Are Investors Paying to be Green?

Evidence from Mutual Funds

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Australasian Finance and Banking Conference

December 14th, 2023

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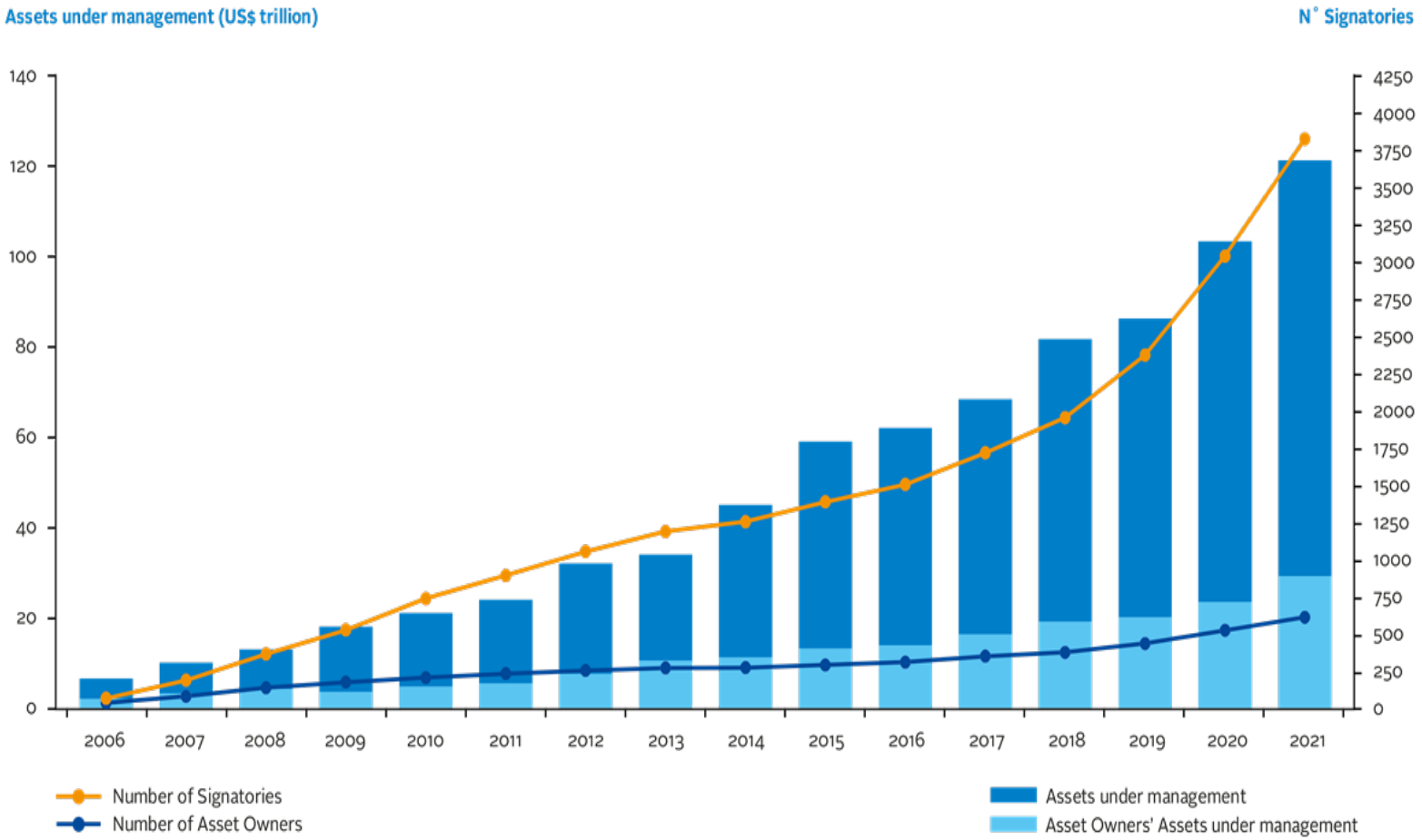

Source: *https://www.unpri.org/pri/about-the-pri*

Motivation

Why would environmentally-friendly ("green") mutual funds be priced differently?

- More costly to run / reputational risks / compliance with regulation
- Compensation for "skill" in sustainable investing
  - Difficult to estimate how companies fare in transition
  - Ability to hedge/neutralise climate risks
- Investors might (mistakenly) believe in higher or lower returns for green investments
- Because fund managers think green investors are willing to pay more for green investments

Contribution

Our paper:

- Investigates the *'direct'* cost of environmentally-friendly investing, whereas most academic research tends to focus on 'hidden' costs (e.g. "Is there a carbon premium?", Are green funds under-diversified?, etc.)
- Provides insight into mutual fund manager's strategic *decision to repurpose* as "green" mutual funds
- Highlights how mutual fund investors are *sophisticated* when it comes to interpreting emissions disclosure and marketing claims from funds they (potentially) invest in

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2. *'Green fund fee premium'*: Average green mutual fund between 5 bps and 10 bps more expensive than conventional counterpart
   - Premium is driven by funds that invest environmentally friendly, rather than by funds that have a green label
3. Funds that "go green" attract vastly larger flows and increase fees in quarters following the name change
   - **But** investors do not blindly follow name changes: effects are driven by name-changing mutual funds that simultaneously improve portfolio's environmental performance

Data

1. Mutual fund data from CRSP's Survivor-Bias-Free Mutual Fund Database.
   - Focus on equity (omit `hedged` and `short` funds) and mixed (equity allocation between 80% and 105%) mutual funds, removing small funds (less than $10 million managed) and start-ups (less than 1 year since inception).
   - Aggregate to funds by value-weighting over shareclasses.
2. Impute missing fee information and turnover ratios from SEC's EDGAR.
   - Results in 180k+ quarterly observations on about 10,000 unique funds.
3. Shareclasses $\rightarrow$ fund mapping using Russ Wermers' `MFLINKS`.
4. Green labels from Morningstar Sustainable Fund Flow reports.
5. Holdings-level emissions and emission intensities from Asset4, MSCI, Refinitiv, Sustainalytics, and S&P Trucost.

Fund Flows

$$\text{Flow}_{it} = \frac{\text{TNA}_{it} - \text{TNA}_{it-1}(1 + r_{it})}{\text{TNA}_{it-1}},$$

where TNA_{it} and TNA_{it-1} are the fund i's Total Net Assets in the months t and $t-1$ and r_{it} is the fund's gross return. Flows are winsorised at the 1^{st} and 99^{th} percentiles. We aggregate flows to the quarterly frequency to match the granularity of our data set.

