

S E C O N D A R Y . 0 8



# Hedging Risk in the Midst of a Credit Crisis

Challenges in Hedging Mortgage Portfolios & Mortgage Servicing Rights



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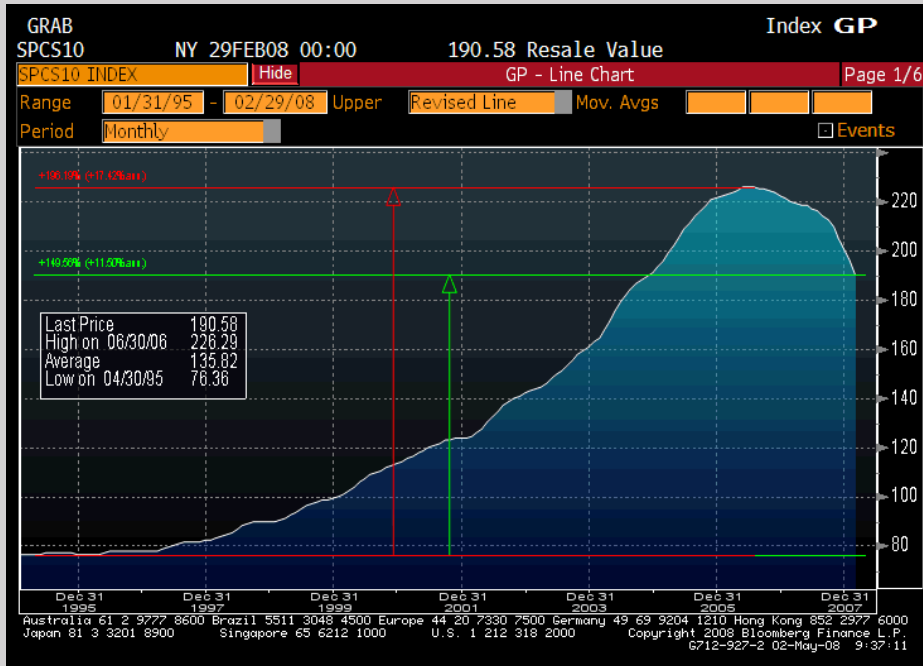
- What Went Wrong?
- Where Are We Now?
- Current Challenges & Actions
- False Hopes?
- How Will We Know We Are Out of the Woods?
- Additional Thoughts

# What Went Wrong?

- Increased rates spawned “affordable housing” products, driving home prices to unsustainable levels.
- Borrowers took loans they couldn’t afford & didn’t understand.
- Loan Officers/Brokers got “creative” in getting borrowers qualified.
- Lenders made loans with excessive “layered” risks.
- Rating Agencies competed to earn business with aggressive ratings & ignored covariant risks in underlying collateral.
- Excess Hedge Fund liquidity drove up prices, financed by Investment Banks.
- I-Banks retained short puts on AAA CDO tranches. Oh the irony!!

# S&P Case/Shiller 10 Index vs. Hourly Earnings

SECONDARY.08



Housing prices increased 17% per annum from 1995 until peak in 2006!

Average Hourly Earnings increased 4% per year since 1995.



Source: Bloomberg, S&P/Case Shiller, US Bureau of Labor and Statistics

Hedging Risk in the Midst of a Credit Crisis  
The Challenges of Managing MSR & a Mortgage Portfolio

