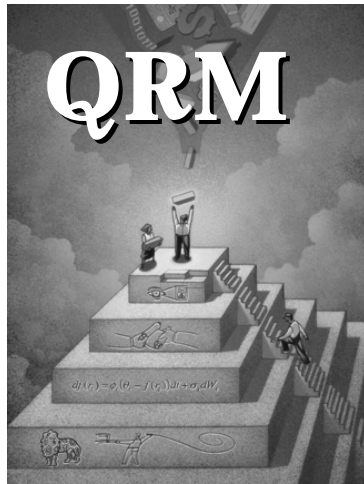

Market For Mortgage Servicing Rights

MBA Accounting Conference
December 11-13
Dallas

Charles Richard III
Senior Vice President,
Co-Founder QRM



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Senior Vice President,
HSBC Mortgage Corp



Overview of Discussion

1. State of the Industry
2. OAS Vs. Static
 - a) What is OAS – Term Structure Model, Generate Future Rate Paths, Discount Cash flows and Average, Option Adjusted Spread
 - b) Who is using OAS
 - c) Why OAS – Choice of Prepayment Models, FAS133, Shock Profiles, Value Decomposition
3. OAS vs. Static (A Practitioner's View)
 - a) Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio
 - b) MSR's Are Too Risky ... They Can Never Be Perfectly Hedged
 - c) I Can't Afford The Risk Management Function, I Need a Ph.D. To Understand That OAS Stuff
4. MSR Management And Analysis In The Future
 - a) Increased Attention From Treasuries
 - b) Forecasting Requirements
 - c) Prepayments, Originations and Trades
5. Conclusions

Quantitative Risk Management

- ◆ A professional risk management / asset-liability consulting and systems development firm
 - Established in 1987
 - Specializing in interest rate risk management
 - Applying sophisticated option based pricing and hedging models

- ◆ 90 professionals with extensive backgrounds in:
 - Banking, mortgage banking and portfolio management
 - Interest rate risk management
 - Financial research
 - Systems engineering

- ◆ Serving over 160 financial institutions including leading international banks, thrifts, insurance companies, and mortgage companies

A Word About QRM Clients

- ◆ QRM Clients manage more than \$5 trillion in assets worldwide
- ◆ QRM System now installed and operated in 16 countries on 4 continents.
- ◆ *Industry and Sector coverage*
 - Commercial Banks (Domestic and Foreign)
 - Consumer Finance Companies
 - Corporate Finance Companies
 - Government Finance Agencies
 - Savings Banks
 - Credit Unions
 - Mortgage Banks
 - Insurance Companies

A Word About QRM Clients

- ◆ QRM Secondary Marketing System is used by over 60 mortgage banking operations including 35 of the top 40 originators. This accounts for over 70% of all origination volume in the United States
- ◆ QRM's Balance Sheet Management Family of products are used by over 75 Banks and Financial Institutions world wide including 27 of the top 40 Banking Institutions in North America
- ◆ QRM Mortgage Servicing System is used by over 25 financial institutions including 7 of the top 10 servicers

State of the Industry

- ◆ **Consolidation continues, and will continue... (No news here)**
- ◆ **Last year who thought rates would be where they are today, were they not already at historic lows?**
- ◆ **The potential for huge losses/impairments has not at all diminished. Profits are continuing to be squeezed from all directions, accountants are becoming more and more influential (and creative)**
- ◆ **Processing power, database technology and financial modeling keep marching forward, but...**
- ◆ **Many servicers (of all sizes and sophistication levels) continue to use static valuation model (with DPEs) and then piece together output from multiple, disparate systems in an attempt to solve hedging, accounting and tax issues**
 - Thank God for Excel, lets not lose our head count!
- ◆ **Question? How many systems does your organization use to complete the monthly servicing valuation, hedging, accounting, tax, reporting and forecasting?**
 - Are the systems even in the same location?
 - How many individuals are involved?
 - When is your process complete?
- ◆ **Base servicing is often ignored while in the pipeline. Who is responsible for valuation and hedging?**

State of the Industry

- ◆ **Servicing is increasingly becoming a “Mark to Model” type asset.**
 - “Market Prices” are not readily available or particularly relevant
 - Brokers are not as prominent as in the old days

- ◆ **Servicing is most often looked at in a vacuum. The focus is on current value and impairment. Little attention is put on evaluating the entire mortgage banking operation**
 - Who can answer what your Mortgage Banking Operation will look in terms of income, value and Interest rate sensitivity 24 months from now, considering:
 - New production/Portfolio Composition
 - Pipeline/Warehouse/Portfolio/Funding
 - Prepayments, Defaults
 - Servicing Trades
 - Hedging Activities
 - Interest Rate Changes (Static/Stochastic)
 - Impairment/Amortization (Static/Stochastic)

- ◆ **Many Mortgage Bankers are adapting balance sheet management techniques (systems) traditionally used by sophisticated Asset Liability Managers**

- ◆ **Conceptually, the OAS valuation approach is gaining wider acceptance**
 - It is hard to argue against it for hedging (some try) and relative value
 - More institutions are doing internal prepayment modeling work
 - Loan level prepay models are becoming more popular

Step Back-What is OAS?

- ◆ Mortgages and mortgage related products are typically modeled using the OAS method.
 - Originally developed in the early and mid 80's
 - By the mid 80's, Wall Street all but abandoned static analysis

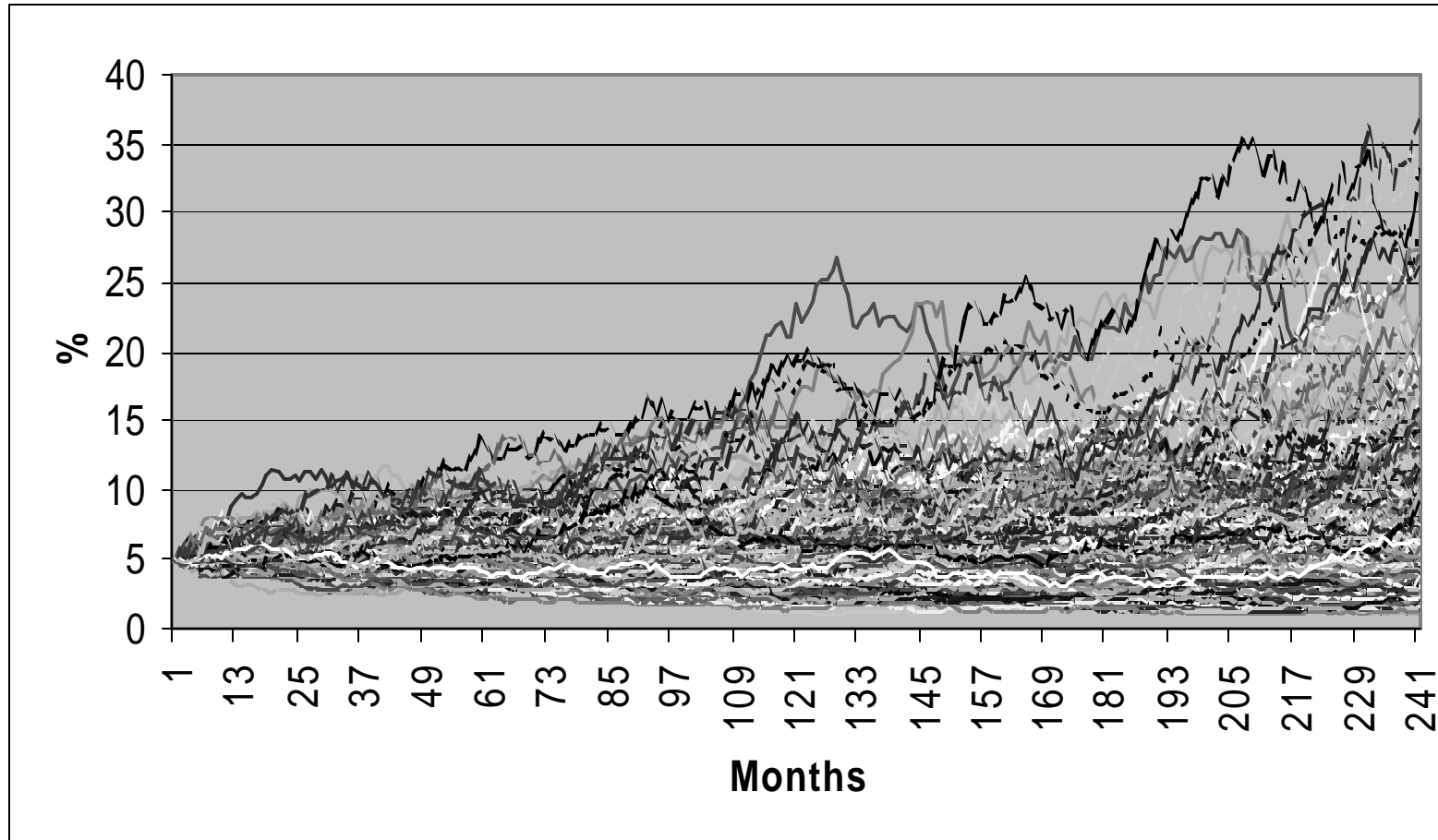
- ◆ The OAS method is often used in conjunction with Monte Carlo simulation.
 - Generation of a broad spectrum of future interest rate paths, using a random number generator.
 - Paths are generated according to the arbitrage-free standard.
 - There are several popular arbitrage-free term structure models
 - Cash flows are generated for each scenario based on:
 - The contractual features of the instrument
 - The behavioral assumptions such as:
 - Prepayments
 - Defaults

