

# Energy Transition, Financial Markets and EU Interventionism: Lessons from the Ukraine Crisis<sup>\*</sup>

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Forthcoming at *Political Science Research and Methods*

This draft: September 16, 2025

## Abstract

A successful energy transition requires the reallocation of private capital away from fossil fuel assets to greener alternatives. This transition is typically hindered by investors' focus on today's returns. In times of crisis, however, credible and unambiguous political signals about the future profitability of green industries can steer investments towards low-carbon assets. Drawing on European Union interventions during the onset of the Russian invasion of Ukraine, we present an event study of daily stock market returns following the most salient policy announcements by the European Commission in 2022. Our analysis shows that markets for shares of EU-based energy firms were initially prepared to move capital to cleaner companies, suggesting support for the clean energy transition. However, the short-lived distributional effects materialized only for announcements that could unmistakably be understood as unwavering commitments to the EU's green renewal, while more ambiguous announcements did not have the same distributional implications. Our findings emphasize that repeated and unambiguous political signals during crisis episodes can create favorable market conditions, at least in the short-term, to support capital reallocation towards greener stocks.

**Keywords:** energy transition; European politics; EU market interventions; credible signaling; political communication; stock markets; event study analysis.

**Competing interests:** The authors declare none.

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\*Previous versions of this paper were presented at the APSA 2023 meeting, the 2023 Hertie Political Economy Lunch Seminar, a University of Bergen workshop, the 2024 Nuffield PPRNet meeting, a St Antony's European Studies Center seminar, a Bocconi-EIEE workshop, and EPSA 2024. We thank Elin Boassson, Jane Gingrich, Tom Hale, Mark Hallerberg, Kathryn Harrison, Jens van't Klooster, Matto Mildenberger, Michael Ross, Lucas Schramm, Christina Toenshoff, and Egon Tripodi for useful feedback.

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## Introduction

Decarbonizing the world economy necessitates unprecedented amounts of money. Despite the increasing capitalization of the low-carbon sector, the *International Energy Agency* in its 2023 World Energy Outlook estimates that investments in clean energy need to triple to about US\$4.3 trillion annually until 2030 to keep net zero emissions by 2050 within reach ([IEA, 2023](#)). Ambitious climate targets require greater investments in green assets and, at the same time, substantial capital reallocation away from fossil fuels. With markets as the primary conduit for steering capital allocation, concerns about financial investors' short time horizons dampen the prospect of a market-led energy transition. Existing research, therefore, highlights the politicization of public policy for speeding up the transition ([Aklin and Urpelainen, 2018](#); [Stokes, 2020](#); [Mildenberger, 2020](#); [Nahm, 2021](#); [Colgan, Green, and Hale, 2021](#); [Gazmararian and Tingley, 2023](#); [Bolet, Green, and González-Eguino, 2024](#); [Voeten, 2024](#)).

In the spirit of this work, this paper studies the response of stock markets to energy transition policy signals in moments of high salience, where “windows of opportunity” for increased policy ambition arise from high levels of uncertainty in capital markets. Specifically, we examine if and under what conditions political reassurances about the future profitability of green industries can boost capital allocation towards low-carbon assets at the onset of the Russian invasion of Ukraine. We motivate the choice of this case with the observation that—despite initial commentary to the contrary—the war did not have much of a catalyzing effect for the energy transition because it did not hit fossil fuel producers with full force.<sup>1</sup> Consistent with the argument that we develop in this paper, we attribute this turn of events to a lack of sustained top-level political commitments by the European Union (EU) leadership to long-term green renewal.

Our study hones in on an important point, namely the conditions of credible communication of

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<sup>1</sup> In fact, the war generated record profits for oil majors and other fossil-fuel intensive industry. See “[World’s largest oil companies have made \\$281bn profit since invasion of Ukraine](#).” *The Guardian*, 19 February 2024. Our data show a similar pattern extending beyond oil majors to the broader fossil fuel industry (Figure A.1).

future energy policy between policymakers and markets to spur a robust energy transition. In the context of the EU response to the Russian invasion of Ukraine, we study the effect of EU Commission announcements throughout 2022. Doubling down on a similarly interventionist approach as seen in the “directionist coordination” during the Covid-19 pandemic ([European Council, 2022](#)), the Commission combined sanction packages against Moscow with announcements about speeding up the clean energy transition to reduce dependence on Russian oil and gas. These state-led policies hoped to address economic risks and stagnation while seeking to overcome the impasse of ambitious climate action, which requires targeted political strategies ([Meckling et al., 2015](#); [Bayer and Urpelainen, 2016](#); [Breetz, Mildenberger, and Stokes, 2018](#); [Gaikwad, Genovese, and Tingley, 2022](#); [Green et al., 2022](#)). But while the effect of these types of (green) industrial policy is being increasingly researched ([Allan, Lewis, and Oatley, 2021](#); [Allan and Nahm, 2024](#); [Juhàsz and Lane, 2024](#)), direct market responses to greater interventionism and the conditions under which markets are prepared to adjust to swiftly emerging political visions laid out by such policies remain largely understudied.<sup>2</sup>