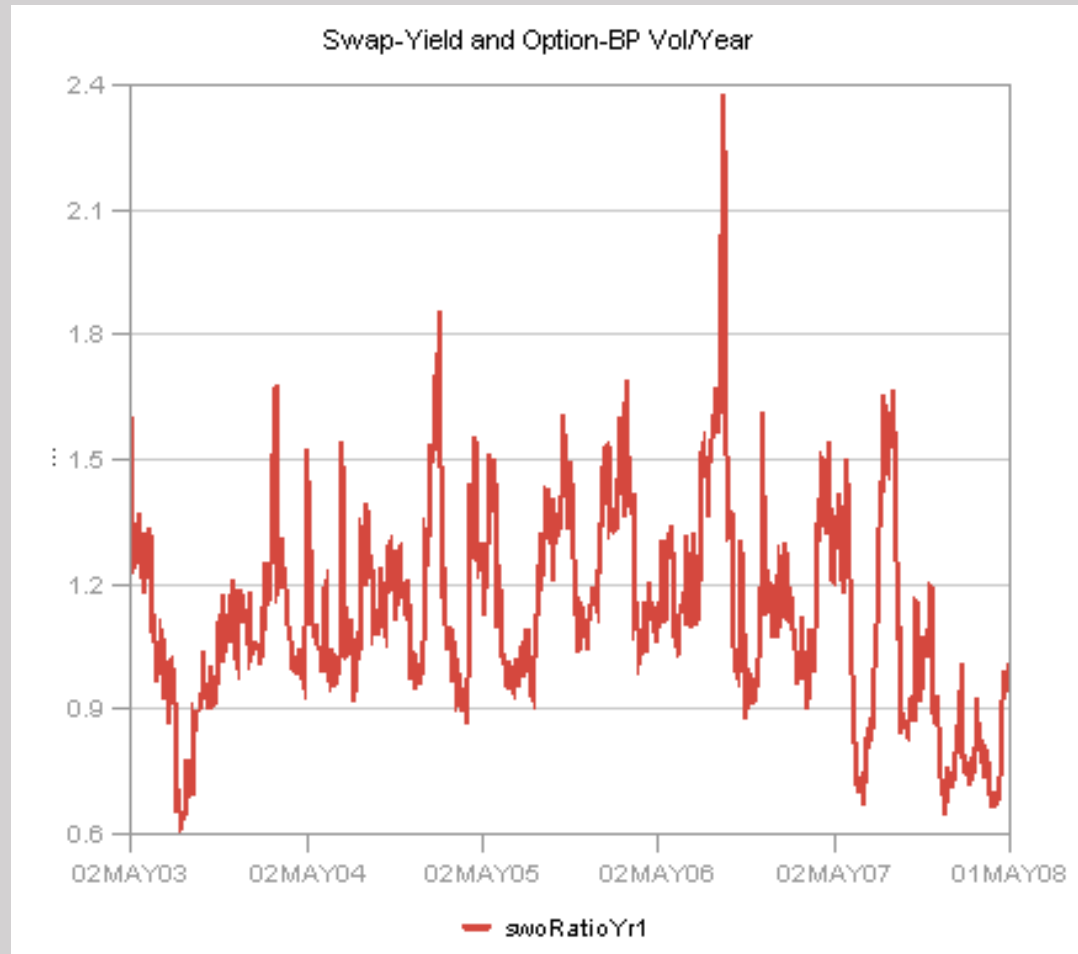
- Mark to market accounting leads to huge write-downs.
  - ABX & RPX exacerbate asset marks.
- Banks forced to take significant off balance sheet items back on balance sheet.
- Credit crisis turned into liquidity crisis as banks need capital and shrink balance sheets.
- Deleveraging resulted in:
  - Balance sheet driven products having little sponsorship.
  - Very high liquidity premiums (CMOs cheap to pass-throughs).
- Institutional risk tolerance is minimal.
- Broker/Dealers mainly focus on being Brokers....not so much Dealers.
- Thinly traded markets spur increased volatility.

- Managing unprecedented volatility.
- Transacting in illiquid markets.
- Getting good marks on illiquid assets.
- Managing model prepayment errors.
- LIBOR settings.
- Term liquidity premium.

- Increased rate volatility exacerbates all risk characteristics.
- Delivered volatility exceeded implied volatility for much of 2008.
- Mortgage rate volatility exceeded swap volatility.
  - Past relationships between TBA current coupon and swaps & volatility did not predict mortgage behavior well.
    - Used more CMM to hedge basis.
    - Dramatically increases negative convexity of MSR and Portfolio.
    - Materially increases hedge costs!
      - Tried to set expectations for increasing costs.
- Dramatic reshaping swaption surface accentuates model risk.
  - Learned a lot about the nuances of term structure and prepayment modeling.

**Unfortunately, the answer to most of these challenges has been to spend more money on gamma!**

## Implied Volatility / Realized Volatility



Source: Banc America Securities

- Increased volatility generally necessitates more transaction rebalancing.
  - Need to balance this need against increased costs.
- Illiquid markets reflect much wider bid-offer spreads.
- Typical transaction size impacts markets much more significantly.
  - Fewer transactions at auction....information valued at a premium.
- Dealers are increasingly risk averse.
  - Pricing risk for immediate disposition.
  - Sometimes more effective to engage Broker/Dealer solely as agent.
- Difficult and expensive to delta hedge interest rate risk.
  - Causes more gamma purchases to facilitate liquidity.
  - Proclivity to avoid expensive TBA coupon swaps, exacerbates current coupon risk.
    - When fairly priced, turned to CMM market as an alternative.

