ESG Preference, Institutional Trading, and Stock Return Patterns

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2022 年 12 月 5 日

Motivation

- strategies and tastes of inst changed in the past 20 years:
  - more quantitative way
  - incorporated ESG performance into investment decision-making
- literatures:
  - the popularity of quantitative invest led to a recent decline in its performance
  - no clear evidence on the investment performance of SR institutions
  - Starks et al. (2020), SR inst are more patient with high ESG firms:less inclined to sell stocks even after negative news or poor performance.
- idea: how the interaction of 2 invest styles influence stock return patterns?

Question

- Can/How has the increased focus on ESG influenced stock return patterns?
  - Yes
  - abnormal returns associated with mispricing signals are greater for stocks held more by SR institutions.

- When does the link between SR ownership and the efficacy of mispricing signals emerge?
  - only emerges in recent years with the rise of ESG investing
  - significant only when there are arbitrage-related funding constraints

Contribution

- the first paper to explore the interaction between ESG preferences and stock return patterns
  - focus on invest performance of SR institutions: lower financial performance(Ridel & Smeets,2017));higher fees(Hartzmark & Sussman,2019))
  - SR institutional investors tend to be more patient with high ESG firms(Starks et al.,2020)

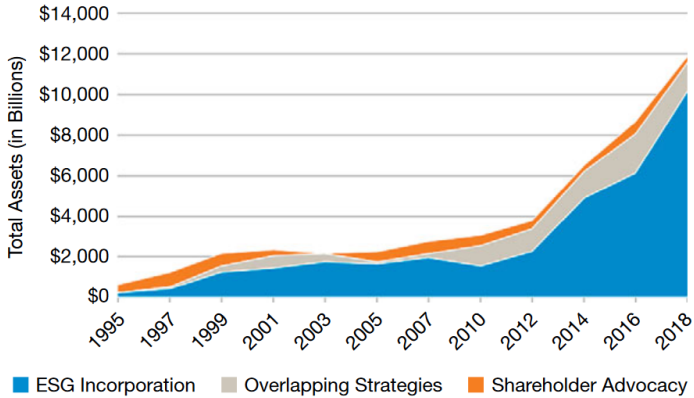
- contribute to stock prices respond slowly——ESG channel.
  - earnings news
  - stock returns respond to market returns with a lag(Hou & Moskowitz, 2005))

Contribution

- Why traditional portfolio optimization considerations do not fully explain the investment decisions of institutional investors.
  - self-imposed constraints(Almazan et al., 2004).
  - behavioral distortions:investors have limited attention-may affect inst(Hirshleifer et al., 2009)
  - investors different tastes
    - agency-induced preferences for stock characteristics affect inst invest decisions(Edelen et al., 2016)
    - investor tastes influence asset pricing.(Fama & French.2007; Pastor et al. ,2021; Pedersen et al.,2021)

- the first to evaluate the effects of tastes on asset pricing by examining stock return patterns change over a period where tastes have clearly changed.

Design



- SR invest assests accelerated since 2004—may influence stock return pattern

Design

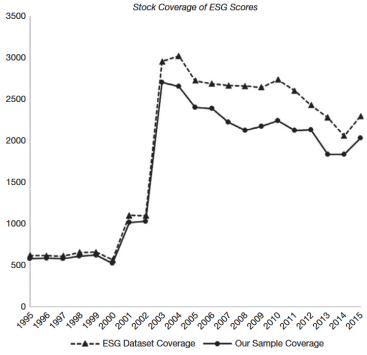
- Specifically, less sensitive to quantitative signals of mispricing
  - SUE: standardized unexpected earnings signal (Foster et al., 1984)
  - SYY： combines 11 signals, including accounting ratios and corporate decisions, like asset growth. (Stambaugh, Yu, and Yuan,2015)
- Main test: SUE and SYY signals may stronger
- Placebo test: 1996–2003 sample period——will not stronger than 2004-2016
- If the return patterns reflect mispricing, then expect to be stronger when the cost of shorting and other capital constraints are higher.
  - shocks to broker-dealer leverage.(Adrian et al.2014))

Data

- stock returns, prices, and trading volumes from CRSP
- accounting data from Compustat
- analyst coverage and forecast data from IBES
- FamaFrench risk factors and the risk-free rate from Kenneth French' s website
- Quarterly institutional holdings (13F) and mutual fund holdings (s12) data from Thomson Reuters
- stock lending data from Markit for the period of 2006 to 2016
- The Stambaugh et al. (2015) mispricing score measures for individual stocks from Stambaugh' s website.

