

Inefficiencies in the Securities Lending Market

Kent Daniel[†], Alex Klos*, and Simon Rottke**

[†]Columbia Business School and NBER, *Kiel University and **University of Amsterdam

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Outline

- Outline:
 - ① Short-selling mechanics
 - ② Borrow cost trends
 - Distribution of borrow costs
 - Borrow cost trends
 - Measuring market efficiency.
 - ③ Returns to high fee portfolios
 - ④ Analyst expectation errors and revisions
 - ⑤ Why isn't there more lending?

Related Literature (1)

- **Constraints and prices – Theory:** Miller (1977); Harrison, Kreps (1978), Diamond, Verrecchia (1987); Duffie, Gârleanu, Pedersen (2002); Blocher, Reed, Van Wesep (2013); Atmaz, Basak, Ruan (2024); Hugonnier, Prieto (2024); Gârleanu, Panageas, Zheng (2025)
- **Constraints and prices – Empirical:** Danielsen, Sorescu (2001), Diether, Malloy, Scherbina (2002); Chen, Hong, Stein (2002); Ofek, Richardson, Whitelaw (2004); Asquith, Pathak, Ritter (2005); Goetzmann, Massa (2005); Boehme, Danielsen, Sorescu (2006); Cohen, Diether, Malloy (2007); Berkman, Dimitrov, Jain, Koch, Tice (2009); Chang, Hsiao, Ljungqvist (2022); Daniel, Klos, Rottke (2024)
- **Equity lending & borrow-costs:** D’Avolio (2002); Geczy, Musto, Reed (2002); Jones, Lamont (2002); Lamont (2012); Kolasinski, Reed, Ringgenberg (2013); Kaplan, Moskowitz, Sensoy (2013); Porras Prado, Saffi, Sturgess (2016); Chague, De-Losso, De Genaro, Giovannetti (2017); Blocher, Ringgenberg (2018); Engelberg, Reed, Ringgenberg (2018); Mainardi (2023); Johnson, Weitzner (2025); Cookson, Fos, Niessner (2025); Sikorskaya (2025); Banerjee, Smith (2025); Chen, Kaniel, Opp (2025)

Related Literature (2)

- **Constraints and anomalies:** Nagel (2005); Hirshleifer, Teoh, Yu (2011); Stambaugh, Yu, Yuan (2015); Drechsler, Drechsler (2014); Muravyev, Pearson, Pollet (2025); Engelberg, Evans, Leonard, Reed, Ringgenberg (2025)
- **Informed short sellers:** Boehmer, Jones, Zhang (2008); Engelberg, Reed, Ringgenberg (2012); Reed (2103); Jones, Reed, Waller (2016); Boehmer, Jones, Wu, Zhang (2020); von Beschwitz and Massa (2020)
- **Equity lending and SEC filings:** Evans, Ferreira, Porras-Prado (2017); Honkanen (2025); Gogar, Haushalter, Pisciotta (2024); Dong, Zhu (2024); Chen, Tran, Wang (2025)

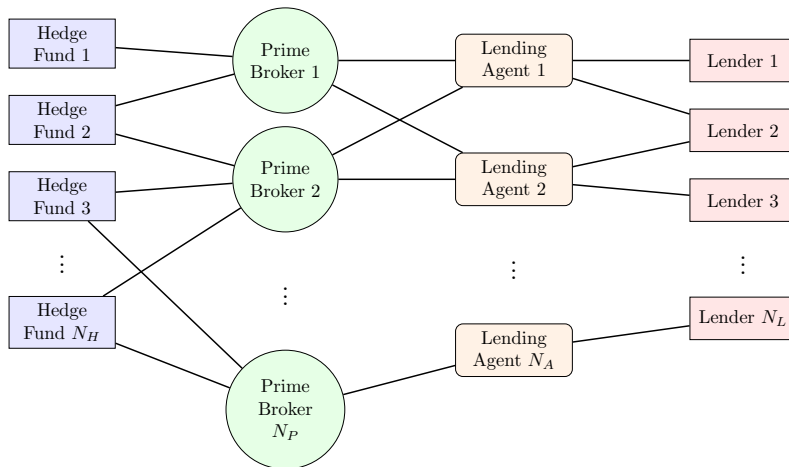
Securities Lending and Short Selling

- To short a US common stock, you must first borrow that stock.
 - Designated market-makers are exempt from this locate requirement.
- All shares held in *margin accounts* at a brokerage firm are held in *street name*, and the brokerage firm can generally lend these shares.
 - All loans are overnight, but are almost always easily renewed.
 - Shares lent can be rehypothecated.
- Shares held in *non-margin* accts are generally not available for lending.
 - Many brokerage firms now offer SLPs, and split lending-fee with holders.
- Institutional investors generally lend out their shares.
 - Empirically, SIRIO (Drechsler and Drechsler, 2014) is a good indicator of whether a stock will be special.
 - If supply \gg demand, stock will be “general collateral” (gc); otherwise fee $>$ gc rate.

