

Sensitivity Analysis of GE-LAV Predictions

Session 15 · When the framework is robust, when it isn't

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What we'll cover today

1

Why sensitivity matters

Calibration risk · model risk

2

Parameter sensitivity

κ, σ, \bar{L} — local sensitivities

3

Crisis depth sensitivity

$L = -1.5$ vs -2.0 vs -2.5

4

Robustness checks

Five tests every analysis should pass

5

Practical sensitivity rules

When to trust, when to caveat

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Why sensitivity matters for GE-LAV

CATEGORY 1

Highly robust predictions

Predictions where 10% parameter variation changes the result by <5%. These can be cited with confidence.

→ Example: long-run mean valuation

CATEGORY 2

Moderately sensitive

Predictions where 10% parameter variation changes the result 5-15%. Cite with explicit caveats and ranges.

→ Example: optimal exit boundary

CATEGORY 3

Highly sensitive

Predictions where 10% parameter variation changes the result >15%. Use ranges and qualitative direction, not point estimates.

→ Example: GFC-depth pricing

Knowing the category before using a result is essential for honest GE-LAV practice.

Parameter sensitivity table (calibrated baseline)

Each cell shows percentage change in the asset value for a $\pm 10\%$ change in that parameter.

Prediction	$\kappa \pm 10\%$	$\sigma \pm 10\%$	$\bar{L} \pm 10\%$	$L_0 \pm 10\%$
Long-run mean valuation	$\pm 1.5\%$	$\pm 2.0\%$	$\pm 3.0\%$	$\pm 0.0\%$
Term structure $\pi(L,T)$	$\pm 3.0\%$	$\pm 4.5\%$	$\pm 2.0\%$	$\pm 5.0\%$
Optimal exit boundary $L^*(t)$	$\pm 5.0\%$	$\pm 8.0\%$	$\pm 4.0\%$	$\pm 2.0\%$
Jensen bias magnitude	$\pm 4.0\%$	$\pm 10.0\%$	$\pm 1.0\%$	$\pm 6.0\%$
GFC-depth pricing ($L=-1.5$)	$\pm 8.0\%$	$\pm 18.0\%$	$\pm 5.0\%$	$\pm 28.0\%$
Welfare gap estimate	$\pm 6.0\%$	$\pm 15.0\%$	$\pm 4.0\%$	$\pm 22.0\%$
Pigouvian tax $\tau^*(L)$	$\pm 10.0\%$	$\pm 25.0\%$	$\pm 6.0\%$	$\pm 35.0\%$

Green: robust ($< 5\%$) • Gold: moderate (5-15%) • Red: highly sensitive ($> 15\%$)

Pattern: predictions about the tails (GFC, welfare, taxes) are most sensitive — exactly where the framework most claims to add value.

Five robustness tests for any GE-LAV analysis

Before presenting GE-LAV results, run these five tests:

1

Sub-sample stability

Does the calibration hold across 2003-2010 vs. 2011-2024?

If parameters differ by >25%, regime instability is a concern. Use sub-period results.

2

Out-of-sample prediction

Calibrate on 2003-2019. Predict 2020-2024. How close?

GE-LAV passes if predictions are within $\pm 20\%$ of observed values.

3

Alternate calibration sources

Use Lazard data → does it produce the same parameters as Evercore data?

Cross-source agreement is essential for credibility.

4

Bootstrap parameter uncertainty

Resample data 1,000 times. What's the 95% CI for each parameter?

Report results with bootstrap CIs, not just point estimates.

5

Stress-test alternative DGPs

What if $L(t)$ follows CIR instead of OU? Or jump-diffusion?

If results survive alternative DGP assumptions, robust. If not, model risk.

What 'sensitivity' means here

Two distinct questions about GE-LAV robustness.

Q1: parameter sensitivity

How do predictions change if κ , σ , π _params shift?

Q2: structural sensitivity

What if the underlying model is wrong (e.g., not OU)?

Q3: data sensitivity

What if the secondary market data is biased?

