Online Appendix
Energy Transition, Financial Markets and EU Interventionism: Lessons from the Ukraine Crisis

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A Data **1**

B Cumulative abnormal returns **9**

C List of other market relevant events **10**

D Robustness tests **12**
D.1 Results from counterfactual Returns built using STOXX Europe 600 constituents . 12
D.2 Results for non-EU firms 13
D.3 Alternative definitions of European-relevant sample 15
D.4 Exclusion of firms not matching with classification by Voeten (2024) 17
D.5 Exclusion of firms with imprecise estimation 18
D.6 OLS-imputed counterfactuals 20
D.7 Results for counterfactual returns from shorter or longer estimation windows . . . 21
D.8 Results for modeling raw returns 22
D.9 CAR analysis when excluding firms with imprecise estimation 23
D.10 CAR analysis when using different time window sizes 25

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A Data

Our effort to create the dataframe of market observations for our main analyses relies on the following steps. First, we use Eikon's API to sample publicly traded renewable energy companies. We start from the global sample of active publicly listed companies trading equities. From this sample, we select renewable energy companies based on their industry classification. Industry classifications capture significant granularity in firms' industrial activity (Bayer, 2023). We rely on the six-digit codes under the North American Industry Classification System (NAICS). A six-digit code represents the most granular level provided by this classification. We select, as renewable energy firms, those that are active in "Electric Power Generation, Transmission and Distribution" under any of the codes indicating generation of hydroelectric, solar, wind, geothermal, biomass, or other electric power.[1] This initial selection returns a sample of 436 publicly traded companies that we classify as renewable energy firms. They are traded and headquartered globally.

Next, we follow a similar procedure to sample fossil fuel producers that are publicly traded. Fossil fuel energy production is composed of extraction, manufacturing of petroleum and coal products, distribution of fuel, and energy production. These activities are classified separately under the NAICS. For this sample, we therefore consider companies from a much larger set of six-digit NAICS codes.[2] Our initial selection yields a sample of 1329 publicly traded fossil fuel companies. Most notably, the sample includes the so-called "oil majors" that are publicly traded (Green et al., 2022): Aramco, BP, Chevron, Eni, Equinor, ExxonMobil, Marathon Petroleum, Phillips 66, Shell PLC, TotalEnergies, and Valero.[3]

We also build a third sample comprising all publicly traded companies in the Standard and Poor's 500 (S&P 500) stock market index. As described in the next section, we use information on companies in this sample as a benchmark to control for general market trends. To ensure the 2022 events we study do not affect selection of firms inside the S&P 500, we consider S&P 500 constituent firms as of January 1st, 2016. REPowerEU announcements and the Russian invasion of Ukraine should not reasonably affect which companies are included in the S&P 500 as of 2016. We discard from the S&P 500 sample any company that is also included in the two samples of renewable energy and fossil fuel firms. This results in a total of 476 firms in the S&P 500 sample.

The final step of our data collection consists in retrieving daily stock prices for the selected firms. From the Refinitiv API, we download daily observations on the price of equities traded on

[1] We consider the following codes: "Hydroelectric Power Generation (221111)", "Solar Electric Power Generation (221114)", "Wind Electric Power Generation (221115)", "Geothermal Electric Power Generation (221116)", "Biomass Electric Power Generation (221117)", and "Other Electric Power Generation (221118)". The latter category includes "establishments primarily engaged in operating electric power generation facilities (except hydroelectric, fossil fuel, nuclear, solar, wind, geothermal, biomass). These facilities convert other forms of energy, such as tidal power, into electric energy". Source: https://www.naics.com/naics-code-description/?v=2022&code=221118. We thus consider it as a source of renewable energy production.

[2] We consider the following codes: "Crude Petroleum Extraction (211120)," "Natural Gas Extraction (211130)," "Fossil Fuel Electric Power Generation (221112)," "Petroleum Refineries (324110)," "Underground Coal Mining (212115)," "Surface Coal Mining (212114)," "Bituminous Coal Underground Mining (212112)," and "Natural Gas Distribution (221210)."

[3] The sample does not include information on very large big oil companies that are not public, *e.g.* Sinopec which is state-owned.

primary markets for all companies we considered, from January 1, 2016 until February 21, 2023. All prices are expressed in current dollars. We then measure each firms' daily stock *Returns* as the percentage change in stock price between the value observed at the close of a given trading day and that observed on the previous trading day.

Because we constructed our samples of interest using industry codes, and because of the large coverage of companies in Refinitiv, the lists of renewable and fossil fuel companies include firms trading "penny stocks", *i.e.* equities with very little value. These firms are often target of financial speculation: investment in their equities is typically not motivated based on expectations of future industrial performances and should not be a result of policy announcements. We therefore exclude them from our samples. To identify them, we follow these steps. For each company, we average the daily stock closing price over the full month of December 2021. We keep only companies whose December 2021 average stock price was above 1$. Finally, we drop all Russian-based or Russian-traded companies from the sample, as we suspect that investors might direct their capital towards/away from Russian companies, in the context of the invasion of Ukraine, for reasons that are unrelated to our theory. After these selections, our samples are made of 191 renewable energy firms and 408 fossil fuel companies.

In Figure A.1 we report the average daily stock price of firms in the two samples over the year 2022, normalized to their value at the end of December 2021 (value = 100). We also report the normalized value of the S&P 500 aggregate index, to show overall market trends in 2022. We highlight the day of the Russian invasion of Ukraine for context. Values above (below) 100 indicate that the sample's average stock price is higher (lower) than its end-of-December 2021 value. We start by observing that the broader financial market was overall depressed in 2022 with respect to the end of 2021, as indicated by the fact that the S&P 500 line is constantly below its December 2021 value. Broadly speaking, renewable energy firms followed this market trend over the full 2022: excluding days of high volatility, this sample tends to follow the direction of the S&P 500, closing the year with an average stock price that was about 85% of its December 2021 value. The fossil fuel sample displays the exact opposite trend. Starting from the day of the Russian invasion and until at least late July 2022, this group of firms traded at prices that were significantly higher than what they were in December 2021, up until more than 150% of that value. In the Fall and Winter of 2022, too, this sample kept trading significantly above its end-of-2021 average, finishing the year at about 120% of its December 2021 value.

