

The Disappearing Index Effect

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Contents

- 1 Introduction
- 2 Setup and Related Literature
- 3 Data
- 4 Empirical Results
- 5 Conclusion
- 6 Extension

1. Introduction

Motivation

- A classic challenge to the Efficient Markets Hypothesis: prices react to demand *unrelated to fundamentals*.
 - ▶ Shleifer (1986), Harris & Gurel (1986): stocks added to the S&P 500 earn $\approx 3\%$ abnormal returns around the change.
- Driven by passive mutual-fund and ETF inflows, money tracking the S&P 500 grew from $\approx 0\%$ of market cap in the 1980s to $\approx 7\%$ today (sell-side estimates $\approx 13\%$).
- Standard logic of a constant-elasticity demand curve:

$$\text{Price Impact}_{it} = M \times D_{it}, \quad M \equiv -\frac{1}{\text{demand elasticity}}$$

where D_{it} is the % of shares mechanically bought (added) or sold (deleted).

⇒ If indexation rises ($D \uparrow$), the index effect should grow **larger** over time.

1. Introduction

The Puzzle

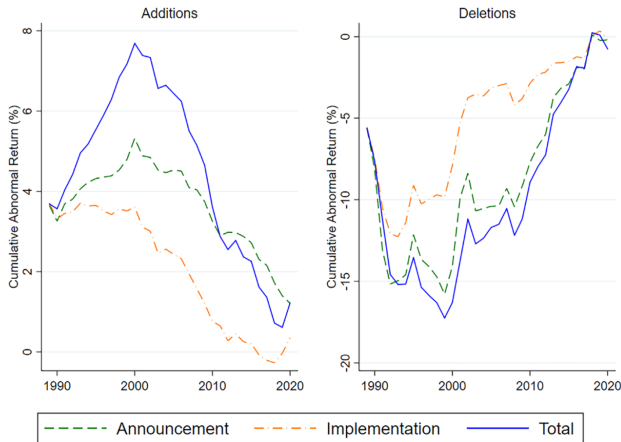


Figure 1: Average Index Effect by Year

- Additions: 3.4% → 7.4% → 5.2% → **1.0%**
- Deletions: -4.6% → -16.1% → -12.4% → **-0.6%**.

⇒ The effect **disappeared** even as indexation kept rising.

1. Introduction

Research Question

- **Question:** Why did the S&P 500 index effect disappear despite a growing index-fund industry and what does it imply for market efficiency?

- **Four candidate explanations:**

- ① Changing composition of additions / deletions
- ② Index “migrations” (smaller true demand shock D)
- ③ Predictability / front-running of index changes
- ④ Increased liquidity — the market became more elastic ($M \downarrow$)

⇒ Driven primarily by (2) migrations and (4) liquidity; (3) predictability plays only a small role & Markets adapt to repeated demand shocks (Lo's adaptive markets; McLean & Pontiff, 2016).

2. Setup

The index-change demand shock

- When a stock is added, S&P 500 trackers **must buy**; when deleted, they **must sell**. → A demand shock orthogonal to fundamentals
- Cumulative abnormal return, measured relative to the index:

$$CAR_{it} = R_{it} - R_{\text{S\&P 500},t}.$$

- **Total return** = cumulative *CAR* from the day before announcement to the day after implementation (≈ 4.8 days for adds, 5.8 for deletes).
- Under constant elasticity, growing *D* should mechanically raise the index effect — the benchmark the paper overturns.

2. Setup

Positioning in the literature

- **Downward-sloping demand / price pressure:** Shleifer (1986); Harris & Gurel (1986); Wurgler & Zhuravskaya (2002).
 - **Rising passive ownership / inelastic demand:** Chang, Hong & Liskovich (2015); Koijen & Yogo (2019); Coles, Heath & Ringgenberg (2022); Gabaix & Koijen (2022).
 - **Closest:** Bennett, Stulz & Wang (2020) — first noted the declining *addition* effect (1997–2017); also Preston & Soe (2021); Vijn & Wang (2022) on migrations.
- ⇒ Contribution: documents the full disappearance (adds *and* deletes, 1980–2020), identifies *why*, and shows a similar decline across other index families.

