The expected returns of ESG excluded stocks. Shocks to firms costs of capital? Evidence from the Worlds' largest fund.

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Research issue

- ESG - Environmental, Social and Governance aspects of corporate decisions.
- Institutional investors unwilling to invest in "bad" ESG firms.
- Generally – Does ESG affect companies?
  - Cost of capital/stock return?
    - Pecuniary view (The BlackRock Argument)
      Firms preparing for the new sustainable economy
      $\rightarrow$ will do better (doing well by doing good).
      (Mispricing argument)
    - Non-pecuniary view.
      Investors care about sustainability in addition to returns.
      $\rightarrow$ Sustainable firms have lower cost of capital.
  - Company Behaviour?
    - Do companies take actions to avoid being excluded?
    - Why?
- How best to save the planet?

Research issue ctd

Our research: The exclusions by Norway's GPFG "(The oil Fund)"
– Huge Sovereign Wealth Fund.

- Exclusions ethically motivated – "worst offenders"
- Investigate:
  - The return of the portfolio of excluded firms
  - Firm reactions to their exclusions

Our Analysis – Preview

Construct portfolio of excluded firms.

- Does the portfolio have "too high" returns (alpha)?
  $\rightarrow$ **Yes**
- Is this due to short-term overreactions, or changes to long term cost of capital
  $\rightarrow$ **It is the long term cost of capital**

After firms get on the exclusion list

- Are firms happy with their high cost of capital?
  $\rightarrow$ **No, they try get their exclusions revoked to get back to a lower cost of capital.**
- If a firm's exclusion is revoked, what happens to cost of capital?
  $\rightarrow$ **It Falls**

Literature etc

Modelling differences in cost of capital due to ESG

- The pecuniary view.
  - Stock prices do not fully reflect future ESG consequences (e.g. climate).
  - E.g. short-termism (Stein, 1989)
- The non-pecuniary view
  - Equilibrium models – tradeoff ESG/Cost of Capital – Pástor et al. (2021) Pedersen et al. (2021)
  - Question magnitude exclusion effects (Berk and van Binsbergen, 2021)
  - Uncertainty of ESG ranking: Muddle the tradeoff (Avramov et al., 2022)

Estimates of corporate cost of capital

- Evidence support the non-pecuniary view
  Examples (estimated return difference)
  - Sin (Hong and Kacperczyk, 2009) (-3.5%)
  - Environment (Chava, 2014) (-0.7% to -1.4%)
  - Carbon (Bolton and Kacperczyk, 2021) (-1.5% to -3.6%).
  - Green vs Brown (Pástor, Stambaugh, and Taylor, 2022) (-1.4%)

Literature ctd

In the setting of the nonpecuniary view:
Equilibrium tradeoff costs/benefits of improving ESG:
Example from (Hong, Wang, and Yang, 2023) in the context of decarbonization:

$$\text{Equilibrium return difference} = -\frac{m}{q}$$

where m is the cost of mitigation per unit of production, and q is the price of firm capital.
More generally, the return difference is a tradeoff:

- Cost of removing reasons for exclusion (becoming more ethical)
- Benefits from lower cost of capital.

Literature ctd

Prior analysis of the oil fund's exclusions

- Event studies. (Atta-Darkua, 2020), (Ayoubi and Enjolras, 2020), (Eriksen, Lindset, Nguyen, and Skara, 2020).
- Long term performance of excluded portfolio. (Hoepner and Schopohl, 2018)

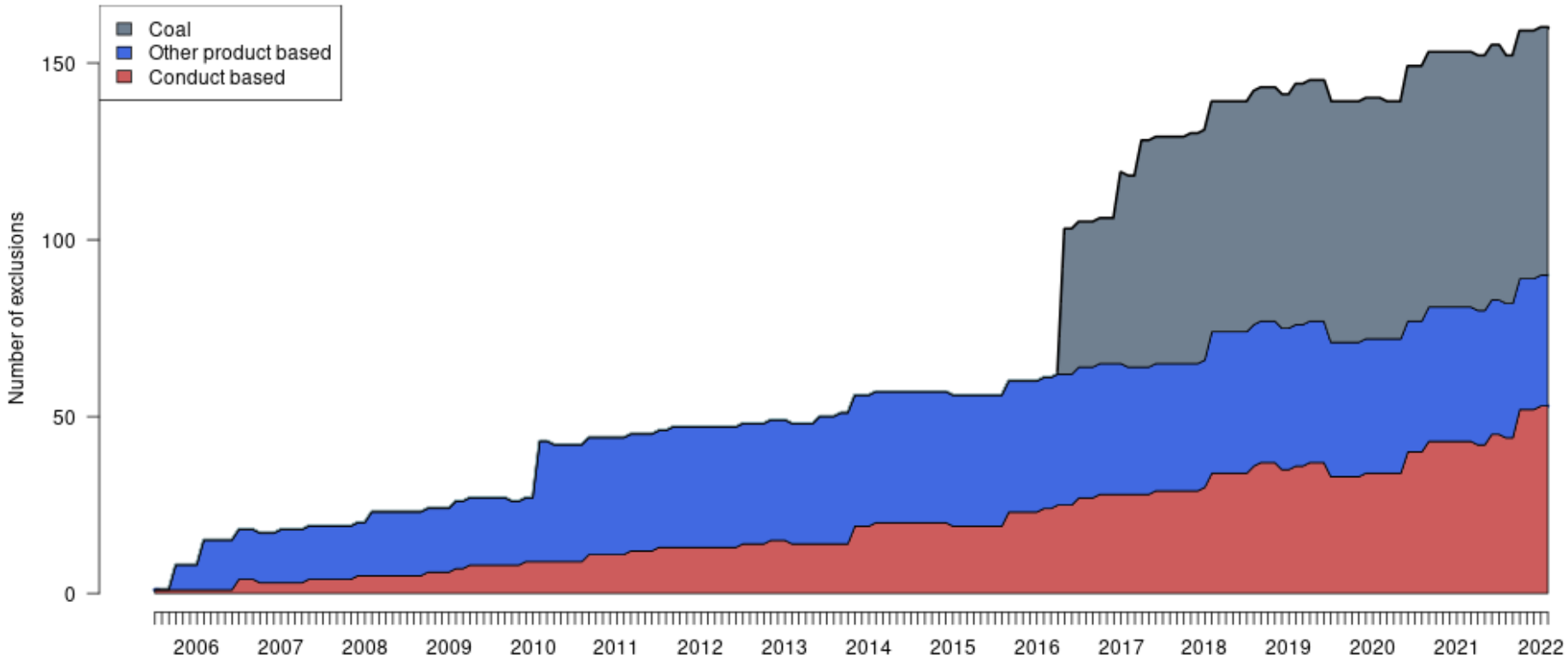
Norway's GPFG (The Oil Fund)

- World's largest SWF. Market value of equity 1 trillion USD at the end of 2021.
- One of the most transparent such funds, model for many institutional investors.
- Near index fund.
- Exclusions handled by external "Council of Ethics", established 2004.
  - 2004–2021: 189 firms in total excluded, shorter or longer time periods.
  - At yearend 2021, fund invested in $\approx$ 10 thousand companies
  - $\rightarrow$ exclusions are truly exceptional

The reasons for exclusions

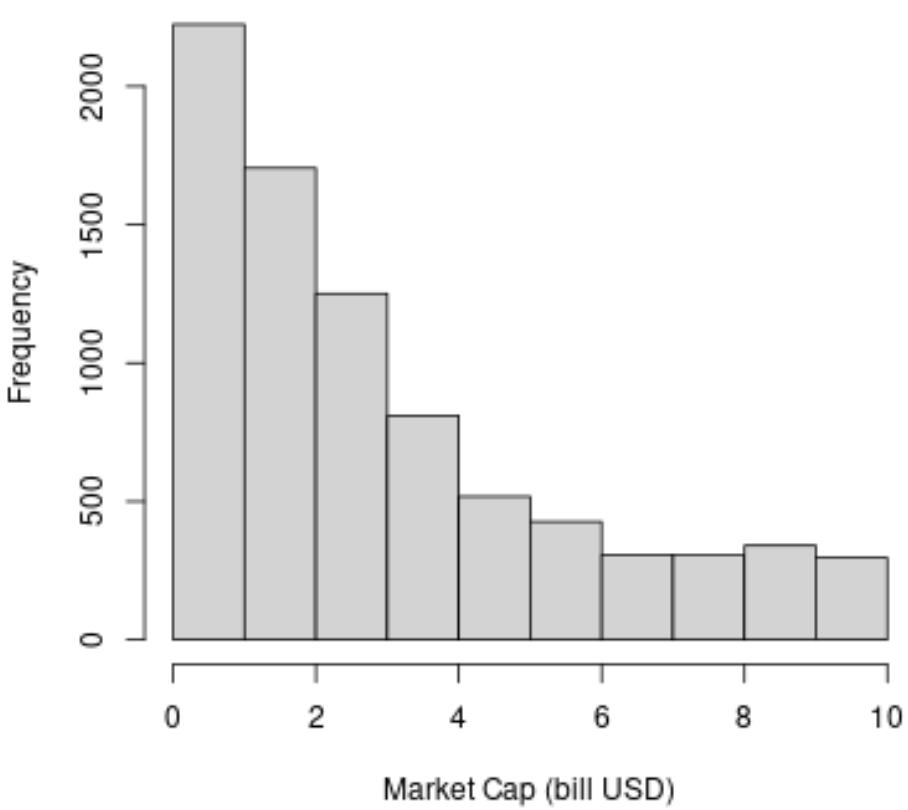
Exclusion reasons	Events
Conduct	67
Environmental damage	28
Individuals' rights in war or conflict	12
Violation of human rights	12
Environmental damage / Violation of human rights	4
Violation of ethical norms	5
Greenhouse gas emissions	4
Gross corruption	2
Product	122
Coal or coal-based energy	75
Weapons	26
Tobacco	21