Portfolio-level environmental measures

$$S_{it} = \sum_{j=1}^{N_i} w_{ijt} S_{jt},$$

Where:

- S_{it} is the portfolio i's ESG, emission, or intensities' value at time t
- w_{ijt} is the weight of holding j in the portfolio i at time t
- S_{jt} is the individual portfolio holding j's ESG or emissions value at time t.

We set the variables $\mathbb{I}$(Low Carbon Emissions) and $\mathbb{I}$(Low Carbon Intensity) equal to 1 if the fund's portfolio emissions are respectively portfolio intensity is in the bottom 30% compared to that of other funds in the same CRSP objective code and otherwise equal to 0.

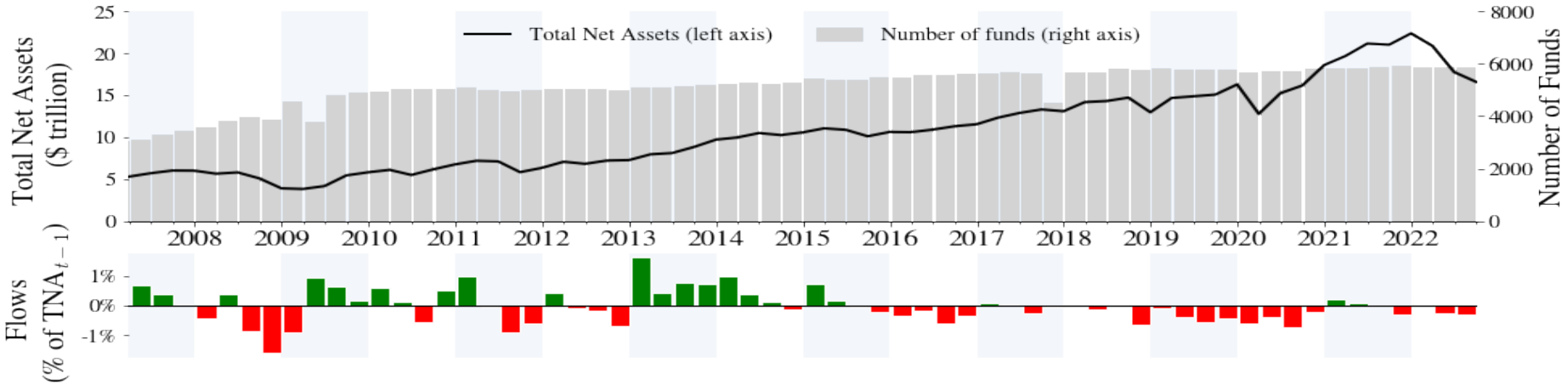
Correlations

Summary statistics

				Percentiles						
	N. Obs.	Mean	SD	1%	5%	25%	Median	75%	95%	99%
Panel A: Fund-level variables										
Total Expense Ratio (%)	181,603	1.36	1.01	0.03	0.14	0.63	1.14	1.82	3.49	4.51
$\text{Return}_{t,t+1}$ (%)	178,624	2.01	10.45	-27.48	-17.86	-2.49	3.19	7.88	17.18	26.76
$\text{Flow}_{t,t+1}$ (% of TNA_{t-1})	177,944	1.48	19.28	-34.99	-14.89	-4.36	-1.12	3.20	23.97	76.48
$\text{Flow}_{t,t+4}$ (% of TNA_{t-1})	161,839	8.99	80.41	-62.74	-38.09	-15.06	-4.46	11.77	87.91	268.48
$\text{Flow}_{t,t+8}$ (% of TNA_{t-1})	145,270	24.95	177.17	-81.27	-57.77	-27.12	-8.40	23.64	188.30	608.04
$\text{Flow}_{t,t+12}$ (% of TNA_{t-1})	129,766	43.05	264.01	-92.09	-71.43	-37.49	-12.59	33.34	289.86	1013.46
Total Net Assets ($ millions)	181,589	2,780	17,204	16	25	103	389	1,438	9,424	41,360
$\mathbb{I}$(Index Fund)	181,603	0.27	0.44	0.00	0.00	0.00	0.00	1.00	1.00	1.00
$\mathbb{I}$(ETF)	181,603	0.21	0.41	0.00	0.00	0.00	0.00	0.00	1.00	1.00
Fund Age (years)	181,603	15.44	12.36	1.26	2.25	6.68	13.00	20.80	35.57	66.26
Fund manager age (years)	180,470	32.53	19.70	3.24	7.24	18.45	26.83	46.06	71.15	86.01
Institutional share (%)	181,603	52.55	42.63	0.00	0.00	3.49	54.66	100.00	100.00	100.00
Panel B: Portfolio-level variables										
Turnover ratio (%)	181,602	61.45	460.99	2.00	6.00	21.00	41.00	75.00	160.71	337.00
Portfolio equity share (%)	181,603	93.97	4.59	81.03	84.20	91.53	94.95	97.36	99.79	100.01
Mean holding mkt. cap. ($ billions)	181,603	95,426	125,603	675	1,625	9,711	60,939	128,330	352,693	684,959
Portfolio sector concentration	181,603	0.24	0.23	0.00	0.11	0.13	0.15	0.20	0.95	1.00
Number of portfolio holdings	176,828	232.82	489.57	17.00	30.00	53.00	88.00	186.00	920.00	2413.46
Panel C: Portfolio-level and fund-level environmental variables										
$\mathbb{I}$(Green Fund Name)	181,603	0.01	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$\mathbb{I}$(Morningstar Green Label)	181,603	0.03	0.16	0.00	0.00	0.00	0.00	0.00	0.00	1.00
$\mathbb{I}$(Low Carbon Emissions)	181,603	0.26	0.44	0.00	0.00	0.00	0.00	1.00	1.00	1.00
$\mathbb{I}$(Low Carbon Intensity)	181,603	0.24	0.43	0.00	0.00	0.00	0.00	0.00	1.00	1.00
Emissions (mlns tons CO_2)	144,212	5.61	6.82	0.06	0.18	1.09	3.27	7.52	18.36	39.10
Emission intensity (tons CO_2 / $ million revenue)	144,212	285.60	326.13	17.02	35.01	97.83	185.97	334.21	891.77	2089.77

