



When investors call for climate responsibility, how do mutual funds respond?

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Motivation

One of the long-term goals of the **Paris Agreement**:
“Making financial flows consistent with a shift towards low GHG emissions” (Article 2.1).

Main policy strategy: Increase the level of climate-related information available to investors (e.g., EU Sustainable Finance Action Plan, Task Force on Climate-related Financial Disclosures, Sustainability Accounting Standards Board, etc.).

Desired virtuous circle:

- (1) Higher transparency will help investors better express their sustainable investment preferences (e.g., Hartzmark and Sussman, 2019, Riedl and Smeets, 2017).
- (2) The change in demand will urge financial intermediaries to become more “climate-friendly” (e.g., on corporates, Heinkel, Kraus, and Zechner, 2001).

This paper: Whether and how this mechanism is at work, with a focus on the **mutual fund industry** (more than USD 11 trillion of AUM in Europe and USD 18 trillion in USA).

Empirical setting

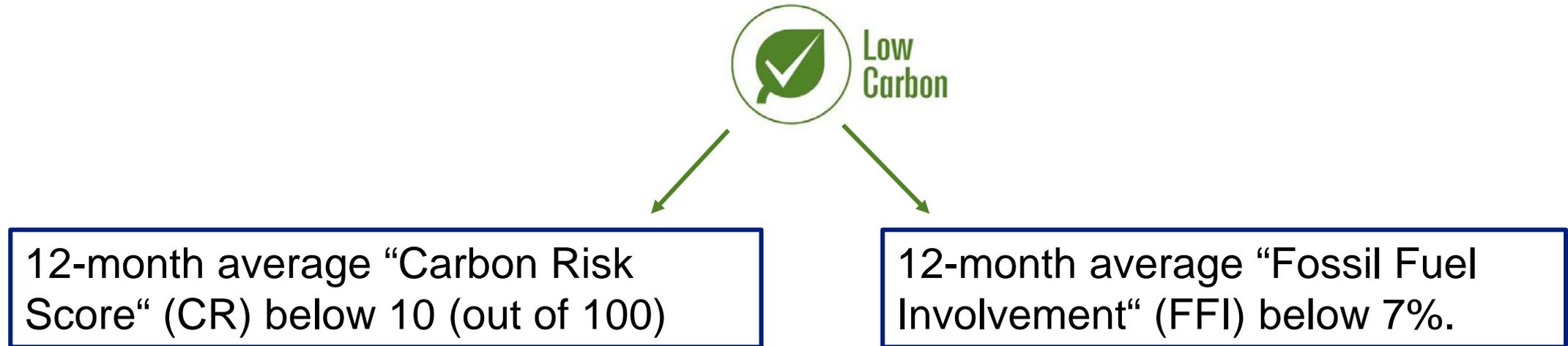
A quasi-experimental setting: Introduction of the Morningstar's Low Carbon Designation (LCD) on April 30, 2018.



- An eco-label meant to easily identify funds aligned with a transition to a low-carbon economy, updated quarterly.
- Not previously announced to either clients or fund managers.
- Based on new firm-level climate-related information from Sustainalytics.
- Applied to mutual funds across different styles and regions.
- For 2018, exclusively based on 2017 firm-level data.

Empirical setting

LCD awarded based on two portfolio-level criteria



Carbon Risk Score (CR): Aims at capturing the unmanaged carbon risk after taking into account firms' policies and risk management activities.

Fossil Fuel Involvement (FFI): Asset-weighted portfolio exposure to firms with significant involvement in fossil-fuel-related activities (e.g., oil & gas products and services).

[More details](#)

[Firm-level carbon risks](#)

Questions and preview of results

Q1. Do investors care about and respond to the «Low Carbon» information?

- **Main result 1:** Low Carbon funds enjoy an increase of ~0.23% of AUM in monthly net flows, compared to otherwise identical mutual funds.

Q2. Do mutual fund managers react to the revealed preferences of investors?

- **Main result 2:** Funds that did not receive the LCD at its initial release actively adjusted their holdings towards more climate-responsible firms.

Q3. What is the risk profile of Low Carbon mutual funds?

- **Main result 3:** LCD funds have higher idiosyncratic volatility than conventional funds, due to their lower sectoral diversification.

