Hedging Fixed Income’s Portfolio
Objectives

◆ Describe Fixed Income’s guiding principles for hedging its illiquid assets

◆ Discuss drivers of hedging inefficiency

◆ Present hedging performance by business
  – Residential Mortgages
  – Commercial Real Estate
  – Acquisition Finance
  – Syndicated Corporate Loans
Guiding Principles

◆ Which positions do we hedge?
  – Hedge illiquid positions that have limited or slow exits
  – Hedge credit risk for those positions which are not part of our core trading strategies
  – Do not necessarily hedge principal positions

◆ How do we implement hedges?
  – Prefer name-specific, targeted hedges where available, nonetheless sometimes utilize index hedges
  – Hedges are implemented by those in the business who are closest to the risks
  – Limited Division or Firm-level hedges

◆ How much do we hedge?
  – Hedge inefficiencies make 100% hedges either too costly or too risky
  – Expectation of hedge inefficiency leads to reduced size of hedge: for example, 20% correlation would typically be associated with less than 20% hedge size
## Hedging Inefficiencies

<table>
<thead>
<tr>
<th>Lack of Instruments</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No cash or synthetic instruments in either name or index form to cost effectively off-set idiosyncratic risk</td>
<td>U.S. Alt-A Residential, U.K. Residential, New issuance Leveraged Loans</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Illiquidity of Hedge</th>
<th>Description</th>
<th>Examples</th>
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<tbody>
<tr>
<td></td>
<td>Even if hedging instrument exists, insufficient liquidity to accommodate Lehman’s portfolio</td>
<td>ABX, Property Derivatives</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Basis Risk</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difference in price movement between the asset being hedged and the hedging instrument</td>
<td>CMBX hedge for CMBS, Equity index hedge for Leveraged Loans</td>
</tr>
<tr>
<td></td>
<td>- Cash versus derivatives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Name versus index</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Capital structure: loans vs. bonds vs. equity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Timing mismatch</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Counterparty Risk</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use of hedging strategy dependent on specific counterparty</td>
<td>Hedging CDO super senior risk with monoline counterparty</td>
</tr>
</tbody>
</table>
Residential Mortgages

Key Hedging Characteristics

Guiding Principles
- We employ a variety of synthetic instruments to hedge exposure to both spreads and home owner defaults/home price depreciation
- In addition, the ABS Synthetics desk ran since 2006 a sizable short position with sub-prime synthetic instruments in the residential mortgage space

Instruments Used
- Alt-A: Primarily CMBX, CDX/Itraxx, ABX (there are no synthetic Alt-A instruments)
- Sub-Prime: Primarily ABX, some CMBX and CDX/single-name CDS
- Europe: Primarily CDX and Itraxx (there are no synthetic European instruments)
- Utilized a ~$12BB Total Return Swap with clients through ‘07 which by Feb ’08 was fully rolled off since we were unable to roll due to lack of client interest

Hedging Inefficiencies
- Basis risk: Cash versus synthetics; we are long cash assets and cannot short cash positions
- Lack of instruments: No synthetic instruments in prime space to hedge the fundamental loss exposure
- Lack of size/liquidity: Size of ABX market is insufficient to hedge our Alt-A book (see next page for details)

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# Residential Mortgages – Hedging Approach

## 1. Spread Hedging

- Exposure to default-adjusted spreads due to general market risk aversion/technicals

## 2. Fundamental Loss Hedging

- Exposure to defaults on mortgages and consequential losses because of house price depreciation

### Purpose

- Combination of residential, commercial real estate, corporate spread hedges (e.g., ABX, TRS, CMBX, CDX, single-name CDS)

### Instruments

- Down the capital structure ABX tranches
- CDS on sub-prime securities

### Applicability for Sub-Prime

- More relevant for loans and senior bonds
- Higher liquidity in Corporate Indices
- Exposure to basis risk

