Explaining green returns

Overview of recent academic contributions

Guillaume Coqueret (EMLYON Business School)

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Introduction

Plan for today

First, **greenness** should be associated with **negative** returns (theoretically, non-financial criteria can only push optimal portfolios away from profitability).*
But recently, they have outperformed traditional benchmarks.
Why?

1. **Flow**-based explanation
2. **Attention** to climate concerns
3. **Alignment** between factor definitions

In the slides, pink text points to SSRN working papers.

*Unless greenness ***drives*** profitability.

Green returns $should$ be negative

Sustainable investing in equilibrium (Pástor, Stambaugh & Taylor JFE 2020). Their reasoning is somewhat circular, but insightful (simplified version here). Imagine each firm has a sustainability score g_n and expected return m_n (stacked into vectors)*:

$$\max_w \left\{ w'm - \frac{1}{\gamma} w'\Sigma w + w'g \right\} \Leftrightarrow w = \gamma^{-1}\Sigma^{-1}(m+g)$$

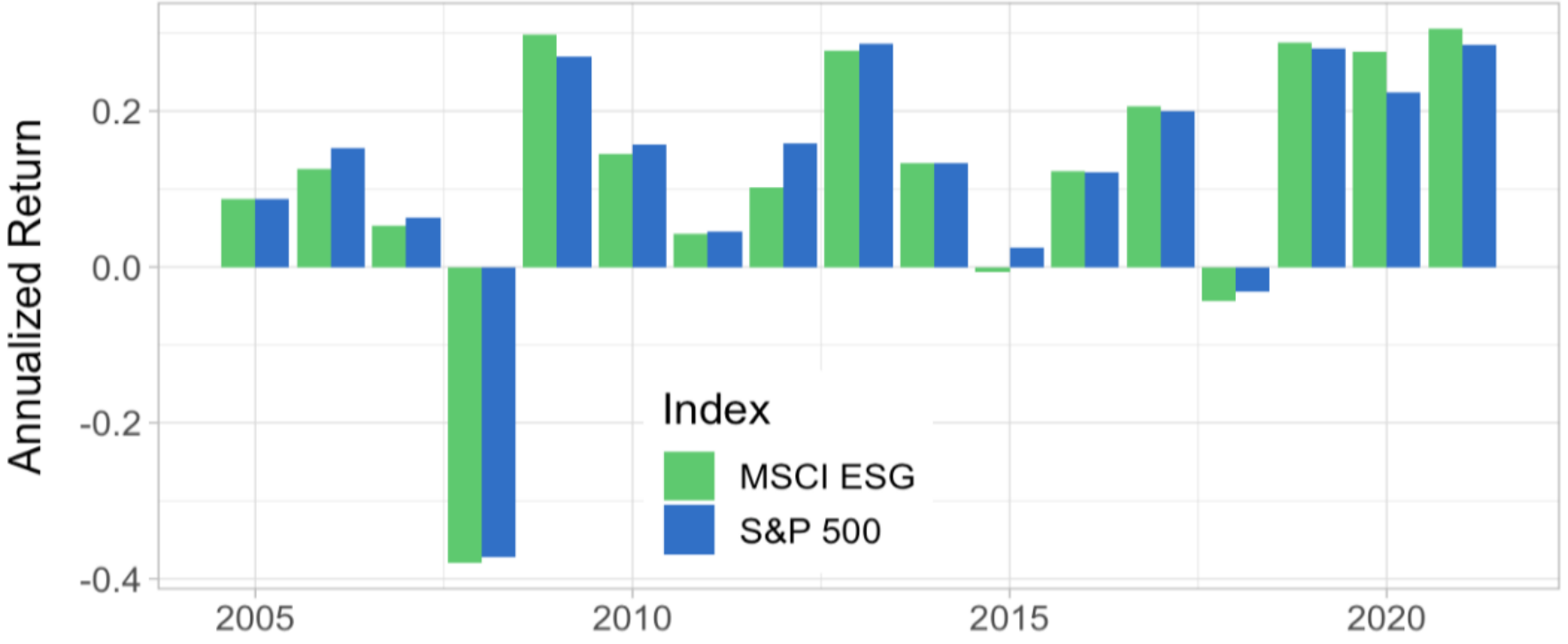
Now, the representative agent faces a supply x (orthogonal to g), so that, in equilibrium, $w = x$ and

$$m = \gamma\Sigma x - g,$$

i.e., in equilibrium, a stocks' expected return is a decreasing function of g_n.