Data

- Information on **all European and US active open-end funds** (equity and fixed-income) from Morningstar Direct.
- Main sample period from April 2017 through September 2019.
- Around **20,000 funds** as of April 2018 (~13,000 in Europe, ~7,000 in USA).

| | N | min | p25 | mean | p50 | p75 | max | sd |
|-------------------|--------|--------|-------|-------|-------|-------|--------|-------|
| LCD | 20,077 | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 1.00 | 0.35 |
| Flows | 20,077 | -19.39 | -2.26 | -0.89 | -1.37 | 0.04 | 30.48 | 3.99 |
| Normalized flows | 20,077 | 1.00 | 26.00 | 50.15 | 50.00 | 74.00 | 100.00 | 28.07 |
| Return | 20,077 | -9.79 | 0.03 | 1.59 | 1.18 | 3.03 | 15.91 | 2.23 |
| Log assets | 20,077 | 5.29 | 17.13 | 18.57 | 18.58 | 19.99 | 25.93 | 2.03 |
| Volatility | 20,077 | 0.00 | 1.24 | 2.09 | 2.22 | 2.76 | 16.21 | 1.11 |
| Age | 20,077 | 0.16 | 5.05 | 13.20 | 11.46 | 18.73 | 118.24 | 10.21 |
| $\Delta 1$ Globe | 20,077 | -1.00 | 0.00 | -0.00 | 0.00 | 0.00 | 1.00 | 0.15 |
| $\Delta 5$ Globes | 20,077 | -1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.14 |
| Δ Stars | 20,077 | -1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.33 |

LCD, sustainability Globes, and Stars ratings

Morningstar sustainability ratings 

| LCD  | 1 | 2 | 3 | 4 | 5 |
|---|--------|--------|--------|--------|--------|
| 0 | 1,185 | 2,474 | 3,914 | 2,350 | 1,068 |
| 1 | 201 | 417 | 851 | 687 | 401 |
| Total | 1,386 | 2,891 | 4,765 | 3,037 | 1,469 |
| % of LCD | 14.50% | 14.42% | 17.86% | 22.62% | 27.30% |

Morningstar overall ratings 

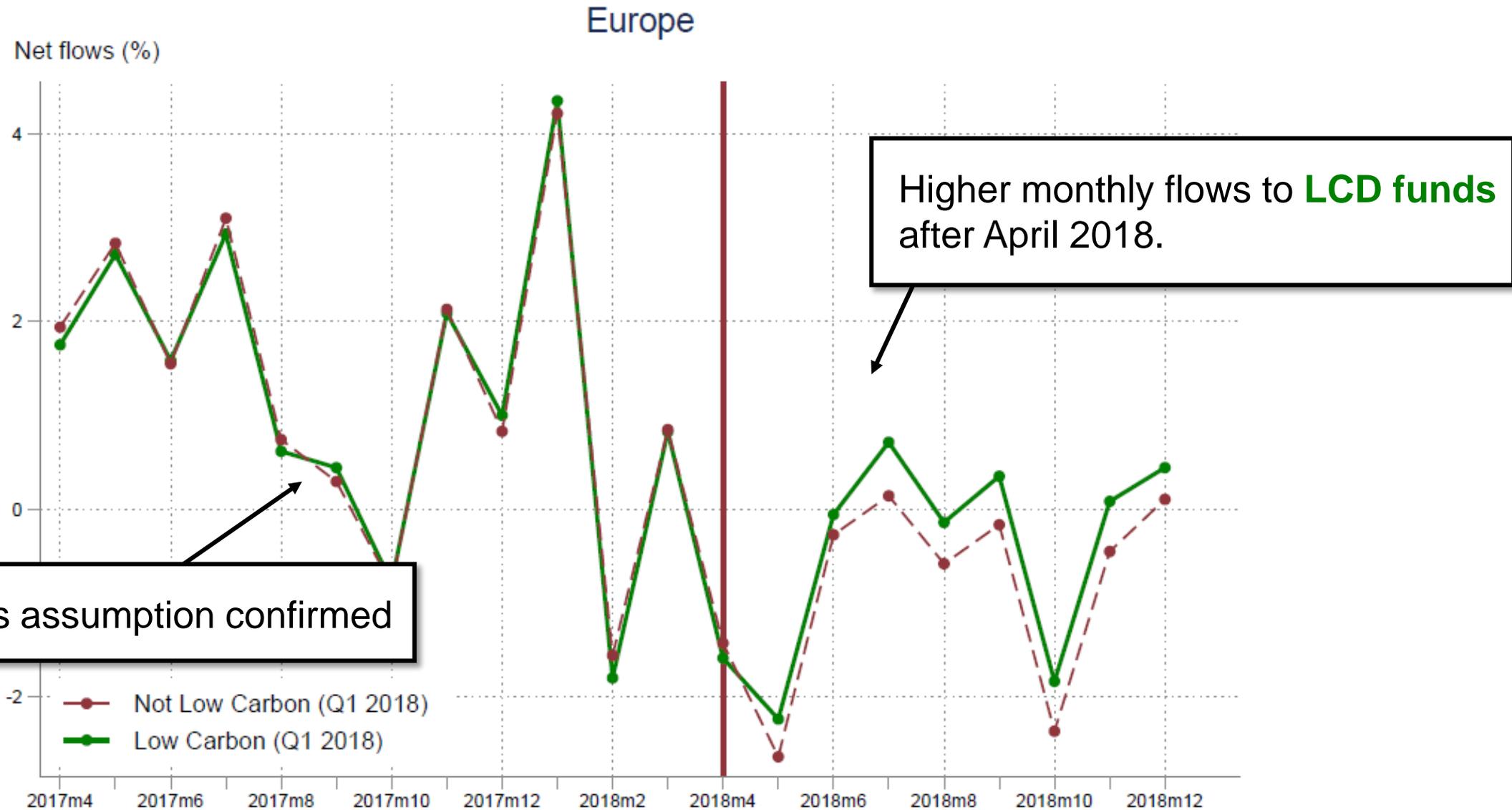
| LCD  | 1 | 2 | 3 | 4 | 5 |
|---|--------|--------|--------|--------|--------|
| 0 | 755 | 2,481 | 4,643 | 3,505 | 1,427 |
| 1 | 96 | 431 | 804 | 729 | 352 |
| Total | 851 | 2,912 | 5,447 | 4,234 | 1,779 |
| % of LCD | 11.28% | 14.80% | 14.76% | 17.22% | 19.80% |