Term Structure Model

- ◆ The process generating rate paths is called the *term structure model*
- ◆ Term structure models vary by
 - Number of “factors”
 - Statistical distribution of factors (Normal, Lognormal)
 - Mean reversion properties
 - Time dependence
- ◆ Some popular term structure models are
 - *Hull & White (1- or 2-factor)
 - Black-Derman-Toy
 - Heath Jarrow & Morton

Generate Future Rate Paths

Each path is a possible future evolution of the short rate



Discount Cash Flows and Average

In current market (“base scenario”)

- Discount cash flows along each path using some spread over the rates along that path
- Average over paths to come up with the present value of the possible cash flows
- Vary the spread to find the one that makes the theoretical value equal to the observed value

This spread is called the *option-adjusted spread*.

Discounting at zero OAS gives the *economic value*.

Option-Adjusted Spread

- ◆ Is the excess return over the benchmark yields expected to be earned “on average”.
- ◆ Could in principle be locked in by hedging, provided the prepayment models and volatility estimates are correct
- ◆ Consists of premia for any risk not already included in benchmark yields
 - Credit risk (of issuer)
 - Default risk (of issuer)
 - Prepayment forecasting risk

Who is Using OAS?

More and more companies incorporating OAS analysis in their monthly MSR valuation process

- According to various industry surveys anywhere between 30% to 45% of the market participants incorporate OAS methodology in the monthly valuation of MSRs. The majority are still using static in production
- More than 50% of QRM client base uses OAS methodology and additional 30% are in the process of incorporating OAS based analysis and the rest are staying with static (for the time being)

Why Use OAS?

There are multiple reason driving the transition from static to OAS

- Choice of dynamic prepayment models
- FAS133/Hedging
- Differences in shock profiles
- Relative value and value decompositions

Choice of Prepayment Models

MSR managers have been consistently disappointed with unexplainable changes in median DPEs

- For example, using DPEs projected as of 5/31 a 7% moderately seasoned loan should have a prepayment speed of 870 PSA in a -90bps environment. But when the -90bps scenarios was realized on 10/31, the projected DPEs were 812 PSA.

A forecasting error of 6.65%.

- Although static analysis can be run against advanced prepayment models such as the QRM's, ADCo's, custom developed internal models or even customer level prepayment models OAS analysis is necessary to derive the most benefit.

FAS133

Implementing FAS133 would be a lot easier using OAS methodology. Just use a consistent approach.

- It is virtually impossible to prove effectiveness using inconsistent methodologies
 - Most servicing is analyzed on a static basis (with modifications)
 - Hedge instruments are priced and traded based on the appropriate market valuation model (OAS, Lattice, Closed Form or otherwise)
- Most mortgage banks value the MSR asset and their hedges in multiple systems, they end up having to...
 - Combine these disjointed results in MS Excel
 - Hire a team of analysts to accomplish this task
 - Spend valuable time reconciling the “differences”
- “Total Value Hedging” is not possible using static analysis

Differences In Shock Profiles

Static analysis results in shock profiles that can not be explained by observed data, this is because volatility and even level of rates are excluded from this analysis.

To demonstrate this we analyzed following generic loans...

- Conventional Fixed Rate Product
- Average Loan Size = \$100K
- WAM (new = 358, moderate = 328 and seasoned = 298)
- WAC (5.0, 5.5 and 6%)
- Current Coupon 5.9%
- Generic Servicing cost / Ancillary Income assumptions
- *Constant OAS Assumption

Differences in Shock Profiles

.. using Static and OAS methodology.

STATIC

Prepayment Rates	DPEs (8/31)
Current Coupon	5.9%
Discount Rate	10%
Earnings Rates	1.806% (3M LIBOR as of 8/31)
Servicing Cost	\$45
Ancillary Income	\$5
Float Days	FNMA MBS

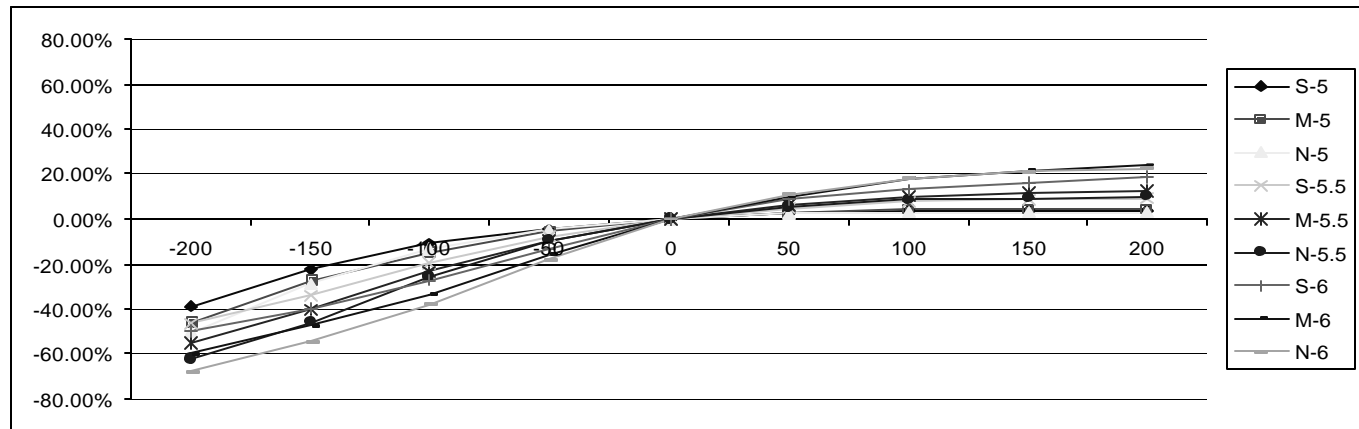
OAS

Prepayment Rates	QRM 4 Factor Model
Current Coupon	10 Y SWAP + 1.25% (=5.9% as of 8/31)
Discount Rate	OAS of 550 (=10% assuming a 7 duration)
Earnings Rates	3M LIBOR
Servicing Cost	\$45
Ancillary Income	\$5
Float Days	FNMA MBS
Paths	200 BDT, 15% Flat Vol

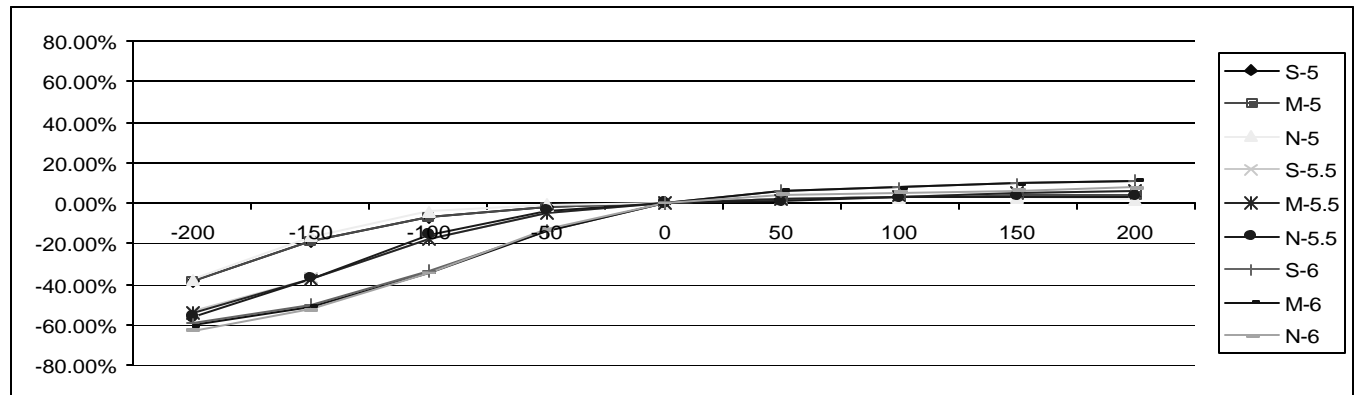
Differences in Shock Profiles

There are significant differences in shock profiles resulting from OAS and Static analysis...

