Overview of the Mortgage-Backed Securities Markets

Presented By
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Director, Mortgage Finance
Citigroup Global Markets
Agenda

Market Overview

Agency and Non-Agency Market Sector

Analyzing MBS

Role of Mortgage Finance at Citigroup Global Markets

Questions
Market Overview
Mortgage-Backed Securities Market

• Constitutes the largest sector of the bond market with more than $5.3 trillion outstanding

• Core holding of almost all U.S. institutional fixed-income investors

• Wall Street dealers trade hundreds of billions of dollars of mortgage backed securities every day

• Largest market segment consists of securities backed by residential mortgage loans

*However, the complexity and variety of these securities means that very few people in the financial industry have a detailed understanding of their characteristics*
## Relative Size of US Debt Sectors

### (Dollars in Trillions)

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Mortgage Debt</td>
<td>$9.465</td>
</tr>
<tr>
<td>Single Family Mortgage Debt</td>
<td>7.282</td>
</tr>
<tr>
<td>Mortgage-Backed Securities(1)</td>
<td>5.357</td>
</tr>
<tr>
<td>Corporate</td>
<td>4.569</td>
</tr>
<tr>
<td>U.S. Treasury(2)</td>
<td>3.755</td>
</tr>
<tr>
<td>Fed Agencies</td>
<td>2.725</td>
</tr>
<tr>
<td>Money Market(3)</td>
<td>2.648</td>
</tr>
<tr>
<td>Asset-Backed(4)</td>
<td>1.771</td>
</tr>
</tbody>
</table>

### Source – Bond Market Association

(1) Includes GNMA, FNMA and FHLNC MBS and CMOs and non-agency MBS/CMOs
(2) Interest bearing marketable public debt
(3) Includes commercial paper, banker’s acceptance and large time deposits
(4) Includes public and private placements
What are Mortgage-Backed Securities ("MBS")?

Definition: *Securities entitled to the cash flow from a specific pool of mortgage loans.*

**Characteristics**

- Payment received on the assets and paid on the securities are made monthly
- Payments include interest and principal (scheduled and unscheduled)
- Cash flows are channeled to investors in two ways:
  - Passed through to investors (a pass-through security)
  - Allocated according to specific rules (structured securities such as collateralized mortgage obligations)
## Factors Influencing the Development of MBS Market

<table>
<thead>
<tr>
<th>Mortgage Loans</th>
<th>Economic Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Unique characteristics of each loan</td>
<td>• Financial institutions desire to sell fixed-rate, long-term assets</td>
</tr>
<tr>
<td>• Relatively illiquid</td>
<td>• Growing market share of mortgage bankers with little interest and limited capability to hold mortgage loans</td>
</tr>
<tr>
<td>• Unrated</td>
<td>• Supply/Demand imbalance for mortgage loans</td>
</tr>
<tr>
<td>• High geographic and economic concentrations in portfolios</td>
<td></td>
</tr>
<tr>
<td>• Cumbersome and expensive to sell/buy whole loans</td>
<td></td>
</tr>
</tbody>
</table>

Securitization is a means of turning illiquid assets into liquid securities, creating an efficient tool for balance sheet management.
In 1970 the Government National Mortgage Association ("Ginnie Mae") guaranteed the first mortgage-pass through security.

Fannie Mae and Freddie Mac closely followed Ginnie Mae with their own issuance of pass-through MBS.

