The fading green glow in the stock market. Evidence from IPOs and asset pricing in the Nordics

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Overview

1. Research Issue
2. Literature and hypotheses
   - Hypotheses
3. Data
4. IPO analysis
   - Underpricing
   - Post-IPO trading
5. Asset pricing in the Nordic crossection
6. Conclusion

Research issue

Background

Stock markets key to financing the circular economy

- Financing large green investments (e.g. Renewable energy generation).
- Financing green innovations – IPO and subsequent SEO's finance the scaling up of startups – particularly green innovations.

Therefore – **Research agenda** – are environmental properties of a company important for firm financing?

- Is there an additional "green glow"?
  $\rightarrow$ investors demand less return for green projects (subsidized financing)
- Reluctance to finance "brown" projects (exclusions)?
  $\rightarrow$ brown projects have to offer higher returns?

Research issue

Empirical Investigations of ESG effects

Typical research: Asset pricing – are "green" / ESG firm properties *priced*?
(are firm's cost of capital affected?)

→ Crossectional investigations of stock returns.
(i.e. pricing on secondary markets)

This paper: Why not look at primary markets — IPOs — instead?

- Any ESG effects should also be present in IPOs
  (it is the same cost of capital, after all)
- Arguably more important, at listing *new capital* flow to company.

Research issue

This paper: IPOs in Nordic Equity Markets – are there any links to green/environmental issues?

Why Nordics?

- Homogeneous set of countries
  – "S" and "G" parts of ESG will have little variation.
- Political agreement on need to act on climate.

Key findings

- Underpricing lower for "green" companies.
- However: IPOs of green companies dry out.

Research issue

Why fall in green IPOs?
Are ESG concerns becoming less important?
One possibility: Green Subsidy in cost of capital channel disappearing, due to e.g.

- Political issues (US – "war on woke")
- Geopolitics – War in Ukraine

To investigate: Go back to crossectional analysis:
Are ESG issues priced in the Nordic crossection?
$\rightarrow$ find a shift around onset of Ukraine war

Literatures

Two distinct literatures

- **Is ESG linked to cost of capital/stock return**?
  Competing theories:
  - Short-term underestimation of climate consequences
    $\rightarrow$ "Good" ESG over-perform
  - "Climate in the utility function"
    willing to accept lower return for "Good" ESG
    $\rightarrow$ "Good" ESG underperform.
  - Empirics: ESG matter, most evidence for lower return.
- **IPOs**
  - Of main interest: Underpricing at IPO (lost money for the firm)
  - Recent: "The decline of the listed corporation"
    (**doidge-karolyi-stulz-2013-jfe-us-left-behind**), lead to reactions:
    - from intermediaries: Fiddling with form of IPO (auctions, direct listings, SPACs)
    - from exchanges: menu of markets, differ on costs, listing requirements, regulation

Hypothesis development – (1) – Asymmetric information about ESG

How should ESG issues affect underpricing in IPOs?
Two approaches

(1) Informational differences between parties in IPO (traditional IPO literature).
Cost of capital lower for "green" firms
IPO buyers better informed about ESG?
→ Need to lower price to induce demand.
→ Underpricing increasing in sustainability.

Hypothesis 1
Measures of underpricing increases with the firm's environmental quality.

Hypothesis development – (2) – Symmetric information about ESG

(2) Alternative framing: Symmetric information, link between ESG and cost of capital is understood by all.

→ IPO *issue price* reflect the ESG properties of the firm and demand of institutional investors.

Supplementary observation: Numerous institutional investors need green stocks (Green funds, PRI signatories, exclusions)
→ Demand for companies with "green" credentials
→ Rationing → Higher price

Hypothesis 2
"Green" companies will have higher IPO prices (lower underpricing).