The LCD positively -- but not perfectly! -- correlated with Morningstars’:

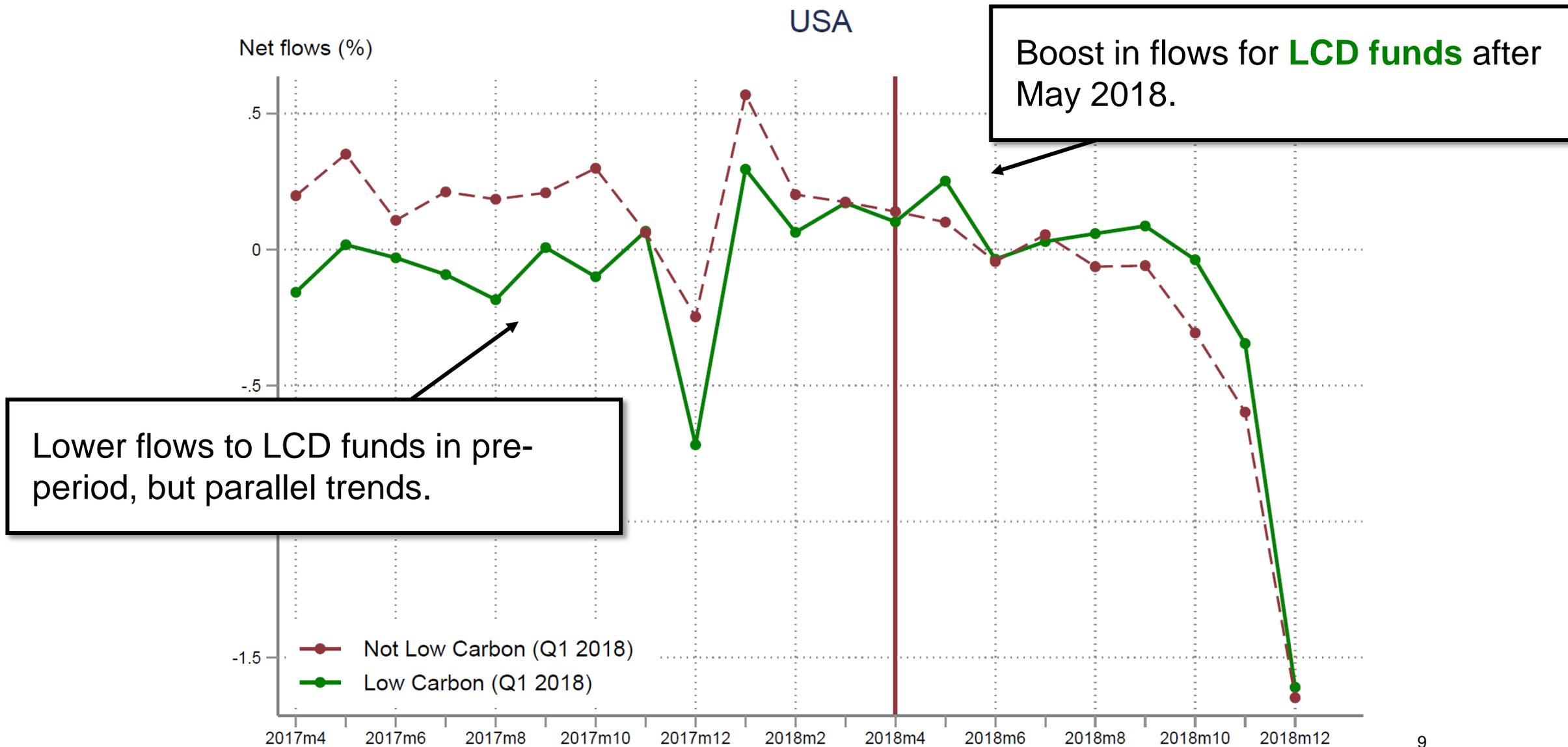
- **Globes ratings** (Hartzmark and Sussman, 2019)
- **Stars ratings** (Del Guercio and Tkac, 2008).