The number of exclusions

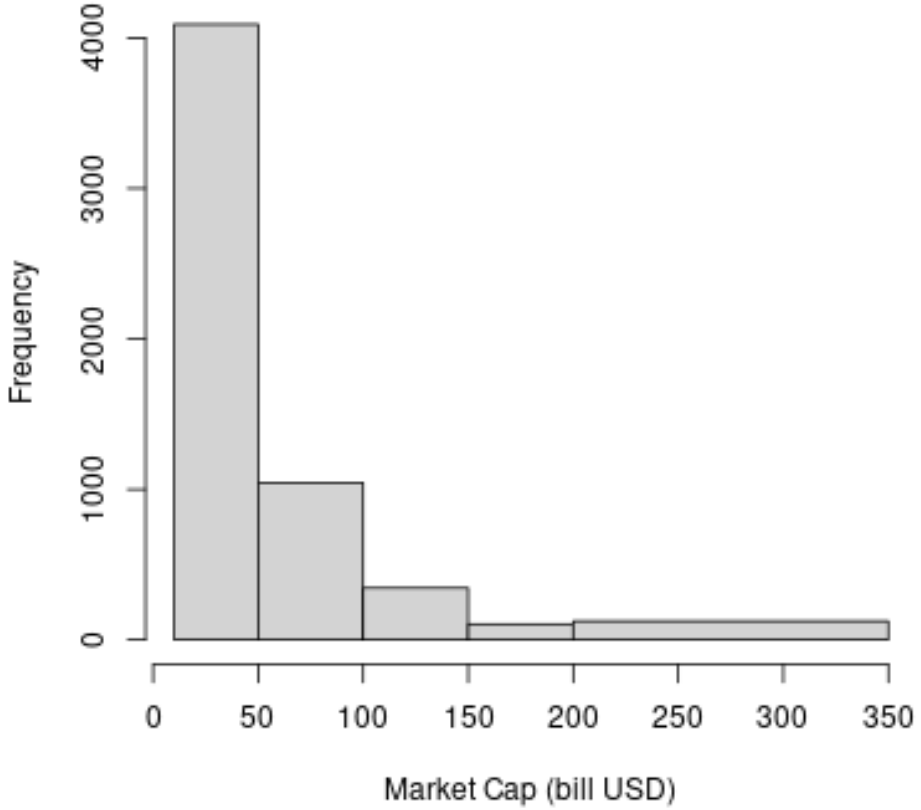


Equity data - Size distribution

B.1: Mkt Cap $\leq$ 10 bill USD



B.2: Mkt Cap $>$ 10 bill USD

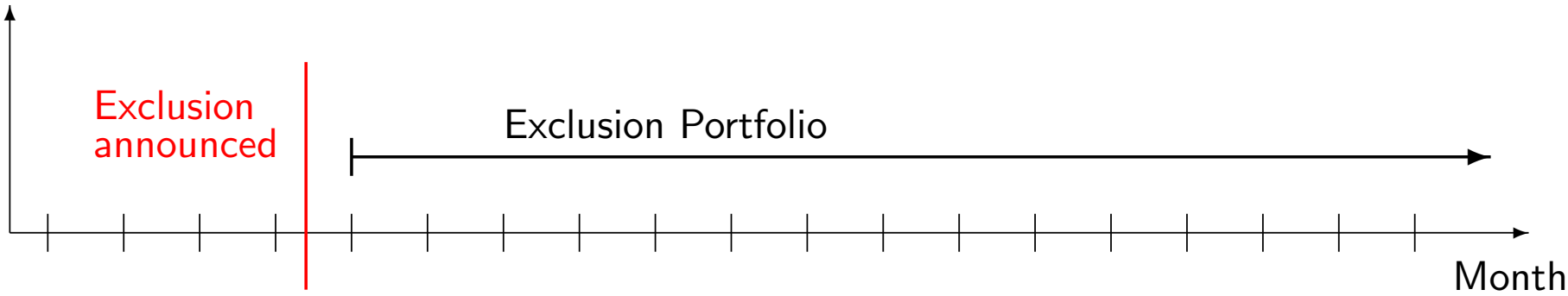


Empirics Part I: Estimating the green return premium

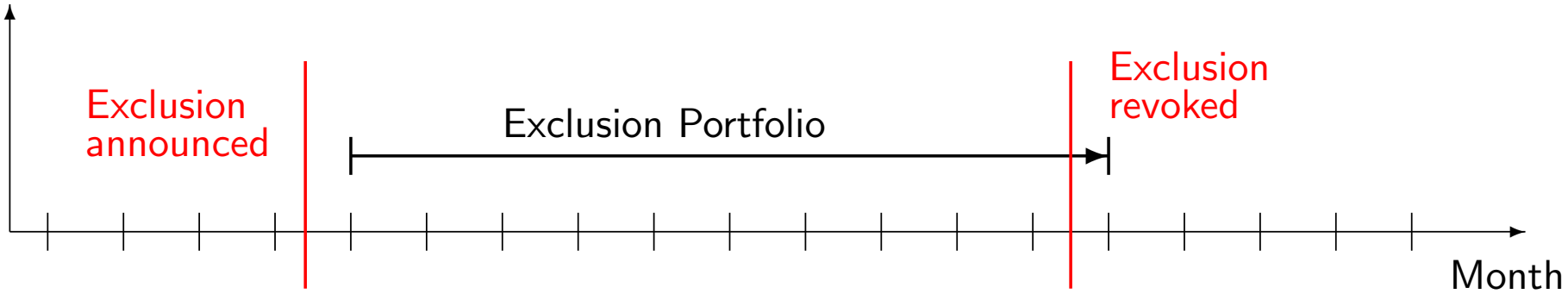
- Construct the returns of Exclusion portfolio
- Asset pricing evaluation of return difference (alpha)
- Robustness.

Construction Exclusion Portfolio

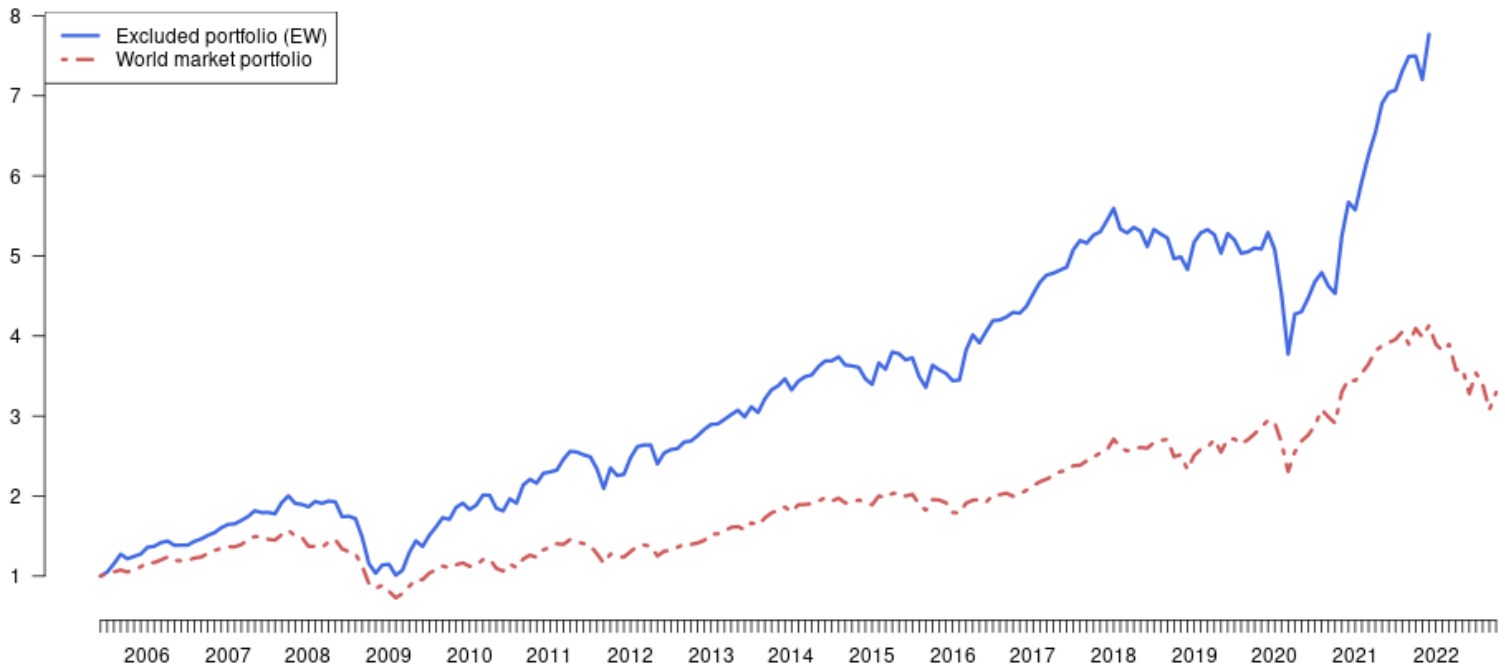
- Firms enter portfolio month after exclusion



- If exclusion revoked, firms leave exclusion portfolio next month.



