

Herding and Counter-herding Effect in Open End Equity Funds using ESG measure

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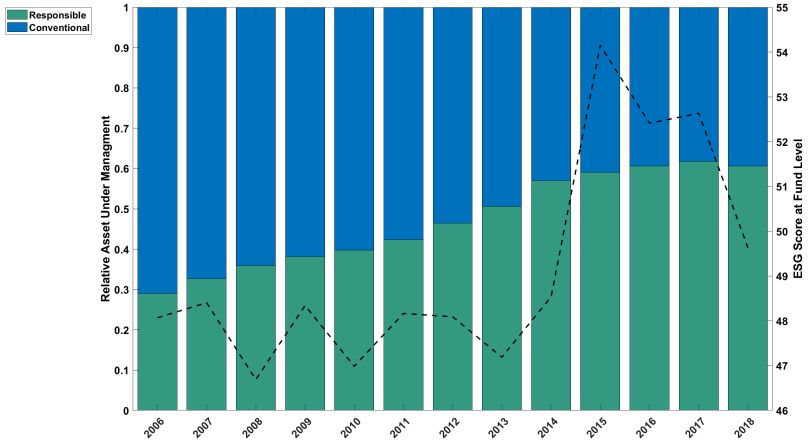
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1 Introduction

2 Data, Methodology & Results

3 Conclusions

ESG Investing Tendency among ESG funds



SRI in Numbers - Global Sustainable Investment Alliance

La Global Sustainable Investment Alliance (2016) shows that:

- worldwide the Asset Under Management (AUM) subjects to ESG investing amounts to \$22.89 billions with an increment of 25% with respect to 2014. It now represents 1 dollar out of 4 under professional asset management;
- only in Europe, the AUM amounts to \$12.02 billions. Here the most commonly used investment strategy is the negative screening. While the ESG criteria integration is the most commonly investment strategy used in the United States, Canada, Australia/New Zealand and Asia ex-Japan financial market. Corporate and shareholder engagement are instead the primary strategy in Japan;

Similarly, the La Global Sustainable Investment Alliance (2018) shows that:

- globally the SRI reaches a \$30.7 billions in terms of AUM with an increment of 34% with respect to 2016. SRI represents now a big share of the AUM in every area. From the 18% in Japan to the 63% in Australia and New Zealand;
- in Europe, the AUM is increased of about 11% and amounts now to \$14.1 billions. The negative screening is still the most commonly used investment strategy that amounts to €9.5 billions;

SRI in Numbers - US Social Investment Foundation

The US Social Investment Foundation (2016) shows:

- sustainable, responsible and impact investing assets have expanded to \$8.72 trillion in the United States from \$6.57 trillion in 2014;
- such growth is driven by asset managers considering environmental, social and/or corporate governance (ESG) criteria across \$8.10 trillion in assets from \$4.8 trillion in 2014;
- top issue considered by both the money managers and their institutional investor clients is the **conflict risk**.

Similarly, the US Social Investment Foundation (2018) shows:

- the SRI reached \$12.0 billions in the United States, with an increment of 38% with respect to the \$8.7 billions in 2016;
- the majority of such an increment is due to a bigger portion of AUM (\$11.6 billions) allocated using ESG criteria for the portfolio composition. With an increment of 44% from the 8.1 billions of 2016.

Asset Pricing and ESG Investing

In this branch of literature we try to disentangle if, and to what extent, the relationship of assets return/risk and their ESG level exists. Results are related:

- *Idiosyncratic Volatility* - the idiosyncratic risk of firms with high CSR intensity is higher than firms with lower intensity – Becchetti, Ciciretti, and Hasan (2015b);
- *Stakeholder risk* - the existence of an ESG risk factor to capture such an additional source of risk – Becchetti, Ciciretti, and Dalò (2018).
- *Pricing Anomalies* - the pricing anomalies that do not cancel out by using the ESG risk factor, are driven by the investors' preference for ESG assets – Ciciretti, Dalò, and Dam (2019);

To summarize, our results show that when we introduce the ESG concepts in the risk/return framework, and we isolate it, the market is better able to price these different business strategies operated by firms.