Summary statistics: TNAs & fund flows

(a) **All** funds in sample



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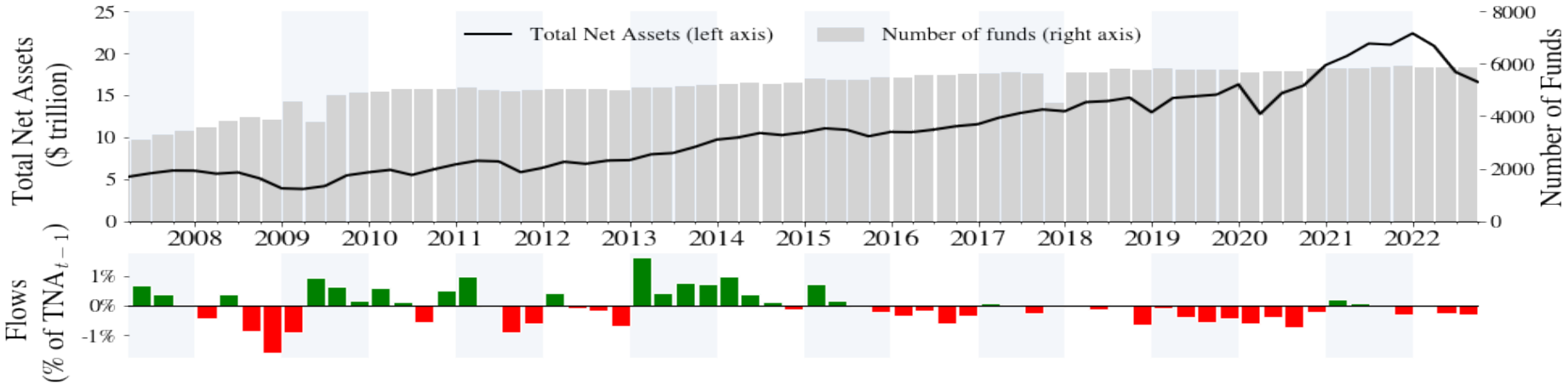
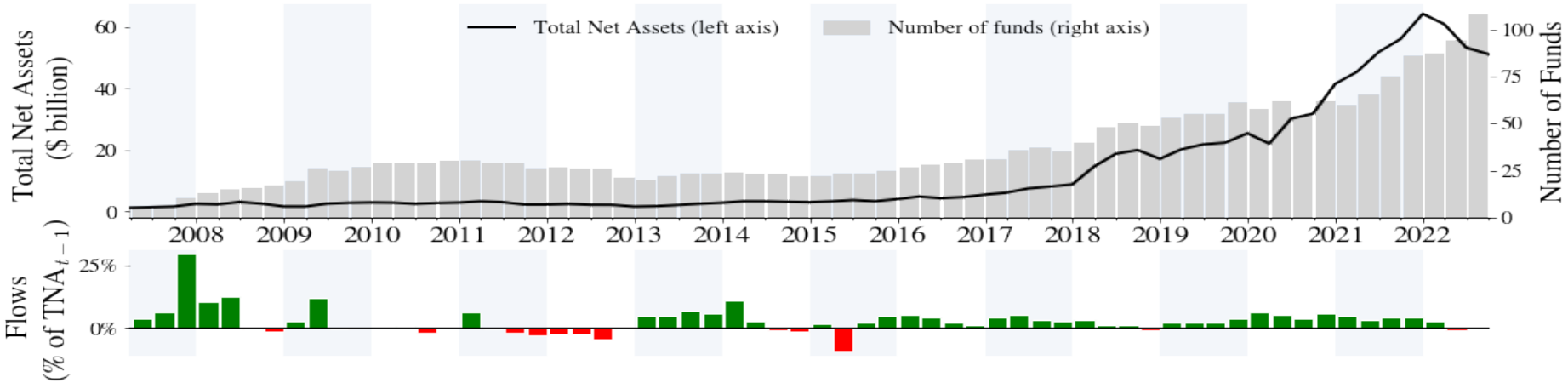


(b) Funds with **green name**



Summary statistics: TNAs & fund flows (cont'd)

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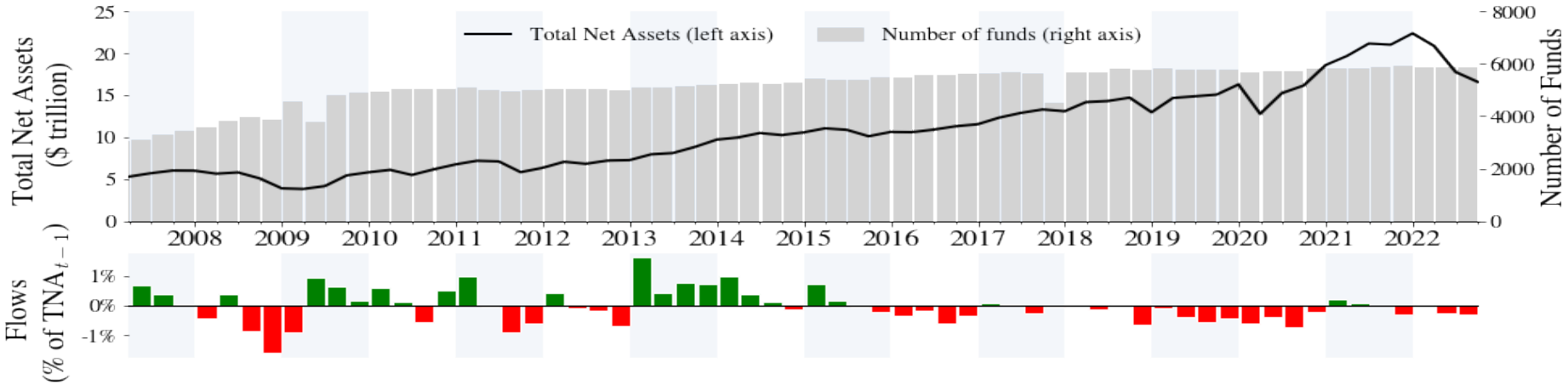
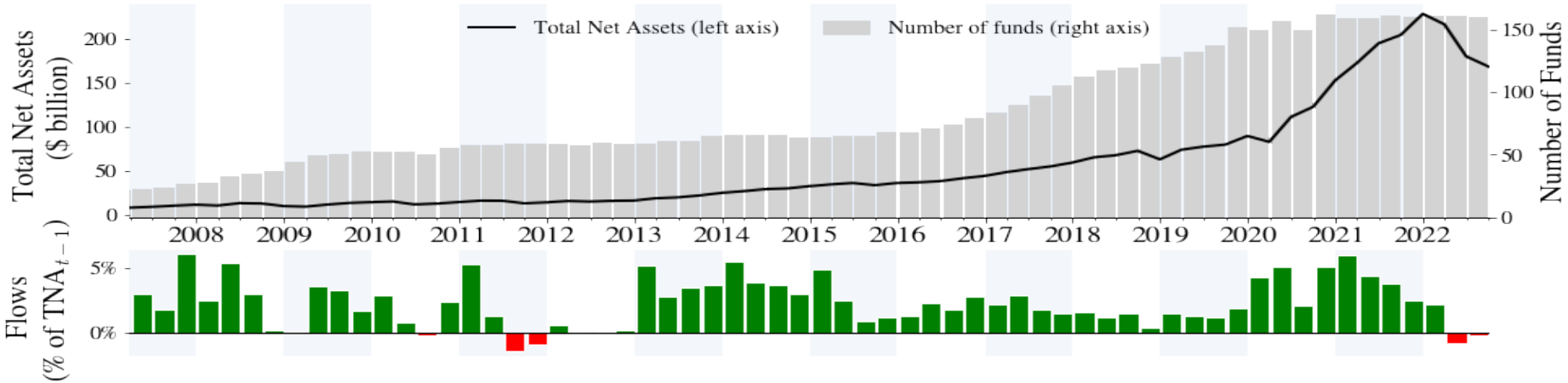


