
ALEX METHODOLOGY

The ALEX Market Trend Model

How the trend line and forecast on every ALEX market statistics page are built · published 22 October 2026
· model row in force: origin September 2026, ledger row e79670256f6f

Every ALEX market statistics page has a trend chart. Until October 2026 its line was a straight-line fit drawn through three years of monthly medians. It now uses the market model ALEX runs everywhere else. This page explains that model twice: first in plain terms, then in exact statistical terms.

Part 1. In plain terms

What the chart shows

The red line is what actually sold. Each point is the middle sale price per square foot for one month, after seller-paid closing costs and repair credits. A month needs at least 25 sales to be drawn.

The gold line is the market trend. It comes from homes that sold twice. Comparing the same house at two dates removes the question of which homes happened to sell. A month full of large new homes can lift the red line without any home gaining value. It does not lift the gold line.

The dashed gold line is the forecast. It shows where the model expects the trend to be 6 and 12 months after its last month. The shaded band is the model's range.

Why it replaced the straight line

The old line was fitted to the same 36 monthly medians it was drawn over. A few unusual months could tilt it. It also knew nothing beyond those 36 points. The new line is estimated from about 289,000 repeat sales across the five-county Austin area, going back to 1996. It is the same series ALEX uses to bring each comparable sale in a valuation to today, and the forecast is the one printed in each valuation's price outlook. One model, everywhere.

Which area it describes

The trend and forecast are for the county. They are drawn at the level of the area being shown, so the line sits on that area’s own prices. But a subdivision or a ZIP code can move differently from its county. ZIP-level repeat-sales indices exist, but they are too noisy to draw: ZIP 78633 moved as much as 8.6% in a single month on one.

How sure the forecast is

The range is narrower than the real uncertainty. It is labelled an 80% range. Tested month by month over 2005–2022, the market finished inside it about two times in three, not eight in ten. In the 2020–2022 boom it failed almost completely. Read the middle line as the model’s best estimate and the band as a minimum spread.

Separately, ALEX’s forecasting studies found that no market model reliably beat “no change” at 12 months ahead. The forecast is shown because it is the official, recorded model. It is not a promise.

Today’s reading for Williamson County

MEASURE	VALUE
Trend over the 12 months to September 2026	−3.7%
Forecast, March 2027 (6 months)	−1.4% (range −6.3% to +3.6%)
Forecast, September 2027 (12 months)	−2.6% (range −10.3% to +5.2%)

Why it can be trusted as a record

Each month’s model is written once to a hash-chained ledger and never edited. Each ledger entry is chained to the one before it by a cryptographic hash. The chart reads that ledger directly and checks the chain. If the chain does not check, or the county is outside the five the model covers, the chart draws no model line at all.

Part 2. In exact statistical terms

2.1 Data

ABOR MLS closed residential sales (PropertyType = Residential, StandardStatus = Closed, ClosePrice > \$10,000). The price is the net price: ClosePrice less seller-paid buyer closing costs and repair credits. Sales are paired as repeat sales of one property. A pair is kept if:

- the holding period is at least 180 days;
- living area changed by no more than 10%;
- the absolute annualised log return is at most 0.5;
- it is not a new-construction first sale resold within 365 days;
- it is not a duplicate transaction (same property and close date, or same price within 31 days);
- its second sale is in the five-county MSA: Travis, Williamson, Hays, Bastrop, Caldwell.

The September 2026 vintage uses 289,319 clean in-MSA pairs. The series run from May 1996 (Caldwell, June 1997) to September 2026.

2.2 The repeat-sales index

Case–Shiller three-stage weighted repeat sales (WRS), estimated monthly in logs. For pair i with sales in months $s < t$ and log price change y_i :

$$\begin{aligned} \text{Stage 1 (Bailey–Muth–Nourse OLS): } & y_i = I_t - I_s + e_i \\ \text{Stage 2 (interval variance): } & \hat{e}_i^2 = a + b \cdot h_i + u_i, \quad h_i = t - s \text{ in months} \\ \text{Stage 3 (WLS): } & \text{weights } 1/\sigma^2(h_i), \quad \sigma^2 \text{ floored at } 0.1 \cdot \text{mean}(\hat{e}^2) \\ & \text{Cov}(\hat{I}) = s^2(X'WX)^{-1}, \quad s^2 = \sum w r^2 / (n - k) \end{aligned}$$

The base month is January 2000 ($I = 0$). Only months in the connected component of the pair graph are estimated. Nothing is interpolated. A metro index is fitted on all pairs. Each county with at least 400 clean pairs gets its own index (all five qualify). Each county month is then shrunk toward the metro month in log space:

$$I_{\text{county,shrunk}}(m) = w \cdot I_{\text{county}}(m) + (1 - w) \cdot I_{\text{metro}}(m), \quad w = n_m / (n_m + 20)$$

Here n_m counts pair endpoints in month m . The constant 20 is the production rule and was not tuned. Each index is a real-time vintage: it uses only pairs whose second sale closed by the end of the origin month T , and it is frozen in that month's ledger row.