Open End Equity Funds and ESG Investing

When we translate single listed firms into a portfolio framework, results show that:

- *Insurance Role* - ESG funds outperform conventional funds during the 2007 global financial crisis – Becchetti, Ciciretti, Daló, and Herzel (2015a);
- *ESG Networks* - fire-sales spillover from assets liquidation has a lower impact on the funds with a higher level of ESG compliance – Cerqueti, Ciciretti, Dalò, and Nicolosi (2020b);
- *ESG Resilience* - high ESG compliance funds networks are more resilient to external shocks than the corresponding networks of funds with low ESG compliance – Cerqueti, Ciciretti, Dalò, and Nicolosi (2020a);

In short, we focus on how single assets characteristics are included into fund portfolio selection.

Research Question

In this paper, we aim to answer the following research question:

In the recent surge, does the herding/counter-herding behavior affects ESG investing in the ESG open end equity funds' portfolio selection?

through the following testing hypothesis:

$H_{0,A}$

Herding/counter-herding behavior among ESG Funds does not exist.

$H_{0,B}$

Herding/counter-herding behavior among ESG Funds has no effect on their risk-adjusted returns.

$H_{0,C}$

Herding/counter-herding behavior among ESG Funds has no effect on their systematic risk exposure.

Data Sources

- Time Horizon: monthly observations from 02/2012 to 06/2018 (77 points in time);
- Unique Funds: 10,456 (Mornigstar - Direct);
- Unique Holdings: 37,181 (Mornigstar - EDW);
- Other characteristics at holding-level: DATASTREAM (Refinitiv)
 - Return Indexes; Market Value of Equity; Common Equity; Total Assets; Net Sales or Revenues; Selling General, and Administrative Expenses; Interest Expense on Debt; and Cost of Goods Sold. These variables are used to create the size (ME), book-to-market (BtM), and momentum characteristics (MoM) following the Fama and French (2012, 2017) procedures;
- International Risk factors at market-level: [Fama-French Website](#) (Fama and French, 2012, 2017):
 - Market Benchmark ($R_{m,t}^e$); Small minus Big (SMB_t); High minus Low (HML_t); Momentum (WML_t).

Descriptive Statistics

| | (A) | (B) | (C) | (D) | (E) | (F) | (G) | (K) |
|-----------------|-------------------|--------------|-----------------|-------------|-------------|--------------------|------------|--------------|
| Panel A | | | | | | | | |
| | <i>AUM (mil.)</i> | <i>Flows</i> | <i>Turnover</i> | <i>FH</i> | <i>R(%)</i> | <i>Expences(%)</i> | <i>Age</i> | <i>ESG</i> |
| <i>Mean</i> | 579 | 0.99 | 0.00 | 0.01 | 0.68 | 1.40 | 13 | 49.68 |
| <i>St.Dev</i> | 174 | 14.01 | 0.02 | 0.18 | 5.05 | 0.12 | 7 | 1.29 |
| Panel B | | | | | | | | |
| <i>AUM</i> | 1.00 | | | | | | | |
| <i>Flows</i> | 0.03 | 1.00 | | | | | | |
| <i>Turnover</i> | -0.01 | 0.13 | 1.00 | | | | | |
| <i>FH</i> | -0.05 | 0.02 | 0.01 | 1.00 | | | | |
| <i>R</i> | -0.02 | 0.00 | 0.00 | 0.02 | 1.00 | | | |
| <i>Expences</i> | -0.26 | -0.04 | 0.00 | 0.02 | 0.06 | 1.00 | | |
| <i>Age</i> | 0.22 | -0.07 | -0.05 | -0.11 | -0.01 | 0.01 | 1.00 | |
| <i>ESG</i> | 0.02 | 0.03 | -0.01 | -0.02 | -0.02 | -0.10 | 0.03 | 1.00 |

Key insights:

1. Average fund in our sample manages 579 million dollars, and has a positive growth in terms of AUM with a low trading frequency (columns A-C). The average fund slightly herd achieving a monthly return of 0.68% (columns D-E). The annual net expense ratio of 1.40% (column F). The average inception date is 13 years (column G). The average ESG score is almost 50 on a scale that goes from from 0 to 100 (column K).

Descriptive Statistics

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| <i>ESG</i> | 0.02 | 0.03 | -0.01 | -0.02 | -0.02 | -0.10 | 0.03 | 1.00 |

Key insights:

- In line with El Ghouli and Karoui (2017) - JBF, bigger and older funds have a tendency to achieve a higher *ESG* score (column A and G). They tend to be less expensive (column F).