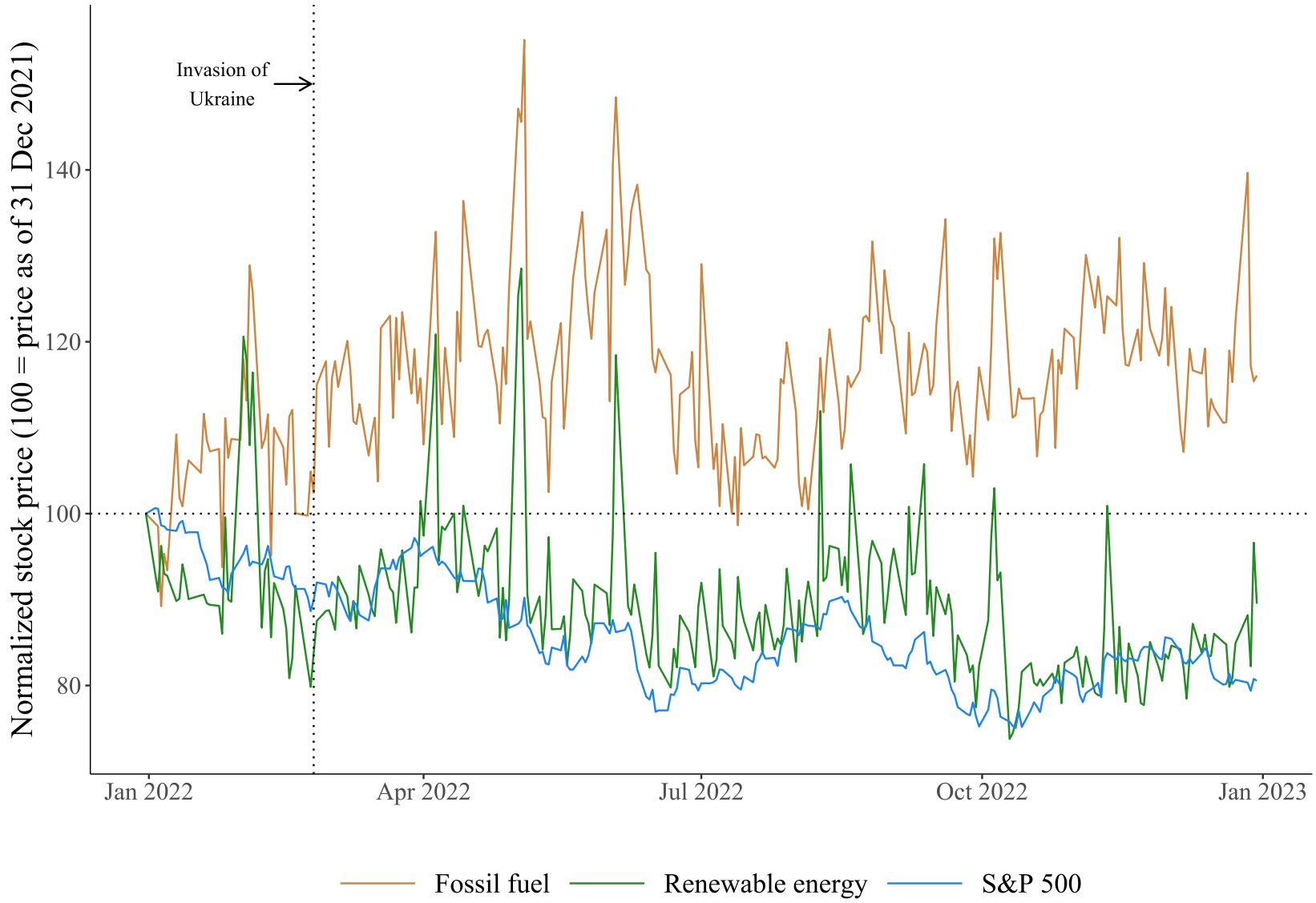

FIGURE A.1: Daily stock prices normalized as of December 2021, one year trends

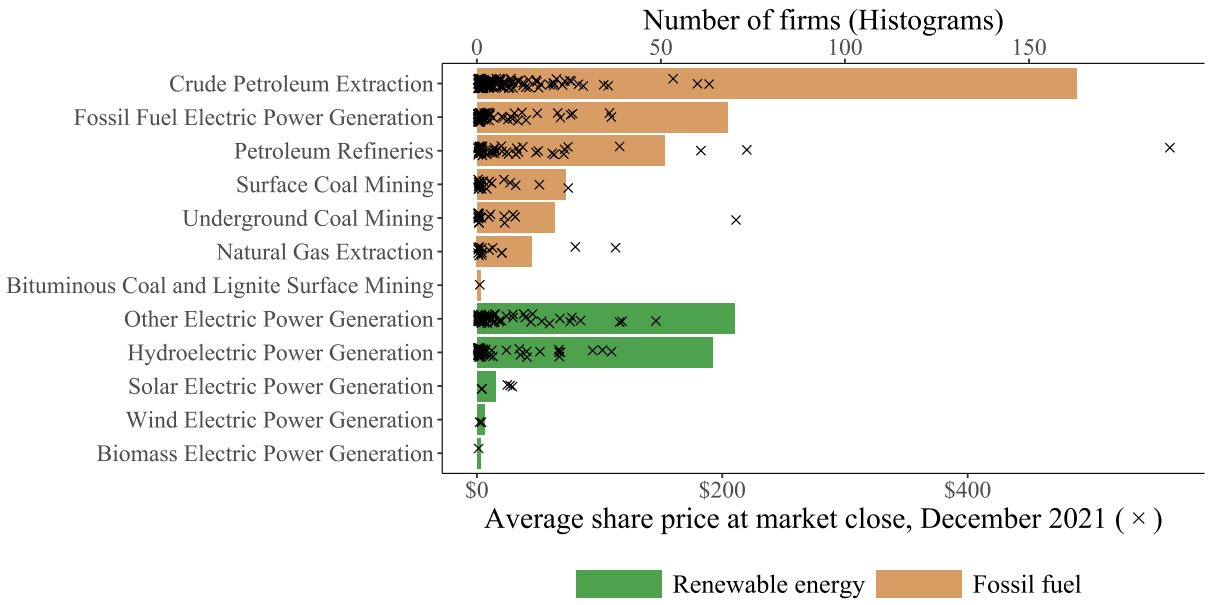

FIGURE A.2: *Description of fossil fuel and renewable energy firms that are non-EU based and non-EU traded.* Histograms report the number of firms by NAICS industrial sector code (top x-axis) and crosses show the average firm market price in December 2021 (bottom x-axis).

TABLE A.1: List of traded European companies in the fossil fuel sample (Firms 1–33)

N	Company name	Headquarter country	Primary exchange	NAICS-6 code name
1	Aker ASA	Norway	OSLO BORS ASA	Crude Petroleum Extraction
2	Aker BP ASA	Norway	OSLO BORS ASA	Crude Petroleum Extraction
3	BP PLC	United Kingdom	LONDON STOCK EXCHANGE	Petroleum Refineries
4	BW Energy Ltd	Bermuda	OSLO BORS ASA	Crude Petroleum Extraction
5	BW Ideol AS	Norway	MERKUR MARKET	Crude Petroleum Extraction
6	Bisichi PLC	United Kingdom	LONDON STOCK EXCHANGE	Underground Coal Mining
7	CEZ as	Czech Republic	PRAGUE STOCK EXCHANGE	Fossil Fuel Electric Power Generation
8	Capricorn Energy PLC	United Kingdom	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
9	Diversified Energy Company PLC	United States of America	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
10	Dno ASA	Norway	OSLO BORS ASA	Crude Petroleum Extraction
11	Drax Group PLC	United Kingdom	LONDON STOCK EXCHANGE	Fossil Fuel Electric Power Generation
12	Elektrocieplownia Bedzin SA	Poland	WARSAW STOCK EXCHANGE	Fossil Fuel Electric Power Generation
13	Enea SA	Poland	WARSAW STOCK EXCHANGE	Fossil Fuel Electric Power Generation
14	Enel SpA	Italy	BORSA ITALIANA	Fossil Fuel Electric Power Generation
15	Energean PLC	United Kingdom	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
16	Engie SA	France	EURONEXT - EURONEXT PARIS	Fossil Fuel Electric Power Generation
17	Eni SpA	Italy	BORSA ITALIANA	Natural Gas Distribution
18	Equinor ASA	Norway	OSLO BORS ASA	Crude Petroleum Extraction
19	Esso Societe Anonyme Francaise SA	France	EURONEXT - EURONEXT PARIS	Petroleum Refineries
20	Etablissements Maurel et Prom SA	France	EURONEXT - EURONEXT PARIS	Crude Petroleum Extraction
21	Gas Plus SpA	Italy	BORSA ITALIANA	Natural Gas Extraction
22	Genel Energy PLC	United Kingdom	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
23	Glencore PLC	Switzerland	LONDON STOCK EXCHANGE	Bituminous Coal and Lignite Surface Mining
24	Global Oil & Gas AG	Germany	BOERSE MUENCHEN	Crude Petroleum Extraction
25	Gulf Keystone Petroleum Ltd	Bermuda	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
26	HELLENiQ ENERGY Holdings SA	Greece	ATHENS EXCHANGE	Petroleum Refineries
27	H&R GmbH & Co KgaA	Germany	XETRA	Petroleum Refineries
28	Harbour Energy PLC	United Kingdom	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
29	Horisont Energi AS	Norway	MERKUR MARKET	Crude Petroleum Extraction
30	INA dd	Croatia	ZAGREB STOCK EXCHANGE	Petroleum Refineries
31	Imperial Petroleum Inc	Greece	NASDAQ CAPITAL MARKET	Crude Petroleum Extraction
32	Indus Gas Ltd	Guernsey	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
33	International Petroleum Corp	Canada	NASDAQ STOCKHOLM AB	Crude Petroleum Extraction

TABLE A.2: List of traded European companies in the fossil fuel sample (Firms 34–66)

N	Company name	Headquarter country	Primary exchange	NAICS-6 code name
34	Jadestone Energy PLC	Singapore	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
35	Jastrzebska Spolka Weglowa SA	Poland	WARSAW STOCK EXCHANGE	Underground Coal Mining
36	Jersey Oil and Gas PLC	Jersey	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
37	Jugopetrol ad Podgorica	Republic of Montenegro	MONTENEGRO STOCK EXCHANGE	Petroleum Refineries
38	Kistos Holdings Plc	United Kingdom	LONDON STOCK EXCHANGE	Natural Gas Extraction
39	La Francaise de l Energie SA	France	EURONEXT - EURONEXT PARIS	Crude Petroleum Extraction
40	Lubelski Wegiel Bogdanka SA	Poland	WARSAW STOCK EXCHANGE	Underground Coal Mining
41	MOL Magyar Olajes Gazipari Nyrt	Hungary	BUDAPEST STOCK EXCHANGE	Petroleum Refineries
42	Maha Energy AB	Sweden	NASDAQ STOCKHOLM AB	Crude Petroleum Extraction
43	Molecular Energies PLC	United Kingdom	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
44	Motor Oil Hellas Corinth Refineries SA	Greece	ATHENS EXCHANGE	Petroleum Refineries
45	Mytilineos SA	Greece	ATHENS EXCHANGE	Fossil Fuel Electric Power Generation
46	NIS ad Novi Sad	Republic of Serbia	BELGRADE STOCK EXCHANGE	Crude Petroleum Extraction
47	Norwegian Energy Company ASA	Norway	OSLO BORS ASA	Crude Petroleum Extraction
48	OMV AG	Austria	WIENER BOERSE	Petroleum Refineries
49	Oil and Gas Exploration and Production AD	Bulgaria	BULGARIAN STOCK EXCHANGE	Crude Petroleum Extraction
50	Okea ASA	Norway	OSLO BORS ASA	Crude Petroleum Extraction
51	Okta AD Skopje	Macedonia	MACEDONIAN STOCK EXCHANGE	Petroleum Refineries
52	PGE Polska Grupa Energetyczna SA	Poland	WARSAW STOCK EXCHANGE	Fossil Fuel Electric Power Generation
53	Panoro Energy ASA	Norway	OSLO BORS ASA	Crude Petroleum Extraction
54	Polski Koncern Naftowy Orlen SA	Poland	WARSAW STOCK EXCHANGE	Petroleum Refineries
55	RMU Banovici dd Banovici	Bosnia and Herzegovina	SARAJEVO STOCK EXCHANGE	Underground Coal Mining
56	Repsol SA	Spain	BOLSA DE MADRID	Petroleum Refineries
57	Seplat Energy PLC	Nigeria	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
58	Serica Energy PLC	United Kingdom	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
59	Shell PLC	United Kingdom	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
60	Societatea Nationala de Gaze Naturale Romgaz SA	Romania	SPOT REGULATED MARKET - BVB	Crude Petroleum Extraction
61	Tethys Oil AB	Sweden	NASDAQ STOCKHOLM AB	Crude Petroleum Extraction
62	TotalEnergies EP Gabon	Gabon	EURONEXT - EURONEXT PARIS	Crude Petroleum Extraction
63	TotalEnergies SE	France	EURONEXT - EURONEXT PARIS	Petroleum Refineries
64	Trinity Exploration and Production PLC	United Kingdom	LONDON STOCK EXCHANGE	Crude Petroleum Extraction
65	Ze Pak Sa	Poland	WARSAW STOCK EXCHANGE	Fossil Fuel Electric Power Generation
66	Zespol Elektrocieplowni Wroclawskich Kogeneracja SA	Poland	WARSAW STOCK EXCHANGE	Fossil Fuel Electric Power Generation

TABLE A.3: List of traded EU companies in the renewable energy sample (Firms 1 – 25)