Hypothesis development – (3) – Post-IPO trading volume

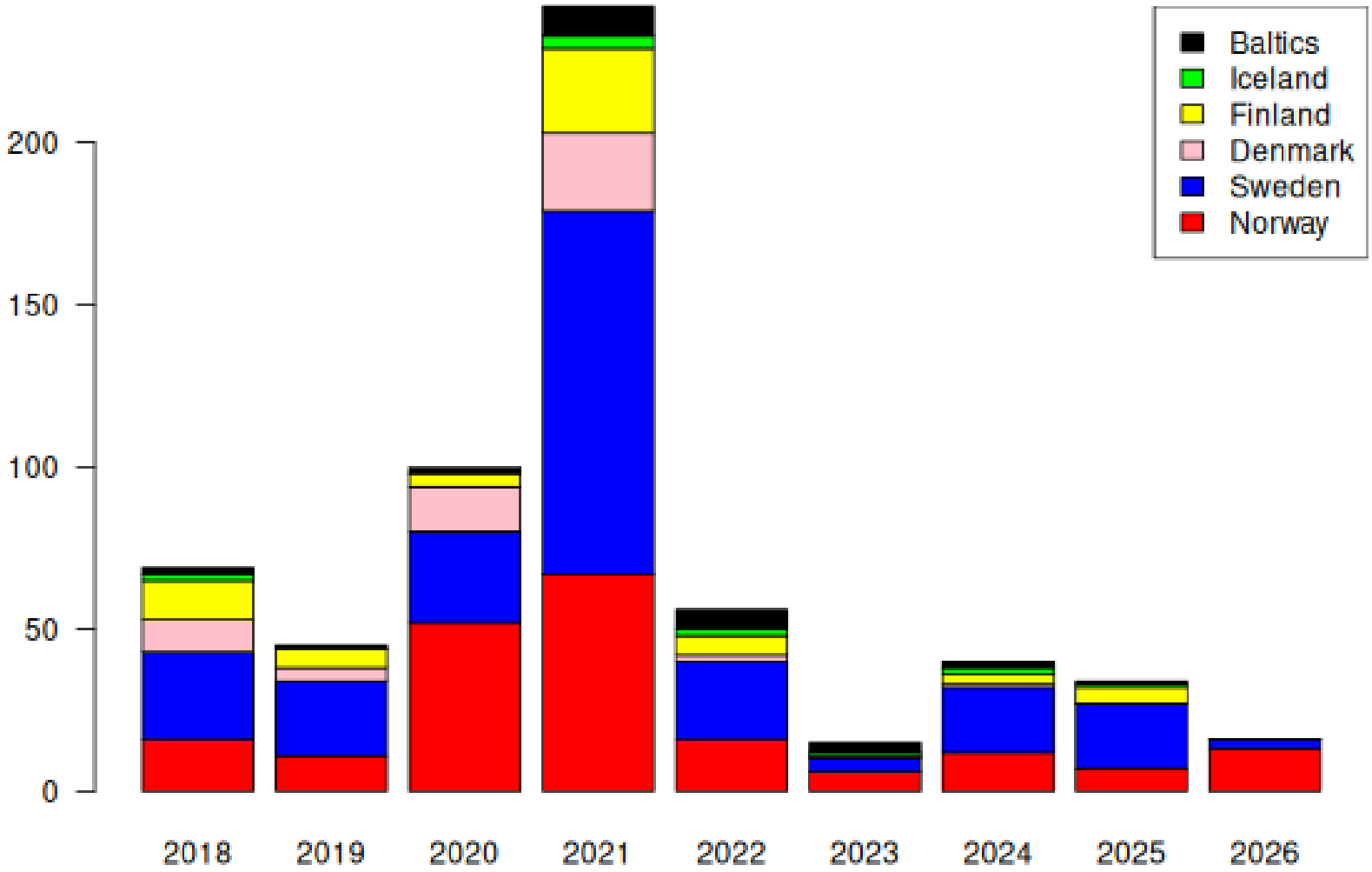
(Still symmetric information about ESG)

- Rationing of companies with "green" credentials.
- $\rightarrow$ Institutional investors hold on to their newly acquired green stocks
- $\rightarrow$ will not be willing to sell the stocks in the post-IPO market.

Hypothesis 3

"Green" companies will have less trading (turnover) post-IPO.

Data – IPOs by country. 2018-2026



Data - Changing nature of IPOs – Lower-tiered market

Firms list earlier

Exchanges created lower tiered market (Growth mkt):

	Main Mkt	Growth mkt
Denmark	9	47
Finland	17	45
Norway	44	156
Sweden	59	202
All	131	486

- Nasdaq: First North Markets
- Oslo: Merkur Markets (Now Euronext Growth)

Firms typically start on lower tier and move up, if successful.