Descriptive Statistics

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| <i>R</i> | -0.02 | 0.00 | 0.00 | 0.02 | 1.00 | | | |
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| <i>Age</i> | 0.22 | -0.07 | -0.05 | -0.11 | -0.01 | 0.01 | 1.00 | |
| <i>ESG</i> | 0.02 | 0.03 | -0.01 | -0.02 | -0.02 | -0.10 | 0.03 | 1.00 |

Key insight:

- More importantly, funds with higher *ESG* score appear to have a counter-herding tendency (column D).

Descriptive Evidences

| | (A) | (B) | (C) |
|-----------------|----------------|-----------------|-------------------|
| | <i>Low ESG</i> | <i>High ESG</i> | <i>Diff</i> |
| <i>AUM</i> | 519.3956 | 353.5962 | 165.7994*** |
| <i>Flows</i> | 1.7045 | 1.5030 | 0.2016 |
| <i>Turnover</i> | 0.0049 | 0.0016 | 0.0032*** |
| <i>FH</i> | 0.0215 | 0.0040 | 0.0175** |
| <i>R</i> | 0.0078 | 0.0063 | 0.0015*** |
| <i>Expences</i> | 1.5523 | 1.4886 | 0.0637** |
| <i>Age</i> | 7.3987 | 7.5640 | -0.1653 |
| <i>ESG</i> | 42.2543 | 55.0482 | -12.7938*** |
| $\hat{\alpha}$ | -0.0018 | -0.0035 | 0.0017*** |
| $\hat{\beta}_m$ | 1.0380 | 1.1258 | -0.0879*** |
| $\hat{\beta}_s$ | 0.3703 | -0.0932 | 0.4635*** |
| $\hat{\beta}_h$ | -0.0088 | 0.0377 | -0.0464*** |
| $\hat{\beta}_w$ | 0.0195 | -0.0462 | 0.0657*** |

Key insights:

1. High ESG funds have a tendency to invest in big and value firms whose returns has decreased in the last eleven months;

Methodology – Jiang and Verardo (2018) Herding Measure, 1 of 4

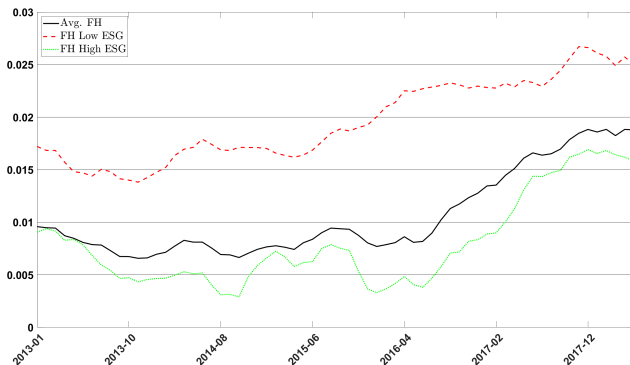
To measure the average tendency of a fund to trade with or against the crowd, we adopt an herding measure introduced by Jiang and Verardo (2018) – JF, and we then estimate the following cross-sectional model that is the our baseline to define the herding measure:

$$Trade_{i,j,t} = \gamma_{0,j,t} + \gamma_{1,j,t}\Delta IO_{i,t-1} + \gamma_{2,j,t}lME_{i,t-1} + \gamma_{3,j,t}lBtM_{i,t-1} + \gamma_{4,j,t}MoM_{i,t-1} + v_{i,j,t} \quad (1)$$

where $Trade_{i,j,t}$ is the change in the number of shares of stock i in the portfolio of mutual fund j during month t ; $\Delta IO_{i,t-1}$ is the change in the aggregate institutional ownership of stock i in month $t-1$; $lME_{i,t-1}$ logarithm of market capitalization, $lBtM_{i,t-1}$ is the logarithm of the book-to-market, $MoM_{i,t-1}$ is the cumulative return from month $t-11$ to month $t-1$.

Methodology – Jiang and Verardo (2018) Herding Measure, 2 of 4

Below you can find the one-year moving average herding measure for the overall sample (FH), and for the funds with Low and High ESG compliance, respectively.



From model (1), we are able to extract the measure of fund-level herding ($FH_{j,t}$) that captures the average tendency of fund j to follow past institutional trades as:

$$FH_{j,t} = \frac{\sum_{h=1}^t \frac{1}{h} \hat{\gamma}_{1,j,t-h+1}}{\sum_{h=1}^t \frac{1}{h}} \quad (2)$$

Methodology – Herding and Counter-herding Using ESG Measure, 3 of 4

To assess if and to what extent ESG funds show a herding/counter-herding tendency in the first place, we run the following model:

$$FH_{j,t} = \theta_0 + \theta_1 ESG_{j,t-1} + \Theta^T Fc_{j,t-1} + \lambda_t + \mu_j + \epsilon_{j,t} \quad (3)$$

where $ESG_{j,t-1}$ is the ESG score for fund j at time $t-1$, and $Fc_{j,t-1}$ represents the matrix of fund characteristics and includes: logarithm of the asset under management ($LAUM$), logarithm of the fund age ($IAge$), the net annual expense ratio ($Expenses$), the funds flows ($Flows$), and the turnover ($Turnover$). λ_t captures the time-fixed effects, and μ_j captures fund fixed effect.