Yet,...

In the last 2-3 years, green assets (& funds) have **fared remarkably well**.



... which **contradicts theory** (and common sense, to a certain extent).

See Avramov et al: ESG disagreement blurs the analysis!

Why? Flows!

Inelastic markets

Recently, the paper (it's almost a book) by Gabaix & Koijen has received **A LOT** of attention.

- Therein, the authors show that flows in and out of the stock market have **large impacts on prices**.*
- Traditionally, it was assumed that flows were somehow too small to move markets: prices *should* be determined by discounted cash-flows.

*One key assumption is that financial institution & money managers are *constrained*.

Institutional demand

van der Beck (2021) - inspired from Kojen & Yogo 2020

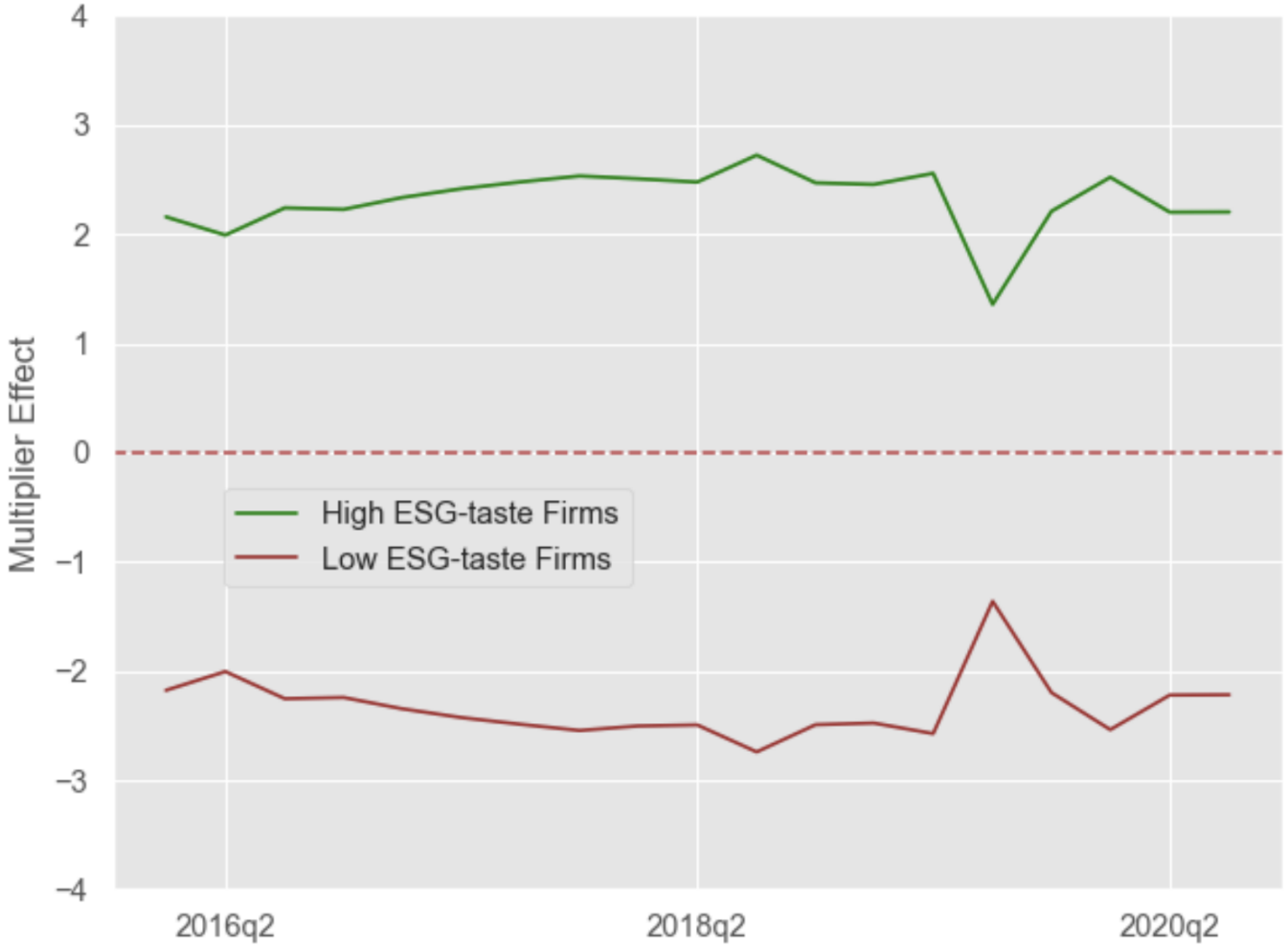
1) The author builds a representative **ESG fund portfolio** from green fund holdings. **No need for ESG ratings!!!** $\longrightarrow$ bypasses the disagreement issue.