Data: Changing nature of IPOs – Pure listing

Listing without raising capital more common

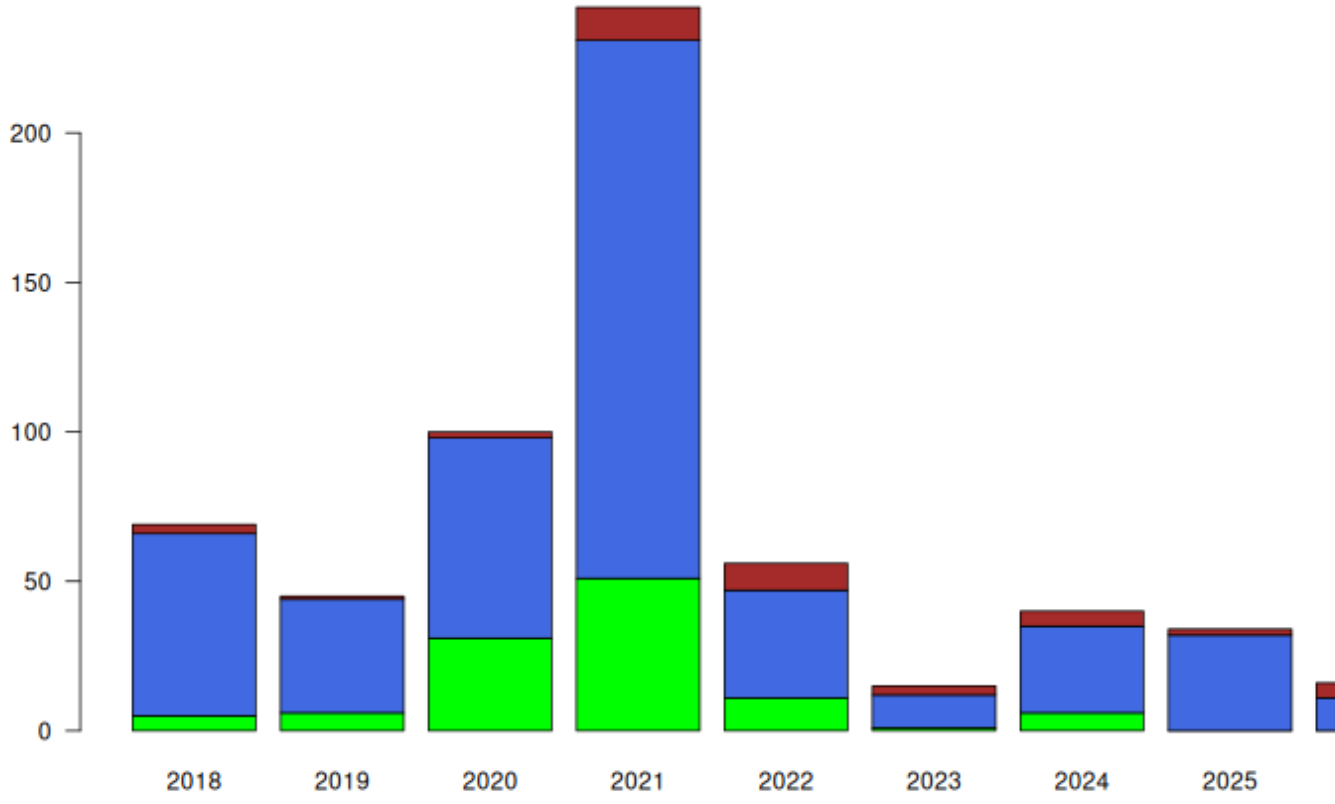
	IPO	Listing
Denmark	52	4
Finland	58	4
Iceland	8	4
Norway	121	79
Sweden	229	32
Baltics	24	2
All	492	125

Data - How green was your company? – Methods

Method 1

Using business plan of company, manually group firms:

- **Brown**.
  Oil and Gas.
- **Neutral**.
  Rest
- **Green**.
  Renewable energy.
  Circular Economy.
  Sustainability.



Data - How green was your company? – Methods

Method 2

Proxy: Firms' emphasis in prospectus – Text analysis

- Nonstandard part of prospectus (business plan)
- Among the IPOs in sample, relative occurrence of terms:
  - e.g. Positive towards environment – ESG(environment).
  - (numerous alternative word collections)

  $\rightarrow$ Idea: Measure how central issues are to business plan of firm.