Value evolution – exclusion portfolio vs market



Cumulative returns of equally weighted exclusion and global market portfolios

Estimates of the green return premium

Brown return premium (return premium for excluded firms) estimated as

- Alpha (the risk-adjusted excess return) of the Excluded Portfolio.
- Estimated using: Fama-French international five factor model

$$\begin{aligned}(r_{p,t} - r_{f,t}) &= \alpha + \beta(r_{m,t} - r_{f,t}) + b^{SMB} SMB_t + b^{HML} HML_t \\ &\quad + b^{RMW} RMW_t + b^{CMA} CMA_t + \varepsilon_{p,t},\end{aligned}$$

- This model nececcary to control for business cycle effects (Bansal et al., 2021)
- (do show estimates with alternative asset pricing models)

Estimates of alpha for (EW) Exclusion Portfolio

	(1)	(2)	(3)	(4)
Alpha	0.004***	0.004**	0.004***	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)
Rm-Rf	0.961***	1.021***	0.993***	0.962***
	(0.040)	(0.049)	(0.042)	(0.049)
SMB	0.173		0.178	0.177
	(0.115)		(0.115)	(0.123)
HML	0.467***		0.310***	0.224***
	(0.115)		(0.074)	(0.089)
RMW	0.155			
	(0.156)			
CMA	−0.257			
	(0.233)			
WML				−0.138***
				(0.076)
Annualized Alphas(percent)	5.170	4.420	5.220	5.980
Adj. R^2	0.809	0.788	0.808	0.813

Estimates of alpha for Exclusion Portfolio

- Alpha: $> 5\%$ in annual terms — economically and statistically significant
- Finding robust to
  - asset pricing model
  - weighting scheme (equal, value weighted)
  - subportfolios: reason for exclusion, country (US).

Conclude:
The alpha is the "brown premium" for excluded firms.
The "green premium" is the negative of this
$\rightarrow$ We estimate a negative green premium of $\approx 5\%$.

Concern: Short term announcement effect

Potential contribution to the high estimate (5%)

- Short term price pressure from exclusion?
- Changes to long term cost of capital?

Various estimates to show this is not only a short term effect

- Wait longer before enter exclusion portfolio
- Look at exclusion portfolio *before* oil funds exclusion
- Event study estimates $\approx 1.5\%$ (one time event).

$\rightarrow$ The estimated return is chiefly due to long-term return differences.

Conclude: Green premium estimates

- The "green premium" is negative, in line with
  - a non-pecuniary explanation,
  - the majority of estimates in the literature.
- The point estimate of -5% is larger in magnitude than most other estimates
  - Possibly due to the sample being only the "worst offenders"

Empirics Part II: Deciding whether to improve to get exclusion revoked

Point when an exclusion is announced
– from potential to actual exclusion
– expect cost of capital to increase.
Time to revisit the firm's evaluation of the tradeoff?
Sample: Exclusions revoked due to:

Cause	no
Change of product mix	11
Cease of activity	7
Sale of subsidiary	4
Other reasons	6
Total	28

Empirics II – Revoking exclusions – analysis

Actions to improve ESG leading to exclusion revoked
→ Endogenous action by firms
Trading off

- Cost of improving ESG (Cause of exclusion)
- Benefits from a lower cost of capital (cheaper to raise capital)

Motivate empirical investigations – proxies

- A. Costs of improving – ESG score when excluded.
- Benefits of low cost of capital –
  - B. Capital needs
    (Revenue increase → Need for scale investments)
  - C. Actual capital raising.
- D. Result of action – cost of capital after exclusion revoked.

Empirics II.A: What determines time before firms get exclusion revoked?

Duration (survival) analysis of exit from Exclusion Portfolio.
Allows estimation of how e.g. cost of improvement affects time till exit.
Estimates

- ESG score when excluded – (negative coefficient)
  $\rightarrow$ Low ESG score when entering exclusion portfolio $\rightarrow$ lower time till exit.
  Possible interpretation: Cost of improving ESG low when starting from a low (ESG) base.

Controls:

- Conduct based exclusion dummy (easier to fix conduct based than product based reasons for exclusion)
- Firm Market Capitalization

Empirics II.B: Benefits from cheaper cost of capital

Benefits of low cost of capital arise when firm needs to raise new external capital.
Argue: Higher likelihood of raising capital – increased benefits.
Empirically: Higher Revenue – Higher investment needs
Empirical formulation:
Probit - Model probability of having exclusions revoked as a function of

- Revenue growth – negative relation:
  High revenue growth $\rightarrow$ higher probability of exclusion revoked.
- Earnings growth – no relation

Empirics II.C: Another estimate of benefit of low cost of capital

Actual equity deals – raising new equity capital

- High probability of raising capital after exclusion revoked

	Firms raising capital	
	Number	Percent
Firms still excluded	56	37.1
Firms with exclusion revoked	11	57.9

Empirics Part II.D: Do cost of capital fall after exclusion revoked?

Estimates of alpha for the post-exclusion portfolio

	(1)	(2)	(3)	(4)
Alpha	−0.002	−0.002	−0.001	0.000
	(0.003)	(0.003)	(0.003)	(0.003)
Rm-Rf	1.080***	1.085***	1.061***	1.033***
	(0.077)	(0.073)	(0.073)	(0.076)
SMB	0.335		0.250	0.245
	(0.221)		(0.209)	(0.208)
HML	0.271		0.235*	0.128
	(0.215)		(0.123)	(0.144)
RMW	0.326			
	(0.292)			
CMA	0.107			
	(0.345)			
WML				−0.192
				(0.136)
Annualized Alphas(percent)	−2.230	−1.970	−0.860	0.300
Adj. R^2	0.604	0.596	0.606	0.609
Num. obs.	149	149	149	149

Key takeaways

1. *Green return premium* estimate $\approx -5\%$.
   - Negative in line with most of literature
   - *Magnitude* of the return difference linked to ESG higher than most estimates, possibly due to sample of "worst offenders."
2. *Dynamics* of corporate reactions to exclusion.
   More likely to see exclusion revoked if
   - ESG "really bad" at exclusion (cheaper to rectify?)
   - Revenue growth high (investment needs?)

Extra tables and results

Extra material - data - Exclusions over time

Year	New Exclusions	Exclusions Revoked	Re-exclusions
2005	9		
2006	11	1	
2007	2		
2008	4		
2009	5	2	
2010	21	1	
2011	5	1	
2012	1		
2013	9	3	
2014	1	1	
2015	4		
2016	61		
2017	11	1	
2018	13	2	1
2019	5	6	
2020	15	3	
2021	12	5	
Total	189	26	1

Extra material - data - Exclusions by industry

Industry	TRBC Code	Exclusions	Exclusions Revoked
Electrical Utilities & IPPs	591010	56	2
Aerospace & Defense	521010	20	7
Food & Tobacco	541020	18	
Coal	501010	14	
Metals & Mining	512010	14	3
Construction & Engineering	522010	10	1
Oil & Gas	501020	9	3
Chemicals	511010	6	2
Paper & Forest Products	513010	5	
Pharmaceuticals	562010	5	
Freight & Logistics Services	524050	4	1
Textiles & Apparel	532020	4	1
Consumer Goods Conglomerates	544010	3	1
Multiline Utilities	591040	3	
Real Estate Operations	601010	3	
Automobiles & Auto Parts	531010	2	1
Homebuilding & Construction Supplies	532030	2	1
Machinery, Equipment & Components	521020	2	
Professional & Commercial Services	522030	2	
Communications & Networking	571020	1	
Diversified Industrial Goods Wholesalers	522020	1	
Diversified Retail	534020	1	1
Food & Drug Retailing	543010	1	1
Hotels & Entertainment Services	533010	1	
Insurance	553010	1	1
Specialty Retailers	534030	1	
Total		189	26

Extra material - data - Exclusions by country

Country	Exclusions	Exclusions Revoked
United States	51	10
China	27	2
India	13	
United Kingdom	11	5
Israel	10	
Canada	9	1
Japan	8	
Malaysia	8	
South Korea	7	1
Brazil	5	
Australia	4	
Poland	4	1
South Africa	3	1
Taiwan	3	
Thailand	3	1
Chile	2	
Czech Republic	2	
France	2	1
Mexico	2	2
Netherlands	2	
Philippines	2	
Egypt	1	
Germany	1	
Greece	1	
Indonesia	1	
Ireland	1	
Italy	1	1
Peru	1	
Russian Federation	1	
Singapore	1	

Extra material - data - Sample of stocks

Status	Events
Total exclusions	189
Exclusion revoked	26
Excluded again	1
Not matched with Refinitiv	5
Total sample	184
Conduct-based exclusions	67
Product-based exclusions	122

Overview of the exclusions, revocations and sample content. Data from the Ethical council, GPFG and Refinitiv.