2) Taste for ESG (across assets) is revealed via comparison with the market portfolio. In addition, this yields flows towards sustainable funds (from the market).

3) The author links price changes to flows via partial equilibrium: $\mathbf{\Delta p} = \mathcal{M}\mathbf{f}$, where $\mathcal{M}$ is a **multiplier** matrix. The diagonal elements of the matrix show how how aggregate flows to the ESG portfolio impact firms' returns.

4) Finally, the authors evaluates the aggregate multiplier, i.e., the aggregate change in market cap due to a $1 ESG flow.

Aggregate multiplier



Bottom line: **flows toward ESG funds** drive green & brown returns.

BONUS: the impact of impact investors

Contrarian argument from Berk & van Binsbergen (2021)

Change in **cost of capital** (in equilibrium):

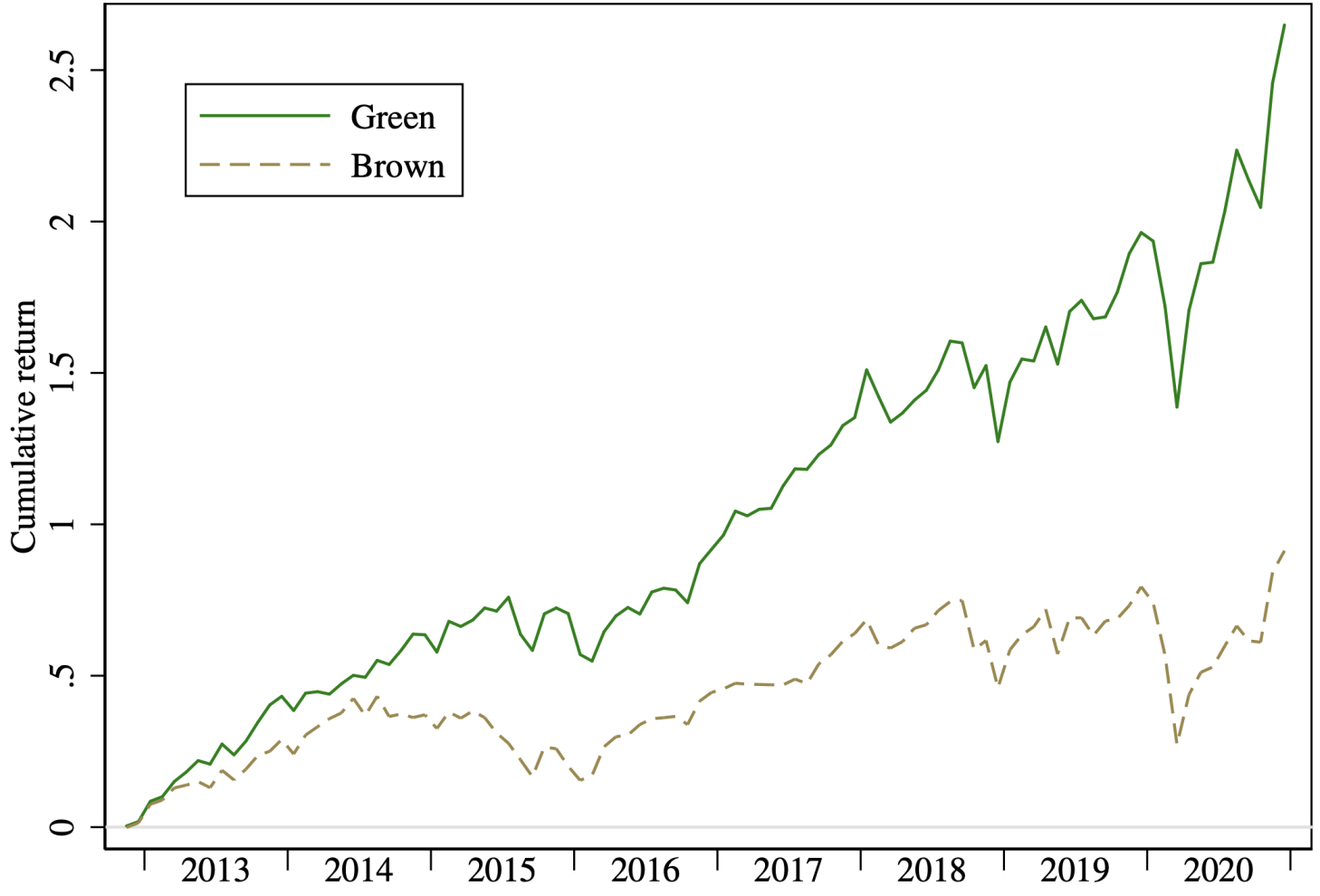
$$\Delta \text{CC} = MRP \times \frac{\text{SRI Wealth}}{\text{Total wealth}} \times f \times (1 - \rho^2),$$