Our argument focuses on how markets perceive the credibility of policy signals by the European Union as *the* most important policy actor at that point in time. While some scholars tend to be skeptical about the EU’s ability to communicate credibly ([Majone, 2000](#); [Meunier and Nicolaidis, 2019](#); [Zeitlin, Nicoli, and Laffan, 2019](#)), concerns about diluted communication due to the EU’s complex, multi-level governance should be muted in times of crisis. When macroeconomic uncertainty is large and market volatility is high, as was the case in Europe at the beginning of the war in Ukraine, markets value political steer to protect profits and minimize transition risks. We argue that, in such moments, financial investors understand political reassurances about the future profitability of low-carbon investments as EU commitments to a sustained energy transition. This logic translates into the expectation of observable market responses of increased returns for green companies as well as divestment from fossil fuel assets. We also claim that these distributional ef-

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<sup>2</sup> See [Bauer, Offner, and Rudebusch \(2023\)](#) for an exception in the case of the U.S. Inflation Reduction Act.

fects of credible policy signals will be stronger for directly climate relevant announcements relative to indirect ones.

While such effects may only matter for brief periods right after an EU announcement, short-term capital reallocation is an important necessary condition to sustain the energy transition in the long run. Therefore, we empirically test our central expectations by studying short-term stock market returns of European fossil fuel and renewable energy companies at the start of the Ukraine war.<sup>3</sup> Our event-study of a sample of 115 EU-based energy companies shows that fossil fuel (66 companies) and renewable energy firms alike (49 companies) experienced abnormally high stock returns that were significantly above market expectations and comparable across both groups, when the EU Commission announced sanction packages that targeted Russian assets and severed ties to Russian oil and gas firms.

We also find that initial announcements that *directly* shaped the EU's climate and decarbonization strategy—primarily through the €300 billion REPowerEU clean energy investment package—had even larger positive effects on the returns of EU-based energy firms and were stronger for green companies. Following the announcement of REPowerEU, European renewable energy companies saw returns that were 5.1% higher than market expectations, while their fossil fuel counterparts' abnormal returns were not significantly above market expectations. However, all of these effects dissipate quickly. Furthermore, once the EU's broader policy vision in response to the war had been communicated through sanction and energy policy announcements, markets internalized this information and market responses became more muted.

Our findings contribute to existing comparative political economy research in two ways. First, they speak to broader debates about the relationship between politics and markets (Przeworski, 2003; McNamara and Newman, 2020). We provide an argument about the *types* of policy announcements and the *conditions* under which markets respond to such announcements in ways

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<sup>3</sup> Consistent with our distributional logic, we find weaker responses to Commission policy announcements among non-European renewable and fossil fuel firms in a robustness test.

that are consistent with the policy vision that is conveyed in them. In line with other work, we show that the ability of interventionist policy announcements to steer markets—i.e., by reallocating capital from fossil fuels to renewables—depends on the perceived credibility of the announcements and sustained efforts to direct markets. In the absence of repeated and unambiguous signals about strong political commitments to the clean energy transition, market support will falter ([Gard-Murray, Hinthon, and Colgan, 2023](#)), and well-studied institutional barriers for long-term policymaking prevail ([Finnegan, 2022b,a](#)).

Second, our findings have implications for the growing firm-level literature in climate politics ([Kennard, 2020](#); [Genovese, 2021](#); [Cory, Lerner, and Osgood, 2021](#); [Bayer, 2023](#)) and the literature on government-firm interactions more generally ([Kim, 2017](#); [Kim and Osgood, 2019](#); [Baccini, Pinto, and Weymouth, 2017](#); [Malesky and Mosley, 2018](#); [Juhàsz and Lane, 2024](#); [Wellhausen, 2014](#)). We demonstrate that firm nationality (here, whether a company is based/traded inside *versus* outside of the EU) does not only shape the relationship between policymakers and firms ([Hansen and Mitchell, 2000](#); [Rickard and Kono, 2013](#); [Malesky, Gueorguiev, and Jensen, 2015](#)), but also matters for how markets respond to policy announcements by political actors in the same (national) jurisdiction. Scholars of firms, therefore, need to pay careful attention to differences both in firm ownership across countries and within sectors. In the case of the clean energy transition, understanding the interaction of these two dimensions has proven essential to avoid forgoing opportunities of systematic change towards a more sustainable future.

