Does Academic Research Destroy Stock Return Predictability?

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Background

- Finance research has uncovered many cross-sectional relations between predetermined variables and future stock returns.

- Beyond their historical insights, these relations are relevant to the extent that they provide insights into the future.

- Whether the typical relation continues outside a study's original sample is an open question, the answer to which can shed light on why cross-sectional return predictability is observed in the first place.

Motivation

- Although several papers note whether a specific cross-sectional relation continues out-of-sample, no study compares in-sample returns, post-sample returns, and post-publication returns for a **large sample** of predictors.

- Jegadeesh and Titman (2001) show that the relative returns to high momentum stocks **increased** after the publication of their 1993 paper.

- While Schwert (2003) argues that, since the publication of the value and size effects, index funds based on these variables **fail** to generate alpha.

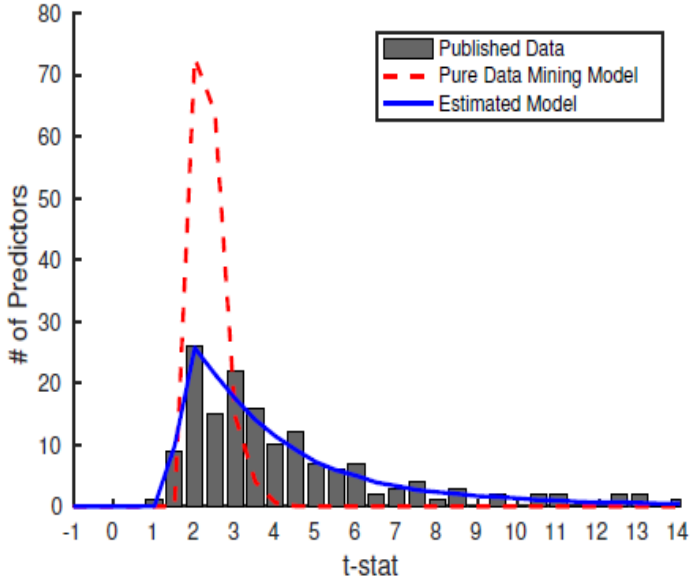
Research idea

① original study's sample period → ② post-sample period → ③ post-publication period

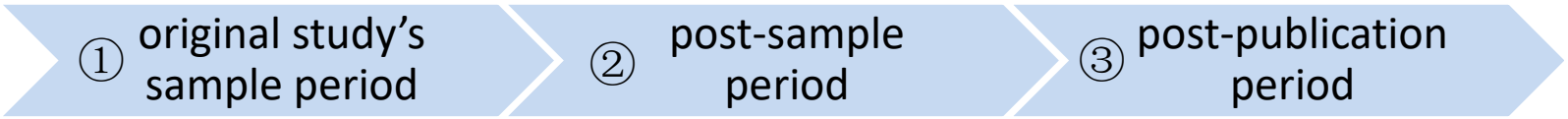
Statistical Bias：① - ②

- Fama (1991) notes that "With many clever researchers on both sides of the efficiency fence, rummaging for forecasting variables, we are sure to find instances of 'reliable' return predictability that are in fact spurious."

- If return predictability in published studies results solely from statistical biases, then predictability should disappear out of sample.



Research idea



Rational Expectations Versus Mispricing： ① - ③ - (① - ②)

- If return predictability reflects only rational expectations, then publication will not convey information that induces a rational agent to behave differently. Thus, once the impact of statistical bias is removed, pre and post publication return predictability should be equal.

- If return predictability reflects mispricing and publication leads sophisticated investors to learn about and trade against the mispricing, then we expect the returns associated with a predictor should disappear or at least decay after the paper is published.

- Decay, as opposed to disappearance, will occur if frictions prevent arbitrage from fully eliminating mispricing. Examples of such frictions include systematic noise trader risk and idiosyncratic risk and transaction.

Research Conclusion

- We estimate the effect of statistical bias to be about 26% (upper bound), The average predictor's return declines by 58% post-publication, which implies a publication effect of 32%.

- Several of our findings support the idea that some or all of the original cross-sectional predictability is the result of mispricing.

- First, the returns of predictor portfolios with larger in-sample means decline more post-publication, and strategies concentrated in stocks that are more costly to arbitrage have higher expected returns post-publication.

