Are We Becoming Greener?
Life-time Experiences and Responsible Investment

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FDIR, 17 November 2022

Introduction

Trends in Responsible Investment

- Increasing interest for ESG investing (a.k.a. socially responsible investing, sustainable investing, ...)
  - Firms' valuations depend also on environmental, social, and governance dimensions (e.g., carbon footprint; relationships with stakeholders; internal mechanisms of control)

- Aggregate trends in sustainable funds are not just explained by the entry of Millennials

- Trends are highly heterogeneous across investors

Questions

- Are (changes in) pro-social concerns behind those trends?
  - Or just a "hype" (Corporate Climate Responsibility Monitor 2022)
  - Or just standard economic factors (say, risk)

- In typical ESG models, investors care about wealth (W) and ESG holdings (X):
$$U(W, X) = f(W) + \mu g(X)$$

- Which factors drive pro-social concerns (μ)?
  - How do these vary across investors?
  - How do these evolve over time?

Life experiences, pro-social preferences, and ESG demand

- ESG demand and economic experiences
  - Malmendier Nagel (2011): growing up in a recession affects risk taking later in life
  - Preferences for redistribution depend on exposure to recessions and inequality (Giuliano Spilimbergo 2014, Roth Wohlfart, 2018)

- ESG demand and non-economic experiences
  - Natural disasters affect pro-social preferences (Cassar et al. 2017, Oishi et al. 2017, Chantarat et al. 2019, Maki et al. 2019)
  - Effects can be long-lasting (Solnit 2010, Becchetti et al. 2017)

- Role of pro-social preferences (as opposed to return expectations)
  - Large literature on the effects of pro-social preferences (DellaVigna 2009, List et al. 2009), much less on their determinants (Cappelen et al. 2020, Kosse et al. 2020)

Our Data

- What shapes the ESG demand for individual investors in China?
  - ESG is relatively new (and fast growing), likely to matter (worldwide)

- Account level data from the Shanghai Stock Exchange (SSE)
  - Individual trades of stocks over 2011-2019

- All trading orders are associated to a unique individual identifier
  - Individual information: gender, age, place of birth, education,
    trading experience, place of residence

Preview

- Reduced-form evidence
  - Living is a polluted city (north of the Huai river) increases ESG investing
  - Living in a city with more pro-social preferences (a rice city) increases ESG investing

- ESG investing and life-time experiences
  - Both economic and non-economic experiences matter
  - Recent experiences matter more, but effects are persistent
  - Significant between- and within-investor variation

- Importance of pro-social preferences (vs. return expectations)
  - Experienced ESG returns have no effect
  - Different trading patterns for ESG stocks (longer horizon, lower sensitivity to financial performance, sensitivity to ESG status)

Literature

- Experience effects in financial decisions (Malmendier Nagel 2011, ..., Malmendier 2021)
  - We focus on ESG investing, non-economic experiences, and dynamics

- Experimental evidence on pro-social attitudes and ESG investing (Barber et al. 2021, Bauer et al. 2021, Bonnefon et al. 2019, Brodback et al. 2019).
  - We focus on determinants and evolution of these attitudes

- Asset pricing models with pro-social investors (Pastor et al. 2020, Goldstein et al. 2021, Pedersen et al. 2021, ...)
  - Possible explanation of investor heterogeneity and of (unexpected) shocks to ESG funds inflows

- ESG fund flows and trading patterns (Starks et al. 2021, Gantchev et al. 2020, Choi et al. 2020, Dyck et al. 2019, ...)
  - More direct link with investors' preferences, study differences between ESG and non-ESG stocks for the same investor

Data

Trading Data

- Account level data from the Shanghai Stock Exchange (SSE)
    - Trades and holdings on all the securities traded on the exchange from January 2011 to October 2019
    - Random sample of $1‰$ of the investors with an active account as of October 2019 : 99,592 investors and 1,501 stocks (i.e., all stocks)
    - Aggregated at the monthly level (4,758,050 investor-month and 15,603,015 investor-stock-month observations)
- Unique trading identifier
    - Date and place of birth, gender, education, **opening date of the trading account (even if before 2011), trading desk used to send orders (proxy for city of residence)**
- Do not observe indirect stock holdings (minimal) and holding on the Shenzhen Stock Exchange (relatively minor for ESG)

ESG measures

- Defining individual ESG demand
  - ESG index=1 if one ESG keyword is in the index description
  - ESG stock=1 if included in one ESG index (35% of stocks are)
  - Individual ESG demand: value of ESG stocks over total portfolio

- Alternative measures: stock included in several ESG indices, ESG ratings

Demographics

	(1)	(2)	(3)	(4)
Dependent Variable:		ESG Demand		
Method:	Panel		Cross Sectional	
Female	1.370***	1.230***	1.708***	0.900***
	(5.74)	(5.35)	(8.14)	(4.75)
	[0.685]	[0.615]	[0.849]	[0.448]
Education	0.241***	0.236***	0.227***	0.178***
	(5.49)	(5.54)	(5.93)	(5.18)
	[0.682]	[0.667]	[0.635]	[0.499]
Trading Experience	0.008***	0.006***	0.017***	0.006***
	(4.03)	(3.18)	(11.88)	(4.88)
	[0.689]	[0.514]	[1.534]	[0.569]
Age	-0.087	-0.074	-0.144***	-0.056
	(-1.46)	(-1.28)	(-3.02)	(-1.29)
	[-1.115]	[-0.946]	[-1.900]	[-0.736]
Age^2	0.001**	0.001**	0.002***	0.001
	(2.37)	(2.08)	(4.02)	(1.64)
	[1.783]	[1.512]	[2.459]	[0.911]
Investment Return		7.035**		22.873***
		(2.41)		(16.96)
		[0.915]		[1.633]
Constant	53.189***	57.344***	-2.213***	-1.058***
	(34.38)	(32.55)	(-19.27)	(-10.20)
Portfolio Controls	No	Yes	No	Yes
Month FE	Yes	Yes	No	No
Observations	4,758,034	4,661,244	97,755	93,903
R^2	0.007	0.041	0.004	0.185

