Mortgage Pricing Analysis: Business Context, Dashboard Insights, and Strategy Realignment

1. Business Objective and Initial Requirements

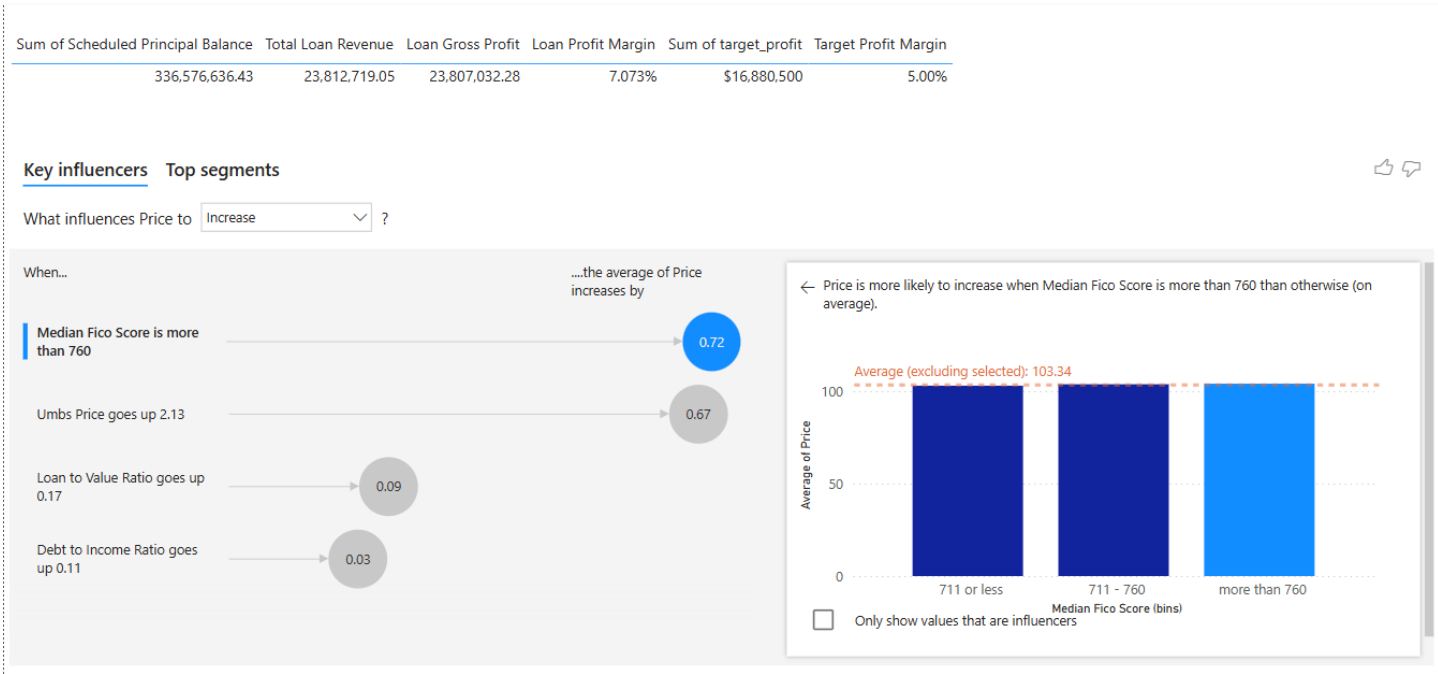
The starting point of this analysis was a business concern that actual loan profit margins were surpassing the set target profit margins. While this initially appears beneficial, it raised questions about the causes behind the unexpected margin growth. In a highly competitive mortgage market, even minor deviations in pricing can affect customer retention and market share. Thus, the business requirement was twofold:

- Identify what variables are contributing to pricing differences.
- Use this insight to optimize pricing strategies without losing competitiveness or profitability.

This analytical task called for a comprehensive review of borrower characteristics, market behavior, and profitability metrics using advanced visual tools within Power BI. The goal was to formulate actionable recommendations that align pricing structures with actual market dynamics and borrower risk levels.

2. Dashboard Overview and Component Breakdown

To support the investigation, a Power BI dashboard was built. It included core metrics and AI-powered visuals designed to explain the key drivers of loan price variation.



