Over with carbon? Investors' reaction to the Paris Agreement and the US withdrawal

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Climate change and sustainability policy [1]

▶ The **Paris Agreement** (PA) marks an important shift in the global attitude towards the climate change mitigation:

- *2015 December: adopted by UNFCCC*
- *2016 April: opened for signature*
- *2016 October: enough for ratification*
- *2016 November: went into force*

▶ **Expectations**

- *More stringent emission targets*
- *Functioning mechanisms to meet the goals*
- *Mobilization of finance needed for the effective changes*
- **Diversion of funds from carbon/GHG-intensive producers**: *squeezed market, taxation*

Climate change and sustainability policy [2]

► The **US withdrawal**:

  - *2017 June: announcement*
  - *2019 November: formal notice to withdraw*
  - *2020 November: formal withdrawal*
  - *2021 February: US rejoined*

► Implications:

  • *decreased motivation to impose or follow tight targets due to the US free-riding*

  • *increased uncertainty about the viability of the PA*

    - *increased costs for countries that continue it*

    - *decreased competitiveness*

  [*Steinhauer (2018); Dai et al. (2017); Zhang et al. (2017a); Zhang et al. (2017b)*]

► **Expectations: diversion of funds becomes less intensive, if not reverses.**

Research framework

▶ **Question**: how do (various) investors react to these policy events?

▶ **Instrument**: stocks

▶ **Participation metric**: $\log \left(\frac{\text{Stock holdings}}{\text{Market capitalization}} \right)$

▶ **Data**: ECB Securities Holdings Statistics (2015Q1-2020Q3)

▶ **Method**: DID between the participation in issuers with high and low total GHG/CO2 levels (Bloomberg data) + additional sectoral constraints.

Methodological aspects

▶ **Size differences: matching** is applied **on** the (logarithm of the) **market value** of firms, as well on the **profitability** (dividend yield) and **riskiness** (historical volatility) of stock returns of issuers.

▶ **Issues with Propensity Score-based matching** (King and Nielsen, 2019): We use the **Coarsened Exact Matching** (CEM, see Iacus et al., 2012) as a **base**. **Genetic** and **NN-PS** matchings used for **robustness** check.

▶ **Issues with a 'standard' panel data-based 'DID' estimator** (e.g., Chaisemartin and Haultfoeuille, 2020): We use the **dynamic doubly-robust DID of Callaway and Sant'Anna (2020)** as the main approach. Chaisemartin et al. (2021) and Xu (2017) are provided for **robustness** check.

▶ **Bootstrap-based inference** is applied.

Method: ATT estimator of Callaway and Sant'Anna (2020)
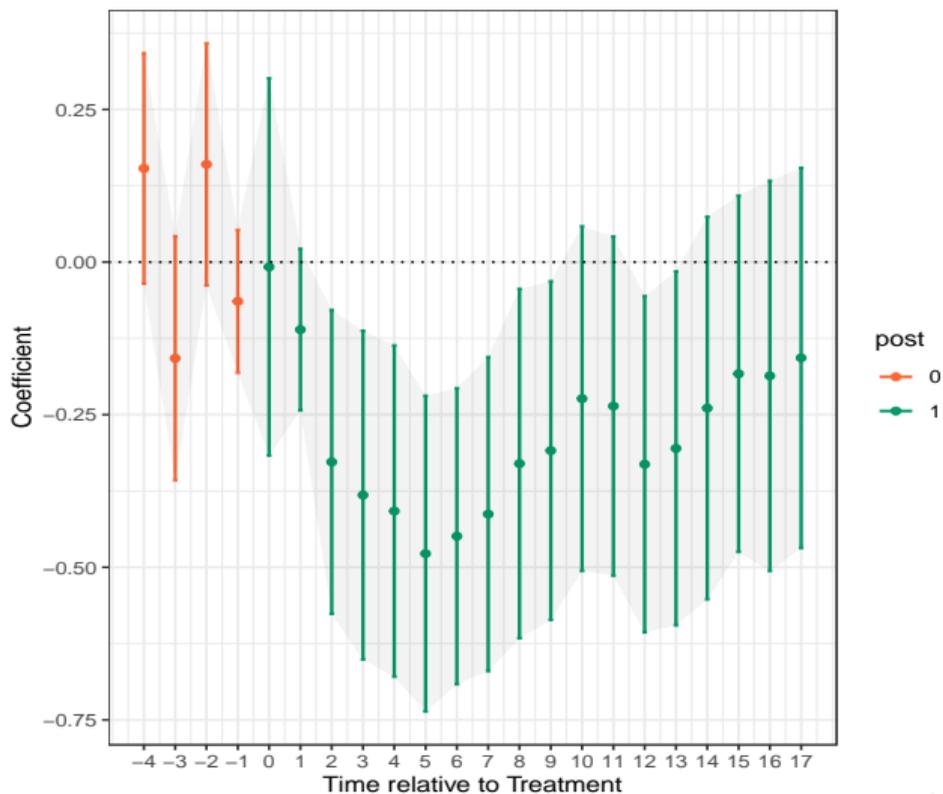
Heterogeneity of the impact: holders and issuers

