

Green Sentiment, Stock returns, and Corporate Behavior

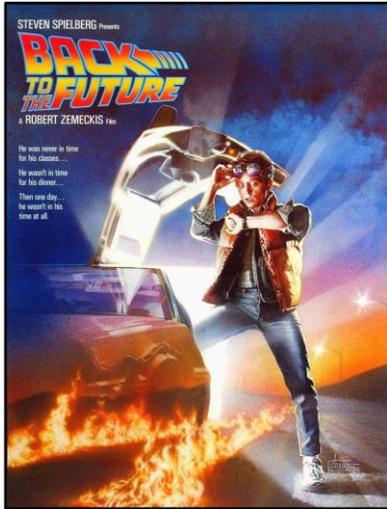
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Two fundamental drivers of green demand in finance

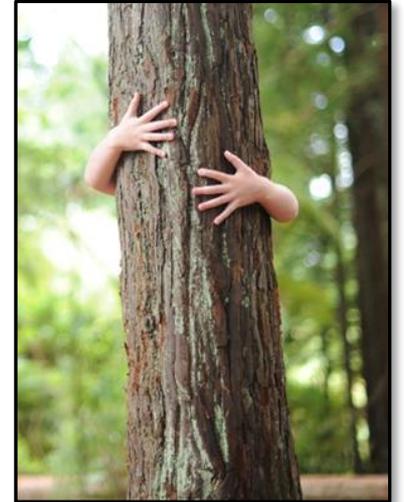
Driver 1: Finance as a “time machine”:
Anticipation of future cash flows and
uncertainties (firm fundamentals).

Driver 2: Investors’ non-fundamental green
taste (environmental preferences or
speculation). Green sentiment.



Why caring about this difference?

- Both channels affect asset prices, but have different effects on expected future returns.
- Investors/supervisors need to know what current prices reflect.
- Important to understand the role of finance in the energy transition.



Presentation overview

Two studies on how these two forces – green fundamental demand and green sentiment -- influence investor behavior:

Study 1:

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Study 2:

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The 2022 fossil fuel rush and the energy
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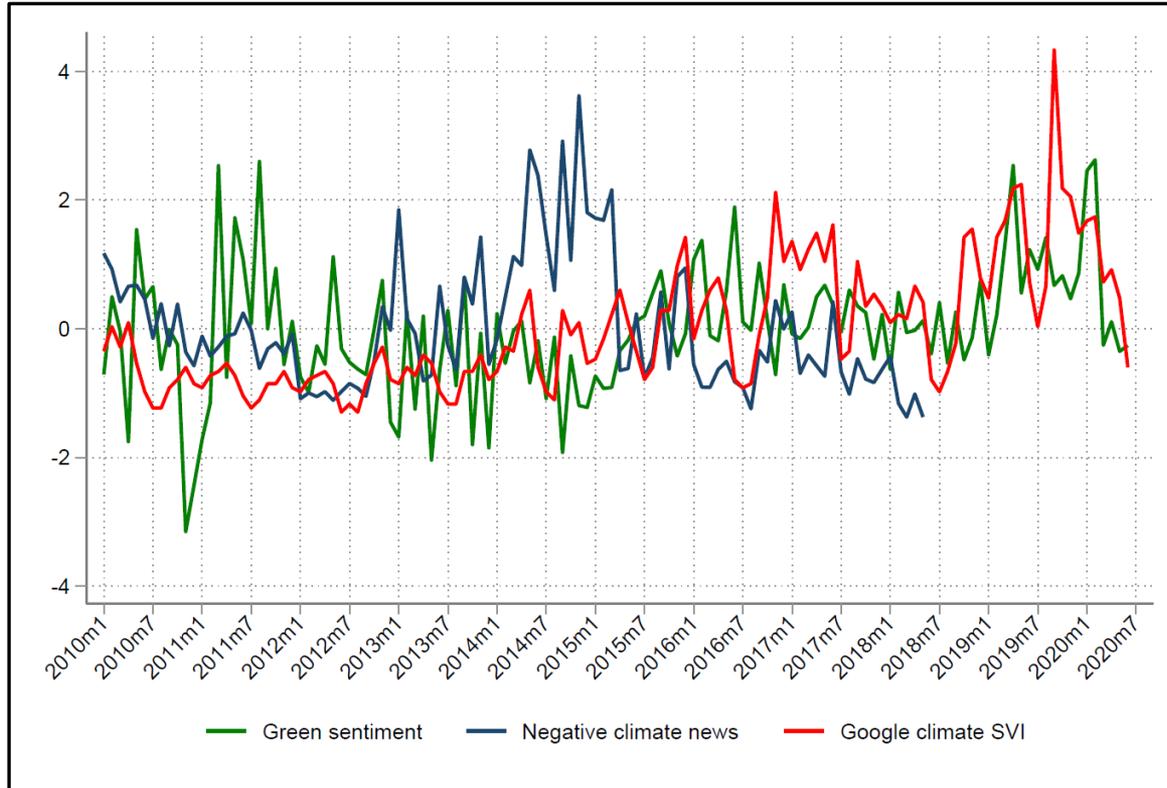
Based on 2022 data on European funds.

