MORTGAGE SERVICING RIGHTS:
Valuation Primer & Market Update

Jeff Boyd, Senior Vice President
Erin Gilbride, Senior Vice President
With over 200 clients throughout the country, the Phoenix Family of Companies...

...continues to be the industry leading MSR advisory firm offering comprehensive solutions for its diverse client base. Having expertly managed over $700 billion in successful MSR transactions since 2013 alone, Phoenix Capital maintains the deepest knowledge base in the MSR space. This real-time market intelligence is seamlessly integrated into Phoenix Analytics’ suite of services, including MSR valuations for two-thirds of the top 20 banks and servicers, currently over $30 trillion in annual UPB. Our expertise extends to servicing audits and surveillance, REO disposition and whole loan trading solutions.
As the number of companies investing in the Mortgage Servicing Asset (MSR) continues to grow, the scrutiny and oversight from the auditors, regulators and guarantors continues to increase. The MSR asset often quickly becomes the largest asset for most Independent Mortgage Bankers. For banks that retain MSRs, it is one of the most volatile assets.

This presentation will focus on:

- Review of MSR asset
- Considerations for Owning the MSR Asset
- Valuation Basics
- MSR Market Update
- Phoenix team and contact
What is a Mortgage Servicing Right?

A mortgage servicing right (MSR) is a strip of interest from the loan, and based on the accounting rules becomes an asset when a mortgage loan is sold servicing retained. The strip of interest is paid to the servicer to perform the servicing duties based on the investor guidelines. Mortgage servicers are responsible for the collection of payments on the mortgage loan and the distribution of these payments to the appropriate authority (including investors, tax authorities and insurance companies). The value of the MSR asset is driven primarily by the strip of interest, but the servicer can also earn income from late fees, ancillary income and float income.
What is a Mortgage Servicing Right?

For FNMA or FHLMC servicing:
- 25 bps is the contractual minimum service fee
- Any amount of service fee above 25 bps is considered excess (for tax purposes)

For GNMA servicing
- GNMA Is are at a minimum of 44 bps
- GNMA IIs are at a minimum of 19 bps

The value of servicing is the net present value of the servicing revenue components less expenses, adjusted for expected prepayment speeds. The servicing value is expressed as either a multiple of the service fee or as a percentage of the UPB. For example, for a FNMA loan that has 25 bps of interest, its value can be expressed as a 4 multiple or 100 bps.
# MSR Examples

## MSR Example with no excess

- A 4.75% 30 Conventional fixed rate loan is pooled and securitized into a 4.00% (in this example the guarantee fee is 50 bps (or .5%)

<table>
<thead>
<tr>
<th>Mortgage Rate</th>
<th>4.75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBS Security Rate</td>
<td>(4.00%)</td>
</tr>
<tr>
<td>Guarantee Fee</td>
<td>(0.50%)</td>
</tr>
<tr>
<td>Service Fee</td>
<td>(0.25%)</td>
</tr>
<tr>
<td>Remaining Interest</td>
<td>0</td>
</tr>
</tbody>
</table>

- If the MSR asset was determined to have a fair value of 100 bps (or a 4 multiple), it would be capitalized at 1% (100 bps) of the unpaid principal balance.

## MSR Example with excess

- A 4.875% 30 Conventional fixed rate loan is pooled and securitized into a 4.00% (in this example the guarantee fee is 50 bps (or .5%)

<table>
<thead>
<tr>
<th>Mortgage Rate</th>
<th>4.875%</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBS Security Rate</td>
<td>(4.00%)</td>
</tr>
<tr>
<td>Guarantee Fee</td>
<td>(0.50%)</td>
</tr>
<tr>
<td>Service Fee</td>
<td>(0.25%)</td>
</tr>
<tr>
<td>Remaining Interest</td>
<td>.125%*</td>
</tr>
</tbody>
</table>

* During pooling process, the .125% can be sold to the agency, or capitalized as servicing making the servicing strip 37.5 bps.
Owning the MSR Asset
Owning the MSR Asset

The MSR asset is volatile and values can change due to a number of factors other than just interest rates; an effective risk management process is critical to managing and communicating the MSR risks.

- Risks to the MSR asset include not only the risk of mispricing the MSR asset, but also the operational risks associated with servicing
- The MSR asset is viewed as a Level 3 asset and therefore an assumption based valuation approach is appropriate
- Effective risk management is an on-going process that requires continual monitoring and improvement
  - Assumption tracking
  - Calibration of cash flows
  - Regular reporting and communication of the values
  - Identification of current and potential risks to the MSR asset
  - Knowledge of the current MSR market conditions
Servicing Retained Decisions

- Economic Value vs Market Value
- Investor Type
  - Ex: Servicing Costs and delinquencies are anticipated to be higher for Ginnie vs. Fannie/Freddie
- Product (Fixed v. ARM)
- State/Geography (licensing, judicial/non)
- Channel of Origination (retail v third party)
- Cash flow considerations (cost of advances/remittance types)
- Key Customers, Friends and Family
- Amount to hold – liquid market exists, but takes time to monetize the asset

Capital Requirements

- Minimum Net Worth (all servicers) = $2.5m + 25bps of MSR Portfolio UPB
- Minimum Capital Ratio (Non Depositories): tangible net worth/total assets >=6%
- Minimum Liquidity (Non Depositories): 3.5bs; of total Agency (FN/FH/GN) + incremental non depositories liquidity for higher non performing portfolios (incremental 200bps * sum of 90+ dq in excess of 6% of total Agency UPB)

