

Showing off cleaner hands: mandatory climate-related disclosure by financial institutions and the financing of fossil energy

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FRBSF Finance Seminar - June, 14th 2021

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Motivation

- COP21, December 2015 : Need to shift global funding towards low carbon activities to curb global greenhouse gas (GHG) emissions → calls for action addressed to private finance
- Private coalitions for sustainable finance (*UNEP FI, TCFD, Climate action 100+* etc.) supporting climate-related **voluntary** disclosure
- In parallel, a move from regulators towards **mandatory** disclosure :
 - France (this paper), incoming in EU (SFDR), in the US (SEC public consultation)
 - G7's endorsement of mandatory reporting following TCFD guidelines

What benefits shall we expect of imposing carbon disclosure requirements on financial institutions ?

This paper

Does mandatory climate-related disclosure by financial institutions lead them to divest from carbon-intensive industries ?

- Natural experiment : French law in 2015, enacted as of January 2016 (*TECV* Bill, art. 173-6)
 - Objective : disclosure of exposure to climate-related risks/ climate change mitigation plans
 - Target : institutional investors (insurers, pension funds, investment funds)
 - Unique in Europe at the time.
- Impact metrics : changes in holdings of fossil energy securities (bonds and stocks)
 - Production/combustion of Fossil fuels \approx 90% of CO₂ emissions
 - Increased scrutiny by NGOs and public opinion

Hypothesis : transparency regulation \Rightarrow incentives to cut priorily funding to fossil fuels (reputation channel/pressure by stakeholders + low hanging fruits)

What we do

- We merge two large granular datasets over 2013-2019 :
 - ① Reconstructed universe of bonds and stocks outstanding of FF companies worldwide (identifiers : ISIN codes)
 - ② Eurosystem proprietary information on ISIN-level securities holding by each sector-country pair in euro area (SHS-S)
- Final sample : 7,040 securities (5,143 bonds/1,897 stocks) issued by 2,757 different FF companies and held by euro area financials
- We run Diff-in-diff regressions, comparing FF holdings :
 - treated sector-country pairs (ICPF and AM in France) vs control sector-country pairs (financials in all other countries + French banks)
 - Before/After January 2016
- Controlling for all potentially confounding effects (demand/supply, macro, country- and sector-specific heterogeneity, price fluctuations)

Main findings

Main take away : mandatory climate-related disclosure caused significant decrease in funding of fossil energy firms (mutatis mutandis)

- Economically significant : relative reduction in holdings by 44%
- Effect along both intensive and extensive margins
- Not an artefact of price fluctuations
- Robust to sequential exclusion of control countries

Additional findings :

- Stronger impact on coal and holdings of stocks + strong (euro area) home bias
- Results suggesting disclosure may foster the adoption of middle-term commitment as setting an emission reduction target.

Related literature

- **Effects of mandatory information disclosure on financial markets.** Financial disclosure : Stiegler (1963), Goldstein and Yang (2017), Jayaraman and Wu (2019). ESG disclosure : Christensen et al., 2017, Ioannou and Serafeim (2017). Carbon emissions : Downar et al. (2019), Jouvenot and Krueger (2020).

⇒ **This paper** : effects of regulation requiring *investors* to report on their carbon footprint

- **Do investors care for climate?** Pricing of climate risks : Bolton and Kacperczyk (2020), Ramelli, Ossola and Rankan (2020), Koelbel et al. (2020). Investors perception of risks and ESG performance : Gibson and Krueger (2017), Dyck et al. (2019), Boermans and Galema (2019).

⇒ **This paper** : divestment from *fossil energy* firms *under constraint to publish* information on carbon footprint.