OAS



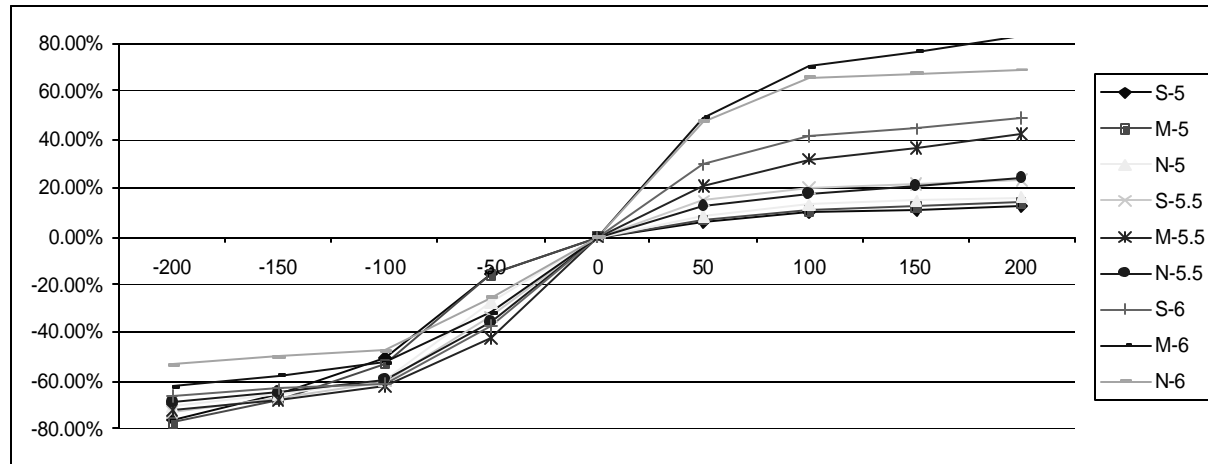
Static



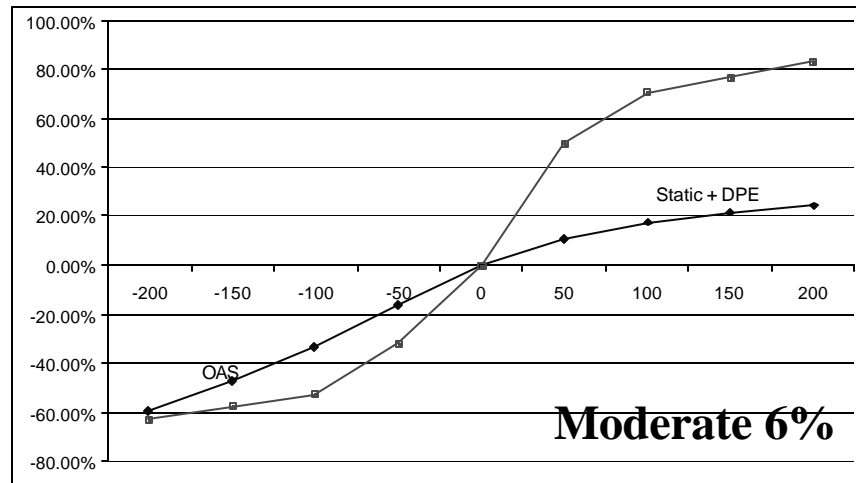
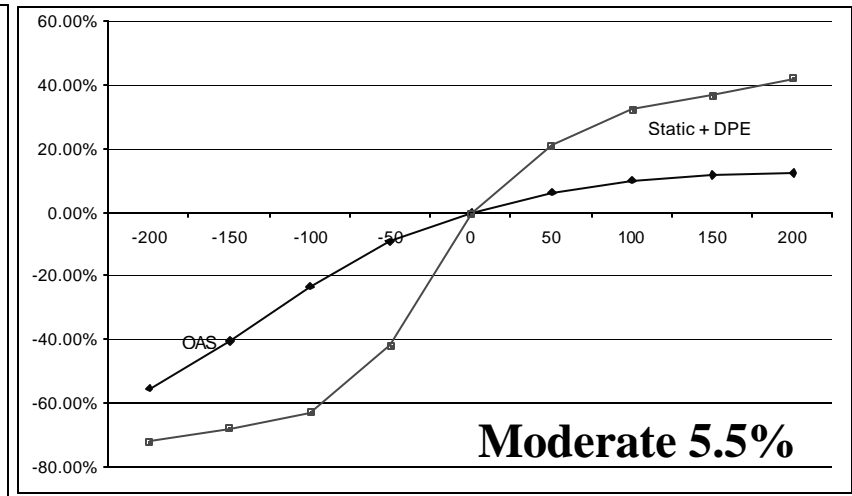
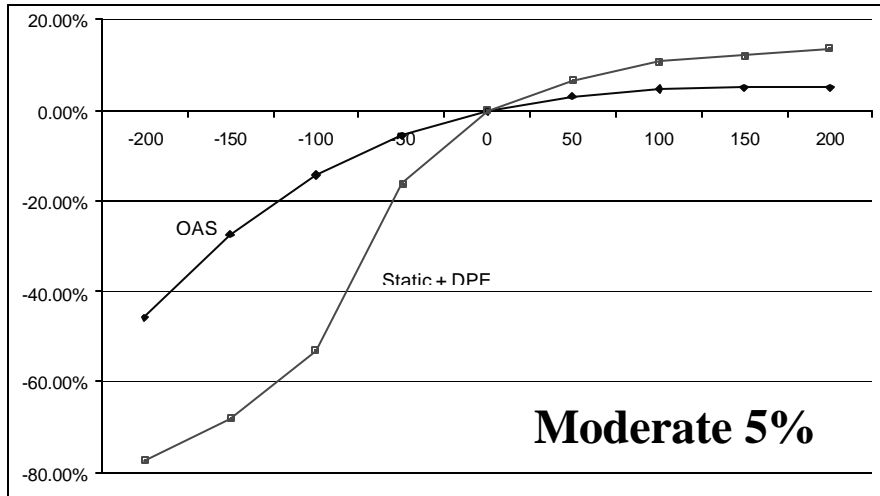
Differences in Shock Profiles

...and these differences are exaggerated when DPEs are incorporated.

Static + DPE

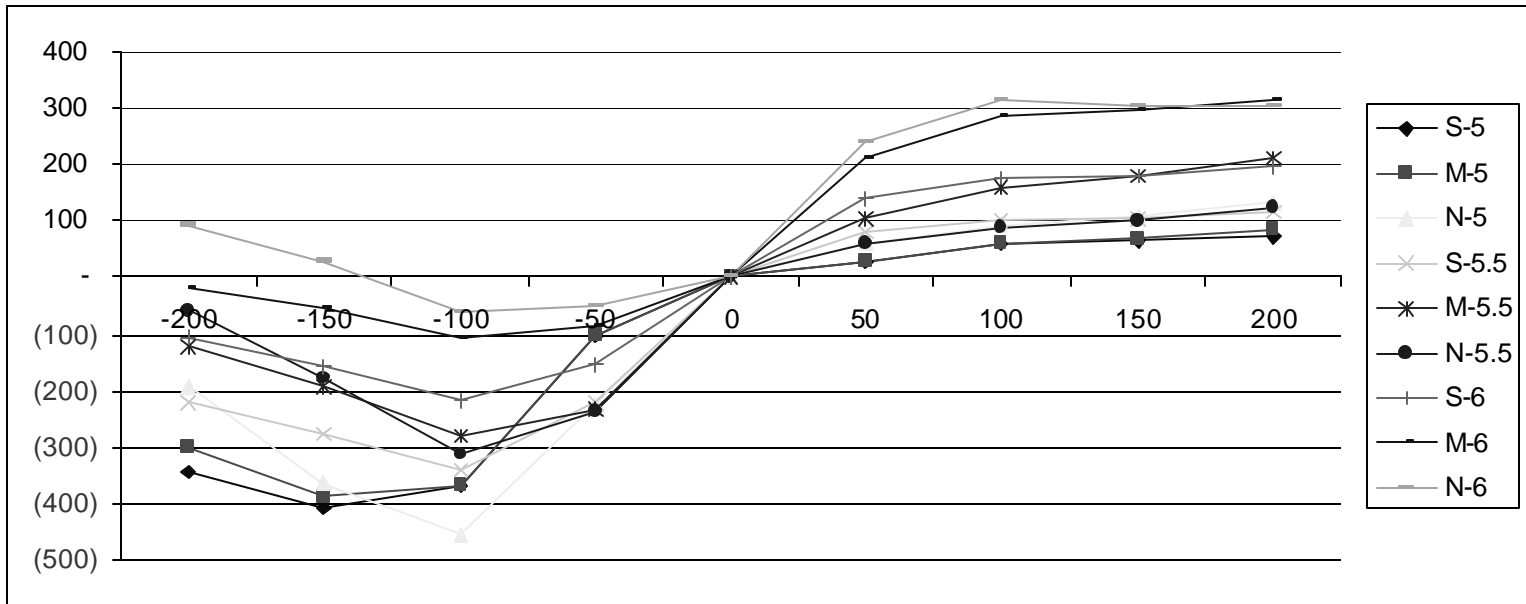


Differences in Shock Profiles



Differences in Shock Profiles

Shocks produced by static with DPE analysis are much more sensitive.