<table>
<thead>
<tr>
<th>UPB of MSR Portfolio</th>
<th>Base Capital</th>
<th>+ 25bps of UPB</th>
<th>Minimum Net Worth Required</th>
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</thead>
<tbody>
<tr>
<td>$100,000,000</td>
<td>$2,500,000</td>
<td>$250,000</td>
<td>$2,750,000</td>
</tr>
<tr>
<td>$250,000,000</td>
<td>$2,500,000</td>
<td>$625,000</td>
<td>$3,125,000</td>
</tr>
<tr>
<td>$500,000,000</td>
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<td>$1,250,000</td>
<td>$3,750,000</td>
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<tr>
<td>$750,000,000</td>
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<td>$1,875,000</td>
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<tr>
<td>$1,000,000,000</td>
<td>$2,500,000</td>
<td>$2,500,000</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>$5,000,000,000</td>
<td>$2,500,000</td>
<td>$12,500,000</td>
<td>$15,000,000</td>
</tr>
<tr>
<td>$10,000,000,000</td>
<td>$2,500,000</td>
<td>$25,000,000</td>
<td>$27,500,000</td>
</tr>
</tbody>
</table>
### MSR Advances (Example)

**GNMA S/S**  
4% 30 Year Fixed Mortgage

<table>
<thead>
<tr>
<th>Time Delq (Months)</th>
<th>UPB</th>
<th>P&amp;I Payment</th>
<th>Avg T&amp;I</th>
<th>Total Cash Advanced (2)</th>
<th>Total Cash Advanced (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>3,105</td>
<td>3,105</td>
</tr>
<tr>
<td>6</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>6,210</td>
<td>3,705</td>
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<tr>
<td>9</td>
<td>175,000</td>
<td>835</td>
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<td>9,315</td>
<td>4,805</td>
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<tr>
<td>12</td>
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<td>835</td>
<td>200</td>
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<tr>
<td>15</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>15,525</td>
<td>5,505</td>
</tr>
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<td>175,000</td>
<td>835</td>
<td>200</td>
<td>18,630</td>
<td>6,105</td>
</tr>
<tr>
<td>24</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>24,840</td>
<td>7,305</td>
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</tbody>
</table>

(1) Assumes that T&I and P&I payments are made for each month of delinquency  
(2) Assumes that loan is not bought out of the pool at 90 days of delinquency  
(3) Assumes that loan is bought out of the pool at 90 days of delinquency

**FNMA A/A**  
4% 30 Year Fixed Mortgage

<table>
<thead>
<tr>
<th>Time Delq (Months)</th>
<th>UPB</th>
<th>P&amp;I Payment</th>
<th>Avg T&amp;I</th>
<th>Total Cash Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>600</td>
</tr>
<tr>
<td>6</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>1,200</td>
</tr>
<tr>
<td>9</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>1,800</td>
</tr>
<tr>
<td>12</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>2,400</td>
</tr>
<tr>
<td>15</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>3,000</td>
</tr>
<tr>
<td>18</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>3,600</td>
</tr>
<tr>
<td>24</td>
<td>175,000</td>
<td>835</td>
<td>200</td>
<td>4,800</td>
</tr>
</tbody>
</table>

(1) Assumes that T&I payments are made for each month of delinquency

- The remittance structure of the servicing has a material impact on the potential advances that are made on the behalf of delinquent borrowers
- Ginnie Mae servicing is always schedule/schedule remittance
- Sample of cash advanced is based only on P&I and T&I (other cash outlays exist)
Subservicer Model

Subservicing Pros

- Minimal upfront investment in personnel and technology
- Ability to get servicing operations up and running quickly
- Ability to make use of best practices of subservicer experiences and implied compliance with National Servicing Standards
- Ability to exit investment in servicing quickly due to lack of infrastructure

Subservicing Cons

- Per loan cost and the inability to get to a marginal cost number
  - Makes lower balance loan less profitable and changes break even point
- Additional cost of vendor oversight and in house servicing full time employees
- A vendor is interacting with customers versus own personnel and therefore limits ability to control borrower experience
- Contracts vary, but often split late fees 50/50
## In House Servicing Model

<table>
<thead>
<tr>
<th>In House Pros</th>
<th>In House Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute ability to control the borrower experience and interaction</td>
<td>Elevated initial (and ongoing) costs of technology and personnel</td>
</tr>
<tr>
<td>Ability to make use of marginal costs once adequate servicing scale is achieved</td>
<td>Significant investment in policies and procedures to ensure compliance with National Servicing Standards</td>
</tr>
<tr>
<td>Greater ability to control cross-sell and refinancing opportunities</td>
<td>Headcount and operations make maintaining scale critical and therefore less ability to sell servicing without materially adversely impacting financial ratios</td>
</tr>
<tr>
<td>Ability to earn 100% of fees associated with subservicing including late fees and ancillary</td>
<td></td>
</tr>
</tbody>
</table>
MSRs are generally Classified as a Level 3 Asset:

Level 1 Asset
- Transparent and readily available quoted market prices
  - EX: Equity Stocks

Level 2 Asset
- Lack of readily available quoted market price (but may have market inputs)
- Involves more complex modeling than Level 1 Asset
  - Ex: Interest Rate Swaps

Level 3 Asset
- Illiquid Market
- Involves complex modeling and reliance on assumptions and estimates that management must support
  - Ex: MSRs
After the MSRs are recognized initially at Fair Value, companies must elect either Fair Value or Lower of Cost or Market (LOCOM)