## The Return of Market Interventions in EU Energy Policy

Much of the making of the European Union since the 1950s happened through the expansion of markets and was centered on neoliberal fundamentals of competition and openness ([McNamara, 2023](#); [Meunier and Nicolaidis, 2019](#)). In the area of EU environmental and energy policy, this tradition took over in the late 1990s when market principles found their way into the Union’s main

governance frameworks. The turn away from command-and-control regulation towards market-based instruments was on prominent display in international climate negotiations when the EU gave up its initial opposition to the flexible mechanisms in the Kyoto Protocol. As a result, the European Union Emissions Trading System (EU ETS), still the largest carbon market worldwide bar China's, started operating in 2005 and was praised by the Commission as the “*EU’s key tool for cutting greenhouse gas emissions.*” It remains a central instrument in the bloc’s climate strategy 20 years on. Notwithstanding its importance, the EU ETS was not the exception in the Commission’s new regulatory paradigm. Policies on renewable energy production and energy efficiency that flanked the introduction of the carbon market as part of the “20-20-20” package were equally guided by market principles in an increasingly liberalized Internal Energy Market.

Despite their central role in EU climate and energy policy, there is increasing evidence that the success of market-based approaches is mixed ([Green, 2021](#); [Perino, Ritz, and van Benthem, 2022](#)). Some find that carbon pricing across Europe helped reduce CO<sub>2</sub> emissions ([Bayer and Aklin, 2020](#); [Colmer et al., 2024](#)) while stimulating investments in innovation ([Calel and Dechezlepretre, 2016](#)). Others warn of political risks and distorted economic incentives. Just like studies have shown that market competition shapes firms’ preferences for climate policy ([Green, 2013](#); [Genovese, 2019](#); [Kennard, 2020](#)), research also finds that firms were able to shape policy provisions to their benefit ([Ellerman, Buchner, and Carraro, 2007](#); [Genovese and Tsvinnereim, 2019](#); [Bayer, 2023](#)).

More recently, a significant change in approach to climate policymaking has occurred, with state intervention making a come back both in Europe and globally. In the case of the EU, the return to more active market interference is rooted in lessons from the 2009 European financial crisis and momentum from the EU’s response to the Covid-19 pandemic. Large-scale EU investment programs “NextGenerationEU” (€800bn investments for post-Covid recovery) and “REPowerEU” (€300bn investments in affordable, secure and sustainable energy for Europe) are emblematic of this “interventionist turn” underpinned by a broad shift in policy vision. This new approach ranges from massive Green New Deal infrastructure investments to regulatory reform, such as the

introduction of a carbon border tax ([Shum, 2024](#); [Bayer and Schaffer, 2024](#)).

The revival of interventionist policymaking has two important drivers which have implications for the (re)allocation of capital for the purposes of the energy transition. The first driver is the desire among policymakers for a 21st century industrial policy as a strategic lever to protect national economic interests ([Allan, Lewis, and Oatley, 2021](#); [Allan and Nahm, 2024](#); [Juhàsz and Lane, 2024](#)). Indeed, institutions scholars have shown that state-led industrial policy can create buy-in from investors, especially if these policies come in the form of subsidies ([Rickard, 2012](#); [Colgan and Hinthon, 2023](#)). Green industrial policy can also induce new global competition, but the extent to which this happens depends on the domestic political economy and the country context ([Nahm, 2021](#); [Kupzok and Nahm, 2024](#)). This literature suggests that green industrial policy can create the initial conditions for a successful green renewal, but markets are needed to sustain and scale up demand.

The second driver for a re-orientation of regulatory paradigms is often a crisis that serves as a critical juncture. Just like the oil crisis in the 1970s became a catalyst for the reform of global energy markets ([Meckling et al., 2022](#)), so does the post-pandemic polycrisis invite a strong policy response. Geopolitical considerations have become paramount for future-proofing supply chains, and supply security was a core motivation for speeding up the clean energy transition in the United States and China ([Colgan and Hinthon, 2023](#)). In times of crisis, when uncertainty is large, institutional responses by policymakers can stabilize markets. They can do so by shaping market expectations and by creating business opportunities, two effects that materialize when policy announcements and underlying political institutions are seen as credible ([Meckling and Nahm, 2022](#)).

Treating the Russian invasion of Ukraine in February 2022 both as such a crisis moment and an exogenous shock to Europe's energy security, we study the effect of public policy announcements by the EU Commission on market responses. Our key inferential goal is to parse whether the EU's move towards greater interventionism, operationalized through announcements of sanctions packages and clean energy investment promises, triggers observable responses in stock market

returns—and if so, under what conditions. We first discuss possible market effects of EU interventionist announcements to underpin our theoretical priors and then describe the research design that allows us to test our expectations.