Coal, Rice, and ESG

Huai River Policy

- Instituted in the 1950s, provides free or heavily subsidized coal for indoor heating to cities north of the river, not to those to the south
  - Ebenstein et al. (PNAS 2017): Over 2004–2012, larger PM10 and 3.1 years lower life expectancy
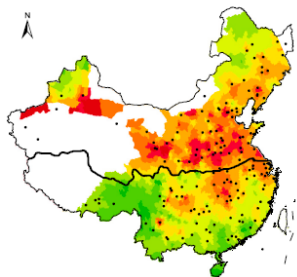

Fig. 1. China's Huai River/Qinling Mountain Range winter heating policy line and PM₁₀ concentrations. Black dots indicate the DSP locations. Coloring corresponds to interpolated PM₁₀ levels at the 12 nearest monitoring stations, where green, yellow, and red indicate areas with relatively low, moderate, and high levels of PM₁₀, respectively. Areas left in white are not within an acceptable range of any station.

Pollution and ESG

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:			ESG Demand			
Latitude to Huai River:		5 degree			3 degree	
Coal Heating	1.724***			2.542***		
	(5.88)			(6.85)		
AQI (predicted)		15.314***	16.013***		21.770***	24.094***
		(5.88)	(6.62)		(6.85)	(6.85)
Female			1.092***			1.056***
			(3.90)			(3.00)
Education			0.253***			0.238***
			(4.93)			(3.79)
Trading Experience			0.006***			0.005**
			(2.84)			(2.12)
Age			0.063***			0.065***
			(4.63)			(3.90)
ESG Stock Proportion			-0.002			0.025*
			(-0.18)			(1.79)
GDP Growth			4.552**			6.018*
			(2.05)			(1.69)
			First Stage			First Stage
Coal Heating		0.113***	0.119***		0.117***	0.108***
		(14.24)	(15.14)		(12.06)	(12.50)
F-Stat (first stage)		202.85	81.47		145.45	55.11
Controls	No	No	Yes	No	No	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observation	2,761,442	2,761,442	2,759,990	1,757,987	1,757,987	1,757,348
R^2	0.006	0.006	0.039	0.007	0.007	0.040

Rice, Wheat, and Social Preferences

- Talhelm et al. (Science 2014): Rice-growing cities have more holistic thought (triad task), more interdependent self-construals (sociogram task), and lower divorce rates.
  - Yangtze River: north: wheat, south: rice

Farmland Devoted to Rice Paddy

0%   90%

Example of rice-wheat border at county level

- > 90% Rice
- > 90% Rice

Rice-wheat border provinces are highlighted in yellow
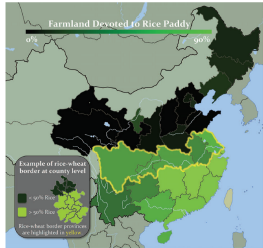
Fig. 1. Percent of cultivated land devoted to rice paddies in 1996. Three major herding provinces are not shaded: Tibet, Xinjiang, and Inner Mongolia. Along the rice-wheat border (highlighted), people from the rice counties thought more holistically than their neighbors in wheat counties.

- Growing rice requires public good (irrigation) and coordination with neighbors (labor force) as opposed to wheat (needs less water and less labor)

Rice, Wheat, and ESG

	(1)	(2)	(3)	(4)
Dependent Variable:			ESG Demand	
Sample:	Close to Yangtze River		Close to Yangtze River and No Heating	
Rice Ratio	3.714***	2.633**	4.724***	3.165*
	(2.88)	(2.15)	(2.78)	(1.93)
Female		0.749*		0.589
		(1.66)		(1.05)
Education		0.147*		0.081
		(1.84)		(0.80)
Trading Experience		0.007**		0.007*
		(2.24)		(1.80)
Age		0.061***		0.072***
		(2.79)		(2.66)
Constant	53.701***	52.451***	52.871***	52.054***
	(62.18)	(24.26)	(43.69)	(19.83)
Portfolio Controls	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Observations	1,012,727	1,012,727	628,818	628,818
R^2	0.006	0.045	0.007	0.041

Note: Huai river is north of Yangtze river, 2 out of 5 provinces are crossed by both rivers. Columns 3-4 exclude 16 cities (out of 65) north of Huai river (wheat + coal).

Life-Time Experiences

Life-Time Experiences

- Can the above logic be generalized?

- Entire population of investors

- Broader set of experiences

- Within-investor dynamics (control for local and individual FE)

Life-Time Experiences

- Say, pollution. Accumulated pollution by investor i at time t:

$$A_{i,t}(\lambda) = \sum_{k=1}^{T_{i,t}-1} w_{i,t} E_{i,t-k}, \tag{1}$$

$$\text{with } w_{i,t}(k,\lambda) = \frac{(T_{i,t}-k)^{\lambda}}{\sum_{k=1}^{T_{i,t}-1}(T_{i,t}-k)^{\lambda}},$$

 $T_{i,t}$ is the trading experience and $E_{i,t}$ is the local level of pollution.