How to measure non-fundamental green demand, a.k.a., green sentiment?

- We propose a new method to estimate shocks in non-fundamental green demand based on abnormal inflows into “green” Exchange Traded Funds (ETFs).
- Why ETFs? A unique setting to study non-fundamental demand (*).
- Green ETFs: ETFs with explicit environment-friendly names, e.g., iShare Global Clean Energy or iShare MSCI Low Carbon Target.
- Green ETFs used primarily by retail investors.

(*) see Ben-David et al., JF 2017; Brown et al., RoF 2021; Davies, JQFA 2020

The Green Sentiment Index



- ✓ Positively related to public attention to climate change (Googles searches) (0.29).
- ✓ Negative related to negative climate “fundamental” news (Engle et al, RFS 2020) (-0.28).

Green Sentiment boosts stock returns for greener firms:

Dependent variable:	Return in t	Cumulative return through:					
		t+1	t+2	t+3	t+4	t+5	t+6
Green sentiment × Env score	0.069** (2.37)	0.273*** (5.31)	0.300*** (4.37)	0.448*** (5.66)	0.485*** (5.22)	0.371*** (3.38)	0.517*** (4.10)
Env score	0.042 (1.25)	0.041 (0.60)	0.103 (1.01)	0.199 (1.49)	0.165 (1.00)	0.181 (0.92)	0.192 (0.84)
Green sentiment	-1.169*** (-36.11)	-2.268*** (-42.33)	-2.416*** (-36.16)	-2.407*** (-30.82)	-2.661*** (-28.94)	-2.336*** (-22.20)	-2.057*** (-17.77)
Leverage	0.003 (1.48)	0.004 (1.18)	0.004 (0.78)	-0.001 (-0.09)	-0.000 (-0.00)	0.001 (0.06)	0.001 (0.10)
Market beta	0.245*** (3.48)	0.177 (1.36)	0.159 (0.86)	-0.208 (-0.90)	-0.342 (-1.19)	-0.544 (-1.58)	-0.725* (-1.79)
Log(marketcap)	0.002 (0.06)	0.008 (0.14)	-0.053 (-0.62)	-0.162 (-1.45)	-0.152 (-1.10)	-0.193 (-1.17)	-0.222 (-1.16)
Book-to-market	-0.134 (-1.00)	-0.405 (-1.54)	-0.567 (-1.52)	-0.685 (-1.49)	-1.003* (-1.84)	-1.015 (-1.58)	-0.971 (-1.31)
Profitability	-0.003 (-0.59)	-0.017 (-1.52)	-0.030* (-1.80)	-0.048** (-2.28)	-0.070*** (-2.73)	-0.090*** (-2.90)	-0.112*** (-3.07)
Momentum	-0.141*** (-9.05)	-0.249*** (-8.41)	-0.290*** (-6.61)	-0.143** (-2.57)	-0.144** (-2.09)	-0.090 (-1.10)	-0.027 (-0.29)
Constant	0.859*** (2.74)	2.086*** (3.42)	3.731*** (4.21)	5.886*** (5.14)	7.093*** (5.05)	8.679*** (5.16)	10.158*** (5.20)
Observations	95,248	93,972	92,704	91,444	90,199	88,969	87,756
R-squared	0.018	0.037	0.032	0.030	0.032	0.027	0.025