- Second, we find that turnover, dollar volume, and especially short interest increase significantly in predictor portfolios post-publication.

- Finally, we find that, before a predictor is featured in an academic publication, its returns are correlated with the returns of other yet-to-be-published predictors, but its returns are not correlated with those of published predictors.

Research Method

Identifying cross-sectional predictors:

- We limit studies in peer-reviewed finance, accounting, and economics journals in which the null of no return predictability is rejected at the 5% level.

- Predictors should be constructed with publicly available data.

- Most studies were identified with search engines (Econlit) by using words such as “cross-section.” Some studies were identified in reference lists in books or other papers.

- We also contacted other finance professors and inquired about predictive variables we may have missed.

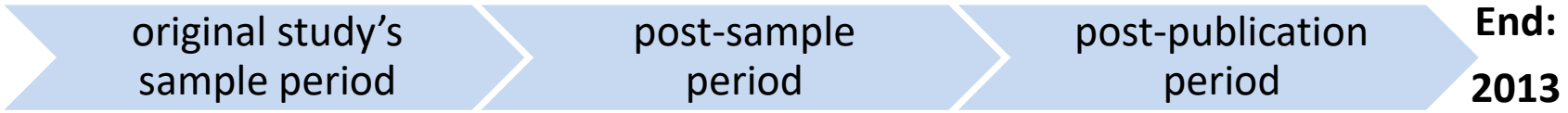
Our search process identifies 79 different studies. Based on these studies, we examine 97 cross-sectional relations, which including all variables that relate to cross-sectional returns.

Research Method

We form **equal-weighted** long-short portfolios based on the extreme 20th percentiles of the characteristic. The long side is the side with the higher returns as documented by the original publication.

Event	Market	Valuation	Fundamental
Change in Asset Turnover	52-Week High	Advertising/MV	Accruals
Change in Profit Margin	Age-Momentum	Analyst Value	Age
Change in Recommendation	Amihud's Measure	Book-to-Market	Asset Growth
Chg. Forecast + Accrual	Beta	Cash Flow/MV	Asset Turnover
Debt Issuance	Bid/Ask Spread	Dividends	Cash Flow Variance
Dividend Initiation	Coskewness	Earnings-to-Price	Earnings Consistency
Dividend Omission	Idiosyncratic Risk	Enterprise Component of B/P	Forecast Dispersion
Dividends	Industry Momentum	Enterprise Multiple	G Index
Down Forecast	Lagged Momentum	Leverage Component of B/P	Gross Profitability
Exchange Switch	Long-term Reversal	Marketing/MV	G-Score
Growth in Inventory	Max	Org. Capital	G-Score 2
Growth in LTNOA	Momentum	R&D/MV	Herfindahl
IPO	Momentum and Long-term Reversal	Sales/Price	Investment
IPO + Age	Momentum-Ratings		Leverage
IPO no R&D	Momentum-Reversal		M/B and Accruals
Mergers	Price		NOA
Post Earnings Drift	Seasonality		Operating Leverage
R&D Increases	Short Interest		O-Score
Ratings Downgrades	Short-term Reversal		Pension Funding
Repurchases	Size		Percent Operating Accrual
Revenue Surprises	Volume		Percent Total Accrual
SEOs	Volume Trend		Profit Margin
Share Issuance 1-Year	Volume Variance		Profitability
Share Issuance 5-Year	Volume-Momentum		ROE
Spinoffs	Volume/MV		Sales Growth
Sustainable Growth			Tax
Total External Finance			Z-Score

Research Method



- The end of the original sample provides a clear demarcation for estimating statistical bias.

- The publication date, in contrast, provides only a proxy for when market participants learn about a predictor.
  - The publication date is determined by the year and month on the cover of the journal.
  - we assume that more investors know about a predictor after the publication date as compared to before the publication date. However, some market participants may not read the paper until years after publication.
  - Post-publication decay in return predictability may therefore be a slow process. Despite the simplicity of our approach, the publication date generates robust estimates of return decay.

Summary Statistics

- Returns are equal-weighted unless the primary study presents value-weighted portfolio results as its primary finding (Ang, 2006).