➤ The LCD is likely to provide investors with new climate-specific information.

1. Investors reward low-carbon funds: Graphical evidence



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1. Investors reward low-carbon funds: Main results

| Dep. variable: | Full sample | | Europe | | USA | |
|-------------------|----------------------|----------------------------|----------------------|----------------------------|----------------------|----------------------------|
| | (1) Flows | (2) Normalized flows | (3) Flows | (4) Normalized flows | (5) Flows | (6) Normalized flows |
| LCD # Post | 0.23*** (3.66) | 1.95*** (3.09) | 0.28*** (3.95) | 2.31*** (3.25) | 0.18** (2.33) | 1.50** (2.79) |
| LCD | 0.14*** (4.68) | 1.18*** (4.37) | 0.07* (1.97) | 0.78** (2.60) | 0.25*** (6.10) | 1.87*** (6.53) |
| Return | 0.15*** (3.77) | 1.04** (2.53) | 0.15*** (4.78) | 1.02*** (3.01) | 0.21*** (8.18) | 1.59*** (6.68) |
| Log assets | -0.01 (-1.72) | 0.87** (2.60) | 0.00 (0.67) | 1.03*** (2.99) | -0.02** (-2.51) | 0.81** (2.35) |
| Volatility | 0.02 (0.39) | 0.30 (0.77) | -0.00 (-0.01) | -0.07 (-0.20) | -0.02 (-0.31) | 0.39 (1.07) |
| Age | -0.05*** (-19.04) | -0.43*** (-28.10) | -0.05*** (-15.30) | -0.39*** (-22.96) | -0.05*** (-22.89) | -0.48*** (-24.75) |
| $\Delta 1$ Globe | -0.07 (-0.97) | -0.30 (-0.79) | -0.03 (-0.36) | 0.07 (0.17) | -0.08 (-0.89) | -0.36 (-0.60) |
| $\Delta 5$ Globes | 0.07 (0.85) | 0.18 (0.30) | 0.04 (0.62) | 0.09 (0.17) | 0.05 (0.65) | -0.37 (-0.72) |
| Δ Stars | 0.08*** (2.87) | 0.39 (1.70) | 0.10** (2.44) | 0.48* (1.83) | 0.05* (2.06) | 0.19 (0.83) |
| Constant | 1.00*** (5.94) | 38.70*** (6.35) | 0.90*** (6.52) | 37.39*** (6.13) | 1.03*** (4.96) | 37.66*** (5.68) |
| Observations | 396,398 | 396,398 | 255,579 | 255,579 | 140,767 | 140,767 |
| R-squared | 0.14 | 0.12 | 0.19 | 0.12 | 0.07 | 0.21 |

1. Investors reward low-carbon funds: Main results

| Dep. variable: | Full sample | | Europe | | USA | |
|----------------|--------------------|-------------------------|-------------------|-------------------------|------------------|-------------------------|
| | (1) Flows | (2) Normalized flows | (3) Flows | (4) Normalized flows | (5) Flows | (6) Normalized flows |
| LCD # Post | 0.23*** (3.66) | 1.95*** (3.09) | 0.28*** (3.95) | 2.31*** (3.25) | 0.18** (2.33) | 1.50** (2.79) |
| Log assets | (-3.77) -0.01 | (-2.53) 0.87 | (-4.78) | (-3.01) | (-8.18) | (-6.68) |
| Volatility | (-1.72) 0.02 | (2.6) 0.3 | | | | |
| Age | (0.39) -0.05*** | (0.7) -0.43 | | | | |
| Δ1 Globe | (-19.04) -0.07 | (-28.) -0.3 | | | | |
| Δ5 Globes | (-0.97) 0.07 | (-0.7) 0.1 | | | | |
| ΔStars | (0.85) 0.08*** | (0.3) 0.3 | | | | |
| Constant | (2.87) 1.00*** | (1.7) 38.70 | | | | |
| | (5.94) | (6.3) | | | | |
| Observations | 396,398 | 396,3 | | | | |
| R-squared | 0.14 | 0.1 | | | | |

- Low-carbon funds enjoy +23 basis points in monthly net flows than otherwise similar funds.
- Economic impact: ~+2% AUM from May through Dec 2018.
- Robust to using normalized flows, and to alternative specifications (e.g., fund fixed effects, all controls interacted with Post, etc.).