3. Data

Sample of index changes

- S&P 500 additions and deletions, **1980–2020**, from SIBLIS Research (announcement & effective dates), merged to CRSP.
 - ▶ 732 of 736 additions and 726 of 731 deletions matched (1990–2020).
 - ▶ Exclude listings, mergers, delistings, spin-offs within 100 days of the change.
- Pre-1990 announcement dates from Barberis, Shleifer & Wurgler (2005).
- Quarterly fund holdings from Thomson S12 (mutual funds & ETFs)

3. Data

Identifying S&P 500 trackers

- For each fund, count index-tracking trades: *not held* the quarter before an addition $\rightarrow$ *held* the quarter after (and the reverse for deletions).
- Classify a fund as an **S&P 500 tracker** if, on average, it makes $\geq 50\%$ of index-tracking trades each year.
 - ▶ Largest trackers (2020): Vanguard 500, SPY, Fidelity 500, iShares IVV.
- Net trading by trackers around each change:

$$\text{Net Trading}_{i,t} = 100 \times \frac{\Delta \text{Shares held}_{i,(t+1,t-1)}}{\text{Shares outstanding}_{i,t+1}}$$

$\Rightarrow$ A *lower bound* on indexation (excludes direct replicators, pensions, shadow indexers).

4. Empirical Results

Fact 1: Mechanical demand grew

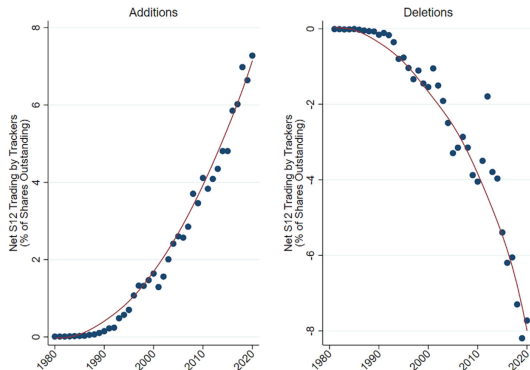


Figure 2: Net Buying and Selling by S&P 500 Index Trackers

- Net buying on **additions**: $\approx 0\%$ (early 1990s) $\rightarrow$ over 6%;
Net selling on **deletions**: $\approx 0\%$ $\rightarrow$ almost 8%
- $\Rightarrow$ The mechanical demand shock D grew steadily.

4. Empirical Results

Fact 2: Returns rose, then vanished

Year	Additions Cumulative Abnormal Returns				Deletions Cumulative Abnormal Returns			
	N	Ann.	Eff.	Total	N	Ann.	Eff.	Total (Mean)
2015	19	2.08%	0.46%	2.56%	6	-2.04%	-1.69%	0.47%
2016	21	0.24%	-1.06%	-0.53%	7	4.18%	1.67%	6.31%
2017	20	0.77%	0.13%	0.10%	12	1.40%	-0.93%	-0.27%
2018	21	0.26%	0.76%	-0.83%	7	-0.35%	-0.08%	-2.77%
2019	15	-0.70%	1.57%	0.47%	10	-6.87%	0.18%	-6.09%
2020	12	0.40%	2.31%	5.49%	10	1.11%	-0.77%	-2.70%
1980s	196	3.36%***	3.44%***	3.42%***	39	-4.71%**	-4.65%**	-4.64%**
1990s	134	4.94%***	3.55%***	7.39%***	56	-13.91%***	-8.52%***	-16.11%***
2000s	211	4.06%***	1.35%***	5.16%***	85	-10.21%***	-4.99%***	-12.39%***
2010s	153	1.02%***	0.26%	0.83%	87	-0.18%	0.13%	-0.62%
2010s vs. 2000s (SE)		-3.04%*** (0.52)	-1.09%*** (0.54)	-4.33%*** (0.93)		10.03%*** (2.29)	5.12%*** (2.16)	11.77%*** (2.56)

Figure 3: S&P 500 Addition and Deletion CARs by Year

- Both effects became indistinguishable from zero by the 2010s (difference vs. 2000s highly significant).
- The 2020 uptick is driven almost entirely by **Tesla** (largest-ever addition); ex-Tesla ≈ -3 bp.