RPX Implied Housing Price Change By Year					
5/2/2008	1	2	3	4	5
Contract Fixing	-13%	-10%	-6%	-4%	-3%
Cumulative	-13%	-20%	-12%	-8%	-6%
Px vs. Current	87	80	88	92	94
<b>Implied Change</b>	<b>-13%</b>	<b>-8%</b>	<b>10%</b>	<b>4%</b>	<b>3%</b>

Source: Radar Logic

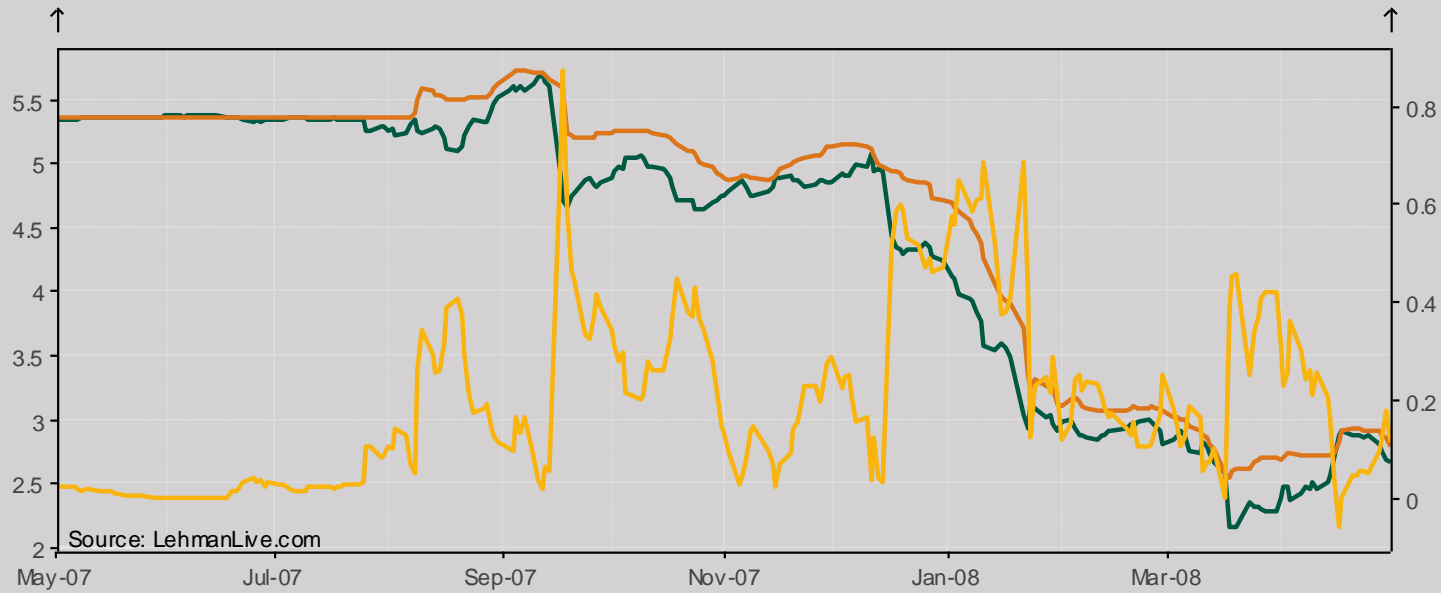
- Wider dispersion of TBA and derivative marks.
  - Often look to multiple pricing sources.
- MSR extremely difficult to value.
  - Limited transactions to reference.
  - Distressed transactions lead to low valuation.
- Using thin market proxies can exacerbate challenges.

- All models are backward looking.
- Changing credit climate not adequately modeled.
- Vintage related “effective” LTV influencing prepayment speeds.
- Models very sensitive to HPA (or HPD!) assumptions.
- Models very sensitive to time frame for “recovery”.
- Frequent recalibration may create over reaction.