Why do investors like low-carbon funds? (1/2)

From May 2018 through September 2019, LCD funds outperformed conventional funds:

| | Full sample | | Europe | | USA | |
|---------------------|-----------------------------|---------------------------|-----------------------------|---------------------------|-----------------------------|---------------------------|
| | (1) CAPM-adj. returns | (2) FF-adj. returns | (3) CAPM-adj. returns | (4) FF-adj. returns | (5) CAPM-adj. returns | (6) FF-adj. returns |
| LCD | 0.36** (2.50) | 0.20** (2.78) | 0.35** (2.45) | 0.21** (2.84) | 0.39** (2.37) | 0.20* (2.08) |
| Observations | 292,381 | 292,381 | 186,144 | 186,144 | 106,192 | 106,192 |
| Adjusted R-squared | 0.47 | 0.44 | 0.63 | 0.60 | 0.48 | 0.46 |
| Constant & controls | Yes | Yes | Yes | Yes | Yes | Yes |

But the LCD is unlikely to capture omitted variables correlated with future performance.

"Perfect Foresight" test →

Why do investors like low-carbon funds? (2/2)

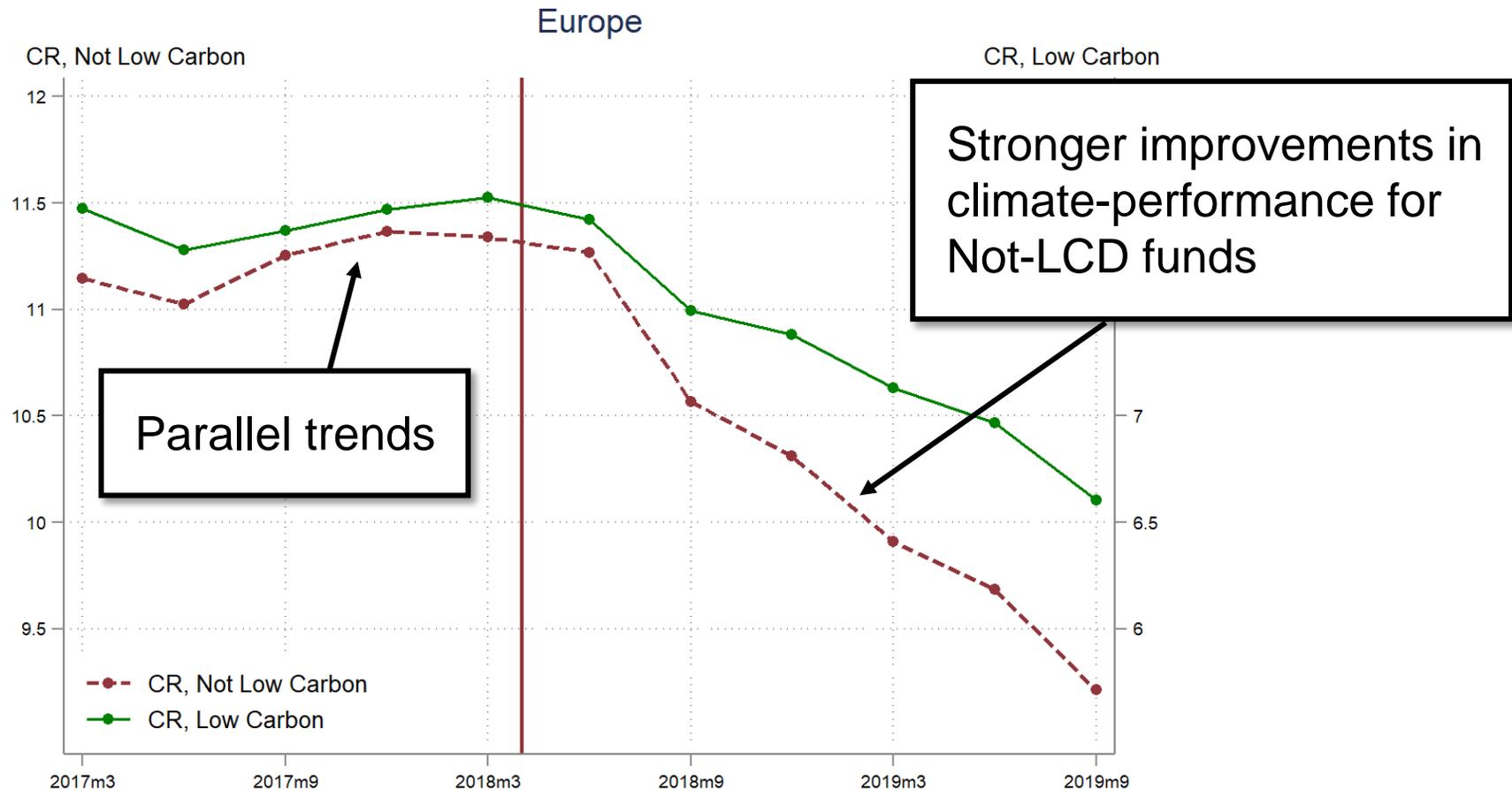
Cross-sectional analyses indicate that the label has a stronger boost on flows for **retail funds** (vs. institutional funds), **poor financial performers** (vs. good financial performers), and **low sustainability funds** (vs. high sustainability funds).