4. Empirical Results

Fact 3: The core puzzle

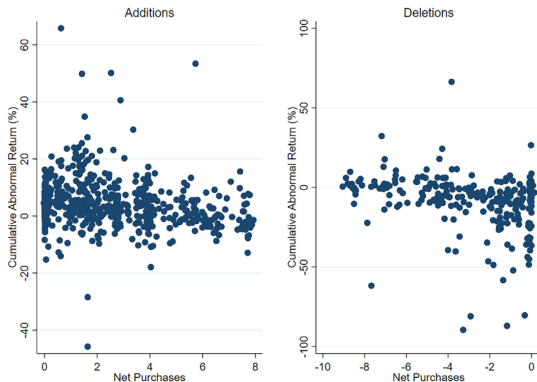


Figure 4: Net Purchases and the Index Effect

- **No apparent relationship** between net purchases and returns (additions $R^2 = 2\%$, deletions $R^2 = 6\%$).

⇒ D grew large yet price impact did not ⇒ Either D is mismeasured or the multiplier M collapsed.

4. Results

Explanation 1: Composition

- **Idea:** maybe the decline reflects a change in the *kind* of firms added/deleted, not a smaller effect per se.
- Three channels:
 - ▶ **Size:** larger additions have larger effects (benchmark investors buy big names to limit tracking error); additions have shrunk relative to total index cap.
 - ▶ **Arbitrage risk** (Wurgler–Zhuravskaya 2002): closer substitutes $\Rightarrow$ lower price pressure; tied to fundamental volatility (Kyle 1985).
 - ▶ **Attention:** inclusion was once a big attention / analyst-coverage shock; less so today.
- **Test:** regress *CAR* on characteristics + decade dummies:

$$CAR_{it} = b_1 Turn + b_2 Size + b_3 WZ + b_4 Cover + \sum_k \gamma_k \mathbf{1}_{era=k} + e_{it}$$

4. Results

Explanation 1: Composition

	CAR Additions (%)		CAR Deletions (%)	
	(1)	(2)	(3)	(4)
$Turn_{i,t-1}$		-0.14 (0.49)		-0.637 (1.03)
$Size_{i,t-1}$		19.08*** (4.15)		28.45* (16.46)
$WZ_{i,t-1}$		3,868*** (1,173.00)		-2,183 (1,590.00)
$Cover_{i,t-1}$		-0.0289 (0.06)		0.0863 (0.17)
1980 to 1989	3.654*** (0.35)	4.594*** (0.58)	-2.184 (2.69)	-0.388 (3.20)
1990 to 1999	7.414*** (0.78)	7.388*** (0.86)	-15.20*** (2.40)	-13.09*** (2.34)
2000 to 2009	4.950*** (0.70)	4.592*** (0.61)	-12.71*** (2.37)	-9.517*** (1.80)
2010 to 2020	0.782 (0.55)	1.765*** (0.61)	-0.62 (1.12)	1.5 (1.96)
N	610	610	237	237
R^2	0.261	0.352	0.28	0.314
2010s vs. 1980s [p-value]	-2.872 [0.000]	-2.829 [0.000]	1.564 [0.592]	1.889 [0.629]
2010s vs. 1990s [p-value]	-6.632 [0.000]	-5.623 [0.000]	14.58 [0.000]	14.59 [0.000]
2010s vs. 2000s [p-value]	-4.168 [0.000]	-2.827 [0.000]	12.09 [0.000]	11.02 [0.000]

Figure 5: CARs, Controlling for Characteristics

- Size matters (+1% of index cap $\approx$ +18%), but additions shrank only 12 $\rightarrow$ 7 bp ($\approx$ 50 bp explained).
- After controls the decline is still large/significant (adds 6.6% $\rightarrow$ 5.6%; dels 14.6% $\approx$ 14.6%).

$\Rightarrow$ Composition **cannot** explain the disappearance.