Core Measures Displayed in the Dashboard:

- **Scheduled Principal Balance**: $336,576,636.43 — Total outstanding principal yet to be repaid across all loans.

- **Total Loan Revenue**: $23,812,719.05 — Aggregate income generated from interest, fees, and premiums.
- **Loan Gross Profit**: $23,807,032.28 — Net earnings after subtracting operational costs.
- **Loan Profit Margin**: 7.073% — Ratio of gross profit to total revenue, reflecting how profitable each dollar of revenue is.
- **Sum of Target Profit**: $16,880,500 — The predefined revenue benchmark used for performance comparison.
- **Target Profit Margin**: 5.00% — The expected profitability margin.

These measures set the foundation for understanding the financial health of the loan portfolio and identifying deviations from expectations.

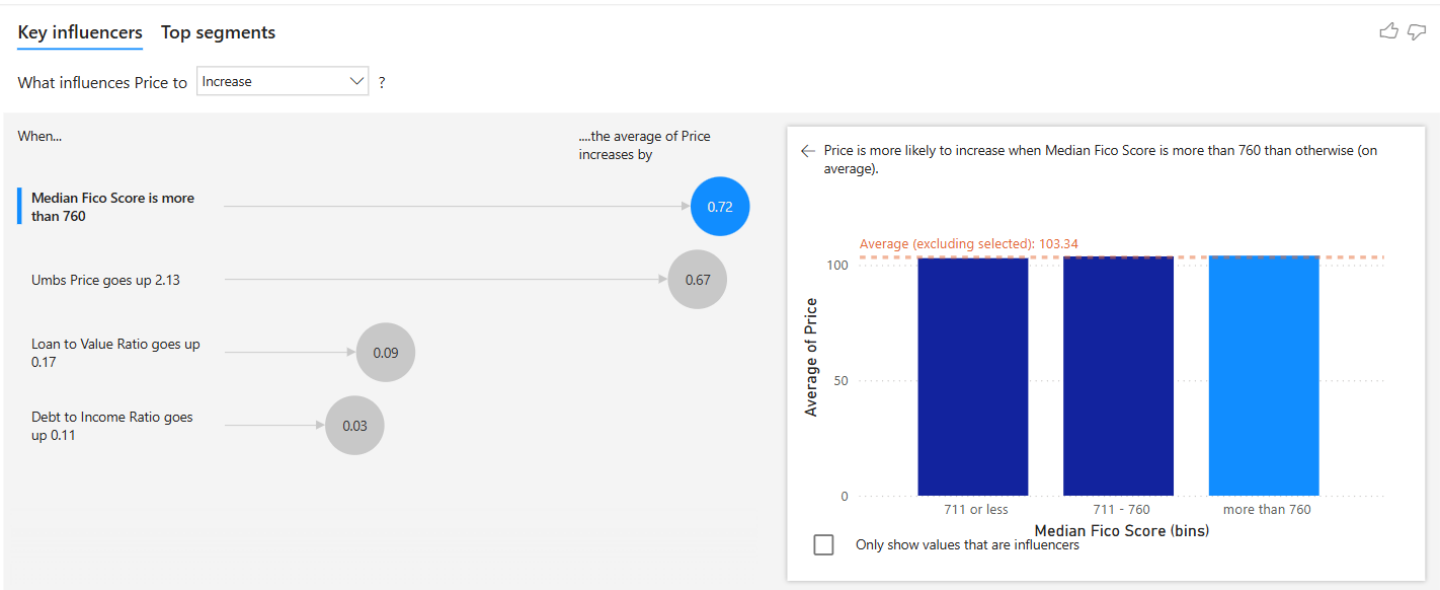
AI-Driven Tool Used: Key Influencers Visual

This Power BI feature uses statistical regression to detect which fields influence a selected metric (in this case, loan pricing). The visual presents findings in terms of price increase and decrease likelihood based on changes in borrower attributes and market conditions.