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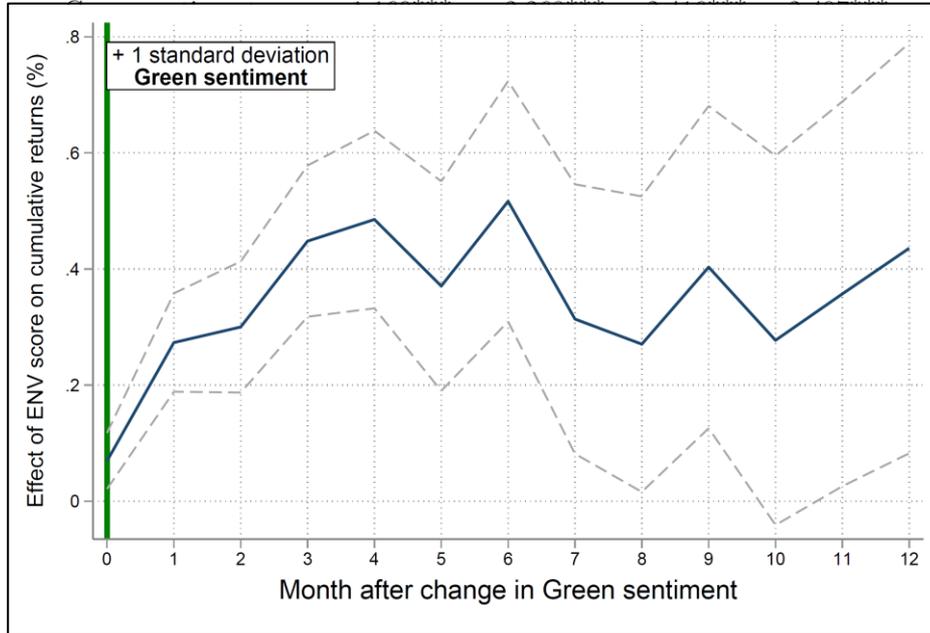
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Observations	95,248	93,972	92,704	91,444	90,199	88,969	87,756
R-squared	0.018	0.037	0.032	0.030	0.032	0.027	0.025

Economic effect:

↑ 1-SD Green sentiment in $t \rightarrow$ 27 bp higher return in $t+1$, and 52 bp in $t+6$ for ↑ 1-SD higher Env score.

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	(1.25)	(0.60)	(1.01)	(1.49)	(1.00)	(0.92)	(0.84)



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1.068	-1.015	-0.371
-1.84	(-1.58)	(-1.31)
0.070***	-0.090***	-0.112***
(-2.73)	(-2.90)	(-3.07)
0.144**	-0.090	-0.027
(-2.09)	(-1.10)	(-0.29)
0.093***	8.679***	10.158***
(5.05)	(5.16)	(5.20)
90,199	88,969	87,756
0.032	0.027	0.025

Real effects of Green Sentiment



- Higher green sentiment allows more environmental responsible firms to increase capital investments and cash holdings.
- But the real impact of green sentiment is significantly influenced by a firm's equity dependence.
- Firms facing no financial constraints are not particularly affected. They can raise external capital regardless of green demand.

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Green financial demand in the current energy crisis

