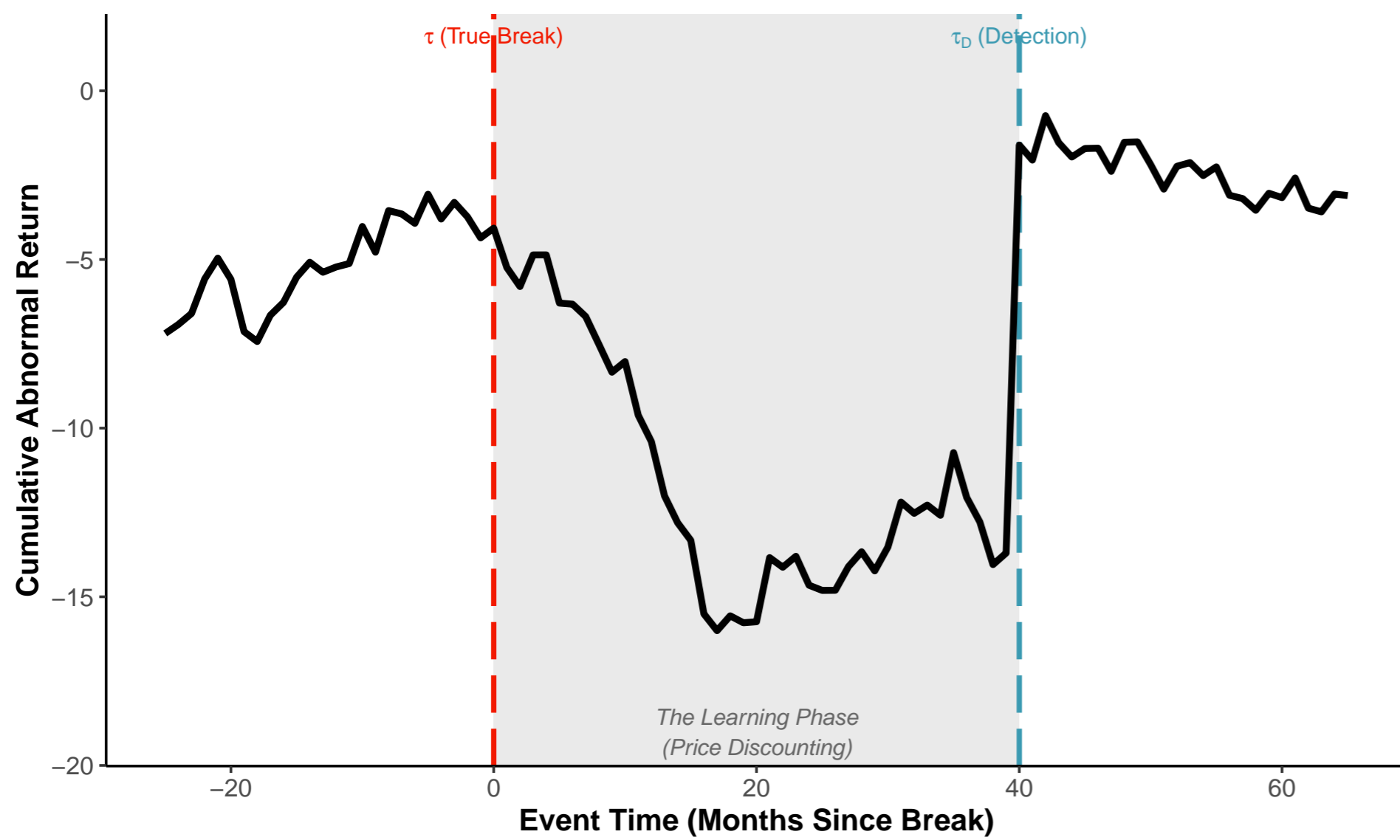


Motivation & Literature

- **Structural breaks are pervasive:** stock return processes shift over time rather than remain stable (Pástor & Stambaugh, 2001; Kim et al., 2005; Smith & Timmermann, 2022).
- **Breaks create parameter uncertainty:** historical data lose relevance, making post-break means and variances harder to estimate (Pesaran et al., 2006; Dangl & Halling, 2012).
- **Markets should price this uncertainty:** ambiguity-averse investors discount assets with unstable parameters (Ellsberg, 1961; Garlappi et al., 2007; Easley & O'Hara, 2009).
- **Uncertainty resolves through learning:** confidence recovers as post-break data accumulate (Pástor, 2000; Pástor & Veronesi, 2009; Collin-Dufresne et al., 2016).
- **This paper:** we test whether *break-age* proxies for stock-level parameter uncertainty and predicts return dynamics around structural breaks (Ang et al., 2006; Diether et al., 2002).