3. Results and Key Influencer Insights

A. Price Increase Drivers

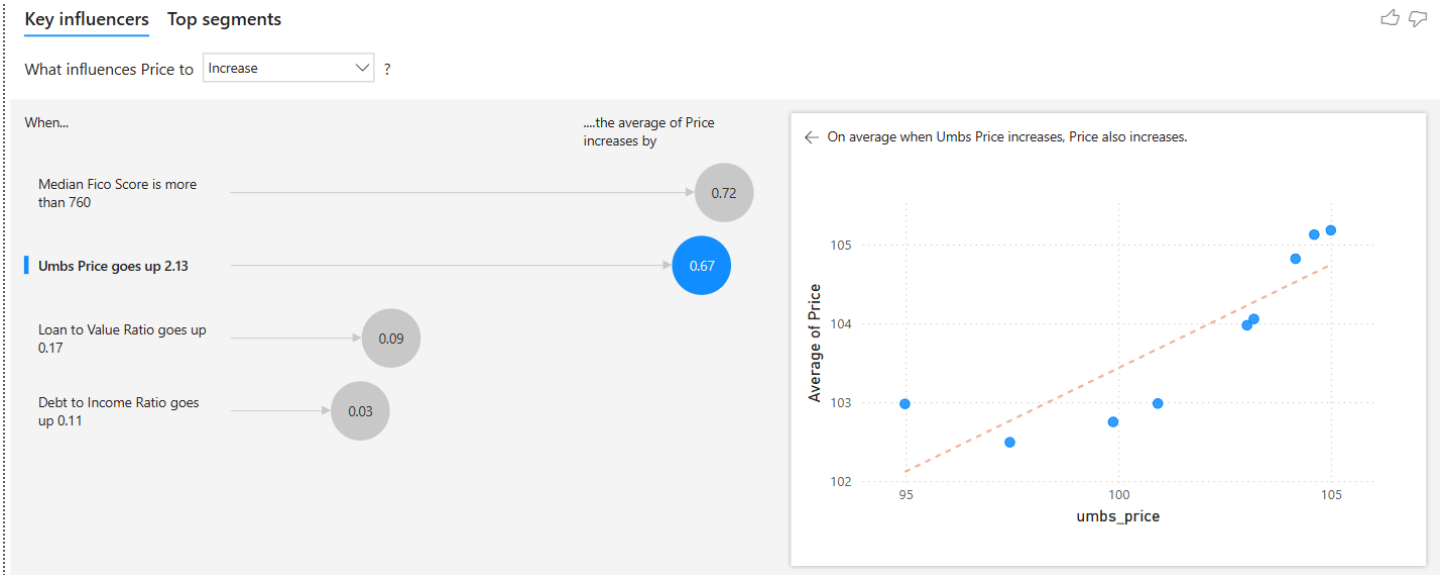
- **Median FICO Score > 760**



  - Result: Average price increased by 0.72

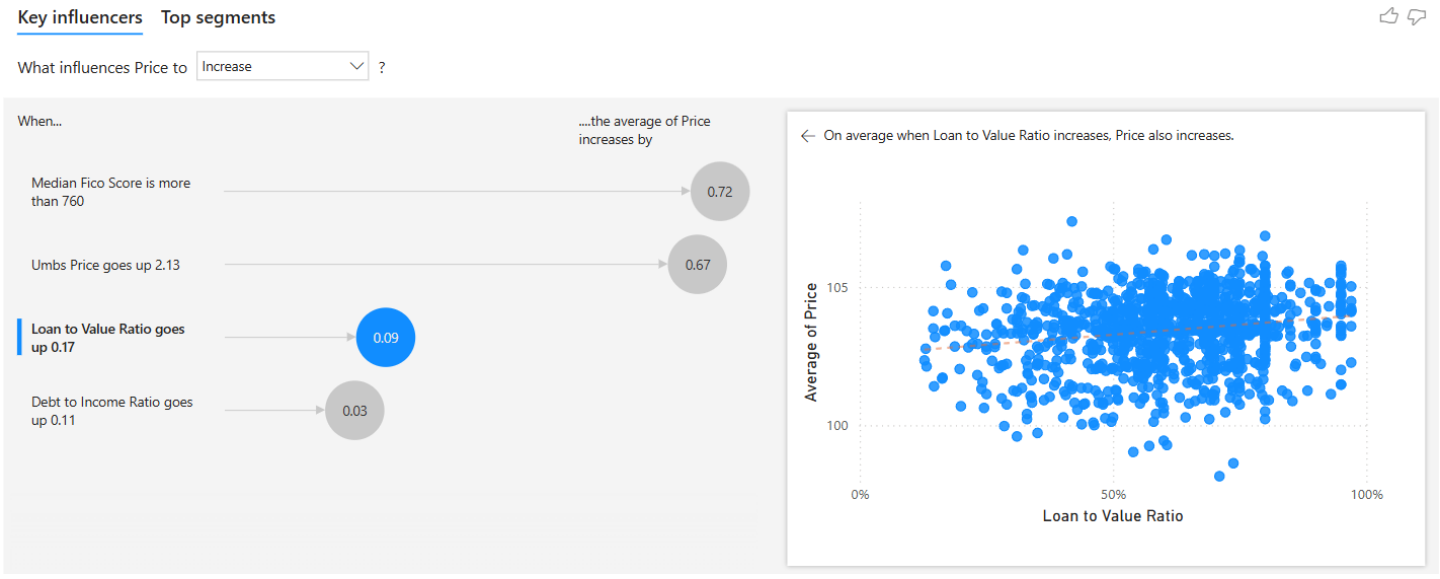
- Interpretation: Borrowers with excellent credit are viewed as low-risk, making their loans more attractive to investors.

- **UMBS Price increases by 2.13 points**



