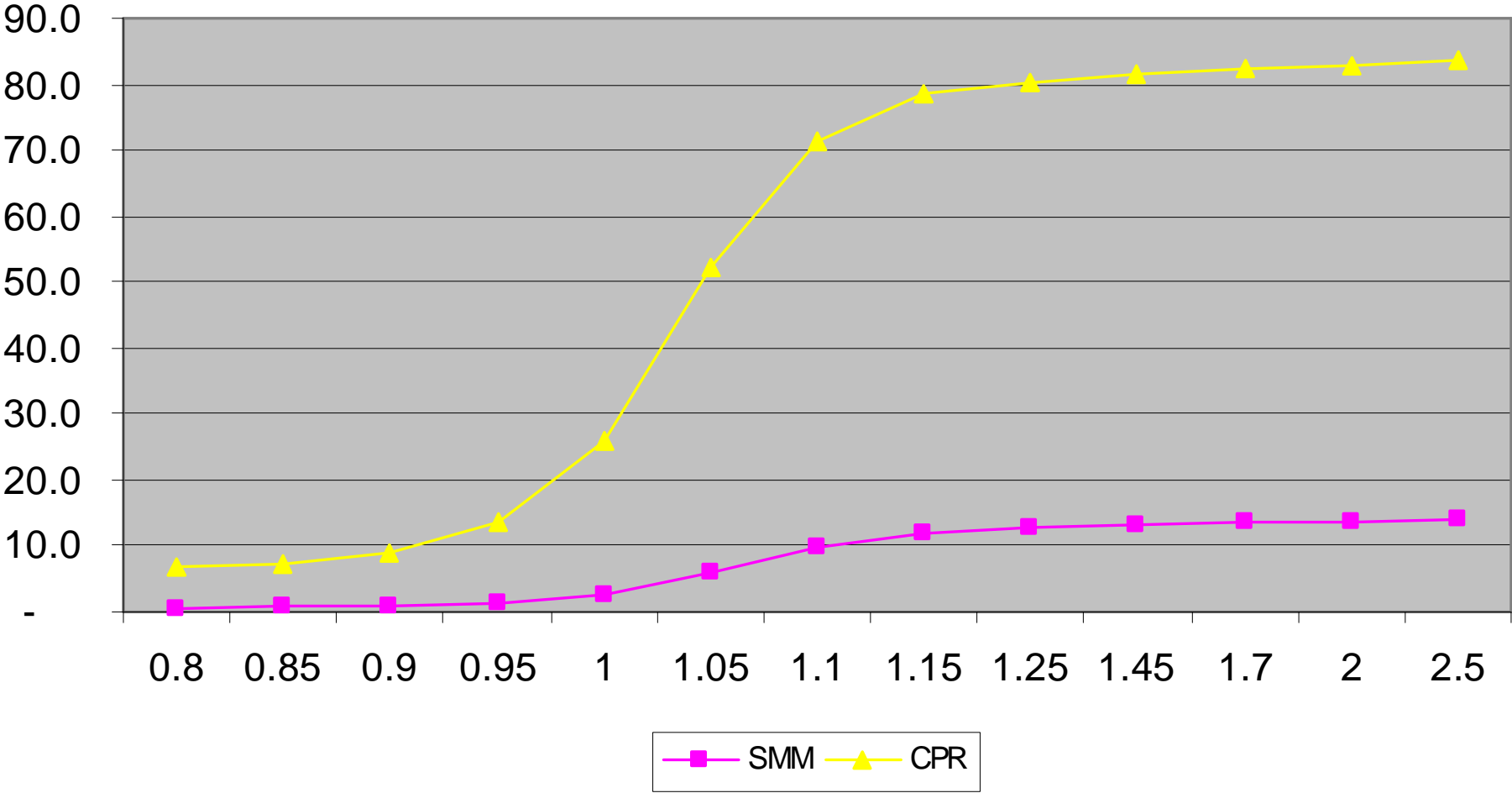
Source: [National Mortgage News' Annual Data Report.](#)