N	Company name	Headquarter country	Primary exchange	NAICS-6 code name
1	7C Solarparken AG	Germany	XETRA	Other Electric Power Generation
2	A2A SpA	Italy	BORSA ITALIANA	Other Electric Power Generation
3	Adev Wasserkraftwerk AG	Switzerland	NA	Other Electric Power Generation
4	Advanced SolTech Sweden AB (publ)	Sweden	FIRST NORTH SWEDEN - SME GROWTH MARKET	Other Electric Power Generation
5	Alerion Clean Power SpA	Italy	BORSA ITALIANA	Other Electric Power Generation
6	Alteo Energiaszolgaltato Nyrt	Hungary	BUDAPEST STOCK EXCHANGE	Other Electric Power Generation
7	Alternus Energy Group PLC	Ireland; Republic of	MERKUR MARKET	Other Electric Power Generation
8	Arise AB	Sweden	NASDAQ STOCKHOLM AB	Other Electric Power Generation
9	Atlantica Sustainable Infrastructure PLC	United Kingdom	NASDAQ/NGS (GLOBAL SELECT MARKET)	Other Electric Power Generation
10	Clere AG	Germany	HANSEATISCHE WERTPAPIERBOERSE HAMBURG	Solar Electric Power Generation
11	Cloudberry Clean Energy ASA	Norway	OSLO BORS ASA	Other Electric Power Generation
12	Corporacion Acciona Energias Renovables SA	Spain	BOLSA DE MADRID	Other Electric Power Generation
13	DGB Group NV	Netherlands	EURONEXT - EURONEXT AMSTERDAM	Other Electric Power Generation
14	EDP Renovaveis SA	Spain	EURONEXT - EURONEXT LISBON	Other Electric Power Generation
15	ERG SpA	Italy	BORSA ITALIANA	Other Electric Power Generation
16	Edisun Power Europe AG	Switzerland	SIX SWISS EXCHANGE	Other Electric Power Generation
17	Elektro Ljubljana dd	Slovenia	LJUBLJANA STOCK EXCHANGE	Other Electric Power Generation
18	Elektroprivreda Crne Gore ad Niksic	Republic of Montenegro	MONTENEGRO STOCK EXCHANGE	Other Electric Power Generation
19	Encavis AG	Germany	XETRA	Other Electric Power Generation
20	Endesa SA	Spain	BOLSA DE MADRID	Hydroelectric Power Generation
21	Enefit Green AS	Estonia	NASDAQ TALLINN AS	Other Electric Power Generation
22	Energa SA	Poland	WARSAW STOCK EXCHANGE	Other Electric Power Generation
23	Energiedienst Holding AG	Switzerland	SIX SWISS EXCHANGE	Hydroelectric Power Generation
24	Energiekontor AG	Germany	XETRA	Wind Electric Power Generation
25	EnviTec Biogas AG	Germany	XETRA	Other Electric Power Generation

TABLE A.4: List of traded EU companies in the renewable energy sample (Firms 26 – 49)

N	Company name	Headquarter country	Primary exchange	NAICS-6 code name
26	Fastned BV	Netherlands	EURONEXT - EURONEXT AMSTERDAM	Other Electric Power Generation
27	Fintel Energija ad Beograd	Republic of Serbia	BELGRADE STOCK EXCHANGE	Other Electric Power Generation
28	Fortum Oyj	Finland	NASDAQ HELSINKI LTD	Hydroelectric Power Generation
29	Grupo Ecoener SA	Spain	BOLSA DE MADRID	Other Electric Power Generation
30	Hydro Exploitations SA	France	EURONEXT ACCESS PARIS	Hydroelectric Power Generation
31	Ignitis Grupe AB	Lithuania	AB NASDAQ VILNIUS	Other Electric Power Generation
32	Inter RAO Lietuva AB	Lithuania	WARSAW STOCK EXCHANGE	Other Electric Power Generation
33	MPC Energy Solutions NV	Netherlands	MERKUR MARKET	Other Electric Power Generation
34	Magnora ASA	Norway	OSLO BORS ASA	Other Electric Power Generation
35	Minesto AB	Sweden	FIRST NORTH SWEDEN - SME GROWTH MARKET	Other Electric Power Generation
36	Neoen SA	France	EURONEXT - EURONEXT PARIS	Other Electric Power Generation
37	Ocean Sun AS	Norway	MERKUR MARKET	Other Electric Power Generation
38	Orron Energy AB	Sweden	NASDAQ STOCKHOLM AB	Other Electric Power Generation
39	PannErgy Nyrt	Hungary	BUDAPEST STOCK EXCHANGE	Geothermal Electric Power Generation
40	Photon Energy NV	Netherlands	WARSAW STOCK EXCHANGE	Other Electric Power Generation
41	Public Power Corporation SA	Greece	ATHENS EXCHANGE	Other Electric Power Generation
42	Renew Energy Global PLC	United Kingdom	NASDAQ/NGS (GLOBAL SELECT MARKET)	Other Electric Power Generation
43	Scatec ASA	Norway	OSLO BORS ASA	Other Electric Power Generation
44	Solaria Energia y Medio Ambiente SA	Spain	BOLSA DE MADRID	Other Electric Power Generation
45	Terna Energy SA	Greece	ATHENS EXCHANGE	Other Electric Power Generation
46	Tion Renewables AG	Germany	XETRA	Wind Electric Power Generation
47	Toplofikatsia Ruse AD	Bulgaria	BULGARIAN STOCK EXCHANGE	Other Electric Power Generation
48	Voltalia SA	France	EURONEXT - EURONEXT PARIS	Hydroelectric Power Generation
49	clearvise AG	Germany	XETRA	Other Electric Power Generation

B Cumulative abnormal returns

In Figure B.1 we present our results for the analysis on cumulative abnormal returns (CAR). CAR are obtained by computing a running sum, for each firm, of daily abnormal returns. In our main specification, we consider a window of 10 days to the left and right of each event. Computed CAR are then regressed on a binary taking value of 1 on the event under consideration and in the 10 following days. Models are linear and estimated using OLS, with standard errors clustered at the firm level. We interact our binary event indicator with a variable coding whether the firm is a fossil fuel or renewable energy producer. Reported estimates correspond to the marginal effects of these regression models. For consistency with our abnormal returns analysis, and for distinguishing the effect among the two groups of firms, we report 95% and 83.4% confidence intervals.

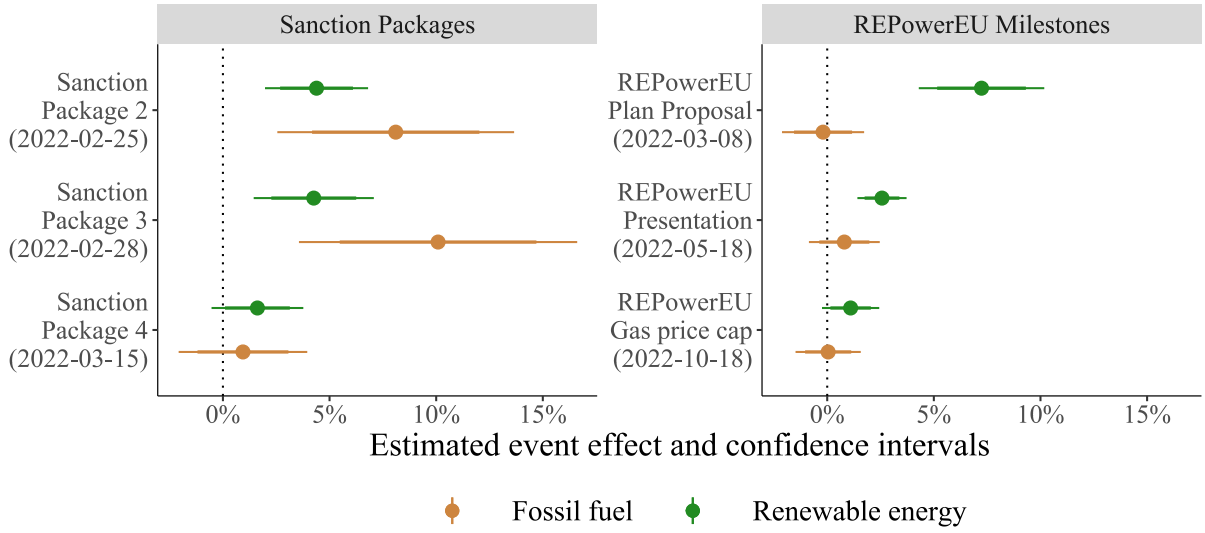

FIGURE B.1: *Cumulative average abnormal returns for fossil fuel and renewable energy producers (European firms).* The figure shows the estimated effect of an event on cumulative abnormal returns for energy companies based or traded in Europe, distinguishing between sanction packages and REPowerEU announcements, separately for fossil fuel producers (brown) and renewable energy producers (green). Horizontal bars denote 95% and 83.4% confidence intervals. Cumulative abnormal returns are here studied in a symmetric window of 10 days to the left and right of each event.

C List of other market relevant events

In the main text we assess the effects of European Commission announcements in terms of sanctions packages and REPowerEU milestones on stock market prices. Clearly, these are not the only market relevant events that affected market prices. We provide a list of other events here that have likely moved markets. Importantly, as discussed in the main text, only events that happen on the *same day* as the Commission announcements *and* that did *not* affect S&P 500 stock market returns, but did affect European firms' returns could invalidate our estimates. The list of events below therefore serves two purposes: first, it helps contextualize the wider policy environment in which Commission announcements were made; second, it demonstrates that there are no events that happened on the same day as the announcements themselves.[4] This makes us confident that the effects we estimate can indeed be attributed to the Commission announcements rather than any other events that our research design does not account for.

[4] The Commission proposal to ban Russian coal imports on 7 March 2022 as the only other potentially directly relevant event was only implemented in August 2022. See "EU sanctions on Russia's coal increase U.S. coal exports to Europe." *US Energy Information Agency*, available at: https://www.eia.gov/todayinenergy/.