  Note
  - Ranking is relative to the corpus of IPOs.
  - Does not have a positive/negative connotation

IPO Results – Underpricing

$$\text{Underpricing} = \frac{\text{Closing price (efficient price)} - \text{Starting price}}{\text{Closing price}}$$

Underpricing by three groups (Green/Neutral/Brown)
Underpricing (first day)

	Green	Neutral	Brown
Denmark	5.9	3.3	
Finland	-5.6	4.9	
Iceland		5.2	22.8
Norway	-3.9	-0.2	-1.3
Sweden	-4.8	2.5	5.4
Baltics	9.3	7.6	2.6
All	-3.1	2.6	-0.1

IPO Results – Underpricing

Estimating underpricing separately for

- Main Market
- Growth Market

Underpricing by market place

	Main Mkt	Growth mkt
Denmark	5.8	3.4
Finland	4.1	3.6
Norway	-0.6	-1.9
Sweden	10.5	-0.9
All	5.5	0.2

Daily Underpricing

IPO Results – Underpricing

Asking if greenness matter

$$\text{Underpricing}_i = \alpha + \mathbf{b}^{ESG}\mathbf{ESG\ measures}_i + \mathbf{b}^{2}\mathbf{Controls}_i + \varepsilon_i,$$

ESG measures

- Categorization: Green/Neutral/Brown
- Text based categorizations

Controls

- Firm size
- dummy(Country)
- dummy(Industry)

IPO Results – Underpricing – GNB classification

$$\text{Underpricing}_i = \alpha + \mathbf{b}^{ESG}\mathbf{ESG\ measures}_i + \mathbf{b}^{2}\mathbf{Controls}_i + \varepsilon_i,$$

	(1)	(2)	(3)	(4)	(5)
(Intercept)	2.6***	−44.0***	−49.9***	−42.1***	−47.4***
	(0.8)	(9.0)	(9.3)	(9.3)	(9.6)
Green	−5.7***	−6.0***	−3.9**	−5.9***	−4.1**
	(1.9)	(1.9)	(1.9)	(2.0)	(2.1)
Brown	−2.7	−4.3	−1.0	−2.7	0.0
	(2.9)	(2.9)	(3.0)	(3.3)	(3.4)
ln(MktCap)		2.5***	3.2***	2.5***	3.1***
		(0.5)	(0.5)	(0.5)	(0.5)
Fixed country effects	N	N	Y	N	Y
Fixed industry effects	N	N	N	Y	Y
Adj. R^2	0.0	0.1	0.1	0.1	0.1
Num. obs.	599	570	570	570	570

$^{***}p < 0.025$; $^{**}p < 0.05$; $^{*}p < 0.1$

First day underpricing

IPO Results – Underpricing - GNB classification

$$\text{Underpricing}_i = \alpha + \mathbf{b}^{ESG}\mathbf{ESG\ measures}_i + \mathbf{b}^{2}\mathbf{Controls}_i + \varepsilon_i,$$

	(1)	(2)	(3)	(4)	(5)
(Intercept)	1.4	−44.9***	−53.6***	−41.9***	−49.4***
	(0.9)	(10.4)	(10.7)	(10.8)	(11.0)
Green	−5.3***	−5.7***	−2.1	−5.9***	−2.8
	(2.1)	(2.2)	(2.3)	(2.3)	(2.4)
Brown	−3.4	−5.0	0.2	−4.2	0.1
	(3.3)	(3.3)	(3.4)	(3.8)	(3.8)
ln(MktCap)		2.5***	3.3***	2.4***	3.2***
		(0.6)	(0.6)	(0.6)	(0.6)
Fixed country effects	N	N	Y	N	Y
Fixed industry effects	N	N	N	Y	Y
Adj. R^2	0.0	0.0	0.1	0.0	0.1
Num. obs.	587	558	558	558	558

$^{***}p < 0.025$; $^{**}p < 0.05$; $^{*}p < 0.1$

First week underpricing

IPO Results – Underpricing - text-based classification

$$\text{Underpricing}_i = \alpha + \mathbf{b}^{ESG}\mathbf{ESG\ measures}_i + \mathbf{b}^{2}\mathbf{Controls}_i + \varepsilon_i,$$

	(1)	(2)	(3)	(4)	(5)
(Intercept)	2.5***	−41.9***	−51.2***	−41.9***	−48.3***
	(1.0)	(9.1)	(9.5)	(9.5)	(9.8)
env_share	−28.0**	−25.0*	−25.6**	−24.0*	−30.5**
	(13.0)	(13.1)	(12.9)	(14.0)	(13.9)
ln(MktCap)		2.4***	3.2***	2.4***	3.1***
		(0.5)	(0.5)	(0.5)	(0.5)
Fixed country effects	N	N	Y	N	Y
Fixed industry effects	N	N	N	Y	Y
Adj. R^2	0.0	0.0	0.1	0.0	0.1
Num. obs.	581	556	556	556	556