Extra material - data - Equity data - Descriptives

	min	mean	med	max
Monthly Return (percent)	-72.8	1.1	0.6	166.2
Market Cap (bill USD)	0.0	20.4	6.0	315.8

Extra material - exclusion portfolio - Descriptives

Panel A: Equally weighted exclusion portfolio

gnn

		EW Exclusion Portfolios				
	Market	All	Conduct	Product	Coal	US
Average return (%)	0.79	1.17	1.44	1.00	1.02	1.24
Std.dev	0.79	5.21	7.73	4.92	4.33	5.06
Average excess return (%)	0.01	1.07	1.35	0.91	0.94	1.14
Sharpe Ratio	0.15	0.21	0.17	0.18	0.22	0.23
n	199	199	199	196	69	199

Panel B: Value weighted exclusion portfolio

		VW Exclusion Portfolios				
	Market	All	Conduct	Product	Coal	US
Average return(%)	0.79	1.37	1.67	1.22	1.27	1.37
Std.dev	0.79	4.23	5.64	4.77	3.47	4.11
Average excess return (%)	0.01	1.28	1.58	1.13	1.19	1.28
Sharpe Ratio	0.15	0.30	0.28	0.24	0.34	0.31
n	199	199	199	196	69	199

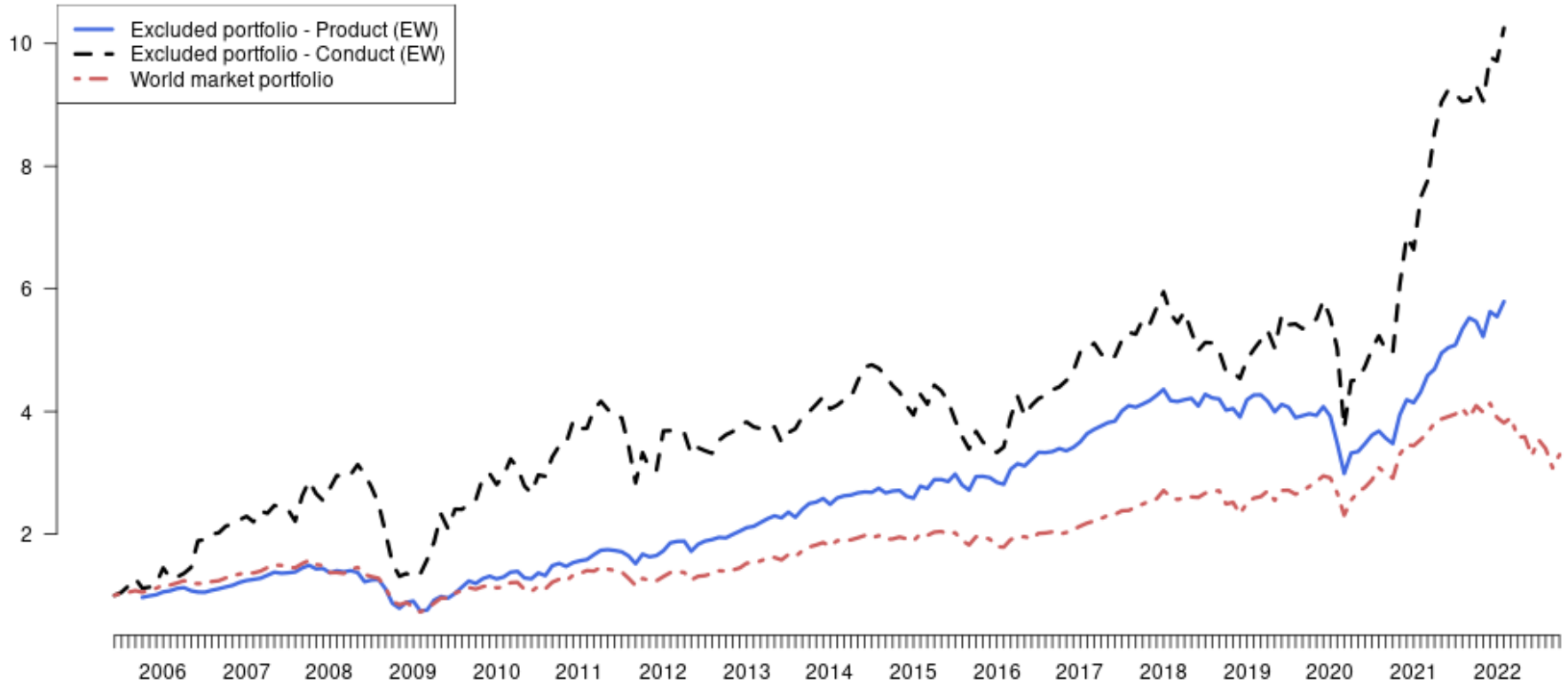
Describing portfolio returns for the various exclusion portfolios. All returns in USD. Returns and

Extra material - exclusion portfolio - Estimates of alpha for (VW) Exclusion Portfolio

	(1)	(2)	(3)	(4)
Alpha	0.006***	0.007***	0.007***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)
Rm-Rf	0.871***	0.801***	0.809***	0.817***
	(0.040)	(0.038)	(0.037)	(0.038)
SMB	−0.313***		−0.421***	−0.421***
	(0.113)		(0.116)	(0.111)
HML	0.183*		0.264***	0.287***
	(0.102)		(0.078)	(0.100)
RMW	0.340***			
	(0.143)			
CMA	0.373***			
	(0.139)			
WML				0.036
				(0.064)
Annualized Alphas(percent)	6.850	9.000	9.010	8.810

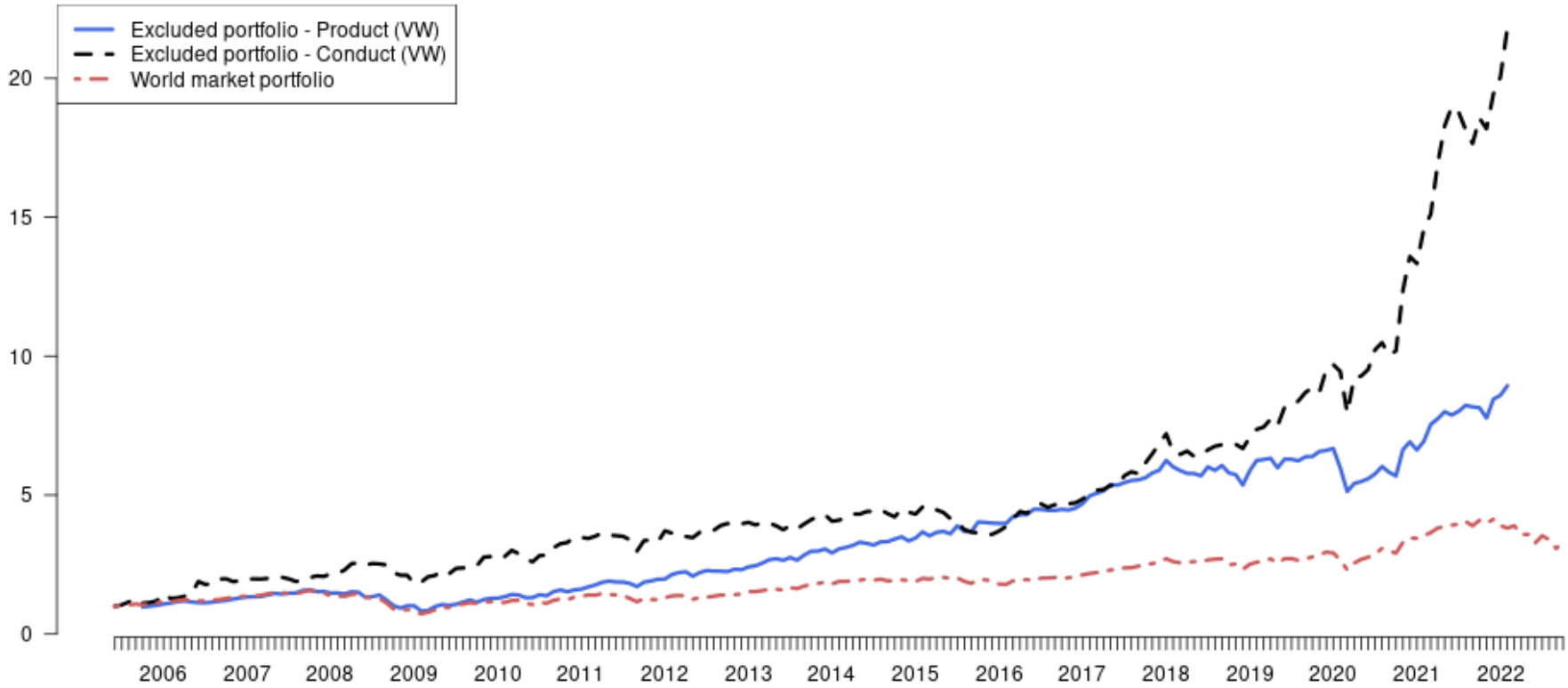
Extra material - exclusion portfolio - Conduct and product based value evolution (EW)

Panel A: Equally weighted exclusion portfolio



Extra material - exclusion portfolio - Conduct and product based value evolution (VW)

