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Data Analytics for Mortgage Secondary Market

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Dynamics of Mortgage Capital Market

Capital markets have become one of the central aspect of mortgage industry. Mortgage capital markets has led to increased liquidity and has been pivotal to the development of the whole sector and economy. Some of the factors presented in this section white paper will help you understand the dynamics of Mortgage capital markets better.

Market risk is an imminent threat in any mortgage banking operation resulting from fluctuations in interest rates. Mortgage lenders reduce market risk and free up liquidity to make more loans by selling mortgages or groups of mortgages to a purchasing agent (e.g., GSEs such as Fannie Mae or Freddie Mac), which packages them with like mortgages for sale in the secondary market. The time between the loan going on the lender's books and its sale to the purchasing agent is called the "mortgage pipeline."

One of the agreed upon definitions of mortgage pipeline is "mortgage loans that are locked-in with a mortgage originator by borrowers, mortgage brokers, or other lenders". The originator's pipeline islowered only when a loan falls out, or sold into the secondary mortgage market, or put into the originator's loan portfolio.

Managing the pipeline is a critical part of mortgage lending that calls for skilled management to keep risk under control and ensure profitability. Hedging is often used to offset risk and increase efficiency.

Hedging involves a series of complex computations and the use of mathematical models to manage risk and determine pricing. When done right, hedging strategies offer lenders more selling flexibility, greater efficiencies, and the ability to hold loans on the balance sheet longer – all leading to higher returns.

The above process works well when secondary marketing/risk managers focus their time on creating strategies for hedge transactions, while synchronizing with data-analysts who will regularly analyse loan assets in the pipeline and hedge instruments to assess value changes; create and constantly update models to determine the real market value of the loans in the pipeline.

When a mortgage lender grants a borrower a loan, the borrower locks in the current rate, and the loan enters that lender's pipeline. If interest rates fall, the borrower is free to choose another lender without penalty. However, mortgage loan commitments are considered firm on the part of the lender. When a locked loan closes, the lender is obligated to provide the customer with mortgage financing at the locked-in interest rate irrespective of the subsequent changes in the interest rate environment.

Therefore, the lender runs the risk of ending up with a portfolio of loan commitments with significant risk from pipeline fallout and/or price fluctuations between the time of loan commitment and when the loan is sold off. This is where having a good pipeline becomes essential. The most common strategies for pipeline management are using forward-sale commitments and hedging the pipeline with capital market instruments.

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Forward Sale Commitment

When the mortgage company originates a loan, it appears as an asset in the balance sheet of the originator, which has the same effect as buying an asset. The originator, in order to protect the value of the asset, sells the loan with a similar risk-profile and sensitivity to the changes in interest rates. A forward sales agreement is an instrument that allows the originator to sell a loan as a hedge transaction.

This type of commitment requires the mortgage originator to make either a "mandatory" or "best-efforts" commitment for future delivery of the loan to the purchasing agent. A "mandatory" commitment requires the originator to deliver a set dollar amount of mortgage loans at a certain price by a specific date; if the originator can't deliver, the agent charges a "pair-off" fee. A "best efforts" commitment doesn't require a pair-off fee, but the price for the loan will be less favorable, often with a large mark-up.

While the concept of offsetting interest rate risk with an inverse instrument is a simple concept, the actual process by which market risk is managed is very complicated and often requires thorough evaluation & verification of hedge advice or strategy.

Forward sales carry a specific product type and coupon, for delivery on a specific future month. The difference between actual loans in the locked pipeline and the characteristics of the forward mortgage security must be addressed. Lenders should ideally engage services of data-analysts to support and perform interest rate risk management through a hedge position recommendation based on the lender's locked pipeline.

Hedging with Capital Market Instruments

As discussed, a lender might experience "pipeline fallout" when loan commitments don't close, because the borrower isn't obligated to take the lender's mortgage. But instead of the significant costs incurred with forward-sale commitments, originators who internally hedge the pipeline can increase profitability.

Data Analytics for optimization

Visionet follows the **A-C-E** approach
- **A**ccurate data
- **C**larity in pipeline
- **E**stimation of hedge amount

for creation of a successful hedging program using a combination of our mortgage domain knowledge and data science technology **know how.**

A
Accurate
Data

C
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E
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Amount

Mortgage Domain Knowledge

Data Science Technology
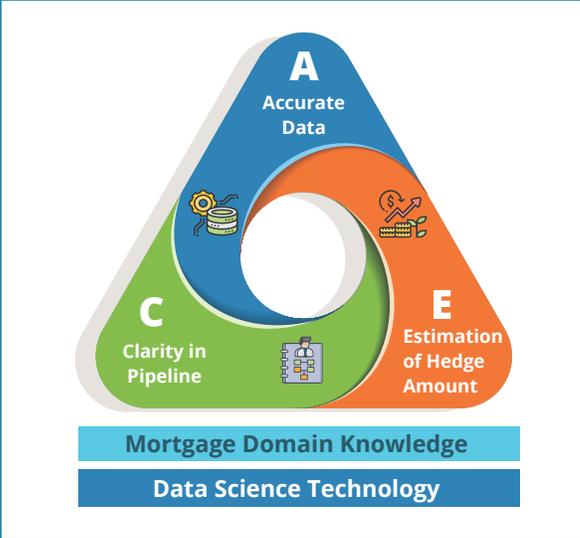
Ensuring data quality is critical for the hedging process because the decisions are made based on data. Ensuring accurate and timely data is of utmost importance, and often involves disciplined and rigorous databasing and IT architecture.