The Securities Lending Market

- Share lending is not done via a centralized clearinghouse/exchange.
 - See, however, Jones and Lamont (2002), who discuss the NYSE lending post which ceased operation in the 1930s.
- In the US, registered mutual-funds, closed-end funds, and (most) ETFs can lend securities; UITs cannot.
 - Funds cannot lend more than one-third of their holdings (by value).
 - Only daily loans are permitted; all loans must be fully collateralized.
 - Funds may employ lending agents to lend their shares; lending agents are often custodians; agents sometimes provide indemnification.
- Generally, Prime Brokers (PBs) intermediate between share lenders and borrowers.
 - PBs play key role in determining the rate that is paid to lenders, and charged to borrowers.
- Historically, this market was opaque.
 - However, more stringent SEC reporting requirements for funds now exist for RICs (since 2019 the NPORT-P, and N-CEN filings)

The Security Lending Market Structure



Largest Lenders

Fund Name	Lent	AUM	ratio
iShares Russell 2000 ETF	6,478,828,734	72,093,428,512	0.090
iShares Core S&P Small-Cap ETF	3,983,488,985	85,836,927,634	0.046
iShares Core S&P 500 ETF	3,575,614,374	584,398,561,119	0.006
Vanguard total stock mkt index fund	3,072,685,466	1,772,368,654,393	0.002
iShares Core MSCI Emerging Mkts ETF	2,808,831,783	80,072,853,241	0.035
Vanguard total intl stock index fund	2,797,110,492	437,351,714,892	0.006
iShares Core S&P Mid-Cap ETF	2,776,593,040	94,310,766,143	0.029
Vanguard developed mkts index fund	2,119,483,377	190,020,993,881	0.011
Fidelity Sml Cap Index Fund	2,110,345,840	26,820,629,983	0.079
Invesco S&P 500 EW ETF	1,999,590,011	65,616,385,655	0.030

From N-PORT filings; 2024:q4

Who are the lending agents?

N	Share	Name
1,834	0.224	State Street Bank and Trust Company
1,237	0.151	BNY Mellon
774	0.094	Citibank, National Association
740	0.090	JPMorgan Chase Bank NA
584	0.071	Brown Brothers Harriman & Co.
574	0.070	BlackRock Institutional Trust Company, NA
460	0.056	Goldman Sachs Bank USA
409	0.050	U.S. Bank, N.A.
392	0.048	National Financial Services, LLC
334	0.041	BlackRock Investment Management, LLC

From N-CEN filings, 2023

Who are the borrowers?

	Borrower Name	Share	Agg. Value (USD)
1	Morgan Stanley	0.146	25,677,305,026
2	Bank of America	0.130	22,952,310,137
3	Goldman Sachs	0.118	20,879,509,465
4	JP Morgan	0.089	15,705,142,936
5	Barclays	0.084	14,892,024,199
6	Citigroup	0.080	14,157,685,594
7	BNP Paribas	0.062	10,925,486,664
8	State Street	0.037	6,441,413,169
9	Wells Fargo	0.032	5,632,548,024
10	UBS	0.031	5,407,831,467

From N-PORT filings submitted in 2023; total = 80.9%

What determines borrow costs?

- The fee for borrowing most shares of stock is typically **25 bps/year**.
 - This is the *general-collateral* rate.
- However, as with most markets, if demand exceeds supply at this minimum fee, the fee rises until supply equals demand.
 - Mechanically, instead of receiving interest on short-sale proceeds at the standard “rebate” rate, you receive the standard rate minus the fee.
- Historically, $\sim 1\text{-}2\%$ of stocks had significant borrow fees (D’Avolio, 2002)
 - In the last several decades, the picture has changed significantly.
- NB:
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“Extreme” Borrow Costs in 2001

Table 4
Selected negative rebate stocks (April 2000 through September 2001).^a

Ticker	Company	Fee (%)	Month
CNH	CNH GLOBAL	79.0	200105
GM	GENERAL MTRS CORP	63.0	200005
TOT	TOTAL FINA SA ^d	55.0	200006
KREM	KRISPY KREME DOUGHNUTS INC ^b	55.0	200102
STLW	STRATOS LIGHTWAVE INC ^b	50.0	200009
UN	UNILEVER N V	46.0	200105
PRKR	PARKERVISION INC	45.0	200005
MCDT	MCDATA CORPORATION ^b	40.0	200106
RD	ROYAL DUTCH PETE CO ^d	35.0	200108
PPD	PRE PAID LEGAL SVCS INC	35.0	200109
PLMD	POLYMEDICA CORP	35.0	200109
PLCE	CHILDRENS PL RETAIL STORES INC	35.0	200105
PALM	PALM INC ^b	35.0	200008
ABX	BARRICK GOLD CORP	27.0	200005
BCE	BCE INC	26.5	200006
NOK	NOKIA CORP. ^d	25.0	200103
HAND	HANDSPRING INC ^b	25.0	200102
INRG	INRANGE TECHNOLOGIES CORP ^b	25.0	200010
COH	COACH INC ^b	25.0	200104
AREM	AREMISSOFT CORP DE	22.0	200107
ERICY	ERICSSON ^b	20.5	200104

On average, 206 stocks per day (about 8.7% of open loans) are designated as special. The value-weighted mean loan fee for all specials is 4.69%. The roughly six special stocks per day with negative rebates have an average implied loan fee of 19%. Table 4 provides a partial list of those negative rebate stocks and their highest measured loan fee in the loan database. The fees that short sellers pay for these stocks are startling (e.g., 55% for Krispy Kreme or 50% for Stratos Lightwave).

