

Dynamic Asset (Mis)Pricing: Build-up versus Resolution Anomalies

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Discussion:

EBEN LAZARUS

MIT Sloan

SFS Cavalcade

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Can we systematically identify these firms/portfolios?

Bloomberg

US Edition ▾

AMC Looks to Issue 25 Million More Shares After 2,300% Rally

- Regulatory filing says new share sale won't take place in 2021
- Theater chain has raised more than \$800 million this week

By Kelly Gilblom

June 3, 2021, 6:06 PM EDT *Updated on June 3, 2021, 7:20 PM EDT*

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AMC Theatres Raises \$230.5M for Acquisitions, Investments via Stock Sale

The company plans to use the money from the share sale to Mudrick Capital "primarily for the pursuit of value creating acquisitions of theater assets and leases, as well as investments to enhance the consumer appeal of its theaters."

BY [GEORG SZALAI](#)  JUNE 1, 2021 3:39AM

Outline

1. Brief Recap
2. Mispricing vs. Risk
3. Convergence Horizon
4. Statistical Issues & Robustness

Overview

Paper proceeds in steps:

1. Define and estimate **price wedges** for anomaly portfolios

- ▶ See some anomaly portfolio with α relative to benchmark model (mostly CAPM)
- ▶ Tempting to assume that positive $\alpha \iff$ ex ante underpricing. . .
- ▶ . . .but wrong: α could be *exacerbating* mispricing
- ▶ Solution: Assume that buy-and-hold portfolio mispricing unconditionally disappears by 15 years after formation date. Then:

$$\text{Price Wedge} = -\mathbb{E} \left[\log \left(\frac{\text{Fundamental Value}_t}{\text{Price}_t} \right) \right],$$

$$\text{where } \frac{\text{Fundamental Value}_t}{\text{Price}_t} = \mathbb{E}_t \left[\sum_{s=1}^{180 \text{ mo.}} \frac{m_{t+s}}{m_t} \frac{D_{t+s}}{P_t} + \frac{m_{t+180}}{m_t} \frac{P_{t+180}}{P_t} \right]$$

- ▶ Interesting results: value, size, investment go in “right” direction (resolve mispricing), but momentum and profit further exacerbate it

Overview

Paper proceeds in steps:

1. Define and estimate **price wedges** for anomaly portfolios. Obtain **unconditional** average mispricing by **decile portfolio**.
2. To get **conditional** mispricing by **firm**: PCA exercise that amounts to taking a linear combination of unconditional portfolio mispricing estimates given firm's characteristics at date t .
 - ▶ If anomaly portfolio mispricing varies over time, then what?

Overview

Paper proceeds in steps:

1. Define and estimate **price wedges** for anomaly portfolios
2. Use these to calculate **conditional** mispricing by **firm**
3. Estimate relationship between mispricing and real investment
 - ▶ Investment- q regressions, where q is split into two parts: (i) price wedge, and (ii) efficient q (difference between observed q and price wedge)
 - ▶ Investment relates significantly to price wedge, esp. for high- q firms

Careful and thorough exploration of important set of questions. Similar to the paper, I'll focus attention on step 1 (price wedge estimation).

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Interpretation: Mispricing vs. Risk

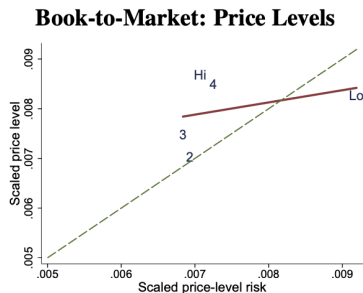
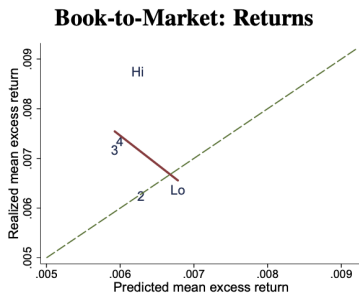
Isn't it begging the question to refer to wedges as "mispricing" rather than compensation for risk?

- ▶ Surprising answer: **Not necessarily!**
- ▶ Even using FF3-based SDF, still get large wedges. . . even for FF3 portfolios
 - ▶ For book-to-mkt, long-short price wedge is still -36% (vs. -54% baseline)
 - ▶ Multifactor SDF correctly prices **one-period returns for rebalanced portfolios**, but not **multi-period returns for buy-and-hold portfolios**
 - ▶ Similar to point made by Chernov, Lochstoer, Lundeby (*RFS*, 2022)

Interpretation: Mispricing vs. Risk

Isn't it begging the question to refer to wedges as "mispricing" rather than compensation for risk?

- ▶ Surprising answer: **Not necessarily!**
- ▶ Then again...**maybe**.
- ▶ According to different measurement of similar price wedge object by Cho and Polk (2021), exposure to long-horizon market return lines up well with wedge:



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Interpretation: Convergence Horizon

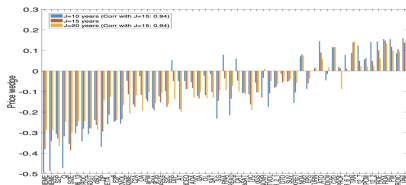
A weaker version of the same question:

What's the assumption of correct pricing after 15 years buying?

