

ZIP-Level Home Price Forecasting

A practical risk signal for mortgage underwriting and portfolio monitoring

Improving ZIP-Level Home Price Forecasting

Benefits for Mortgage Lenders

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Why This Complements Existing Lender Tools

Where this fits in your workflow

- Adds a consistent ZIP-level 1-month outlook to complement AVMs, appraisals, and review queues.
- Helps prioritize manual review when short-term collateral risk is elevated
- Supports faster geographic scanning than loan-by-loan monitoring alone

Outputs That Map to Decisions

1) Next-month expected value

Forecast next month's typical home value for each ZIP.

Example: "Expected value next month \approx \$372K".

2) Downside risk flag

Triggers when forecasted next-month return \leq -1%.

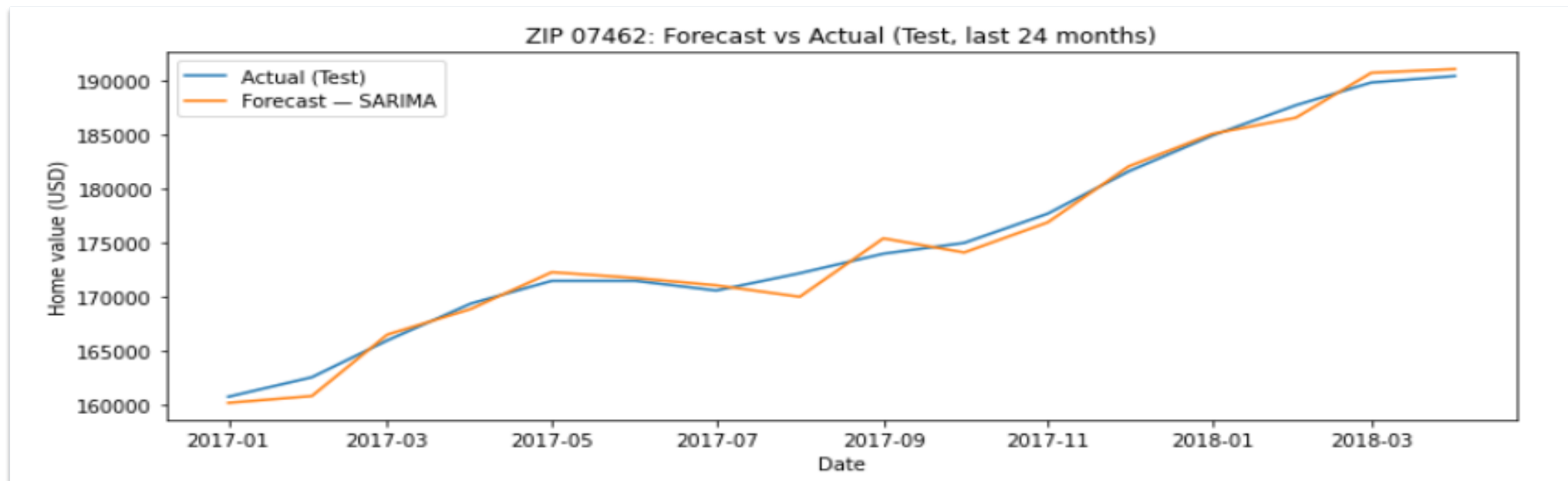
Example: "Route this ZIP to review / tighten terms."

How the Signal Earns Trust (Simple → Smarter)

Modeling approach (business-first)

- Start with a baseline: “next month = last month” (the bar to beat)
- Add trend and seasonality only when it improves validation accuracy
- Select the final approach using RMSE/MAE, then evaluate once on a holdout test