- <u>Participation size</u>: **large holders react less**, if at all QTT

- <u>Intensity of emissions</u>: **Reduction is more significant** for **heavier emitters** 2wFE

- <u>Holder sector</u>
    - **Financial institutions** are more **consistent** over time
    - **Hump-shaped** reaction **for Households**
    - **Other financial corporations increase** their participation

- <u>Holder area</u>
    - **Shrinking** participation for holders from **more developed countries**
    - **Hump-shaped** reaction of holders from **EUGB and tax havens**
    - **Increasing** participation for holders from the **BRIC** countries

  TWFE   ATT   Summ.

Method: QTT estimator of Athey and Imbens (2006)
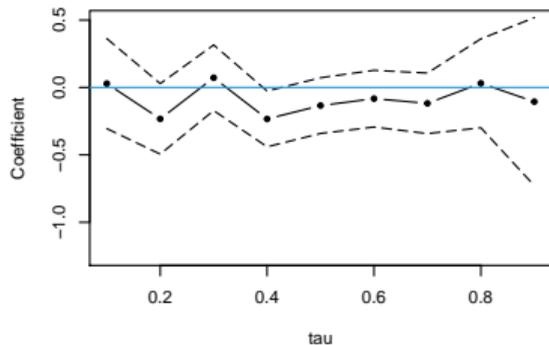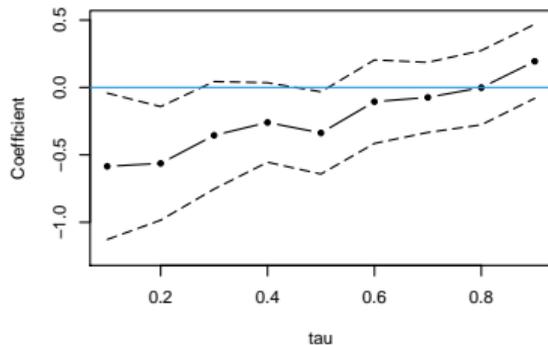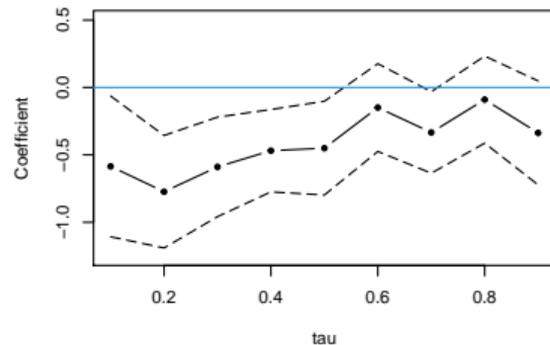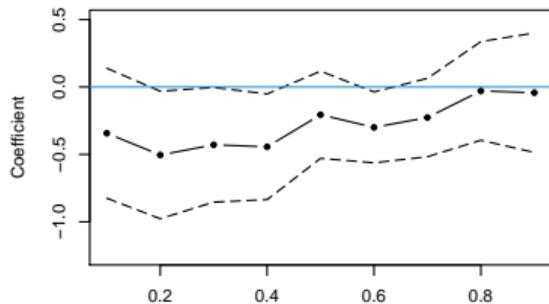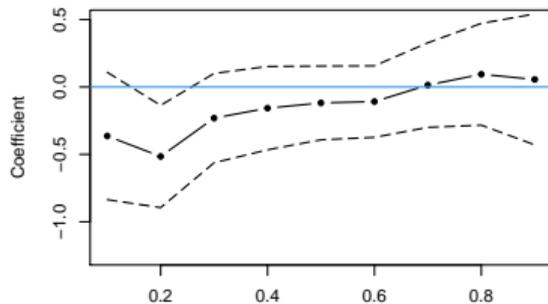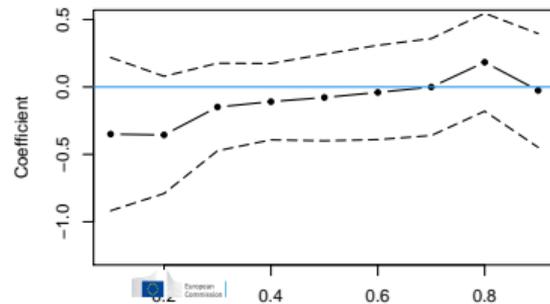
Intensity of emissions