Date	Event
24-02-2022	**Russian invasion of Ukraine**
25-02-2022	Sanctions package 2
28-02-2022	Sanctions package 3
07-03-2022	European Commission proposes a ban of Russian coal imports
08-03-2022	REPowerEU Plan proposal
10-03-2022	ECB signals tightening of interest rates amidst growing inflation concerns
15-03-2022	Sanctions package 4
24-03-2022	EU agrees to remove Russian banks from international payments system SWIFT
12-04-2022	European Commission announces €10bn to support reconstruction effort in Ukraine
21-04-2022	IMF and World Bank spring meeting, focusing on concerns about inflation and government debt
02-05-2022	European Commission announces plans to phase out Russian oil imports by end of 2022
15-05-2022	European Commission proposes a €500mn military aid package for Ukraine
18-05-2022	REPowerEU Plan presentation
30-05-2022	EU agrees partial ban on Russian oil imports
01-06-2022	Denmark votes to join the EU's Common Security and Defence Policy
15-06-2022	U.S Fed raises interest rates by 0.75 basis points
23-06-2022	European Union award official candidate status to Ukraine and Moldova
01-07-2022	European Union introduces ban on Russian oil imports
21-07-2022	ECB raises interest rates
25-07-2022	EU agrees to a €1bn aid package for Ukraine
27-07-2022	U.S. Fed raises interest rates by another 0.75 basis point
20-09-2022	European Commission proposes a €100bn fund to support energy security in Europe
22-09-2022	Bank of England raises interest rates by 50 basis points, U.S. Fed raises rates by another 75 basis points
18-10-2022	REPowerEU Gas Price Cap

TABLE C.1: Timeline of other market relevant political events and announcements. Russian invasion is printed in bold. Sanction packages are shaded in gray, REPowerEU announcements are highlighted in green. We estimate effects for stock market returns for these events. All other events are listed for context of the wider policy environment.

D Robustness tests

D.1 Results from counterfactual Returns built using STOXX Europe 600 constituents

Here, we test robustness of our results when using a European baseline of firms (as opposed to the US S&P 500 constituents) to generate the synthetic counterfactual Returns that supports our results. The US baseline we use in the main text is justifiable on methodological and theoretical grounds (being US-based, these firms are least likely to be impacted by EU policy announcements, thus they constitute a cleaner baseline), but one could object that the different nationality makes them too dissimilar from the European ones we consider. To counter this point, we show that results do not change significantly when replacing the S&P 500 baseline with a European equivalent.

In Figure D.1, we replicate our analysis on the same group of firms that we consider in the main analysis, but we generate the synthetic counterfactual Returns by considering individual constituents of the STOXX Europe 600 index. This index, designed by STOXX Ltd, comprises major European publicly listed firms. Importantly, it does not only consider stocks listed in the Eurozone. We replicate our estimation window with the same LASSO procedure used in the main text, just using this alternative sample of firms.

Similarly to our main results, we find that early sanction packages generated positive *Abnormal Returns* for fossil fuel and renewable energy firms alike, while sanction package 4 damaged significantly green ones. EU industrial policy announcements, instead, created a significant separation between the two groups of firms, with renewable energy companies benefitting from the REPowerEU plan proposal announcement and fossil fuel being damaged by the plan presentation.

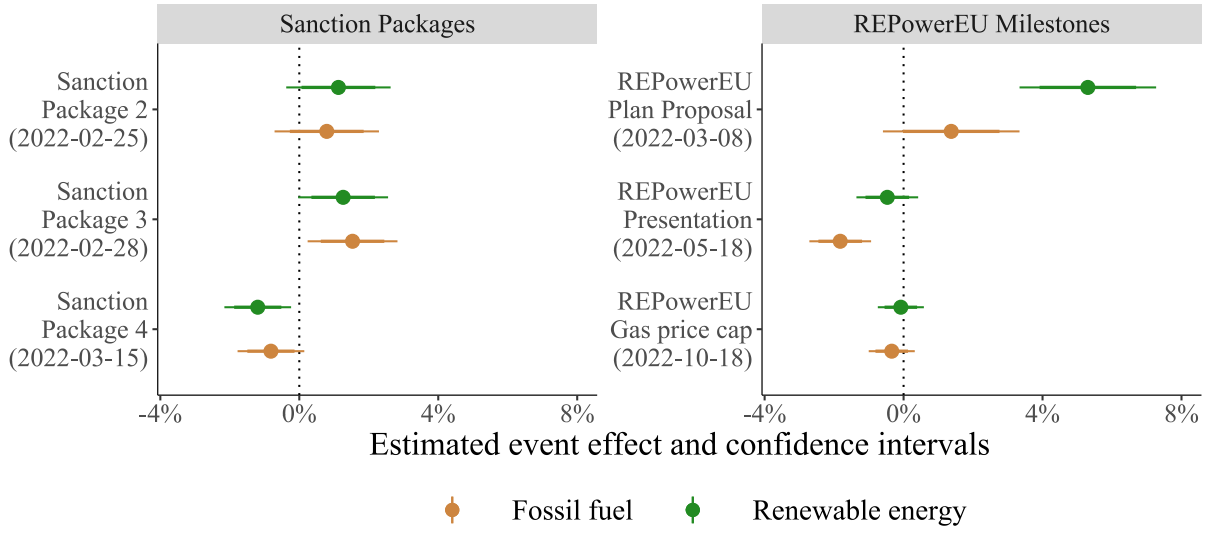

FIGURE D.1: Effects on *Abnormal Returns* obtained when constructing counterfactual Returns using STOXX Europe 600 constituents

D.2 Results for non-EU firms

Here, we replicate our analysis for firms that are neither headquartered nor primarily traded in a European country. We construct this new group of firms by repeating our data collection procedure; however, this time we consider only renewable energy and fossil fuel firms that have a non-European headquarters and non-European country of primary exchange. This yields 485 "non-European" firms which, by construction, do not overlap with the 115 European firms studied in our main analysis.

Among these firms one might not expect any significant effect for EU industrial policymaking, akin to a placebo test. However, due to high levels of global integration in energy markets, this is unlikely to be the case. Many non-European energy firms have extensive business on European soil, for example, either because they market to European consumers or because they own local subsidiaries, facilities, or contracts with local energy suppliers. For instance, Exxon Mobil invested more than €20 billion in Europe over the past 10 years,[5] PetroChina has large contracts on the European continent,[6] Brookfield Renewable markets to consumers in several European countries, including Ireland and Spain,[7] and NextEra has large offshore wind projects in the Baltic and North Sea.[8] Investors in these firms likely responded to EU policy announcements in a similar way to those invested in European energy firms. It is thus unreasonable to expect precisely null effects for this non-European set of energy firms. Instead, when analyzing this group we just expect smaller effects.

Indeed, results in Figure D.2 show that sanction packages overall have a similar but smaller effect, impacting non-European renewable and fossil fuel firms in a similarly positive (sanction packages 2 and 3) and negative (sanction package 4) way as they impact European companies. When considering the effect of REPowerEU milestones on non-European energy firms, we find distributional effects, similar to those for European firms, but smaller in scale. Although this is not the case for the Plan Proposal (which yields non-significant effects and effect differences), we document consistent evidence for the Plan Presentation and gas price cap.

[5] See: https://corporate.exxonmobil.com/locations/european-region.

[6] See: https://www.zawya.com/en/projects/bri/petrochina-awarded-20-yr-access-to-gate-lng-terminal-in-rotterdam-a84yb1so.

[7] See: https://www.brookfield.com/news-insights/insights/onshore-wind-portfolio-one-europes-strongest-wind-resource-locations and https://brookfieldrenewableus.com/explore-market/iberia/.

[8] See: https://www.roi-nj.com/2022/09/08/industry/energy-utilities/nextera-energy-transmission-signs-mou-with-subsidiary-of-most-experienced-offshore-wind-firm-in-europe/.

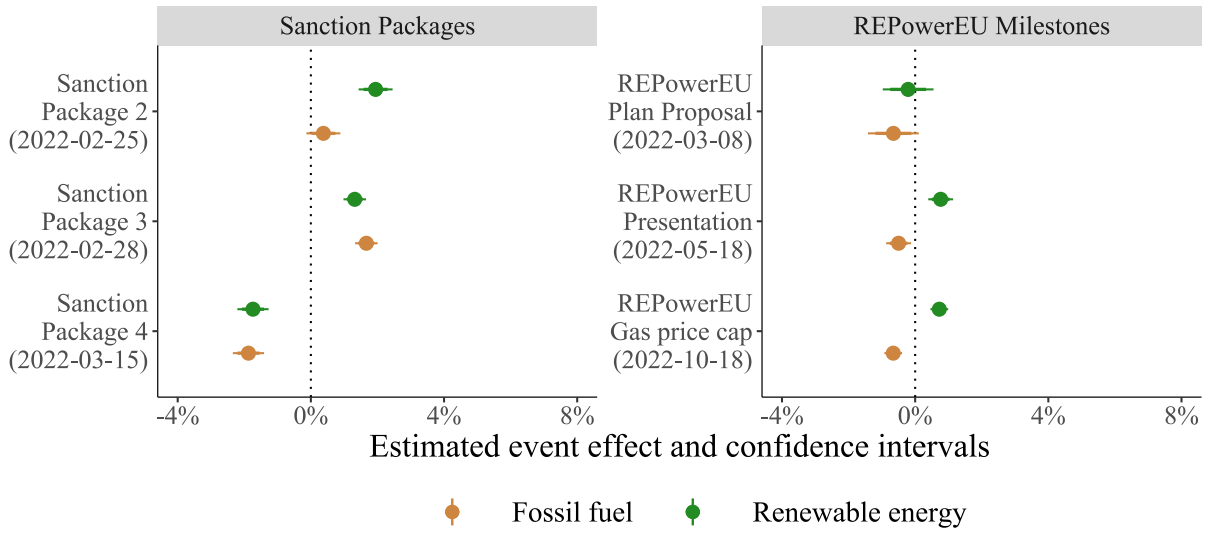

FIGURE D.2: Effects on *Abnormal Returns* obtained when considering firms that are neither headquartered nor primarily traded in a EU member

D.3 Alternative definitions of European-relevant sample

We probe our definition of the relevant sample of European energy firms by considering only European-based firms (Figure D.3), only European-traded firms (Figure D.4), and firms based or traded in EU member countries (Figure D.5).