The 2015 French law on climate-related disclosure

Law on Energy transition and green growth (TECV)

- Passed on 17 August 2015, in run-up to Paris COP21
- Enacted by a decree on 29 December 2015, entered into force on 1 January 2016

Art. 173-6 of the law pioneers mandatory climate-related reporting by investors in Europe

- **Target** : asset management firms (AM - *Sociétés de gestion*), insurance companies and pension funds (ICPF) in France
- **Scope** : three dimensions of climate-related impact and responsibility :
 - Carbon footprint of investment portfolio
 - Analysis of exposure to physical and transition risks
 - Own contribution to climate change mitigation (portfolio alignment, green share etc.)
- Consistent with disclosure recommendations of FSB's TCFD
- No harmonized methodologies, *Comply-or-explain* basis

The 2015 French law on climate-related disclosure (2)

Implementation of Art. 173-6 monitored by public supervisors

(AMF, ACPR) and NGOs (WWF, Novethic...)

- Focus mostly on compliance and quality/sincerity of firms' reports
- Shared conclusion : still insufficient provision of information by many institutions
 - French regulators [ACPR/AMF/DGT/MTES (2019)] : only half of the 48 large institutions publish information on all required dimensions

In contrast, we focus here on investments into fossil energy corporations (holdings of bonds and shares)

No similar regulatory change elsewhere in the Euro area up to 2019

- Revision of 2014 EU NFR Directive, including (non-binding) guidelines on climate-related disclosure starting June 2019
- Consultation on EU sustainable finance strategy starting February 2020 \Rightarrow SFDR, March 2021.

Data (1)

Recovering the universe of outstanding fossil energy securities (ISIN codes) over 2013Q4-2019Q3

(extraction/transportation/production of FF) :

- Thomson Reuters/Refinitiv : 12,437 securities sorted into 31 TRBC-subcategories related to fossil energy (e.g., *Petroleum Refining*, *Gas drilling - offshore*, etc.).
- Bloomberg : 12,085 securities sorted into 8 BICS-subcategories related to fossil energy.

⇒ **Reunion of both sources : 15,523 ISIN-codes** (12,167 bonds / 3,356 stocks)

- Sorted into *Conventional Oil and Gas* vs *Coal and unconventional fossil fuel*
- Large overlap of Bloomberg and Refinitiv (75% of ISIN codes in common)

Data (2)

Eurosystem's granular Securities Holdings Statistics (SHS-S) :

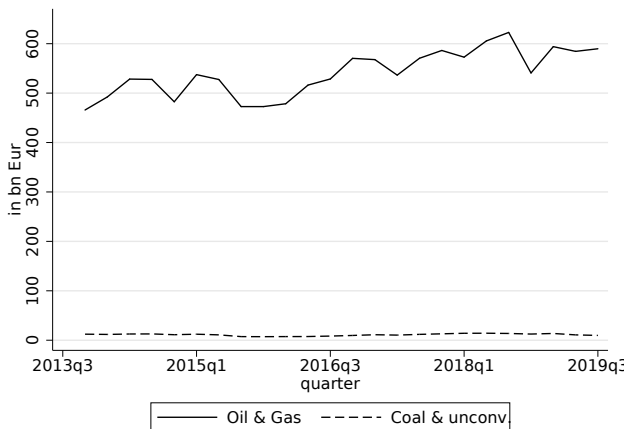
- ISIN-level holdings of each ESA 2010 institutional sector in each EA country, locational basis, no minimum threshold.
 - Financial sectors : banks (S122), ICPF (S128, S129), asset managers (S16, S123 to S127)
- Quarterly from 2013Q4 onward
- Rich information about each security (price, market cap etc.)
- Cleaning : keep only positive holdings (≥ 1 EUR)

Example : holdings of bond XS1327914062, issued 12 Dec. 2015 by Total SA, in portfolios of Spanish banks, Dutch pension funds etc.