– D’Avolio (2002, p. 285)

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Extreme Borrow Costs in 2025

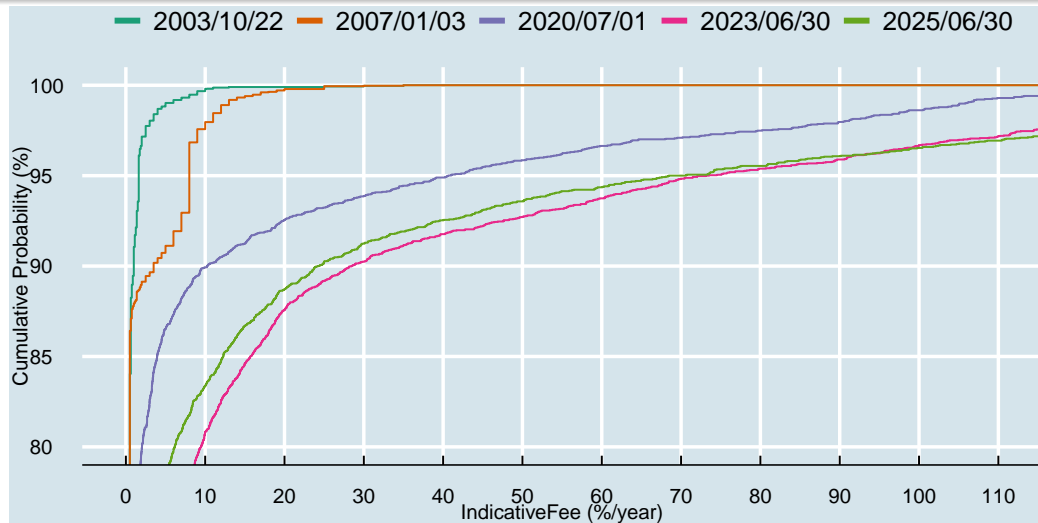
Tick	Name	Date	Ind.Fee (%)	Rebate (%)	MktCap
ARMP	ARMATA PHARMACEUTICALS INC	2024/05/10	1000.00	-994.830	111.744
SBET	SHARPLINK GAMING INC	2025/06/13	940.96	-935.790	549.395
QXO	Q X O INC	2024/07/31	902.75	-897.580	5117.875
AIRJ	AIRJOULE TECHNOLOGIES CORP	2024/06/11	896.70	-891.530	431.273
SDST	STARDUST POWER INC	2024/08/12	881.04	-875.870	432.845
NUKK	NUKKLEUS INC	2024/12/18	859.60	-854.430	207.376
NXTT	NEXT TECHNOLOGY HOLDING INC	2025/06/26	799.13	-793.960	959.783
LASE	LASER PHOTONICS CORP	2024/10/14	747.85	-742.680	118.740
FBLG	FIBROBIOLOGICS INC	2024/02/15	731.13	-725.960	417.197
ZENA	ZENATECH INC	2024/12/16	731.01	-725.840	134.310
COCH	ENVOY MEDICAL INC	2024/03/12	722.24	-717.070	148.960
NMAX	NEWSMAX INC	2025/04/02	718.46	-713.290	4671.601
DJT	TRUMP MEDIA & TECH GRP CORP	2024/04/01	705.54	-700.370	6651.871
KIDZ	CLASSOVER HOLDINGS INC	2025/05/06	699.68	-694.510	108.830
BNAI	BRAND ENGAGEMENT NETWORK INC	2024/06/13	615.95	-610.780	146.950
OPTX	SYNTEC OPTICS HOLDINGS INC	2024/12/27	605.71	-600.540	122.538
LVWR	LIVEWIRE GROUP INC	2025/06/03	594.13	-588.960	814.264
AISP	AIRSHIP A I HOLDINGS INC	2024/03/19	590.19	-585.020	291.309
GATE	MARBLEGATE ACQUISITION CORP	2025/04/01	584.48	-579.310	190.308
ATLN	ATLANTIC INTERNATIONAL CORP	2025/01/03	553.83	-548.660	297.002
AIFF	FIREFLY NEUROSCIENCE INC	2025/02/12	545.60	-540.430	103.047
TVGN	TEVOGEN BIO HOLDINGS INC	2024/10/30	526.34	-521.170	420.104
CRWV	COREWEAVE INC	2025/04/01	515.99	-510.820	19023.769
SIRI	SIRIUS X M HOLDINGS INC NEW	2024/07/23	513.47	-508.300	14633.800
XBP	XBP EUROPE HOLDINGS INC	2024/05/14	499.62	-494.450	101.056
JNVR	DEFI DEVELOPMENT CORP	2025/04/16	499.13	-493.960	103.074
UPXI	UPEXI INC	2025/05/15	496.64	-491.470	356.884

- Largest fee stocks, 2024:01–2025:06.
- Universe is all common stocks on major exchanges w/ ME > \$100 MM.
- $\text{shrcd} \in \{11, 12\}$; $\text{exchcd} \in \{1, 2, 3\}$
- On average, 113 stocks/day with ann. fee > 100%
- 43% have fee > 1% (2023)
- ~20% have fees > 10% (2022)