with *MRP* market risk premium (6%), % of SRI (2%), *f* fraction of green firms in the economy (48.5%), ρ the correlation between green firms and the market (0.97).
$\rightarrow$ Leads to ΔCC=0.35bps. **Small**!

Attention to climate change

Dissecting green returns

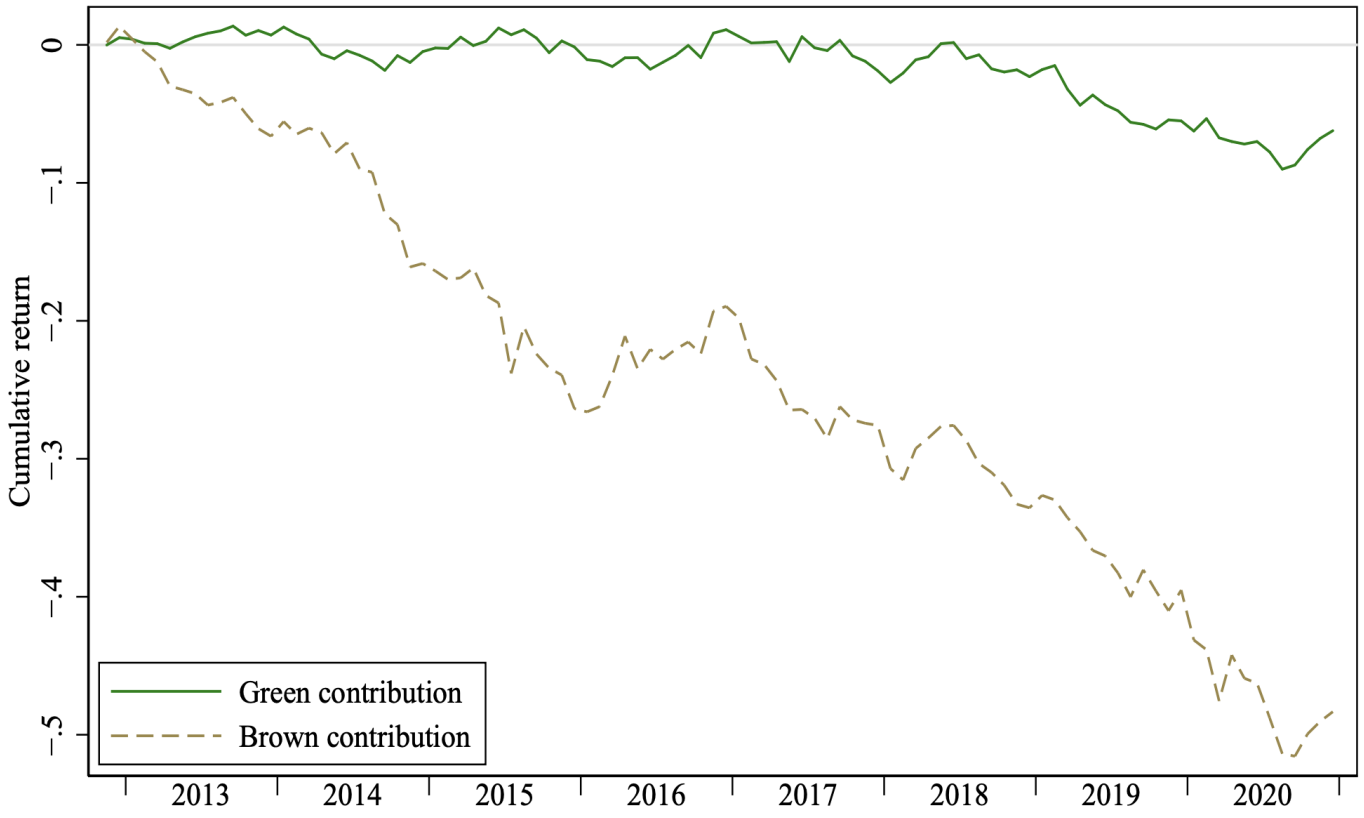