- Result: Average price increased by 0.67
- Interpretation: UMBS prices reflect demand in the secondary market. Higher prices signify favorable conditions, boosting sale values.

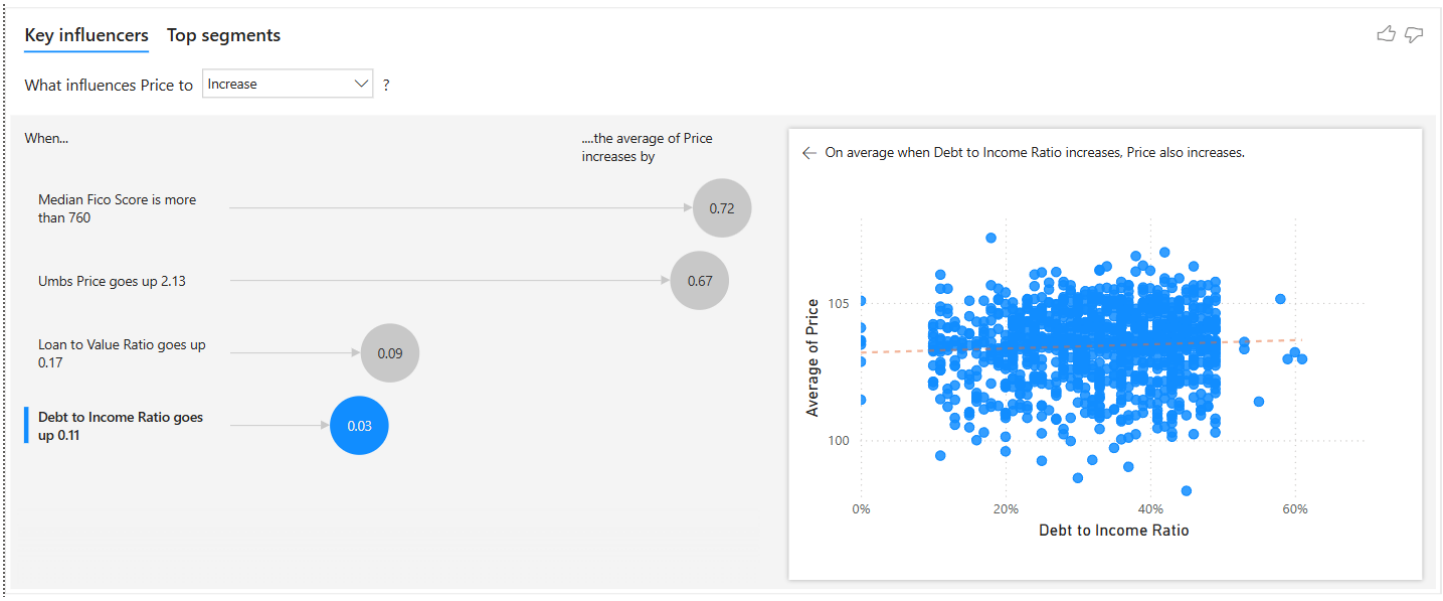
- **Loan-to-Value (LTV) increases by 0.17**



- Result: Average price increased by 0.09

- Interpretation: Slightly higher LTV may still yield good pricing if offset by high FICO scores or low DTI.