Pros of Fair Value

➤ Balance sheet value for the MSR value represents market at all times

➤ Decay/amortization is determined based on actual prepayments vs a prepayment model based approach that is used for LOCOM

Cons of Fair Value

➤ Likely to introduce volatility to income statement due to writing up/down the asset; may necessitate hedging the MSR value changes

➤ Increases the volatility of decay/amortization as the overall basis (MSR asset) can change dramatically

➤ One time irrevocable decision to elect fair value

Pros of LOCOM

➤ When rates rise and MSR values increase, permits the servicer to sell the MSR asset for a gain (as the asset cannot be written up above the initial capitalized amount)

➤ In general, makes amortization expense easier to model and project based on the cash flows

Cons of LOCOM

➤ Impairment (book value being higher than market value) can occur suddenly and must be tested for each quarter/year end

➤ MSR value on the balance sheet reflects the cost basis and may deviate greatly from actual market value (especially in a rising rate environment)

➤ Amortization expense is determined by future modeled prepayments
Two types of valuation approaches are common for MSRs: Static and Option Adjusted Spreads (“OAS”). Each has its advantages and disadvantages:

**Static Valuation**
- Remains the most common technique
- Used by the majority of non top 25 servicers
- Discount rate remains constant, incorporates:
  - required rate of return
  - premium for market liquidity
  - operational risk

**OAS Valuation**
- Common among top 25 servicers, but not all have adopted
- Discount rate (OAS) varies over time
- Assumes interest rates are random and change over time
- More complex and dynamic, requires significantly more computer processing
MSR Valuation Components Summary

Revenues
- Service fee revenue
- Escrow float earnings
- P&I and payoff float earnings
- Ancillary income (ex: late fees, modification income, optional insurance, etc)

Predicted Prepayments
- Voluntary payoffs and refinances
- Involuntary payoffs (foreclosures)

Expenses
- Servicing costs
- Additional costs for delinquent loans and foreclosures
- Advances on delinquent P&I and escrow payments
- Interest owed on escrow accounts (ie CA, CT, MA, ME, NY, OR, RI, UT, VT & WI)
- Interest owed on early payoffs (unique to scheduled/scheduled products)

Prepayment speeds are a key driver behind servicing values (on performing or new production):
- The longer a performing MSR is held in the portfolio, the more revenue will be received
- As interest rates rise, prepayment speeds will slow, that increases the duration and resulting value of the MSR
- Conversely, as interest rates drop, prepayment speeds will rise, which will decrease the life and value of the MSR
Support for MSR Valuation

Valuation of the MSR portfolio must be supported by documentation that includes the policies and procedures for the establishment of the fair value and should include:

- Quarterly review of valuations (and impairment test if required)
- Comparison of MSR valuation to relevant market sources including:
  - External market data
  - Market trades
  - Third party valuations
  - Survey data
- Reconciliation of expected vs. actual cash flows (see figure to the right)
- Detailed support for changes in the valuation process
- Support for prepayment estimates used in determination of fair value

### Modeled vs. Actual Cash Flow Analysis

<table>
<thead>
<tr>
<th></th>
<th>Modeled</th>
<th>Actual</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Service Fee Revenue</td>
<td>$229,003</td>
<td>$212,205</td>
<td>($16,798)</td>
</tr>
<tr>
<td>Prepaid Interest Lost</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Net Service Fee Revenue</strong></td>
<td>$229,003</td>
<td>$212,205</td>
<td>($16,798)</td>
</tr>
<tr>
<td>Net Float Income</td>
<td>$5,424</td>
<td>$4,975</td>
<td>($449)</td>
</tr>
<tr>
<td>Ancillary Income*</td>
<td>$11,452</td>
<td>$9,500</td>
<td>($1,952)</td>
</tr>
<tr>
<td><strong>Total Ancillary &amp; Late Fee Income</strong></td>
<td>$11,452</td>
<td>$9,500</td>
<td>($1,952)</td>
</tr>
<tr>
<td>Base Cost to Service</td>
<td>($21,299)</td>
<td>($25,250)</td>
<td>($3,951)</td>
</tr>
<tr>
<td>Delinquency/Foreclosure Costs</td>
<td>($537)</td>
<td>($757)</td>
<td>($220)</td>
</tr>
<tr>
<td><strong>Total Cost to Service</strong></td>
<td>($21,836)</td>
<td>($26,007)</td>
<td>($4,171)</td>
</tr>
<tr>
<td>Net Income</td>
<td>$224,043</td>
<td>$200,673</td>
<td>($23,370)</td>
</tr>
</tbody>
</table>

*Phoenix model includes late fee income in ancillary income
### Sample MSR Valuation Report