- The average length of time between the end-of-the sample and publication dates is 56 months. In comparison, the average original in-sample span is 323.

Number of predictor portfolios	97
Predictors portfolios with t-statistic > 1.5 (in sample)	85 (88%)
Mean publication year	2000
Median publication year	2001
Predictors from finance journals	68 (70%)
Predictors from accounting journals	27 (28%)
Predictors from economics journals	2 (2%)
Mean portfolio return in-sample	0.582
Standard deviation of mean in-sample portfolio return	0.395
Mean observations in-sample	323
Mean portfolio return out-of sample	0.402
Standard deviation of mean out-of-sample portfolio return	0.651
Mean observations out-of-sample	56
Mean portfolio return post-publication	0.264
Standard deviation of mean post-publication portfolio return	0.516
Mean observations post-publication	156

1. Predictor Return Dynamics Relative to Publication Dates

$$R_{it} = \alpha_i + \beta_1 \, Post\ sample\ dummy_{i,t} + \beta_2 \, Post\ publication\ dummy_{i,t} + e_{it}$$

- Purely statistical biases(data mining.): $\beta_1 = \beta_2 = -0.582$
- Purely mispricing: $\beta_1 = 0$, $\beta_2 = -0.582$
- Purely rational expectations: $\beta_1 = \beta_2 = 0$

Variables	(1)	(2)	(3)	(4)
Post-Sample (S)	−0.150***	−0.180**	0.157	0.067
	(0.077)	(0.085)	(0.103)	(0.112)
Post-Publication (P)	−0.337***	−0.387***	−0.002	−0.120
	(0.090)	(0.097)	(0.078)	(0.114)
S × Mean			−0.532***	
			(0.221)	
P × Mean			−0.548***	
			(0.178)	
S × *t*-statistic				−0.061***
				(0.023)
P × *t*-statistic				−0.063***
				(0.018)
Predictor FE?	Yes	Yes	Yes	Yes
Observations	51,851	45,465	51,851	51,944
Predictors (*N*)	97	85	97	97
Null : S = P	0.024	0.021		
Null: P = −1 × (mean)	0.000	0.000		
Null: S = −1 × (mean)	0.000	0.000		

97 (0.582) 85 (0.652)

0.157 + (−0.532 × 0.582) = −0.153

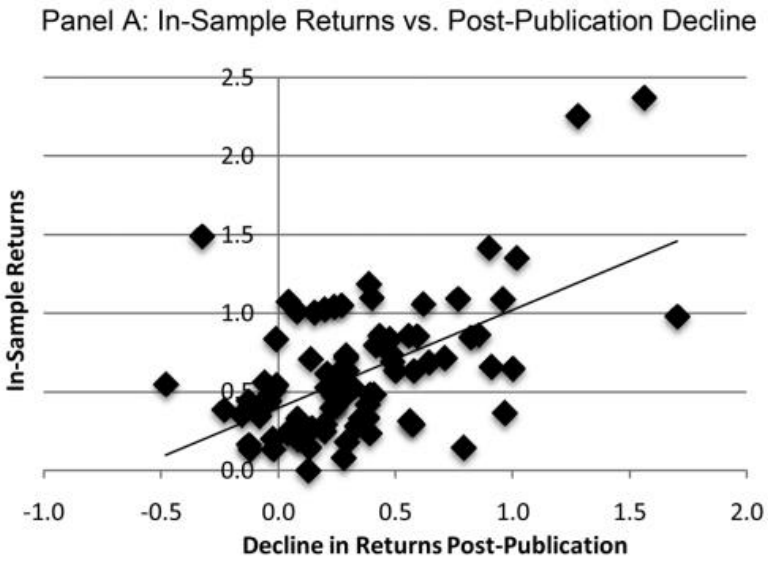
- Post-sample and post-publication returns decline relative to the in-sample mean by 26% and 58%, respectively.