- **Debt-to-Income (DTI) increases by 0.11**



- Result: Average price increased by 0.03
- Interpretation: In some contexts, moderate DTI changes may not signal higher risk if borrower income is stable.

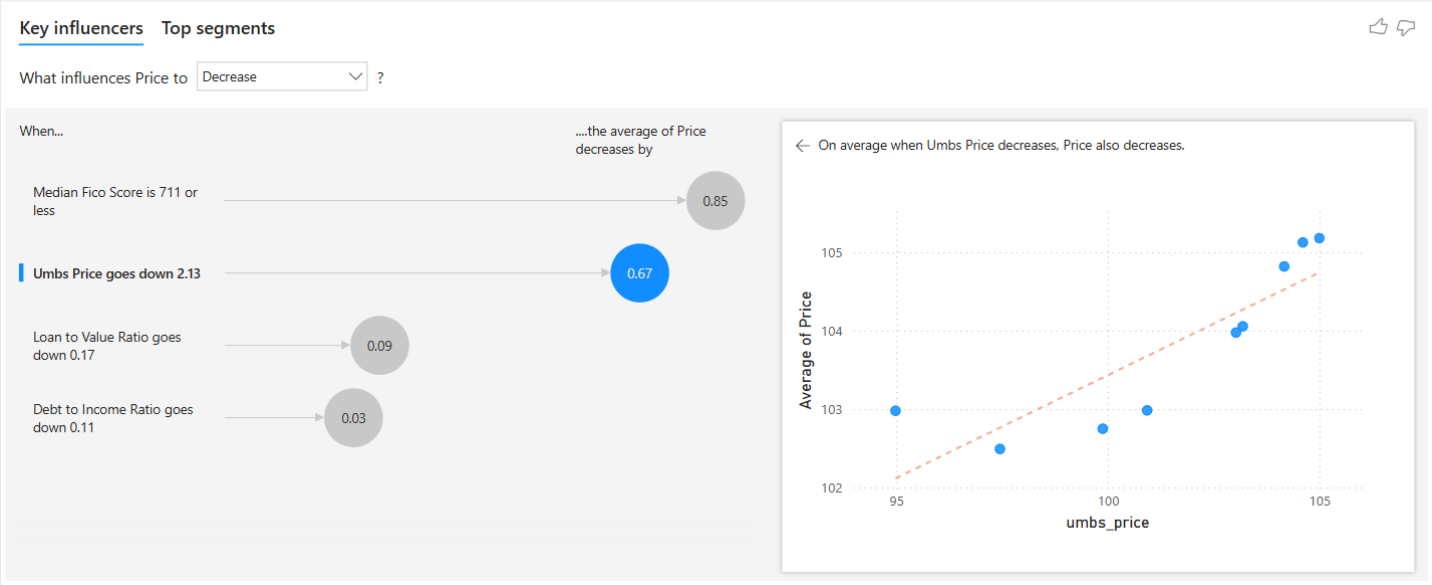
B. Price Decrease Drivers

- **Median FICO Score ≤ 711**

- Result: Average price decreased by 0.85