From Pastor, Stambaugh & Taylor 2021: **portfolio sorts**.



Asymmetric contribution

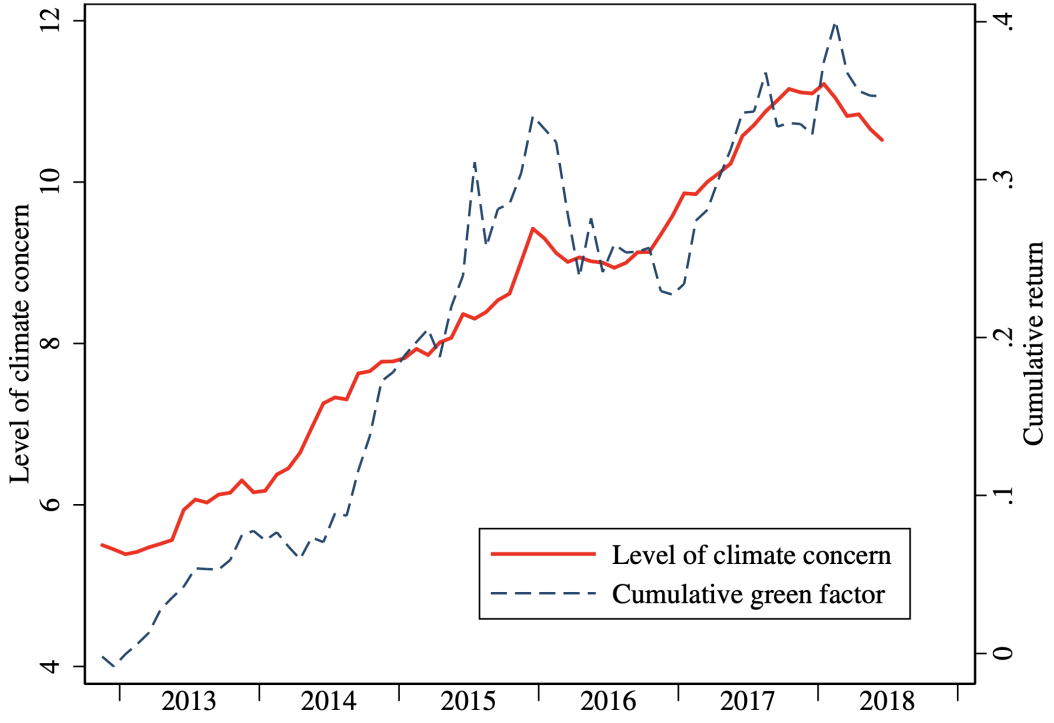
Market neutral factors: $f_t = g'_{t-1}\tilde{r}_t/(g'_{t-1}g_{t-1})$, where $\tilde{r}_t$ is the vector of market neutral returns. The factor is split in two (+*g* scores vs -*g* scores).