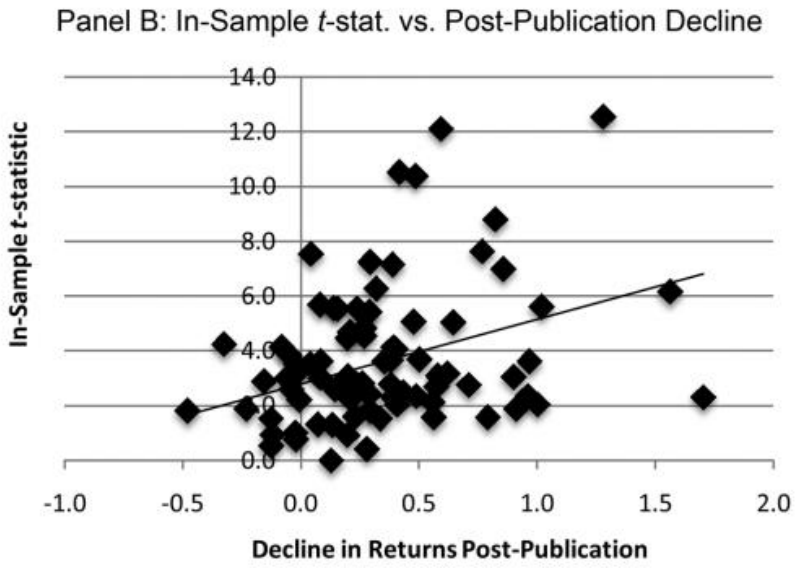
1. Predictor Return Dynamics Relative to Publication Dates

$$R_{it} = \alpha_i + \beta_1 \, Post\ sample\ dummy_{i,t} + \beta_2 \, Post\ publication\ dummy_{i,t} + e_{it}$$

- This could reflect predictors with larger in-sample returns having a larger degree of statistical bias.

- The results here are consistent with the idea that arbitrageurs devote more capital to characteristic portfolios that are associated with higher in-sample returns.