Today's focus

Q1 (most tractable); touch Q2 and Q3 briefly

Why this matters

Practitioners need confidence intervals, not point estimates

Tool

Local sensitivity (partial derivatives) and global (Monte Carlo)

Session 15 summary

What we accomplished today

- 1 GE-LAV predictions vary widely in sensitivity — from <5% (robust) to >35% (highly sensitive)
- 2 Most robust: long-run mean valuation, term-structure shape
- 3 Most sensitive: tail predictions (GFC pricing, welfare, Pigouvian tax)
- 4 Run the five robustness tests before publishing or citing any GE-LAV result

Next session

Unit 4 begins: regulatory and platform implementation

Parameter sensitivity: GE-LAV master output

Effect of each parameter on the GE-LAV / DCF gap.

Parameter	Base value	+10%	-10%	Gap (% chg)
κ (OU reversion)	0.45	0.495	0.405	-3% (faster recovery)
σ (vol)	0.32	0.352	0.288	+18% (more risk)
\bar{L} (long-run mean)	1.0	1.1	0.9	-7%
π_{\max} coefficient	0.045	0.0495	0.0405	+11%
β (linear in L)	-0.025	-0.0275	-0.0225	+4%
γ (quadratic)	0.021	0.0231	0.0189	+9%

σ and π_{\max} coefficient dominate; calibration of these matters most.

When GE-LAV is most robust

Use cases where the framework is least sensitive to parameter uncertainty.

Normal-regime predictions

Near $L=0$, predictions are within $\pm 15\%$ of point estimate

Long-horizon term structure

$T > 8$ yrs: averaging reduces variance

Portfolio-level results

Aggregating across funds dampens single-fund errors

Out-of-sample forecasting

Predictions robust across calibration windows

Welfare gap estimation

$\pm \$50\text{B}$ around the $\$300\text{B}/\text{yr}$ central estimate

When GE-LAV is least robust

Where to be cautious with the framework.

Extreme L ($|L| > 2$)

Tail estimation is inherently uncertain

Short horizons ($T < 2$ yrs)

Term structure noise dominates

Crisis-onset prediction

Timing is essentially unpredictable

Cross-asset spillovers

Not modeled; sensitivity to single-asset assumption

Recent vintage tail

Insufficient cycle data; bias toward bull-market patterns

Sensitivity to model structure

What if the true L process isn't OU?

OU vs CIR

Try CIR (mean-reverting square-root); GE-LAV results similar in 80% range

OU vs jump-diffusion

Adding jumps amplifies crisis predictions by 20-30%

Stationarity check

Test for κ time-variation; 30-yr data shows mild drift

Non-Gaussian innovations

Empirical L distribution has slight kurtosis

Practical advice

Report OU baseline + 1 alternative structure

Sensitivity to data quality

How discount-to-NAV data could mislead.

Selection bias

Secondary trades happen when LP wants to sell; not random sample

Stale NAV

Reported NAV lags true NAV by 1-2 quarters

Negotiation noise

Bilateral trades have private info; mid-market estimates

Survivor bias

Funds in distress may not transact at all

Mitigation

Use multiple data sources (Lazard, Greenhill, PJT); cross-check

Monte Carlo sensitivity analysis

How to run a full Monte Carlo over parameter uncertainty.

Step 1

Specify prior distributions for κ , σ , π -params (book Table 5.2)

Step 2

Draw 10,000 samples • solve GE-LAV for each

Step 3

Report 95% credible intervals on each prediction

Step 4

Identify which parameters drive most variance

Step 5

Time: ~2 hours on a modern laptop

Output

Distribution of welfare gap: 95% interval \$230-\$380B/yr

Robustness checks to report in papers

What to include in any GE-LAV-based research output.

Calibration window variation

Re-estimate over different historical windows

Sub-sample analysis

Pre-2008 vs post-2008 calibrations

Alternative L process

Show CIR or jump-diffusion results in appendix

Out-of-sample window

Hold out one year for validation

Confidence intervals

Always report; not just point estimates

Bridge to Session 16

We now have a robust framework. How do regulators use it?

Solvency II implications

Insurance capital depends on illiquidity premia

Basel implications

Banks holding PE need state-dependent capital

ORSA (Own Risk and Solvency Assessment)

Internal models must incorporate L_t

Pillar 2 add-ons

Regulators can require GE-LAV-consistent stress tests

Session 16 covers

Specific regulatory frameworks and their gaps