Panel B. Green and brown contributions to the green factor



Link with climate concerns

Climate concerns are EWMA from Ardia et. al (2021): Media Climate Change Concerns index



ΔC_t explains time $t+1$ returns for the green factor (after controlling for earnings and flows)!

Related studies

1. **Climate change exposure**:
   Sautner, van Lent, Vilkov & Zhang (2021)
   earnings conference calls & NLP $\rightarrow$ captures exposures related to opportunity, physical, and regulatory shocks
2. **ESG shocks affect growth forecasts**:
   Derrien, Krüger, Landier & Yao (2021)
   ESG incidents $\rightarrow$ earnings forecasts $\rightarrow$ firm value
3. **ESG news spillovers to (and from) the supply chain**:
   Coqueret & Vu (2022): ESG incidents are propagated intra-daily into prices. Clients or suppliers may be impacted by ESG shocks, thought the effect is milder and takes more time.

Factor alignment

Chasing the ESG factor

From Lioui & Tarelli 2021: there are two ways (at least) to build **asset pricing factors** (see Fama & French 2020).
The **time-series** (TS) approach builds **ESG**-sorted long-short portfolios:

- The long leg has the top q quantile of ESG stocks, while the short leg, the bottom q quantile (often, $q=0.3$).
- The portfolio weights may be proportional to market capitalization (VW), or uniform (EW).

The traditional **Fama-French factors** are built this way.

Cross-sectional factors

In this case, time-*t* (excess) returns (of all *N* stocks) are regressed against mean-zero (& possibly scaled) **ESG scores**:

$$\mathbf{r}_t = \lambda_{t,0}\mathbf{1}_N + \lambda_{t,1}\mathbf{ESG}_{t-1} + \mathbf{e}_t$$

and estimated OLS coefficient can be viewed as returns, with:

$\mathbf{X}_{t-1} = [\mathbf{1}_N \ \ \mathbf{ESG}_{t-1}]$

$$\begin{bmatrix} \hat{\lambda}_{t,0} \\ \hat{\lambda}_{t,1} \end{bmatrix} = (\mathbf{X}'_{t-1}\mathbf{X}_{t-1})^{-1}(\mathbf{X}_{t-1})'\mathbf{r}_t$$

$\hat{\lambda}_{t,1}$ is thus considered as the green **CS factor return**.

They are more flexible because they do not have a **scale**.

Findings

- the raw factors have roughly the same alpha **IF THEY HAVE THE SAME (weighted) ESG** score - and if other characteristics are ignored. $\rightarrow$ the greenness of the portfolio is paramount.
- exposure to other characteristics is easier to handle with CS factors $\rightarrow$ pure ESG factor!
- ESG factors relate negatively to past levels of **ESG sentiment** (media attention: Factiva / Dow Jones coverage on sustainability)
- The pure ESG factor is positively linked to unexpected variations of **ESG sentiment**