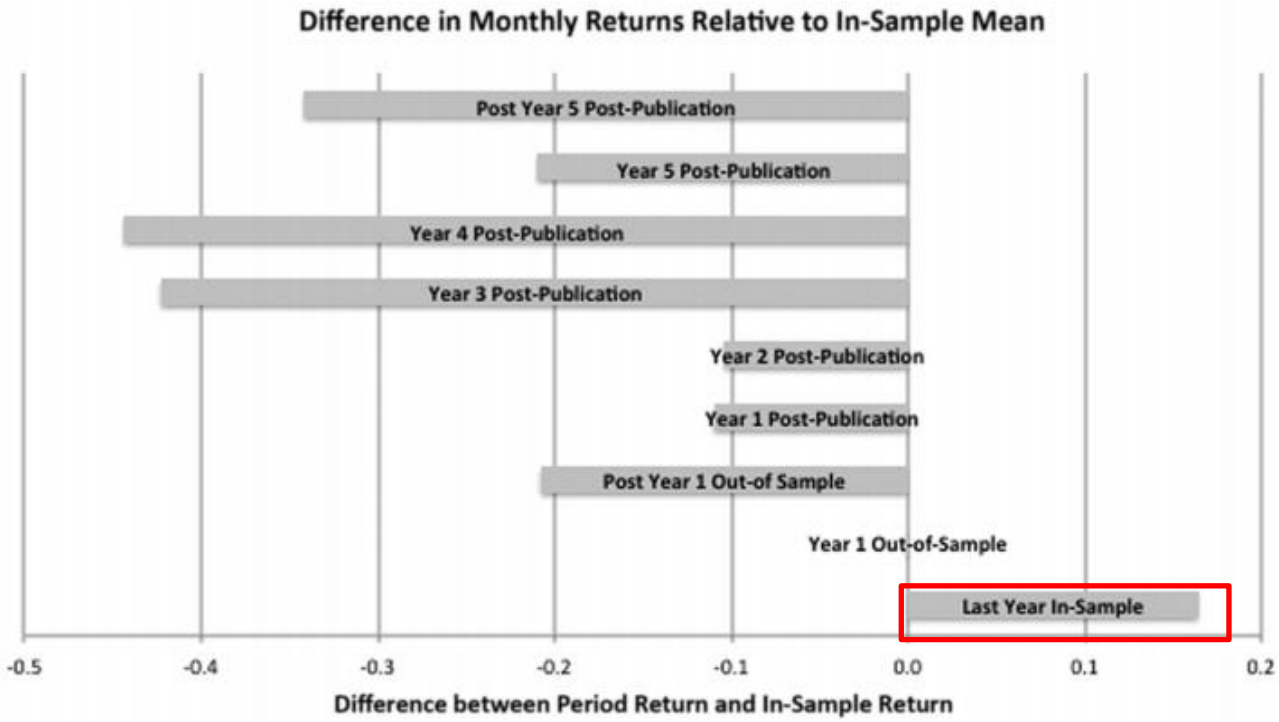




2. Predictor Return Dynamics around Publication Dates

$$R_{it} = \alpha_i + \beta_1 \, Post\ sample\ dummy_{i,t} + \beta_2 \, Post\ publication\ dummy_{i,t} + e_{it}$$

- The last 12 months of the sample have higher returns, consistent with researchers ending their samples opportunistically.
- During the remaining out-of-sample months but before publication, returns are more than 20 basis points lower.
- Returns remain at this level the first two years post-publication, and then decay further.



3. Controlling for Time Trends and Persistence

- Our end-of-sample and publication coefficients reflect a time trend or a trend that proxies for lower costs of corrective trading.

- Anomalies' returns may drop post-publication if anomalies reflect mispricing and declining trading costs have made arbitrage less costly.

- Chordia (2013) show that the returns of the 12 anomalies decline after 1993, which they attribute to an increase in hedge funds and lower trading costs.

Variable	(1)	(2)	(3)	(4)
Time	−0.069***		−0.069***	
	(0.011)		(0.026)	
Post-1993		−0.120	0.303***	
		(0.074)	(0.118)	
Post-Sample			−0.190**	−0.179**
			(0.081)	(0.080)
Post-Publication			−0.362***	−0.310**
			(0.124)	(0.122)
1-Month Return				
12-Month Return				
Observations	51,851	51,851	51,851	51,851
Char. FE?	Yes	Yes	Yes	Yes
Time FE?	No	No	No	Yes

4. Publication bias vary across Predictor Types

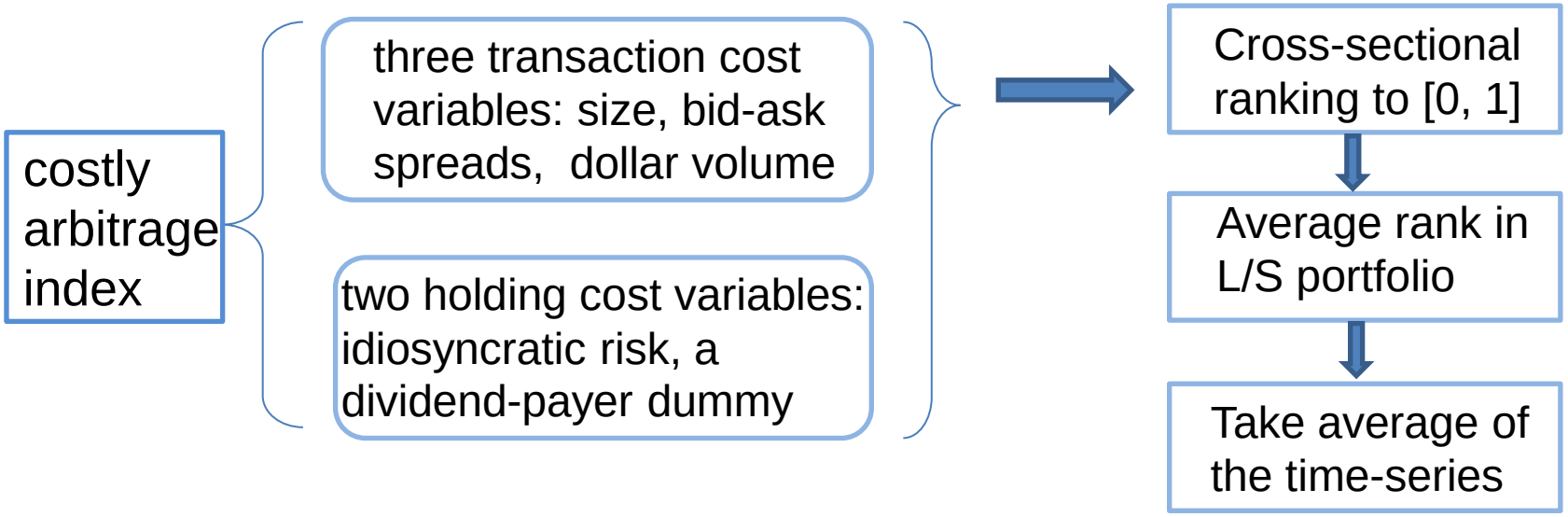
$$R_{i,t} = \alpha_{i,} + \beta_1 \, Post\ Publication\ Dummy_i + \beta_2 \, Predictor\ Type\ Dummy_i + \beta_3 \, Post\ Publication\ Dummy_i \times Predictor\ Type\ Dummy_i + e_{it}$$