Data

- firms' ESG from MSCI ESG KLD STATS database (formerly known as KLD).



- prices <5 dollars on the last trading day of the previous month are excluded.
- 321,449 stock-month observations, 2004.1- 2016.12, with 4,559 unique stocks
- inst own 71% of the shares and 9.66 analysts follow each stock.

Key Measures——SR_IO

- Socially Responsible Institutional Ownership(SR_IO) for each stock each quarter(Hwang et al., 2022)
  1. raw firm-level ESG score:E+S+G score
  2. size-adjust: ESG_j= raw firm j's ESG score - average group ESG score(sort into 10 deciles based on size)
  3. inst i' s social preference:

$$ISRS_{i,q} = \sum_{j \in i} w_{j,q} ESG_j \tag{1}$$

  4. Each quarter sort inst into 3 groups based on $ISRS_{i,q}$,highest group as SR inst
  5. SR_IO at the stock level:

$$SR\_IO_{i,q} = \frac{shares\ held\ by\ SR\ inst}{shares\ held\ by\ all\ inst} \tag{2}$$

Key Measures——Mispricing Signals

- Mispricing Signals: SUE
  1. Calculate the dif between current quarter earnings and earnings 4 quarters ago
  2. Standardize: Divide the dif by the std of unexpected earnings over the last 8 quarters.

- Mispricing Signals: SYY
  1. 11 anomalies: O_SCORE, MOMENTUM, ASSET_GROWTH……
  2. For each anomaly, the stocks are ranked and sorted into 100 groups
  3. assigned rank 1-100: highest rank is assigned to the lowest average abnormal future return
  4. SYY: average
  5. For convenience, ranging between -100 and -1

Summary Statistics

Panel A. Stock Characteristics: Time-Series Average of Cross-Sectional Distributions

Jan. 2004–Dec. 2016	Mean	Std. Dev.	10-Pctl	Q1	Med	Q3	90-Pctl
SR_IO (%)	13.35	10.05	4.17	6.13	10.07	17.65	28.08
SUE_SCORE (%)	0.05	9.86	−1.59	−0.36	0.11	0.50	1.55
SYY_SCORE	−49.42	12.69	−66.35	−57.87	−48.91	−40.35	−33.34
ESG_SCORE	−0.02	2.20	−2.08	−1.38	−0.54	1.00	2.62
MARKET_CAPITALIZATION ($billion)	6.83	22.69	0.23	0.55	1.36	4.10	13.50
STOCK_TURNOVER (%)	21.13	20.21	5.92	9.84	15.88	25.87	40.90
IVOL (%)	8.30	5.10	3.81	5.09	7.11	10.10	13.99
ANALYST_COVERAGE	9.66	7.06	2.27	4.21	7.72	13.51	19.79
INSTITUTIONAL_OWNERSHIP	0.71	0.22	0.40	0.58	0.75	0.86	0.95

Panel B. Correlations Among Stock Characteristics

Pearson \ Spearman	SUE_ SCORE	SYY_ SCORE	SR_IO	ESG_ SCORE	MARKET_ CAPITALIZATION	ANALYST_ COVERAGE	INSTITUTIONAL_ OWNERSHIP
SUE_SCORE	1.00	−0.13	−0.04	−0.02	0.05	0.01	0.01
SYY_SCORE	−0.06	1.00	−0.13	−0.12	−0.24	−0.12	−0.05
SR_IO	−0.01	−0.11	1.00	0.26	0.40	0.33	−0.05
ESG_SCORE	−0.01	−0.15	0.33	1.00	0.22	0.18	−0.07
MARKET_CAPITALIZATION	0.01	−0.16	0.30	0.32	1.00	0.70	0.18
ANALYST_COVERAGE	0.00	−0.14	0.31	0.27	0.42	1.00	0.24
INSTITUTIONAL_OWNERSHIP	−0.02	−0.07	−0.05	−0.05	−0.06	0.20	1.00

Panel C. Institution Characteristics: Time-Series Average of Cross-Sectional Mean

Q1.2004–Q4.2016 Institution Type	AUM ($billion)	# of Stocks	INVESTMENT_ HORIZON (1/CHURN_RATIO)	EW_ESG_ SCORE	EW_SUE_ SCORE (%)	EW_SYY_ SCORE	VW_ESG_ SCORE	VW_SUE_ SCORE (%)	VW_SYY_ SCORE
Socially responsible (SR) institutions	2.79	205	4.26	2.41	0.14	−43.68	3.37	0.16	−41.90
Non-SR institutions	5.23	260	2.63	0.71	0.31	−47.54	0.85	0.20	−46.60