### Applicability for Alt-A

- ABX synthetic instruments are available to hedge similar exposure of cash sub-prime assets (across the capital structure and different vintages)

- No synthetic instruments in Alt-A space to hedge the fundamental loss exposure
- Using ABX as a hedge has basis risk due to difference in Sub-Prime and Alt-A performance
- ABX market lacks sufficient size and liquidity. Hence, it is difficult to hedge the HPA component of our entire Alt-A portfolio. For example in May ’08, we would have needed to be short ~$20BB of ABX 07-2 A versus a monthly total market volume (buys & sells) of only ~$250MM (equivalent of 160 month’s volume)
Residential Mortgages – Market Context

<table>
<thead>
<tr>
<th>ABX Implied Risk Adjusted Spread</th>
<th>Change in 07-2 Cumulative Loss Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>(bps)</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

2/1/08 4/1/08 5/31/08

Note: 07-2 implied loss is derived from the market prices of ABX index tranches representing derivative contracts on subprime securities issued during the first half of 2007

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Residential Mortgages

Q1 and Q2 Gross and Net Write-downs

<table>
<thead>
<tr>
<th></th>
<th>Q1 Gross</th>
<th>Hedges (1)</th>
<th>Net</th>
<th>Q2 Gross</th>
<th>Hedges (1)</th>
<th>Net</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alt A / Prime</td>
<td>(1.9)</td>
<td>1.0</td>
<td>(0.9)</td>
<td>(1.2)</td>
<td>0.1</td>
<td>(1.3)</td>
</tr>
<tr>
<td>Sub prime/ Second lien</td>
<td>(0.5)</td>
<td>0.8</td>
<td>0.3</td>
<td>(0.6)</td>
<td>0.4</td>
<td>(0.2)</td>
</tr>
<tr>
<td>Other US ^2)</td>
<td>(0.2)</td>
<td>0.3</td>
<td>0.1</td>
<td>(0.1)</td>
<td>0.1</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Europe</td>
<td>(0.2)</td>
<td>0.0</td>
<td>(0.2)</td>
<td>(0.3)</td>
<td>0.1</td>
<td>(0.3)</td>
</tr>
<tr>
<td>ABS CDO</td>
<td>(0.2)</td>
<td>0.1</td>
<td>(0.1)</td>
<td>(0.2)</td>
<td>0.1</td>
<td>(0.1)</td>
</tr>
<tr>
<td>Total</td>
<td>(3.0)</td>
<td>2.2</td>
<td>(0.9)</td>
<td>(2.4)</td>
<td>0.4</td>
<td>(2.0)</td>
</tr>
</tbody>
</table>

Hedging Efficiency: ~72% ~17%

\(^1\) Includes Servicing Rights and Carry
\(^2\) Includes Scratch & Dent and Reverse Mortgages

Explanation

- Lack of proper hedging instruments; unrealistic to hedge using ABX; TRS fully rolled off in Feb ‘08
- Effective ABX and single-name CDS hedges in Q1; hedging efficiency lower in Q2 due to smaller price declines in shorts down the capital structure and those of earlier vintages
- Lack of synthetic hedge instrument, additional hedge losses on macro/non-mortgage hedges
- Single name Corporate, iTraxx and ABX short positions
Commercial Real Estate

Key Hedging Characteristics

Guiding Principles
- We hedge our commercial mortgages inventory
  - Fixed rate book: short positions in synthetic instruments for the CMBS portfolio (both loans and securities)
  - Floating rate book: macro hedge against an overall macro-economic decline
- Naturally, we don’t hedge our principal real estate holdings

Instruments Used
- Fixed rate book: short positions in CMBX, Total Return Swaps (TRS) since those hedges are most efficient (underlying deals in both the CMBX and TRS are fixed-rate conduit deals)
- Floating rate book (shorter duration): macro hedge using Itraxx, Hvol in small size due to low correlation with CMBS floaters