Variable	(1)	(2)	(3)	(4)
Post-Publication (P)	−0.208***	−0.316***	−0.310***	−0.301***
	(0.059)	(0.097)	(0.080)	(0.089)
Market	0.304***			
	(0.079)			
P × Market	−0.244			
	(0.169)			
Event		−0.098**		
		(0.046)		
P × Event		0.105		
		(0.091)		
Valuation			−0.056	
			(0.063)	
P × Valuation			0.186	
			(0.131)	
Fundamental				−0.201***
				(0.045)
P × Fundamental				0.025
				(0.089)
Constant	0.482***	0.606***	0.585***	0.630***
	(0.036)	(0.052)	(0.000)	(0.053)
Observations	51,851	51,851	51,851	51,851
Predictors	97	97	97	97
Type + (P × Type)	0.060	0.007	0.121	−0.176
p-value	0.210	0.922	0.256	0.012

5. Costly Arbitrage

- Pontiff (1996) suggests that costs associated with arbitrage can prevent arbitrageurs from fully eliminating mispricing.
  - Predictor portfolios concentrated in stocks that are costlier to arbitrage (smaller stocks, less liquid stocks) should decline less post-publication.

- If predictor returns are the outcome of rational asset pricing, then the post-publication decline should not be related to arbitrage costs.



5. Costly Arbitrage

$$R_{i,t} = \alpha_{i,} + \beta_1 \, Post \; Publication \; Dummy_{i,t} + \beta_2 \, Arbitrage \; Cost_i + \beta_3 \, Post \; Publication \; Dummy_{i,t} \times Arbitrage \; Cost_i + e_{it}$$

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Post-Pub. (P)	−0.190	−0.139	0.215	−0.242	−0.321	−0.264**
	(0.274)	(0.235)	(0.230)	(0.273)	(0.211)	(0.078)
P × Size	−0.138					
	(0.459)					
Size	−1.064**					
	(0.236)					
P × Spreads		−0.301				
		(0.603)				
Spreads		1.228**				
		(0.252)				
P × Dol.Vol.			−1.059*			
			(0.500)			
Dol. Vol.			0.215			
			(0.308)			
P × Idio. Risk				−0.047		
				(0.554)		
Idio. Risk				2.064***		
				(0.330)		
P × Div.					−0.321	
					(0.211)	
Div.					−0.526***	
					(0.145)	
P × Index						−0.009
						(0.019)
Index						−0.056***
						(0.011)
Constant	1.145***	0.146*	0.476***	−0.469***	0.855***	0.565***
	(0.130)	(0.174)	(0.144)	(0.171)	(0.097)	(0.000)
Observations	51,851	51,851	51,851	51,851	51,851	51,851
CA + (P × CA)	−1.202	0.927	−0.844	2.017	−0.847	−0.065
p-value	0.003	0.096	0.000	0.000	0.144	0.000

6. Post-Publication Trading Activity

- If academic publication provides market participants with information, then informed trading activity should affect not only prices, but also other indicators of trading.

- We test whether trading volume, dollar trading volume, variance, and short interest increase in predictor portfolios after publication.

- Short interest is measured as shares shorted scaled by shares outstanding.

- We measure the difference in short interest between the short and long sides of each portfolio each month, and use the difference as the dependent variable in our regressions.