- Effect of experienced pollution on ESG investing :

$$y_{i,t} = \alpha_i + \beta A_{i,t}(\lambda) + \gamma X_{i,t} + \phi_t + \varepsilon_{i,t}, \tag{2}$$

  $X_{i,t}$ is a vector of investor and portfolio characteristics.

- Joint estimation of λ (how $\{E_{i,t}\}_t$ contribute to $A_{i,t}$) and of β
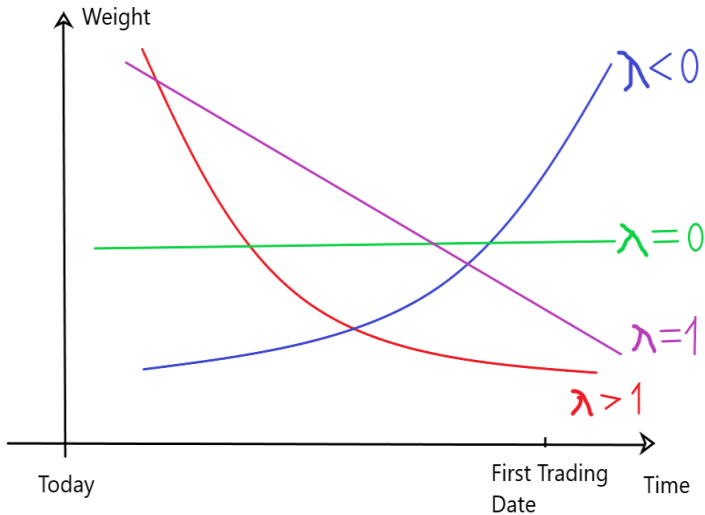
Life-Time Experiences

- Build on Malmendier Nagel (2011), with some differences

- Estimate effects both across and within investors
  - For ESG investment, within investor std dev is 32%, between investor std dev is 28%

- Focus on local experiences

- Focus on experiences after having started trading
  - Also due to data limitations

Interpreting Estimates

- $\hat{k}(\lambda)$: number of most recent periods (over total number of trading periods) that account for 50% of the accumulated experience for an investor with median trading experience, 13 years. ($\hat{k}(\lambda, T_{it}) \simeq \hat{k}(\lambda)$ for all T_{it})

- $\hat{\delta}(\lambda, \beta)$: Cumulative impact of one standard deviation shock on a given experience over the next 13 years
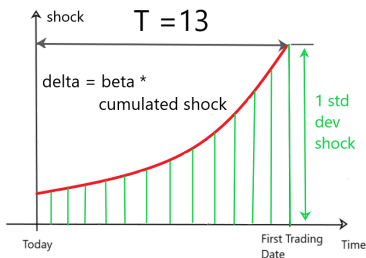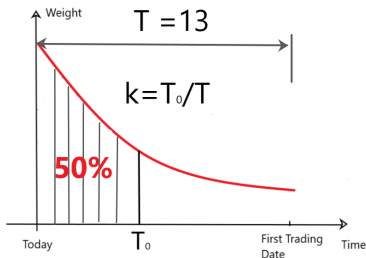
Experience measures

- Economic Experiences
    - GDP growth (province/year, from WIND)
    - Stock market returns (monthly value-weighted SSE returns)
    - Own portfolio returns (monthly, in SSE)

- Non-Economic Experiences
    - Pollution (city/month, Air Quality Index from China Stock Market & Accounting Research Database, consistent with NASA)
    - Natural disasters (province/year, number of deaths over the population, from UC Louvain's center on the epidemiology of disasters)
    - Corporate scandals (province/month, over the number of listed firms, from CSMAR)

- Local experiences measured where the investor lives (using birth place would be similar, 81.2% live in their birth city)

Economic Experiences

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:			ESG Demand			
Experience Measure:	GDP Growth		Mkt Ret		Own Ret	
λ	0.146***	1.171***	1.572***	0.193	0.917***	1.343***
	(6.36)	(4.75)	(3.63)	(1.46)	(6.96)	(7.06)
β	76.308***	24.388*	22.102***	28.084***	47.590***	5.593***
	(9.91)	(1.76)	(3.38)	(4.22)	(9.26)	(2.70)
$\hat{k}(\lambda)$	46.0%	28.4%	23.7%	44.2%	30.4%	25.7%
$\hat{\delta}(\lambda, \beta)$	6.530	1.246	2.494	8.713	13.076	1.233
Demographic Controls	Yes	No	Yes	No	Yes	No
Portfolio Controls	Yes	Yes	Yes	Yes	Yes	Yes
Investor FE	No	Yes	No	Yes	No	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,690,573	4,687,208	4,691,196	4,687,829	4,385,542	4,383,081
R^2	0.041	0.459	0.040	0.459	0.043	0.481

Non-Economic Experiences

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:				ESG Demand		
Experience Variable:		AQI		Natural Disaster		Corp. Scandals
λ	6.941***	1.867***	-0.268***	-0.622***	3.012***	3.246***
	(22.71)	(3.23)	(-4.43)	(-7.31)	(24.70)	(5.56)
β	1.174**	2.567***	20.617***	58.476***	116.832***	43.531**
	(2.25)	(3.07)	(2.91)	(2.69)	(3.19)	(2.35)
$\hat{k}(\lambda)$	8.4%	20.9%	58.4%	70.8%	15.9%	15.1%
$\hat{\delta}(\lambda, \beta)$	0.319	0.976	2.553	9.097	1.857	0.676
Demographic Controls	Yes	No	Yes	No	Yes	No
Portfolio Controls	Yes	Yes	Yes	Yes	Yes	Yes
Investor FE	No	Yes	No	Yes	No	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,408,035	4,404,590	4,603,570	4,600,518	4,667,376	4,664,222
R^2	0.040	0.464	0.040	0.462	0.040	0.460