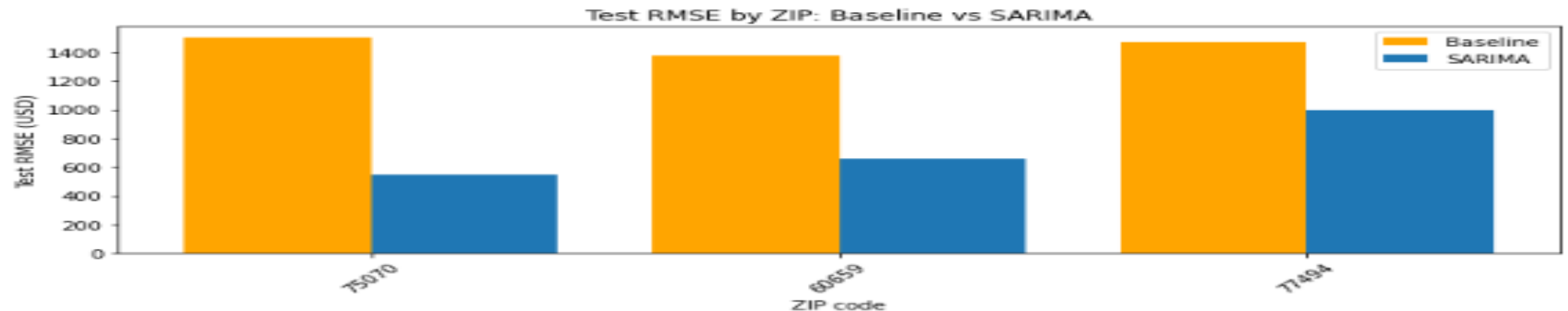
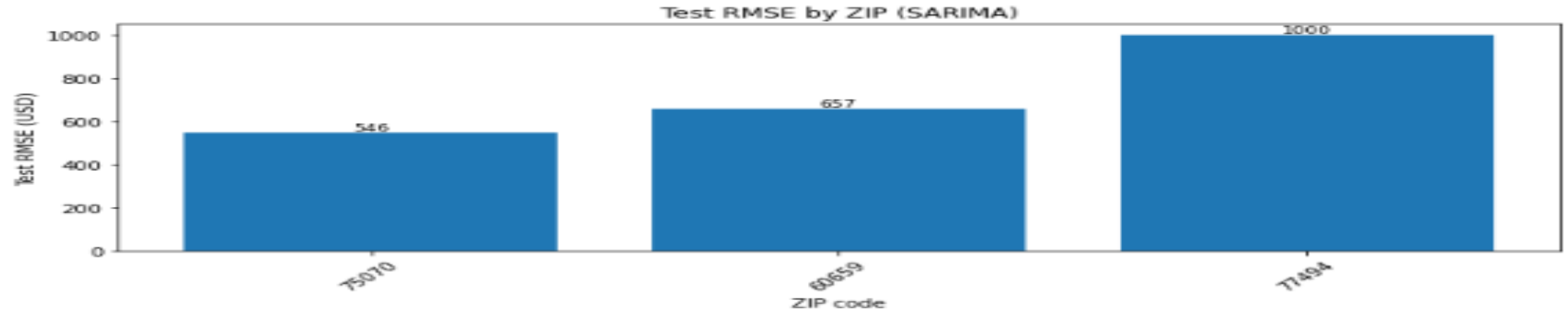
Example ZIP: Actual vs Forecast (Holdout Test)



Key takeaway: the seasonal model tracks recurring market patterns more closely than a simple persistence baseline.

Portfolio View: Where to Focus Attention

| | zip | rmse_baseline | rmse_sarima | rmse_improvement | next_month_pred_ret | risk_flag_decline_le_1pct |
|---|-------|---------------|-------------|------------------|---------------------|---------------------------|
| 0 | 75070 | 1502.081889 | 546.174452 | 955.907436 | 0.000854 | 0 |
| 1 | 60659 | 1373.408169 | 656.538703 | 716.869467 | -0.001336 | 0 |
| 2 | 77494 | 1470.544117 | 1000.258140 | 470.285977 | 0.005991 | 0 |



Interpretation: each bar represents one ZIP. Lower error = a more reliable month-ahead signal for monitoring and review prioritization.

How This Complements Existing Tools

Examples of operational use

- Underwriting: tighten pricing or LTV tolerances in ZIPs flagged for downside
- Portfolio monitoring: route flagged ZIPs into geographic review queues
- Risk management: track alert hit-rate over time as a risk control

Next Steps to Increase Business Value

Roadmap

- Add macro drivers (rates, unemployment) to improve stress sensitivity
- Add loan-level context (LTV, DTI) to better calibrate action thresholds
- Scale evaluation across many ZIPs and monitor performance drift monthly