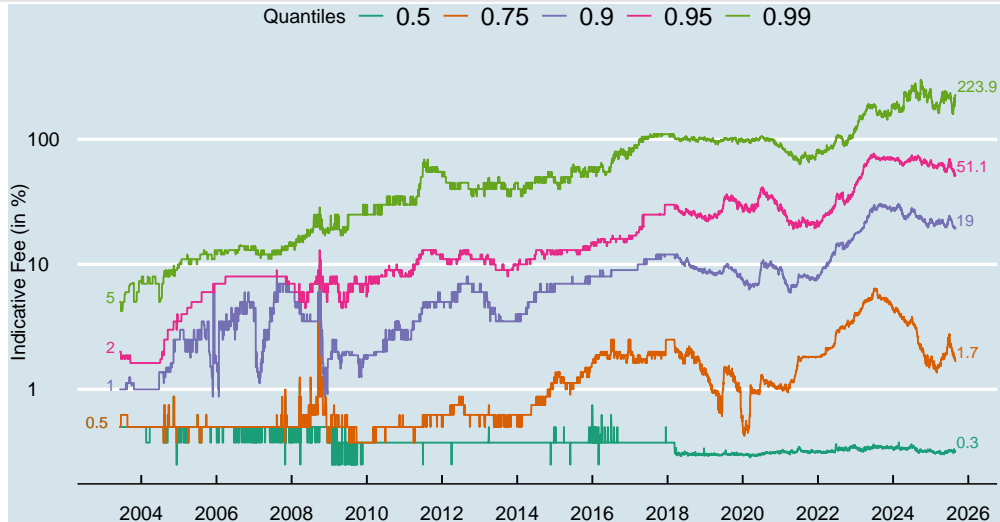
Data

- CRSP
 - Prices, Returns, Trading Volume
- Markit
 - daily since 2006:07; weekly 2003:06; ~full coverage since 2010.
 - Variables:
 - ① Indicative Fee
 - ② Simple Average Fee
 - ③ Active Utilization, Lender Concentration, etc.
- SEC filings scraped from SEC website.
 - N-PORT (qtr.): for each security: amount held and amount on loan.
 - N-CEN (ann.): fund's total income from lending.
- Exchanges & COMPUSTAT.
 - Short Interest
- Thomson Reuters & SEC
 - Institutional Ownership

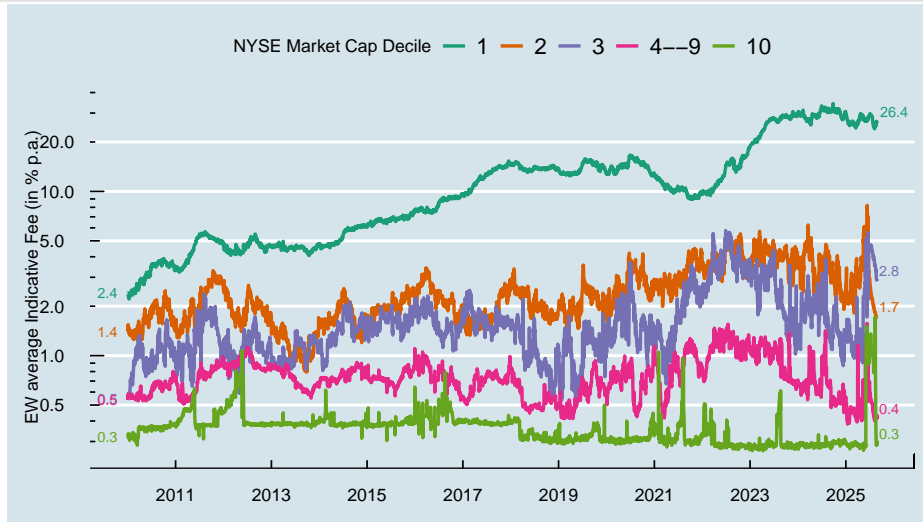
Markit Indicative Fee CDFs (exchcd $\in \{1, 2, 3\}$; shrcd $\in \{10, 11\}$)