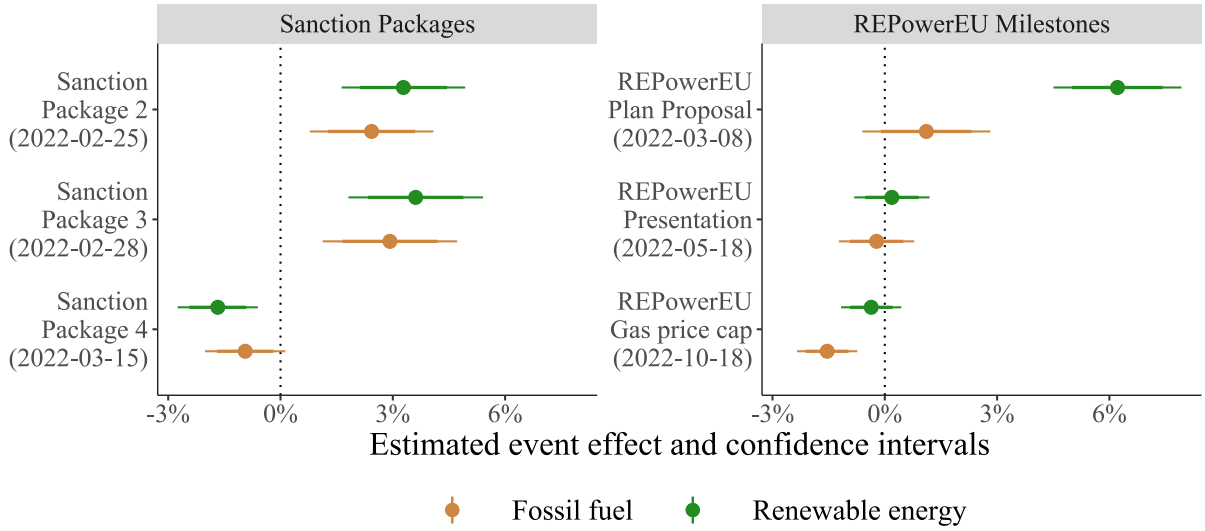

FIGURE D.3: Effects on *Abnormal Returns* obtained when considering only firms that are headquartered in a European country

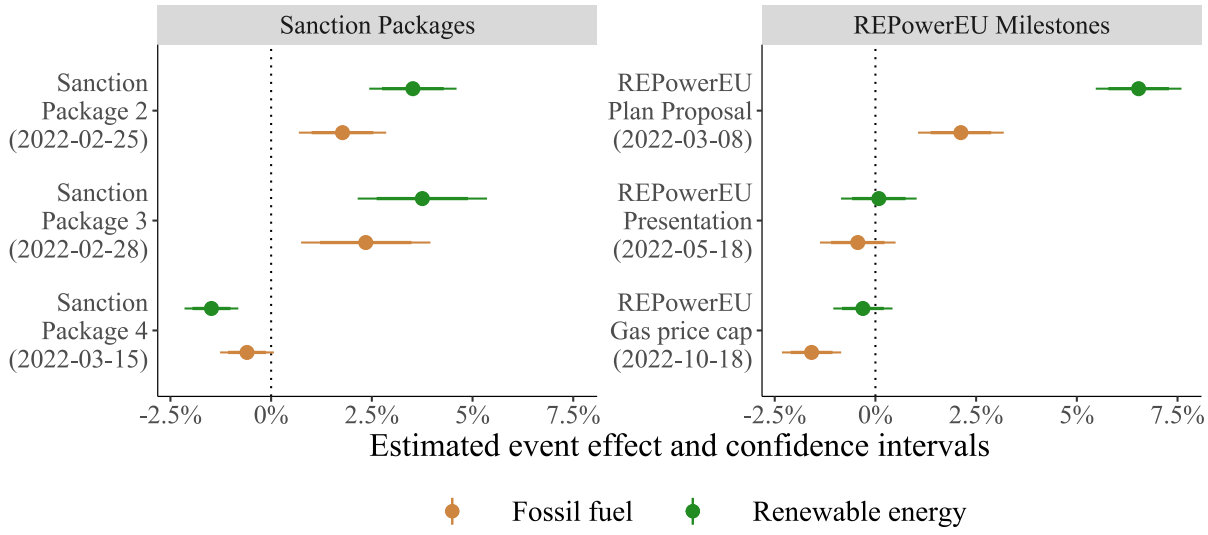

FIGURE D.4: Effects on *Abnormal Returns* obtained when considering only firms that are primarily traded in a European country

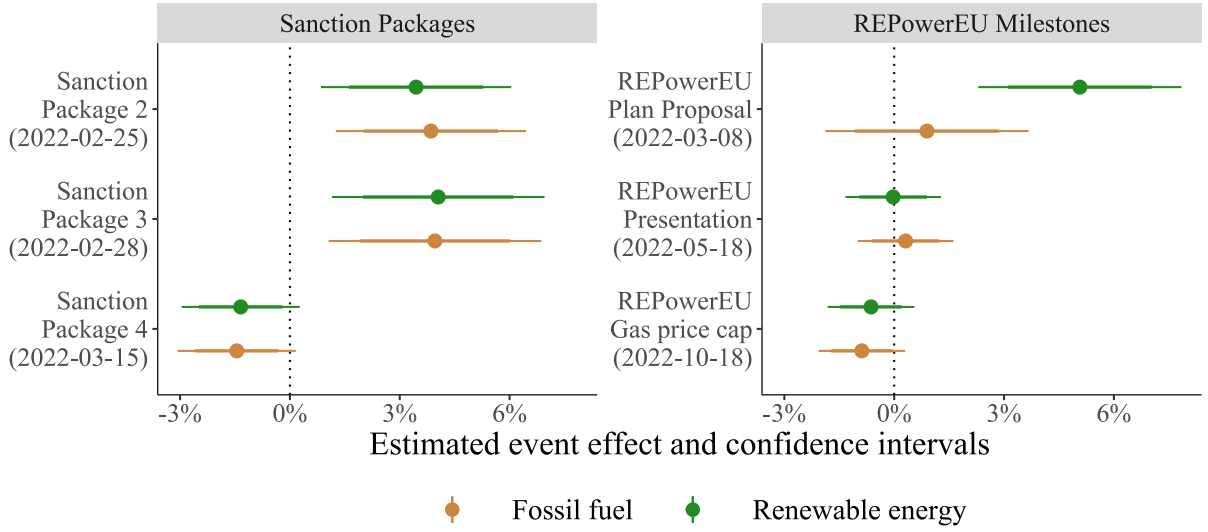

FIGURE D.5: Effects on *Abnormal Returns* obtained when considering only firms that are headquartered or traded in a EU member

D.4 Exclusion of firms not matching with classification by Voeten (2024)

We exclude from our analysis firms that we classify as renewable energy producers and which Voeten (2024) classifies as fossil fuel. Results are in Figure D.6.

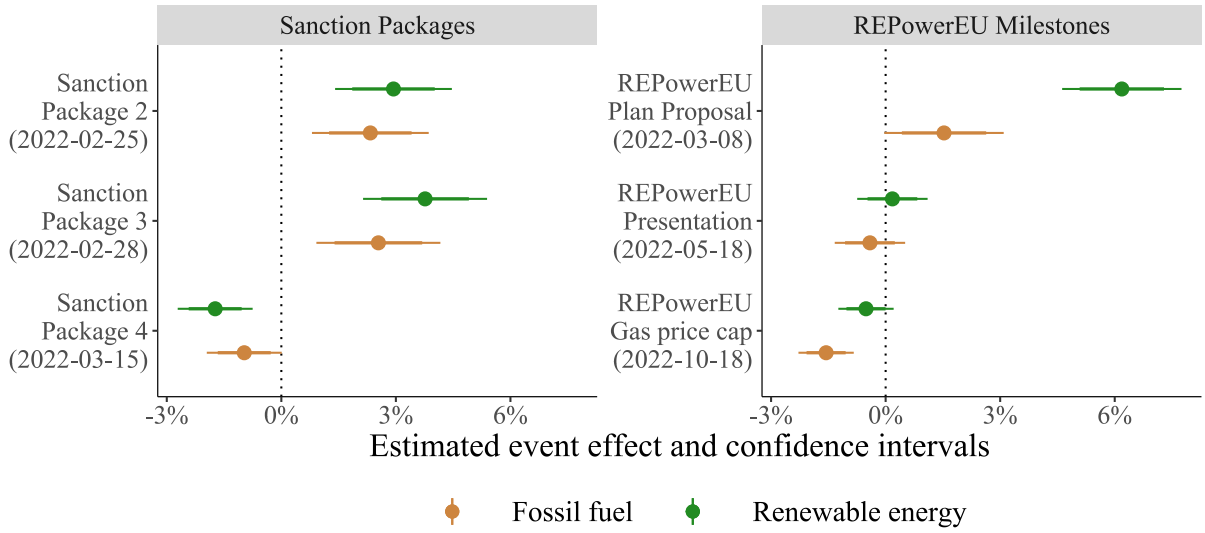

FIGURE D.6: Effects on *Abnormal Returns* obtained when excluding firms mis-classified based on data by Voeten (2024)

D.5 Exclusion of firms with imprecise estimation

We test robustness of our results to the exclusion of firms whose counterfactual is based on market models with weak explanatory power. In Figures D.7, D.8, and D.9 we drop firms whose LASSO market models resulted in R2 lower than 0.10, 0.30, and 0.50 respectively. We still detect significant distributional effects, in the direction discussed in the main text, for REPowerEU events.