θ_1 is the parameter that disentangles the relation between herding/counter-herding tendency and the responsibility level of a fund ($H_{A,0}$).

Herding and Counter-herding Using ESG Measure, ($H_{0,A}$)

$$FH_{j,t} = \theta_0 + \theta_1 ESG_{j,t-1} + \Theta^\top Fc_{j,t-1} + \lambda_t + \mu_j + \epsilon_{j,t} \quad (3)$$

| | (A) | (B) | (C) |
|-----------------|-------------------------|-------------------------|--------------------------------|
| <i>ESG</i> | -0.1802*** [-8.2670] | -0.1550*** [-6.8255] | -0.2713*** [-3.6783] |
| <i>LAUM</i> | 0.6566*** [9.2525] | 0.6713*** [9.3564] | 1.1917*** [6.2938] |
| <i>lAge</i> | -0.5631*** [-3.9250] | -0.5810*** [-3.9355] | -1.3274*** [-3.0433] |
| <i>Expences</i> | 0.1906 [0.9729] | 0.1885 [0.9355] | 2.2047*** [4.2354] |
| <i>Flows</i> | -0.0016 [-0.5038] | -0.0023 [-0.7161] | 0.0013 [0.5059] |
| <i>Turnover</i> | 0.9563 [0.3165] | 0.7593 [0.2513] | 0.9176 [0.4108] |
| <i>Const.</i> | 7.2302*** [5.8898] | 5.9041*** [4.7086] | 16.8401*** [2.1408] |
| R^2_{adj} | 0.0025 | 0.0032 | 0.5035 |
| <i>Obs.</i> | 58297 | 58297 | 58297 |
| <i>Time FE</i> | N | Y | Y |
| <i>Fund FE</i> | N | N | Y |

Methodology – Herding and Counter-herding Using ESG Measure, 4 of 4

We then check if the herding/counter-herding tendency of ESG funds has an impact on their performance and market risk exposure. To do so we first estimate the Carhart (1997) model for each fund using two years of past monthly return:

$$R_{j,t}^e = \alpha_{j,t} + \beta_{m,j,t}R_{m,t}^e + \beta_{s,j,t}SMB_t + \beta_{h,j,t}HML_t + \beta_{w,j,t}WML_t + \epsilon_{j,t} \quad (4)$$

We then use the estimated risk-adjusted return ($\hat{\alpha}_{j,t}$) and market risk exposure ($\hat{\beta}_{j,m,t}$) as dependent variable of the following models:

$$\hat{\alpha}_{j,t} = \omega_0 + \omega_1 FH_{j,t-1} + \omega_2 ESG_{j,t-1} + \omega_3 ESG_{j,t-1} \times FH_{j,t-1} + \Omega_4^\top F_{C,j,t-1} + \lambda_t + \mu_j + \epsilon_{j,t} \quad (5)$$

and

$$\hat{\beta}_{j,m,t} = \psi_0 + \psi_1 FH_{j,t-1} + \psi_2 ESG_{j,t-1} + \psi_3 ESG_{j,t-1} \times FH_{j,t-1} + \Psi_4^\top F_{C,j,t-1} + \lambda_t + \mu_j + \epsilon_{j,t} \quad (6)$$

where ω_3 and ψ_3 disentangle the combined effect of herding/counter-herding tendency and responsibility level on funds risk-adjusted returns and market risk exposure respectively ($H_{B,0}$ and $H_{C,0}$).