Questions? Email: Paul.Muolo@ThomsonMedia.com

Home Sales and Price



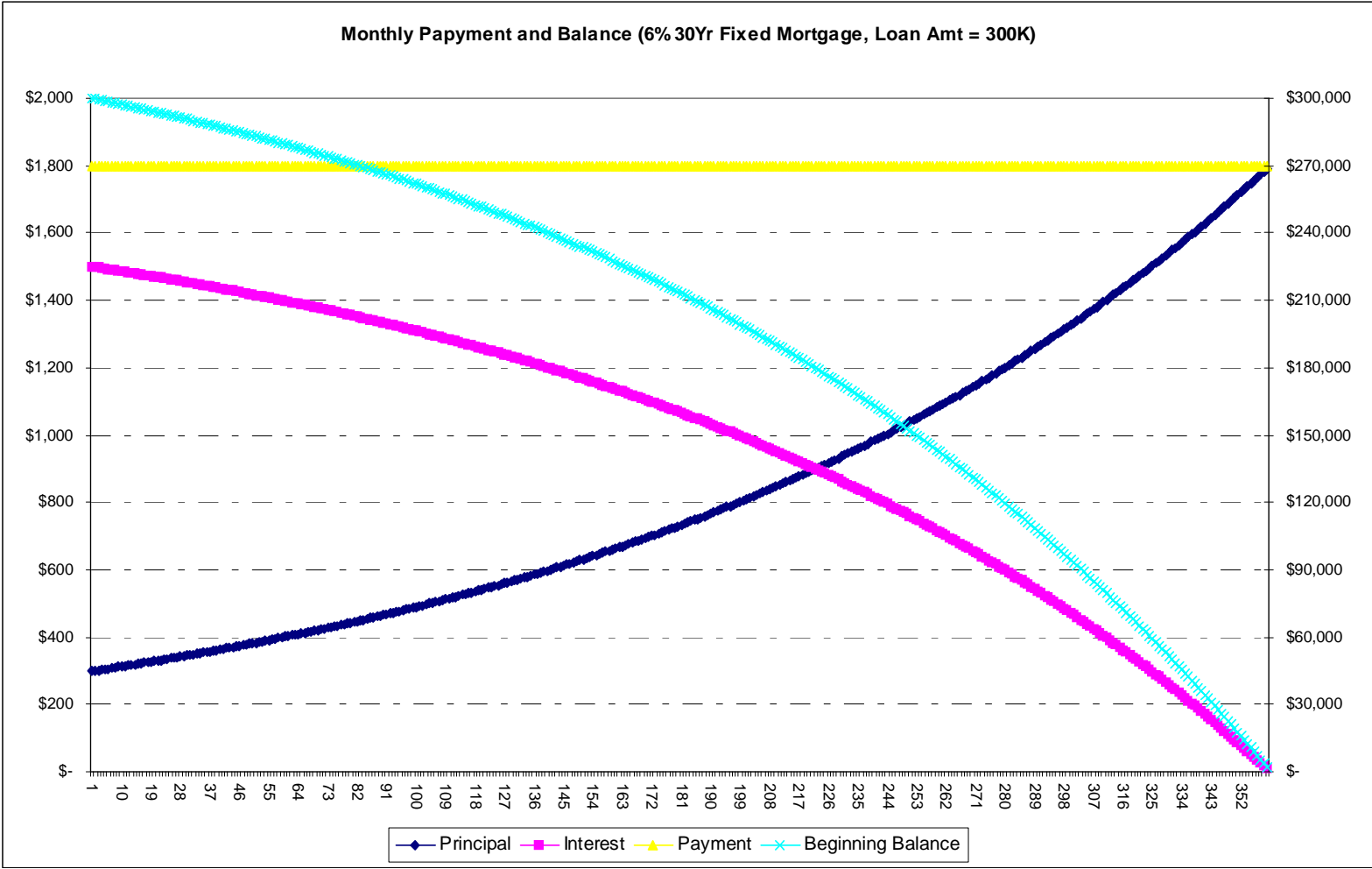
Refi S-Curve - A Sample Illustration



3. Valuation

- Collateral cash flow
 - Principal
 - Interest
- Deal structure
 - Passthrough
 - TBA
 - IO and PO
 - Other CMOs
- OAS analysis