**To be dynamic in adjusting prepayment models, we must use new prepayment data, tempered by intuition and experience.**

- Unusual volatility.
- Disconnected from Euro Dollar market & Fed Funds Futures market.
- BBA condemns lending at LIBOR + spreads.
  - Banks avoid locking in long term liquidity premiums.
- Models calibrate to cash LIBOR as well as Euro Dollar rates.
  - Market close convention is 3PM. LIBOR sets at 6AM.
  - Mark to market hedging is much easier benchmarking models to Euro Dollar prices.

Spreads have been extremely volatile!



Key	Axis	Name	Last	Minimum	Maximum	Mean	SD	SD Change
—	Left	100-ED1/100	2.670	2.150 03/19/2008	5.688 09/12/2007	4.370	1.106	0.083
—	Left	USD LIBOR 3M rate	2.784	2.542 03/18/2008	5.725 09/07/2007	4.556	1.069	0.047
—	Right	LIBOR3M:QYLD-(100-ED1/100)	0.114	-0.063 04/17/2008	0.873 09/18/2007	0.194	0.179	0.083

Source: Lehman Live

- Term Borrowing is at huge premium to LIBOR/Swap rates.
- Banks may choose to take some liquidity risk.
  - Bet on timing of market recovery.

# False Hopes?



1yr x 10yr swaption premium dropped 23% since March 17<sup>th</sup>!



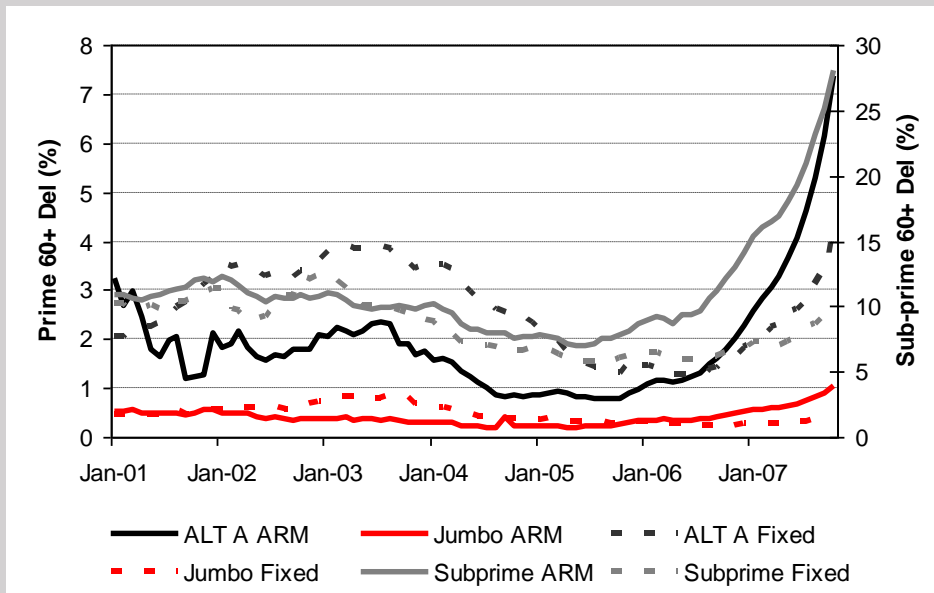
Equities rallied 11.5% since March 10<sup>th</sup>.

# How Will We Know We Are Out of the Woods?

- The glut of housing supply needs to decrease.
- Serious delinquencies need to decrease.
- Bank Capital needs to be replenished enabling asset growth.



Source: National Association of Realtors, Bloomberg



Source: Loan Performance, Banc America Securities

- Low interest rates lead to a prolonged weak dollar & increased inflation....but that's not all bad!
  - Exports sustain businesses.
  - Inflation supports Housing Prices
- Eventually ECB will cut rates, which will strengthen dollar and curb inflation.
- Mortgage default rates continue to rise.
- Housing Prices continue to fall.
  - Very market specific.
- Fed will continue to cut rates and will stay low much longer than currently implied.
- Treasury will continue to facilitate lending liquidity.
- Legislative action will likely be a necessary evil.

- The difference between cats and dogs....
  - People focus on immediate needs without proper regard for future risks.
- National stigma associated with bankruptcy and foreclosure has dissipated.
- People behave the way they are incented.....
  - Bank Portfolios
  - Hedge Fund Managers
  - Loan Officers
- Student Loan Market
  - Securitization market has dried up.
  - Credit is greatly reduced.
  - Long term ramifications to Education system and Economy.