(c) Funds with **green Morningstar label**

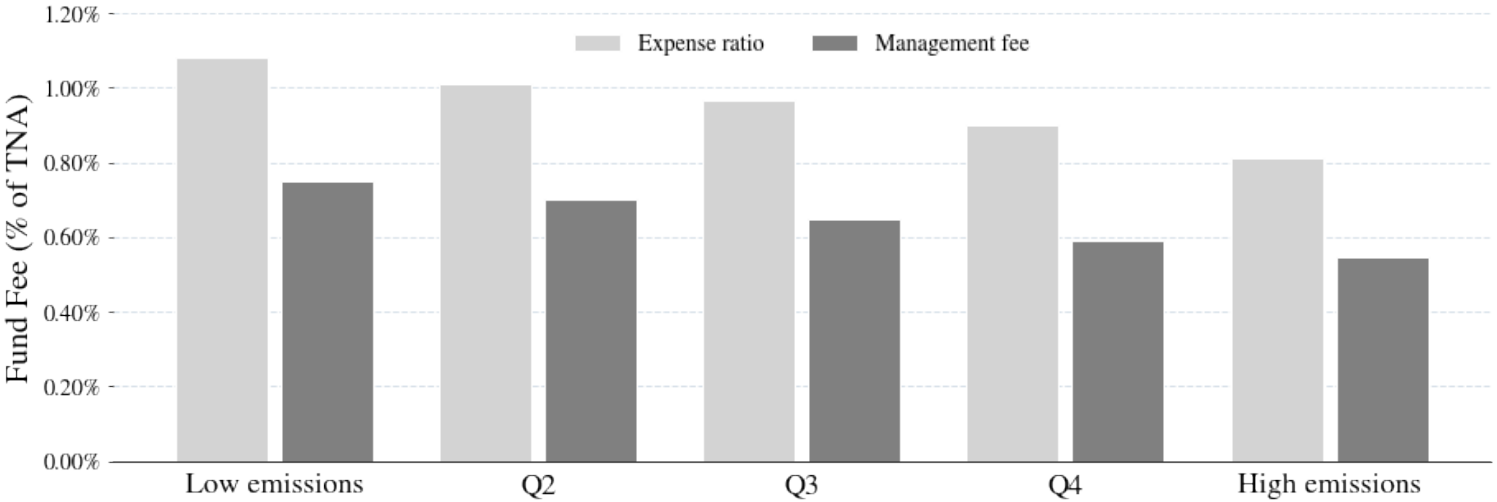


Results

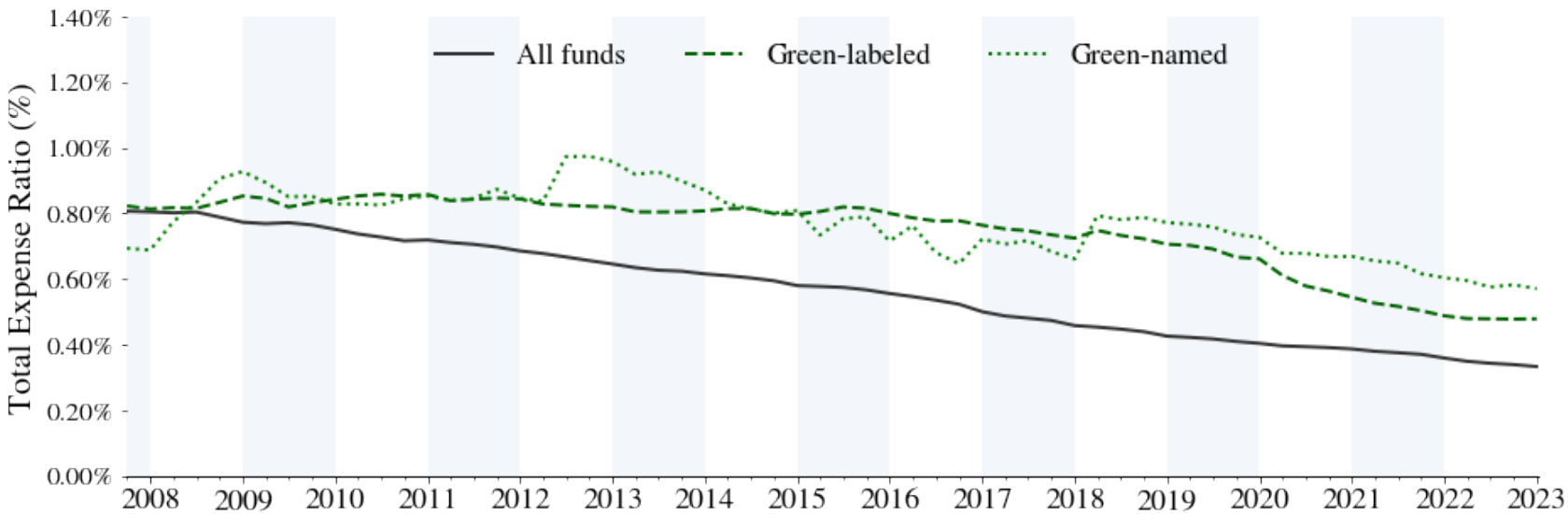
Do investors care about green labels?