- some SR institutions hold some stocks in low ESG industries

Results: ESG Preference and Institutions' Trading Behaviors

- Effect of Mispricing Signals on Trading Behaviors(change in inst holding)

SUE_SCORE	P1 (Overpriced)	P2	P3	P4	P5 (Underpriced)	P5–P1 (H–L Spread)
Panel A1. Sorted on SUE_SCORE: Change in Institutional Ownership (%)						
SR institutions	−0.17	−0.07	−0.03	−0.01	−0.11	0.06
	(−1.33)	(−1.02)	(−0.49)	(−0.11)	(−1.52)	(0.43)
Non-SR institutions	−0.90*	−0.65	−0.31	0.30	0.67	1.57**
	(−1.68)	(−1.62)	(−0.82)	(0.54)	(1.21)	(2.31)
Diff (SR–Non-SR)	0.73*	0.58	0.28	−0.31	−0.79	−1.51**
	(1.89)	(1.25)	(0.79)	(−0.57)	(−1.48)	(−2.58)
Panel A2. Sorted on SUE_SCORE: Change in the Number of Institutions (%)						
SR institutions	−0.32*	−0.32	0.25	1.92	0.21	0.53
	(−1.78)	(−0.78)	(1.17)	(1.12)	(1.27)	(1.32)
Non-SR institutions	−2.42***	−1.02	0.65	0.87	0.49	2.91***
	(−4.83)	(−1.24)	(0.81)	(0.88)	(0.70)	(3.97)
Diff (SR–Non-SR)	2.10***	0.70**	−0.40	1.04	−0.28	−2.38***
	(5.15)	(2.30)	(−0.59)	(1.13)	(−0.46)	(−4.12)

- The number of these institutions holding stocks with the most negative unexpected earnings decreases by 2.42%
- SR institutions react less to the mispricing signals

Results: Mispricing Signals, SR_IO, and Stock Return Patterns

- Monthly Returns Sorted on SR_IO and Mispricing Signals

Panel A. Value-Weighted Portfolio Return Sorted on SUE_SCORE (%)

SUE_SCORE		P1 (Overpriced)	P2, P3, and P4 (Fairly Priced)	P5 (Underpriced)	P5–P1 (H–L Spread)
CAPM α	All stocks	−0.35** (−2.11)	0.07* (1.83)	0.01 (0.05)	0.35 (1.46)
	Low SR_IO	0.11 (0.56)	0.12 (1.17)	−0.11 (−0.43)	−0.21 (−0.68)
	High SR_IO	−0.43** (−2.34)	0.08 (1.58)	0.06 (0.42)	0.49* (1.90)
				Diff	0.70** (2.04)
FF-3 α	All stocks	−0.38** (−2.50)	0.08* (1.94)	0.01 (0.07)	0.39* (1.70)
	Low SR_IO	0.09 (0.61)	0.13 (1.57)	−0.09 (−0.37)	−0.18 (−0.62)
	High SR_IO	−0.47*** (−2.75)	0.08* (1.72)	0.06 (0.41)	0.52** (2.12)
				Diff	0.70** (2.08)

- SUE return spread is in fact significant for the high SR_IO stocks
- come from the low SUE score stocks- may reflect potential short-selling constraints.

Results: Mispricing Signals, SR_IO, and Stock Return Patterns

Panel B. Value-Weighted Portfolio Return Sorted on SYY_SCORE (%)

SYY_SCORE		P1 (Overpriced)	P2, P3, and P4 (Fairly Priced)	P5 (Underpriced)	P5–P1 (H–L Spread)
CAPM α	All stocks	−0.66***	0.00	0.12	0.78***
		(−3.45)	(0.02)	(1.56)	(3.12)
	Low SR_IO	−0.34*	0.12	−0.02	0.32
		(−1.80)	(0.93)	(−0.12)	(1.61)
	High SR_IO	−0.76***	−0.01	0.13	0.89***
		(−3.45)	(−0.21)	(1.59)	(3.20)
		Diff			0.57**
					(2.46)
FF-3 α	All stocks	−0.67***	−0.00	0.13*	0.80***
		(−3.34)	(−0.08)	(1.69)	(3.06)
	Low SR_IO	−0.33*	0.13	0.00	0.33*
		(−1.91)	(1.16)	(0.01)	(1.66)
	High SR_IO	−0.78***	−0.02	0.14*	0.92***
		(−3.34)	(−0.40)	(1.73)	(3.11)
		Diff			0.58**
					(2.39)