Portfolios hedged using static shocks would be much more expensive to hedge.

Value Decomposition

Static modeling typically does not consider forward rates, therefore cost and revenue components are priced incorrectly

	OAS					Static		
	WAM	WAC	Fee Value	Revenue Value	Cost Value	Fee Value	Revenue Value	Cost Value
S-5.5	298	5.5	101.21%	24.13%	-25.30%	109.25%	19.19%	-28.42%
M-5.5	328	5.5	101.31%	23.70%	-25.04%	108.49%	21.19%	-29.75%
N-5.5	358	5.5	102.22%	21.72%	-23.94%	109.73%	17.18%	-26.97%
S-6	298	6.0	100.20%	26.24%	-26.35%	108.31%	23.81%	-32.06%
M-6	328	6.0	100.17%	26.14%	-26.36%	107.70%	27.02%	-34.79%
N-6	358	6.0	100.81%	24.29%	-25.15%	108.66%	22.80%	-31.46%

Components of Servicing Value Expressed as a % of Total Value

A Practitioner's View – Tom Rettinger-HSBC

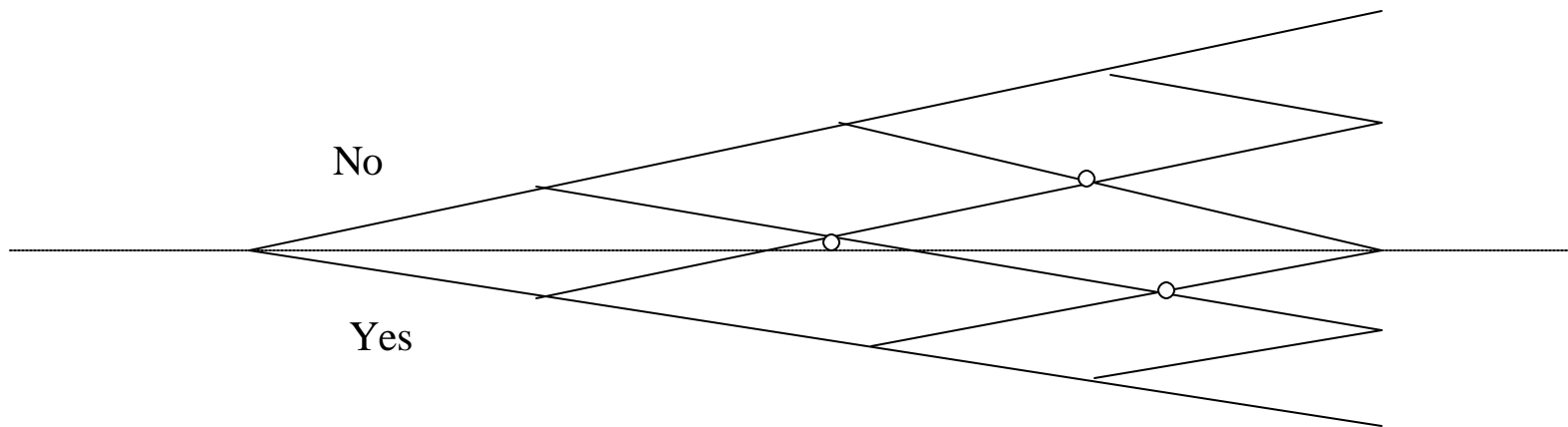
“Static modeling is how servicing trades, so I only need static to value my portfolio.”

“MSRs are too risky ... they can never be perfectly hedged.”

“I can't afford the risk management function, you need a Ph.D. to understand that OAS stuff.”

Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

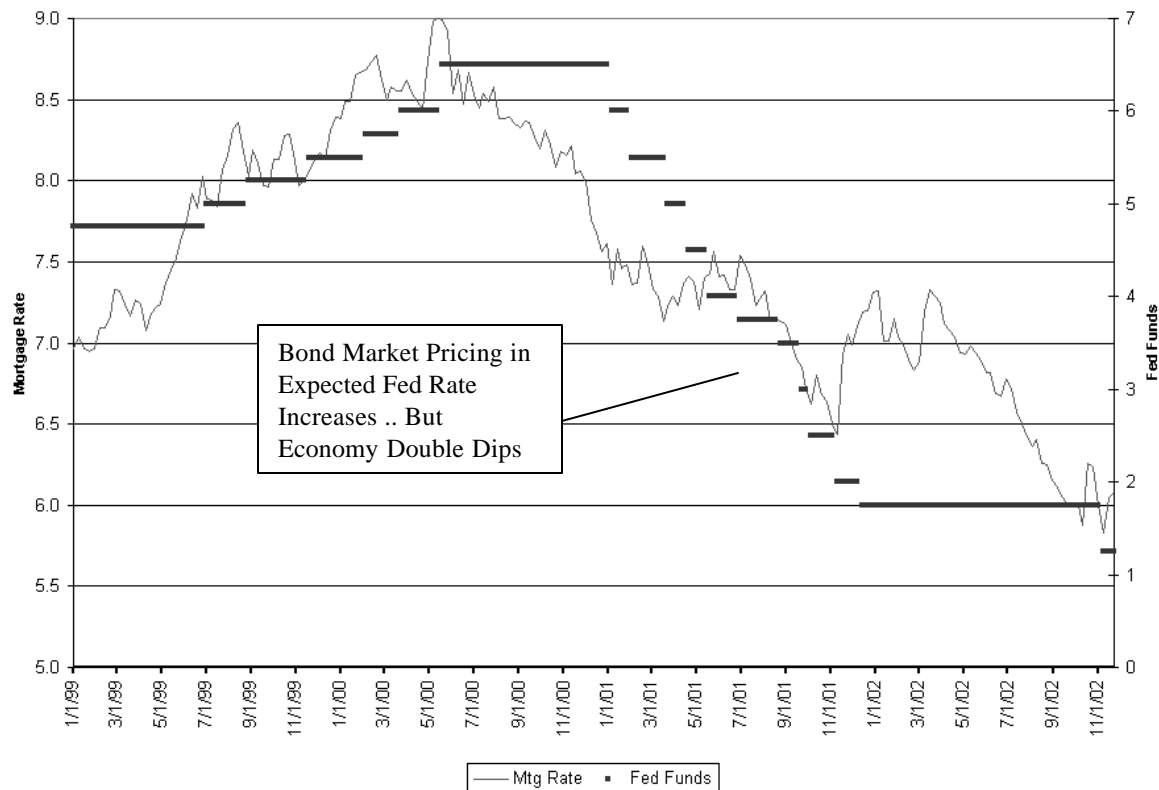
If you breakdown any decision to its most basic component, you have only **2** possible solutions ... Yes or No ... which in turn, points to a binomial world that we live in ... not Static.



Each Borrower makes many decisions along the way during the life of a mortgage ... Refi, New House, Relocate, etc ... These are all Yes or No questions.