	Dependent variable: participation (in logs)			
	(1)	(2)	(3)	(4)
treatment (β_0)	− **0.207*****	−0.135*	−0.064	−0.050
	(0.074)	(0.073)	(0.089)	(0.046)
treatment $*$ emissions (β_1)		−**0.010*****	−0.011*	−0.009**
		(0.002)	(0.006)	(0.004)
treatment $*$ emissions-to-sales			−0.003	
			(0.005)	
treatment $*$ emissions-to-assets				−0.012
				(0.007)
Observations	2,772	2,772	2,160	2,160
R^2	0.832	0.834	0.841	0.841
R^2 (within)	0.0134	0.0242	0.015	0.015
F Statistic (within)	41.98***	35.96***	12.14***	12.14***
Degrees of freedom (of F Stat.)	[1; 2621]	[2; 2620]	[3; 2034]	[3; 2034]
Issuer and period effects	Yes	Yes	Yes	Yes

Holder sector
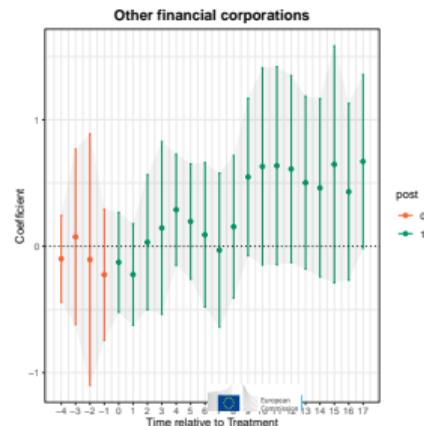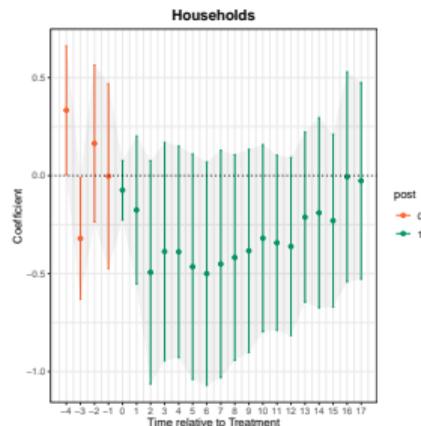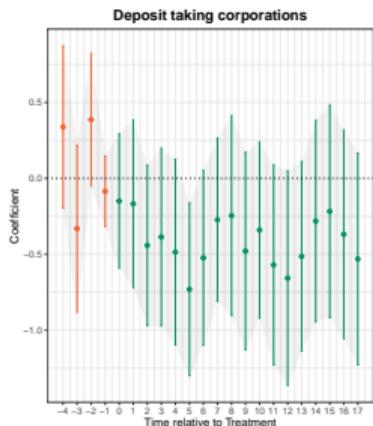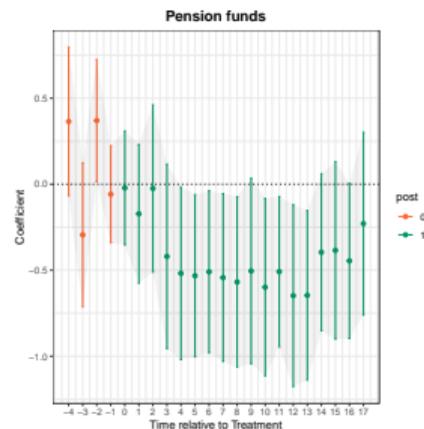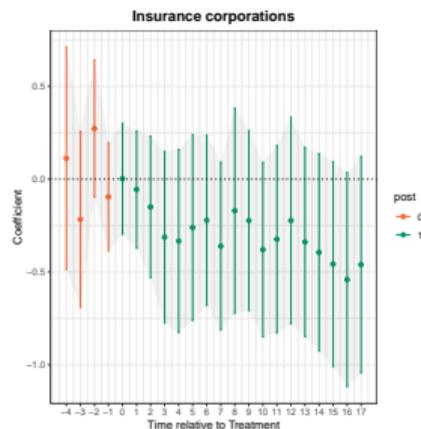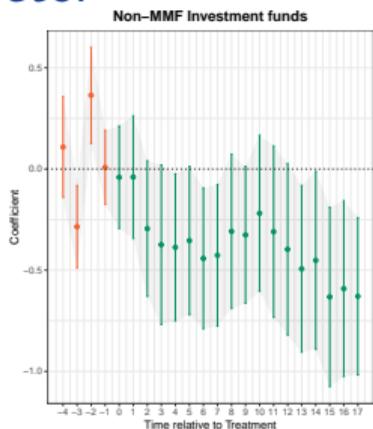
Holder area
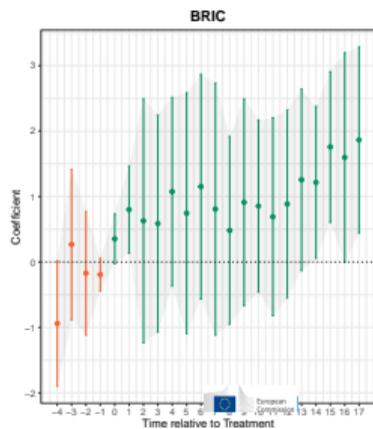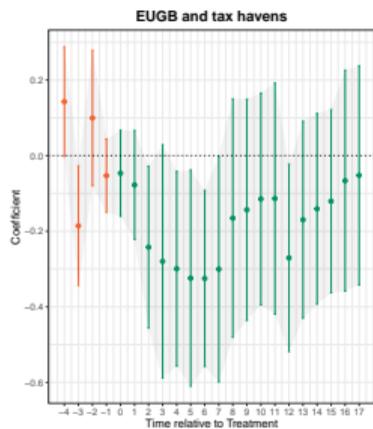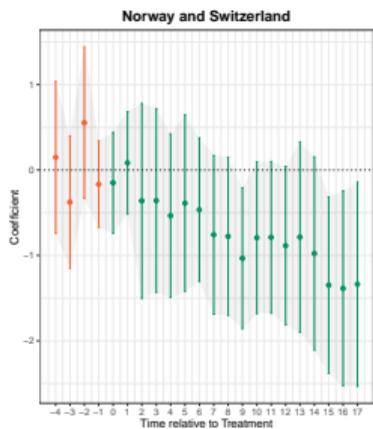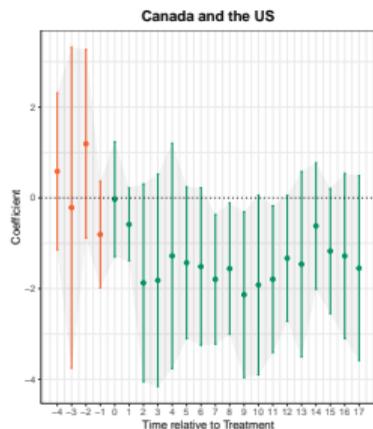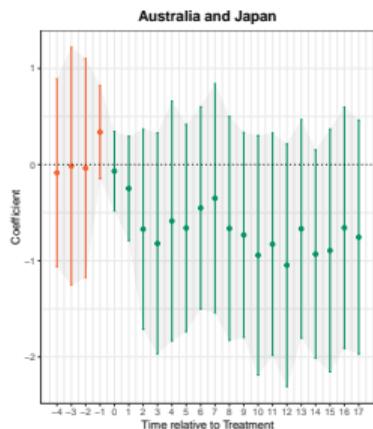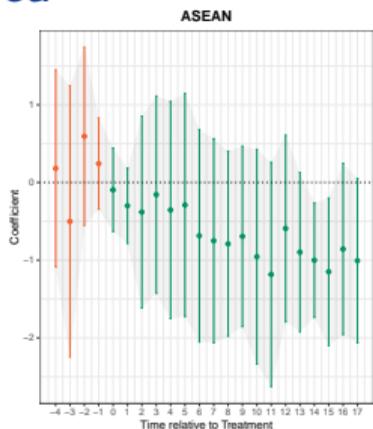
Overall impact