The non-agency market developed several years later, primarily as funding tool for mortgage bankers.
Benefits of Mortgage Securitization

• Attracts new capital to the market, improves overall liquidity and keeps rates low

• Stabilizes the U.S. housing finance system by shifting interest rate and credit risk from banks and thrifts to broader investors that are often better able to diversify and hedge

• Made homeownership available to more buyers – 69.2% of Americans own their homes
Benefits of Investing in MBS

**Higher Returns:** – Significantly higher yields (+100bps) over Treasuries and comparable-quality corporate bonds

**Credit Quality:** – Ginnie Mae MBS are backed by the full faith and credit of the US government, Fannie Mae and Freddie Mac which have close ties to the US Government are perceived as minimal risk investments and private MBS typically are rated AAA

**Variety of Investment Profiles:** – Sector provides the widest range of investment characteristics, including durations, coupons, indices, and prepayment sensitivities

**Liquidity:** – The outstanding MBS supply, trading volume and involvement of major dealers provides an active and liquid market for most MBS

**Analytic Tools:** – Sophisticated analytical models for evaluating MBS provide an in-depth understanding of the mortgage cash flows and characteristics
Agency and Non-Agency Market Sectors
Two Primary Sectors of the MBS Market

**Agency Market**
- Underlying loans conform to Agency guidelines
- Securities guaranteed by the issuer
- Securities carry triple-A ratings based upon U.S. government guaranty (Ginnie Mae) or implied support (Fannie Mae and Freddie Mac)
- Largest and most liquid part of the MBS market

**Non-Agency Market**
- Underlying loans typically DO NOT conform to Agency guidelines
- No guarantee, bonds independently credit enhanced.
- Covers complete spectrum of borrowing demographics and credit characteristics
- Highly rated bonds, with most of the structure rated triple –A
- Large and diverse sector of the market
Agency Sector
# Agency Market

<table>
<thead>
<tr>
<th>Types of Mortgages</th>
<th>Ginnie Mae</th>
<th>Fannie Mae</th>
<th>Freddie Mac</th>
</tr>
</thead>
<tbody>
<tr>
<td>FHA/VA</td>
<td></td>
<td>Conventional (Some FHA/VA)</td>
<td>Conventional (Some FHA/VA)</td>
</tr>
<tr>
<td>Guarantee</td>
<td>Timely payment of interest and principal</td>
<td>Timely payment of interest and principal</td>
<td>Timely payment of interest and principal</td>
</tr>
<tr>
<td>Guarantor</td>
<td>U.S. Government</td>
<td>Fannie Mae</td>
<td>Freddie Mac</td>
</tr>
<tr>
<td>Currently Outstanding (in Billions)</td>
<td>$457.3</td>
<td>$1,879.0</td>
<td>$1,189.7</td>
</tr>
</tbody>
</table>

**Main Collateral Types**
- • 30 Yr Fixed Ginnie I
- • Ginnie II
- • 15 Yr Fixed Ginnie I
- • Ginnie II
- • ARMs
- • Projects
- • 30 Year Fixed
- • 15 Year Fixed
- • Balloons
- • ARMs
- • Multifamily
- • 30 Year Fixed
- • 15 Year Fixed
- • Balloons
- • ARMs
- • Multifamily
Agency Market

Agency Issuance and Outstandings

- Ginnie Mae
- Fannie Mae
- Freddie Mac
- Ginnie Mae Outstanding
- Fannie Mae Outstanding
- Freddie Mac Outstanding
Agency Trading

**To-Be-Announced (TBA) Pools**
- Most common agency trade
- Buyer and seller decide on trade parameters, but exact pools are unknown to the buyer until two days before settlement
- TBA market facilitates liquidity in pass-through trading, as most individual pools are small

**Specified Pools**
- Buyers know exactly which pools they are buying and its relevant characteristics
- Specified pools typically trade at a premium to TBAs due to the certainty

**Pass-Through Vintages**
- Investors specify a particular loan origination year. Buyer may specify 2003 30-year Fannie 5’s.
- Extra certainty of prepayment characteristics results in pools trading at a premium to TBAs
## Agency TBA Pricing

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Telerate - US MBS</th>
<th>09/28 15:44</th>
<th>7105</th>
</tr>
</thead>
</table>