| Dep. variable: | (1) Flows | (2) Flows | (3) Flows | (4) Flows | (5) Flows | (6) Flows |
|----------------|-------------------|-------------------|-------------------|----------------|-------------------|-------------------|
| | Retail | Institutional | Poor | Good | Low sust. | High sust. |
| LCD # Post | 0.25*** (3.11) | 0.18** (2.32) | 0.33*** (3.77) | 0.16 (0.91) | 0.45*** (3.64) | 0.04 (0.45) |
| LCD | 0.08** (2.65) | 0.32*** (6.84) | 0.16** (2.60) | 0.11 (1.67) | 0.17** (2.70) | 0.27*** (5.06) |
| Observations | 299,981 | 96,361 | 81,112 | 80,738 | 80,218 | 85,347 |
| R-squared | 0.17 | 0.10 | 0.14 | 0.19 | 0.15 | 0.15 |

Consistent with the effect being driven, at least in part, by **non-pecuniary preferences for climate-conscious products** (e.g., Renneboog et al., 2011, Riedl and Smeets, 2017).

2. Funds move towards low-carbon firms: Graphical evidence

- How do mutual funds respond to shifts in demand for climate responsibility?
- Since we are interested in the **active reaction of mutual funds**, we exclude both explicit and closet indexers (Active Share < 60%, Cremers et al., 2016).



2. Funds move towards low-carbon firms: Main results

Panel A: Carbon Risk

| Dep. variable: | Full sample | | Europe | | US | |
|----------------|----------------------|---------------------|-----------|---------------|-----------|---------------|
| | (1) CR | (2) Abn CR | (3) CR | (4) Abn CR | (5) CR | (6) Abn CR |
| NotLCD # Post | -0.48*** (-13.83) | -0.31*** (-8.49) | | | | |
| Observations | 86,063 | 86,063 | | | | |
| R-squared | 0.71 | 0.19 | | | | |

Panel B: Fossil Fuel Involvement

| Dep. variable: | Full sample | | (3) CR | (4) Abn CR | (5) CR | (6) Abn CR |
|----------------|---------------------|----------------------|-----------|---------------|-----------|---------------|
| | (1) FFI | (2) Abn FFI | | | | |
| NotLCD # Post | -0.29*** (-4.15) | -0.90*** (-12.46) | | | | |
| Observations | 86,063 | 86,063 | 57,846 | 57,846 | 28,206 | 28,206 |
| R-squared | 0.66 | 0.37 | 0.59 | 0.39 | 0.78 | 0.39 |

- Active Not-LCD funds reduced their CR by 0.48% (11% of a sd) and their FFI by 0.29% (4% of a sd) more than LCD funds.
- Robust to controlling for changes in firm valuations, by benchmarking CR and FFI on passive funds (*Abn CR* and *Abn FFI*).
- Improvements in climate performance seemingly due to **active trading decisions**.

2. Funds move towards low-carbon firms: Main results

Panel A: Carbon Risk

| | Full sample | | Europe | | US | |
|----------------|----------------------|---------------------|----------------------|---------------------|---------------------|---------------------|
| | (1) CR | (2) Abn CR | (3) CR | (4) Abn CR | (5) CR | (6) Abn CR |
| Dep. variable: | | | | | | |
| NotLCD # Post | -0.48*** (-13.83) | -0.31*** (-8.49) | -0.46*** (-11.32) | -0.29*** (-7.01) | -0.50*** (-7.44) | -0.31*** (-4.26) |
| Observations | 86,063 | 86,063 | 57,846 | 57,846 | 28,206 | 28,206 |
| R-squared | 0.71 | 0.19 | 0.69 | 0.24 | 0.79 | 0.23 |

Panel B: Fossil Fuel Involvement

| | Full sample | | Europe | | US | |
|----------------|---------------------|----------------------|---------------------|----------------------|--------------------|---------------------|
| | (1) FFI | (2) Abn FFI | (3) FFI | (4) Abn FFI | (5) FFI | (6) Abn FFI |
| Dep. variable: | | | | | | |
| NotLCD # Post | -0.29*** (-4.15) | -0.90*** (-12.46) | -0.26*** (-3.16) | -0.98*** (-11.61) | -0.33** (-2.47) | -0.60*** (-4.41) |
| Observations | 86,063 | 86,063 | 57,846 | 57,846 | 28,206 | 28,206 |
| R-squared | 0.66 | 0.37 | 0.59 | 0.39 | 0.78 | 0.39 |

Competing for flows through climate responsibility

Heinkel et al. (2001): firms are more likely to move towards cleaner technologies when the cost of doing so is low and the cash flow of the clean technology is high.