Comparing Across Experiences

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:				ESG Demand		
GDP Growth	74.753***	28.158*			68.249***	29.616*
	(9.23)	(1.89)			(7.72)	(1.82)
	[6.397]	[1.439]			[5.840]	[1.514]
Market Return	-2.324	26.949***			0.021	25.371***
	(-0.35)	(3.26)			(0.00)	(2.71)
	[-0.262]	[8.361]			[0.002]	[7.871]
Investor Return	47.221***	5.295**			49.492***	5.851***
	(9.08)	(2.55)			(9.72)	(2.79)
	[12.974]	[1.167]			[13.598]	[1.290]
AQI			1.284**	2.410***	0.942*	2.372**
			(2.40)	(2.78)	(1.70)	(2.48)
			[0.343]	[0.901]	[0.252]	[0.887]
Natural Disaster			18.066**	65.032**	6.762	72.572**
			(2.27)	(2.56)	(0.80)	(2.62)
			[2.709]	[12.248]	[1.014]	[13.668]
Corporate Scandal			120.762***	51.323**	149.493***	72.075***
			(3.20)	(2.60)	(4.32)	(3.53)
			[2.172]	[0.902]	[2.689]	[1.267]
Demographic Controls	Yes	No	Yes	No	Yes	No
Portfolio Controls	Yes	Yes	Yes	Yes	Yes	Yes
Investor FE	No	Yes	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,384,959	4,382,500	4,305,701	4,302,721	4,056,576	4,054,170
R^2	0.043	0.481	0.040	0.468	0.044	0.489

Life Experiences and ESG Investing

- Life-time experiences affect ESG demand
  - Non-economic experiences tend to matter more for within investor variation, economic experiences for between investor variation

- Magnitudes are large (relative to demographics)
  - One std dev increase in own return or natural disaster is associated to an increase of 13.7% in ESG demand (effect of female is 1.3%)

- Recent experiences tend to matter more
  - Economic experiences are more persistent, non-economic experiences are more like shocks

- (Unexpected) inflows into ESG stocks are key for asset pricing models (Pastor et al. 2020)

Discussion

Interpretation

- Are these effects more likely to be driven by investors' (intrinsic) preferences for ESG stocks or by return expectations?

- Experienced returns affect return expectations (Malmendier Nagel 2011), but experienced ESG returns do **not** affect ESG demand

- Significantly different trading patterns for ESG vs. non-ESG stocks
  - Lower sensitivity to financial information (disposition effect, trend chasing)
  - Sensitivity to non-financial information (ESG status)
  - Longer horizon (turnover and churn ratio)
  - True also for the same investor at the same point in time

Alternative: Supply Side

- Supply-side effects
  - Firms may become more compliant to ESG in response say to an increase in local pollution
  - Investors may be more likely to buy local stocks

- Results are not driven by ESG supply
  - Controlling for the province-level proportion of ESG stocks does not change the results
  - No correlation between home bias and ESG demand

Alternative: Government

- Government-side effects
  - 56% of SSE stocks are state owned (SOE), 45% of SOE stocks are ESG (vs. 35% ESG stocks in SSE)
  - Promoting a green economy is central in the government agenda

- ESG investing is different from SOE investing
  - Results are similar if we restrict to ESG demand of non-SOE stocks
  - Results are **not** similar if we consider SOE demand

- Experience effects go beyond government policies
  - Experienced environmental regulation (e.g., government expenditure on environmental protection) has weaker (not significant) effects

Robustness and Placebo

- Results are similar using other definitions of ESG stock
  - ESG stocks belonging to many indices

- Results are similar using ESG ratings
  - Syno-Securities released market-wide ratings in April 2019
  - High vs. low rating (AA threshold)

- Results are **not** similar using other indices (SSE 180 or SSE 380)

Discussion

- Pro-social preferences seem to matter for ESG investing
- Importance of life-time experiences
- ESG investing is different

- Open questions
  - Heterogeneity in experience effects
  - Macro effects

- Broader question: non-financial dimensions in financial decisions

Thank you.

Appendix

Trends in ESG Investing (U.S.)

US SUSTAINABLE INVESTING GROWTH 1995-2020

Since 1995, when the US SIF Foundation first measured the size of the US sustainable investment universe at $639 billion, assets have increased more than 25-fold, a compound annual growth rate of 14 percent.
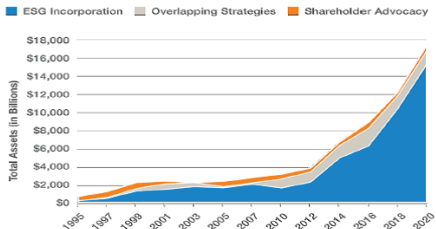
SOURCE: US SIF Foundation.

Blue: money managers apply ESG criteria; orange: MM file shareholders resolution on ESG; gray: both strategies

Trends in ESG Investing (China)
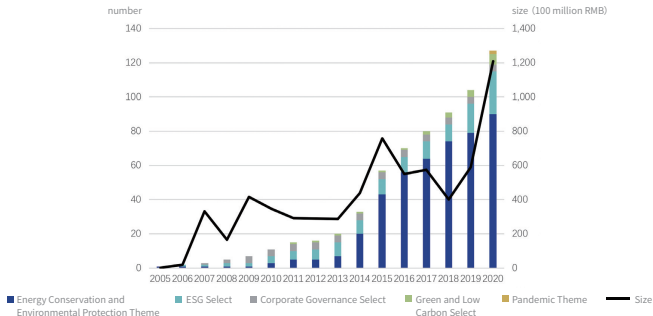
Source: Wind Data Terminal, collected and analyzed by China SIF.