Indicative fee quantile breakpoints



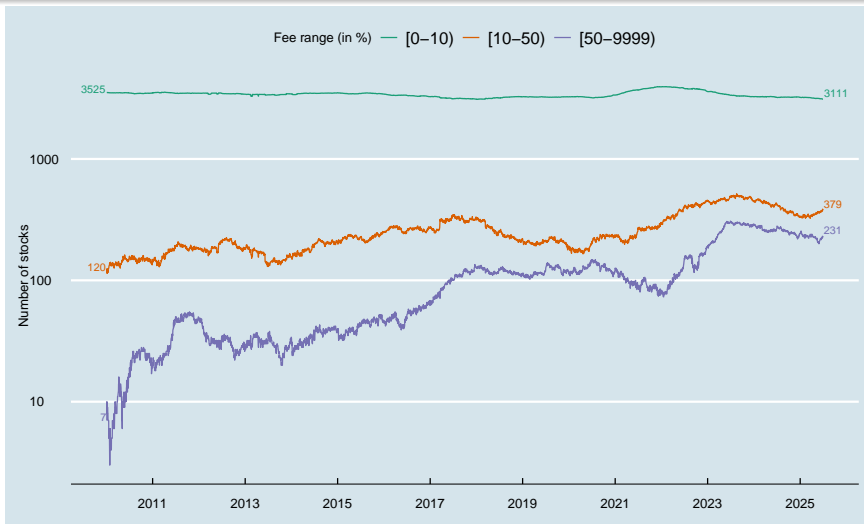
Average borrow cost, by size decile



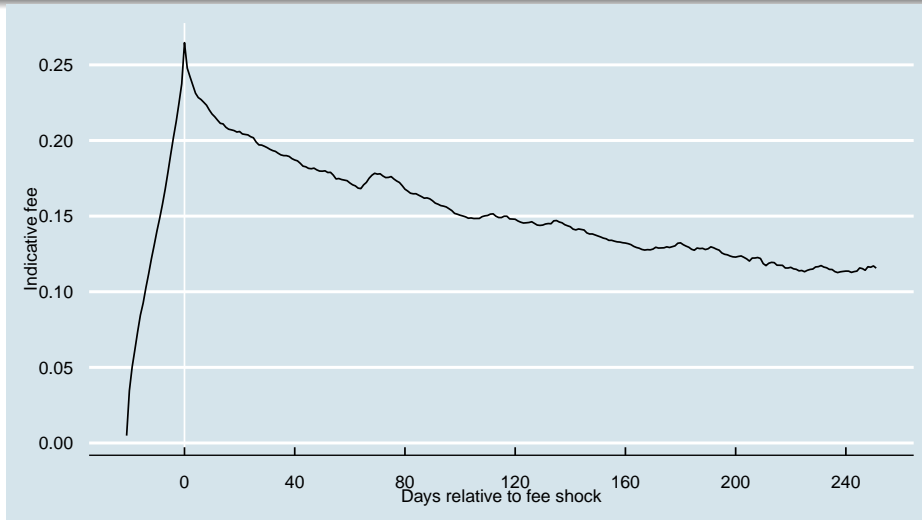
Calendar-time portfolios of fee-sorted stocks.

- We construct a portfolio strategy based on ex-ante borrow costs.
- All US ordinary common equities; major exchanges; valid price and fee data at end of month $t-1$.
- Formed monthly 2010:01-2025:07, based on Markit indicative fee on the last day of month $t-1$.
- Eight portfolios; breakpoints: 50 bps, 1%, 2.5%, 5%, 10%, 20%, and 50%.
- market-cap-weighted portfolios.
- Calculate realized CAPM α s for raw returns (“gross”), and adding in full Indicative Fee (“net”).