<table>
<thead>
<tr>
<th>Agency</th>
<th>Type</th>
<th>Term</th>
<th>NoteRange</th>
<th>Loans</th>
<th>UPB</th>
<th>AvgBal</th>
<th>IntRate</th>
<th>SvcFee</th>
<th>Age</th>
<th>Price$</th>
<th>Price%</th>
<th>Mult</th>
<th>Yield</th>
<th>Setup</th>
<th>AncInc</th>
<th>CCY</th>
<th>Vol</th>
<th>CPR</th>
<th>PSA</th>
<th>Invol</th>
<th>CDR</th>
<th>AvgLifeCPR</th>
<th>AvgLifeYrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 4.501 -&gt; 4.750</td>
<td>142</td>
<td>40,819,874</td>
<td>286,055</td>
<td>3.157</td>
<td>0.2500</td>
<td>9.50</td>
<td>60</td>
<td>7</td>
<td>479,476</td>
<td>1.1804</td>
<td>4.7216</td>
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<td>60</td>
<td>7</td>
<td>45</td>
<td>3.528</td>
<td>7.85</td>
<td>131</td>
<td>0.40</td>
<td>7.89</td>
<td>8.3</td>
<td></td>
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<tr>
<td>FNMA MBS FIXED</td>
<td>30 4.751 -&gt; 5.000</td>
<td>611</td>
<td>160,540,625</td>
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<td>60</td>
<td>7</td>
<td>1,727,668</td>
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<td>60</td>
<td>7</td>
<td>45</td>
<td>3.528</td>
<td>9.62</td>
<td>160</td>
<td>0.40</td>
<td>9.85</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 5.001 -&gt; 5.250</td>
<td>715</td>
<td>162,089,621</td>
<td>226,699</td>
<td>3.587</td>
<td>0.2500</td>
<td>9.50</td>
<td>60</td>
<td>7</td>
<td>1,583,318</td>
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<td>60</td>
<td>7</td>
<td>45</td>
<td>3.528</td>
<td>11.45</td>
<td>191</td>
<td>0.39</td>
<td>11.81</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 5.251 -&gt; 5.500</td>
<td>369</td>
<td>81,965,689</td>
<td>222,129</td>
<td>3.815</td>
<td>0.2500</td>
<td>9.50</td>
<td>60</td>
<td>7</td>
<td>732,617</td>
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<td>9.50</td>
<td>60</td>
<td>7</td>
<td>45</td>
<td>3.528</td>
<td>13.31</td>
<td>222</td>
<td>0.38</td>
<td>13.75</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 5.501 -&gt; 5.750</td>
<td>96</td>
<td>18,923,835</td>
<td>197,123</td>
<td>4.057</td>
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<td>7</td>
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<td>60</td>
<td>7</td>
<td>45</td>
<td>3.528</td>
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<td>252</td>
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<tr>
<td>FNMA MBS FIXED</td>
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<td>4,069,580</td>
<td>193,790</td>
<td>4.253</td>
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<td>7</td>
<td>29,349</td>
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<td>9.50</td>
<td>60</td>
<td>7</td>
<td>45</td>
<td>3.528</td>
<td>17.96</td>
<td>299</td>
<td>0.35</td>
<td>18.52</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 &lt;= 4.5</td>
<td>46</td>
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<td>262,430</td>
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<td>60</td>
<td>7</td>
<td>151,979</td>
<td>1.2500</td>
<td>5.0359</td>
<td>9.50</td>
<td>60</td>
<td>7</td>
<td>45</td>
<td>3.528</td>
<td>6.51</td>
<td>109</td>
<td>0.41</td>
<td>6.36</td>
<td>9.1</td>
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</tbody>
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** ** ** ** 2,000 | 480,280,995 | 240,140 | 3.528 | 0.2500 | 0 | 4,858,046 | 1.0117 | 4.0467 | 9.50 | 60 | 7 | 45 | 3.528 | 10.92 | 182 | 0.39 | 11.23 | 6.8 |

<table>
<thead>
<tr>
<th>Agency</th>
<th>Type</th>
<th>Term</th>
<th>NoteRange</th>
<th>P1 Days</th>
<th>Ppay Days</th>
<th>Days Lost</th>
<th>Avg Esc</th>
<th>IOE</th>
<th>Delq 30%</th>
<th>Delq 60%</th>
<th>Delq 90%</th>
<th>FC%</th>
<th>D30 Cost</th>
<th>D60 Cost</th>
<th>D90 Cost</th>
<th>FC Cost</th>
<th>Float Eam %</th>
<th>Escrow Eam %</th>
<th>Adv Cost %</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 4.501 -&gt; 4.750</td>
<td>13</td>
<td>30</td>
<td>12</td>
<td>0.65</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100</td>
<td>200</td>
<td>500</td>
<td>750</td>
<td>0.47</td>
<td>0.81</td>
<td>0.97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 4.751 -&gt; 5.000</td>
<td>13</td>
<td>30</td>
<td>12</td>
<td>0.65</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100</td>
<td>200</td>
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<td>0.81</td>
<td>0.97</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>FNMA MBS FIXED</td>
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<td>12</td>
<td>0.65</td>
<td>0.00</td>
<td>0.00</td>
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<td>0.00</td>
<td>100</td>
<td>200</td>
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<td>0.81</td>
<td>0.97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 5.251 -&gt; 5.500</td>
<td>13</td>
<td>30</td>
<td>12</td>
<td>0.65</td>
<td>0.00</td>
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<td>0.81</td>
<td>0.97</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 5.501 -&gt; 5.750</td>
<td>13</td>
<td>30</td>
<td>12</td>
<td>0.65</td>
<td>0.00</td>
<td>0.00</td>
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<td>0.00</td>
<td>100</td>
<td>200</td>
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<td>0.81</td>
<td>0.97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 5.751 -&gt; 6.000</td>
<td>13</td>
<td>30</td>
<td>12</td>
<td>0.65</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100</td>
<td>200</td>
<td>500</td>
<td>750</td>
<td>0.47</td>
<td>0.81</td>
<td>0.97</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>FNMA MBS FIXED</td>
<td>30 &lt;= 4.5</td>
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<td>30</td>
<td>12</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100</td>
<td>200</td>
<td>500</td>
<td>750</td>
<td>0.47</td>
<td>0.81</td>
<td>0.97</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** ** ** ** 13 | 30 | 12 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100 | 200 | 500 | 750 | 0.47 | 0.81 | 0.97 |