Dependent variable:	Quarterly Flows (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{I}$(Green fund name)	0.0150**	0.0198**	-	-	-	-
	(2.029)	(2.478)	-	-	-	-
$\mathbb{I}$(Morningstar green fund)	-	-	0.0346***	0.0366***	-	-
	-	-	(6.378)	(4.836)	-	-
$\mathbb{I}$(Low carbon emissions)	-	-	-	-	0.0043***	0.0033**
	-	-	-	-	(2.847)	(2.109)
Total Expense Ratio (bps)	-0.0060***	-0.0006	-0.0059***	-0.0005	-0.0061***	-0.0007
	(-7.890)	(-0.663)	(-7.726)	(-0.528)	(-7.969)	(-0.689)
log(Total Net Assets ($ millions))	-0.0024***	-0.0028***	-0.0022***	-0.0026***	-0.0024***	-0.0028***
	(-7.040)	(-5.462)	(-6.456)	(-5.108)	(-6.808)	(-5.499)
$\text{Return}_{t-3,t}$ (%)	0.3152***	0.2752***	0.3131***	0.2736***	0.3142***	0.2747***
	(29.700)	(28.699)	(29.481)	(28.544)	(29.627)	(28.645)
$\text{Return}_{t-1,t}$ (%)	0.5062***	0.4228***	0.5045***	0.4229***	0.5055***	0.4219***
	(21.189)	(21.659)	(21.097)	(21.667)	(21.165)	(21.598)
Year-Quarter × Fund Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company FE	No	Yes	No	Yes	No	Yes
N. Obs.	175,660	175,652	175,660	175,652	175,660	175,652
R^2-Adj.	0.025	0.021	0.026	0.022	0.026	0.021

Are green funds more expensive?



Are green funds more expensive? (cont'd)



Are green funds more expensive? (cont'd)

Dependent variable:	Total Expense Ratio (percentages)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\mathbb{I}$(Green fund name)	-0.0133	0.0356***	-	-	-	-	-	-
	(-0.411)	(2.556)	-	-	-	-	-	-
$\mathbb{I}$(Morningstar green fund)	-	-	-0.0003	-0.0020	-	-	-	-
	-	-	(-0.012)	(-0.108)	-	-	-	-
$\mathbb{I}$(Low carbon emissions)	-	-	-	-	0.0963***	0.0569***	-	-
	-	-	-	-	(14.302)	(11.491)	-	-
$\mathbb{I}$(Low carbon intensity)	-	-	-	-	-	-	0.0524***	0.0313***
	-	-	-	-	-	-	(8.602)	(7.154)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter × Fund Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company FE	No	Yes	No	Yes	No	Yes	No	Yes
N. Obs.	189,767	189,767	189,767	189,767	189,767	189,767	189,767	189,767
R^2-Adj.	0.426	0.236	0.426	0.235	0.426	0.235	0.426	0.235

Show control variables

Repurposing Mutual Funds: Green Name Changes

Selection effects

Which funds "repurpose"?

$$\mathbb{I}(\text{Green Name Change})_{it} = \alpha + \beta\, X_{it-1} + \sigma_{it} + \epsilon_{it},$$

where:

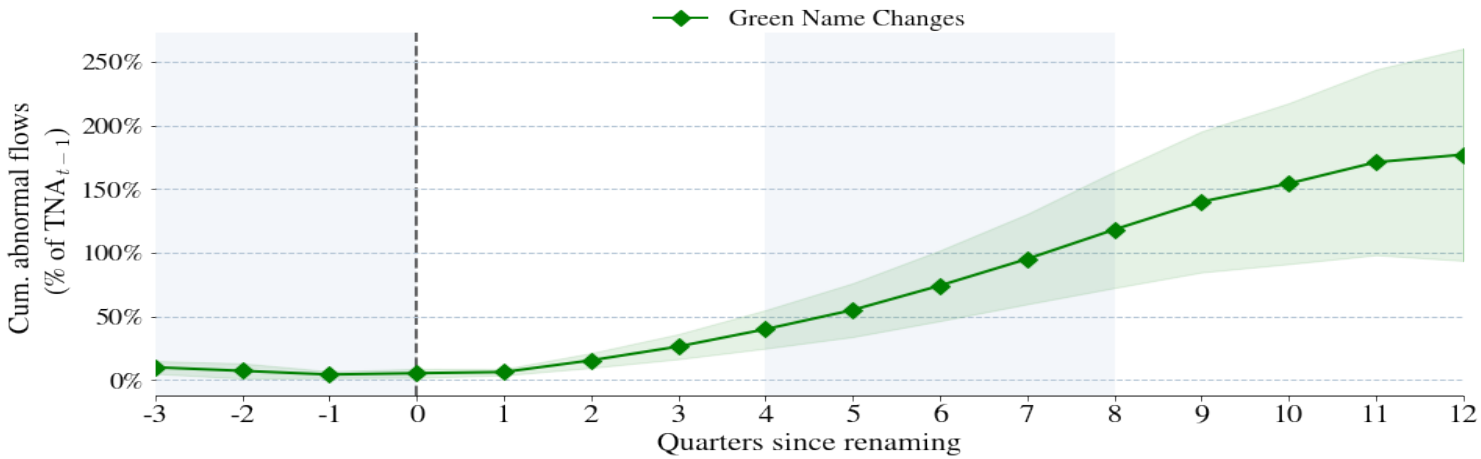
- $\mathbb{I}(\text{Green Name Change})_{it}$ equals 1 if fund i undertakes a green name change in quarter t
- X_{it} includes the fund's fee, age, size, investor base, whether or not it is an index fund, past-quarter and past-year returns, past-quarter and past-year flows, its portfolio's emissions, and its portfolio's ESG score
- σ_{it} is a year-quarter $\times$ fund style fixed effect

Selection effects (cont'd)

Dependent variable:	$\mathbb{I}$(Green Name Change)	
	(1)	(2)
Total Expense Ratio (bps)	0.195	0.229
	(0.1836)	(0.1870)
log(Fund age (years))	0.494*	0.517*
	(0.2652)	(0.2693)
log(Total Net Assets ($ millions))	-0.347***	-0.340***
	(0.1120)	(0.1119)
Institutional funds (%)	0.399	0.498
	(0.4808)	(0.4850)
$\mathbb{I}$(Index fund)	-0.422	-0.496
	(0.5675)	(0.5842)
$\text{Return}_{t-3,t}$ (%)	6.415***	6.377***
	(1.7881)	(1.8427)
$\text{Return}_{t-1,t}$ (%)	-0.621	-1.644
	(4.3851)	(4.3314)
$\text{Flow}_{t-3,t}$ (%)	-3.605***	-3.682***
	(1.3928)	(1.3803)
$\text{Flow}_{t-1,t}$ (%)	0.017	0.015
	(0.0644)	(0.0648)
log(Mean Emissions S1&2)	-	-0.326**
	-	(0.1557)
Mean ESG score	-	0.038**
	-	(0.0185)
Year-Quarter × Fund Style FE	Yes	Yes
N. Obs.	173,514	151,548
Pseudo R^2	0.133	0.151