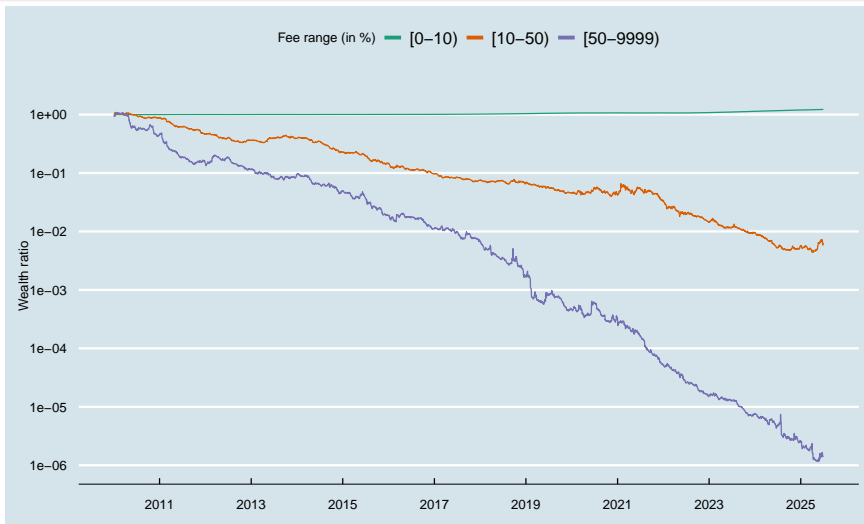
Portfolio Sizes



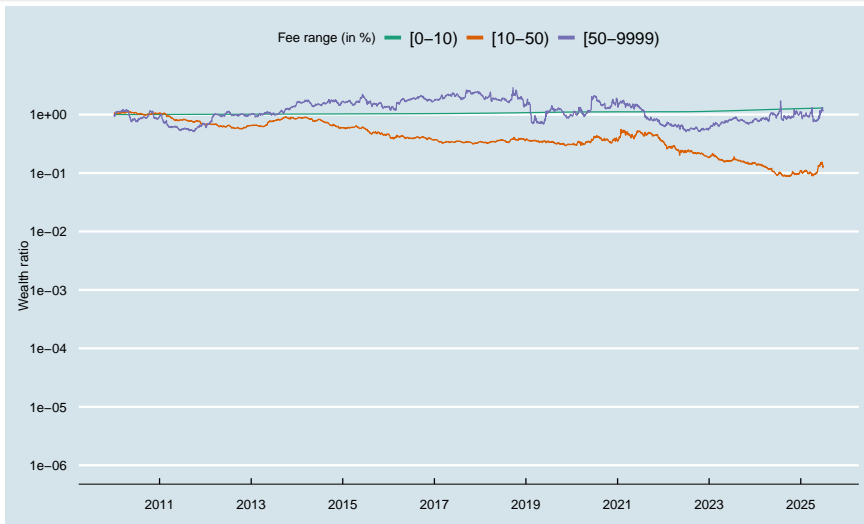
Fee Persistence – 10% threshold



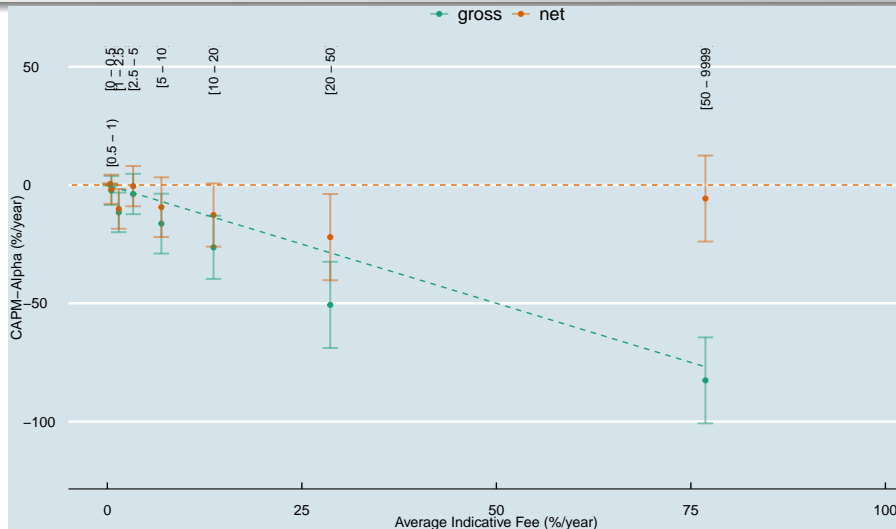
Calendar time portfolios - Mkt. hedged raw returns (CRSP-only)



Calendar time portfolios - plus indicative fee



Returns, gross- and net-of borrow costs – monthly formation



Calendar time portfolios – Results Summary

- High fee stocks which aren't lent earn a CAPM $\alpha \approx -1 \times \text{fee}$.
 - For high-fee portfolio annualized $\hat{\alpha} = -82.58\%$ ($t = -8.90$)
 - 100% of shares outstanding are not lent and do not earn lending fees.
 - Adding back in Markit fee results in $\hat{\alpha} = -0.62\%$ ($t = -0.62$)
- Going long and lending high-fee portfolio resulting in negative alphas, given intermediation costs.
- Shorting moderate fee stocks ($< 50\%$) has yielded positive alpha.
 - CAPM-alpha is marginally significant for 10–20% ($\hat{\alpha} = -12.7\%$, $t = -1.86$) and 20–50% ($\hat{\alpha} = -22.0\%$, $t = -2.37$) portfolios.
- Results are broadly consistent with a market in which:
 - Short sellers are informed.
 - Short seller competition drives fees to close to $-1 \times \alpha$.
 - Investors who go long lose money without lending fees, or with fees after intermediation costs.

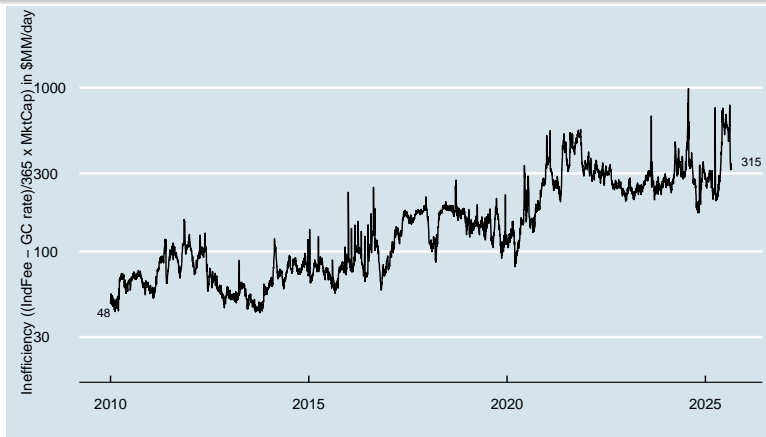
Inefficiency

- We calculate dollar “inefficiency” as the losses to the holders of the high fee stocks who don’t lend these stocks.
- For each security i at time t , the dollar amount of that security which is not on loan is $ME_{i,t}$
- Assuming the daily alpha is equal to -1 times the daily fee $fee_{i,t}$, the daily alpha lost by these investors is:

$$\text{Inefficiency}_t \equiv \sum_i fee_{i,t} \cdot ME_{i,t}$$

- Current estimated inefficiency (\approx \$315MM/day) is small relative to total US equity market cap (\approx \$62T), but is sizeable relative to the market cap of the small decile portfolio (\approx \$157B)

Daily “inefficiency”



$$\text{Inefficiency}_t \equiv \sum_i fee_{i,t} \cdot ME_{i,t}$$

Estimating the Lender Share (1)

- Since 2019, the SEC has required that all registered investment companies (RICs) file forms N-CEN and N-PORT.
- On form N-CEN, annual *Net Income from Security Lending* is reported at the fund level ($LR_{i,t}$)
- On form N-PORT, funds report quarterly snapshots of holdings and lending, by security.
- By merging the N-PORT data, interpolated between the quarterly snapshots, with the Markit indicative fees, we can estimate the annual borrow cost ($BC_{i,t}$) for the funds' lending portfolio.
- For each fund-year, we calculate the Lender Share as:

$$LS_{i,t} = \frac{LR_{i,t}}{BC_{i,t}}$$

Estimating the Lender Share (2)