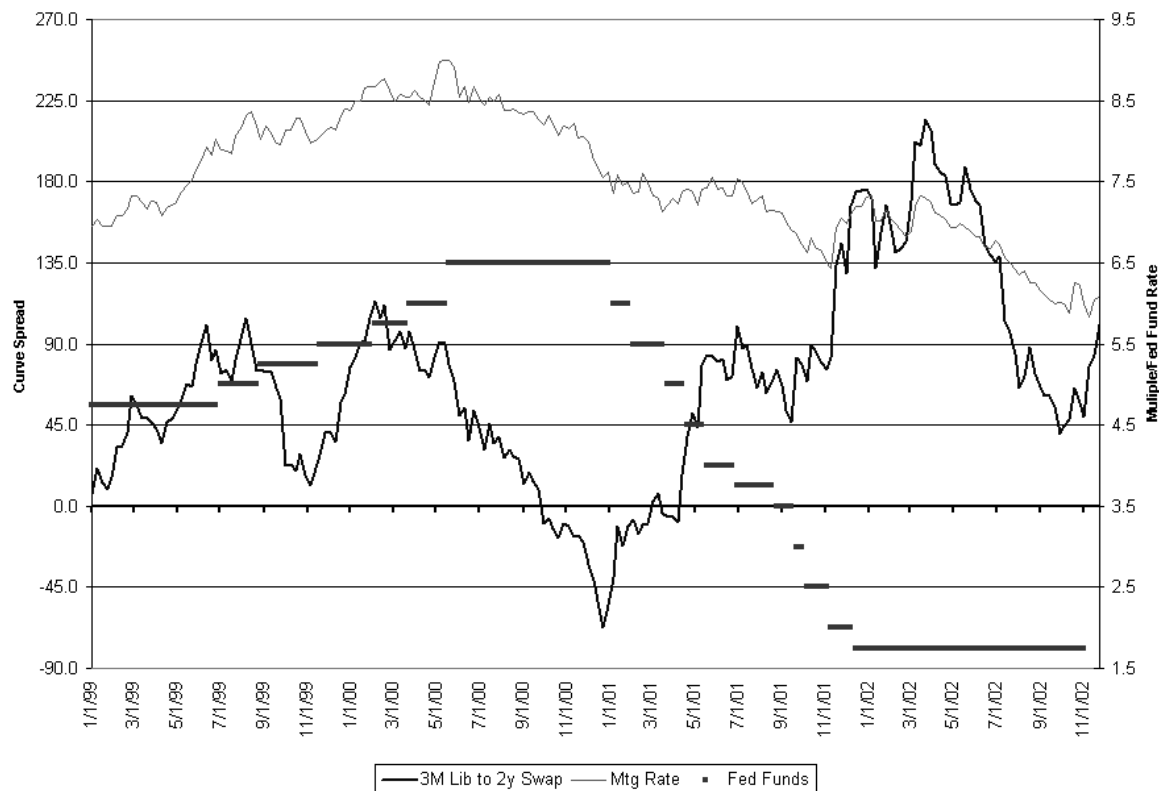
Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

The FOMC continues to drive Mortgage Rates, while the *Market* influences direction of rates ... captured in OAS.



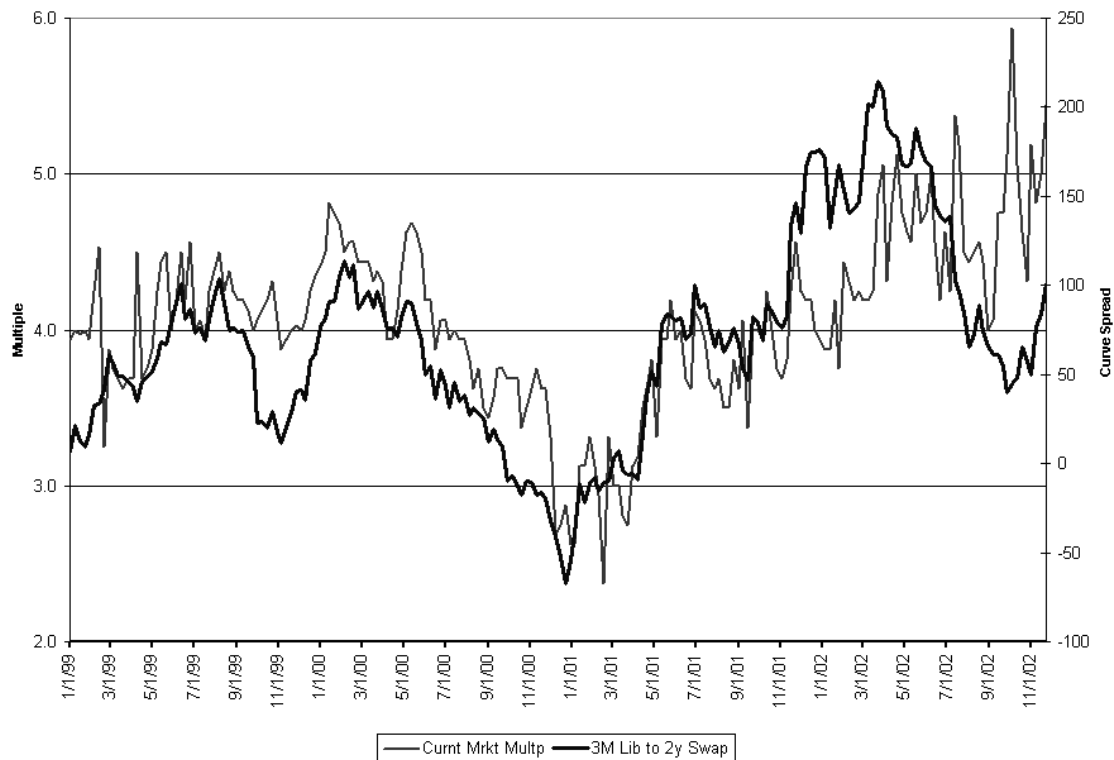
Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

The Shape of the Curve between 3 Months and 2 Years is an indicator of where rates are heading ...



Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

The Shape of the curve between 3 months and 2 years is highly correlated with implied IO Multiples .. Pointing toward OAS!



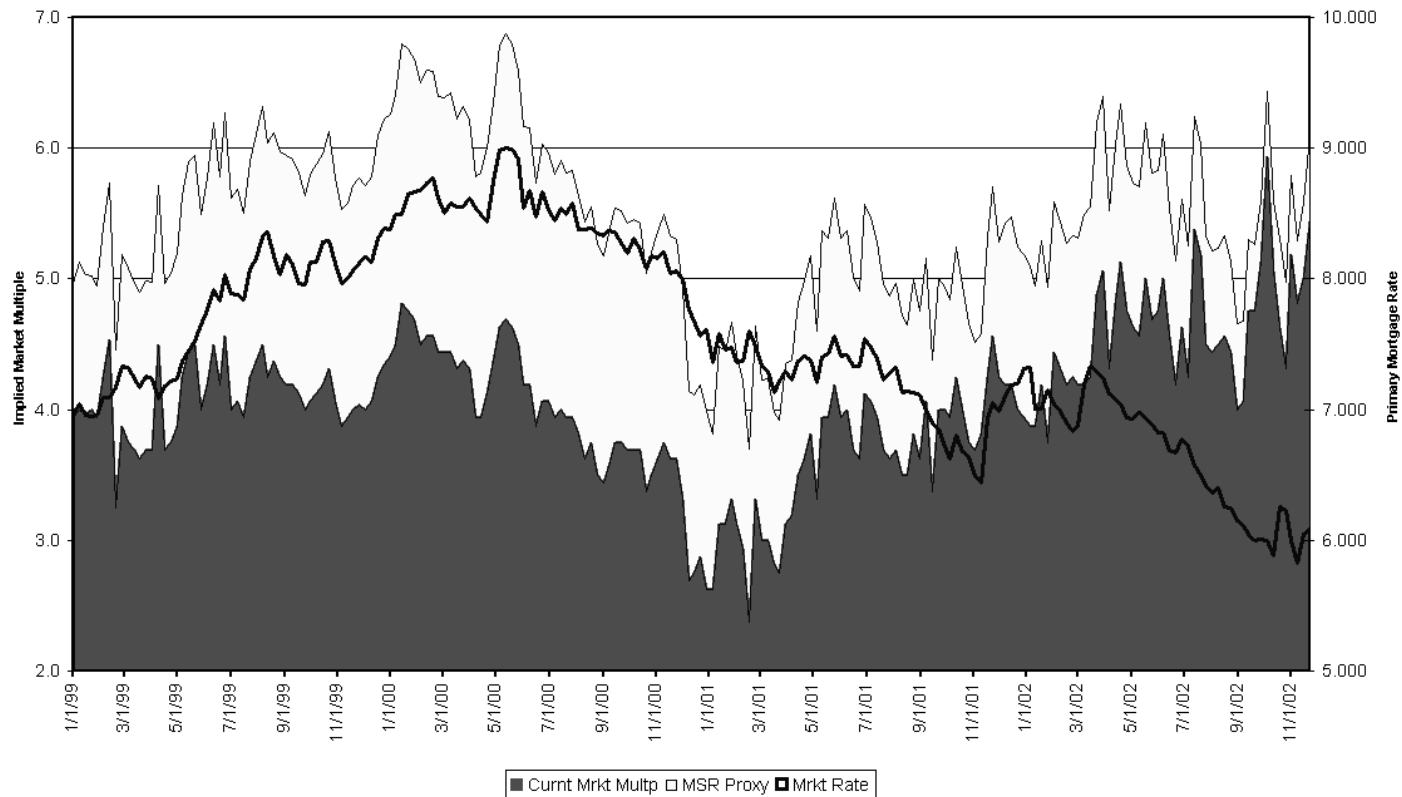
Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

In addition to OAS analysis, information derived from static analysis and broker inputs is also very useful for MSR managers.

- Servicing Brokers provide a Range of Value reflecting where they feel they can trade a portfolio
- Looking at Inter-Coupon Spreads on TBA's can shed light on where the Bond Market would price the 50 bps strip.
- Consistent Methodology can support values when liquidity is thin.

Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

Using the implied current market multiple between Security coupons, you can approximate current multiples for MSR.



Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

Consistent OAS methodology can support values when liquidity is thin, it can also protect against the prepayment volatility inherent in static valuation.

- Incorporating volatility in the determination of the MSR value increases the likelihood of correctly pricing the asset.
- A dynamic prepayment model incorporates volatility of the bond market into its projections.
- Using the forward curve to price the benefit of Float and Escrows matches the cash flows priced into Interest Rate Swaps ... creating “correlation” between the Asset & Hedge.

Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

Developing or determining the appropriate OAS is the mystery ... Bloomberg is of no help. There are several approaches

- Based on the Required Weighted Average Cost of Capital
- Using Current implied Market Multiples to solve for OAS, or
- Using a Static Discount Rate within an OAS Framework.

Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

Based on the Required Weighted Average Cost of Capital

- Using the Required (or Desired) Return on Equity for the Mortgage Business to form a Basis for where to develop an OAS
- If the required capital Allocation is 12%, the Required return is 30%, and the Funding cost for the Servicing portfolio is 7 year money or 4.25%, the following calculation would be used:

Required Return on Equity	30.0%	x	12%	=	3.600%
Pre Tax Funding Cost	4.25%	x	88%	=	3.740%
Total Cost of Capital					7.340%
Benchmark Swap Rate					4.500%
Implied OAS					2.840%

- You can keep this as a constant spread, or allow this index to be a formula within the modeling process.

Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

Using Current implied Market Multiples to solve for OAS

Fannie Mae 6.00% Price	102.50%
Fannie Mae 5.50% Price	100.75%
Inter-Coupon Spread	1.75%
Implied Multiple	3.50x
MSR Components	0.75x (Revenue-Cost)
Combined MSR Proxy	4.25x

Using this proxy within your model you can solve for the OAS that matches the 4.25x price.

Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

Using a Static Discount Rate within an OAS Framework

- If you needed to, you could create a static yield curve that would allow you to value based on your Static Yield, then use the price and current yield curve to solve for the OAS.
- I am not sure why you would do this .. But I guess you could

Static Modeling Is How Servicing Trades, So I Only Need Static To Value My Portfolio

MSR trade volume has all but dried up, but 2003 may see some improvement.

- The flow market remains the only channel that is currently active .. Although most buyers are on the sidelines.
- I heard that only 2 Bulk deals traded in the past year ... not including First Nationwide & Homeside Lending
- The First Quarter of 2003 should see a large amount of current production Bulk deals and should drive MSR pricing higher or back to “Normal” Levels

MSRs Are Too Risky ... They Can Never Be Perfectly Hedged

Yes, but they can be hedged within an acceptable tolerance.

Sample Mortgage Company				MSR Strategy Committee								
				MSR Parallel Curve Shifts								
				Week Ending: November 1, 2002								
	Notional	Book Value	Market Value	Current	Change in Value							
					-100	-75	-50	-25	25	50	75	100
CMS Rate				4.45	3.45	3.70	3.95	4.20	4.70	4.95	5.20	5.45
Mortgage Rate				6.00	5.20	5.40	5.60	5.80	6.20	6.40	6.60	6.80
MSR Asset - QRM OAS BDT Model, ADco Prepayment Model												
Market Value	\$ 75,000,000	\$ 1,050,000	\$ 1,023,750	(26,250)	741,195	808,763	879,401	952,088	1,085,175	1,136,363	1,187,550	1,228,500
Change in MV %	35 bps Serv Fee	4.00x	3.90x	100%	72%	79%	88%	93%	106%	111%	118%	120%
Change in Market Value				(26,250)	(282,555)	(214,988)	(144,349)	(71,663)	61,425	112,613	163,800	204,750
AFS Assets												
MBS Position	\$ 985,000	\$ 965,300	\$ 989,734	24,434	13,236	12,005	10,773	5,387	(5,387)	(10,773)	(21,855)	(32,936)
Total AFS	\$ 985,000	\$965,300	\$989,734	24,434	13,236	12,005	10,773	5,387	(5,387)	(10,773)	(21,855)	(32,936)
Trading Hedges												
TBA Positions	475,000	0	0	-	20,455	14,755	11,672	6,898	(9,199)	(19,277)	(28,659)	(38,042)
CMS Caps	4,750,000	14,130	20,158	6,028	(12,996)	(10,779)	(7,950)	(4,394)	5,347	11,801	19,442	28,399
Swaptions	2,493,750	64,634	62,427	(2,207)	89,105	56,141	30,818	12,508	(7,648)	(11,295)	(11,899)	(10,308)
CMS Swap	1,900,000	0	(8,728)	(8,728)	62,421	46,985	30,798	15,142	(14,642)	(28,799)	(42,485)	(55,715)
CMS Floors	4,754,750	87,448	101,999	14,551	94,306	66,972	41,977	19,601	(16,741)	(30,637)	(41,809)	(50,610)
Total Hedges (less TBAs)	\$ 14,373,500	\$ 166,212	\$ 175,857	9,644	253,290	174,073	107,315	49,755	(42,884)	(78,207)	(105,411)	(126,275)
Cumulative MSR Position	75,000,000	1,050,000	1,023,750	(26,250)	(282,555)	(214,988)	(144,349)	(71,663)	61,425	112,613	163,800	204,750
Cumulative AFS Position	985,000	965,300	989,734	24,434	13,236	12,005	10,773	5,387	(5,387)	(10,773)	(21,855)	(32,936)
Cumulative Hedge Position	14,373,500	166,212	175,857	9,644	253,290	174,073	107,315	49,755	(42,884)	(78,207)	(105,411)	(126,275)
Cumulative Economic Position	\$ 90,358,500	2,181,512	2,189,341	7,828	(16,029)	(28,910)	(26,261)	(16,521)	13,155	23,632	36,534	45,539
Economic Loss Coverage %		(Policy < -X.XX%)			-1.6%	-2.8%	-2.6%	-1.6%	1.3%	2.3%	3.6%	4.4%
Coverage Ratio (Correlated / Negatively Correlated)*	(Target 60% to 75%)				94.3%	86.6%	81.8%	76.9%	78.6%	79.0%	77.7%	77.8%
Implied Change in Value per bps (\$ in thousands)				-	-160.3	-385.5	-525.2	-660.8	526.2	472.6	487.1	455.4
FAS 140 P&L Impact												
Cumulative Impairment (FAS 140)				(26,250)	(308,805)	(241,238)	(170,599)	(97,913)	-	-	-	-
Cumulative Hedge P&L				9,644	253,290	174,073	107,315	49,755	(42,884)	(78,207)	(105,411)	(126,275)
AFS (Realized)**				-	37,670	36,439	35,208	29,821	-	-	-	-
Cumulative P&L (w/o Recapture)				(16,606)	(17,845)	(30,726)	(28,077)	(18,336)	(42,884)	(78,207)	(105,411)	(126,275)
% of AFS Realized					100%	100%	100%	100%	0%	0%	0%	0%
				Estimated AFS & Hedge P/L								
				Mthly (\$000) Mthly (bps) Annual (bps)								
Est Hedge P/(L)	\$	(6,280.6)								(28.8)		(345.5)
Swap Inc	\$	5,700.0								26.1		313.5
Nil (AFS)	\$	3,283.3								15.1		180.6
Net P/(L)	\$	2,702.7								12.4		148.7

*The coverage ratio measures the amount that the Correlated components (AFS Assets and Trading Hedges) value covers the negatively correlated assets (MSR) value change.

** AFS can be used to off-set P&L Losses at Management Discretion, at this time it is Management's intent to hold the AFS position as an earning asset B37

MSRs Are Too Risky ... They Can Never Be Perfectly Hedged

The sensitivity of the MSR position has to be tracked and understood by management.

	<u>Notional</u>	<u>Book Value</u>	<u>Market Value</u>	<u>Current</u>	<u>Change in Value</u>							
					<u>-100</u>	<u>-75</u>	<u>-50</u>	<u>-25</u>	<u>25</u>	<u>50</u>	<u>75</u>	<u>100</u>
CMS Rate				4.45	3.45	3.70	3.95	4.20	4.70	4.95	5.20	5.45
Mortgage Rate				6.00	5.20	5.40	5.60	5.80	6.20	6.40	6.60	6.80
MSR Asset - QRM OAS BDT Model, ADco Prepayment Model												
Market Value	\$ 75,000,000	\$ 1,050,000	\$ 1,023,750	(26,250)	741,195	808,763	879,401	952,088	1,085,175	1,136,363	1,187,550	1,228,500
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MSRs Are Too Risky ... They Can Never Be Perfectly Hedged

For HSBC, assets are used to offset some of the economic changes in the MSR positions and interest rate Hedges are used to offset P&L implications of impairment.