Green name changes: Effect on flows

(a) Unconditional effect



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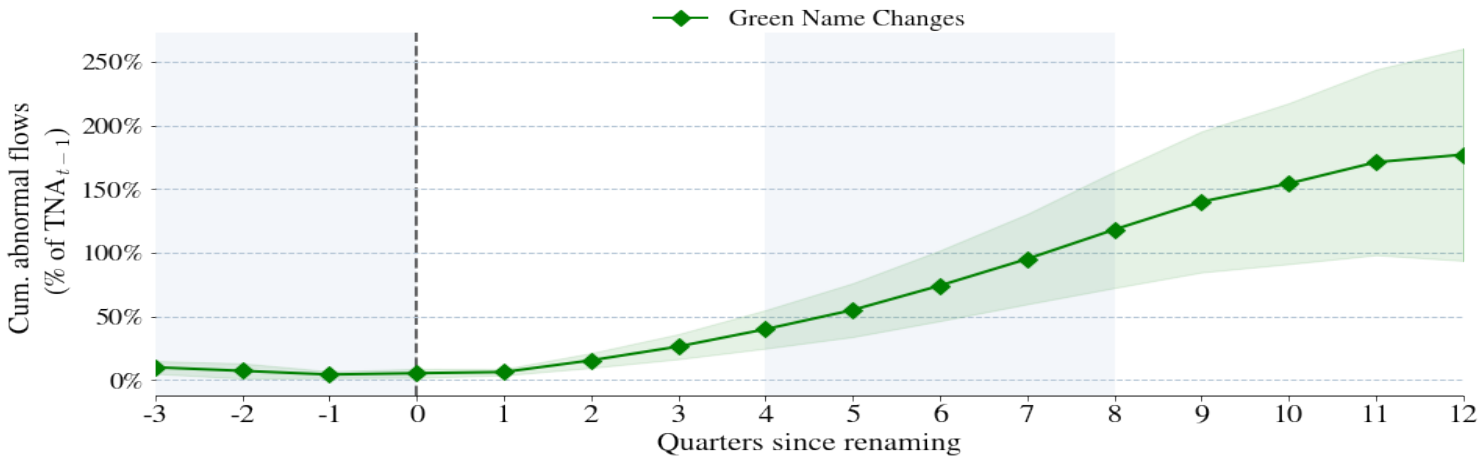
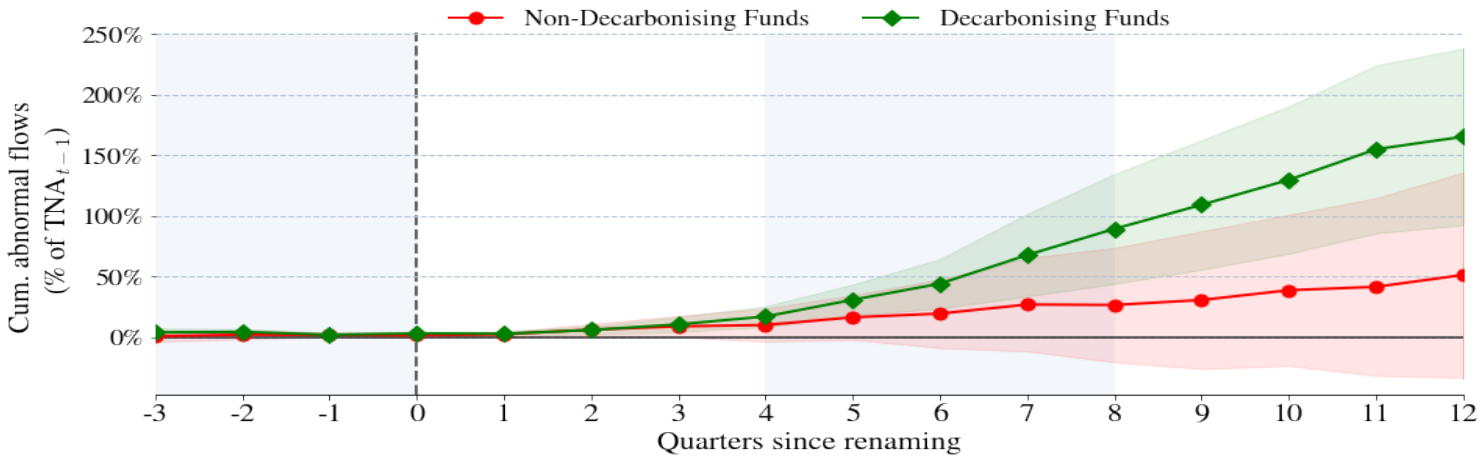