$^{***}p < 0.025$; $^{**}p < 0.05$; $^{*}p < 0.1$

env-share: Share of discussion in prospectus about environmental issues

IPO Results – Underpricing – text based classifiction

$$\text{Underpricing}_i = \alpha + \mathbf{b}^{ESG}\mathbf{ESG\ measures}_i + \mathbf{b}^{2}\mathbf{Controls}_i + \varepsilon_i,$$

	(1)	(2)	(3)	(4)	(5)
(Intercept)	1.2*	−44.0***	−53.2***	−43.8***	−50.8***
	(0.7)	(9.1)	(9.4)	(9.4)	(9.7)
esm_pooled	−1.5**	−1.6**	−1.5**	−1.6*	−1.8***
	(0.7)	(0.7)	(0.7)	(0.8)	(0.8)
ln(MktCap)		2.5***	3.3***	2.5***	3.2***
		(0.5)	(0.5)	(0.5)	(0.5)
Fixed country effects	N	N	Y	N	Y
Fixed industry effects	N	N	N	Y	Y
Adj. R^2	0.0	0.0	0.1	0.1	0.1
Num. obs.	581	556	556	556	556

$^{***}p < 0.025$; $^{**}p < 0.05$; $^{*}p < 0.1$

esm-pooled – Quantity environmental keywords

IPO Results – Post-IPO trading – GNB classification

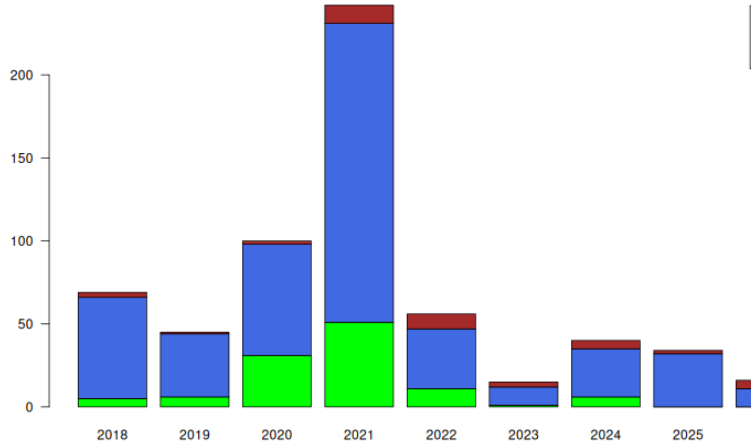
	(1)	(2)	(3)	(4)	(5)
(Intercept)	0.089***	0.180*	0.144	0.209**	0.176*
	(0.009)	(0.098)	(0.103)	(0.102)	(0.106)
Green	−0.048***	−0.046***	−0.030	−0.053***	−0.038*
	(0.020)	(0.020)	(0.022)	(0.022)	(0.023)
Brown	−0.061**	−0.056*	−0.034	−0.064*	−0.044
	(0.030)	(0.031)	(0.032)	(0.036)	(0.037)
ln(MktCap)		−0.005	−0.005	−0.006	−0.006
		(0.005)	(0.006)	(0.005)	(0.006)
Fixed country effects	N	N	Y	N	Y
Fixed industry effects	N	N	N	Y	Y
Adj. R^2	0.013	0.013	0.029	0.012	0.027
Num. obs.	482	482	482	482	482

$^{***}p < 0.025$; $^{**}p < 0.05$; $^{*}p < 0.1$

First Day Turnover

Nordic asset pricing – Fading green glow?

Saw earlier: "Green" IPOs disappear.



Can not use non-existing IPOs to estimate cost of capital effects.
Therefore: Estimate cost of capital from crossection (secondary trading).
Asset pricing model, expanded CAPM: $E[r_i^e] = \beta_i E[r_m^e] + \gamma ESG_i$
Estimated two ways:

- System (Gibbons, 1982)
- "Rolling beta" (Fama & MacBeth, 1973)

Question: Is the coefficient on ESG (γ) changing?

