

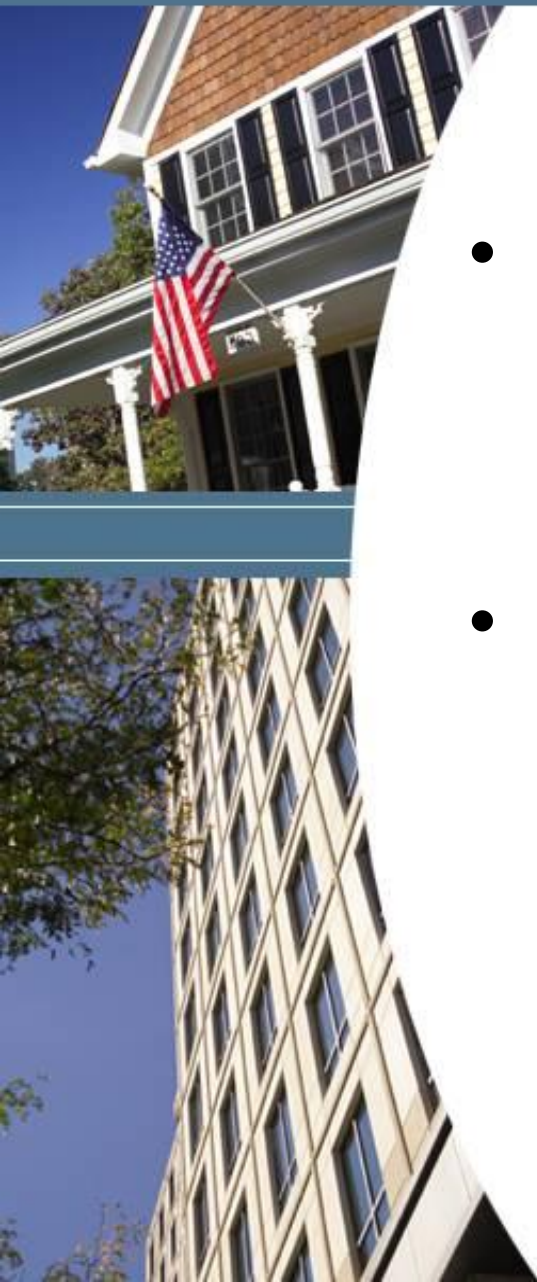


Mortgage Servicing Rights Valuation

The 2008 Perspective

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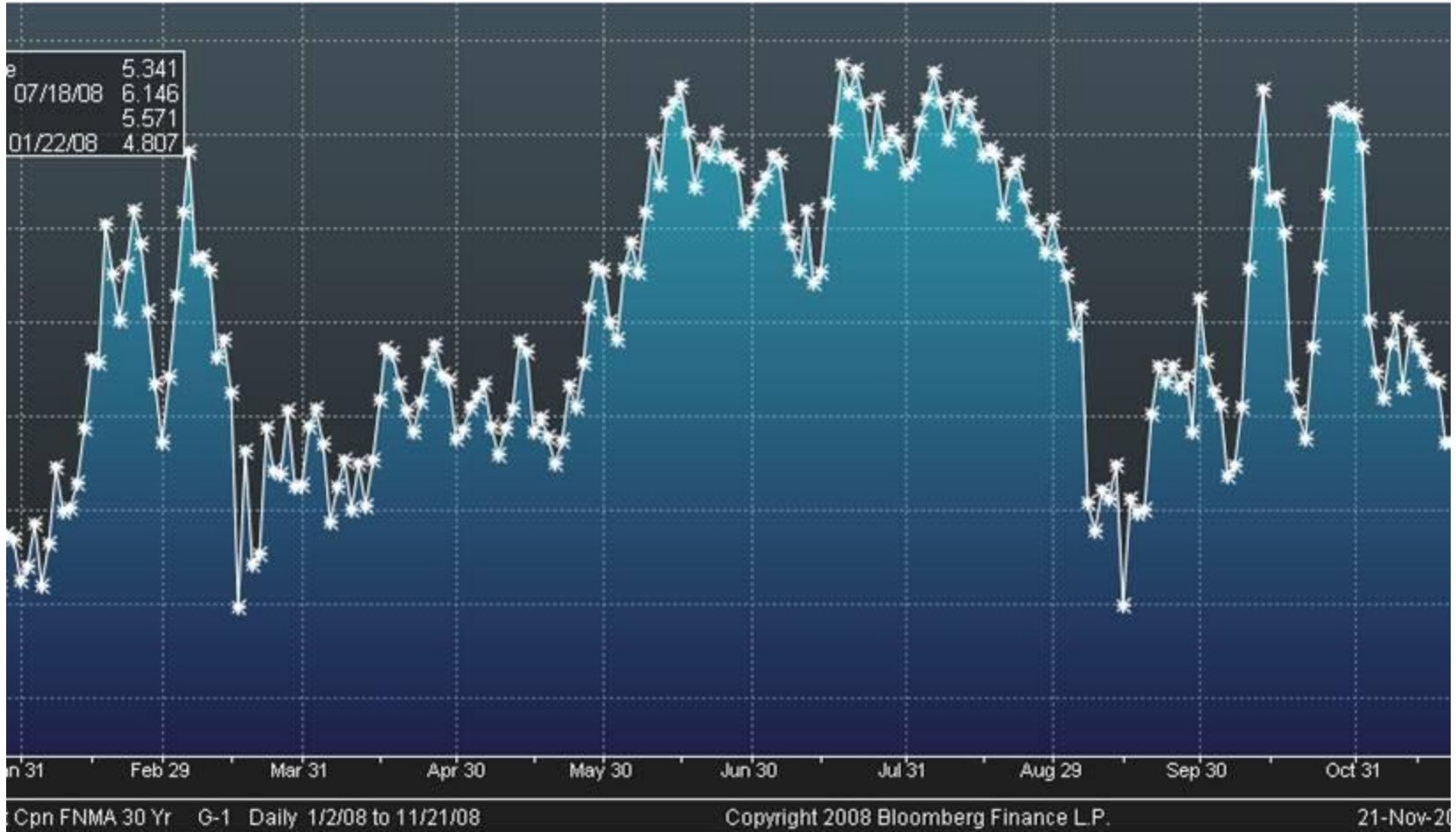
MSR Valuations