Panel B: Value weighted exclusion portfolio

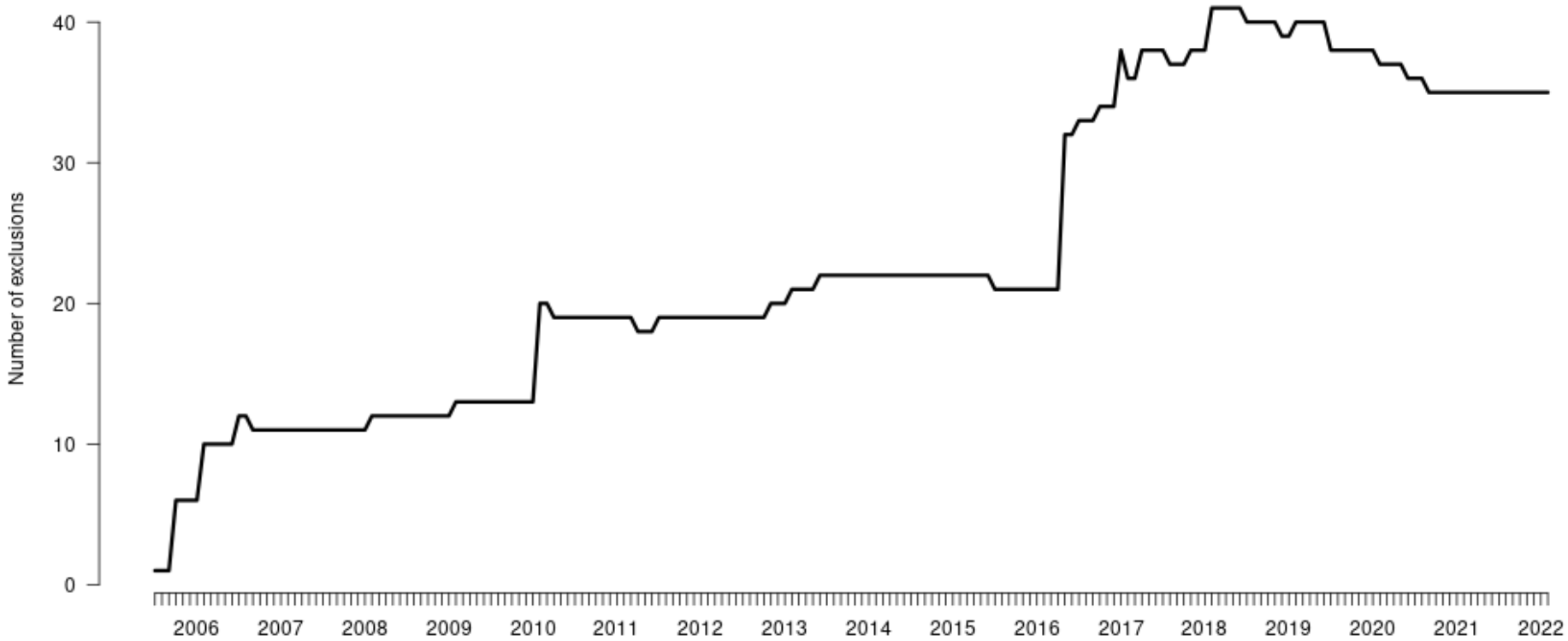


Extra material - exclusion portfolio - Conduct and product based exclusion

	Conduct		Product	
	EW	VW	EW	VW
Alpha	0.007*	0.009***	0.003	0.004**
	(0.004)	(0.003)	(0.002)	(0.001)
Rm-Rf	1.061***	0.793***	0.926***	0.935***
	(0.130)	(0.077)	(0.037)	(0.037)
SMB	0.139	−0.269	0.167	−0.280**
	(0.293)	(0.255)	(0.136)	(0.128)
HML	0.967***	0.293	0.295***	0.208*
	(0.214)	(0.165)	(0.107)	(0.107)
RMW	0.231	0.419	0.164	0.345*
	(0.349)	(0.285)	(0.174)	(0.211)
CMA	−1.241***	0.306	0.070	0.305*
	(0.412)	(0.244)	(0.167)	(0.157)
Annualized Alphas(percent)	8.540	11.310	3.370	4.680

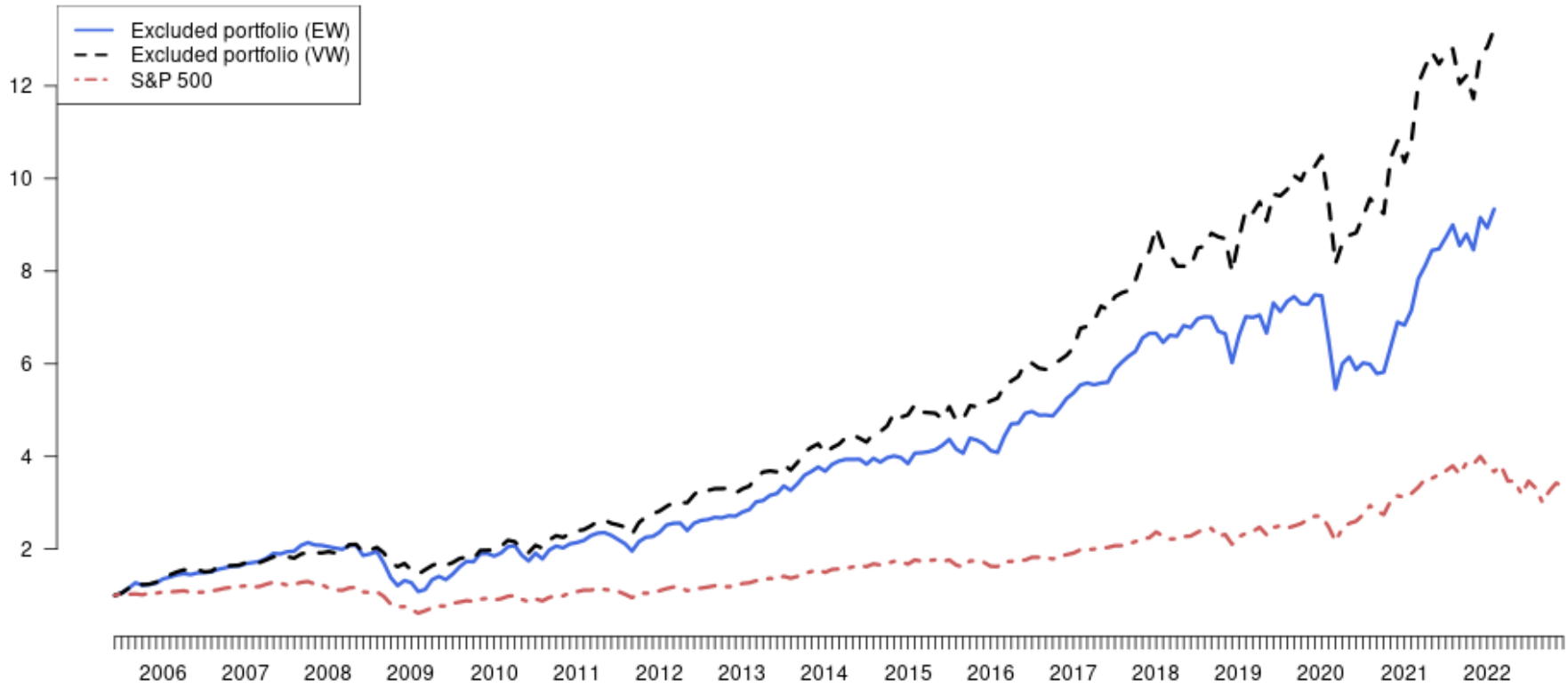
Extra material - exclusion portfolio - US Exclusion Portfolio

Panel A: Number of exclusions



Extra material - exclusion portfolio - US Exclusion Portfolio

Panel B: Cumulative returns



Extra material - exclusion portfolio - US Exclusion Portfolio

	Equally Weighted	Value Weighted
Alpha	0.004*	0.006***
	(0.002)	(0.002)
Rm-Rf	0.925***	0.783***
	(0.050)	(0.045)
SMB	0.012	−0.280***
	(0.089)	(0.080)
HML	0.239***	0.168***
	(0.081)	(0.073)
RMW	0.050	0.258***
	(0.117)	(0.106)
CMA	0.073	0.173
	(0.146)	(0.132)
Annualized Alphas(percent)	4.870	7.200
Adj. R^2	0.710	0.644
Num. obs.	200	200

Extra material - exclusion portfolio - Alpha estimation for Subperiods

Panel A: Equally weighted exclusion portfolio.