We merge the retrieved list of FF securities with SHS-S ► Descr. Stat. :

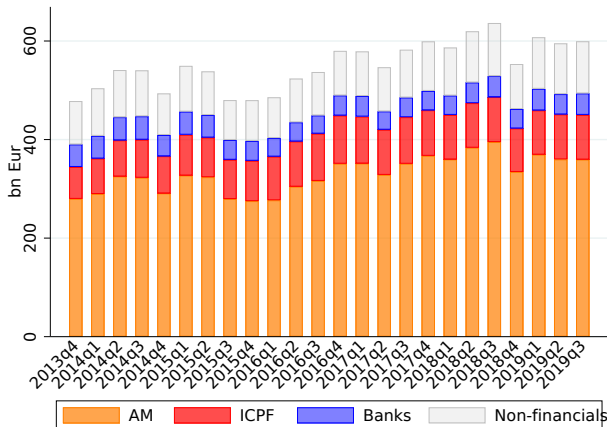
- **All EA investors** : 7,427 securities issued by 3,082 FF companies worldwide
- **Financial investors only** : 7,040 securities (5,143 bonds/1,897 stocks) from 2,757 different FF companies

Euro area investments in fossil fuel firms on the rise



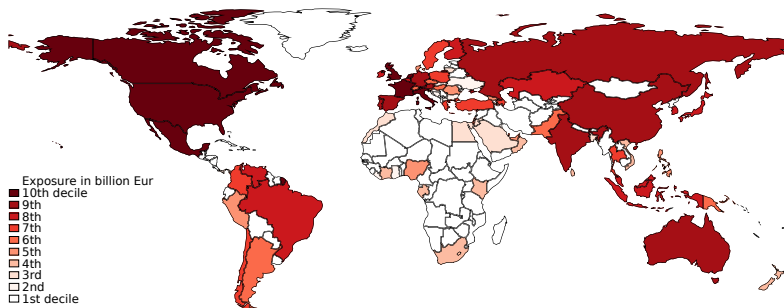
Note. Holdings of bonds and stocks reported by euro area investors (all sectors) in the SHS database. Current market value.

Exposure to fossil energy concentrated in financial sectors



Note. Holdings of bonds and stocks reported by Euro area investors, breakdown by holder sector. Current market values. *Non-financials* include households, non-financial corporations and government entities.

Geography of fossil energy investments by EA financials



Note. Holdings of fossil energy securities by euro area financials are cumulated at the level of the country of residence of issuer companies. Countries are grouped into deciles. Countries in the last decile benefit from the largest amounts invested by euro area financials. Holdings are expressed at market value as of 2015Q4.

Concentration : 3 oil companies \approx 1/5 of holdings by EA financial sectors.

Empirical strategy

Objective : Evaluating causal impact of French disclosure regulation on holdings of fossil energy securities.

Difference-in-differences strategy :

- **Treated sectors :** Institutional Investors (AM + ICPF) in France.
- **Control sectors :** French banks + all financial sectors in 18 other EA countries.
- Comparing **pre-policy** period (2013-2015) vs **post-policy** period (2016-2019).
- Saturating the regression with fixed effects so as to control for demand and supply of securities, price fluctuations and country-sector specifics.

Empirical models

Intensive margin :

$$\begin{aligned}
 b_{ihct} = & \beta_1 POST_t \times InstInv_h \times FR_c \\
 & + \beta_2 POST_t \times FR_c + \beta_3 POST_t \times InstInv_h + \beta_4 InstInv_h \times FR_c \\
 & + \gamma_i + \gamma_t + \gamma_c + \gamma_h + u_{ihct}
 \end{aligned}$$

