ESG investing and media attention to environmental issues

Annual Financial Market Liquidity Conference

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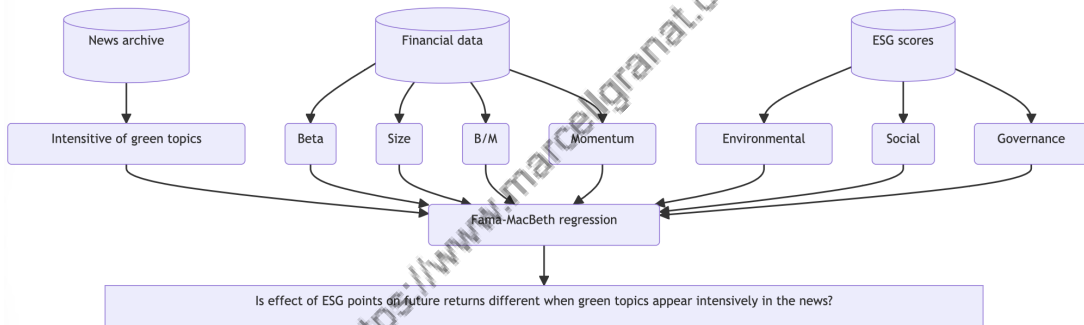4. Fama-MacBeth regression

5. Conclusion

Introduction

Environmental responsibility

Literature review

- Is environmental responsibility beneficial for the company?
  - lower cost of capital [14]
  - positive effect on ROA [5]
- Do investors appreciate the companies' efforts in this direction?
  - Results in the literature are not clear
  - Impact varies from country to country [16] [2]
  - Impact varies by sector [5]
  - Not priced by the market [19] [13]
- What influences the attitude of investors towards the importance of environmental protection issues?
  - Personal experience matters [8]

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Overview of the study design

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Financial data

- Thomson Reuters Datastream

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EIKON

- NYSE & NASDAQ stocks
- Data cleaning based in Ince and Porter [12]
- 97.178 total observations for the period between 01.01.2010 and 02.02.2020, for 1983 companies.

- Variables:
  - Unadjusted Price
  - Total Return Index
  - Turnover by Volume
  - Common Shares Outstanding
  - Book Value per Share
  - **Environment Pillar Score**
  - **Social Pillar Score**
  - **Governance Pillar Score**

News I

- Publicly available news archive about **investing.com**, that are
- related to **NYSE/NASDAQ** securities
- After the cleaning process we have news **from 2010 until 2020**, **221.513** documents in total

Topic model

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Topic modelling in general

- **Machine learning tool for text** (unstructured) data

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Topic modelling in general

- **Machine learning tool for text** (unstructured) data
- Every topic is a mixture of words and **every document is a mixture of topics** [18]
- An unsupervised model

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Topic modelling in general

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- An important hyperparameter: **Number of topics**

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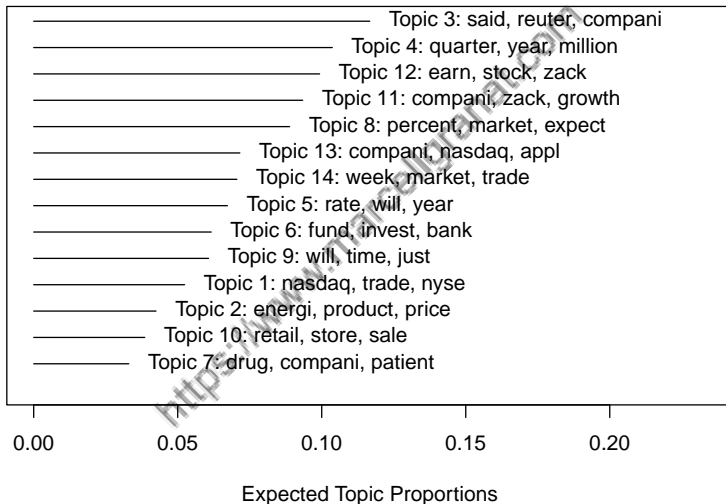○●○○○

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Topic modelling in general

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- We ran the model with topic numbers between 2 and 30