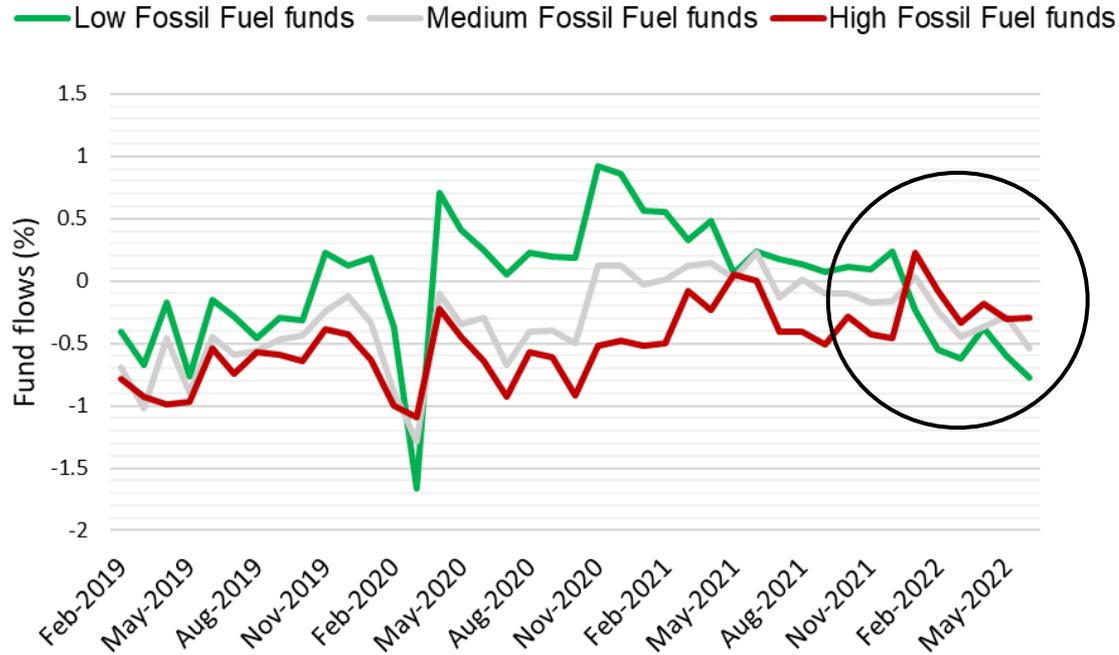
- Strong demand for “green” financial assets over the 2010-2020 period. But the soaring energy prices after Russia’s invasion of Ukraine have changed the investment landscape (e.g., Deng, Leippold, Wagner, and Wang, 2022).

How are European financial flows responding? Is there a reversal in green sentiment?
Are investors anticipating a slow-down of the energy transition?

Ongoing research with Marie Brière and Karin Huynh:

- ✓ Flows into European-domiciled mutual funds, from Feb 2019 to June 2022.
- ✓ Fossil Fuel Involvement: % of portfolio invested in firms with significant revenues from fossil fuel activities (source Morningstar).

Ukraine war triggered a “fossil fuel rush” in European fund flows



Europe’s High-FF funds are currently attracting more investments than low-FF “green” funds.

Ukraine war triggered a “fossil fuel rush” in European fund flows

Dependent variable:	Monthly flows				
	(1)	(2)	(3)	(4)	(5)
Fossil Fuel Involvement × War	0.06*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.02** (0.01)	0.02** (0.01)
Fossil Fuel Involvement	-0.03*** (0.004)	-0.02*** (0.004)	-0.01*** (0.004)	-0.01*** (0.004)	-0.01** (0.004)
Observations	166,854	166,854	166,854	166,854	166,854
R ²	0.04	0.06	0.06	0.06	0.06
Lagged return controls	N	N	N	N	N
Style controls	N	N	Y	N	Y
Other controls	N	Y	Y	Y	Y
MY-Category FE	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y
Month & Fund clustered SE	Y	Y	Y	Y	Y

Economic effect:

↑ 1-SD FFI (8%) → >+2% AUM between Feb and June 2022.

“Silver lining” n.1: Some investors still don’t like fossil fuels

Dependent variable:	Monthly flows					
	SFDR art.9		SFDR art.8		SFDR art.6	
	(1)	(2)	(3)	(4)	(5)	(6)
Fossil Fuel Involvement × War	0.05*	-0.002	0.09***	0.03***	0.06***	0.03***
	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)
FFI	-0.03**	0.003	-0.03***	-0.01*	-0.02***	-0.002
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.005)
Observations	7,345	7,345	63,755	63,755	58,447	58,447
R ²	0.16	0.19	0.06	0.09	0.09	0.06
Lagged return controls	N	Y	N	Y	N	Y
Style controls	N	Y	N	Y	N	Y
Other controls	N	Y	N	Y	N	Y
MY-Category FE	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Month & Fund clustered SE	Y	Y	Y	Y	Y	Y

- Investors in Article 9 funds (financial + sustainable objectives) do not seem particularly interested in fossil fuel exposure, also in the current crisis.