Hedging Inefficiencies
- Basis risk: Cash versus synthetics basis risk for the fixed-rate book hedges
- Lack of instruments: No hedging instrument exists for the floating rate book; Itraxx, Hvol used as an approximation
Commercial Real Estate

Q1 and Q2 Gross and Net Write-downs

($BB)

<table>
<thead>
<tr>
<th></th>
<th>Q1</th>
<th>Q2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross</td>
<td>Hedges</td>
</tr>
<tr>
<td>Commercial Mortgages</td>
<td>(1.0)</td>
<td>0.4</td>
</tr>
<tr>
<td>Real Estate Held for Sale</td>
<td>(0.3)</td>
<td>0.0</td>
</tr>
<tr>
<td>Corporate Debt</td>
<td>(0.1)</td>
<td>0.0</td>
</tr>
<tr>
<td>Corporate Equity</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>(1.4)</strong></td>
<td><strong>0.4</strong></td>
</tr>
</tbody>
</table>

Explanation

Short positions in CMBX, Itraxx and Duration Neutral Swaps gained in Q1, but huge cash/synthetic divergence in Q2 (see next page) led to additional hedging loss.

Limited hedging

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Commercial Real Estate – Market Context

Basis between Derivatives & CMBS BBB Bonds

Bonds Richer

Bonds Cheaper

Jul-07 | Sep-07 | Nov-07 | Jan-08 | Mar-08 | May-08 | Jul-08

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As part of our Investment Banking business, we provide both High Grade and High Yield Acquisition Financing to our clients.

Acquisition Financing often involves creation of a new entity or significant changes to an existing entity; as a result, direct name-specific hedges usually do not exist.

We hedge our High Yield exposures, mostly by using macro/index hedges.

Given low correlation between macro hedge and exposure, target 25% hedge ratio.

Most of the hedges are typically Corporate debt indices: CDX, LCDX, Bond Index.

Other macro hedges include Equity indices: SPDRS, Russell Index.

Significant basis risk between single name cash exposure and derivative index hedges.

Macro hedges are effective in a quick down turn, but over time the correlation breaks down and the time decay/negative carry takes affect.
Hedges diverged in 2Q08: Liquid derivative index hedges vs. illiquid individual cash positions
- Lost $100MM on hedges in April

In the new issue book, Hedges have made about $100MM (life to date)

High Grade Acquisition Finance is very different:
- Short-dated loans with minimal volatility
- Reserve all upfront fees
Syndicated Corporate Loans

Key Hedging Characteristics

Guiding Principles
- To facilitate our Investment Banking business, we constantly participate in the syndicated lending facilities of our Corporate Clients
- We use dynamic hedging to reduce earnings volatility related to mark to market changes, and to reduce the impact of defaults
- Current hedging approach has been in place since 2001; successfully protected Lehman from taking material losses in Enron, Worldcom, and other defaults

Instruments Used
- Better able to hedge this portfolio given available instruments
- Bulk of hedges are single-name credit derivatives; currently have several hundred single name CDS hedges, representing most of the book
- Utilize CDX index and other macro hedges for those names where CDS doesn’t exist
- Notional amount of hedges equal to ~55% of underlying exposure

Hedging Inefficiencies
- Index vs. Name basis risk on CDX hedges, although we match maturity and rating
- Different liquidity/technicals in credit derivative vs. cash loan market
Current hedging approach was put place in 2001. 2Q08 was the first quarter in which basis resulted in a material negative impact.

- Of the Actual P&L for 2008, ($225MM) is due to basis risk, while another ($100MM) is Initial Mark to Market costs for the year, which are unhedgeable.

- Derivative hedges rallied more aggressively than loan assets in 2Q08. Lesser movement in loans was due to:
  - Lower loan appetite from financial institutions dealing with their own capital issues
  - Slower pace to trade loans versus trading derivatives
  - Continued overhang of large acquisition loans

- Additionally, there was some basis risk due to secured loans being hedged by unsecured positions.