- SYY same as SUE

Results: Emergence of ESG Invest and Stock Return Patterns

		P1	P2, P3, and P4	P5	P5–P1
Panel A. Value-Weighted Portfolio Return Sorted on SUE_SCORE (%)					
Panel A1. Sample Period of 1996 to 2003					
FF-3 α	Low SR_IO	−0.49	0.17	−0.00	0.48
		(−1.42)	(0.91)	(−0.01)	(1.23)
	High SR_IO	−0.19	0.22	0.10	0.29
		(−0.43)	(1.22)	(0.34)	(0.60)
				Diff	−0.19
					(−0.37)
Panel A2. Sample Period of 2004 to 2016					
FF-3 α	Low SR_IO	0.09	0.13	−0.09	−0.18
		(0.61)	(1.57)	(−0.37)	(−0.62)
	High SR_IO	−0.47***	0.08*	0.06	0.52**
		(−2.75)	(1.72)	(0.41)	(2.12)
				Diff	0.70**
					(2.08)
Panel B. Value-Weighted Portfolio Return Sorted on SYY_SCORE (%)					
Panel B1. Sample Period of 1996 to 2003					
FF-3 α	Low SR_IO	−0.60**	0.04	0.49*	1.09**
		(−2.56)	(0.24)	(1.71)	(2.59)
	High SR_IO	−0.44	0.08	0.62***	1.05**
		(−1.33)	(0.38)	(2.74)	(2.63)
				Diff	−0.04
					(−0.09)
Panel B2. Sample Period of 2004 to 2016					
FF-3 α	Low SR_IO	−0.33*	0.13	0.00	0.33*
		(−1.91)	(1.16)	(0.01)	(1.66)
	High SR_IO	−0.78***	−0.02	0.14*	0.92***
		(−3.34)	(−0.40)	(1.73)	(3.11)
				Diff	0.58**
					(2.39)

Results: SR_IO, Limits to Arbitrage, and Funding Liquidity

Panel B. The Effect of Funding Liquidity

Panel B1. Value-Weighted FF-3 Alpha (%) of (H-L) Return Spread Sorted on SUE_SCORE

H-L portfolio VW FF-3 α (%)	All Stocks	Low SR_IO	High SR_IO	Diff
Entire period (2004–2016)	0.39*	−0.18	0.52**	0.70**
	(1.70)	(−0.62)	(2.12)	(2.08)
High funding liquidity period	0.19	0.18	0.24	0.05
(More arbitrage capital)	(0.76)	(0.47)	(0.91)	(0.14)
Low funding liquidity period	0.63**	−0.30	0.80*	1.10***
(Less arbitrage capital)	(2.10)	(−1.23)	(1.93)	(2.90)

Panel B2. Value-Weighted FF-3 Alpha (%) of (H-L) Return Spread Sorted on SYY_SCORE

	All Stocks	Low SR_IO	High SR_IO	Diff
Entire period (2004–2016)	0.80***	0.33*	0.92***	0.58**
	(3.06)	(1.66)	(3.11)	(2.39)
High funding liquidity period	0.24	−0.01	0.27	0.28
(More arbitrage capital)	(0.67)	(−0.04)	(0.63)	(0.61)
Low funding liquidity period	1.27***	0.58*	1.44***	0.86***
(Less arbitrage capital)	(3.51)	(1.92)	(3.63)	(2.65)

- Diffin long-short spreads between high and low SR_IO group is significant

additional test： stock prices respond

- SR institutions slows down the speed that stock prices respond to information

延迟反应指标：滞后市场回报解释的t期个股回报变化的比例

PRICE_DELAY (Hou and Moskowitz (2005))