### 30-Year Fixed Rate MBS Indications

<table>
<thead>
<tr>
<th>Month</th>
<th>GN 6.0</th>
<th>OCT 103.23-25 -0.01</th>
<th>FN 6.0</th>
<th>OCT 103.17-19 -0.01</th>
<th>GOLD</th>
<th>OCT 103.13-15 -0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCT</td>
<td>103.23-25 -0.01</td>
<td>FN 6.0</td>
<td>OCT 103.17-19 -0.01</td>
<td>[GOLD] OCT 103.13-15 -0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOV</td>
<td>103.14-16 -0.01</td>
<td>NOV 103.03-05 -0.01</td>
<td>6.0</td>
<td>NOV 103.03-05 -0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEC</td>
<td>103.04-06 -0.01</td>
<td>DEC 102.22-24 -0.01</td>
<td>6.0</td>
<td>DEC 102.23-25 -0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JAN</td>
<td>102.26-28 -0.01</td>
<td>JAN 102.09-11 -0.01</td>
<td>6.0</td>
<td>JAN 102.11-13 -0.01</td>
<td></td>
<td></td>
</tr>
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</table>

### MBS Indications

<table>
<thead>
<tr>
<th>Month</th>
<th>OCT GNMA</th>
<th>OCT FNMA</th>
<th>OCT PC GOLD</th>
<th>TREASURY (BID)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCT</td>
<td>103.23-25 -0.01</td>
<td>103.17-19 -0.01</td>
<td>103.13-15 -0.01</td>
<td>5Y 100.15 +0.01</td>
</tr>
<tr>
<td>NOV</td>
<td>103.14-16 -0.01</td>
<td>103.03-05 -0.01</td>
<td>103.03-05 -0.01</td>
<td>10Y 101.30+ -0.03+</td>
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<tr>
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<td>102.22-24 -0.01</td>
<td>102.23-25 -0.01</td>
<td>30Y 108.19+ -0.13</td>
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<tr>
<td>JAN</td>
<td>102.26-28 -0.01</td>
<td>102.09-11 -0.01</td>
<td>102.11-13 -0.01</td>
<td>DJIA</td>
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### 5Y TREASURY

<table>
<thead>
<tr>
<th>Month</th>
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<th>OCT FNMA</th>
<th>OCT PC GOLD</th>
<th>TREASURY (BID)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCT</td>
<td>103.23-25 -0.01</td>
<td>103.17-19 -0.01</td>
<td>103.13-15 -0.01</td>
<td>5Y 100.15 +0.01</td>
</tr>
<tr>
<td>NOV</td>
<td>103.14-16 -0.01</td>
<td>103.03-05 -0.01</td>
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<td>10Y 101.30+ -0.03+</td>
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<tr>
<td>DEC</td>
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<td>30Y 108.19+ -0.13</td>
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<tr>
<td>JAN</td>
<td>102.26-28 -0.01</td>
<td>102.09-11 -0.01</td>
<td>102.11-13 -0.01</td>
<td>DJIA</td>
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### 30Y TREASURY

<table>
<thead>
<tr>
<th>Month</th>
<th>OCT GNMA</th>
<th>OCT FNMA</th>
<th>OCT PC GOLD</th>
<th>TREASURY (BID)</th>
</tr>
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<td>102.23-25 -0.01</td>
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<td>102.09-11 -0.01</td>
<td>102.11-13 -0.01</td>
<td>DJIA</td>
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</tbody>
</table>

### Currencies

<table>
<thead>
<tr>
<th>Currency</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPY</td>
<td>111.36-41</td>
</tr>
<tr>
<td>EUR</td>
<td>1.2314-19</td>
</tr>
<tr>
<td>GBP</td>
<td>1.8121-25</td>
</tr>
</tbody>
</table>

### FED FUNDS

<table>
<thead>
<tr>
<th>Rate</th>
<th>Bid</th>
<th>Ask</th>
<th>Last</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/16</td>
<td>1 11/16</td>
<td>1 3/4</td>
<td>1 3/4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rate</th>
<th>Bid</th>
<th>Ask</th>
<th>Last</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8121-25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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[TELERATE DATA ON BLACKBERRY PG 11]

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Non-Agency Sector
Non-Agency Market

Securities backed by mortgage loans that do not “conform” to agency guidelines.