The hedge model developed is updated throughout each business day. The hedge model considers several factors to produce its recommendation, including interest rate movement and impact on TBA price, servicing value, yield curves, hedge ratios; fallout assumptions; rate negotiations and float downs; extensions & re-locks; program changes; Cycle time assumption variances; and other adjustments and manual inputs.

The models will display the estimated pipeline profit and loss over a range of interest rates, factoring expected changes in secondary market prices and pipeline fallout at each level of interest rate. The model carries out the analysis of the lock price relative to current market price, loan status, time to lock expiration, and any other relevant variable. This analysis has direct correlation with the probability of loans closing or falling out.

For the analytics model to be efficient, a mortgage originator requires automation and integration of the LOS with servicing platform and any other financial modelling software. This also minimizes the possibility of human error. Choosing an analytics vendor that has the capabilities to integrate seamlessly with LOS, can provide the real operational uplift that the mortgage originator requires.

Understanding the pipeline and how it reacts to rate movement is truly what makes a successful model. A pipeline is a collection of loans with varying data points that are ever-changing. Each lender's pipeline will react differently to market movement.

The stages of the pipeline must be clearly defined, understood, and monitored in relation to your lock process and policies. Lock desk policies, management, level of flexibility, and tolerance to change
margins based on market activity are critical pieces of the equation, as are other intangible items such as confidence in sales updates, operation capacity and efficiency, warehouse liquidity, investor turn times, etc.

Understanding fallout is imperative to the hedging process and can contribute significantly to hedge tracking error. Lenders use fallout ratios to estimate pull-through ratios (one minus the fallout ratio). The pull-through ratio is the likelihood that a loan commitment will be funded. Variations in interest rates and time to closing affect fallout rates, with rising rates usually increasing the borrower's incentive to close and vice versa.

Emphasis is required on fallout experienced by the lender during periods of extreme market volatility. The fallout patterns of the lender's historical pipeline behaviour form critical assumptions that drive the hedge calculations. Data analysts measure the lender's actual fallout behaviour relative to behaviour predicted by the lender's historical experience and report deviations.

Estimate the Hedge Amount

Analysts identify the combination of forward sales of mortgage securities and options contracts that produce an optimal balance of risk and return over a range of interest rates. The interest rates are taken after adjusting for probability based on interest rate volatility.

Forward contracts can mitigate pipeline fallout risk by protecting open positions from adverse price movements. Because the originator has a long position in mortgages, taking short forward contracts on "To Be Announced" (TBA) mortgage-backed securities (MBS) protects the originator if prices decline as the hedge position's value would rise.

To determine the amount that needs to be hedged, the risk manager must measure the market risk exposure associated with the mortgage assets, after adjusting for the expected fallout impact. The hedge position is calculated by adjusting the dollar duration of the mortgage pipeline by the projected fallout. Also, in case the lender services its funded loans, then mortgage servicing rights (MSR) asset volatility would also be important to model. If a lender has a long position in mortgages, it may initiate a hedge by selling short the appropriate amount of TBA MBS.

Summary

The hedge model applies a sophisticated and complex process to effectively calculate the secondary marketing transactions necessary to accurately and consistently preserve the value of the underlying lender's locked pipeline. The hedge model considers and assesses all of the necessary elements to reach a trade recommendation to accomplish the objective of asset value preservation.

Market risk is a reality in any mortgage banking operation. The way a mortgage bank mitigates market risk in its locked pipeline via a hedging strategy is a complex series of detailed computations and mathematical algorithms that require advanced-level math and financial training. Therefore, it is essential that lenders obtain the support of data analysts/scientists to effectively structure and implement a hedge program.

Every lender's pipeline is unique, and its characteristics change daily. Understanding how the pipeline reacts to market volatility and taking the initiative to improve data are keys to managing a hedge position that's custom-tailored for the lender. Each day, with new locks coming in, existing locks coming off, loans moving up or out of stages, and loans being purchased, reporting on the pipeline must be dynamic, and the fall out of the changes in the pipeline needs to be analyzed and reacted to.

While internal hedging can bring substantial cost savings, its success is reliant on the accuracy of the data input, understanding of the domain, effectiveness of modelling, and the expertise of the risk manager at controlling costs and implementing a hedging strategy. Therefore, partnering with firms that are experienced in analysis, integration with LOS, and understand capital markets is a prudent approach.

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