2.3 Placing the index on the chart

The index measures change, not level. On a market page with monthly medians p_m (net \$/SF, months with ≥ 25 sales), the drawn line is:

$$L(m) = \exp(I(m) + c), \quad c = \text{mean over drawn months of } [\log p_m - I(m)]$$

That is least squares on log levels with the slope fixed at one. A single constant is estimated, from the area's own sales, and the shape is the county's. Twelve-month change is $\exp(I(T) - I(T-12)) - 1$.

2.4 The v2 market forecast

For each unit (five counties and metro), origin T and horizon $h \in \{6, 12, 24, 36\}$ months, the forecast distribution of $I(T+h) - I(T)$ is an equal-weight quantile average (Vincentisation) of three components, at 99 levels (0.01...0.99). The weights are 1/3 each and are not estimated:

COMPONENT	POINT FORECAST
rw	No change: 0.
fhfa	Four-quarter log change of the FHFA purchase-only HPI, Austin MSA, NSA, as known at T (each quarter usable 3 months after quarter end), $\times h/12$. Same for every county.
bvar_H60	Four-variable monthly BVAR per unit, 12 lags. Variables: index log growth (vintage T), 30-year mortgage rate (MORTGAGE30US), payroll growth (12-month log change of AUST448NA), log months of supply. Minnesota prior in Litterman ridge form: $\lambda_1 = 0.2$, $\lambda_2 = 0.5$, $\lambda_3 = 1$. First own-lag prior mean is 0 for index growth and 1 for the others. Observation s is weighted $0.5^{(T-s)/60}$ (60-month half-life). Posterior-mean coefficients are iterated forward and growth is summed over h .

Ranges (method B). Each point forecast becomes a distribution:

$$Q_{\tau} = \text{point} + \sigma(T, h) \cdot \sqrt{h} \cdot z_{\tau}$$

- z_{τ} is a weighted quantile of two pooled sets of standardised errors.
 - The component's own past errors: origins $s \leq T-h$ across the five counties, expanding from January 2004. They are used once at least 24 exist.
 - FHFA all-transactions index shocks (ATNHPIUS12420Q, ALFRED vintages as of T). Each set is weighted by its number of non-overlapping h -month windows; FHFA carries about 0.76–0.92.
- σ blends a 24-month-half-life EWMA standard deviation of monthly index growth with its full-history standard deviation, weight $0.5^{h/24}$.

The chart draws the 10th, 50th and 90th percentiles at 6 and 12 months:

$$L(T+h) = \exp(I(T) + c + q_{\tau}(h)), \quad \tau \in \{0.10, 0.50, 0.90\}$$

Caldwell County carries the metro forecast in every component.

2.5 Evidence and calibration

The market quantiles are not calibrated. Adaptive quantile tracking in the v2 specification applies only to property-level forecasts. Real-time replay results for the metro unit are exploratory, scored against the final index, which still revises:

PERIOD	CRPS H=12, V2	CRPS H=12, NO CHANGE	80% COVERAGE H=6	80% COVERAGE H=12
2005–2015	0.0382	0.0519	0.658	0.685
2016–2022	0.0735	0.0912	0.619	0.631

- CRPS. v2’s continuous ranked probability score is lower than no change in both periods; lower is better.
- Coverage. 80% coverage is well below nominal.
- 2020–2022 boom. In the development sample, coverage collapsed to 0.02–0.30.
- 2023–2026 holdout. Against no change at 12 months, the bootstrap p-value for the BVAR component was 0.498, so it showed no significant gain.

The prospective test is pre-registered:

- one ledger row per month, issued on the 15th;
- market truth frozen from the index vintage published at T + h + 3 months;
- a formal readout after 60 matured origins.

As of 22 October 2026, two rows are issued (origins August and September 2026). None has matured.

2.6 Provenance

The chart reads the newest row of the official ledger (forecast-model/v2/ledger) through a read-only service that verifies the hash chain first. The row used here:

- origin: 2026-09;
- issued: 2026-10-08 21:09 CDT;
- row hash: e79670256f6f…;
- specification: V2_SPEC through amendment A6.

Without a valid row for the county, the page draws the measured medians only.

2.7 Limitations

- County level. The forecast is a county-level market forecast. It is not a forecast for one subdivision or one home.
- Interval width. The ranges are too narrow by the replay evidence above.
- Index revisions. The newest index months rest on fewer pairs, and late-reported sales revise them.
- Payroll and FHFA inputs. These are metro-level series, so every county shares them.

References

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