Heterogeneity in ESG Trends (China)
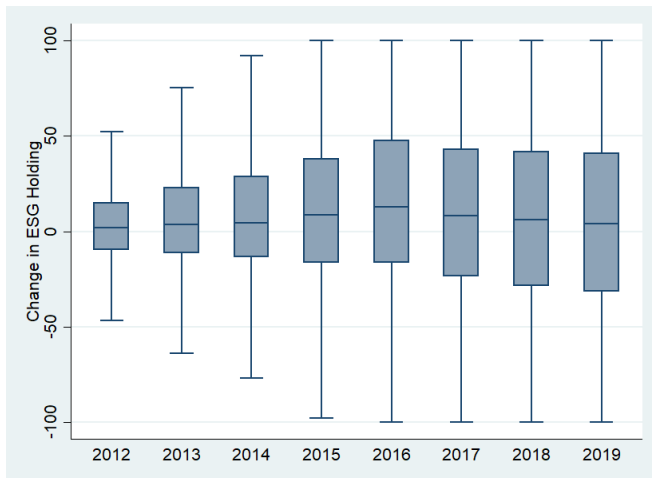
Baseline: 2011 or earliest trading date. Sample is conditional on a change in ESG demand.

Boxplots display min, max, median, 25th and 75th percentiles.

Summary Statistics

Summary Statistics at the Investor-Month Level

Variable	Obs	Mean	Std. Dev	Min	p25	p50	p75	Max
ESG Index Prop	4,758,050	57.41	42.81	0.00	0.00	70.57	100.00	100.00
High ESG Rated Prop	4,235,932	48.68	42.79	0.00	0.00	47.80	100.00	100.00
Female	4,758,050	0.49	0.50	0.00	0.00	0.00	1.00	1.00
Education (Years)	4,758,050	13.22	2.82	9.00	12.00	12.00	15.00	21.00
Age (Years)	4,758,050	48.61	12.77	18.00	40.00	48.00	57.00	98.00
Trading Experience (Months)	4,758,050	143.64	85.20	0.00	58.00	162.00	214.00	338.00
Churn Ratio(%)	4,758,050	30.36	61.95	0.00	0.00	0.00	20.32	200.00
Turnover Ratio(%)	4,758,050	13.43	23.33	0.00	2.44	6.13	13.14	150.99
Monthly Investment Return	4,661,245	-0.01	0.13	-0.62	-0.06	-0.01	0.04	0.98
Ln(Size)	4,758,050	10.16	1.76	2.77	8.98	10.16	11.33	22.14
Portfolio Beta	4,758,050	1.05	0.85	-104.08	0.79	1.04	1.31	116.51
Portfolio Beta for Size	4,758,050	-0.00	2.95	-265.52	-0.69	0.06	0.72	633.87
Portfolio Beta for B-M	4,758,050	0.35	3.29	-279.99	-0.27	0.28	0.87	957.02

Summary Statistics (Continued)

Summary Statistics at the Investor-Stock-Month Level								
Sell Dummy	11,664,531	0.16	0.37	0.00	0.00	0.00	0.00	1.00
Sell Prop	11,664,531	0.09	0.42	-1.86	0.00	0.00	0.00	1.00
Winner	11,664,531	0.34	0.47	0.00	0.00	0.00	1.00	1.00
Cumulative Return	11,664,531	-0.07	0.50	-5.78	-0.32	-0.10	0.07	44.07
Buy Dummy	12,726,544	0.16	0.37	0.00	0.00	0.00	0.00	1.00
High Return Past-Month	12,726,544	0.50	0.50	0.00	0.00	1.00	1.00	1.00
Number of Trades	15,603,015	1.07	2.37	0.00	0.00	0.00	1.00	46.00
Number of Buys	15,603,015	0.56	1.30	0.00	0.00	0.00	1.00	23.00
Number of Sells	15,603,015	0.50	1.20	0.00	0.00	0.00	1.00	23.00
Summary Statistics at the Stock-Month Level								
ESG	119,691	0.35	0.48	0.00	0.00	0.00	1.00	1.00
Monthly Return (%)	119,691	0.80	13.87	-80.40	-6.53	-0.35	6.67	456.31
Stock Turnover Ratio	119,691	1510.40	1611.73	1.47	506.54	975.99	1903.09	27850.68
Return Volatility	119,691	0.03	0.01	0.00	0.02	0.02	0.03	0.43
Ln(Market Cap)	119,691	8.97	1.13	6.21	8.17	8.78	9.57	14.59
Market-to-Book Ratio	119,691	10.68	129.97	0.26	1.74	2.73	4.56	9890.99
Dividend Yield Ratio	119,691	1.03	1.44	0.00	0.00	0.57	1.44	36.21

ESG vs non-ESG stocks

	(1)	(2)	(3)
	Non-ESG	ESG	ESG - Non-ESG
Monthly Return(%)	0.862	0.679	-0.387
	(14.85)	(11.88)	(13.87)
Ln(Cap)	8.570	9.698	1.120***
	(0.83)	(1.23)	(1.13)
Return Volatility	0.027	0.023	-0.003***
	(0.01)	(0.01)	(0.01)
Turnover Ratio	1659.305	1237.294	-463.498***
	(1707.66)	(1377.82)	(1611.73)
Market to Book	14.610	3.468	-11.471***
	(152.71)	(70.87)	(129.97)
Dividend Yield Ratio	0.764	1.516	0.770***
	(1.19)	(1.71)	(1.44)
Beta (Mkt Return)	1.002	1.059	0.054***
	(1.48)	(0.83)	(1.29)
Beta (Size)	0.767	0.342	-0.420***
	(4.36)	(2.94)	(3.92)
Beta (Value)	-0.209	-0.077	0.133***
	(4.24)	(3.46)	(3.98)
Number of Observations	77,459	42,232	119,691