4. Results

Explanation 2: Migrations

- **Idea:** The *net* demand D may be mismeasured.
- A “migration” is a stock moving between the S&P MidCap 400 and the S&P 500.
 - ▶ MidCap $\rightarrow$ 500: MidCap-trackers **sell** while 500-trackers **buy** $\Rightarrow$ smaller *net* shock.
- Passive ownership of midcap stocks grew sharply over 30 years $\Rightarrow$ the offsetting shock has grown over time.
- **Hypothesis:** migrations have smaller inclusion effects than direct additions, and the gap *widens* over time.

4. Results

Explanation 2: Migration share over time

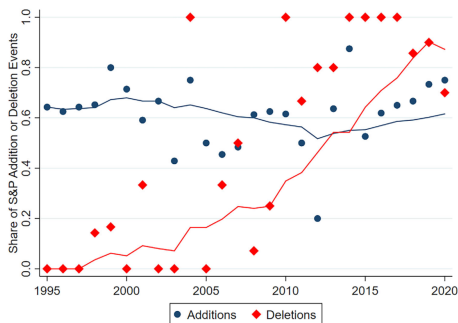


Figure 6: Migrations as a fraction of S&P 500 Additions and Deletions

- A migration addition is added to the S&P 500 *and* dropped from the MidCap on the same date.
 - In the 1990s, migrations were $\approx 69\%$ of additions but $< 10\%$ of deletions; recently **both exceed 70%**.
- ⇒ A growing share of index changes carries an *offsetting* MidCap shock, shrinking the net demand D .

4. Results

Explanation 2: MidCap passive ownership

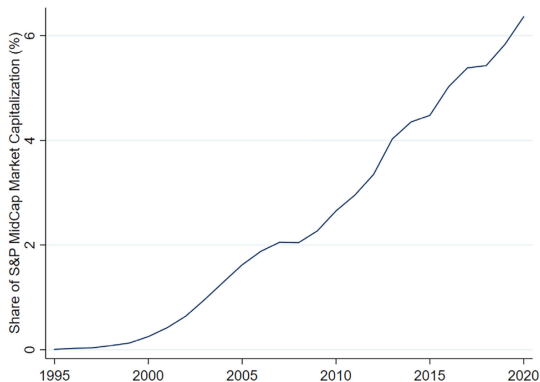


Figure 7: Percent of S&P MidCap 400 owned by Index Trackers

- Dollars tracking the MidCap grew to $\approx 6\%$ of its market cap — slightly *more* than the S&P 500's tracked share.
- ⇒ The offsetting sell-side of a migration has become economically large, so migrations face far smaller net buying.

4. Results

Explanation 2: Migrations vs. Direct

		Additions CAR (%)			Deletions CAR (%)		
		Direct	Migrations	Diff.	Direct	Migrations	Diff.
1995 to 1999	Mean	10.23%	6.65%	-3.58%	-12.78%	-0.17%	12.61%
	(SE)	(7.69%)	(10.41%)	(2.12%)	(10.85%)	(4.98%)	(7.82%)
2000 to 2009	Mean	8.80%	2.72%	-6.07%	-15.71%	-4.10%	11.61%
	(SE)	(9.65%)	(9.29%)	(1.34%)	(25.61%)	(6.16%)	(6.29%)
2010 to 2020	Mean	5.40%	-1.82%	-7.22%	-6.86%	0.06%	6.92%
	(SE)	(8.38%)	(3.77%)	(0.99%)	(24.44%)	(8.45%)	(4.15%)

Figure 8: CARs, Controlling for Characteristics

- **Additions:** direct 10.2% $\rightarrow$ 8.8% $\rightarrow$ 5.4%; migration 6.7% $\rightarrow$ 2.7% $\rightarrow$ -1.8%.
The gap is significant every decade and *widens* over time.
 - **Deletions:** direct -12.8% $\rightarrow$ -15.7% $\rightarrow$ -6.9%; migration -0.2% $\rightarrow$ -4.1% $\rightarrow$ 0.1%.
- $\Rightarrow$ Migrations have systematically smaller (even reversed) effects, consistent with Vijh & Wang (2022).