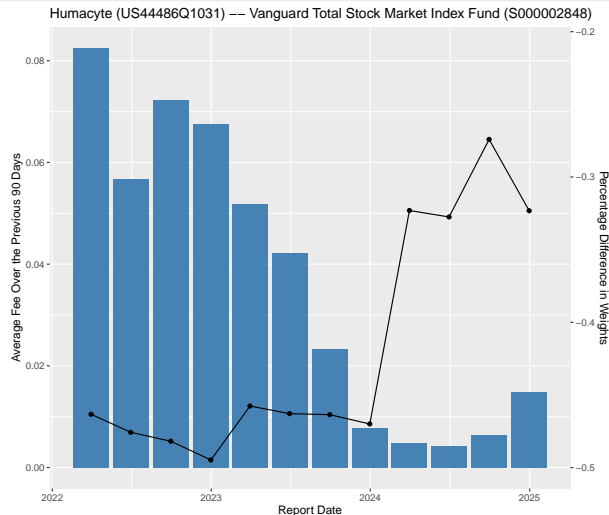
$$LS_{i,t} = \frac{LR_{i,t}}{BC_{i,t}}$$

- A $LS = 1$ would be consistent with a share lending market with no intermediation costs; $LS = 0$ would mean that the intermediation chain would capture all the fees paid by borrowers.
- We estimate a median $LS = 0.577$, (N=4,194), with filters
 - Without data filters, the median estimated LS is 0.587 (N=9,603).
 - The median is consistent across the five years in our sample (2020–2024)
- There is a relatively small amount of variation of LS with the borrow cost of the fund's portfolio.
 - Lowest fee portfolios' median LS is 0.47; highest fee median is 0.67
- This suggests that, even for the highest borrow cost stocks, the intermediaries capture $\sim 1/3$ of the borrow costs.

Index ETF Fund Holdings

- We use the SEC's N-PORT and N-CEN data, merged with the Markit borrow-cost data.
- we examine whether Index ETFs downweight securities which have had high borrow costs over the preceding 90 days.
 - See Evans, Ferreira, and Porras-Prado (2017), who find that funds that sell (rather than lend) high fee stocks perform better.
- Filters:
 - Funds self-report as both ETFs and index funds in their N-CEN filings.
 - Consider only positions larger than \$500,000
 - include only funds on report dates where they hold at least 10 such positions

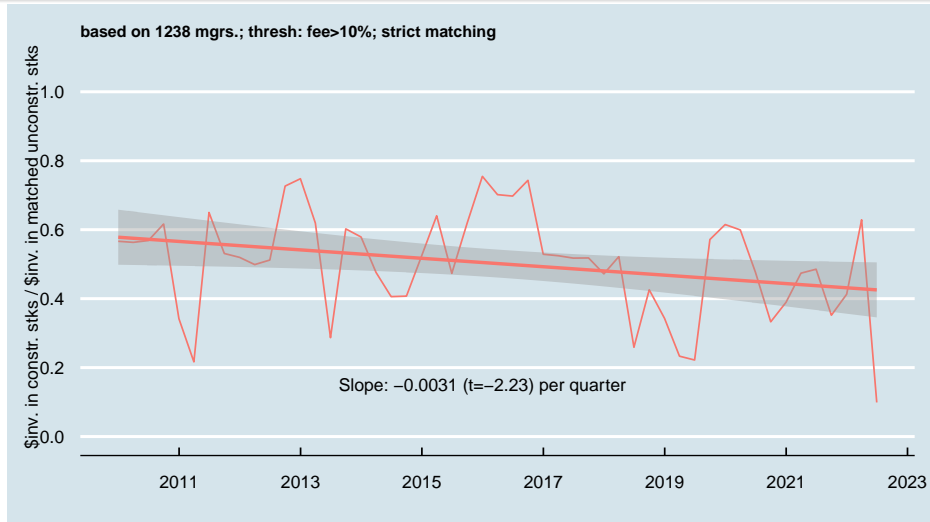
Do funds underweight high-fee stocks?



Fund Weights and Borrow Costs– Index-ETFs

	Dep. Var: $\log(\text{port-wt})$		
	(1)	(2)	(3)
$\log(\text{mkt-wt})$	1.017 (0.006)	1.004 (0.003)	1.004 (0.003)
$\log(\text{avg-fee})$		-0.121 (0.008)	-0.123 (0.009)
$\log(\text{avg-fee}): I_{0.01 \leq fee < 0.1}$			0.007 (0.004)
$\log(\text{avg-fee}): I_{fee \geq 0.1}$			-0.041 (0.014)
Quarter Fixed Effects	Yes	Yes	Yes
Observations	964,301	964,301	964,301
Adjusted R ²	0.970	0.972	0.972

13F Analysis



Conclusions

- The securities lending market has experienced a marked deterioration in efficiency over the past several decades, in contrast to trends in other financial markets.
 - Borrow costs have increased dramatically.
- A strong, approximately one-to-one relationship exists between borrowing costs and future alpha.
 - Our highest-fee stocks earn an annualized CAPM alpha of $\sim -75\%$.
 - The cost of this inefficiency has averaged $> \$300$ million/day, post-2020.
- The inefficiency appears driven by the behavior of key market participants:
 - **Share Lending Market Frictions:** frictions in the intermediation chain linking lenders and the borrowers result in low returns to share-lenders.
 - **Lending Supply Contraction:** Institutional investors, including passive index funds, now systematically and rationally underweight high-fee stocks. This reduces the supply of lendable shares, leading to a partial market failure.
- Findings suggest revisiting share lending market regulations and structure.