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- **2008 has been a very unique environment for the mortgage industry**
 - **How has it affected MSR valuations?**
 - Valuation practices
 - MSR performance
 - Valuation results

- Single most important assumption in MSR valuation process is prepayment speed
- Prepayment speed is determined by the prepayment model
- Primary input for any prepayment model is the “Mortgage Rate”
- What is the definition of the “Mortgage Rate”?
- Where can I find the “Mortgage Rate”?

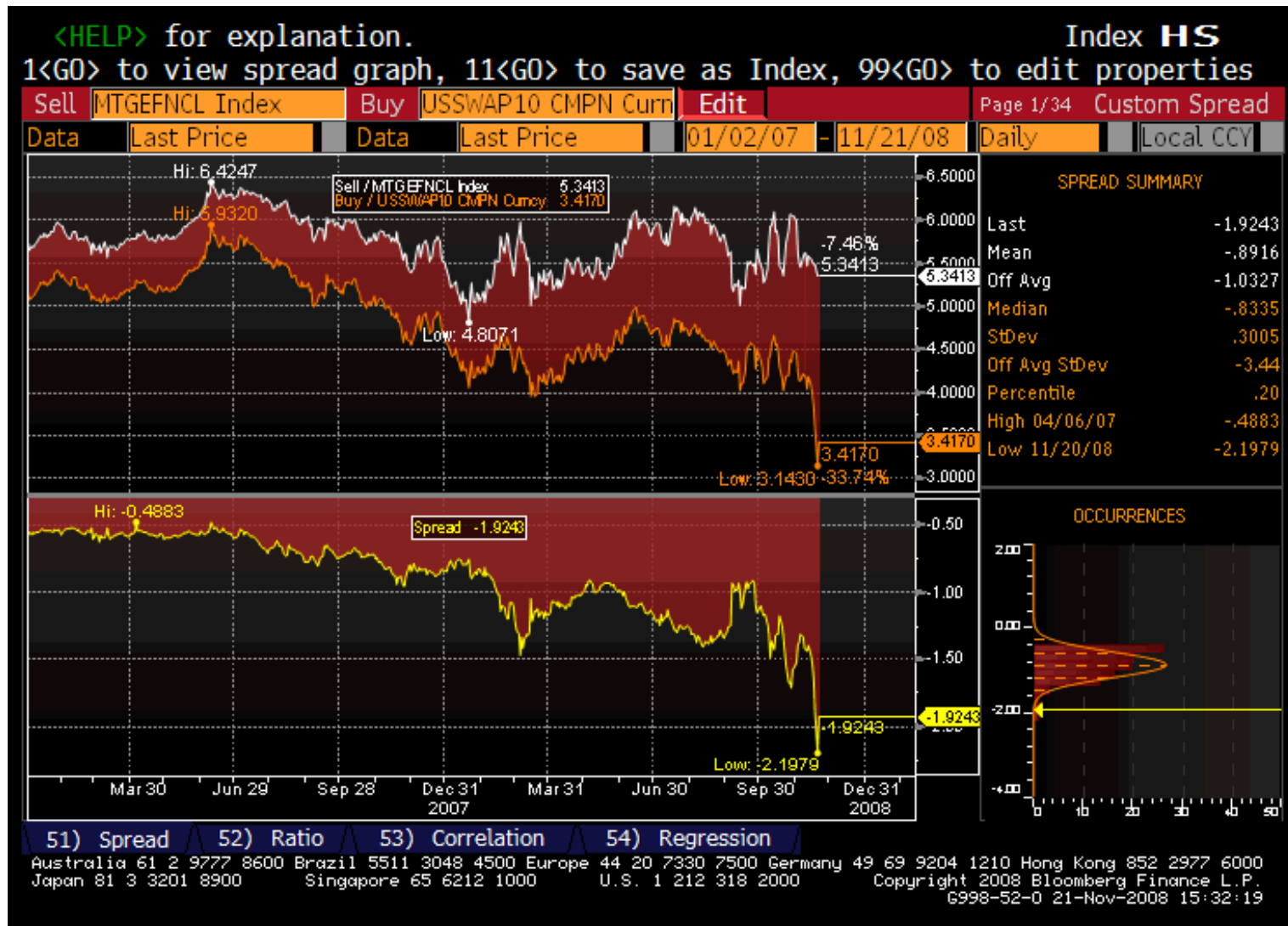
- 2008 has been very challenging in regards to the “Mortgage Rate”:
 - Secondary mortgage rates like Current Coupon Mortgage Yield (MTGEFNCL on Bloomberg) have decoupled from the Swap and Treasury curve
 - The spread between Current Coupon Mortgage Yield and 10-Year Swap rate has widened by 100 bps