“Silver lining” n.2: An energy crisis in the energy transition

Dependent variable:	Monthly flows		
	(1)	(2)	(3)
Fossil Fuel Involvement × War × Carbon Risk	-0.002*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)
Fossil Fuel Involvement × War	0.04** (0.01)	0.01 (0.01)	0.01 (0.01)
Carbon Risk × War	0.15*** (0.02)	0.12*** (0.01)	0.12*** (0.02)
Carbon Risk × Fossil Fuel Involvement	0.0004 (0.0003)	0.001** (0.0003)	0.0003 (0.0003)
Carbon Risk	0.01 (0.01)	-0.02 (0.01)	0.005 (0.01)
Fossil Fuel Involvement	-0.02*** (0.01)	-0.03*** (0.01)	-0.02** (0.01)
Observations	144,708	144,708	144,708
R ²	0.06	0.06	0.06
Lagged return controls	N	Y	Y
Style controls	Y	N	Y
Other controls	Y	Y	Y

Keeping constant funds' Fossil Fuel exposure, investors prefer portfolios more aligned with the energy transition (lower Carbon Risk).

“Silver lining” n.2: An energy crisis in the energy transition

Dependent variable:	Monthly flows (Share class)			
	Institutional		Retail	
	(1)	(2)	(3)	(4)
Fossil Fuel Involvement × War × Carbon Risk		-0.004** (0.002)		-0.001** (0.0004)
Fossil Fuel Involvement × War	-0.05 (0.04)	0.01 (0.03)	0.05** (0.02)	0.04* (0.02)
Carbon Risk × War		0.10** (0.04)		0.12*** (0.03)
Carbon Risk × Fossil Fuel Involvement		0.001 (0.001)		0.001 (0.001)
Observations	78,669	69,619	648,880	569,791
R ²	0.04	0.04	0.03	0.03

Institutional funds:
More “sophisticated” forward-looking screening based on transition risk exposures.

Retail funds:
Clear “Green Sentiment” reversal.

Concluding remarks

- Both green sentiment and more rational economic thinking drive investor demand for environmental responsibility.
- Important to better understand both drivers and their effects.
- In the current crisis, European fund flows indicate a mismatch: A rush to resurrected fossil fuel activities, but also the awareness of the need to prepare for an acceleration of the energy transition.
- Not the first temporal mismatch in climate policy: After Trump's election, carbon-intensive firms had a short-term boost in value, but long-term investors rewarded firms better prepared to face the post-Trump Boomerang in climate policy. (Ramelli, Wagner, Zeckhauser, and Ziegler, 2021).

Thank you!

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References

- Brière, Marie, and Stefano Ramelli, 2021, Green sentiment, stock returns, and corporate behavior, Working Paper: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3850923
- Brière, Marie, Karen Huynh, and Stefano Ramelli, 2022, The 2022 fossil fuel rush and the energy transition: Evidence from European mutual funds, In progress.
- Brown, David C., Shaun William Davies, and Matthew C. Ringgenberg, 2021, ETF arbitrage, non-fundamental demand, and return predictability, *Review of Finance* 25, 937--972.
- Davies, Shaun, 2020, Speculation sentiment, *Journal of Financial and Quantitative Analysis*, Forthcoming.
- Deng, Ming, Markus Leippold, Alexander F. Wagner, and Qian Wang, 2022, Stock Prices and the Russia-Ukraine War: Sanctions, Energy and ESG., Working Paper.
- Engle, Robert F., Stefano Giglio, Bryan Kelly, Heebum Lee, and Johannes Stroebel, 2020, Hedging climate change news, *The Review of Financial Studies* 33, 1184--1216.
- Ramelli, Stefano, Alexander F. Wagner, Richard J. Zeckhauser, and Alexandre Ziegler, 2021, Investor rewards to climate responsibility: Stock-price responses to the opposite shocks of the 2016 and 2020 U.S. elections, *Review of Corporate Financial Studies* (10).