• Loan balance in excess of agency limitations (currently $333,700)
• Loan documentation that does not meet agency requirements
• Non-prime credit borrowers

A large and diverse market sector covering the complete spectrum of borrower demographics, credit characteristics, loan types and loan sizes
# Non-Agency Residential Mortgages

<table>
<thead>
<tr>
<th>Credit</th>
<th>Prime/A Credit</th>
<th>Alternative A</th>
<th>Sub-Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>High credit quality borrowers generally with loan amounts in excess of agency limits (currently $333,700)</td>
<td>High credit quality borrowers with loan documentation that does not conform to agency requirement i.e. no-income verification</td>
<td>Borrowers with lower credit quality that do not meet agency credit standards</td>
</tr>
<tr>
<td>Characteristics</td>
<td>• Low interest rate • Avg loan balance $600k • High California and NE concentrations • Affluent borrowers • Very efficient refiencers when rates drop</td>
<td>• Interest rates generally 25-50 bps higher than Prime • Avg loan balance $250k • Limited loan documentation • Good credit • High debt load</td>
<td>• Higher interest rates commensurate with risk • Avg loan balance $150k • Limited loan documentation • Poor credit • Heavy debt load • High California concentrations • Some second liens</td>
</tr>
<tr>
<td>Current Interest Rate (30yr Fixed)</td>
<td>6.0%</td>
<td>6.35%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Major Issuers</td>
<td>• Countrywide • Wells Fargo • Washington Mutual</td>
<td>• GMAC – Residential Funding • Impac Mortgage</td>
<td>• Ameriquest • New Century • Option One</td>
</tr>
</tbody>
</table>
Non-Agency Market