In our setting, the responses of mutual funds are likely to depend on:

- How easy is to actively climate-consciously rebalance portfolios (**Ability**).
- How strong are their incentives and pressure to attract flows (**Incentives**).

In line with these expectations, the moving-towards-low-carbon effect is strongest for:

- Mutual funds with **high past net flows** (High Ability funds).
- **Young funds** (High Incentive funds).

➤ Evidence consistent with active mutual funds improving their climate performance as a way to compete for the flows from climate-conscious investors.

Effects of LCD upgrades and downgrades

After the initial release, Morningstar updated the LCD on a quarterly basis:

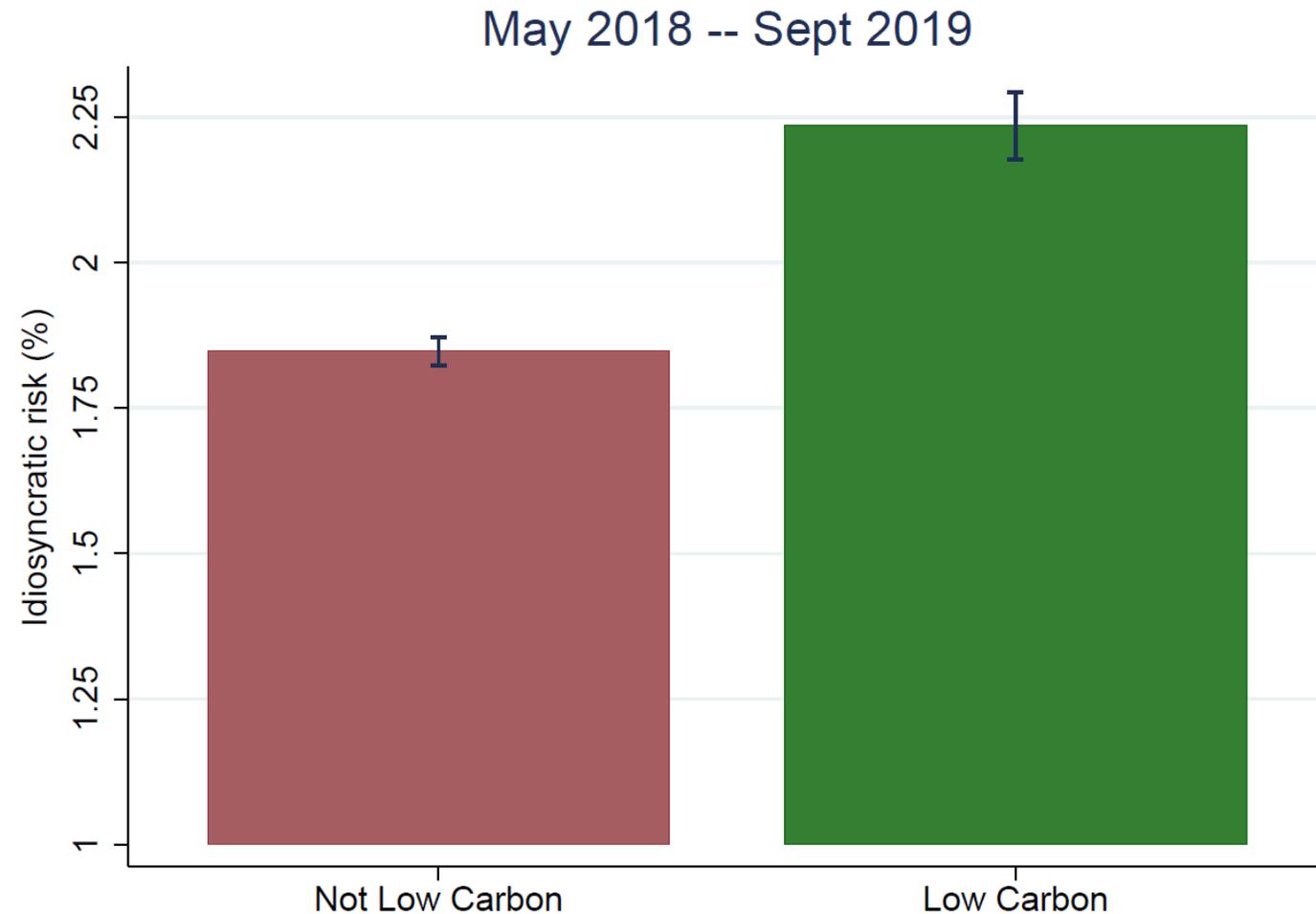
| LCD updates | Aug 2018 (Q2-2018) | Nov 2018 (Q3-2018) | Feb 2019 (Q4-2018) | May 2019 (Q1-2019) | Aug 2019 (Q2-2019) |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Downgrades | 274 (1.15%) | 192 (0.98%) | 166 (0.85%) | 274 (1.36%) | 158 (0.66%) |
| Confirmations | 19,656 (98.01%) | 17,303 (97.83%) | 19,218 (97.69%) | 19,656 (97.27%) | 19,872 (97.57%) |
| Upgrades | 168 (0.84%) | 235 (1.19%) | 288 (1.46%) | 276 (1.36%) | 337 (1.65%) |