Estimating λ and β

- Iterative procedure similar to Malmendier Nagel (2011)
  - But we have both time and investor fixed effects
- Fix λ and estimate (2) with OLS, repeat many times, select λ minimizing sum of squared residuals
- Use that λ as starting value for a non-linear estimation of (2) using least-squares method
- Std errors of λ via bootstrapping residuals with resampling for 100 times
- Std errors of β by OLS estimates of (2) with given the estimated λ

ESG Investing and the Supply Side

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:				ESG Demand		
Experience Measure:	GDP Growth	MKT Ret	Inv Ret	AQI	Natural Disaster	Corp. Scandals
β	25.233*	27.951***	5.602***	2.415***	62.556***	41.123**
	(1.82)	(4.21)	(2.71)	(2.89)	(2.87)	(2.24)
ESG Stock Proportion	0.026***	0.025***	0.026***	0.021***	0.029***	0.025***
	(3.89)	(3.79)	(3.86)	(3.10)	(4.33)	(3.79)
Portfolio Controls	Yes	Yes	Yes	Yes	Yes	Yes
Investor FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,687,208	4,687,829	4,383,081	4,404,590	4,600,518	4,664,222
R^2	0.459	0.459	0.481	0.464	0.462	0.460

ESG Investing and the Home Bias

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:			Home Bias		Home	
ESG Demand			-0.0023	-0.0015		
			(-1.33)	(-1.01)		
ESG Stock					0.0002	-0.0002
					(0.05)	(-0.06)
Constant	4.6007***	3.5046***	3.4003***	4.6824***	0.0927***	0.0943***
	(42.78)	(5.84)	(5.76)	(48.81)	(4.64)	(4.17)
Demographic Controls	No	Yes	Yes	No	No	No
Portfolio Controls	No	Yes	Yes	Yes	No	No
Stock Controls	No	No	No	No	Yes	Yes
Investor FE	No	No	No	Yes	No	No
Investor-by-Month FE	No	No	No	No	No	Yes
Month FE	No	No	Yes	Yes	Yes	Yes
Stock FE	No	No	No	No	Yes	Yes
Observations	4,478,982	4,388,418	4,388,418	4,385,904	11,640,914	9,463,305
R^2	-0.000	0.002	0.003	0.527	0.079	0.399

Determinants of Investments into Stocks included in several ESG Indices

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:			Value Weighted Number of ESG Indices			
Experience Measure:	GDP Growth	MKT Ret	Inv Ret	AQI	Natural Disaster	Corp. Scandals
λ	0.631^{***}	0.574^{***}	0.299^{***}	6.042^{***}	-0.095	7.899^{***}
	(7.85)	(4.73)	(4.02)	(6.94)	(-0.24)	(7.65)
β	0.895^{**}	1.100^{***}	0.738^{***}	0.071^{**}	3.767^{***}	1.161^{*}
	(2.43)	(3.41)	(6.86)	(2.24)	(3.88)	(1.78)
Portfolio Controls	Yes	Yes	Yes	Yes	Yes	Yes
Investor FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,687,208	4,687,829	4,383,081	4,404,590	4,600,518	4,664,222
R^2	0.534	0.534	0.554	0.544	0.536	0.535

Investment behaviors and inclusion in several ESG Indices

	(1)	(2)	(3)	(4)	(5)
Dependent Variable	ChurnRatio	N.O. Trades	Sell Dummy	Buy Dummy	Sell Dummy
Value Weighted NumIndex	-0.849*** (-7.51)				
NumIndex		-0.240*** (-4.68)		-0.019* (-1.66)	-0.028 (-1.41)
Winner			0.073*** (60.22)		
NumIndex * Winner			-0.088*** (-10.15)		
High Return Past-Month				0.004*** (5.69)	
NumIndex * High Return Past-Month				-0.017** (-2.35)	
Constant	26.301*** (73.33)	-2.039*** (-23.95)	0.131*** (349.74)	-0.385*** (-23.70)	-0.435*** (-6.20)
Portfolio Controls	Yes	No	No	No	No
Stock Controls	No	Yes	No	Yes	Yes
Investor FE	Yes	No	No	No	No
Investor-by-Month FE	No	Yes	Yes	Yes	No
Stock FE	No	Yes	No	Yes	No
Stock-by-Month FE	No	No	Yes	No	No
Stock-Event FE	No	No	No	No	Yes
Year-Month FE	Yes	No	No	No	Yes
Observations	4,658,227	13,358,092	9,503,091	10,549,036	4,641,659
R^2	0.430	0.602	0.623	0.442	0.118

Determinants of Investments into High ESG Rated Stocks

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:			High Rated Prop			
Experience Measure:	GDP Growth	MKT Ret	Inv Ret	AQI	Natural Disaster	Corp. Scandals
λ	0.917***	0.107	0.249***	1.054***	-0.455*	3.162***
	(4.09)	(1.27)	(4.13)	(11.36)	(-1.89)	(17.84)
β	89.079***	28.449***	11.505***	2.658***	-2.225	35.788***
	(2.84)	(4.24)	(5.16)	(2.81)	(-0.08)	(2.71)
Portfolio Controls	Yes	Yes	Yes	Yes	Yes	Yes
Investor FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,194,861	4,195,392	3,991,241	3,995,132	4,125,067	4,177,078
R^2	0.412	0.412	0.429	0.418	0.415	0.413