	(2005–15)	(2016–21)
Alpha	0.006***	0.003
	(0.002)	(0.002)
Rm-Rf	0.955***	0.930***
	(0.057)	(0.071)
SMB	0.070	0.372*
	(0.130)	(0.165)
HML	0.331**	0.231
	(0.188)	(0.145)
RMW	−0.027	0.197
	(0.297)	(0.176)
CMA	−0.623***	0.458*
	(0.154)	(0.252)
Annualized Alphas(percent)	7.860	3.320

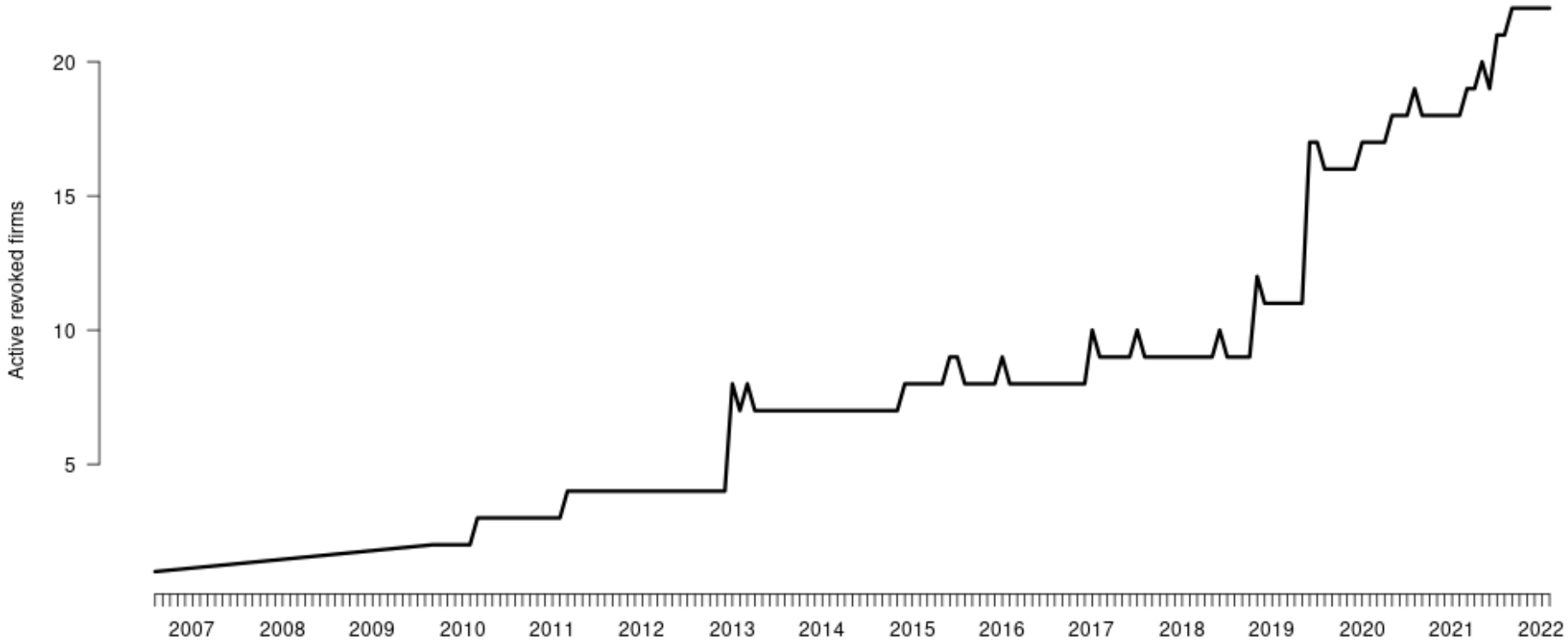
Extra material - exclusion portfolio - Alpha estimation for Subperiods

Panel B: Value weighted exclusion portfolio.

	(2005–15)	(2016–21)
Alpha	0.007***	0.004*
	(0.002)	(0.001)
Rm-Rf	0.840***	0.958***
	(0.040)	(0.046)
SMB	−0.402***	−0.317*
	(0.134)	(0.161)
HML	−0.064	0.128
	(0.141)	(0.178)
RMW	0.274	0.183
	(0.195)	(0.203)
CMA	0.168	0.704***
	(0.144)	(0.264)
Annualized Alphas(percent)	8.440	5.010

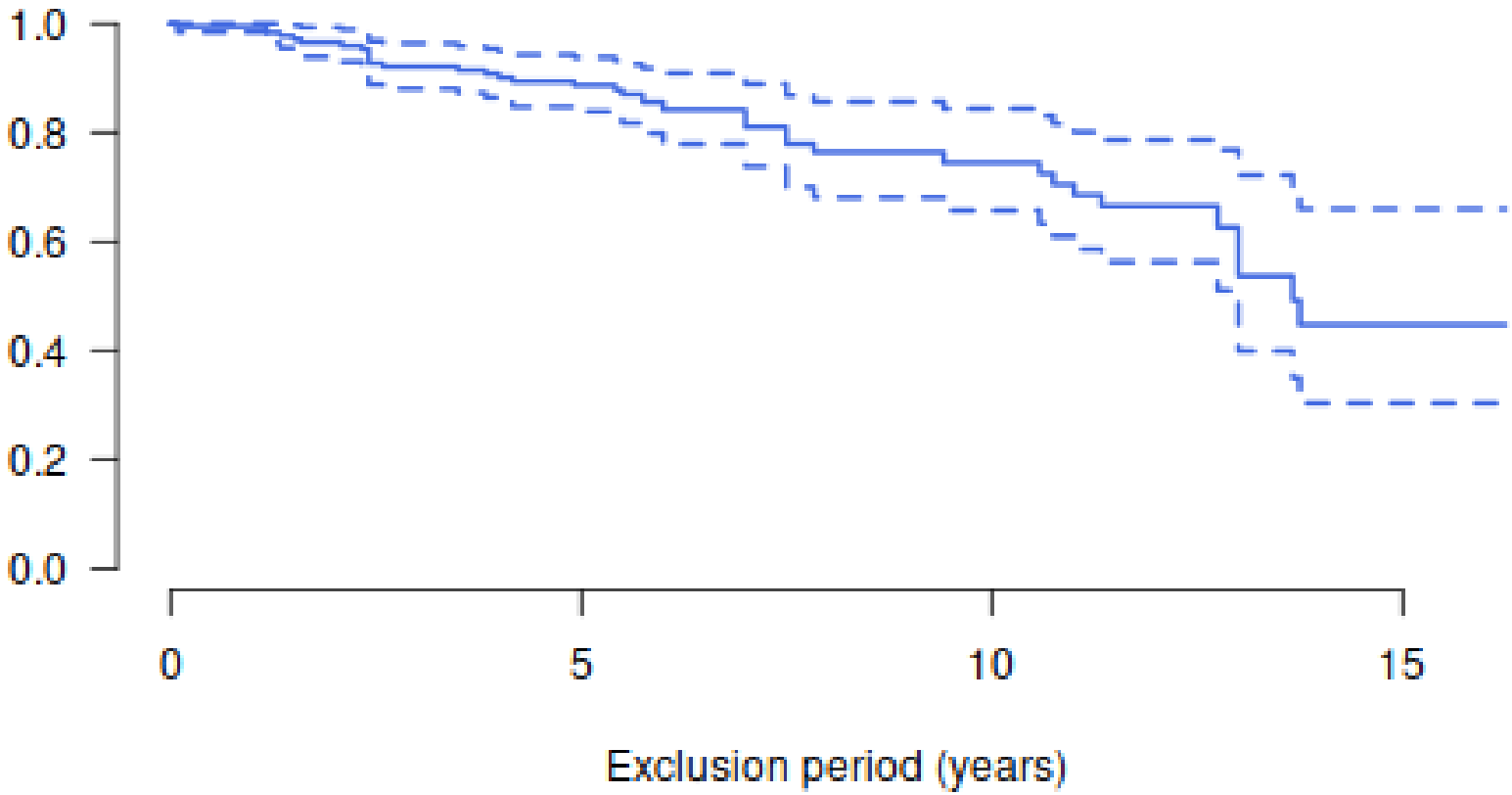
Extra material – Revoking exclusion – Post-Exclusion portfolio