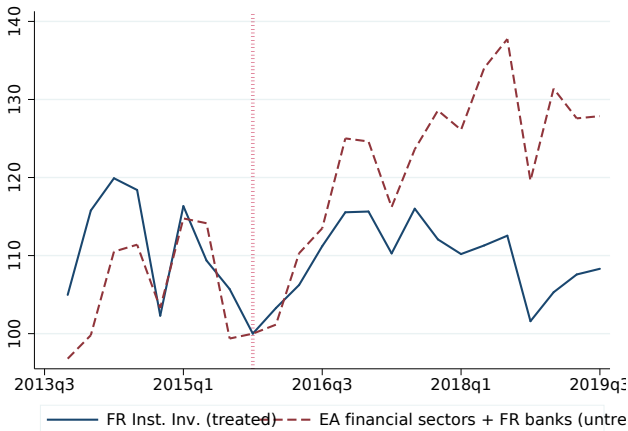
Extensive margin :

$$\begin{aligned}
 I_{(b_{ihct} > 0)} = & \beta_1 POST_t \times InstInv_h \times FR_c \\
 & + \beta_2 POST_t \times FR_c + \beta_3 POST_t \times InstInv_h + \beta_4 InstInv_h \times FR_c \\
 & + \gamma_i + \gamma_t + \gamma_c + \gamma_h + u_{ihct}
 \end{aligned}$$

Zeros : all possible c, h, t triplets for each observed security i .

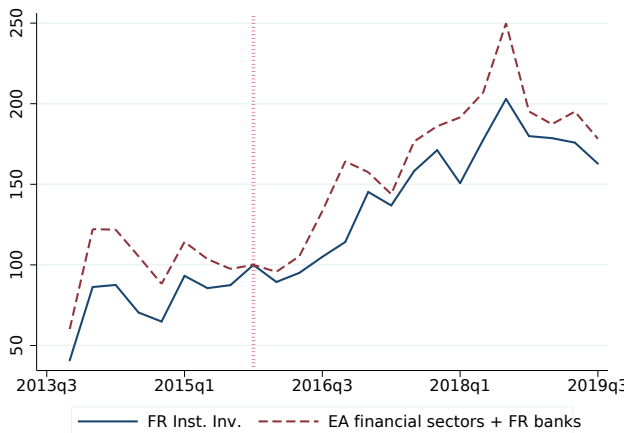
Expected sign : $\beta_1 < 0$

Preview : cumulated holdings of fossil energy securities (2015Q4=100)



Note. Cumulated amounts of fossil energy securities held by “treated” vs “control” institutions. Scaled at 100 in December 2015 (vertical dotted line). Holdings are expressed at market value.

Average price fluctuations : treated vs controls



Note. Unweighted average price of fossil energy securities held by “treated” vs “control” institutions. Scaled at 100 in December 2015 (vertical dotted line). Prices are expressed at market value in euro.

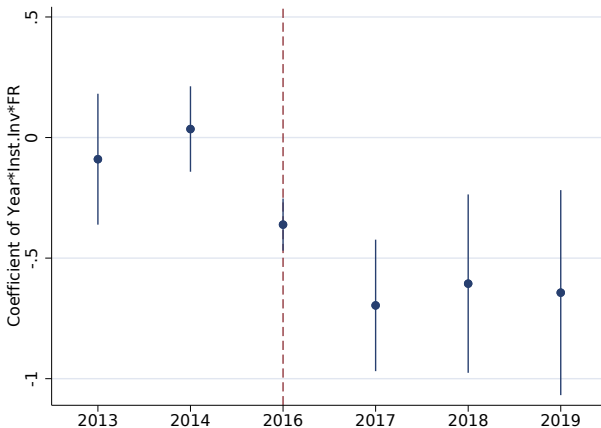
Impact of mandatory disclosure on holdings : intensive margin

	(1)	(2)	(3)	(4)	(5)
Post \times InstInv \times FR	-0.470** [0.208]	-0.569*** [0.197]	-0.628*** [0.169]	-0.585*** [0.148]	-0.580*** [0.107]
Interacted terms	Yes	Yes	Yes		
ISIN FE	Yes	Yes			
Time FE	Yes	Yes			
Country FE	Yes				
Sector FE	Yes				
Country \times Sector FE		Yes	Yes	Yes	
Country \times Time FE				Yes	Yes
Sector \times Time FE				Yes	Yes
ISIN \times Quarter FE			Yes	Yes	Yes
ISIN \times Sect. \times Count. FE					Yes
Nb clusters	57	57	57	57	57
Observations	587,455	587,455	571,967	571,967	565,672
Adj. R2	0.56	0.62	0.59	0.59	0.90

Note. Dependent variable : holdings at market value (in log) at the ISIN-holder sector-holding country level. Estimation period : 2013-2019. Standard errors are clustered at the holding sector-holding country level.