Investing Behaviors on High ESG Rated Stocks

	(1)	(2)	(3)	(4)
Dependent Variable	ChurnRatio	N.O. Trades	Sell Dummy	Buy Dummy
HighRated Prop	-0.026***			
	(-5.61)			
HighRated		0.002		0.005***
		(0.23)		(3.02)
Winner			0.068***	
			(51.20)	
HighRated * Winner			-0.011***	
			(-5.88)	
High Return Past-Month				0.004***
				(5.00)
HighRated * High Return Past-Month				-0.002*
				(-1.76)
Constant	26.657***	-2.101***	0.135***	-0.376***
	(71.42)	(-23.37)	(346.23)	(-23.98)
Portfolio Controls	Yes	No	No	No
Stock Controls	No	Yes	No	Yes
Investor FE	Yes	No	No	No
Investor-by-Month FE	No	Yes	Yes	Yes
Stock FE	No	No	No	No
Stock-by-Month FE	No	No	Yes	No
Stock-Event FE	No	No	No	No
Year-Month FE	Yes	No	No	No
Observations	4,188,080	11,652,520	8,498,682	9,433,860
R^2	0.440	0.594	0.625	0.445

Determinants of Investments into Stocks in the SSE 380 Index

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:				High Rated Prop		
Experience Measure:	GDP Growth	MKT Ret	Inv Ret	AQI	Natural Disaster	Corp. Scandals
λ	3.530***	1.242***	3.005***	-0.177	0.184	1.110***
	(5.91)	(6.37)	(9.2)	(-0.2)	(0.32)	(3.21)
β	-1.247	-9.027*	-4.635***	-0.586	19.567	62.636***
	(-0.34)	(-1.98)	(-3.45)	(-0.51)	(1.29)	(3.63)
Portfolio Controls	Yes	Yes	Yes	Yes	Yes	Yes
Investor FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,687,208	4,687,829	4,383,081	4,404,590	4,600,518	4,664,222
R^2	0.355	0.355	0.374	0.361	0.357	0.356

Investing Behaviors on Stocks in the SSE 380 Index

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	ChurnRatio	N.O. Trades	Sell Dummy	Buy Dummy	Sell Dummy
SSE380Index Prop	0.019***				
	(5.20)				
SSE380Index		-0.023***		0.001	-0.004
		(-3.92)		(0.74)	(-0.72)
Winner			0.061***		
			(43.56)		
SSE380Index * Winner			0.015***		
			(7.56)		
High Return Past-Month				0.003***	
				(3.47)	
SSE380Index * High Return Past-Month				0.001	
				(0.52)	
Constant	25.285***	-2.005***	0.131***	-0.378***	-0.199***
	(74.02)	(-23.96)	(319.04)	(-23.38)	(-3.15)
Portfolio Controls	Yes	No	No	No	No
Stock Controls	No	Yes	No	Yes	Yes
Investor FE	Yes	No	No	No	No
Investor-by-Month FE	No	Yes	Yes	Yes	No
Stock FE	No	Yes	No	Yes	No
Stock-by-Month FE	No	No	Yes	No	No
Stock-Event FE	No	No	No	No	Yes
Year-Month FE	Yes	No	No	No	Yes
Observations	4,386,428	13,358,092	9,503,091	10,549,036	2,527,364
R^2	0.427	0.602	0.623	0.442	0.119

ESG Trading

Investor Horizon

	(1)	(2)	(3)	(4)
Dependent Variable	Turnover Ratio		Churn Ratio	
ESG Demand	-0.017***	-0.006***	-0.102***	-0.049***
	(-9.17)	(-4.76)	(-14.35)	(-9.42)
Female	-1.262***		-7.304***	
	(-15.13)		(-25.65)	
Education	0.094***		0.135***	
	(7.29)		(3.55)	
Age	0.012***		-0.104***	
	(3.69)		(-6.70)	
Trading Experience	-0.003***		-0.050***	
	(-4.23)		(-16.91)	
Investment Return	0.146	3.438*	-144.467***	-103.313***
	(0.09)	(1.78)	(-14.07)	(-13.61)
Portfolio Controls	Yes	Yes	Yes	Yes
Investor FE	No	Yes	No	Yes
Month FE	Yes	Yes	Yes	Yes
Observations	4,661,245	4,658,227	4,661,245	4,658,227
R^2	0.042	0.178	0.182	0.430

$$TurnoverRatio_{i,t} = \frac{\sum_{j \in J} |(N_{i,j,t}P_{j,t} - N_{i,j,t-1}P_{j,t-1})|}{\sum_{j \in J} N_{i,j,t-1}P_{j,t-1}}. \tag{3}$$

$$ChurnRatio_{i,t} = \frac{\sum_{j \in J} |N_{i,j,t}P_{j,t} - N_{i,j,t-1}P_{j,t-1} - N_{i,j,t-1}\Delta P_{j,t}|}{\sum_{j \in J}(N_{i,j,t}P_{j,t} + N_{i,j,t-1}P_{j,t-1})/2}. \tag{4}$$