2008 Mortgage Rates - MTGEFCNL



Source: Bloomberg

2008 Mortgage – Swap Spread



Source: Bloomberg

Valuation Practices

- The erratic mortgage rates in 2008 pose significant challenges on how to model mortgage rates into the future.
- MSR valuations are based on 30 years of cash flow projections. The model needs current **and** future mortgage rates. What level of mortgage rates should be assumed in the future?
- While most people tend to agree that interest rates (and spreads between them) will converge closer to historical averages, the time horizon and magnitude are highly debatable.
- Mean reversion is a common concept in interest rate modeling. However, no precedent exists for current environment. There is no consensus in the industry.
- The large differential between MBS rates and Swap rates is caused by the lack of demand for mortgage securities.
- The demand for MBS will return. How long will the memories of 2008 last? Will MBS rates include a permanent “mortgage meltdown” premium?
- The answers to the questions above may materially affect MSR valuations. The right answers will not be known for quite awhile.

- Delinquency & Default modeling has become more important in 2008
 - Used to be an after-thought in (A paper) MSR valuations
 - Mostly viewed as an operational issue not modeling issue
 - Credit risk is supposed to be born by investor, not servicer
 - Nobody likes losses – Investors try to push back any loss that may be attributable to origination deficiencies
 - More often than not the servicer is also the originator – the financial risk to the mortgage company is real
 - New industry developments may put servicers more at risk - for instance who is responsible for MI coverage if MI company has gone bankrupt? – Servicers or Investors?

- Prepayment Speeds
 - Prepayment models are geared towards interest rates and their impact on prepayment behavior
 - The following non-interest rate factors affected prepayment speeds in 2008:
 - Stricter underwriting guidelines
 - Home price depreciation
 - Disappearance of private (non-GSE) securitization market
 - All of these factors led to a reduced prepayment activity
 - MSR portfolio performance was very positively impacted by prepayment speeds

- Servicing Costs
 - Delinquencies have risen throughout 2008
 - MSR valuations prior to 2008 did not incorporate high delinquency levels in base case scenarios
 - Various loan modification/workout programs have increased operation costs to servicers
 - MSR portfolio performance was somewhat negatively impacted by servicing costs

- Hedging
 - Interest rate derivative market has been very volatile
 - Hedge results in 2008 have been very dependent on hedge strategies employed
 - Swap-based hedges tend to have outperformed as mortgage-swap spread widened to historical levels
 - Mortgage-based hedges may have been affected by lack of liquidity in MBS market
 - Hedging the convexity in the MSR asset has become increasingly costly as option-based hedge instruments have become significantly more expensive in 2008
 - Volatility is a primary input in any option pricing model. Volatility has been high in 2008, pushing option prices above historical levels.
 - Overall, hedging had a neutral impact on MSR performance

Recent MSR Performance

- Overall
 - Prepays: Very Positive
 - Servicing costs: Slightly negative
 - Hedging: Neutral
- 2008 has been a positive environment for MSR holders.
- Returns on servicing asset should have been significantly above modeled levels
- However, nobody is rushing out and buying MSR portfolios due to capital requirements
- Mortgage assets (even the ones that are performing well like MSRs) have a negative connotation
- Most holders of MSR assets (banks) are desperately holding on to any capital

- What is the difference?
 - Market value: What somebody is willing to pay
 - Economic value: The NPV of future cash flows without any market risk premiums
- How to reconcile?
 - Compare market-implied assumptions (prepays, float & escrow earnings, etc) with actual experience
 - When demand for MSR asset shrinks, market-implied assumptions may move significantly away from actual cash flow experience
 - Considering that MSR valuations are 30 year cash flow projections, should out- (or under) performance over the last 12-months be reason enough to change MSR assumption for the next 29 years?

- Which one should be used for financial statements?
 - As a fair value asset, MSR should be recorded at Fair Market Value
 - As a Level 3 asset, most MSR market models are very dependent on model assumptions instead of observable pricing data – what do those model results represent?
- Which one should be used for hedging?
 - Are companies protecting financial statements or cash flow performance?
 - Changes in MSR prices due to changes in demand (i.e. sudden lack thereof due to negative sentiments) are not hedgeable
 - Hedging follows MSR pricing model
 - A consistent MSR model is easier to hedge but may move away from economic reality in certain scenarios