4. Results

Explanation 3: Predictability

- **Idea:** index changes became more predictable, attracting arbitrageurs who **front-run** — buying additions / selling deletions *before* the announcement.
 - ▶ Extreme case (perfect anticipation): *zero* abnormal return between announcement and effective date.
 - ▶ Wall Street desks bet on index events; banks (UBS) publish “addition watch” lists.
- **Two tests:** (i) cumulative pre-announcement returns; (ii) can a simple market-cap-rank rule predict additions?
- **Caveat:** endogeneity $\Rightarrow$ stocks that rise are more likely to be added (S&P may simply pick winners).

4. Results

Explanation 3: Pre-event returns

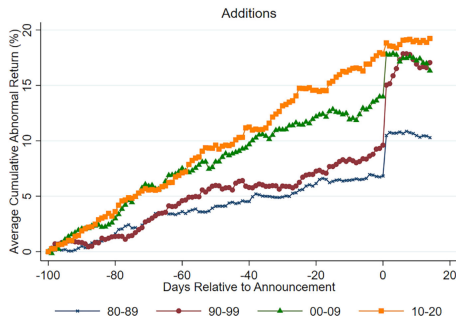


Figure 9: Cumulative Abnormal Preaddition Market-adjusted Returns

- The total run-up over the window is fairly steady, but the price *spike at announcement* has become less sharp over time.
 - Pre-announcement CAR: 9.6% (90s) → 14.2% (00s) → 18.7% (10s).
- ⇒ Consistent with more anticipation — but could also mean S&P increasingly adds recent winners.

4. Results

Explanation 3: Pre-announcement windows

	Time Relative to Announcement		Mean CAR (%)			
			1980 to 1989	1990 to 1999	2000 to 2009	2010 to 2020
Cumulative abnormal returns: Additions	-100	-1	6.91%	9.60%	14.16%	18.68%
	-50	-1	2.71%	2.49%	5.96%	6.61%
	-20	-1	0.81%	1.54%	1.99%	2.35%
	-10	-1	0.39%	0.88%	1.31%	0.96%
	-100	10	10.65%	17.21%	17.41%	19.79%
	-50	10	6.37%	9.29%	9.37%	7.20%
	-20	10	4.24%	8.18%	5.41%	3.01%
	-10	10	3.89%	7.31%	4.80%	1.60%

Figure 10: CARs including Longer Pre-Announcement Windows

- Immediate $[-20, -1]$ window: additions 1.54% (90s) vs. 2.35% (10s)
 - No rise in front-running in the short window (and the wrong sign for deletions); only the long $[-100, -1]$ window looks stronger.
- ⇒ Front-running in the immediate pre-event window is *not* increasing ⇒ predictability is limited.

4. Results

Explanation 3: Predicting additions

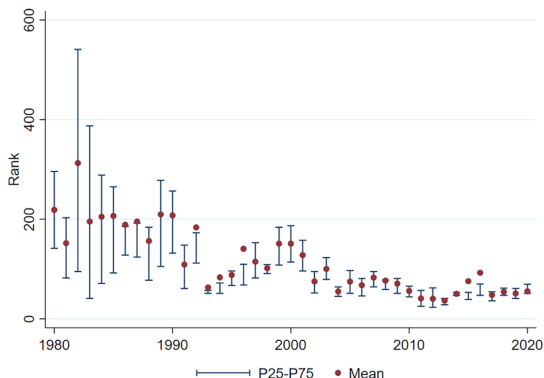


Figure 11: Rank of Additions among Stocks Outside the S&P 500 Index

- S&P now picks larger firms (lower average rank, narrower IQR), but the average rank is still ≈ 50 with an IQR spanning ≈ 40 ranks.
- ⇒ A simple “largest eligible firm” rule predicts additions better than before, yet exact picks remain hard.

4. Results

Explanation 4: Liquidity

- **Idea:** The market became more efficient at absorbing index demand — in Price Impact = $M \times D$, the multiplier M ($= -1/\text{elasticity}$) **declined**.
- Decompose by decade, letting D blend migrations & non-migrations:

$$\overline{CAR} = M \times (w \cdot \bar{D}_{\text{Mig}} + (1 - w) \cdot \bar{D}_{\text{NonMig}})$$

- Then ask *why* M fell:
 - ▶ Overall liquidity $\uparrow$ / trading costs $\downarrow$; coordination & specialization of index trading; accommodation by other institutions; corporate issuance.