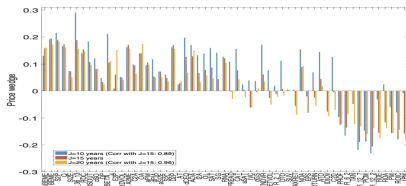
- ▶ The usual assumption would be correct pricing after ∞ years
 - ▶ Similar to *forward-stable* equilibrium selection
- ▶ But given a finite sample, can't do this (*more on this later*)
- ▶ Is this an issue? My first answer: Yes, for portfolios formed (i) on persistent characteristics, (ii) with long-duration firms
 - ▶ Permanent characteristics & mispricing: $\frac{P}{D} = \frac{1}{\text{fair return} + \alpha - g} \implies$ more mispricing the higher g is, and any finite cutoff will underestimate
 - ▶ And we do in fact see $\text{Corr}(\text{characteristic persistence}, |PW|) \approx 0.3$
- ▶ But...
 1. Price wedges in long-short portfolios: mostly from long leg (*unclear why!*)
 2. Firms in long leg tend to be shorter duration (Gormsen & Lazarus, 2021)
- ▶ So seems not to be an issue (see next slide)

Interpretation: Convergence Horizon

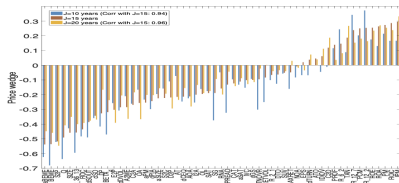
Price wedges in long and short leg estimated using 10-year cutoff (blue), 15-year cutoff (red), 20-year cutoff (yellow):



(a) Long



(b) Short



(c) Long-Short

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Estimation and Inference Issues

- ▶ When choosing price convergence horizon, tension between:
 1. Economic significance (longer horizon is better)
 2. Statistical power (shorter horizon is better)
- ▶ Paper squares this circle by using relatively long horizon (15 years), but extreme portfolio sorts (1st and 10th deciles)
- ▶ Do the results survive using the usual tercile sorts?

4.5.b Going from Decile to Tercile Portfolios

The first panel of Figure 3 shows that **economically large price wedges are still present** if we expand our analysis to the top and bottom three deciles. For instance, various anomalies in the value category (BEME, S2P and Q) are associated with price wedges in deciles 1 to 3 of -25% or below. Consistent with the results in Section 4.3, while this effect is smaller than before when focusing only on the extreme (i.e., first and tenth) deciles, we are now considering

- ▶ This means no! “Statistically significant” means yes.

Estimation and Inference Issues

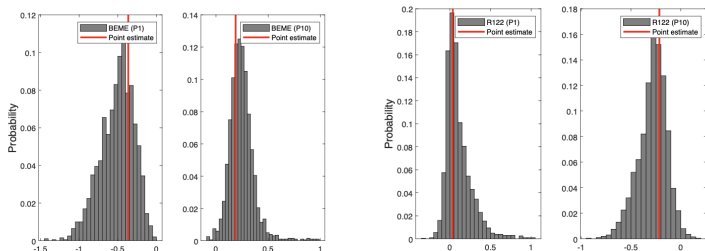
- ▶ But a potential concern for even the stat. significant baseline (decile) results
- ▶ p -values are reported using **bootstrap percentile method**: What percent of bootstrap samples feature positive (negative) price wedges?

TABLE I: **Price Wedges.** This table presents point estimates for the price wedges ($PW \times 100$) of the long and short portfolios constructed by sorting individual stocks on each of 57 characteristics. In particular, we present the price wedges for deciles 1 and 10. The price wedge is calculated using the exponentially affine CAPM SDF that sets the price wedge for the aggregate market equal to zero, using the two bias adjustments discussed in Appendix D. We sort the characteristics on the difference in the price wedge between deciles 1 and 10. **% Underpriced (% Overpriced) is calculated as the fraction of bootstrap simulations** (with block length equal to 180 months, see the description in Appendix F), **where the PW for the long (short) portfolio is negative (positive)**. We also report the price wedge estimates that are not log-bias adjusted (denoted by PW^*). Finally, we report the fraction of CRSP market capitalization allocated to the deciles.

Characteristic		Long (Decile 1)		Short (Decile 10)	
		PW	% Underpriced	PW	% Overpriced
BEME	Book equity over market equity	-36.5	[1.00]	18.8	[0.99]
aBEME	BEME - IndustryAdjusted	-40.5	[0.99]	15.1	[0.81]
S2P	Sales to price	-33.9	[1.00]	18.2	[0.99]
Q	Tobin's Q	-34.4	[0.99]	16.6	[0.99]
SIZE	Market cap	-41.8	[0.95]	7.1	[0.98]
R3613	Long-term reversal	-28.1	[1.00]	17.8	[1.00]

Estimation and Inference Issues

- ▶ But a potential concern for even the stat. significant baseline (decile) results
- ▶ p -values are reported using **bootstrap percentile method**: What percent of bootstrap samples feature positive (negative) price wedges?
- ▶ But this “amounts to looking up the wrong tables backwards” (Hall, 1988)
- ▶ Bootstrap : Data :: Data : Population \implies want to use *left tail* of bootstrap distribution for negative estimate to rule out *positive* population values
- ▶ Some reason for concern here: bootstrap distributions are skewed (e.g., left skewed for negative PW estimates), suggesting higher p -values than reported



(a) Book-to-market

(e) Momentum

FIGURE F.1: Bootstrapped distribution of price wedges.

Final Notes

- ▶ Big step forward on big question: How do anomalies affect real outcomes?
- ▶ Main focus here is on measuring anomaly price wedges
 - ▶ Price wedges are important, whether mispricing or risk: Informative for valuation and q
- ▶ Given this focus, still a lot of interesting questions to answer about effects on portfolio choice and real outcomes
 - ▶ Are firm-level price wedges exploitable out of sample? (Some basic evidence on this in the paper, but using only two-sample test)
 - ▶ How much more useful a measure is PW than one-period α in explaining sensitivity of investment to mispricing?
 - ▶ How distorted is capital allocation in aggregate? Over time?
- ▶ Excited to see future work using this as a starting point