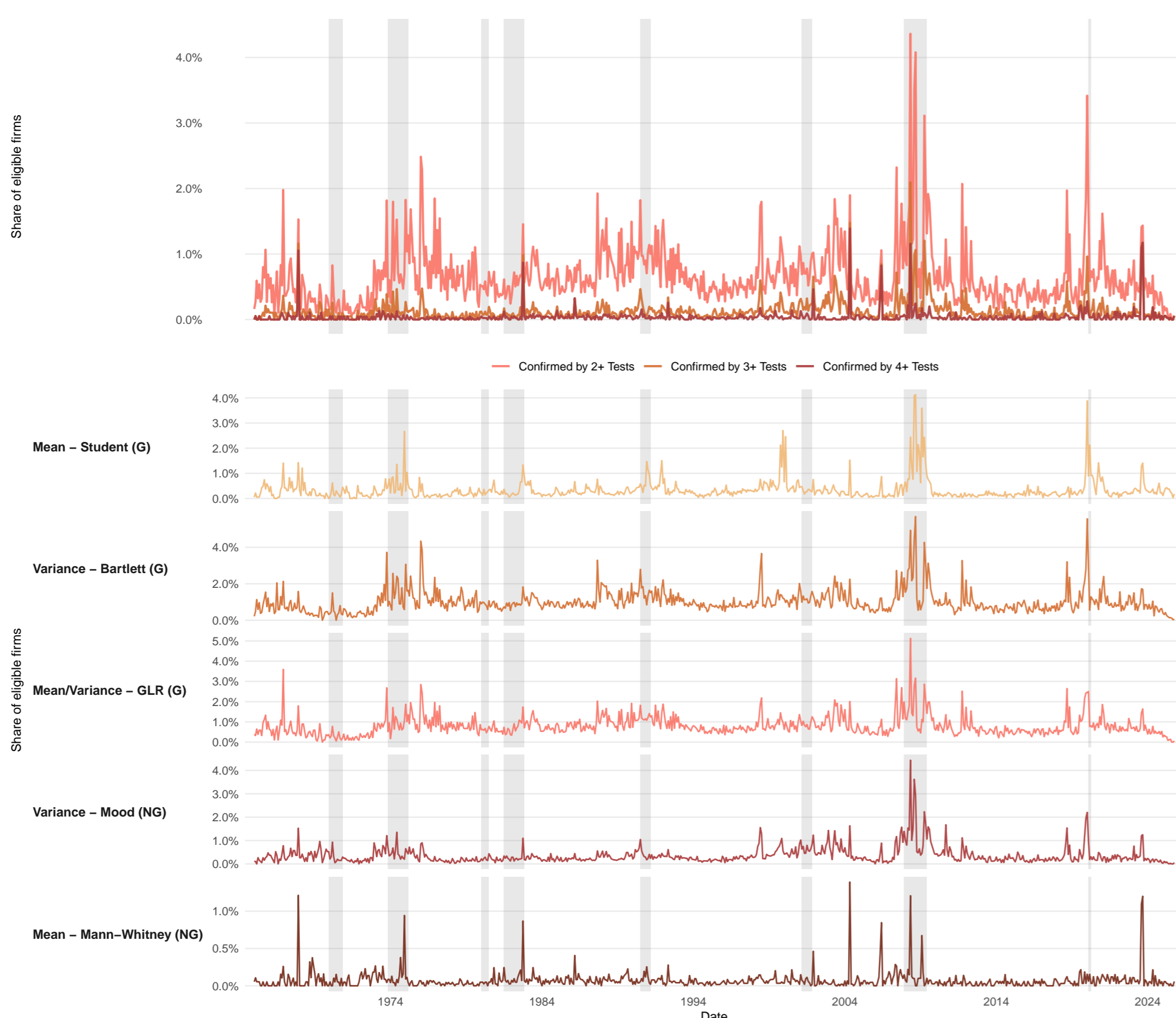
Stylized Life Cycle



Data & Methodology

- **Sample:** CRSP monthly delisting-adjusted stock returns, 1966–2024; exclude recent IPOs and stocks priced below USD 5.
- **Break-age:** months since the most recent structural break in a stock's return process.
- **Break detection:** online tests use only information available up to month t (Mean - Student (G), Variance - Bartlett (G), Mean/Variance - GLR (G); plus non-Gaussian robustness checks).
- **Calibration:** simulation-based tuning balances low false positives against economically meaningful detection power.
- **Event study:** treat each detected break as an event and track abnormal returns from break month to statistical detection.
- **Counterfactuals:** Mahalanobis matching on pre-break firm characteristics avoids unstable betas near breaks and yields matched abnormal returns.

Panel A: Breakpoint Confirmation (Out-of-Sample)



Takeaway: Out-of-sample breakpoint confirmations cluster around the same detection episodes, supporting that the monitored breaks are systematic rather than isolated noise.

Panel B: Resolution of Uncertainty Around Detection

Mean CARs from the break month (τ) to statistical detection (τ^D). Bold entries indicate estimates with $|t| > 2$.

Method	r_τ	$r_{\tau+1, \tau^D-1}$	r_{τ^D}
Mean - Student (G)	0.020	-0.286	0.089
Mean - Mann-Whitney (NG)	-0.066	-1.042	-0.160
Variance - Bartlett (G)	-0.021	-0.123	0.115
Variance - Mood (NG)	-0.025	-0.113	0.026
Mean/Variance - GLR (G)	-0.025	-0.170	0.098

Takeaway: All five tests show a negative return drift between the break and its later confirmation, while the detection-month rebound is positive for four tests and negative only for Mann-Whitney.

Panel C: How Uncertainty Evolves After a Break

This panel asks whether larger break shocks and longer detection delays predict deeper losses, slower resolution, and stronger rebounds. All regressions include break-method and calendar-year fixed effects; standard errors are double-clustered by firm and year.