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Topic modelling in general

- **Machine learning tool for text** (unstructured) data
- Every topic is a mixture of words and **every document is a mixture of topics** [18]
- An unsupervised model
- An important hyperparameter: **Number of topics**
- We ran the model with topic numbers between 2 and 30
- LDA + metadata = Structural Topic Model
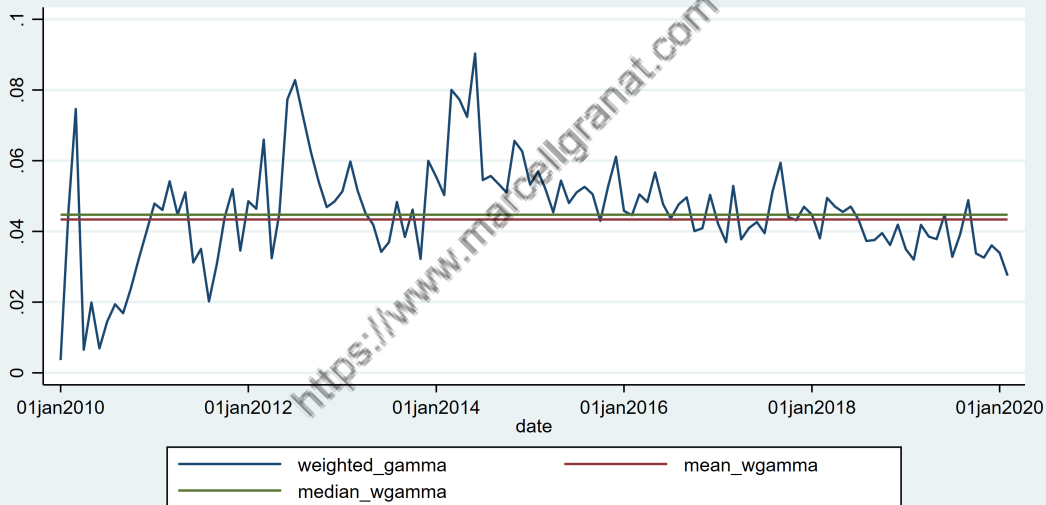
Results from topic modelling I

Topic	Terms
Topic 3:	said, reuter, compani
Topic 4:	quarter, year, million
Topic 12:	earn, stock, zack
Topic 11:	compani, zack, growth
Topic 8:	percent, market, expect
Topic 13:	compani, nasdaq, appl
Topic 14:	week, market, trade
Topic 5:	rate, will, year
Topic 6:	fund, invest, bank
Topic 9:	will, time, just
Topic 1:	nasdaq, trade, nyse
Topic 2:	energi, product, price
Topic 10:	retail, store, sale
Topic 7:	drug, compani, patient

0.00   0.05   0.10   0.15   0.20

Expected Topic Proportions

Results from topic modelling II

Example from the archive

"Exxon Mobil NYSE XOM says it is restarting its 560K bbl day Baytown Tex refinery second largest in the U S six days after it was shut because of **heavy rain from Hurricane** Harvey Phillips 66 NYSE PSX says it is preparing to resume operations at its Sweeny refinery and its Beaumont terminal in Texas its Pasadena refined products terminal is resuming truck loading for **gasoline** this afternoon while operations at its **Gulf Coast fractionation plant** in Mont Belvieu are suspended Also Occidental Petroleum NYSE OXY has loaded and shipped its first **crude oil** cargo from its Western Gulf Coast terminal at the Port of Corpus Christi since Harvey"

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Intensity of the green theme over time

Fama-MacBeth regression

Fama-MacBeth regression

Fama-MacBeth regression

Two-step regression:

1. we regress the return of stocks with the examined factors
2. In each month, the cross-sectional stock returns are regressed with the coefficients obtained in the first step

What factors should we control for?

1. **Beta**: Coefficient expressing the movement of the share with the market.
2. **Size**: The difference in returns between small and large market capitalization companies.
3. **B/M**: The excess return of companies with a higher book to market ratio compared to companies with a lower B/M ratio.
4. **Momentum**: Return of the period between the 12th month before the month under review and the 2nd month before the month under review.
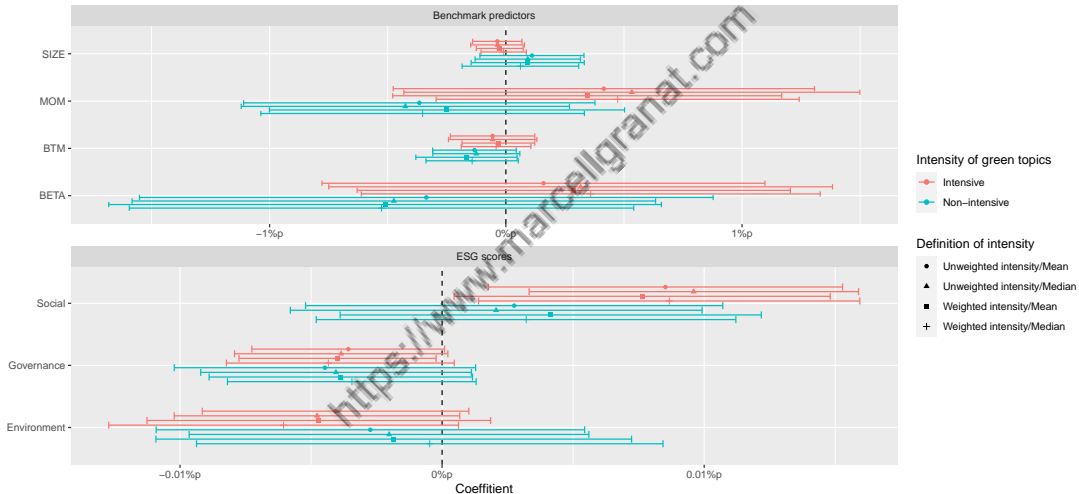5. **+ ESG scores**

Examining the research question

Do ESG scores have a significant effect on future returns when green topics are heavily in the news?