Trading Frequency on ESG and non-ESG Stocks

	(1)	(2)	(3)
Dependent Variable	Trades Num	Buy Num	Sell Num
ESG Stock	-0.044***	-0.024***	-0.020***
	(-5.20)	(-5.10)	(-4.92)
Ln(Stock Turnover)	0.126***	0.073***	0.053***
	(23.04)	(25.07)	(19.68)
Return Volatility	6.949***	4.050***	2.900***
	(16.19)	(17.69)	(13.69)
Ln(Market Cap)	0.217***	0.139***	0.078***
	(27.48)	(30.16)	(22.21)
Market-to-Book Ratio	0.000*	0.000*	0.000
	(1.73)	(1.95)	(1.50)
Dividend Yield	0.004*	0.000	0.004***
	(1.69)	(0.00)	(3.33)
Constant	-2.010***	-1.356***	-0.654***
	(-24.04)	(-28.35)	(-17.14)
Stock FE	Yes	Yes	Yes
Investor-by-Month FE	Yes	Yes	Yes
Observations	13,358,092	13,358,092	13,358,092
R^2	0.602	0.550	0.587

Disposition Effect on ESG and non-ESG Stocks

	(1)	(2)	(3)	(4)	(5)
					$\frac{\Delta Holdings_{i,j,t}}{Holdings_{i,j,t-1}}$
Dependent Variable			Sell Dummy		
Winner	0.076***		0.089***	0.074***	0.092***
	(39.65)		(55.51)	(55.55)	(59.60)
ESG Stock		-0.006***	0.004***		
		(-4.89)	(4.51)		
ESG Stock * Winner			-0.021***	-0.015***	-0.021***
			(-8.33)	(-7.72)	(-9.68)
Ln(Stock Turnover)	0.004***	0.010***	0.005***		
	(3.98)	(12.21)	(4.95)		
Return Volatility	0.687***	0.798***	0.657***		
	(7.70)	(9.39)	(7.58)		
Ln(Market Cap)	-0.002***	0.001**	-0.001**		
	(-4.17)	(2.40)	(-2.53)		
Market-to-Book Ratio	-0.000***	0.000	-0.000***		
	(-3.00)	(0.15)	(-3.30)		
Dividend Yield	0.002***	0.004***	0.002***		
	(4.91)	(8.25)	(5.63)		
Constant	0.098***	0.050***	0.086***	0.131***	0.051***
	(12.84)	(6.96)	(12.37)	(326.70)	(115.89)
Investor-by-Month FE	Yes	Yes	Yes	Yes	Yes
Stock-by-Month FE	No	No	No	Yes	Yes
Observations	9,454,072	9,454,072	9,454,072	9,503,091	9,503,091
R^2	0.591	0.585	0.591	0.623	0.473

Trend Chasing on ESG and non-ESG Stocks

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable				Buy Dummy		
ESG Stock	-0.004***	-0.002			-0.002**	-0.000
	(-4.04)	(-1.08)			(-2.22)	(-0.20)
High Return Past-Month			0.004***	0.003***	0.006***	0.005***
			(6.31)	(4.58)	(7.66)	(6.13)
ESG Stock * High Return Past-Month					-0.003***	-0.003***
					(-2.98)	(-2.65)
Ln(Stock Turnover)	0.017***	0.019***	0.016***	0.018***	0.017***	0.018***
	(17.55)	(21.31)	(17.29)	(21.13)	(17.49)	(21.14)
Return Volatility	1.406***	0.976***	1.394***	0.953***	1.366***	0.947***
	(20.18)	(14.85)	(19.78)	(14.31)	(19.30)	(14.23)
Ln(Market Cap)	0.008***	0.040***	0.007***	0.040***	0.008***	0.040***
	(13.09)	(24.39)	(12.10)	(24.22)	(12.93)	(24.27)
Market-to-Book Ratio	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(6.50)	(5.93)	(6.94)	(6.25)	(6.60)	(6.17)
Dividend Yield	-0.001	-0.003***	-0.001*	-0.003***	-0.001*	-0.003***
	(-1.52)	(-5.64)	(-1.83)	(-5.67)	(-1.72)	(-5.67)
Constant	-0.063***	-0.382***	-0.056***	-0.379***	-0.063***	-0.380***
	(-6.41)	(-23.60)	(-5.78)	(-23.39)	(-6.43)	(-23.57)
Investor-by-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Stock FE	No	Yes	No	Yes	No	Yes
Observations	10,549,036	10,549,036	10,549,036	10,549,036	10,549,036	10,549,036
R^2	0.440	0.442	0.440	0.442	0.440	0.442

Investors' Reactions to Changes in ESG Status

	(1)	(2)	(3)
Dependent Variable	Sell Dummy		$-\frac{\Delta Holdings_{i,j,t}}{Holdings_{i,j,t-1}}$
ESG Stock	-0.016***	-0.013***	-0.012***
	(-4.58)	(-4.76)	(-4.04)
Ln(Stock Turnover)		0.047***	0.027***
		(11.32)	(6.32)
Return Volatility		1.140***	0.983***
		(3.97)	(3.19)
Ln(Market Cap)		0.034***	0.002
		(3.55)	(0.20)
Market-to-Book Ratio		-0.000***	-0.000***
		(-3.56)	(-3.38)
Dividend Yield		0.000	0.003*
		(0.09)	(1.88)
Investment Return		0.016***	0.012***
		(3.08)	(3.00)
Constant	0.196***	-0.488***	-0.124
	(108.33)	(-5.42)	(-1.49)
Stock-Event FE	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes
Observations	1,391,080	1,391,080	1,391,080
R^2	0.106	0.114	0.047

Sample is restricted to a 12-month window before and after the ESG status change.

Out of 1,501 stocks, 431 experience an inclusion and 258 experience an exclusion in our sample.

Trading Patterns

- ESG investing has longer horizon
  - Lower turnover of ESG stocks

- Lower sensitivity to financial performance, but selling upon ESG exclusion
  - Consistent with models with different sensitivity to financial and ESG dimensions (Goldstein et al. 2021)

- True for the same individual and time