(b) Conditional on decarbonisation



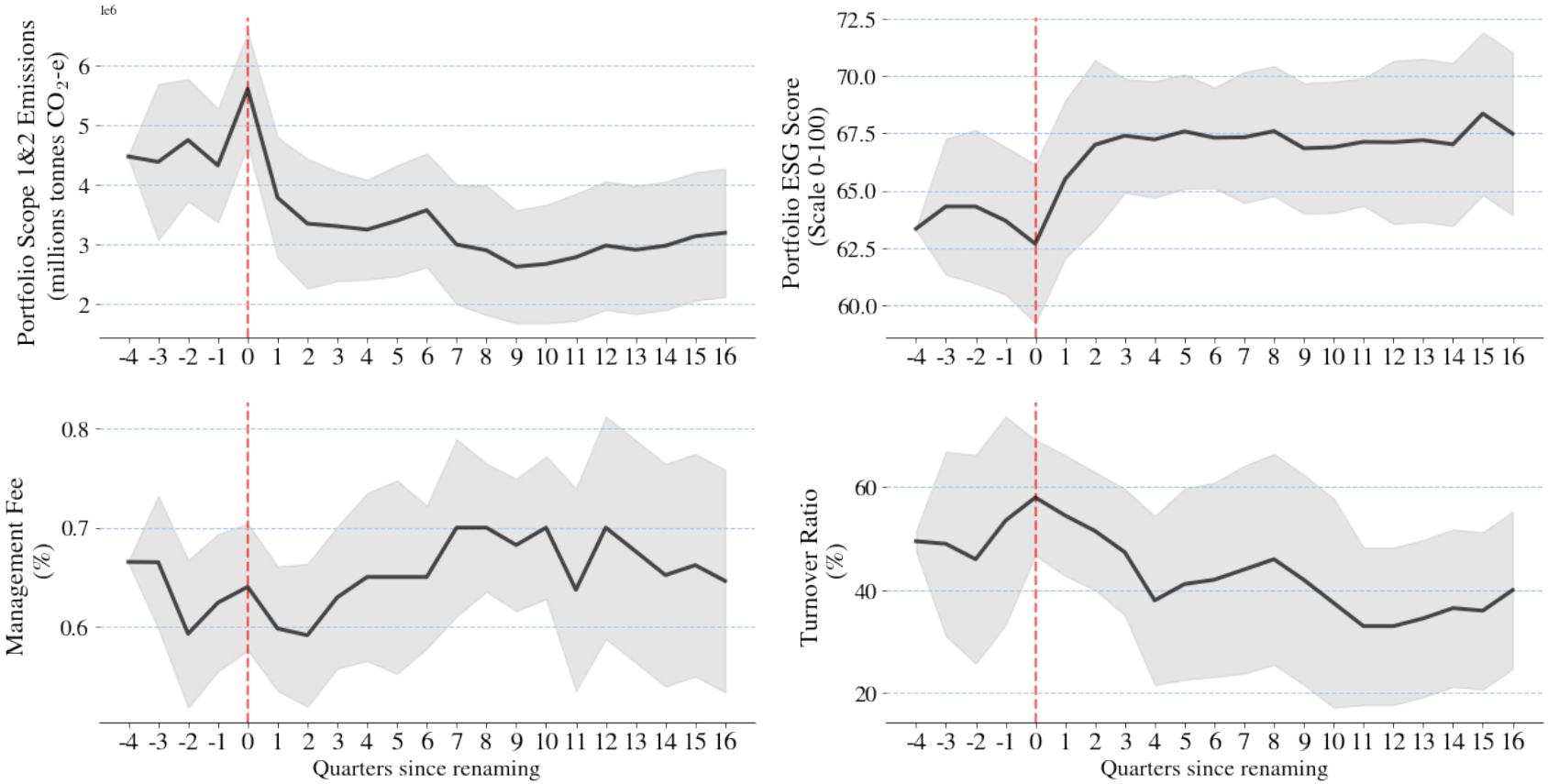
Green name changes: Effects on flows

Dependent variable:	Cumulative $\text{Flow}_{t,t+q}$							
Quarters ahead:	1Q	4Q	8Q	12Q	1Q	4Q	8Q	12Q
$\mathbb{I}$(Green Name Change)	0.0606***	0.3975***	1.1808***	1.7704***	-	-	-	-
	(4.718)	(5.156)	(5.051)	(4.160)	-	-	-	-
$\mathbb{I}$(Green Name Change) × $\mathbb{I}$(High Decarbonisation)	-	-	-	-	0.0176**	0.1329***	0.9035***	1.6276***
	-	-	-	-	(2.047)	(2.706)	(3.955)	(4.638)
$\mathbb{I}$(Green Name Change) × $\mathbb{I}$(Low Decarbonisation)	-	-	-	-	0.0226**	0.1071	0.3105	0.5768
	-	-	-	-	(2.349)	(1.241)	(1.131)	(1.118)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter × Fund Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N. Obs.	169,723	156,995	140,665	125,424	138,358	126,599	111,420	97,197
R^2-Adj.	0.009	0.003	0.002	0.003	0.009	0.002	0.002	0.002

Green name changes: Effects on fund fees

Dependent variable:	Δ Total Expense Ratio$_{t,t+q}$ (percentage points)							
Quarters ahead:	1Q	4Q	8Q	12Q	1Q	4Q	8Q	12Q
$\mathbb{I}$(Green Name Change)	0.0091	0.0467	0.1024***	0.1063***	-	-	-	-
	(0.734)	(1.628)	(2.613)	(2.734)	-	-	-	-
$\mathbb{I}$(Green Name Change) $\times$ $\mathbb{I}$(High Decarbonisation)	-	-	-	-	-0.0095	0.0294	0.1292**	0.1128
	-	-	-	-	(-0.818)	(0.961)	(2.104)	(1.235)
$\mathbb{I}$(Green Name Change) $\times$ $\mathbb{I}$(Low Decarbonisation)	-	-	-	-	-0.0047	0.0202	-0.0323	-0.0113
	-	-	-	-	(-0.436)	(0.697)	(-0.635)	(-0.248)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter $\times$ Fund Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N. Obs.	176,865	162,965	145,611	129,563	140,016	127,606	111,865	97,189
R^2-Adj.	0.002	0.001	0.001	0.000	0.002	0.001	0.000	0.000

Green name changes: Effect on other variables



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- Yet investors do not blindly follow name changes: effects are driven by name-changing mutual funds that simultaneously improve portfolio's environmental performance

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Appendix: Are green funds more expensive?

Dependent variable:	Total Expense Ratio (percentages)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\mathbb{I}$(Green fund name)	-0.0133	0.0356***	-	-	-	-	-	-
	(-0.411)	(2.556)	-	-	-	-	-	-
$\mathbb{I}$(Morningstar green fund)	-	-	-0.0003	-0.0020	-	-	-	-
	-	-	(-0.012)	(-0.108)	-	-	-	-
$\mathbb{I}$(Low carbon emissions)	-	-	-	-	0.0963***	0.0569***	-	-
	-	-	-	-	(14.302)	(11.491)	-	-
$\mathbb{I}$(Low carbon intensity)	-	-	-	-	-	-	0.0524***	0.0313***
	-	-	-	-	-	-	(8.602)	(7.154)
log(Total Net Assets ($ millions))	-0.0868***	-0.0468***	-0.0868***	-0.0468***	-0.0858***	-0.0463***	-0.0869***	-0.0468***
	(-34.995)	(-24.035)	(-34.959)	(-24.047)	(-35.151)	(-24.035)	(-35.202)	(-24.089)
log(Fund age (years))	0.0503***	0.0165***	0.0503***	0.0165***	0.0482***	0.0152***	0.0495***	0.0156***
	(8.795)	(3.504)	(8.798)	(3.500)	(8.522)	(3.243)	(8.689)	(3.322)
Institutional funds (%)	-0.3041***	-0.3034***	-0.3041***	-0.3034***	-0.3067***	-0.3068***	-0.3042***	-0.3044***
	(-28.513)	(-30.046)	(-28.501)	(-30.040)	(-29.152)	(-30.609)	(-28.679)	(-30.241)
Turnover ratio (%)	0.0006***	0.0004***	0.0006***	0.0004***	0.0006***	0.0004***	0.0006***	0.0004***
	(9.008)	(6.865)	(9.001)	(6.864)	(9.060)	(6.896)	(9.023)	(6.864)
$\mathbb{I}$(Index fund)	-0.3961***	-0.3719***	-0.3962***	-0.3719***	-0.3894***	-0.3707***	-0.3920***	-0.3709***
	(-35.158)	(-32.391)	(-35.114)	(-32.341)	(-34.891)	(-32.615)	(-34.855)	(-32.407)
Number of shareclasses	0.0263***	0.0292***	0.0263***	0.0292***	0.0271***	0.0292***	0.0266***	0.0291***
	(15.333)	(12.695)	(15.329)	(12.694)	(15.998)	(12.926)	(15.607)	(12.739)
log(Number of holdings)	-0.0299***	0.0239***	-0.0299***	0.0239***	-0.0266***	0.0252***	-0.0263***	0.0258***
	(-7.569)	(6.822)	(-7.571)	(6.823)	(-6.795)	(7.270)	(-6.544)	(7.327)
log(Mean holding mkt. cap. ($ billions))	-0.0022	-0.0075***	-0.0022	-0.0075***	0.0050	-0.0041	-0.0040	-0.0085***
	(-0.617)	(-2.654)	(-0.616)	(-2.653)	(1.490)	(-1.469)	(-1.163)	(-3.028)
Portfolio sector concentration	0.0194	0.0235	0.0195	0.0235	0.0157	0.0219	0.0175	0.0224
	(1.332)	(1.312)	(1.331)	(1.312)	(1.424)	(1.331)	(1.367)	(1.321)
Year-Quarter × Fund Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company FE	No	Yes	No	Yes	No	Yes	No	Yes
N. Obs.	189,767	189,767	189,767	189,767	189,767	189,767	189,767	189,767
R^2-Adj.	0.426	0.236	0.426	0.235	0.426	0.235	0.426	0.235