Regressor	Severity	Drawdown + shock controls	Time until trough	Rebound at detection
<i>Shock characteristics</i>				
Δ Mean		3.36***	-13.5***	1.42***
Δ Vola		-1.24***	-6.78***	0.646***
Δ Mean \times Δ Vola		-0.652***	-4.28	1.24***
<i>Learning delay and firm size</i>				
Time to Detection	-0.017***	-0.016***		
$\log(MC)$	-0.012*	0.006		
Time to Detection \times $\log(MC)$	0.002***	0.001***		

How to read this panel:

- Longer detection delays are associated with more severe drawdowns.
- The positive interaction with firm size shows that this delay penalty is weaker for larger firms.
- Larger shocks in means and volatility are linked to faster troughs and stronger rebounds once the break is confirmed.

Panel D: Size Quintiles and 12-Month CARs

Twelve-month between-period CARs by size quintile. Values are percentages. Bold entries indicate estimates with $|t| > 2$.

Method	Q1	Q2	Q3	Q4	Q5
Mean - Student (G)	-5.47	1.71	3.00	4.46	2.29
Mean - Mann-Whitney (NG)	-11.40	-4.78	-4.17	-2.45	-0.38
Variance - Bartlett (G)	-2.19	-0.49	0.07	0.72	0.65
Variance - Mood (NG)	-2.77	-1.40	-0.07	-0.12	0.15
Mean/Variance - GLR (G)	-3.10	-0.81	-0.00	0.52	0.52

Takeaway: The size gradient is strongest for Bartlett and GLR, but across most methods the smallest firms experience the most negative between-period abnormal returns.

Conclusion & Outlook

- **Conclusion:** Structural breaks create a measurable uncertainty window in which returns remain depressed until the new regime becomes statistically identifiable.
- **Main message:** The evidence is strongest for Variance - Bartlett (G) and Mean/Variance - GLR (G), which show a clear sequence of break-month losses, negative drift during the ambiguity window, and revaluation at detection.
- **Cross-sectional implication:** The discount is most pronounced among smaller firms, consistent with slower learning and weaker information environments after a regime shift.
- **Outlook:** Link break events more directly to firm news and macro shocks, and test whether break-age improves asset-pricing and risk-forecasting models out of sample.