Panel A: Number of stocks with exclusions revoked and still listed



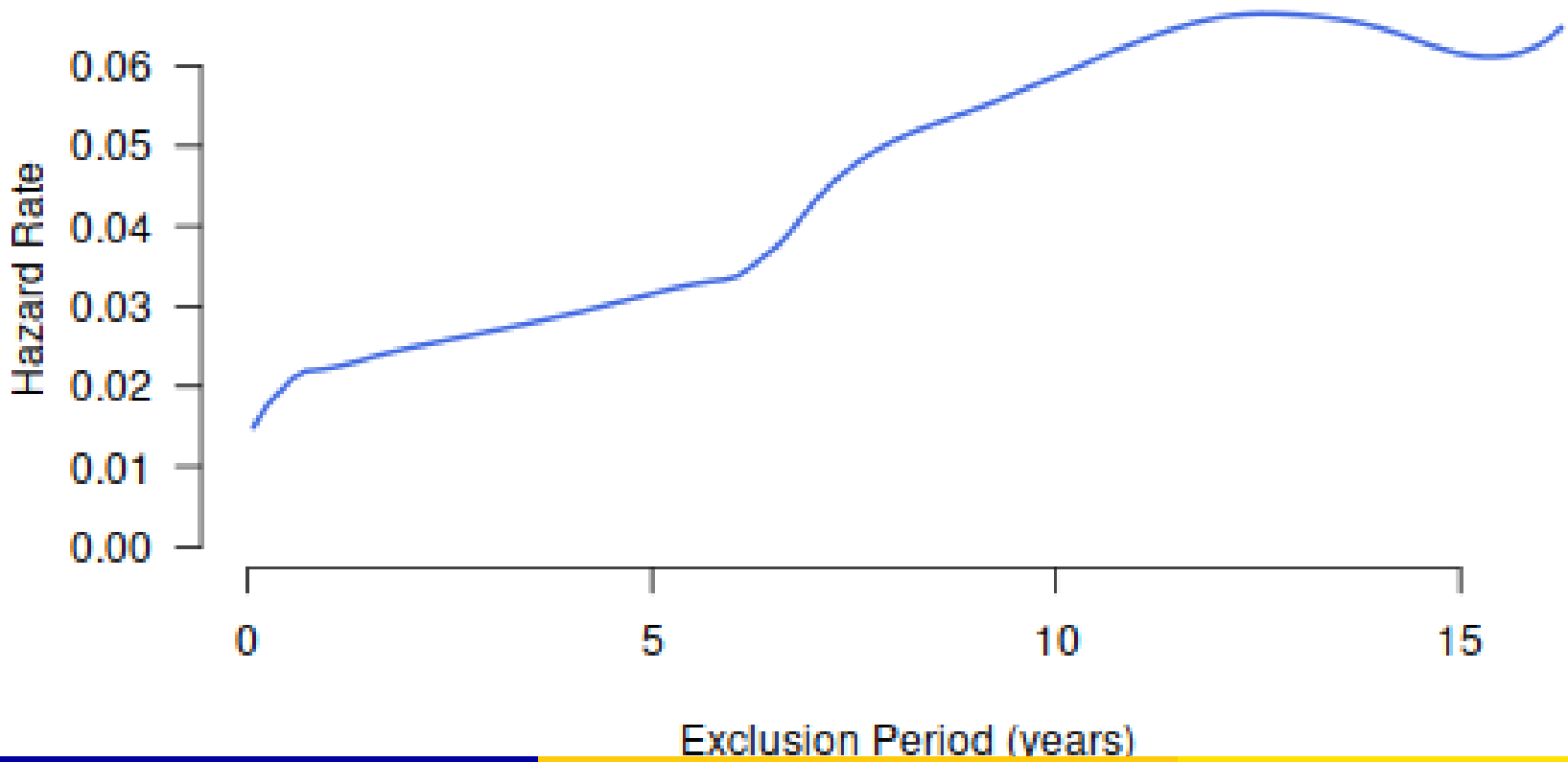
Extra material – Revoking exclusion – Duration (survival) analysis of exit from Exclusion Portfolio

Panel A. Survival curve



Extra material – Revoking exclusion – Duration (survival) analysis of exit from Exclusion Portfolio

Panel B. Instantaneous hazard curve (smoothed)



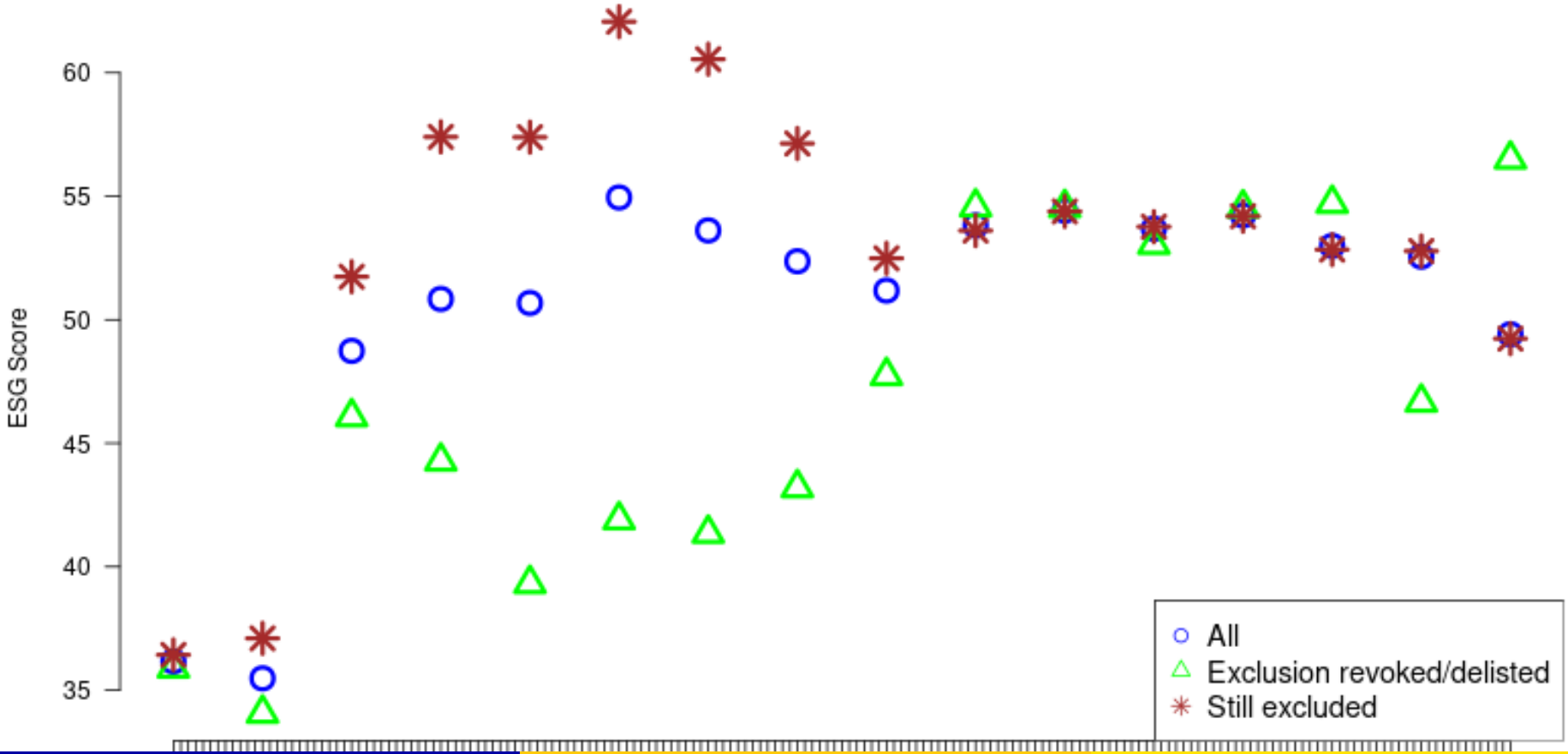
Extra material – Revoking exclusion – Duration (survival) analysis of exit from Exclusion Portfolio

Contributions to survival of exclusion

	(1)	(2)	(3)	(4)
ESG Score	−0.03***	−0.03***	−0.02**	−0.03**
	(0.01)	(0.01)	(0.01)	(0.01)
Ind(Conduct)		0.85**		0.98***
		(0.39)		(0.44)
ln(Mkt Cap)			−0.05	−0.11
			(0.09)	(0.10)
AIC	219.27	217.21	221.05	218.16
R^2	0.03	0.06	0.04	0.07
Max. R^2	0.77	0.77	0.77	0.77
Num. events	28	28	28	28
Num. obs.	150	150	150	150
PH test	0.47	0.76	0.55	0.68

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

Extra material – Revoking exclusion – ESG Scores for firms with/without exclusion revoked

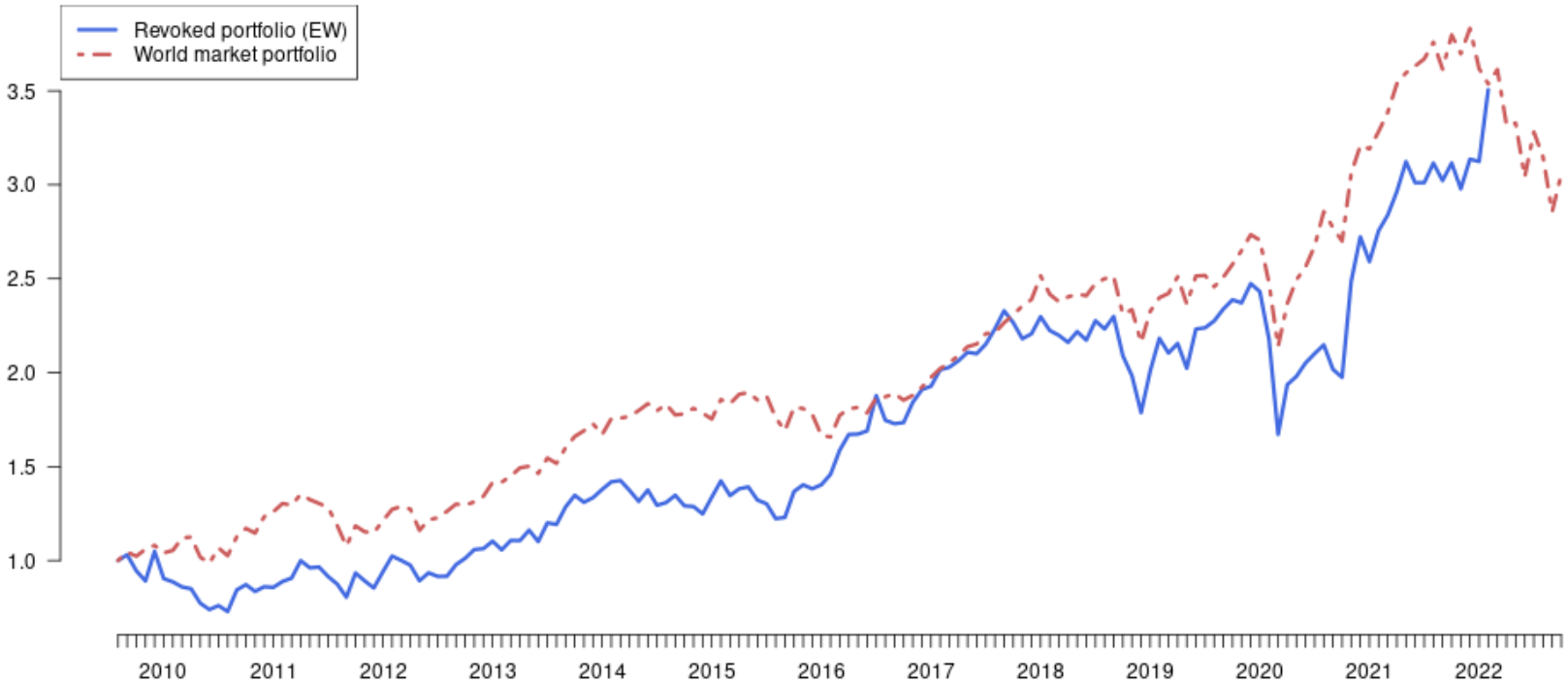


Extra material – Revoking exclusion – Probit estimation of determinants of discontinuation of exclusion