Mortgage Cashflow



Passthrough and TBA

- Agencies
 - FNMA
 - FHLMC
 - GNMA
- Non-Agencies
 - Countrywide
 - Wells Fargo
 - Washington Mutual

IO and PO

- Benchmark trust IO and PO
 - FNMA trusts
 - FHLMC trusts
 - Non-Agency IO and PO

Other CMOs

- Sequential structures
- PAC/Support structures
- Z/Accretion-Directed structures
- Floater/Inverse structures
- Structured IO/PO

OAS Analysis

- Interest rate processes
 - 1 factor models
 - 2 factor models
 - 3 factor models
- Prepayment projection
 - Short term
 - Long term
- Monte-Carlo simulation

Interest Rate Models

- Multiple factors
 - Parallel shifts and non-parallel shifts
- Volatility skew
- Calibration
 - Futures and swaps
 - Caps and Floors
 - Swaptions

Prepayment Models

- Turnover
- Refinancing
 - Rate refinancing
 - Cash-out refinancing
- Curtailment
- Default

4. Portfolio Management

- Return vs Risk
- Diversification
 - Product
 - Coupon
 - Issuer
 - Geography

Return Analysis

- Carry
- ZV Yield
- Yield Table
- OAS

Risk Analysis

- Duration
- Convexity
- Vega
- Spread Duration
- Prepayment Duration
- Scenario Analysis
- Stress Testing

Model Risk

- Interest rate models (Libor)
- Mortgage rate models
 - 30 Yr vs 15 Yr
 - Jumbo vs Conforming
- Prepayment models
 - Media effect
 - Burn-out effect

Relative Valuation

- Mortgage Basis
- Coupon Swaps
- Agency vs Non-Agency
- Fixed vs ARM and Hybrid ARM
- Synthetic PT/IO/PO

4. Challenges and Open Problems

- Mortgage rate modeling
 - Relationship to Libor and Treasury markets
- Understanding refinancing behavior
 - Incentive and choice
- High-dimensional data analysis
 - Binary event forecasting
 - Comparative analysis

Mortgage Rates

- Product
- Originator
- Borrower credit
- Loan size
- Property type
- Purpose
- Geography

Mortgage Rates

Source	Conf 30Yr	Conf 15Yr	Jumbo 30Yr	Jumbo 15Yr	Conf 30-15Yr	Jumbo 30-15Yr	Jumbo-Conf
WaMu	6.13	5.38	6.13	5.50	0.75	0.63	0.03
Wells	6.13	5.50	6.38	5.63	0.63	0.75	0.22
Countrywide	6.28	5.75	6.88	6.41	0.53	0.47	0.61
Chase	6.00	5.31	6.25	5.56	0.69	0.69	0.25
BOA	6.16	5.41	6.17	5.77	0.75	0.40	0.10
ABN Amro	6.25	5.63	6.50	5.88	0.63	0.63	0.25
CitiMortgage	6.00	5.50	6.38	5.63	0.50	0.75	0.31
GMAC	6.00	5.25	6.13	5.50	0.75	0.63	0.16
National City	6.13	5.41	6.50	5.75	0.72	0.75	0.37
Cendant	6.16	5.57	6.41	5.82	0.59	0.59	0.25
Average	6.12	5.46	6.35	5.73	0.65	0.62	0.24
Min	6.00	5.25	6.13	5.50	0.50	0.40	0.03
Max	6.28	5.75	6.88	6.41	0.75	0.75	0.61
Stdev	0.11	0.16	0.25	0.30	0.10	0.13	0.17

Refinancing Behavior

- Economic incentive
 - Lower monthly payment
 - Shorten mortgage term
 - Cashout/debt consolidation
- Non-Economic effects
 - Refi processes/technologies
 - Media effect
 - Burnout effect

High-dimensional Data Analysis

- Loan level analysis
 - Non-Agency
- Pool level analysis
 - Enhanced GSE disclosure
- Binary event forecasting
- Comparative analysis
- Curse of dimensionality