How do investors respond to LCD upgrades and downgrades?

| Dep. variable: | Full sample | | (3) Flows |
|----------------|---------------------|----------------------------|------------------|
| | (1) Flows | (2) Normalized flows | |
| LCD Downgrade | -0.15*** (-4.66) | -0.53 (-1.74) | -0.15 (-4.66) |
| LCD Upgrade | 0.23*** (5.02) | 1.56*** (6.01) | 0.23 (4.66) |

- Investors' rewards for low-carbon funds not merely a reaction to the initial LCD publication.
- Also managers of “conventional” funds can access a new source of higher flows if they rebalance their portfolios in a climate-responsible direction.

3. Risk-sharing: A downside of chasing eco-labels?



- **Idiosyncratic risk:** standard deviation of residuals in a Fama-French model.
- Low Carbon funds exhibits higher idiosyncratic risks than conventional funds -- both before and after April 2018 -- reflecting a lower (sectorial) diversification.
- In line with the basic argument of Donaldson and Piacentino (JET, 2018) → Competing for flows by contracting on public information may prevent risk sharing.

Concluding remarks

Main contribution:

- 1. Investors reward mutual funds identified as climate responsible.
- 2. Financial intermediaries respond to the revealed climate preferences of their clients, competing for flows *also through* climate performance. Related literatures:
 - Competitive behavior of mutual funds (e.g., Wahal and Wang, 2011).
 - Effects of market competition on CSR practices (e.g., Flammer, 2015).
- 3. But be mindful of possible unintended effects in terms of diversification.

Practical implications:

- **For fund managers:** Climate responsibility is a key competitive edge in the mutual fund industry, especially in light of the return and fee pressures from passive funds.
- **For policy-makers:** Insights on the effects of eco-labeling schemes to re-orient capital flows.



Thank you!

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Appendix: Carbon Risk and Fossil Fuel Involvement

Carbon Risk Score (CR)

The carbon risk score is based on assessments across two dimensions: exposure and management. Exposure is a measure of the degree to which carbon risks are material for the firm. Management is a measure of the ability of the firm to reduce emissions and related carbon risks. The Carbon Risk score is the remaining unmanaged carbon risk after taking into account a firm's carbon risk management.

Fossil Fuel Involvement (FFI)

The fossil fuel involvement highlights the degree to which a portfolio is exposed to companies with involvement, based on a percentage of revenue, in the following activities: thermal coal extraction or generation (5% revenue threshold), oil & gas production or power generation (5% revenue threshold), oil & gas products and services (50% revenue threshold).

Source: Morningstar (2018)

Appendix: Firm-level Carbon Risk by GICS sectors

USA

| | N | min | p25 | mean | p50 | p75 | max | sd |
|------------------------|-------|------|-------|-------|-------|-------|-------|-------|
| Energy | 106 | 0.00 | 12.27 | 33.61 | 24.07 | 58.15 | 75.28 | 24.24 |
| Materials | 104 | 0.00 | 9.93 | 16.40 | 15.35 | 21.64 | 63.51 | 11.59 |
| Industrials | 149 | 0.00 | 8.27 | 14.84 | 14.21 | 21.16 | 46.22 | 9.56 |
| Consumer discretionary | 131 | 0.00 | 0.00 | 11.58 | 10.10 | 17.63 | 67.65 | 11.22 |
| Consumer staples | 60 | 0.00 | 4.74 | 12.03 | 10.64 | 17.50 | 58.06 | 10.08 |
| Health care | 95 | 0.00 | 0.00 | 8.97 | 7.28 | 14.37 | 81.09 | 11.08 |
| Financials | 161 | 0.00 | 7.24 | 13.03 | 12.98 | 16.25 | 76.20 | 10.19 |
| IT | 125 | 0.00 | 0.00 | 9.95 | 7.81 | 14.41 | 67.32 | 12.06 |
| Communication | 58 | 0.00 | 0.00 | 8.95 | 7.62 | 14.78 | 35.07 | 8.69 |
| Utilities | 52 | 0.00 | 9.67 | 16.27 | 16.48 | 23.14 | 37.79 | 10.26 |
| Real Estate | 104 | 0.00 | 8.73 | 13.92 | 13.80 | 18.72 | 54.08 | 8.76 |
| Total | 1,145 | 0.00 | 5.78 | 14.61 | 12.55 | 19.50 | 81.09 | 13.98 |