Economic significance : $\beta_1 = -0.585 \Leftrightarrow$ holdings \downarrow by 44% (*mutatis mutandis*).

Time-varying coefficients



Note. Estimated coefficients of the triple interaction terms $Year \times InstInv \times FR$ in a dynamic version of baseline equation. 2015 is taken as a reference year and hence omitted. The vertical dotted line in 2016 corresponds to the year when the new climate-related disclosure regulation was enacted in France.

Impact of mandatory disclosure on holdings : extensive margin

	(1)	(2)	(3)	(4)	(5)
Post \times InstInv \times FR	-0.018** [0.007]	-0.018** [0.007]	-0.018** [0.007]	-0.018** [0.008]	-0.013** [0.006]
Interacted terms	Yes	Yes	Yes		
ISIN FE	Yes	Yes			
Time FE	Yes	Yes			
Country FE	Yes				
Sector FE	Yes				
Country \times Sector FE		Yes	Yes	Yes	
Country \times Time FE				Yes	Yes
Sector \times Time FE				Yes	Yes
ISIN \times Quarter FE			Yes	Yes	Yes
ISIN \times Sect. \times Count. FE					Yes
Nb clusters	57	57	57	57	57
Observations	5079156	5079156	5079156	5079156	5053107
Adj. R2	0.29	0.41	0.40	0.40	0.80

Note. Linear probability regressions. Dependent variable : dummy variable for positive holdings at the ISIN-holder sector-holding country level. Estimation period : 2013-2019. Standard errors are clustered at the holding sector-holding country level.

Robustness checks : summary

Results at intensive margin qualitatively robust to :

- **Selection of control countries** : dropping each control country in turn [▶ Details](#)
- **Price fluctuations** : computing real holdings at 2015q4 prices
- Accounting better for heteroscedasticity : PPML regression
- **Cross-sectional approach** : collapsing time dimension into two 3-years periods. [▶ Details](#)

Extensions : fuel type, institution type, security type, home bias

Differentiated effects by [Details](#) :

- **Fuel type** : $\downarrow -75\%$ if coal/unconventional vs $\downarrow -42\%$ if oil/gas
- **Green bonds** : No impact of removing Green bonds (cf. Bloomberg and Refinitiv lists)
- **Security type** : $\downarrow -74\%$ if stocks vs (non-significant) $\downarrow -2\%$ if bonds
- **Issuer country** : $\downarrow -55\%$ if non-EA vs $\downarrow -13\%$ if EA.

Going for real effects

TABLE : Firm-level regressions : adoption of CO2 emission targets.

	All firms		Firms held > 0 FR II	
	(1)	(2)	(3)	(4)
Treatment intensity	5.276*** [1.454]	11.117*** [2.623]	4.484*** [1.431]	9.374*** [2.542]
ROA(2015)	-0.541*** [0.166]	-0.917*** [0.207]	-0.636** [0.289]	-1.054*** [0.371]
Market cap(2015) (ln)	0.404*** [0.050]	0.568*** [0.069]	0.343*** [0.059]	0.468*** [0.075]
Country FE	No	Yes	No	Yes
Observations	827	453	361	218
Pseudo R^2	0.28	0.43	0.16	0.32

Note. Cross-sectional probit regressions. Dependent variable : dummy equal to one when the firm has adopted a target for reducing its CO2 emissions as of the end of 2019. *Treatment intensity* is defined at the firm level as the share of equity held by French institutional investors, as of 2015Q4. Market capitalization in expressed in Eur, as of 2015Q4. Columns 1-2 : all fossil fuel firms, even if not held by French institutional investors in 2015. Columns 3-4 : sample restricted to firms with positive treatment intensity. All firm-level controls as of end 2015. White-robust standard errors.

