Price Path Convexity and Analyst Recommendations

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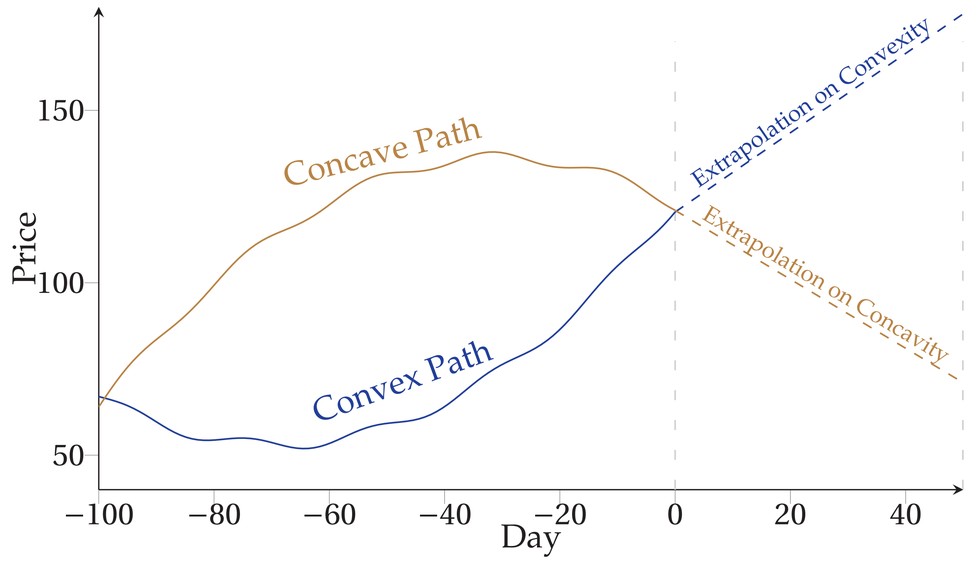
Price path convexity and Investor behavior



- At day 0, an investor decides which stock to buy.
- The figure shows two stocks with identical cumulative returns; only the price path differs— down-to-up (convex) versus up-to-down (concave).
- Faced with these two price paths, the investor is more likely to prefer the convex stock (Grosshans and Zeisberger, 2018).
- This extrapolation-driven demand leads to mispricing, with convex stocks earning lower short-horizon future returns (Gulen and Woeppel, 2024).

What would Analyst do?

- Analyst may also extrapolate and upgrade stocks with convexity, catering to the investors' extrapolation.
- They may counteract investor-driven extrapolation by downgrading stocks with convexity.

AND

- Higher returns along with high convexity may signal strong momentum, prompting analysts to upgrade high convexity stocks
- Higher returns along with convexity may signal the exacerbated mispricing and may prompt higher downgrades from analysts.

Data

Analyst Recommendations Data (1994–2022)

- Downgrade: Dummy equals 1 if the analyst's current recommendation for the firm is more pessimistic than the previous one; upgrade is defined analogously.
- Price Path Convexity: Scaled difference between midpoint and average of daily prices; higher (lower) values indicate convex (concave) paths.