Herding and Counter-herding Using ESG Measure, Risk-Adjusted Returns ($H_{0,B}$)

$$\hat{\alpha}_{j,t} = \omega_0 + \omega_1 FH_{j,t-1} + \omega_2 ESG_{i,t-1} + \omega_3 ESG_{i,t-1} \times FH_{j,t-1} + \Omega_4^T Fc_{j,t-1} + \lambda_t + \mu_j + \epsilon_{j,t} \quad (5)$$

| | (A) | (B) | (C) |
|-----------------|--------------------------|--------------------------|-------------------------|
| <i>ESG</i> | -0.0044*** [-11.7462] | -0.0013*** [-3.2182] | 0.0195*** [18.0909] |
| <i>FH</i> | -0.6562*** [-9.6033] | -0.6022*** [-8.8937] | -0.1989*** [-3.3155] |
| <i>ESGxFH</i> | 0.0134*** [9.7001] | 0.0123*** [8.9313] | 0.0036*** [2.9484] |
| <i>LAUM</i> | 0.0287*** [23.4678] | 0.0338*** [27.6116] | 0.1006*** [33.1332] |
| <i>lAge</i> | 0.0420*** [12.2626] | 0.0292*** [8.4823] | -0.0941*** [-5.3966] |
| <i>Expences</i> | -0.1073*** [-31.9009] | -0.0878*** [-25.6229] | -0.0177** [-2.3363] |
| <i>Flows</i> | 0.0012*** [21.6256] | 0.0012*** [21.9981] | 0.0008*** [22.4045] |
| <i>Turnover</i> | 0.1380** [2.5009] | 0.1152** [2.1063] | 0.1604*** [4.7177] |
| <i>Const.</i> | -0.1618*** [-7.4218] | -0.2843*** [-12.8844] | -0.9893*** [-8.1805] |
| R_{adj}^2 | 0.0551 | 0.0729 | 0.6711 |
| <i>Obs.</i> | 53627 | 53627 | 53627 |
| <i>Time FE</i> | N | Y | Y |
| <i>Fund FE</i> | N | N | Y |

Herding and Counter-herding Using ESG Measure, Systematic Risk ($H_{0,C}$)

$$\hat{\beta}_{j,m,t} = \psi_0 + \psi_1 FH_{j,t-1} + \psi_2 ESG_{i,t-1} + \psi_3 ESG_{i,t-1} \times FH_{j,t-1} + \Psi_4^T Fc_{j,t-1} + \lambda_t + \mu_j + \epsilon_{j,t} \quad (6)$$

| | (A) | (B) | (C) |
|----------------------|-------------------------|-------------------------|--------------------------|
| <i>ESG</i> | 0.0204 [0.9196] | 0.0398* [1.7335] | -0.1996*** [-4.2440] |
| <i>FH</i> | 15.6179*** [3.9037] | 15.3534*** [3.8613] | -2.3002 [-0.9030] |
| <i>ESGx<i>FH</i></i> | -0.2828*** [-3.4862] | -0.2805*** [-3.4788] | 0.0659 [1.2787] |
| <i>LAUM</i> | 1.2712*** [17.8409] | 1.2057*** [16.8488] | 1.7270*** [13.8539] |
| <i>lAge</i> | -1.0756*** [-7.0520] | -0.7251*** [-4.6607] | -1.9552*** [-6.5280] |
| <i>Expences</i> | 2.6456*** [13.4606] | 2.2078*** [10.9606] | 1.6018*** [4.8146] |
| <i>Flows</i> | 0.0019 [0.5784] | 0.0007 [0.2223] | -0.0101*** [-6.3084] |
| <i>Turnover</i> | -4.0050 [-1.2952] | -4.7911 [-1.5596] | 0.7652 [0.5582] |
| <i>Const.</i> | 99.9280*** [79.8427] | 99.2044*** [78.2850] | 125.2952*** [27.7628] |
| R_{adj}^2 | 0.0086 | 0.0221 | 0.8237 |
| <i>Obs.</i> | 48692 | 48692 | 48692 |
| <i>Time FE</i> | N | Y | Y |
| <i>Fund FE</i> | N | N | Y |

Conclusions

To conclude, our results show that:

- 1 ESG funds show a counter-herding behavior when ESG rating increases;
- 2 the higher the combination of ESG and herding/counter-herding, the higher is the risk-adjusted return. Specifically, a one standard deviation decrease in the herding measure, increases the monthly risk-adjusted return by 0.06 basis points ($0.0036 * 0.18 = 0.0006$) that is 0.72bps per year;
- 3 the interaction between ESG and herding/counter-herding has no impact on market risk-exposure;
- 4 the anti-herding behavior suggests that high-ESG funds contribute to market efficiency by lowering the probability of the formation of financial bubbles;
- 5 it remains to be studied whether through the anti-herding behavior we found high-ESG funds contribute to the Price Discovery mechanism, essential to promote efficiency in financial markets.

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