4. Results

Explanation 4: The multiplier M

Return Measure	Sample	Period	N	$\overline{CAR}$	$\bar{D}_{Migrations}$	$\bar{D}_{NonMig.}$	w	$\bar{D}_{Wt. Mean}$	M	$\varepsilon = -1/M$
Baseline $CAR =$ one day before announcement to one day after effective date	Additions	1995 to 1999	97	7.8%	1.11	1.24	69.07%	1.15	6.75	-0.15
		2000 to 2009	211	5.2%	0.71	2.49	59.24%	1.44	3.58	-0.28
		2010 to 2020	153	0.8%	0.31	5.61	63.40%	2.25	0.37	-2.72
	Deletions	1995 to 1999	34	-11.4%	-0.94	-1.07	5.88%	-1.06	10.76	-0.09
		2000 to 2009	85	-12.4%	-0.72	-2.50	20.00%	-2.15	5.77	-0.17
		2010 to 2020	87	-0.6%	-0.22	-5.53	87.36%	-0.89	0.70	-1.44
Extended $CAR = 20$ days before announcement to 1 day after effective	Additions	1995 to 1999	97	10.3%	1.11	1.24	69.07%	1.15	8.98	-0.11
		2000 to 2009	211	6.5%	0.71	2.49	59.24%	1.44	4.52	-0.22
		2010 to 2020	153	3.0%	0.31	5.61	63.40%	2.25	1.34	-0.75
	Deletions	1995 to 1999	34	-15.7%	-0.94	-1.07	5.88%	-1.06	14.74	-0.07
		2000 to 2009	85	-19.9%	-0.72	-2.50	20.00%	-2.15	9.25	-0.11
		2010 to 2020	87	-2.9%	-0.22	-5.53	87.36%	-0.89	3.29	-0.30

Figure 12: Index Effect Decomposition

- Splitting $\bar{D}$ into migrations vs. non-migrations, estimate M each decade.
 - Additions: $M = 6.75$ (late 90s) $\rightarrow 3.58 \rightarrow 0.37$ ($\approx 20\times$ decline; $\varepsilon = -0.15 \rightarrow -2.72$). Deletions: $M = 10.76 \rightarrow 0.70$.
- $\Rightarrow$ Even after accounting for smaller D (migrations), the multiplier collapsed — a genuine rise in elasticity.

4. Results

Explanation 4: Robustness of $M \downarrow$

	Additions CAR				Deletions CAR			
	Ann-1→Eff+1		Ann-20→Eff+1		Ann-1→Eff+1		Ann-20→Eff+1	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Turn_{i,t-1}$		-0.0858 (0.518)		-0.60 (0.689)		-0.578 (1.040)		1.081 (1.335)
$Size_{i,t-1}$		20.69*** (3.931)		20.36*** (4.680)		35.18 (24.130)		70.04** (32.080)
$WZ_{i,t-1}$		3.856*** (1.222)		4.234** (1.658)		-1.156 (1.852)		-6.059*** (1.581)
$Cover_{i,t-1}$		-0.0293 (0.067)		-0.0891 (0.091)		0.0623 (0.177)		-0.128 (0.219)
1995–1999 × Avg. demand shock	6.779*** (0.868)	6.640*** (0.934)	9.120*** (1.350)	8.712*** (1.389)	10.90*** (1.868)	8.709*** (2.329)	14.99*** (3.123)	10.85*** (3.686)
2000–2009 × Avg. demand shock	3.441*** (0.487)	3.116*** (0.431)	4.227*** (0.671)	3.869*** (0.653)	5.540*** (1.043)	4.400*** (0.815)	9.433*** (1.258)	6.544*** (1.167)
2010–2020 × Avg. demand shock	0.348 (0.246)	0.726*** (0.276)	1.307*** (0.374)	1.749*** (0.472)	0.696 (1.258)	-1.893 (2.325)	3.290* (1.918)	0.686 (2.965)
N	451	451	451	451	200	200	200	200
R^2	0.231	0.34	0.202	0.251	0.257	0.277	0.345	0.423

Figure 13: Effect of Controls on Elasticity Estimates

- Adds characteristic controls (turnover, size, WZ , coverage) and a longer $[-20, +1]$ window that absorbs anticipation.
- M still falls with controls ($6.6 \rightarrow 0.7$) and on the longer window ($\approx 7\times$ for additions and deletions).