Conclusion

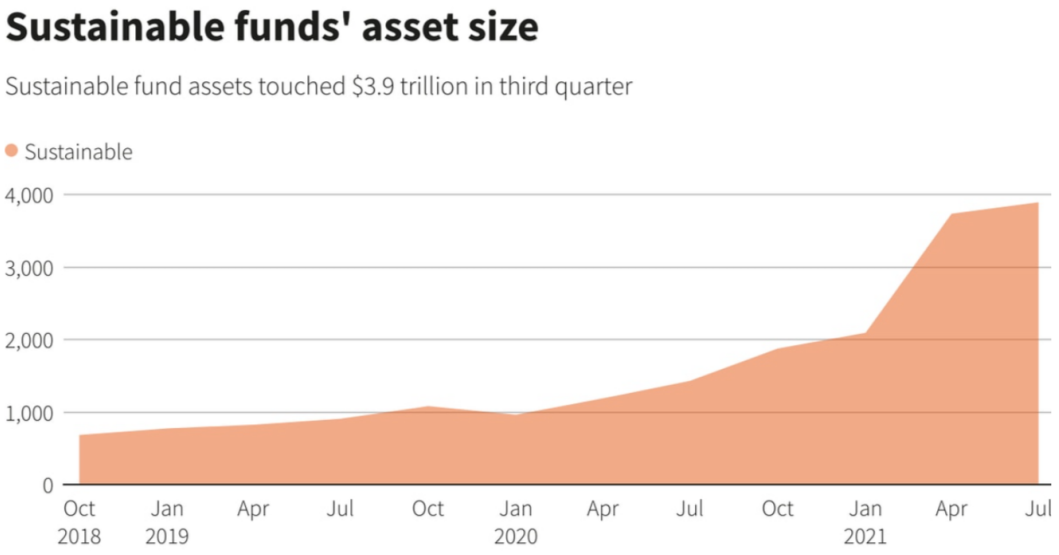
Is it all hype?

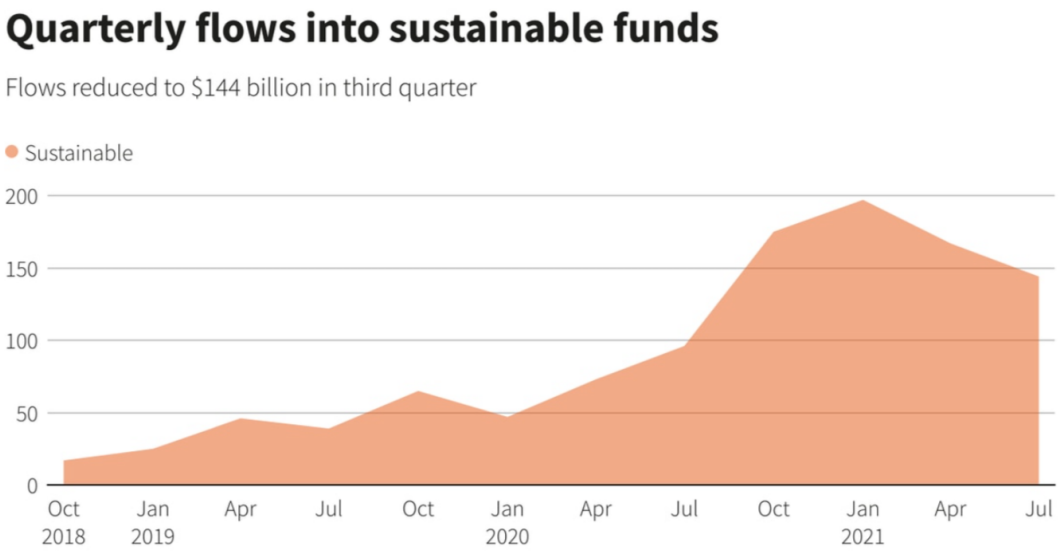
- Variables that capture attention towards sustainability seem to somewhat drive green returns.
- This needs further empirical confirmation, though (publication bias? The story seems appealing).
- Nevertheless, this is consistent with **flows**: the hype, whether genuine or greenwashed, pushes AUM up for green funds. This generates price pressure for green / brown stocks.

The big question

How long will it last? Could be a matter of flows...

(Morningstar data below)





I would look at the second derivative (dynamics of net flows).

Thank you!

Going further: Perspectives in sustainable equity investing

Time for **Q&A**!

Bibliography

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- Sautner, van Lent, Vilkov & Zhang 2021: *Firm-level Climate Change Exposure*
- van der Beck 2021: *Flow-Driven ESG Returns*