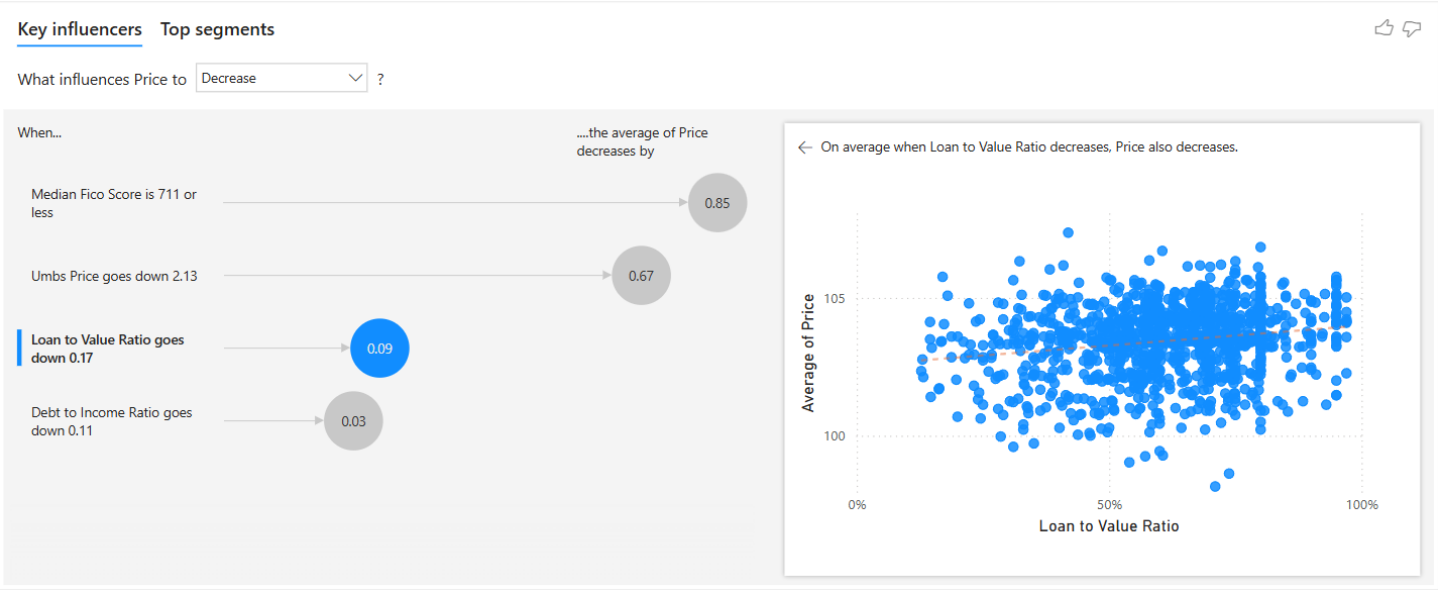
- Interpretation: Lower credit scores significantly reduce loan attractiveness and execution price.

- **UMBS Price decreases by 2.13 points**



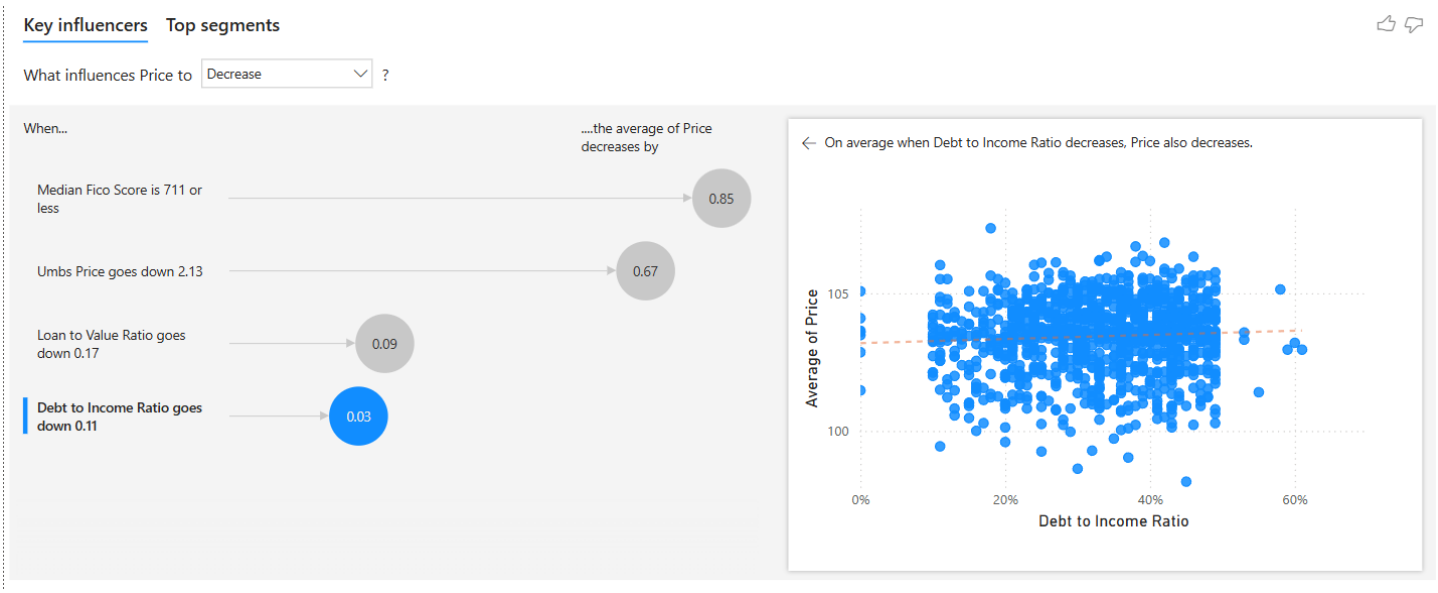
- Result: Average price decreased by 0.67
- Interpretation: A market-level trend that reduces investor willingness to pay.