Since non-agency MBS have no Agency guarantees that assure investors they will receive timely payment of interest and principal, regardless of delinquency or default rates on the underlying loans, credit enhancement is needed to protect investors from borrower delinquencies.
<table>
<thead>
<tr>
<th>Class</th>
<th>Approximate Size ($)</th>
<th>Type(1), (2)</th>
<th>WAL(3), (4)</th>
<th>Principal Payment</th>
<th>Pmt Window(3), (4)</th>
<th>Call / Mat</th>
<th>Call / Mat</th>
<th>Interest Delay</th>
<th>Interest Accrual</th>
<th>Expected Ratings</th>
<th>Initial Credit Enhancement (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-2</td>
<td>250,000,000</td>
<td>FLT / PT</td>
<td>2.51/2.72</td>
<td>1-95/1-214</td>
<td>0 Act/360</td>
<td>38</td>
<td>AAA / Aaa / AAA</td>
<td>23.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-3</td>
<td>100,000,000</td>
<td>FLT / SEQ</td>
<td>1.00/1.00</td>
<td>1-24/1-24</td>
<td>0 Act/360</td>
<td>17</td>
<td>AAA / Aaa / AAA</td>
<td>23.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-4</td>
<td>39,300,000</td>
<td>FLT / SEQ</td>
<td>2.70/2.70</td>
<td>24- 49/24-49</td>
<td>0 Act/360</td>
<td>34</td>
<td>AAA / Aaa / AAA</td>
<td>23.75</td>
<td></td>
<td></td>
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<tr>
<td>A-5</td>
<td>36,427,000</td>
<td>FLT / SEQ</td>
<td>6.46/7.48</td>
<td>49- 95/49-214</td>
<td>0 Act/360</td>
<td>53</td>
<td>AAA / Aaa / AAA</td>
<td>23.75</td>
<td></td>
<td></td>
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<tr>
<td>A-6</td>
<td>94,960,000</td>
<td>FLT / SEQ</td>
<td>0.70/0.70</td>
<td>1-15/1-15</td>
<td>0 Act/360</td>
<td>15</td>
<td>AAA / Aaa / AAA</td>
<td>23.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-7</td>
<td>145,204,000</td>
<td>FLT / SEQ</td>
<td>3.70/4.05</td>
<td>15- 95/15-214</td>
<td>0 Act/360</td>
<td>43</td>
<td>AAA / Aaa / AAA</td>
<td>23.75</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>M-1</td>
<td>147,000,000</td>
<td>FLT / MEZ</td>
<td>5.39/5.98</td>
<td>42- 95/42-187</td>
<td>0 Act/360</td>
<td>62</td>
<td>AA+ / Aa1 / AA+</td>
<td>18.85</td>
<td></td>
<td></td>
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<tr>
<td>M-2</td>
<td>120,000,000</td>
<td>FLT / MEZ</td>
<td>5.34/5.91</td>
<td>40- 95/40-177</td>
<td>0 Act/360</td>
<td>65</td>
<td>AA / Aa2 / AA</td>
<td>14.85</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>M-3</td>
<td>54,000,000</td>
<td>FLT / MEZ</td>
<td>5.32/5.87</td>
<td>40- 95/40-167</td>
<td>0 Act/360</td>
<td>70</td>
<td>AA- / Aa3 / AA-</td>
<td>13.05</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>M-4</td>
<td>52,500,000</td>
<td>FLT / MEZ</td>
<td>5.30/5.83</td>
<td>39- 95/39-162</td>
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<td>118</td>
<td>A+/A1/A+</td>
<td>11.3</td>
<td></td>
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<tr>
<td>M-5</td>
<td>51,000,000</td>
<td>FLT / MEZ</td>
<td>5.30/5.81</td>
<td>38- 95/38-156</td>
<td>0 Act/360</td>
<td>125</td>
<td>A / A2 / A</td>
<td>9.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-6</td>
<td>37,500,000</td>
<td>FLT / MEZ</td>
<td>5.28/5.77</td>
<td>38- 95/38-150</td>
<td>0 Act/360</td>
<td>145</td>
<td>A- / A3 / A-</td>
<td>8.35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-7</td>
<td>36,000,000</td>
<td>FLT / MEZ</td>
<td>5.28/5.74</td>
<td>38- 95/38-144</td>
<td>0 Act/360</td>
<td>195</td>
<td>BBB+ / Baa1/ BBB+</td>
<td>7.15</td>
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<tr>
<td>M-8</td>
<td>33,000,000</td>
<td>FLT / MEZ</td>
<td>5.28/5.70</td>
<td>38- 95/38-138</td>
<td>0 Act/360</td>
<td>205</td>
<td>BBB / Baa2 / BBB</td>
<td>6.05</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>M-9</td>
<td>39,000,000</td>
<td>FLT / MEZ</td>
<td>5.27/5.63</td>
<td>37- 95/37-131</td>
<td>0 Act/360</td>
<td>410</td>
<td>BBB-/ Baa3 / BBB-</td>
<td>4.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-1(5)</td>
<td>1,621,609,000</td>
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<td>Not Offered</td>
<td>Not Offered</td>
<td>Not Offered</td>
<td>AAA / Aaa / AAA</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Analyzing MBS
Prepayments

*Prepayments have a dramatic impact on the performance and valuations of MBS*

Why do prepayments occur:
- Home Sales – Generally leads to the payoff of the sellers mortgage
- Refinancings – Borrower pays off old mortgage with proceeds from new loan, generally to take advantage of lower rates
- Defaults – Prepayments caused by foreclosure and subsequent liquidation of the mortgage
- Curtailments and Full Payoffs – Borrowers make extra payments or pay additional principal, up to the full amount of the mortgage, to speed up payoff of the loan
Impact of Prepayments