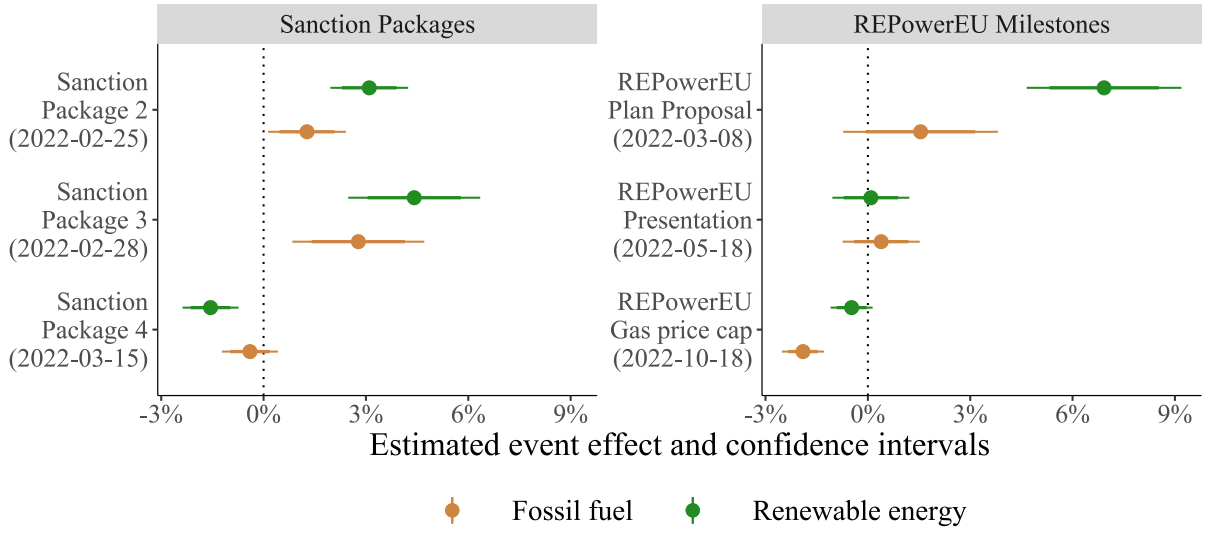

FIGURE D.7: Effects on *Abnormal Returns* obtained when excluding firms whose counterfactual is based on market models with R2 smaller than 0.10

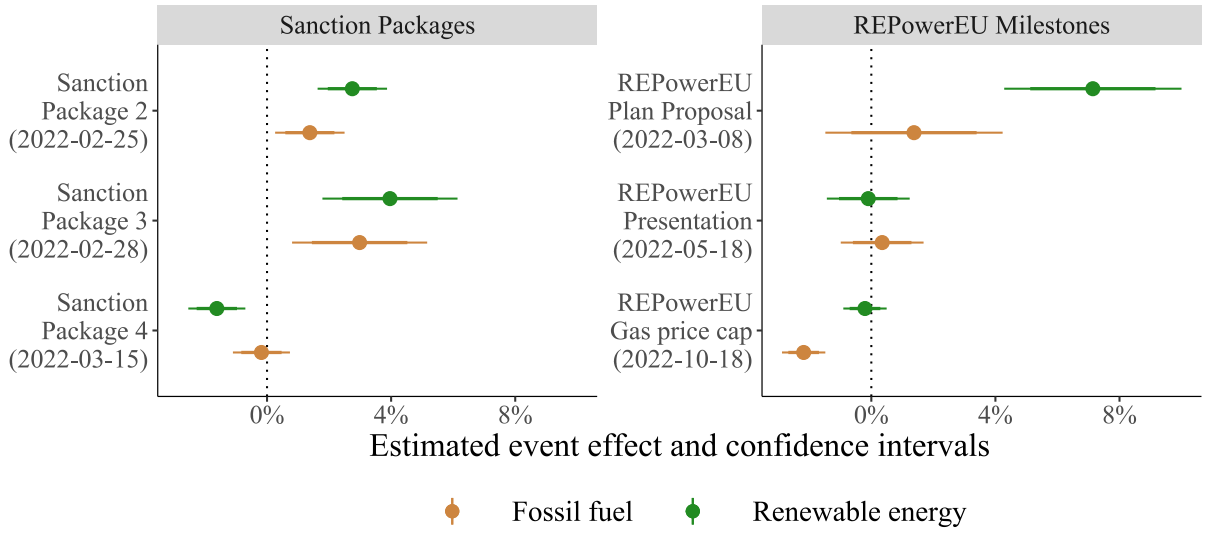

FIGURE D.8: Effects on *Abnormal Returns* obtained when excluding firms whose counterfactual is based on market models with R2 smaller than 0.30

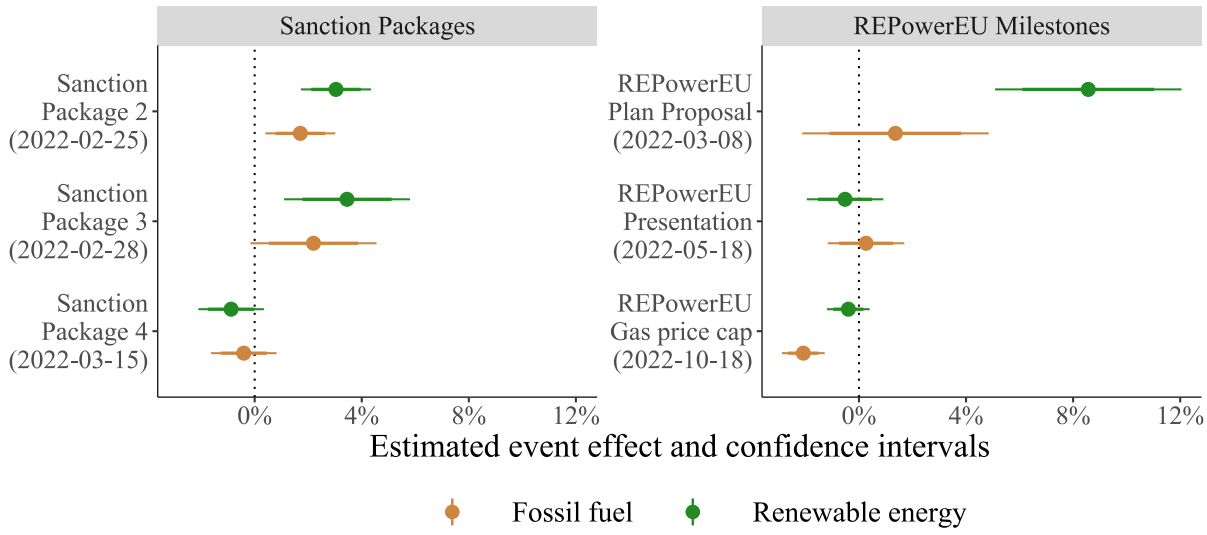

FIGURE D.9: Effects on *Abnormal Returns* obtained when excluding firms whose counterfactual is based on market models with R2 smaller than 0.50

D.6 OLS-imputed counterfactuals

We replicate our analysis substituting LASSO-synthesized counterfactuals with OLS-imputed ones to test whether our results hinge on the chosen strategy. Because our matrix of S&P500 constituents includes 476 firms and estimation windows are 60 days long, using all 476 firms as predictors would result in unidentifiable OLS models with more predictors than observations. For this reason, in this test we substitute the 476 individual firms' returns used in the LASSO estimation with six market-wide aggregated indexes of firm financial performance: the S&P 500 aggregated index itself—as opposed to its individual constituents—(.SPX), the Dow Jones Industrial Average (.DJI), the Financial Times Stock Exchange 100 (.FTSE), the Frankfurt DAX Performance Index (.GDAXI), the Nasdaq-100 (.NDX), and the NYSE Composite (.NYA).

We predict firms' returns using the same procedure described in the main text (60 days-long estimation windows predating the event) including all six indexes as predictors. We then replicate the analysis as done in the main text: we perform a series of t-tests on the difference between *Returns* and predicted *Returns*—an OLS-imputed measure of *Abnormal Returns*. We test whether the average *Abnormal Returns* differ from zero for renewable and fossil fuel firms, distinguishing EU and non-EU based companies.

Figure D.10 reports our findings. We find similar effects as in our main analysis. The plan presentation of REPowerEU still has detectable distributional effects among EU companies, favoring renewable firms more than fossil fuel ones. Similarly, the plan presentation and October gas price cap had distributional (albeit more modest in size) effects among non-EU companies. Sanction packages had, instead, less clear-cut effects, with package 3 disproportionately benefiting non-EU fossil fuel producers.

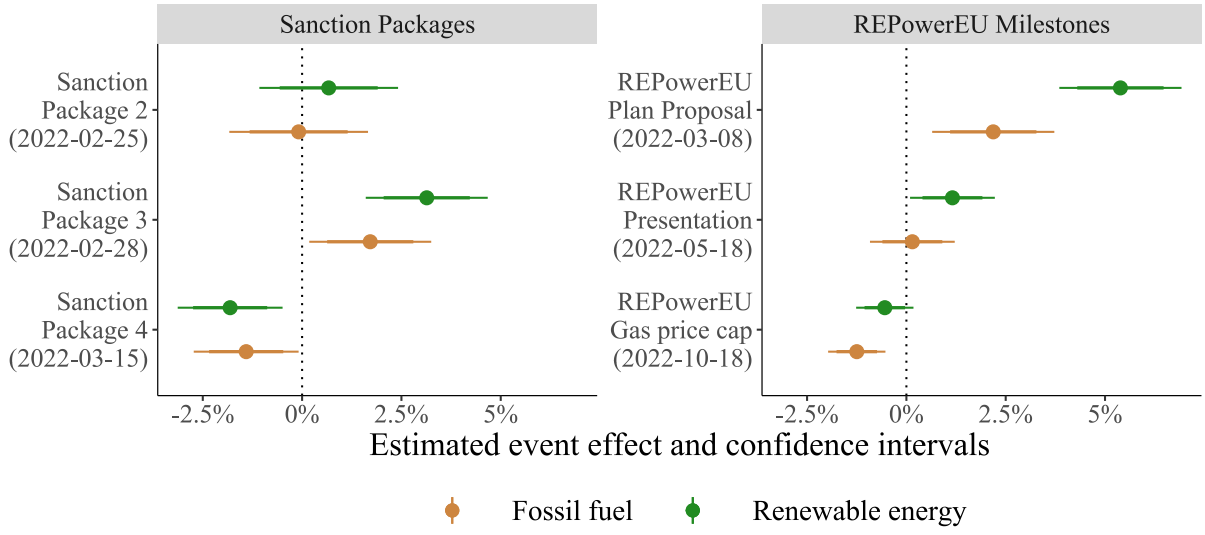

FIGURE D.10: Effects on *Abnormal Returns* obtained when using firm-level counterfactuals imputed using OLS models and market-wide indexes

D.7 Results for counterfactual returns from shorter or longer estimation windows

Here, we test robustness of our results when replicating our procedure restricting the estimation window which is 30 days long (Figure D.11 or 180 days long (Figure D.12).