We can define intensive periods in four ways:

- gamma is above its mean value (73 months)
- gamma is above its median value (72 months)
- weighted gamma is above its mean value (67 months)
- weighted gamma is above its median value (67 months)

How does the coefficient of ESG points change if only the intensive months are used in the regression?

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Conclusion

1. **There is no significant relationship** between ESG points and future returns az **in non-intensive months**.

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Conclusion

1. **There is no significant relationship** between ESG points and future returns az **in non-intensive months**.

2. There is a **significant relationship** between ESG scores and future returns in **months with high green theme intensity** when we use the **median to define intensive periods**

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Limitations

- The STM model estimates the occurrence of topics based on all the news, so the Fama-MacBeth regression also uses information at time *t* that only became available later

Thank you for your attention!

To aid understanding and reproducibility, the codes are available in the following public repo:

github.com/MarcellGranat/green-finance-news

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Results

		Benchmark (1)	Identifying intensive periods based on *gamma (γ)*				Identifying intensive periods based on *weighted gamma (w.γ)*			
			INTENSIVE (2)	NON INTENSIVE (3)	INTENSIVE (6)	NON INTENSIVE (7)	INTENSIVE (4)	NON INTENSIVE (5)	INTENSIVE (8)	NON INTENSIVE (9)
Months in regression		*Every month*	$\gamma > \gamma_{mean}$	$\gamma \le \gamma_{mean}$	$\gamma > \gamma_{median}$	$\gamma \le \gamma_{median}$	$w.\gamma > w.\gamma_{mean}$	$w.\gamma \le w.\gamma_{mean}$	$w.\gamma > w.\gamma_{median}$	$\gamma \le w.\gamma_{median}$
BETA (A)	Average return	-0.000357	0.001646	-0.003341	0.003231	-0.004528	0.002913	-0.005066	0.00364	-0.005226
	NW t-statistics	-0.11	0.35	-0.55	0.60	-0.86	0.63	-0.87	0.74	-0.98
	NW p-value	0.911	0.728	0.582	0.549	0.396	0.530	0.389	0.459	0.331
SIZE (B)	Average return	0.000229	-0.000363	0.001111	-0.000348	0.000933	-0.000259	0.000932	-0.000094	0.000623
	NW t-statistics	0.35	-0.69	1.01	-0.61	0.84	-0.52	0.78	-0.20	0.50
	NW p-value	0.723	0.492	0.316	0.544	0.407	0.604	0.439	0.846	0.616
B/M (C)	Average return	-0.000873	-0.000562	-0.001337	-0.000557	-0.001258	-0.000317	-0.001674	-0.000414	-0.001433
	NW t-statistics	-1.40	-0.63	-1.52	-0.59	-1.37	-0.41	-1.57	-0.56	-1.47
	NW p-value	0.165	0.532	0.136	0.554	0.177	0.682	0.123	0.577	0.148
MOM (D)	Average return	0.000995	0.004141	-0.003693	0.005327	-0.004283	0.003439	-0.002525	0.004731	-0.003557
	NW t-statistics	0.40	0.93	-0.99	1.10	-1.23	0.83	-0.67	1.23	-1.04
	NW p-value	0.690	0.358	0.325	0.275	0.223	0.408	0.504	0.224	0.304
ENVIRONMENT SCORE (E)	Average return	-0.000036	-0.000041	-0.000028	-0.000048	-0.000021	-0.000047	-0.000019	-0.000061	-0.000000
	NW t-statistics	-1.40	-1.59	-0.69	-1.75	-0.54	-1.43	-0.42	-1.81	-0.11
	NW p-value	0.164	0.116	0.496	0.086 *	0.589	0.157	0.679	0.075 *	0.911
SOCIAL SCORE (F)	Average return	0.000062	0.000085	0.000028	0.000096	0.000021	0.000076	0.000042	0.000087	0.000032
	NW t-statistics	2.27	2.50	0.71	3.04	0.54	2.11	1.05	2.37	0.81
	NW p-value	0.025 **	0.015 **	0.482	0.003 ***	0.592	0.038 **	0.301	0.021 **	0.422
GOVERNANCE SCORE (G)	Average return	-0.00004	-0.000036	-0.000045	-0.000038	-0.000041	-0.00004	-0.000039	-0.000043	-0.000035
	NW t-statistics	-2.45	-1.94	-1.59	-1.88	-1.60	-2.11	-1.57	-2.23	-1.48
	NW p-value	0.016 **	0.057 *	0.118	0.065 *	0.115	0.039 **	0.122	0.029 **	0.145

* p<0.1, ** p<0.05, *** p<0.01

Source: own calculation

Descriptive stats about ESG

Az ESG pontok eloszlása a vizsgált időszakban