Variables	Variance	Trading volume	Dollar volume	Short-long short interest
Post-Sample (S)	−0.054***	0.092***	0.066***	0.166***
	(0.007)	(0.001)	(0.007)	(0.014)
Post-Publication (P)	−0.065***	0.187***	0.097***	0.315***
	(0.008	(0.013)	(0.007)	(0.013)
Observations	52,632	52,632	52,632	41,026
Time FE?	Yes	Yes	Yes	No
Predictor FE?	Yes	Yes	Yes	Yes
Null: S = P	0.156	0.000	0.000	0.000

7. The Effects of Publication on Correlations

- If predictor returns reflect mispricing：
  - And if mispricing has a common source (e.g., investor sentiment), then we expect in-sample predictor portfolios to be correlated with other in-sample predictor portfolios.

- If publication causes arbitrageurs to trade on a predictor:
  - Then publication could also cause a predictor portfolio to become more highly correlated with other published predictors, because of fund flows or other factors common to arbitrage portfolios.

Variables	Coefficients
In-Sample Index Returns	0.748***
	(0.027)
Post-Publication Index Return	−0.008
	(0.004)
P × In-Sample Index Returns	−0.674***
	(0.033)
P × Post-Publication Index Return	0.652***
	(0.045)
Publication (P)	−0.081
	(0.042)
Constant	0.144***
	(0.019)
Observations	42,975
Predictors	97

8. Publication bias across the world

- To 80 anomalies used in McLean (2016), we add a second set of 161 cross-sectional return phenomena.

- Anomalies in international markets are strong both post-sample and post-publication, only the US market shows a robust and significant post-publication decline in long-short returns

		International markets (pooled)				International markets (composite)			
Period	US	All	Developed	Large	G7 + Australia	All	Developed	Large	G7 + Australia
N	99,214	2,041,067	1,246,763	1,075,133	558,408	92,806	92,750	92,788	92,692
Panel A: Regression coefficients, equally weighted long-short returns									
Post-sample	−0.276***	0.103**	0.094*	0.153***	0.108*	0.113**	0.108**	0.142***	0.104*
	(−3.43)	(2.41)	(1.81)	(3.07)	(1.95)	(2.59)	(2.09)	(2.85)	(1.95)
Post-publication	−0.450***	0.132*	0.093	0.138**	0.083	0.128**	0.106	0.146**	0.098
	(−4.75)	(1.88)	(1.26)	(2.00)	(1.14)	(2.11)	(1.48)	(2.13)	(1.29)
Panel B: Implied relative changes in anomaly profitability, equally weighted long-short returns									
Mean in-sample return	0.724	0.410	0.450	0.459	0.463	0.340	0.352	0.345	0.343
Post-sample change	−38%	25%	21%	33%	23%	33%	31%	41%	30%
Post-publication change	−62%	32%	21%	30%	18%	38%	30%	42%	29%
Panel C: Regression coefficients, value-weighted long-short returns									
Post-sample	−0.173**	0.047	0.029	0.064	0.053	−0.007	0.033	0.053	0.039
	(−2.02)	(0.94)	(0.47)	(1.08)	(0.82)	(−0.11)	(0.51)	(0.82)	(0.59)
Post-publication	−0.305***	0.044	−0.010	0.022	−0.006	−0.046	−0.032	−0.008	−0.024
	(−2.96)	(0.57)	(−0.12)	(0.29)	(−0.08)	(−0.66)	(−0.45)	(−0.12)	(−0.32)
Panel D: Implied relative changes in anomaly profitability, value-weighted long-short returns									
Mean in-sample return	0.464	0.331	0.356	0.372	0.362	0.245	0.247	0.250	0.249
Post-sample change	−37%	14%	8%	17%	15%	−3%	13%	21%	16%
Post-publication change	−66%	13%	−3%	6%	−2%	−19%	−13%	−3%	−10%

Research Conclusion

- Several of our findings support the idea that some or all of the original cross-sectional predictability is the result of mispricing.

- First, the returns of predictor portfolios with larger in-sample means decline more post-publication, and strategies concentrated in stocks that are more costly to arbitrage have higher expected returns post-publication.

- Second, we find that turnover, dollar volume, and especially short interest increase significantly in predictor portfolios post-publication.

- Finally, we find that, before a predictor is featured in an academic publication, its returns are correlated with the returns of other yet-to-be-published predictors, but its returns are not correlated with those of published predictors.