	Specification	Coeff.	S.E.	90% conf.bands		95% conf.bands		p-val.(Par.Tr.)
Aggregate	**Base**	-0.282**	0.088	-0.436	-0.128	-0.454	-0.110	0.802
Holder sector	Non-MMF inv. funds	-0.373**	0.110	-0.553	-0.193	-0.626	-0.120	0.552
	Insurance corp.	-0.289*	0.151	-0.543	-0.035	-0.606	0.027	0.894
	Pension funds	-0.426**	0.142	-0.660	-0.193	-0.687	-0.166	0.630
	Deposit taking institutions	-0.409**	0.173	-0.689	-0.129	-0.739	-0.080	0.695
	Households	-0.301*	0.163	-0.557	-0.046	-0.626	0.023	0.424
	Other financial corp.	0.315**	0.156	0.075	0.554	0.001	0.628	0.908
Holder area	ASEAN	-0.674**	0.336	-1.199	-0.149	-1.286	-0.063	0.847
	Australia and Japan	-0.665*	0.413	-1.323	-0.007	-1.475	0.145	0.990
	Canada and US	-1.396**	0.516	-2.256	-0.537	-2.351	-0.442	0.644
	Norway and Switzerland	-0.725**	0.375	-1.300	-0.150	-1.406	-0.044	0.949
	BRIC	0.981**	0.513	0.202	1.761	0.184	1.779	0.761
	EUGB and tax havens	-0.181**	0.074	-0.306	-0.056	-0.345	-0.016	0.525
	DE,FR, ES	0.047	0.129	-0.174	0.268	-0.217	0.311	0.969
	IT, NL, SE, UK	-0.222*	0.117	-0.412	-0.032	-0.463	0.018	0.759
Robustness checks	Holder-level estimation	-0.323**	0.121	-0.527	-0.120	-0.554	-0.093	1.000
	Without UK issuers	-0.386**	0.154	-0.631	-0.141	-0.650	-0.122	0.998
	Without UK holders and issuers	-0.439**	0.130	-0.647	-0.231	-0.694	-0.184	0.952
	Genetic matching	-0.152*	0.086	-0.292	-0.011	-0.317	0.014	0.871
	Nearest neighbor matching	-0.132*	0.074	-0.255	-0.009	-0.294	0.030	0.916
	Matching on 2013-2015 averages	-0.325**	0.109	-0.502	-0.148	-0.521	-0.129	0.721
	Matching on 2015 data	-0.213**	0.086	-0.352	-0.073	-0.395	-0.030	0.955
	No constraint on relat. emissions	-0.274**	0.090	-0.422	-0.125	-0.436	-0.112	0.829
	3 times higher relative emissions	-0.263**	0.101	-0.423	-0.103	-0.482	-0.045	0.609
	Random draw 1	0.024	0.090	-0.128	0.175	-0.161	0.208	0.994
	Random draw 2	-0.074	0.109	-0.251	0.104	-0.284	0.136	0.971