	(1)	(2)	(3)	(4)
(Intercept)	−3.53***	−2.26***	−2.24***	−3.38***
	(1.12)	(0.13)	(0.13)	(1.13)
Growth EPS	−0.02	−0.02		
	(0.02)	(0.02)		
Ind(Conduct)	0.69***	0.66***	0.52***	0.54***
	(0.19)	(0.19)	(0.19)	(0.19)
ln(Mkt Cap)	0.06			0.05
	(0.05)			(0.05)
Growth Revenue			0.46*	0.45*
			(0.26)	(0.26)
Log Likelihood	−97.86	−98.51	−99.08	−98.55
Num. obs.	981	981	969	969

Extra material - The Post-Exclusion portfolio

Firms enter the post-exclusion portfolio month after exclusion is revoked.



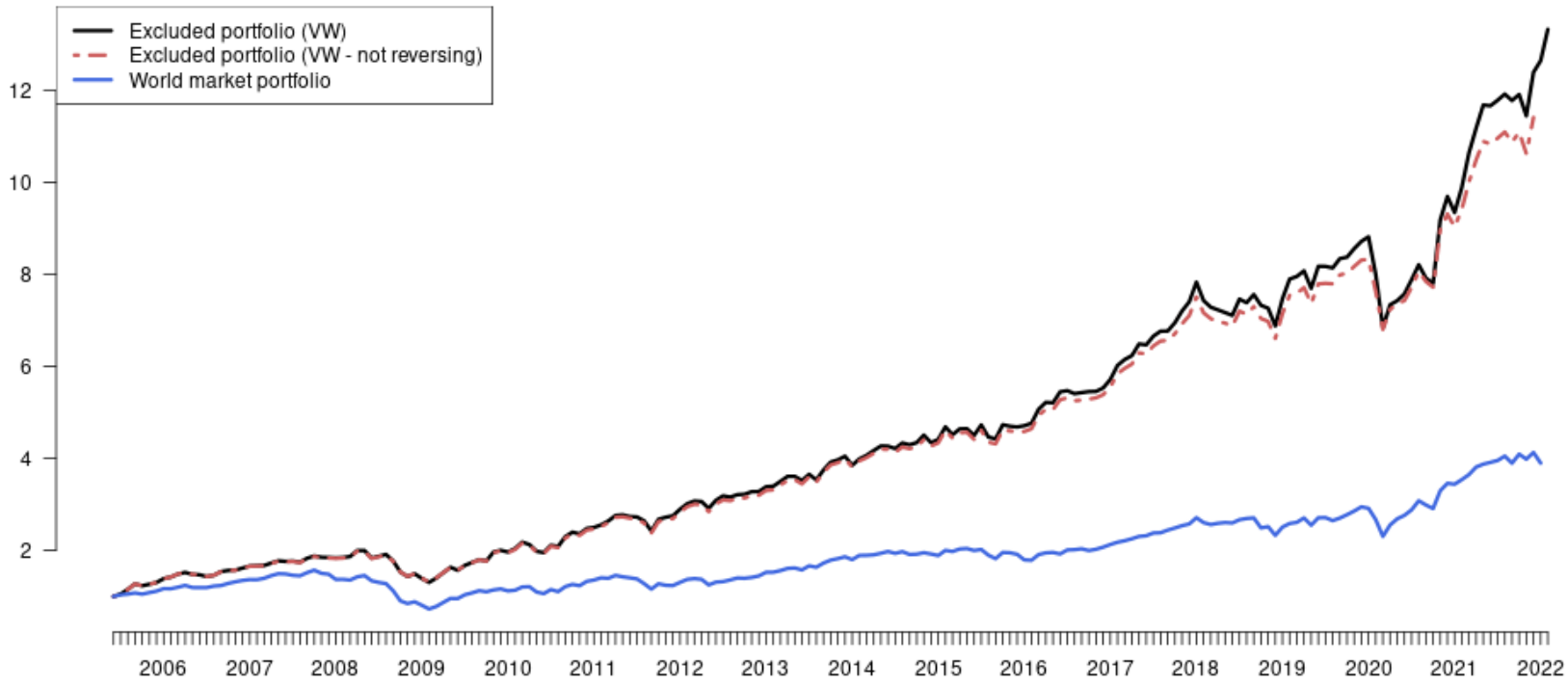
Cumulative returns for the Post-Exclusion Portfolio

Extra analysis - Is revocation a selection issue?

- The Exclusion portfolio – firms only in portfolio *while* excluded.
- Remove firms *post* exclusion. Selection problem?
  - What is the return on the portfolio of post-excluded firms?
  - What if we keep firms in the portfolio even if the exclusion is revoked?

Extra analysis - Is revocation a selection issue? – Keeping the firms with exclusion revoked

Compare Exclusion Portfolio with corresponding portfolio where firms whose exclusion is revoked is kept



Vaska Atta-Darkua. Corporate ethical behaviours and firm equity value and ownership: Evidence from the GPFG's ethical exclusions. Available at SSRN 3388868, 2020.

Doron Avramov, Si Cheng, Abraham Lioui, and Andrea Tarelli. Sustainable investing with ESG rating uncertainty. *Journal of Financial Economics*, 145(2, Part B): 642–664, 2022. doi: 10.1016/j.jfineco.2021.09.009.

Khalil Al Ayoubi and Geoffrey Enjolras. How norway's sovereign wealth fund negative screening affect firm's value and bahaviour. *Business Ethics*, 30:19–37, 2020. doi: 10.1111/beer.12314.

Ravi Bansal, Di (Andrew) Wu, and Amir Yaron. Socially Responsible Investing in Good and Bad Times. *The Review of Financial Studies*, 35(4):2067–2099, 06 2021. doi: 10.1093/rfs/hhab072.

Jonathan Berk and Jules H van Binsbergen. The impact of impact investing. Available at SSRN 3909166, 2021.

Patrick Bolton and Marcin Kacperczyk. Do investors care about carbon risk? *Journal of Financial Economics*, 142(2):517–549, 2021. doi: 10.1016/j.jfineco.2021.05.008.

Sudheer Chava. Environmental externalities and cost of capital. *Management Science*, 60(9):2223–2247, 2014.

Sondre Hansen Eriksen, Snorre Lindset, Quynh Trang Nguyen, and Marie Skara. Market reactions to ESG announcements: Evidence from a $1 trillion fund. Available at SSRN 3640447, September 2020.

Andreas G F Hoepner and Lisa Schopohl. On the price of morals in market: An empirical study of the Swedish AP-funds and the Norwegian government pension fund. *Journal of Business Ethics*, 151:665–692, 2018.

Harrison Hong and Marcin Kacperczyk. The price of sin: The effects of social norms on markets. *Journal of Financial Economics*, 93(1):15–36, 2009. doi: 10.1016/j.jfineco.2008.09.001.

Harrison Hong, Neng Wang, and Jinqiang Yang. Welfare Consequences of Sustainable Finance. *The Review of Financial Studies*, 06 2023. doi: 10.1093/rfs/hhad048.

L'uboš Pástor, Robert F Stambaugh, and Lucian A Taylor. Sustainable investing in equilibrium. *Journal of Financial Economics*, 142(2):550–571, 2021. doi: 10.1016/j.jfineco.2020.12.011.

L'uboš Pástor, Robert F Stambaugh, and Lucian A. Taylor. Dissecting green returns. *Journal of Financial Economics*, 146(2):403–424, 2022. ISSN 0304-405X. doi: https://doi.org/10.1016/j.jfineco.2022.07.007. URL `https://www.sciencedirect.com/science/article/pii/S0304405X22001672`.

Lasse Heje Pedersen, Shaun Fitzgibbons, and Lukasz Pomorski. Responsible investing: The ESG-efficient frontier. *Journal of Financial Economics*, 142(2):572–597, 2021. doi: 10.1016/j.jfineco.2020.11.001.

Jeremy Stein. Overreactions in the options market. *Journal of Finance*, 44:1011–23, 1989.