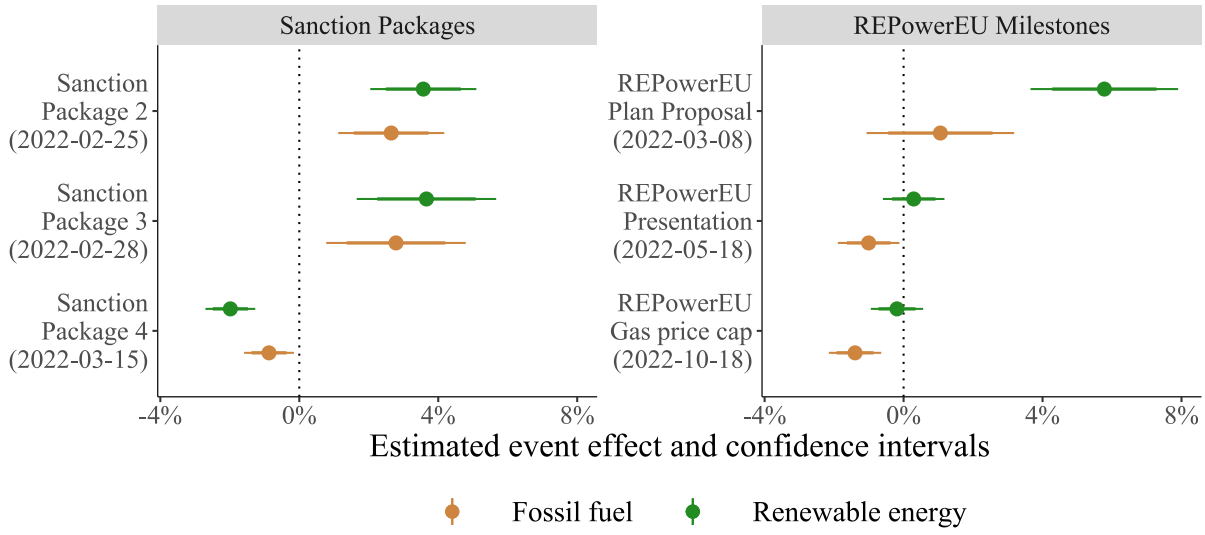

FIGURE D.11: Effects on *Abnormal Returns* obtained when constructing counterfactual Returns using a 30 days-long estimation window

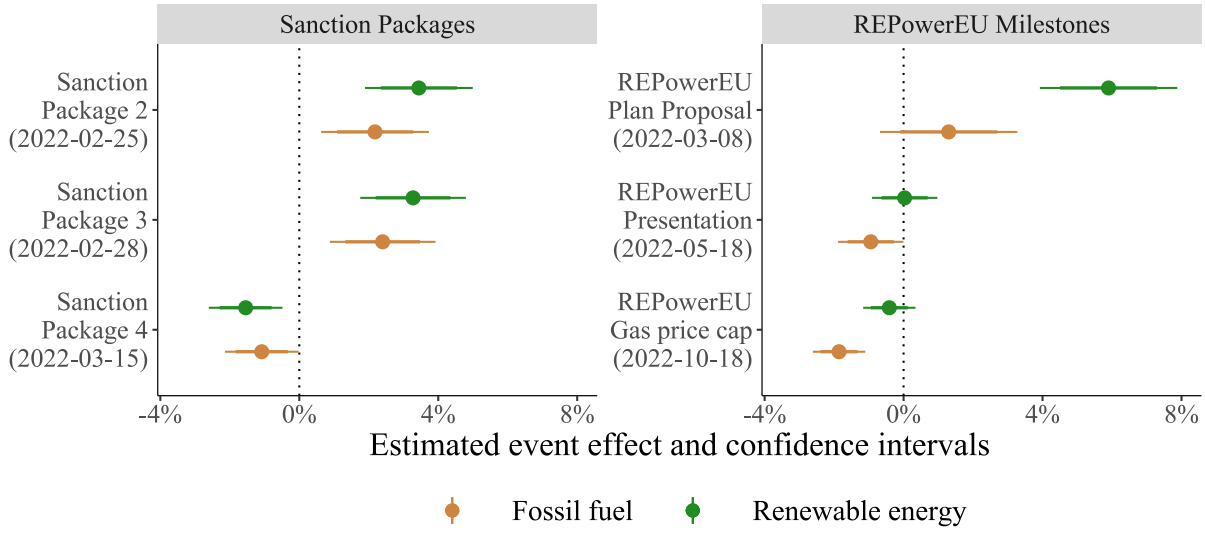

FIGURE D.12: Effects on *Abnormal Returns* obtained when constructing counterfactual Returns using a 180 days-long estimation window

Results are consistent with those presented in the main text. Regardless of the estimation window length, sanction packages 2 and 3 exhibited a positive effect on energy firms (fossil fuel or

renewable energy). Sanction package 4, instead, generated a negative effect for both types of firms. These effects are, broadly speaking, indistinguishable from each other, confirming our expectation that sanction announcements did not generate distributional effects.

Confirming again what we found in the main text, REPowerEU milestones generated stronger distributional effects which are also detected with these alternative estimation windows. The Plan Proposal announcement significantly increased abnormal returns of renewable energy firms, and did so statistically significantly as well when compared against fossil fuel companies. When using a shorter estimation window, we furthermore find evidence that abnormal returns for fossil fuel firms were significantly lower in the case of the Plan Presentation, which is a stronger result compared to the main text where this effect was not distinguishable from zero. For the REPowerEU gas price cap abnormal returns for fossil fuel firms were statistically significantly negative compared to those for renewable energy firms, for which we find a null effect.

D.8 Results for modeling raw returns

For transparency, we report our findings when studying average raw firm *Returns* on the event days in Figure D.13. Although most effects are in line with those estimated using *Abnormal Returns*, we caution readers from interpreting these effects substantively as many of them change significantly once we account for market expectations.

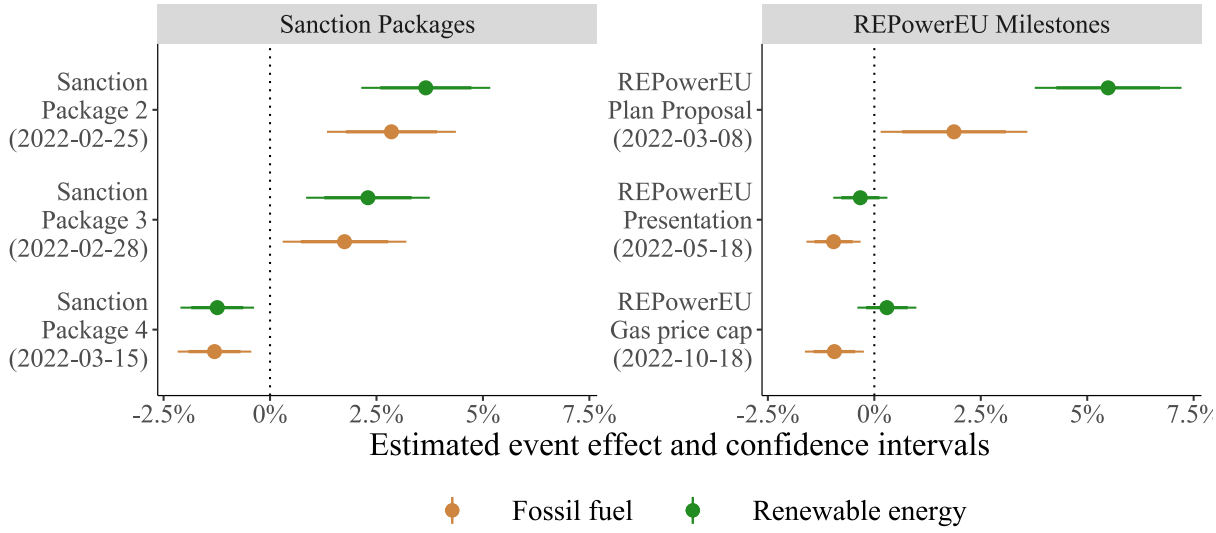

FIGURE D.13: Event effects on *Returns*. These estimates are obtained without discounting observed *Returns* from the market baseline.

D.9 CAR analysis when excluding firms with imprecise estimation

Similarly to what we did above, in Figures D.14, D.15, and D.16 we replicate our *Cumulative Abnormal Returns* analysis after excluding firms whose counterfactuals are based on LASSO market models with R2 smaller than 0.10, 0.30, and 0.50 respectively (all these analyses use windows of ten days to the left and right of each event). We find similar results to those reported in the main text, with a much larger spread between fossil fuel and renewable energy firms (favoring the latter group) in the EU in the context of the REPowerEU plan proposal.

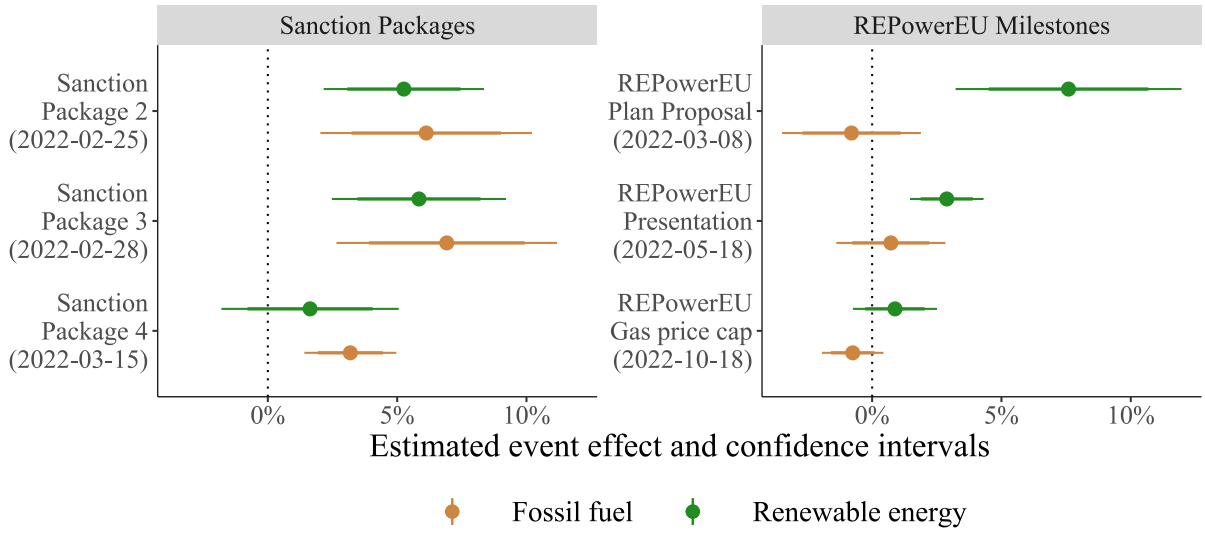

FIGURE D.14: Effects on *Cumulative Abnormal Returns* obtained when excluding firms whose counterfactual is based on market models with R2 smaller than 0.10