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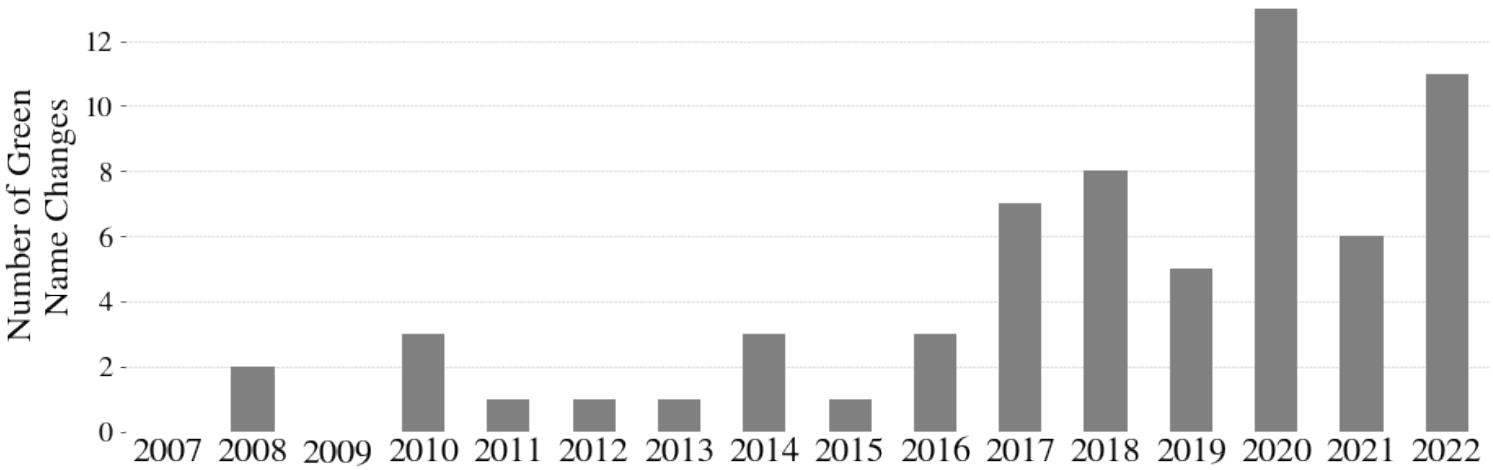
Appendix: Frequency of name changes



Green Term	N.o. Funds with Green Term in Name	N.o. Name Changes
SUSTAINAB	57	33
CLEAN	9	0
CLIMATE	8	3
CARBON	5	1
ENVIRONMENT	4	1
TRANSITION	3	1
FOSSIL	2	0
RENEWABLE	2	0
EARTH	1	0
ECOLOG	1	0
SOLAR	1	1

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Appendix: Correlations of green measures

	Portfolio Emissions						*Portfolio ESG-scores*								
Portfolio Emissions	Asset4	MSCI	Refinitiv	Sust.	Trucost	**Mean**	Asset4	FTSE	MSCI	Refinitiv	RepRisk	S&P	Sust.	TruValue	**Mean**
Asset4	1.00	-	-	-	-	**-**	-	-	-	-	-	-	-	-	**-**
MSCI	0.81	1.00	-	-	-	**-**	-	-	-	-	-	-	-	-	**-**
Refinitiv	0.85	0.89	1.00	-	-	**-**	-	-	-	-	-	-	-	-	**-**
Sustainalytics	0.78	0.85	0.79	1.00	-	**-**	-	-	-	-	-	-	-	-	**-**
Trucost	0.80	0.94	0.90	0.84	1.00	**-**	-	-	-	-	-	-	-	-	**-**
Mean	**0.85**	**0.92**	**0.88**	**0.88**	**0.92**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio ESG-scores															
Asset4	0.19	0.35	0.28	0.29	0.33	**0.33**	1.00	-	-	-	-	-	-	-	**-**
FTSE	-0.06	-0.17	-0.05	0.01	-0.16	**-0.19**	0.00	1.00	-	-	-	-	-	-	**-**
MSCI	-0.13	0.04	-0.06	-0.12	-0.03	**0.02**	0.49	0.17	1.00	-	-	-	-	-	**-**
Refinitiv	0.02	0.23	0.15	0.08	0.17	**0.25**	0.55	-0.06	0.54	1.00	-	-	-	-	**-**
RepRisk	-0.09	-0.35	-0.18	-0.18	-0.32	**-0.36**	-0.35	0.54	-0.15	-0.38	1.00	-	-	-	**-**
S&P Global	0.05	0.20	0.17	0.11	0.22	**0.21**	0.44	0.15	0.21	0.24	-0.17	1.00	-	-	**-**
Sustainalytics	-0.19	-0.17	-0.25	-0.32	-0.22	**-0.21**	0.19	0.13	0.44	0.11	0.07	0.10	1.00	-	**-**
TruValue	0.15	0.23	0.10	0.10	0.21	**0.23**	0.33	-0.22	0.11	0.33	-0.37	0.10	0.38	1.00	**-**
Mean	**0.06**	**0.35**	**0.26**	**0.04**	**0.32**	**0.32**	**0.63**	**-0.04**	**0.63**	**0.53**	**-0.38**	**0.44**	**0.29**	**0.43**	**1.00**

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