► Descr. Stat.

Conclusion

Mandatory climate-related disclosure by investors instrumental in curbing funding of fossil energy industry.

- Calls for extension of such regulation to all types of investors, ideally at EU level.
- Voluntary coalitions may help, but not enough to wipe out effect of regulation over time (Bingler, Kraus, Leippold, 2021 : “Cheap talk and cherry-picking”)
- Harmonized reporting may prove more effective (Jouvenot and Krueger, 2020), but even loosely defined reporting standards help.

Appendix

Descriptive statistics (estimation sample)

TABLE : Summary statistics - cleaned sample

Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P50	P75
Holdings (Mn Eur)	587,660	18.71	181.2	0	19407.3	.27	1.61	8.51
Log Holdings	587,660	14.02	2.83	0	23.69	12.51	14.29	15.96
Bond price	405,334	99.95	16.21	0	180.49	98.15	101.73	106.33
Log Price	587,606	4.03	1.8	-9.21	13.26	4.06	4.61	4.66
Yield-to-maturity (bonds)	381,365	4.11	3.17	-1.5	20	1.85	3.74	5.59
Resid. maturity (yr, bonds)	405,362	11.4	8.92	.49	100.08	7	10	10.34

► Back

Descriptive statistics (issuer-level sample)

TABLE : Summary statistics, firm level : sample of fossil fuel firms with balance sheet information.

	Obs.	Mean	Std. Dev.	Min.	p25	Median	p75	p90	Max.
<i>Panel 1 : All firms</i>									
Co2 target	1002	0.05	0.21	0.00	0.00	0.00	0.00	0.00	1.00
Treatment intensity	1002	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.49
Market cap(2015) (ln)	991	18.46	3.30	3.22	16.59	18.84	20.82	22.14	26.42
ROA(2015)	827	-0.01	0.31	-4.40	-0.04	0.05	0.11	0.17	0.76
<i>Panel 2 : Firms with positive treatment intensity</i>									
Co2 target	381	0.12	0.32	0.00	0.00	0.00	0.00	1.00	1.00
Treatment intensity	381	0.01	0.04	0.00	0.00	0.00	0.00	0.01	0.49
Market cap(2015) (ln)	370	20.93	1.92	15.44	19.83	21.02	22.22	23.31	26.42
ROA(2015)	361	0.02	0.24	-2.68	-0.00	0.07	0.12	0.18	0.61

Note. The treatment intensity is the ratio of a firm's shares held by treated investors to the market capitalization of these shares, as of December 2015. *CO2 Target* is a dummy variable that takes the value of one whenever the firm has committed between 2016 and 2019 to meet an explicit GHG emissions target by a given horizon (e.g., 2030). Source : Refinitiv ESG.

Robustness : excluding one control country at a time

	Excluding in turn one control-country :					
	DE	IT	LU	IE	NL	BE
Post \times InstInv \times FR	-0.399** [0.162]	-0.573*** [0.165]	-0.636*** [0.124]	-0.610*** [0.158]	-0.551*** [0.153]	-0.621*** [0.143]
Country \times Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Country \times Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector \times Time FE	Yes	Yes	Yes	Yes	Yes	Yes
ISIN \times Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Nb clusters	54	54	54	54	54	54
Observations	488,637	528,060	478,671	483,045	499,897	540,056
Adj. R2	0.56	0.60	0.57	0.59	0.60	0.59

Note. Dependent variable : holdings at market value (in log) at the ISIN-holder sector-holder country level. Estimation period : 2013-2019. Standard errors are clustered at the holder sector-holder country level.