				Change in Value									
					3.45	3.70	3.95	4.20	4.70	4.95	5.20	5.45	
				4.45	5.20	5.40	5.60	5.80	6.20	6.40	6.60	6.80	
				6.00									
CMS Rate													
Mortgage Rate													
AFS Assets													
MBS Position	\$ 985,000	\$ 965,300	\$ 989,734	24,434	13,236	12,005	10,773	5,387	(5,387)	(10,773)	(21,855)	(32,936)	
Total AFS	\$ 985,000	\$965,300	\$989,734	24,434	13,236	12,005	10,773	5,387	(5,387)	(10,773)	(21,855)	(32,936)	
Trading Hedges													
TBA Positions	475,000	0	0	-	20,455	14,755	11,672	6,898	(9,199)	(19,277)	(28,659)	(38,042)	
CMS Caps	4,750,000	14,130	20,158	6,028	(12,996)	(10,779)	(7,950)	(4,394)	5,347	11,801	19,442	28,399	
Swaptions	2,493,750	64,634	62,427	(2,207)	89,105	56,141	30,818	12,508	(7,648)	(11,295)	(11,899)	(10,308)	
CMS Swap	1,900,000	0	(8,728)	(8,728)	62,421	46,985	30,798	15,142	(14,642)	(28,799)	(42,485)	(55,715)	
CMS Floors	4,754,750	87,448	101,999	14,551	94,306	66,972	41,977	19,601	(16,741)	(30,637)	(41,809)	(50,610)	
Total Hedges (less TBAs)	\$ 14,373,500	\$ 166,212	\$ 175,857	9,644	253,290	174,073	107,315	49,755	(42,884)	(78,207)	(105,411)	(126,275)	

MSRs Are Too Risky ... They Can Never Be Perfectly Hedged

Put it all together and set limits for the Risk Manager to use ...

					Change in Value							
CMS Rate				4.45	3.45	3.70	3.95	4.20	4.70	4.95	5.20	5.45
Mortgage Rate				6.00	5.20	5.40	5.60	5.80	6.20	6.40	6.60	6.80
Cumulative MSR Position	75,000,000	1,050,000	1,023,750	(26,250)	(282,555)	(214,988)	(144,349)	(71,663)	61,425	112,613	163,800	204,750
Cumulative AFS Position	985,000	965,300	989,734	24,434	13,236	12,005	10,773	5,387	(5,387)	(10,773)	(21,855)	(32,936)
Cumulative Hedge Position	14,373,500	166,212	175,857	9,644	253,290	174,073	107,315	49,755	(42,884)	(78,207)	(105,411)	(126,275)
Cumulative Economic Position	\$ 90,358,500	2,181,512	2,189,341	7,828	(16,029)	(28,910)	(26,261)	(16,521)	13,155	23,632	36,534	45,539
Economic Loss Coverage %		(Policy < -X.XX%)			-1.6%	-2.8%	-2.6%	-1.6%	1.3%	2.3%	3.6%	4.4%
Coverage Ratio (Correlated / Negatively Correlated)*		(Target 60% to 75%)			94.3%	86.6%	81.8%	76.9%	78.6%	79.0%	77.7%	77.8%
Implied Change in Value per bps (\$ in thousands)				-	-160.3	-385.5	-525.2	-660.8	526.2	472.6	487.1	455.4
FAS 140 P&L Impact												
Cumulative Impairment (FAS 140)				(26,250)	(308,805)	(241,238)	(170,599)	(97,913)	-	-	-	-
Cumulative Hedge P&L				9,644	253,290	174,073	107,315	49,755	(42,884)	(78,207)	(105,411)	(126,275)
AFS (Realized)**				-	37,670	36,439	35,208	29,821	-	-	-	-
Cumulative P&L (w/o Recapture)				(16,606)	(17,845)	(30,726)	(28,077)	(18,336)	(42,884)	(78,207)	(105,411)	(126,275)
% of AFS Realized					100%	100%	100%	100%	0%	0%	0%	0%
									Estimated AFS & Hedge P/L			
									Mthly (\$000)			
									Mthly (bps)			
									Annual (bps)			
Est Hedge P/(L)	\$	(6,280.6)							(28.8)			(345.5)
Swap Inc	\$	5,700.0							26.1			313.5
NII (AFS)	\$	3,283.3							15.1			180.6
Net P/(L)	\$	2,702.7							12.4			148.7

*The coverage ratio measures the amount that the Correlated components (AFS Assets and Trading Hedges) value covers the negatively correlated assets (MSR) value change.

** AFS can be used to off-set P&L Losses at Management Discretion, at this time it is Management's intent to hold the AFS position as an earning asset.B37

Understand your Cashflow implications of your hedge program if Rates don't change ... this is your baseline P&L.

MSRs Are Too Risky ... They Can Never Be Perfectly Hedged

Sample Mortgage Company

MSR Strategy Committee

MSR Parallel Curve Shifts

Week Ending: November 1, 2002

	Notional	Book Value	Market Value	Current	Change in Value							
					-100	-75	-50	-25	25	50	75	100
CMS Rate				4.45	3.45	3.70	3.95	4.20	4.70	4.95	5.20	5.45
Mortgage Rate				6.00	5.20	5.40	5.60	5.80	6.20	6.40	6.60	6.80
MSR Asset - QRM OAS BDT Model, ADco Prepayment Model												
Market Value	\$ 75,000,000	\$ 1,050,000	\$ 1,023,750	(26,250)	741,195	808,763	879,401	952,088	1,085,175	1,136,363	1,187,550	1,228,500
Change in MV %	35 bps Serv Fee	4.00x	3.90x	100%	72%	73%	86%	93%	106%	111%	116%	120%
Change in Market Value				(26,250)	(282,555)	(214,988)	(144,349)	(71,663)	61,425	112,613	163,800	204,750
AFS Assets												
MBS Position	\$ 985,000	\$ 965,300	\$ 989,734	24,434	13,236	12,005	10,773	5,387	(5,387)	(10,773)	(21,855)	(32,936)
Total AFS	\$ 985,000	\$965,300	\$989,734	24,434	13,236	12,005	10,773	5,387	(5,387)	(10,773)	(21,855)	(32,936)
Trading Hedges												
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CMS Swap	1,900,000	0	(8,728)	(8,728)	62,421	46,985	30,798	15,142	(14,642)	(28,799)	(42,485)	(55,715)
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Total Hedges (less TBAs)	\$ 14,373,500	\$ 166,212	\$ 175,857	9,644	253,290	174,073	107,315	49,755	(42,884)	(78,207)	(105,411)	(126,275)
Cumulative MSR Position	75,000,000	1,050,000	1,023,750	(26,250)	(282,555)	(214,988)	(144,349)	(71,663)	61,425	112,613	163,800	204,750
Cumulative AFS Position	985,000	965,300	989,734	24,434	13,236	12,005	10,773	5,387	(5,387)	(10,773)	(21,855)	(32,936)
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% of AFS Realized					100%	100%	100%	100%	0%	0%	0%	0%

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	Estimated AFS & Hedge P/L		
	Mthly (\$000)	Mthly (bps)	Annual (bps)
Est Hedge P/L	\$ (6,280.6)	(28.8)	(345.5)
Swap Inc	\$ 5,700.0	26.1	313.5
Nil (AFS)	\$ 3,283.3	15.1	180.6
Net P/L	\$ 2,702.7	12.4	148.7