⇒ The decline in M is not an artifact of composition or predictability.

4. Results

Explanation 4: Who provides liquidity?

Year	Additions (Median by Year)				Deletions (Median by Year)			
	Trackers	Passive	Active	Insts.	Trackers	Passive	Active	Insts.
2017	6.35%	2.03%	2.46%	0.48%	-7.05%	-1.94%	-0.35%	0.32%
2018	7.43%	0.88%	0.92%	0.45%	-7.68%	-0.31%	-3.16%	-0.87%
2019	7.57%	0.99%	-0.60%	1.16%	-8.46%	-2.35%	-5.28%	-6.40%
2020	7.53%	2.55%	2.40%	0.65%	-8.45%	-2.29%	-5.23%	-1.42%
Mean	3.04%	1.29%	0.13%	0.85%	-3.08%	-1.24%	-1.03%	-2.20%

Figure 14: Net Buying and Selling by Trackers and Institutional Investors

- 2020: trackers buy 7.53% of an addition's shares, yet total 13F institutional ownership rises only 0.65% (deletions: -8.45% vs. -1.42%).
 - Active funds ≈ 0 .
- ⇒ Non-S12 institutions (hedge funds, pensions, endowments) absorb the mechanical demand — they are the liquidity providers.

5. Conclusion

- The S&P 500 index effect grew through the 1990s, then fell to near zero by the 2010s, despite rising indexation.
 - Driven *primarily* by:
 - ① Migrations from the S&P MidCap
 - ② $\approx 20\times$ Decline in the multiplier M
 - ③ Predictability plays only a small role.
 - When demand shocks become regular and repeated, competitive markets adapt to minimize price impact (Lo's adaptive markets).
- ⇒ Open puzzle: S&P 500 changes date to 1957 — why did it take until the 2010s for the market to neutralize them?

6. Extension

- First, is there the same effect in Korea?
- Addition & Deletion Data from KRX (1995–2025)
 - ▶ Raw: 1,300 events (650 Additions, 650 Deletions)
 - ▶ After filtering: 1,067 events (593 AD, 474 DE) as of the effective dates
- Announcement dates collected from KRX announcement pages
 - ▶ No Announcement dates before 2002
 - ▶ After filtering: 675 events (339 AD, 336 DE) as of the announcement dates (2002–2025)
- Return data from FnGuide