- **Loan-to-Value (LTV) decreases by 0.17**



- Result: Average price decreased by 0.09
- Interpretation: Surprisingly, certain low LTV scenarios did not improve pricing — possibly due to conservative valuations or lower revenue potential.

- **Debt-to-Income (DTI) decreases by 0.11**



  - Result: Average price decreased by 0.03
  - Interpretation: Lower DTI sometimes correlates with smaller loan sizes or reduced loan profitability.

Visual Summary:

- The Key Influencer visualizations included both bar charts and scatter plots.
- Strong linear trends were evident in FICO and UMBS relationships.
- LTV and DTI showed more variability, indicating nuanced impacts that depend on context.

4. Strategy Realignment: Pricing Recommendation

Understanding the Use of Basis Points (bps):

- A basis point is 1/100th of 1 percent (1 bps = 0.01%).
- This unit is used to express interest rate or pricing changes in a more precise and consistent way.
- For example:
  - A 72 bps increase means pricing improved by 0.72%.
  - An 85 bps decrease means pricing worsened by 0.85%.

Business Finding:

- Loans for borrowers with FICO > 760 were priced 72 bps better.

- Loans for FICO ≤ 711 were priced 85 bps worse.

Recommended Pricing Strategy:

Rather than applying blanket adjustments, implement a tiered pricing system based on FICO credit bands:

Proposed FICO-Based Tiers

- **Tier 1: FICO > 760**
    - Offer most competitive rates.
    - Lower margins accepted due to lower risk and high execution prices.
- **Tier 2: FICO 711–760**
    - Standard pricing.
    - Balanced risk and reward profile.
- **Tier 3: FICO ≤ 711**
    - Apply risk-based price premiums.
    - Justified by lower execution prices and higher risk of default.

Additional Considerations:

- Combine FICO tiers with LTV and DTI ratios for multi-dimensional pricing.
- Monitor UMBS trends daily to adjust secondary market sale timing.
- Ensure the pricing model aligns with regulatory guidelines and fairness policies.

5. Real-World Validation and Best Practices

Lenders in the real world already use this tiered strategy:

- Credit score, LTV, and DTI influence pricing directly.
- Borrowers with excellent credit are offered favorable rates.
- Riskier borrowers are charged more to offset potential default risk.
- These differences are embedded in rate sheets used by originators and underwriters.

6. Final Summary

This analysis revealed the statistical factors influencing mortgage loan pricing and translated them into business recommendations. FICO score emerged as the dominant predictor, followed by market-level UMBS price shifts. While LTV and DTI also influenced pricing, their impacts were more dependent on contextual data.

The proposed strategy of tiered, risk-based pricing offers a scalable, defensible, and competitive way to align profitability with borrower credit risk. Implementing this strategy can help balance growth, competitiveness, and stability in the mortgage business.