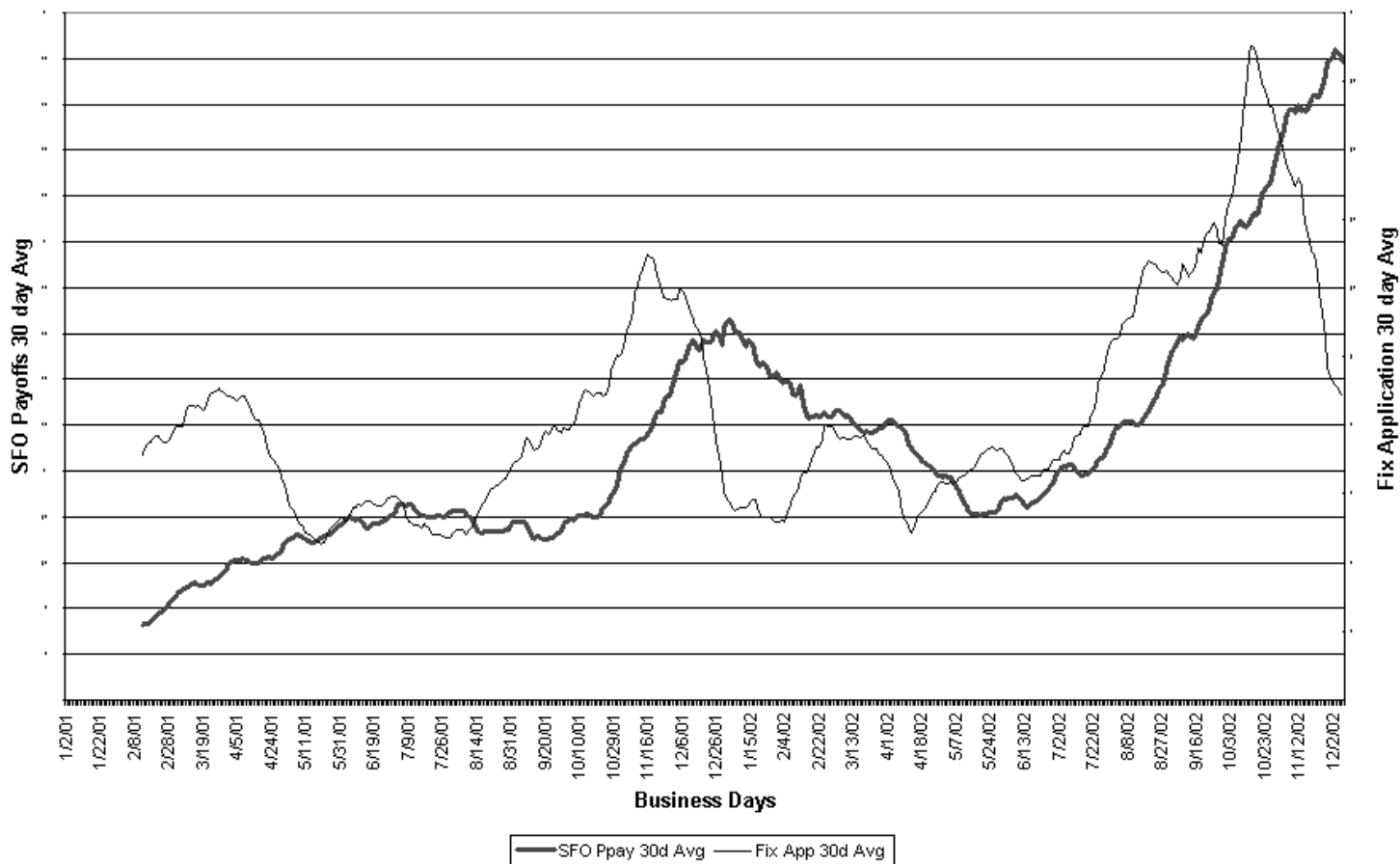
I Can't Afford The Risk Management Function, I Need a Ph.D. To Understand That OAS Stuff

Firms that choose to maintain an MSR position need to have the expertise to manage it.

- Hedging MSRs is NOT a Trading function, it is Risk Mitigation.
 - i. MSRs are part of a cyclical business that extend when Production slows.
 - ii. Production profits help offset some of the losses due to impairment ... this is the “Natural Hedge.” Horizon Analysis will help Quantify the benefits.
- Understanding Prepayments and Applications trends are a Requirement, not an option.

I Can't Afford The Risk Management Function, I Need a Ph.D. To Understand That OAS Stuff

Fixed Prepayments and Applications



I Can't Afford The Risk Management Function, I Need a Ph.D. To Understand That OAS Stuff

MSR Risk Management extends beyond looking at today to determine the appropriate hedge program.

- Advanced training in a Mathematical or Financial discipline is needed to understand the business planning needed to balance the Risk Mitigation process.
- Those that develop individuals to understand the Risks associated with maintaining both a MSR and Pipeline position will succeed in mitigated the risks
- Having attained a certain level of comfort with today's "valuations" and "instantaneous rate shocks" ... planning and forecasting for future "valuations" and "instantaneous rate shocks" is becoming increasingly important

MSR Management And Analysis In The Future

Given the risk inherent in the MSR asset, bank treasuries and investors are interested in their future MSR exposure under various rate scenarios.

- Most treasuries were previously unaware of the P&L risk embedded in their mortgage operations .. Both Pipeline and MSR Risk
- Treasuries are responsible for providing earnings guidance to the street for the coming quarters
- Expected or unexpected value changes in MSRs, which can significantly alter a bank's P&L, need to be forecasted, hedged and explained

Forecasting Requirements

Progressively more and more MSR managers are being asked to forecast their portfolio and profiles, one month, one quarter or one year out.

Such forecasting needs to include...

- Interest rate forecasting and scenario development
- Prepayment modeling
- Origination modeling
- Definition of expected new production (WAC, WASF, Escrow etc.)
- Expected sales, purchases or flow executions

Prepayments, Originations, Trades etc.

Ability to model production, prepayment and trades is essential in estimating future MSR position.

Beginning Principal Balance	545,298	912,574	1,018,491	913,059	875,333	1,122,421	1,383,393	1,642,633	1,895,074	2,140,345	2,380,043	2,591,362
Defaults	5	8	8	8	7	9	12	14	16	18	20	22
Runoff(Prepay's+Paydown's)	2,001	3,294	3,692	3,330	3,194	4,118	5,108	6,135	7,168	8,206	9,301	10,409
Reinvestment												
Bottomup New Volume	387,141	357,294	217,722	233,073	247,101	261,299	259,898	253,386	246,479	241,146	212,934	205,077
Allocated New Volume	-17,860	-24,075	-319,454	-267,461	3,188	3,800	4,462	5,204	5,976	6,776	7,706	8,775
Ending Principal Balance	912,574	1,018,491	913,059	875,333	1,122,421	1,383,393	1,642,633	1,895,074	2,140,345	2,380,043	2,591,362	2,794,784
New Volume WAC	5.91%	5.91%	5.91%	5.91%	5.91%	5.91%	5.91%	5.91%	5.91%	5.91%	5.91%	5.91%
Account Interest/Expense												
Interest Received	2,817	3,510	2,943	2,500	4,348	5,564	6,848	8,124	9,366	10,573	11,753	12,792
Change in Accrued Interest	-3									-1	-2	3
Amortization of Prem/Disc												
Ancillary Interest Income												
Servicing Interest Income												
Total Interest Income	2,814	3,510	2,943	2,500	4,348	5,564	6,848	8,124	9,366	10,572	11,751	12,796
Unrealized Gain/Loss												
Realized Gain/Loss												
Other Ancillary Income												
Other Servicing Income												
Total Subaccount Income	2,829	3,510	2,943	2,500	4,348	5,564	6,848	8,124	9,366	10,572	11,751	12,796
Cash Flow												
Total Cash		4,606	5,095	4,550	4,348	5,564	6,848	8,124	9,366	10,573	11,753	12,792
Ending Balances												
Book Value	912,574	1,018,491	913,059	875,333	1,122,421	1,383,393	1,642,633	1,895,074	2,140,345	2,380,043	2,591,362	2,794,784
Market Value	914,757	1,020,074	914,139	876,092	1,123,180	1,384,152	1,643,392	1,895,834	2,141,105	2,380,802	2,592,121	2,795,543
Instrument Parameters												
Average Balance	544,742	912,039	1,018,229	913,035	875,453	1,122,519	1,383,498	1,642,720	1,895,175	2,140,443	2,380,076	2,591,473
Starting WAC	6.17%	6.06%	6.00%	5.98%	5.96%	5.95%	5.94%	5.93%	5.93%	5.93%	5.93%	5.92%
Starting WAM	176.6	177.5	177.7	177.5	177.5	177.2	177.0	176.6	176.2	175.8	175.3	174.8

Sales

Origination

New Volume Definition

Conclusions

- ◆ **Consolidation continues, and will continue... the strong, smart and nimble will survive**
- ◆ **Rates will continue to be volatile, the potential for huge losses/impairments will not diminish**
- ◆ **Processing power, database technology and financial modeling will keep marching forward, the industry will adapt or be forced to adapt**
- ◆ **Servicers will consolidate their disparate systems and adopt consistent methodologies across their operations – the inefficient will not be competitive**
 - the OAS valuation approach will be widely accepted
 - Static modeling and other dated methods will fade
- ◆ **Base servicing will not be ignored while in the pipeline, it will be priced and hedged correctly**
- ◆ **Servicing will not be analyzed in a vacuum, Mortgage Bankers will adapt sophisticated balance sheet management techniques**

Contact US!

- ◆ We will be happy to provide you with additional detail and answer any questions that you may have:
 - Please call me at 312-782-2855 or...
 - Email me at Crichard@QRM.com or..
 - Check our our website at www.QRM.com

Or

 - Tom Rettinger at 716-651-6466 or...
 - Email Tom at thomas.rettinger@us.hsbc.com
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- ◆ Thank you all very much for you attention!