► Back

Robustness : constant prices, PPML and CS analysis

	Panel regressions			CS reg
	(1) OLS	(2) OLS	(3) PPML	(4) OLS
Post \times InstInv \times FR	-0.624*** [0.144]	-0.582*** [0.108]	-0.232*** [0.085]	
InstInv \times FR				-0.802*** [0.139]
Country \times Sector FE	Yes		Yes	
Country \times Time FE	Yes	Yes	Yes	
Sector \times Time FE	Yes	Yes	Yes	
ISIN \times Time FE	Yes	Yes	Yes	
ISIN \times Sect. \times Count. FE		Yes		
Nb clusters	57	57	57	
Observations	468,112	465,632	571,967	23,389
Adj. R2	0.60	0.90		0.11
Log Lik.	-9.03e+05	-5.64e+05	-6.06e+12	-51714.76
Pseudo R2			0.77	

Note. Dependent variable : holdings expressed at 2015 Q4 market prices (in log) at the ISIN-holder sector-holder country level (col. 1-6), or growth rate of holdings at market prices at the ISIN-holder sector-holder country level (col. 7). In the regression presented in col. 7, growth rates compare the average holdings over 2013-2015 vs 2016-2019. Estimation period : 2013-2019. Standard errors are clustered at the holder sector-holder country level (col. 1-6) or White-robust (col. 7).

Extensions : detailed results

	Fossil (1)	Excl. greenbonds (2)	Oil/gas (3)	Coal/Unc. (4)	(5) Bonds	(6) Stocks	Fossil (7)	(8) For.	(9) EA
Post × InstInv × FR	-0.585*** [0.148]	-0.587*** [0.149]	-0.537*** [0.154]	-1.402*** [0.288]	-0.021 [0.117]	-1.358*** [0.202]		-0.793*** [0.192]	-0.143 [0.100]
Post × ICPF × FR							-0.406** [0.164]		
Post × OFI × FR							-0.643*** [0.134]		
Country × Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector × Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISIN × Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nb clusters	57	57	57	51	57	57	57	57	57
Observations	571,967	571,646	547,307	26,085	397,139	174,828	571,967	452,014	134,152
Adj. R2	0.59	0.59	0.59	0.74	0.49	0.68	0.59	0.67	0.52

Note. Dependent variable : holdings at market value (in log) at the ISIN-holder sector-holder country level. Estimation period : 2013-2019. Standard errors are clustered at the holder sector-holder country level.

► Back

Refinitiv TRBC classification

FIGURE : Refinitiv TRBC - extract of the fossile energy sub-classification

ECONOMIC SECTOR	BUSINESS SECTOR	INDUSTRY GROUP	INDUSTRY	ACTIVITY
Energy				
	Energy - Fossil Fuels			
		Coal		
			Coal	
				Coal (NEC)
				Coal Mining Support
				Coal Wholesale
		Oil & Gas		
			Integrated Oil & Gas	
				Integrated Oil & Gas
			Oil & Gas Exploration and Production	
				Oil & Gas Exploration and Production (NEC)
				Oil Exploration & Production - Onshore
				Oil Exploration & Production - Offshore
				Natural Gas Exploration & Production - Onshore
				Natural Gas Exploration & Production - Offshore
				Unconventional Oil & Gas Production
			Oil & Gas Refining and Marketing	
				Oil & Gas Refining and Marketing (NEC)
				Petroleum Refining
				Gasoline Stations
				Petroleum Product Wholesale
		Oil & Gas Related Equipment and Services		
			Oil & Gas Drilling	
				Oil & Gas Drilling (NEC)
				Oil Drilling - Onshore
				Gas Drilling - Onshore
				Oil Drilling - Offshore
				Gas Drilling - Offshore
				Unconventional Oil & Gas Drilling
			Oil Related Services and Equipment	
				Oil Related Services and Equipment (NEC)
				Oil Related Services
				Oil Related Equipment
				Oil Related - Surveying & Mapping Services