6. Extension

Time trend of Additions and Deletions in Korea

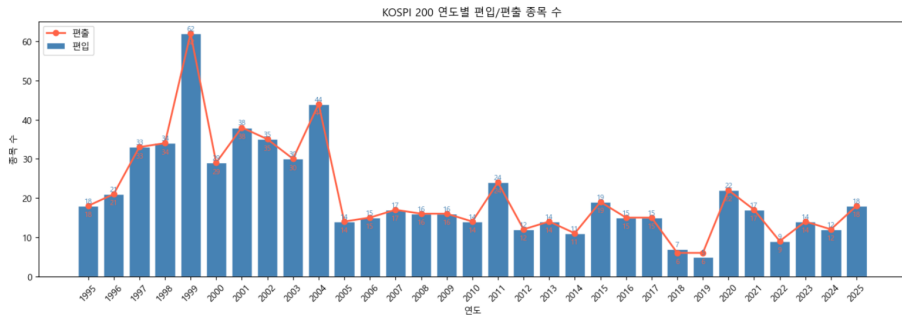


Figure 15: Korea: Raw # of Additions and Deletions by Year

6. Extension

Replicate: Figure 2

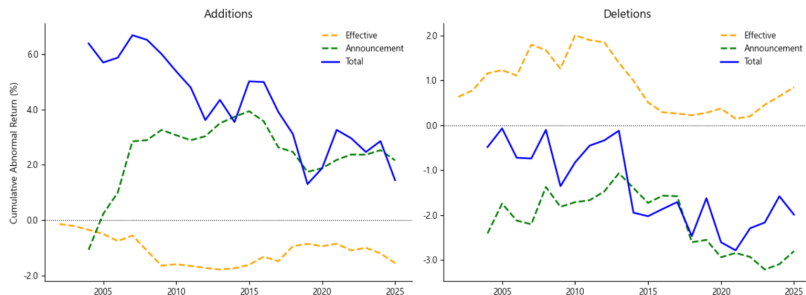


Figure 16: Korea: Average index effect by year

- **Additions:** The announcement effect stays large while the effective-date effect is persistently *negative*; the total declines.
- **Deletions:** The announcement effect *deepens* while the effective-date effect stays *positive*; the total drifts more negative.
- Unlike the US, the two components remain large with *opposite signs*: price pressure + reversal, not disappearance.

6. Extension

Original: Figure 2

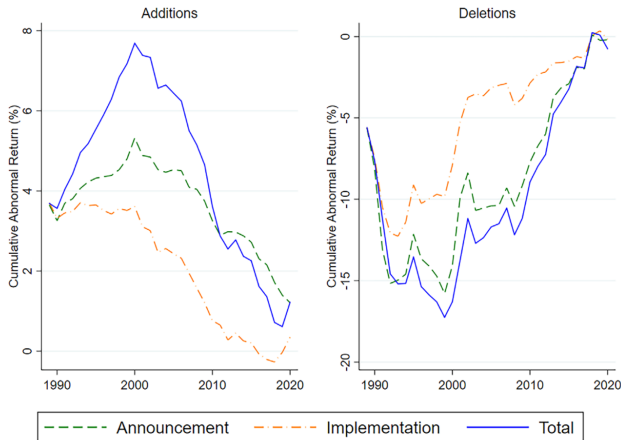


Figure 17: GS: Average Index Effect by Year

Korean extension

KOSPI 200 index effect: CARs by decade

Decade	Additions		Deletions	
	<i>N</i>	CAR (<i>t</i>)	<i>N</i>	CAR (<i>t</i>)
<i>Panel A. Announcement-date window $[-1, +1]$, 2002–2025</i>				
2000s	157	1.89%*** (3.13)	150	−1.99%*** (−4.45)
2010s	109	2.10%*** (5.33)	102	−2.19%*** (−5.28)
2020s	73	2.94%*** (4.60)	84	−2.19%*** (−5.97)
<i>Panel B. Effective-date window $[-1, +1]$, 1995–2025</i>				
1990s	160	0.18% (0.38)	97	2.67%*** (3.66)
2000s	238	−1.23%*** (−2.93)	191	1.44%*** (3.87)
2010s	119	−0.54% (−1.53)	102	0.14% (0.35)
2020s	76	−1.90%*** (−2.98)	84	0.76% (1.37)

Korean extension

Two facts that GS's framework cannot explain

- **Fact 1:** The announcement effect does NOT vanish.
 - ▶ Additions: $+1.89\% \rightarrow +2.10\% \rightarrow +2.94\%$; deletions stable near -2% .
 - ▶ Passive AUM tracking KOSPI 200 grew sharply over this period (D grew), yet the effect *does not disappear*
 - ▶ Opposite of GS's US result.
 - **Fact 2:** Reversal at the effective date
 - ▶ Additions turn negative on the effective-date window; deletions turn positive.
 - ▶ Most of the announcement price move is *given back*, not a permanent revaluation.
- ⇒ The market's adaptation to a fully rule-based, pre-announced demand shock **has not occurred in Korea.**

Research Question

Research Question

When and why do markets adapt to repeated, predictable, non-informational demand shocks — and what frictions cause adaptation to fail?

- GS (2025) documents adaptation (S&P 500, US) and leaves “why did it take until the 2010s?” as an open puzzle.
- **Korea as an identification laboratory:**
 - ▶ A *failure* of adaptation
 - ▶ Variation in arbitrage constraints: short-sale bans switched on/off in 2008–09, 2011, 2020–21, 2023–25.
 - ▶ KRX daily investor-type flows let us *directly observe* who supplies liquidity.
 - ▶ No tracked mid-cap benchmark $\Rightarrow$ the “migration” channel is absent by design.