References I

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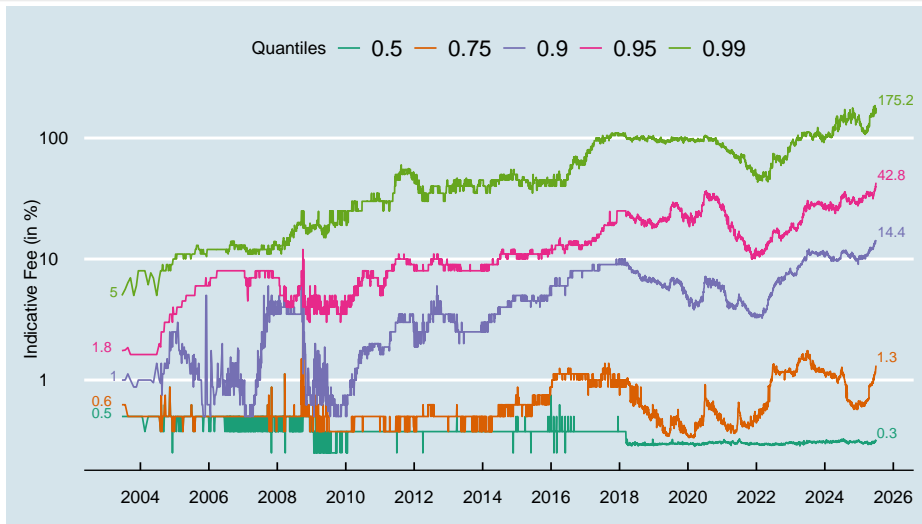
EquiLend Case

In 2001, a consortium of investment banks founded a platform called EquiLend to improve the securities lending workflow. In 2017, a group led by four pension funds and a trading firm accused the banks of “relegat[ing] the stock lending market to the stone age” by using their board positions on EquiLend to boycott startup platforms in order to keep monopoly control over the market and charge excessive lending fees since 2009. Through August 2023, five of the banks have settled for a combined \$580m in damages.

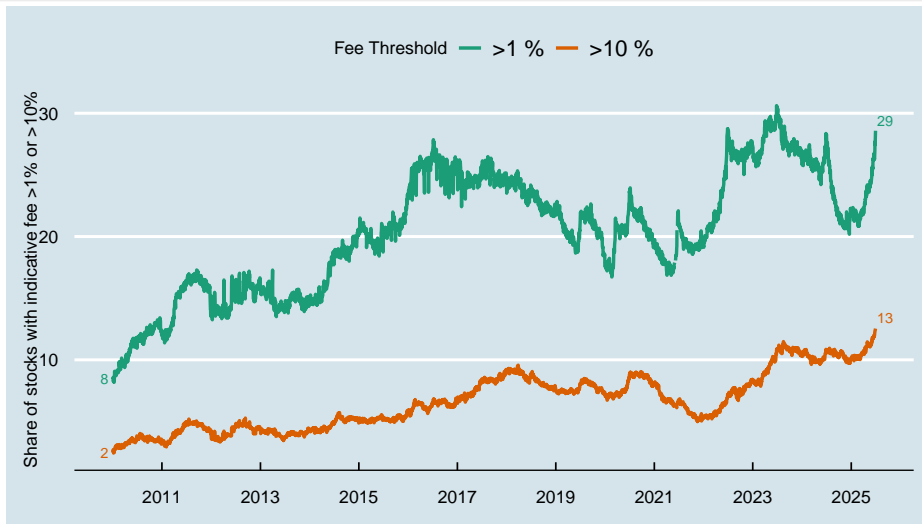
CASE 1:17-CV-06221-KPF-SLC

- Defendants include GS, JPM, MS, CS/UBS, BlackRock and BofA.
 - BofA has not yet settled
- See [Reuters, 08/23/23](#)
- The EquiLend platform was for sale (see [Reuters, 9/29/23](#))
 - Sold to PE firm Welsh, Carson, Anderson & Stowe ([Equilend, 1/18/24](#))
- See also [P&I, 9/5/23](#) and [P&I, 2/14/22](#).

Indicative fee quantiles – excl. stocks < 5 years old



Share of stocks with $\geq 1\%$ and 10% fees – excl. stocks < 5 years old



Forecasting forecast errors

Analyst 1-quarter-ahead forecast errors regressed on past forecast errors and past lending fees. 2010/01–2024/12

	1	2	3	4
Intercept	-0.00 (-1.11)			
fee	-0.02 (-11.02)	-0.02 (-11.01)		-0.02 (-11.01)
error (t-1)			0.18 (17.82)	0.18 (17.74)
R^2	0.0105	0.0169	0.0376	0.0451
Fixed Effects		qtr	qtr	qtr
Clustering	permno,qtr	permno,qtr	permno,qtr	permno,qtr
N	170,525	170,525	170,525	170,525

Forecasting revisions

Revision in analyst 1-quarter-ahead forecasts regressed on lagged
lending fees, 2010/01–2024/12

	1	2	3	4	5
Intercept	-0.02 (-233.55)	-0.02 (-31.04)	-0.02 (-26.03)	-0.02 (-4.92)	
fee	-0.41 (-100.87)	-0.41 (-11.00)	-0.41 (-10.84)	-0.41 (-11.60)	-0.41 (-12.11)
R^2	0.0020	0.0020	0.0020	0.0020	0.0088
Fixed Effects					year
Clustering		permno	permno, analys	permno, analys,yr	permno analys,yr
N	5,093,157	5,093,157	5,093,157	5,093,157	5,093,157

Is it a supply or demand story?