Summary: What do we find?

▶ The **participation** of (SHS-registered) holders in the matched brown companies was **significantly shrinking after the Paris Agreement**.

▶ The trend has **reversed after the US withdrawal** announcement.

▶ The change in the trend seems to be **largely driven by households'** investments.

▶ A **more consistent and sharper decrease** of participation is observed **for more traditional financial institutions** and **holders from developed countries**.

▶ **Other financial corporations** and **holders from the BRIC** economies tend even to **increase their participation** in the European brown companies.

▶ **Large shareholders** were **less willing or able to reduce** their participation.

▶ There is **a vanishing impact** in the latest periods.

What might it mean? [1]

▶ The Paris Agreement has **increased the risk of lower profitability and failure** of brown companies due to higher taxation, regulations, and the squeezing market, **motivating the respective diversion of investments**.

▶ **Part of risks tends to be transfered to the (outside) holders** who are not covered by the SHS, i.e., not having the legal obligation to report to the ECB about their holdings of securities.

▶ Within the SHS, there seems to be a noticeable **shift in the participation** (and therefore the transfer of connected risks) **from more traditional financial institutions towards other financial corporations**, and **from holders in developed countries towards the BRIC members**:

  • *exploit simultaneous* **(over-)reaction**; *act as* **intermediaries** *for foreign acquisitions;*
  • *direct* **interest of controlling** *the European energy sector by Russia and, potentially, any control of influential large corporations by China;*
  • *a portfolio* **diversification motive** *can outweigh the likely reduction of profitability.*

What might it mean? [2]

▶ The **US announcement** to withdraw from the agreement **created uncertainty about the viability and credibility** of the agreement, changing the reaction.

▶ **Households behavior** seems to **be more affected** by such news **(sentiment-driven)** as well as more **tangible** problems like the **Covid-19**. The behavior by **financial institutions** is **more consistent** over time.

▶ **Large investors** might be slow to adjust, if at all, because they **face larger adjustment costs**—potentially, due to the market impact—**outweighing potential inaction losses**.

▶ A stagnant adjustment in later years might also indicate that **the initial valuation and expectations of the PA implications** in the EU, especially by households, could be **in contrast with the actual implementation and achievements**.

▶ It might also indicate that either the **emission targets are non-binding**, **insufficiently costly**, or **other criteria than the GHG/CO2 levels become at the center of actual regulations** thus affecting also investor criteria.

Final remarks

▶ A number of issues will become **more clear after 2021-2022** data will become available due to **Biden's decision to "restore America's credibility and commitment"** and, hopefully, **diminishing impact of the Covid-19**.

▶ The **successful implementation** of the global redirection of **finance towards less polluting activities** needs **a clear and unanimous signal from the global economic policy makers**.

▶ There is a need not only of **a better communication of policy measures** ensuring their **proper perception** and long-lasting actual implementation, but also of **reconsideration of the validity, adequacy and sufficiency of the current actions and tools**.

▶ The **transfer of ownership** to foreigners might be **problematic from the geopolitical perspective** and create **new risks**.

Thank you

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