Nordic asset pricing – System estimates of γ

Estimates of ESG coefficient γ
Whole period 2018–2025

	Dependent variable:
	R_i^e
ESG	0.0001***
	(0.00001)
Market betas included	yes
Observations	32,724
Adjusted R^2	0.234
Note:	*p<0.1; **p<0.05; ***p<0.01

Nordic asset pricing – System estimate of γ

Two subperiods:

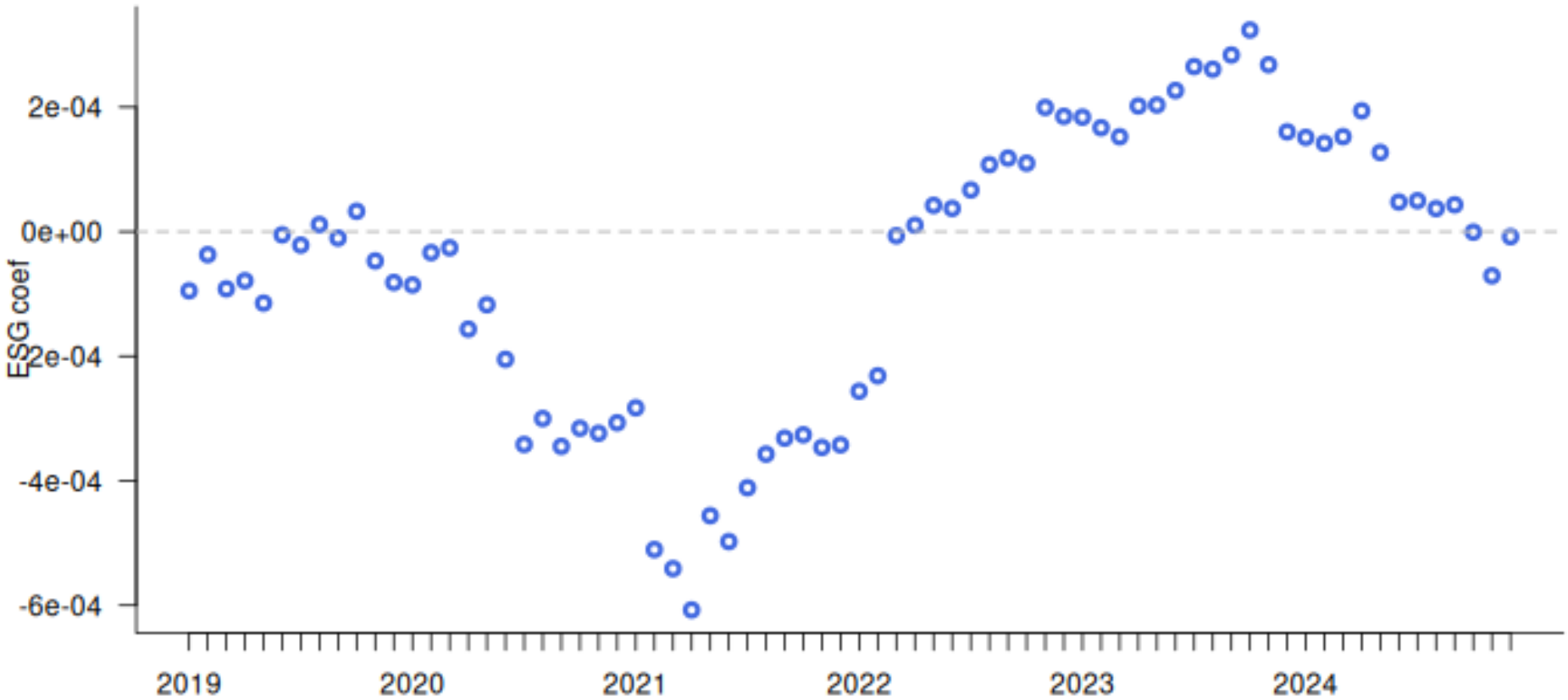
Pre-War: 2018–2022:02

Post-war: 2022:03–2025

	Dependent variable:
	R_i^e
ESG pre-war	0.0001^{***}
	(0.00001)
ESG post-war	-0.00004^{**}
	(0.00002)
Market betas included	yes
Observations	32,724
Adjusted R^2	0.235
Note:	*p<0.1; **p<0.05; ***p<0.01

Nordic asset pricing – rolling estimate of γ

ESG coefficients – γ (moving average)



Conclusion

Results (weakly) support link between ESG properties and IPO issue price.

- Green companies overpriced (Rationed?)

However

- IPOs drying up post 2021

Analyzing existing (non-IPO) firms in crossection:

- Corresponding shift in pricing of ESG.

ESG no longer matter for the Nordic Stock Markets?
Bad news for the climate?

Fama, E. F., & MacBeth, J. (1973).Risk, return and equilibrium, empirical tests. *Journal of Political Economy*, *81*, 607–636.

Gibbons, M. R. (1982).Multivariate tests of financial models, a new approach. *Journal of Financial Economics*, *10*, 3–27.