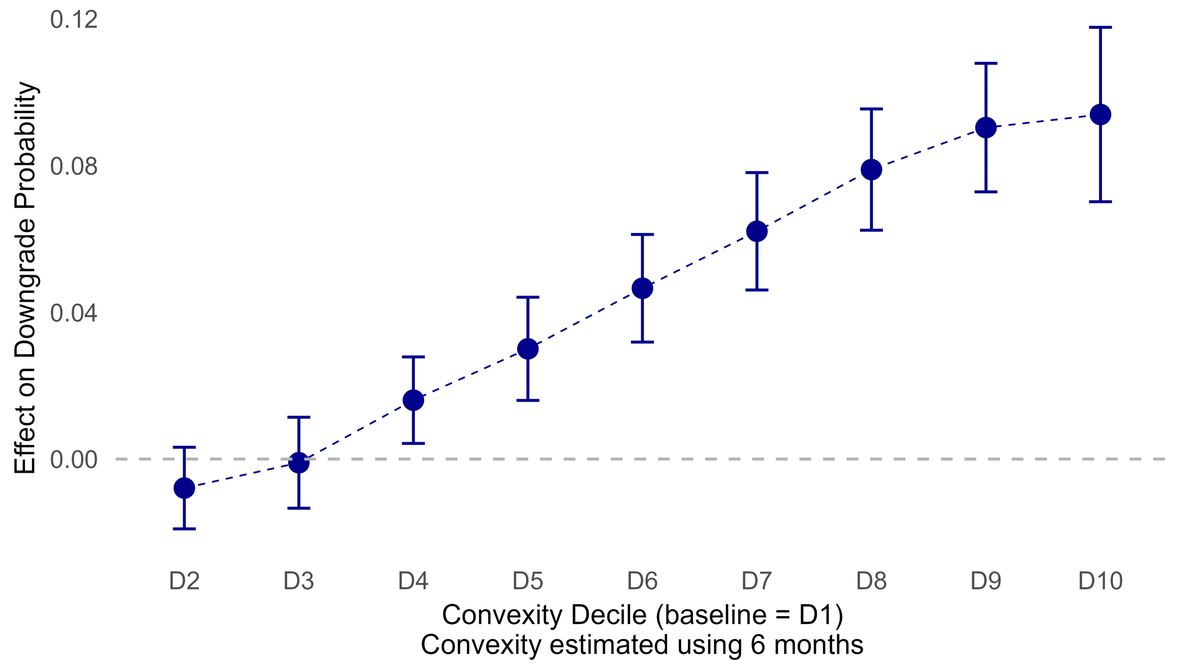
Results - Convexity and Downgrades

Dependent variable Downgrade Dummy	**Convexity estimated using**		
	3 months	**6 months**	**12 months**
Convexity (Scaled)	0.0229***	0.0309***	0.0172***
Num. obs.	320,972	320,972	320,972
Adj. R^2 (full)	0.113	0.113	0.112

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Fixed effects and Controls: Yes, Convexity is scaled by mean 0 and SD 1.

Interpretation: Higher convexity is associated with higher downgrades.

Coefficient plot: Convexity deciles and Downgrades



Interpretation: The estimated probability of a downgrade increases monotonically across convexity deciles.

Results - Convexity, Returns and Downgrades

Dependent variable Downgrade Dummy	**Interaction variables**		
	Returns	**Momentum**	**Contrarian**
Convexity	0.030***	0.021***	0.039***
Interaction	−0.011***	0.030***	−0.020***
Convexity × Interaction	**0.023*****	**0.028*****	**−0.039*****
Obs.	333,730	333,287	333,287
R^2 (full)	0.116	0.114	0.114

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Convexity estimated using 6 months. Fixed effects and Controls: Yes

Interpretation: The association between convexity and downgrades strengthens with higher returns; it is stronger for momentum stocks and weaker for contrarian stocks.

Are downgrades really informative?

Dependent variable Downgrade Dummy	**Future returns**		
	3 months	**6 months**	**12 months**
Convexity	−0.007***	−0.008***	−0.012***
Downgrade	−0.0089***	−0.0056***	0.0073***
Convexity × Downgrade	**−0.0047*****	**−0.0032****	**−0.0046****
Num. obs.	325,774	316,793	301,429
R^2	0.376	0.437	0.531

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Convexity estimated using 6 months. Fixed effects and Controls: Yes

Interpretation: Downgrades during periods of high convexity are followed by negative future returns, possibly indicating that analysts counteract potential mispricing.

Conclusion

- Analysts respond contrarily to investor extrapolation reflected in price path convexity.
- They may be acting as a corrective force against the convexity-induced potential mispricing.