Independent valuation by a 3rd party with knowledge of MSR pricing and activity is viewed as a key component in validating the fair value of MSR portfolios.
Sample Economic MSR Retained Grids

» Customized using originator’s economics
» Adjusted for balance, state, escrow, product, fico, ltv, interest rate
» Updated monthly, quarterly, or semi-annually
» Used in a variety of ways:
  » Capitalization
  » Hold/Sell decisions
  » Pricing loans
  » Buying MSR
The documentation of the assumptions used in the valuation of an MSR portfolio is an on-going process and best practices include comparing the internal to external assumptions, including:

- Clear documentation around the source of assumptions, frequency of updates, last update and next scheduled update (update does not necessarily mean change)
- Documentation of the parallel testing of new assumptions
- Documentation of not only the final assumptions, but also other items considered and tested but not necessarily implemented
  - Helps to answer auditor/regulator “what if” questions
- Documentation of the approval process for new assumptions
- Involves complex modeling and reliance on assumptions and estimates that management must support
- At a minimum, should include prepayment speeds, discount rate (OAS), cost to service, ancillary and escrow earnings rate

<table>
<thead>
<tr>
<th>Product</th>
<th>Assumption</th>
<th>Internal Valuation (9/30)</th>
<th>9/30 Valuation External (1)</th>
<th>9/30 Valuation External (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNMA/FHLMC 30 Year Fixed</td>
<td>CPR (Life)</td>
<td>10.2</td>
<td>9.1</td>
<td>12.4</td>
</tr>
<tr>
<td>FNMA/FHLMC 15 Year Fixed</td>
<td>CPR (Life)</td>
<td>14.6</td>
<td>12.2</td>
<td>16</td>
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<tr>
<td>GNMA 30 Year Fixed</td>
<td>CPR (Life)</td>
<td>11.1</td>
<td>11.5</td>
<td>12.2</td>
</tr>
<tr>
<td>GNMA 15 Year Fixed</td>
<td>CPR (Life)</td>
<td>16.8</td>
<td>13.7</td>
<td>18.4</td>
</tr>
</tbody>
</table>
In addition to tracking the assumptions, best practice is to develop a history of the ranges used both internally and externally.
Key Assumption: Prepayment Speeds

The prepayment speed estimate is a key assumption used in the determination of the fair value for MSRs, therefore additional scrutiny and documentation is required.

- Documentation of the source of prepayment estimate and calibration process
  - Tolerances around modeled to actual speeds
  - Historical performance of modeled to actual speeds
- Common sources of prepayment estimates include:
  - Industry recognized models such as Andrew Davidson ("AD-CO") or the AFT Model (owned by Black Knight)
- Prepayment models require constant monitoring and calibration
A variety of sources now exist to obtain actual servicer level prepayment speeds. Best practices include comparing company specific prepayments to the total cohort and a consistent subset of peers.

<table>
<thead>
<tr>
<th>Product</th>
<th>Vintage</th>
<th>Company</th>
<th>Peer 1</th>
<th>Peer 2</th>
<th>Peer 3</th>
<th>Peer 4</th>
<th>Peer 5</th>
<th>Peer 6</th>
<th>Total Cohort</th>
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<tr>
<td>FNMA 3.0</td>
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<td>3.1</td>
<td>3.4</td>
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<td>2014</td>
<td>6.2</td>
<td>6.0</td>
<td>6.3</td>
<td>8.7</td>
<td>9.0</td>
<td>9.3</td>
<td>5.8</td>
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</tr>
<tr>
<td></td>
<td>2013</td>
<td>5.4</td>
<td>5.2</td>
<td>5.5</td>
<td>7.9</td>
<td>8.2</td>
<td>8.5</td>
<td>4.6</td>
<td>5.1</td>
</tr>
<tr>
<td>FNMA 3.5</td>
<td>2015</td>
<td>3.7</td>
<td>4.8</td>
<td>3.8</td>
<td>3.8</td>
<td>4.8</td>
<td>3.8</td>
<td>4.8</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>12.3</td>
<td>12.1</td>
<td>11.7</td>
<td>11.7</td>
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<td>2013</td>
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<td>7.9</td>
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<td>7.7</td>
</tr>
<tr>
<td>FNMA 4.0</td>
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<td>3.5</td>
<td>3.2</td>
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<td>2.6</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>14.9</td>
<td>15.1</td>
<td>14.8</td>
<td>12.4</td>
<td>12.1</td>
<td>11.8</td>
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<td>14.4</td>
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<td></td>
<td>2013</td>
<td>15.0</td>
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<td>12.5</td>
<td>12.2</td>
<td>11.9</td>
<td>11.6</td>
<td>14.1</td>
</tr>
</tbody>
</table>
Tracking Prepayments

Modeled to Actual Speeds

- Modeled CPR
- Actual CPR
- Absolute Variance
Implementation of New Assumptions

The implementation and timing of new assumptions in the official valuation must be considered:

- For entities that hedge the MSR asset, the change in assumptions may impact the base value, but more importantly the shock profile
  - Providing adequate time to test and understand the profile changes is critical
  - The interplay of assumption changes as rates move and more time to test is better to understand the impact (both expected and unexpected)
- Changing the assumptions can have a ripple impact on the production side of the business as the SRP premiums are likely impacted
  - Providing adequate time to implement changes to the SRP helps make the transition more seamless
MSR Market Overview
Mortgage servicing rights (MSRs) were actively traded between banks
- Only purchased MSRs were recognized on the balance sheet as an asset
- MSR sale transactions occurred between banks to recognize stored value (gain)
- Originated MSRs became an on balance sheet asset during the mid 1990’s
  - No longer needed to sell MSRs to recognize MSR gains
- Buyers of MSRs were typically banks
- Emergence of the flow / co-issue market (versus traditional bulk transactions)

Servicing transaction market was active in both bulk and flow through mid 2008
- Servicing was viewed as “core product” by banks
- Large bank aggregators became more and more dominant buyers
  - Aggregators attempted to force sellers into a correspondent relationship
- Fair value accounting option for MSRs was implemented
- Refinance boom of 2002/2003 followed by several years of “product innovation”
- Financial crisis struck in late 2008
Historical Perspective – MSR Market

- Very quiet period for MSR transactions with very few MSR trades
- MSR portfolios that were “sold” occurred at distressed prices
- Flow values dipped below a 3 multiple of servicing fee for new Fannie Mae/ Freddie Mac 30 year fixed rate production
- Internal focus by servicers on “legacy servicing issues”
- Aggregators backed away from broker and correspondent production channels

- MSR market has returned with emergence of new buyers
- Private equity funded buyers dominate the market
- Significant demand for new production
- Bulk market for recent originations or legacy servicing is active
- Originators that traditionally delivered to the aggregators, who are now delivering to the agencies, have become either investors in servicing or flow sellers of servicing
Servicing Portfolio Trends

Non banks are the fastest growing servicers year over year. Due to impact of legacy/delinquent servicing and BASEL III concerns, many banks have reduced greatly their MSR portfolios.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
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<td>115</td>
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<td>3.6%</td>
<td>7%</td>
</tr>
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<td>(0.6%)</td>
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<td>Regions</td>
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<td>26</td>
<td>(1.4%)</td>
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<td>Wells Fargo</td>
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<td>1,405</td>
<td>1,374</td>
<td>1,344</td>
<td>1,323</td>
<td>1,300</td>
<td>(1.7%)</td>
<td>-7.5%</td>
<td>-12%</td>
</tr>
<tr>
<td>Fifth Third</td>
<td>89</td>
<td>65</td>
<td>64</td>
<td>62</td>
<td>60</td>
<td>59</td>
<td>(1.7%)</td>
<td>-9.2%</td>
<td>-14%</td>
</tr>
<tr>
<td>Chase</td>
<td>816</td>
<td>752</td>
<td>724</td>
<td>723</td>
<td>703</td>
<td>674</td>
<td>(4.1%)</td>
<td>-10.3%</td>
<td>-17%</td>
</tr>
<tr>
<td>PHH</td>
<td>129</td>
<td>113</td>
<td>109</td>
<td>105</td>
<td>102</td>
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<td>(2.8%)</td>
<td>-12.2%</td>
<td>-23%</td>
</tr>
<tr>
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<td>-18.1%</td>
<td>-30%</td>
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<td>199</td>
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<td>-11.8%</td>
<td>-31%</td>
</tr>
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<td>474</td>
<td>459</td>
<td>409</td>
<td>391</td>
<td>378</td>
<td>(3.3%)</td>
<td>-20.3%</td>
<td>-31%</td>
</tr>
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<td>Everbank</td>
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<td>41</td>
<td>39</td>
<td>35</td>
<td>35</td>
<td>31</td>
<td>(10.4%)</td>
<td>-24.4%</td>
<td>-41%</td>
</tr>
</tbody>
</table>

Total            | 5,030   | 4,740   | 4,643   | 4,508   | 4,193   | 4,116   |                              |                               |                               |
Selling MSRs

Management should periodically review, validate and document its decision to retain or sell servicing as conditions can change rapidly and have a material impact on the MSR value.

Factors that influence a decision to retain versus sell include:

- Market prices
- Internal return metrics
- Management’s interest rate tolerance
- Strategic considerations including the use of internal versus external servicers
- Capital management concerns

Servicing can be sold either on a bulk or flow basis. Each transaction type comes with a different set of operational and interest rate risks that must be understood by management.
Flow vs. Bulk Transactions

Advantages of Flow/Co-Issue Transaction

- Monthly sales reduce interest rate risk; there is a lag, but production is following current coupon
  - Buyer can protect against interest rate movements in the pricing grid
  - Seller can price in expected MSR price
  - Sellers avoid having to sell large portfolios for cash in falling interest rate environments
- Significant upfront effort and expense fosters long-term relationships
- Requires small initial cash outlay for buyer
- Avoids boarding and de-boarding fees

Advantages of Bulk Transaction

- Known characteristics are simpler to price
- Buyer has ability to gain scale immediately
- Seller can raise significant cash at one time
  - Buyer can more easily plan for a one time cash outlay
- Seller can arbitrage in times of rising interest rates
- Transaction structure is simpler for both sides
- Seller can strategically dispose of particular segments of a portfolio if a suitable buyer can be found (ie, particular states or products, delinquent loans, etc)
2015 brought about changes in the MSR market that are accelerating in 2016:

- 2015 reflected a balanced market between buyer demand and seller supply
- 2016 market favors buyers as demand wanes while supply remains steady
  - Several PE buyers have retrenched pricing and/or exited/paused acquisitions
  - Interest rate risk and market volatility along with subdued capital raising prospects among PE firms have decreased buyer appetite
  - GNMA liquidity declined sharply in the second half of 2015 and remains challenging
- Liquidity is present, but overall deal success rate continues to decline from 2014/15 levels
  - Realistic pricing expectations are imperative
  - Bid/ask spreads have widened to the 5-10bp range leading to many failed trades
  - Generally only mortgage bankers needing cash are completing deals in today’s market
MSR Market Overview 2016

- Buyer demand dependent on counterparty, deal size and loan-level attributes
  - Flow buyers paying more attention to current relationships and less aggressive bidding new deals
  - Buyers revisiting returns on 2015 deliveries and adjusting models and grids to better match expectations going forward
- A wider dispersion of bid levels across all MSR deal classes
- MSR financing continues to create an alternative source of generating cash (vs an outright sale)
- Some (large) sellers have had success selling the MSR but subserving for the buyer to retain economies of scale on their platform; achieving sale treatment is a hurdle
- Excess Servicing Fee Transactions (IO Strip Sale) – selling a portion of the 25bps servicing strip to an investor
Summary Observations for Holders & Sellers

- **Valuation Process**: As a result of an active MSR market, the demand for valuations (often multiple valuations) by auditors and regulators to ensure values are calibrated appropriately to the most recent market activity has increased substantially.

- **Managing the MSR Asset**: In addition to greater emphasis on the valuation process, the overall management of the MSR asset and documentation of assumptions, oversight and valuation process including vendor management.

- **Servicing Compliance**: Active monitoring including an annual audit of the subservicer is required and must be performed on a periodic basis to ensure initial and ongoing compliance with servicing standards.

- **Data**: Quality of images and completeness of files along with managing the document custodian are important to reduce risk of losses from repurchase requests.

- **Type of Transaction**: Understanding the benefits and risks of co-issue/flow vs bulk transactions and integrations within a long-term strategy.

- **Sale Selection Process**: Particularly relevant for bulks, understanding the risks of what is to be sold vs retained is critical. Investor/guarantor approvals are also important to understand.

- **Market Conditions**: Buy side demand is not consistent. Understanding buyer appetite and strategies as well as how to slot deals in the market has become more critical.

- **Data**: The data requirements vary across buyers and understanding the impact on the overall price and execution is critical.

- **Bid Analysis**: The difference between the gross and net price is the initial layer of the analysis, but within a co-issue, a number of additional factors must be included in order to determine the best execution.
Historic MSR Flow Pricing: Conventional

Historic Conventional MSR Market Pricing (FRM 30yr at Par)
Historic MSR Flow Pricing: Government

Historic FHA MSR Market Pricing (FRM 30yr at Par)
Phoenix Team and Contact
Brett H. Schaffer, President of Phoenix Capital, Inc. and Phoenix Analytic Services, Inc., has over 30 years of mortgage banking experience including over 25 years in the mortgage servicing brokerage industry. During this period, Brett has managed several hundred bulk and flow servicing transactions amounting to over a trillion dollars in principal balance.

Brett co-founded Phoenix Capital, Inc. and Phoenix Analytic Services, Inc. and has been instrumental in developing both companies into top-tier brokerage, analytic, and consulting firms. Brett has developed a solid and long-term client base with his reputation for maintaining his clients’ objectives first and emphasizing a level-headed approach to negotiating transactions while pushing Phoenix clients to deal practically with market realities in managing the mortgage servicing right (MSR) asset. Prior to co-founding Phoenix Capital, Inc., Brett spent four years with United Financial, Inc. and five years with John S. Hopkins, Inc., both servicing brokerage firms.

Brett began his career in Secondary Marketing with Prudential Home Mortgage in 1985 after graduating from the University of Virginia.

Dean H. DeMeritte, Executive Vice President of Phoenix Capital, Inc. and Phoenix Analytic Services, Inc., has over 30 years in the mortgage banking industry and has been with Phoenix for over fifteen years. His responsibilities at Phoenix include management of the Transaction Advisory and Transaction Management Teams, as well as managing all strategic and high level analytics performed, including 3rd party MTM and valuing servicing rights for sales/acquisitions.

Prior to Phoenix, he was with Fleet Mortgage as Vice President of Portfolio Transactions. He has also worked at Harbor Financial Mortgage Corp., Banc One Mortgage, Banc Plus Mortgage, Chemical Mortgage and J.I. Kislak Mortgage. His expertise includes buying and selling mortgage servicing rights, contract negotiations, company acquisitions, strategic planning, finance and accounting. In addition, he was a principal with a mortgage production company.

Dean has a B.S. in marketing from the University of Maryland and has an MBA with a concentration in Finance from Duke University.
Stephen Fleming, Senior Vice President, Phoenix Capital, Inc.

Stephen B. Fleming, Senior Vice President, joined the Phoenix team in 2011 and helps lead the strategic business development, client management and industry relations groups. Stephen’s responsibilities span bulk and flow servicing transactions, MSR analytics including best execution engagements, and M&A activity. Prior to joining Phoenix, Stephen was a Senior Credit Trader at Fannie Mae in Washington DC, working on both the bulk and flow Pricing Strategy teams. He began his career at JP Morgan Chase as an Assistant Vice President. Stephen is a frequent industry speaker, including various MBA Conferences and the Fannie Mae Lender Forums. In addition to being a Georgetown University MBA honors graduate, Stephen holds a Finance and Accounting Certification from UPenn’s Wharton School of Business and a BA degree in Mathematics and Economics from the College of the Holy Cross.