	1996–2003	2004–2016		
		Entire Period	High Funding Liquidity Period	Low Funding Liquidity Period
	1	2	3	4
SR_IO	0.007 (0.47)	0.037** (2.28)	0.021 (0.93)	0.052** (2.36)
INSTITUTIONAL_OWNERSHIP	−0.079*** (−3.75)	−0.045*** (−3.51)	−0.067*** (−3.77)	−0.034* (−1.93)
STOCK-LEVEL_INVESTMENT_HORIZON	0.013 (0.30)	−0.039 (−0.83)	−0.133* (−1.90)	0.040 (0.61)
ln(ME)	−0.004 (−0.92)	−0.043*** (−14.26)	−0.044*** (−10.86)	−0.041*** (−9.84)
STOCK_TURNOVER	−0.168*** (−8.09)	−0.026*** (−2.69)	−0.038** (−2.37)	−0.017 (−1.15)
Firm fixed effect Time fixed effect	Yes Yes	Yes Yes	Yes Yes	Yes Yes
Adj. R^2 No. of obs.	0.332 28,755	0.513 42,598	0.570 18,662	0.566 22,119

- SR_IO are associated with a slow response to market information in the later period, and stronger during the period when funding liquidity is low.

Robustness and Discussion

- our documented return patterns are related to short sale-robust
- our patterns are not driven by differences in inst investment horizon
- our patterns are not driven by rise of passive investing
- robust to different definitions of SR_IO
- robust to using ESG measures from an alternative database
- SR_IO is more important than ESG score in the stock return patterns.
- the effect of firm size
  - mispricing signals show better for small firms, while SR inst focus on big stocks more, still exist?
  - indexers focus on large stocks: Our results may because high SR_IO stocks tend to be in the S&P 500, and are held more by passive investors

Robustness and Discussion: Size

Sorted on SYY_SCORE		P1 (Overpriced)	P2, P3, and P4 (Fairly Priced)	P5 (Underpriced)	P5–P1 ((H–L) Spread)
Panel A1. Value-Weighted FF-3 Alpha (%) for 1996–2003 Period					
Largest 1,000 stocks		−0.99***	0.08	0.42***	1.42***
		(−3.91)	(1.01)	(3.33)	(4.05)
Other stocks		−1.41***	0.12	0.67***	2.08***
		(−5.01)	(0.89)	(3.72)	(6.15)
Panel A2. Value-Weighted FF-3 Alpha (%) for 2004–2016 Period					
Largest 1,000 stocks		−0.71***	−0.01	0.13*	0.84***
		(−3.19)	(−0.13)	(1.68)	(2.97)
Other stocks		−0.33***	0.07	0.03	0.36**
		(−2.80)	(1.15)	(0.32)	(2.21)
SYY_SCORE		P1 (Overpriced)	P2, P3, and P4 (Fairly Priced)	P5 (Underpriced)	P5–P1 (H–L Spread)
Panel B1. Value-Weighted FF-3 Alpha (%) Among High SR_IO Stocks for 2004–2016 Period					
All high SR_IO stocks		−0.78***	−0.02	0.14*	0.92***
		(−3.34)	(−0.40)	(1.73)	(3.11)
Firm size	Small	−0.37**	0.11	0.24*	0.61***
		(−2.04)	(0.97)	(1.73)	(2.79)
	Large	−0.80***	−0.02	0.14*	0.94***
		(−3.27)	(−0.44)	(1.71)	(3.06)
	H–L	−0.43*	−0.13	−0.10	0.33
		(−1.86)	(−1.13)	(−0.63)	(1.15)
Panel B2. Value-Weighted FF-3 Alpha (%) Among Low SR_IO Stocks for 2004–2016 Period					
All low SR_IO stocks		−0.33*	0.13	0.00	0.33*
		(−1.91)	(1.16)	(0.01)	(1.66)
Firm size	Small	−0.37***	0.09	−0.03	0.33*
		(−3.64)	(1.28)	(−0.26)	(1.96)
	Large	−0.29	0.18	0.03	0.32
		(−1.29)	(1.22)	(0.23)	(1.32)
	H–L	0.07	0.09	0.06	−0.01
		(0.34)	(0.51)	(0.36)	(−0.05)

Conclusion

- although the predictive power of SUE and SYY is much weaker in the post-2004 period, these continue to predict the returns with high SR_IO.
- The link between only emerges in recent years with the rise of ESG investing, and is significant only when there are arbitrage-related funding constraints.
- focus on ESG may explain why the efficacy of mispricing signals declined more in the recent period for small capitalization stocks than large

New ideas

- future research: SR institutions can influence informational efficiency of stock prices, which can also affect corporate financing and investment choices.
- SR_IO 是否会影响其他股票回报模式？比如一些事件反应，动量效应等
- SR_IO 是否会影响其他资产的异象回报模式?
- 还有什么会影响异象回报模式呢？趋势：社交媒体的影响，主动与被动投资，对科技新兴行业的关注……投资者类型：注意力集中的投资者……

Thanks!