7% Cash Flows with no Prepayments

7% cash Flow at Prepayment Rate of 100% PSA

Cash Flow per $100,000

Principal
Interest

Impact of Prepayments
Impact of Prepayments

Effect of Prepayments On Average Life

Mortgage Market Extension Risk

Rate of 10-Year Treasury

Duration
Extension Risk

Purchase Bond at +55 to yield curve

Yield

Term

5 Yr

+55 bps
Extension Risk

Upward shift in yield curve as rates increase
Extension Risk

Prepayments slow and life of bond extends

Less cash flow than originally anticipated, can not reinvest at higher rates
Shortening Risk

Purchase Bond at +55 to yield curve
Shortening Risk

Downward shift in yield curve as rates decrease

Yield

Term

5 Yr
Shortening Risk

Prepayments increase and life of bond shortens

More cash flow than originally anticipated which must be reinvest at lower rates
Impact of Prepayments on MBS Pricing

Negative Convexity of Pricing

FN Oct (10/1/04)

Coupon

95 97 99 101 103 105 107 109

4.5 5 5.5 6 6.5 7 7.5 8 8.5
Factors Influencing Prepayments and Defaults

<table>
<thead>
<tr>
<th>Factor</th>
<th>Turnover</th>
<th>Rate-Driven</th>
<th>Other*</th>
<th>Defaults</th>
</tr>
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<td><strong>Collateral and Borrower Related</strong></td>
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<tr>
<td>Larger Loan Sizes</td>
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<tr>
<td>Higher Credit Score, Lower Debt</td>
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<tr>
<td>More Second Liens</td>
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<tr>
<td>Higher LTV</td>
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<td><strong>Macro Economics</strong></td>
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<tr>
<td>Lower Rates</td>
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<tr>
<td>Healthier Economy</td>
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<tr>
<td>Higher Home Prices</td>
<td>↑</td>
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</tbody>
</table>

* Refinancings on lower credits that are insensitive to rate moves, driven by debt consolidation and credit improvement
Role of Mortgage Finance Group at CGM
Mortgage Finance Organizational Structure

Citigroup Global Corporate and Investment Bank

Global Fixed Income

Global Securitized Markets

ABS
  Syndicate
  Trading
  ABS Finance

MBS
  Trading
  Mortgage Finance
  Mortgage Analytics

CMBS
  Trading
  CMBS Finance

Conduits
  Multi Seller CP Facilities
  Proprietary Trading
Mortgage Finance Department

• Product specialist
  – Touch all aspects of the organization when mortgage expertise is required (M&A assignments, valuations, balance sheet restructuring)

• Account coverage
  – Cover accounts from Washington Mutual and Countrywide to small mortgage originators

• Represent products and services offered by Citigroup
  – Securitization, whole loan trades, financing

• Transaction origination
  – Generate new business

• Transaction execution
  – Responsible for all aspects of transaction execution
Mortgage Finance Products

- **Mortgage-Backed Securities**
  - Agency MBSs
  - Non-Agency “Jumbo” MBSs

- **Mortgage Related Asset-Backed Securities**
  - Home Equity ABS
  - Timeshare Transactions
  - Small Balance Commercial

- **Whole Loan Mortgage Transactions**

- **Financing / Warehouse Lines**

- **Internal Securitizations**

- **Credit Default Swaps**

- **Synthetic Securitizations**
Transaction Execution

- Attorneys
- Accountants
- Trustees
- Rating Agencies

Issuer

Client Relationship
Overall Execution Responsibility

Pricing and Market Color

Mortgage Finance

Coordinate Transaction Process

Assist in Distribution Effort

Analyzes Data and Structures Transactions

Mortgage Analytics

Capital Markets
- Syndicate
- Trading
- Research

Sales

Investors

- Attorneys
- Accountants
- Trustees
- Rating Agencies

Coordinate Transaction Process

Assist in Distribution Effort

Analyzes Data and Structures Transactions

Mortgage Analytics

Capital Markets
- Syndicate
- Trading
- Research

Sales

Investors
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