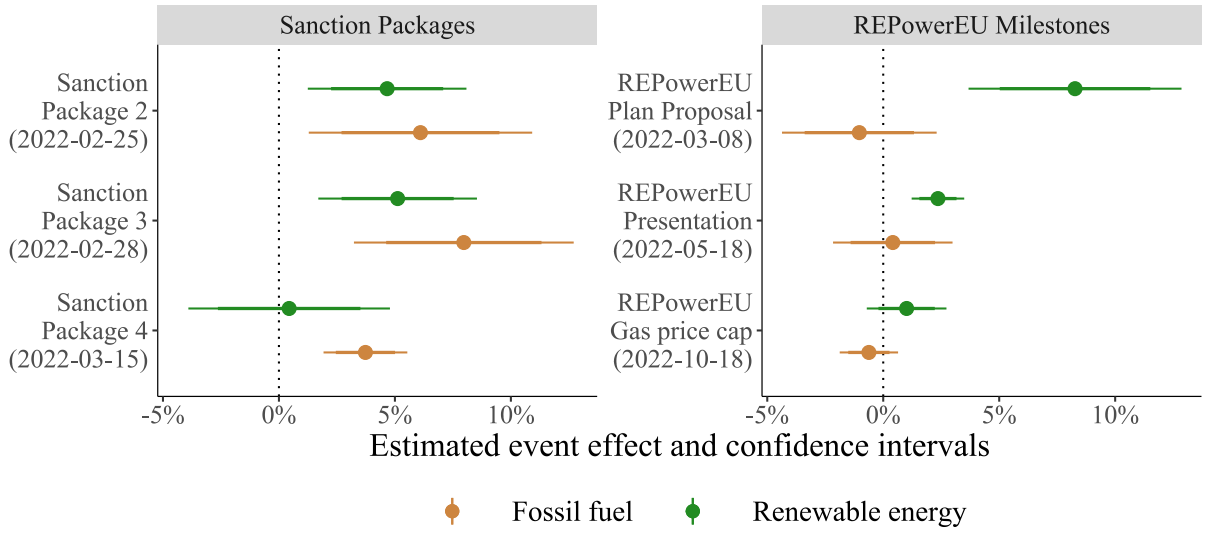

FIGURE D.15: Effects on *Cumulative Abnormal Returns* obtained when excluding firms whose counterfactual is based on market models with R2 smaller than 0.30

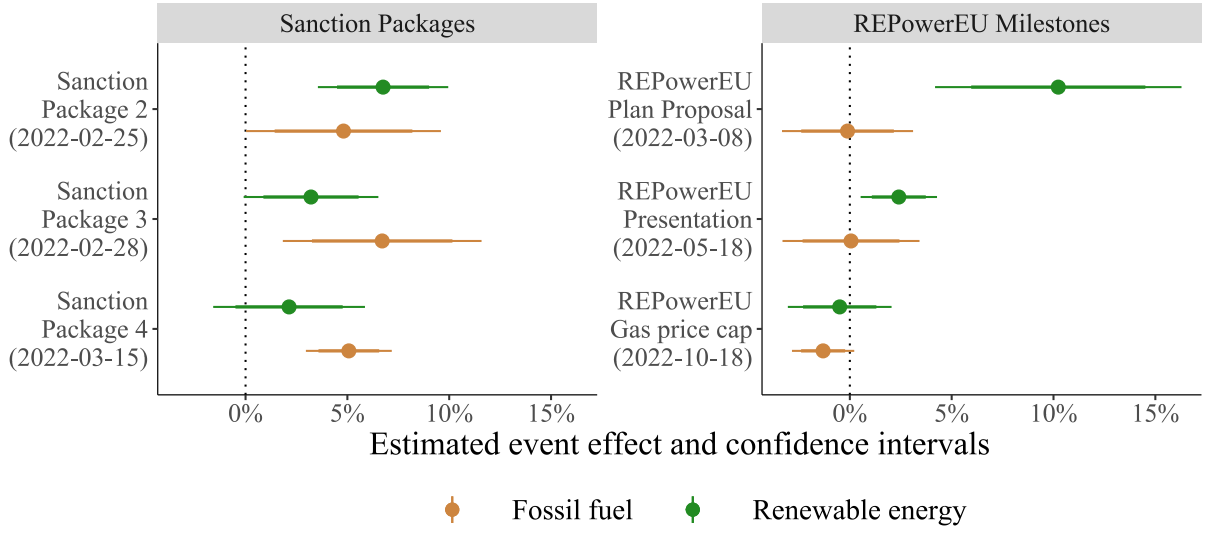

FIGURE D.16: Effects on *Cumulative Abnormal Returns* obtained when excluding firms whose counterfactual is based on market models with R2 smaller than 0.50

D.10 CAR analysis when using different time window sizes

In Figures D.17 and D.18, we replicate our *Cumulative Abnormal Returns* analysis after limiting the size of the time window used to twenty and five days to the left and to the right of each event, respectively. In this case, too, we find similar results to those reported in the text. The spread between fossil fuel and renewable energy firms in the EU becomes much larger on the day of the REPowerEU plan proposal when using a small window.

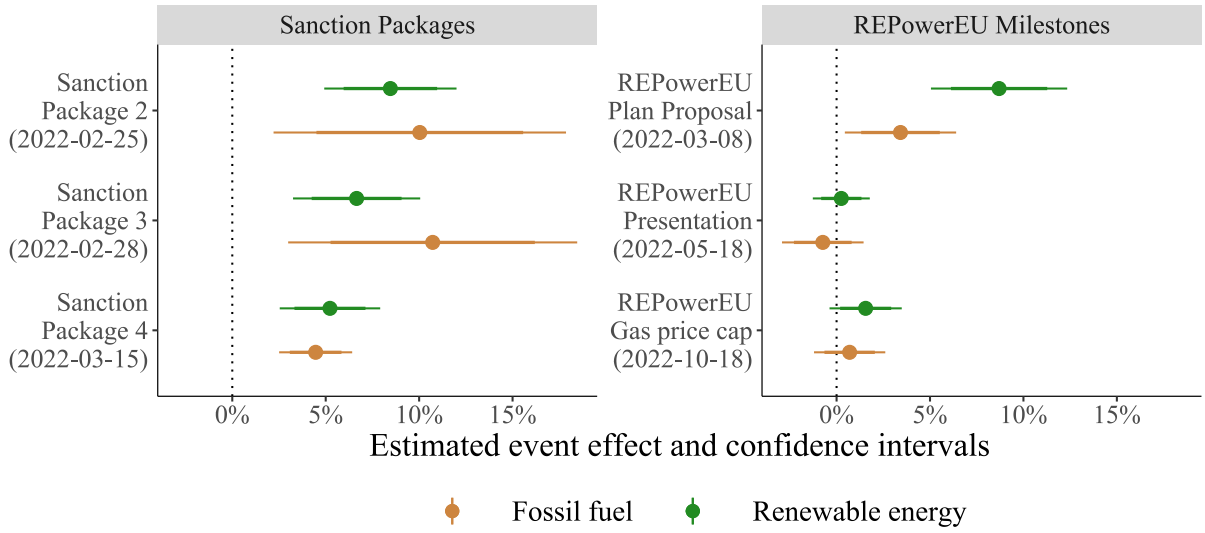

FIGURE D.17: Effects on *Cumulative Abnormal Returns* obtained when limiting time windows to 20 days to the left and right of each event

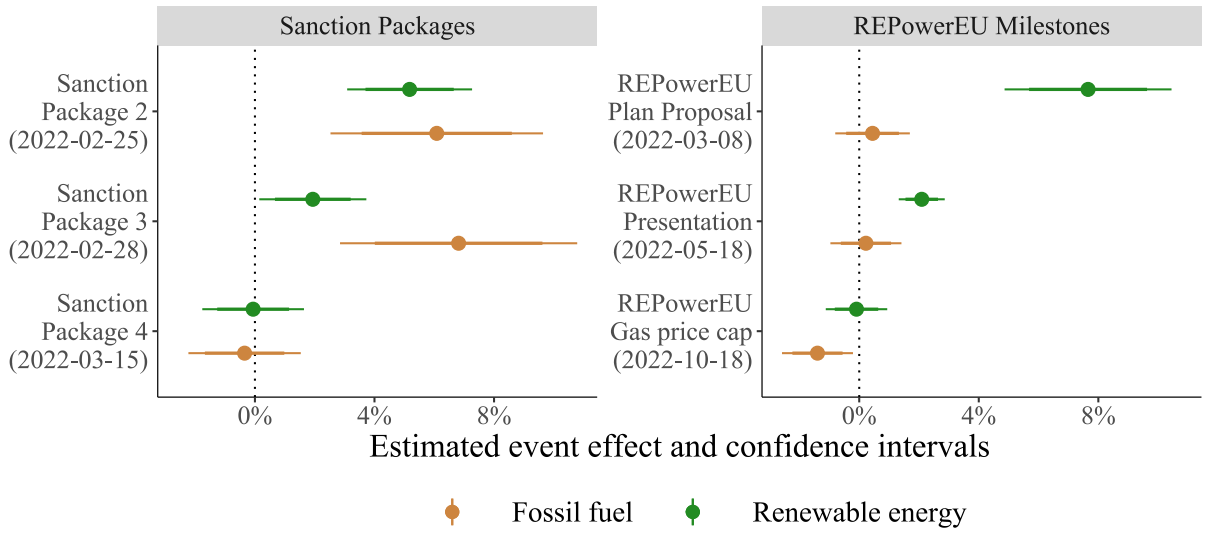

FIGURE D.18: Effects on *Cumulative Abnormal Returns* obtained when limiting time windows to 5 days to the left and right of each event

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