Rod Schluter, Senior Vice President, Phoenix Capital, Inc.

Rodney L. Schluter, Senior Vice President, joined the Phoenix family in 2013. Rod’s primary duties at PCI include advising on the sale, acquisition, and valuation of MSR portfolios, with emphasis on new client development and management. Rod also has business development and cross marketing strategy duties with other companies in the Phoenix family, including Phoenix Analytic Services, and MSR valuation and analytics firm, Phoenix Asset Management, and REO and short sale service provider, Phoenix Whole Loan Solutions, an active investor in whole loans and Phoenix Collateral Advisors, an operational and loan-level due diligence firm. Previously, Rod worked at United Financial, Matrix Bancorp and MountainView Capital where he was responsible for the strategic management of MSR portfolios on behalf of his clients, as well as the sale and acquisition of residential whole loan portfolios. Rod brings over 22 years of mortgage banking experience to the Phoenix companies and is a graduate of the University of Northern Colorado with a degree in Finance.

Seth D. Sprague, CMB, Senior Vice President, Phoenix Capital, Inc.

Seth D. Sprague, CMB, Senior Vice President, has been with Phoenix since early 2013 after more than ten years with SunTrust Mortgage managing their mortgage servicing rights portfolio valuation process as well as their periodic MSR transaction activity. Seth’s primary duties at Phoenix include managing bulk and flow MSR transactions, advising on analytic and valuation strategies, and participating in strategic business development activities as the MSR market continues to evolve. Seth has a total of over 17 years of mortgage banking and servicing valuation experience at a variety of firms including SunTrust Mortgage, Bank of America Mortgage, United Financial / Matrix Financial and KPMG LLP. Seth is a frequent speaker with the MBA’s School of Mortgage Banking Program and holds an MBA from the University of Colorado – Denver and an undergraduate degree from the University of Richmond with a concentration in Accounting.
Brady DuPuis, Senior Vice President, Phoenix Capital, Inc.

Brady J. DuPuis, Senior Vice President, has been with Phoenix for more than ten years where he leads the Transaction Management Team for PCI after serving as a senior analyst for Phoenix Analytic Services, Inc., where he focused on mark-to-market valuations, modeling servicing release premium schedules, and performing various detailed analyses of flow and bulk servicing transactions for both buyers and sellers of MSRs. Brady has extensive experience in valuing all types of mortgage servicing products, including agency, non-agency, subprime, scratch and dent, and reverse mortgages as well as experience using the top industry valuation software and the ADCO prepayment model. Brady brings in-depth experience and understanding of the valuation process to the client management team. Brady has an MBA from the University of Colorado – Denver and an undergraduate degree in Business Administration from Fort Lewis College.

Erin Gilbride, Senior Vice President, Phoenix Capital, Inc.

Erin L. Gilbride, Senior Vice President, joined Phoenix in 2005 and is currently a senior member of Transaction Advisory Team after spending the majority of her tenure with Phoenix leading the Transaction Management Team for PCI, including comprehensive bid analysis of gross vs. net price encompassing key economic terms, negotiation of bid letter and purchase and sale contracts, optimization of sales strategy and facilitation of marketing process. Erin's expertise in all functions associated with comprehensive deal management has been instrumental in developing Phoenix's industry leading Transaction Management Team. Erin's ability to innovate creative deal terms in a difficult trading environment to satisfy both buyer and seller has led to her reputation as a trusted client manager. Erin has a BS in Management Information Systems and an MBA from Ohio University.

Jeff Boyd, Senior Vice President Phoenix Analytics Services, Inc.

Jeffrey S. Boyd, Senior Vice President, leads the day-to-day management of Phoenix Analytic Services, Inc. (PAS) and has been with PAS for over fourteen years. In addition to the training and oversight of all PAS staff, Jeff is directly involved with all analytic-related engagements. His primary responsibilities include servicing portfolio valuations (mark-to-markets), acquisition analyses, servicing released premium (SRP) schedule development, economic hold/sell analysis, FASB 140 accounting and impairment outsourcing services and the modeling of bulk and flow servicing transactions. Prior to joining Phoenix, he worked with Commercial Federal. He holds a BS in Finance from the University of Colorado.
Kathryn M. Ferriman, Vice President, Phoenix Analytics Services, Inc.

Kathryn M. Ferriman, Vice President of Phoenix Analytic Services, Inc., joined PAS in 2007. Her primary responsibilities include the management and training of PAS analysts, as well as overseeing MSR portfolio valuation and MSR Accounting outsourcing services. She is also actively involved in the valuation of bulk transactions. Kathryn has a B.S.B.A. in International Business and an M.A. with a concentration in Statistics, both from the University of Denver.

John Burnett, President, Phoenix Collateral Advisors, Inc.

John Burnett, President of Phoenix Collateral Advisors, has 20 years of mortgage banking and servicing experience. During the period, John has overseen the servicing management of hundreds of thousands of loans, and more than ten thousand real estate liquidations. John has worked closely with Wall Street Investment firms and GSEs to execute loan retention and liquidation strategies. Throughout John’s career, he has focused on providing clients with asset level solutions rather than task management metrics. Prior to joining the Phoenix Family of Companies, John held executive and senior leadership positions with Integrated Asset Services, Statebridge Company, IBM/Seterus and Wilshire Credit Corporation/Merrill Lynch.
Don’t hesitate to contact us!

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