## Market Responses to EU Public Policy Announcements in Times of Crisis

We start our argument about the observable market effects of EU interventionist announcements from the vantage point of a large political economy literature that characterizes when and how political communication moves expectations of financial markets. Accordingly, announcements by sovereign political authorities will have reverberating effects in domestic markets as long as they have legitimacy and credibility.

In contrast to announcements by domestic political elites, EU announcements may, however, be perceived differently for two reasons. First, the multi-level governance and long delegation chains in EU decision-making can dilute messages from Brussels, breaking the link between announcements and the material implications for businesses.<sup>4</sup> The empirical evidence about market responses to EU announcements is indeed mixed: some find that decisions taken at EU summits move financial markets (Bechtel and Schneider, 2010; Gray, 2009), yet others point to a lack of clarity in EU communication (Majone, 2000; Zeitlin, Nicoli, and Laffan, 2019). Second, even if markets were receptive to EU announcements, contents matters. As such, markets might understand interventionist public policy announcements as protectionism, depressing profit expectations (Wolf, 2023).

Following these considerations, we argue that the EU has likely a more significant role to play for market responses in times of crisis.<sup>5</sup> While financial investors may find it cumbersome to

<sup>4</sup> Systematic evidence about mixed market signals from EU public policy announcements are documented in a review of the “Economic Effects of the European Single Market” by Sweden’s National Board of Trade. Available at <https://www.kommerskollegium.se/globalassets/publikationer/rapporter/2016-och-aldre/publ-economic-effects-of-the-european-single-market.pdf>.

<sup>5</sup> Our theoretical argument should work at various levels of institutional governance and, potentially, at other times. However, in this paper we focus on the EU in times of crises as a most likely case because climate and trade policy,

decipher the material consequences of EU public policy announcements for their portfolios during normal times, EU announcements carry special weight in moments when political and economic uncertainty are high and markets are volatile. This is both a function of the size of the EU Single Market—with 450 million people and an output of US\$16 trillion—and its institutional stability. Multi-level governance is a boon during crises as interlocked decision-making institutions create the very credibility that markets seek. Political commitments cannot simply be undone at the whim of a single government, so they are likelier to stand the test of time. It is hence not by accident that the “credibility premium” of EU institutions tends to be highest in turbulent times ([Jones, Kelemen, and Meunier, 2016](#); [Schimmelfennig, 2018](#)).

This logic holds for any crisis, but becomes the more important the more existential a crisis is. The European financial crisis, the Covid-19 pandemic, and the 2022 Russian invasion of Ukraine all serve as good examples. The protective umbrella of the EU as a bloc of 27 member states is most valuable for outsized crises that threaten to overwhelm the crisis-management capacity of individual states. EU intervention quelled market speculation about Greek liquidity during the country’s debt crisis. Coordinated procurement and rollout of Covid-19 vaccines had a similar effect for charting a way out of lockdowns towards economic recovery. We therefore expect that announcements by the EU Commission in response to the Russian invasion of Ukraine, as the latest crisis in a string of geopolitical challenges to Europe’s peace and security, are likely to invite clear market reactions.

Focusing on a crisis episode is, therefore, most helpful for our argument. By design, crises are synonymous with high levels of market uncertainty. This makes it more difficult for market participants to rely on standard decision-making heuristics and prompts them to turn to policymakers for guidance and reassurance. For actors, such as the European Commission, this creates opportunities to fill the informational vacuum that crisis moments create and tame market uncertainty. As long as these policy announcements are perceived as credible signals, markets will follow the

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as the policy areas of our empirical case study, fall within the immediate competence of the European Commission.

political direction laid out by such announcements. While credible communication should also be possible outside of crisis moments, both the demand from markets for political steer and the supply of such announcements by political actors to stabilize markets is higher when crises hit. Our focus on times of crisis hence aids our theorizing insofar as these moments create important preconditions for effective information-transmission in the form of political communication through policy announcements.

Taking this basic claim to the case of the EU energy transition, we argue that how and for whom interventionist EU announcements matter depends on both *the type of announcement* (i.e., whether it directly concerns the energy transition or not) and *the type of affected assets* (i.e., whether the announcement targets green or fossil fuel firms). In developing our expectations about the distributional effects of public policy announcements—and how they translate into market responses—we therefore concentrate on these two key dimensions.

## **Expectations**

Confronted with the Russian attack on Ukraine, the European Commission responded with two types of announcements that had implications for energy markets: some announcements were targeted sanctions against Russia's exports; others were commitments to the EU's clean energy transition as a way to reduce European import dependence from (Russian) oil and gas. While both types of announcements matter for energy markets and the respective actors involved in them, we argue that distributionally relevant differences in the announcements' contents exist.<sup>6</sup> The sanctions packages were varied in whom they targeted and were broader than just hitting energy markets and associated oil and gas infrastructure. Sanctions importantly demonstrated the EU's resolve against the Russian aggression in spite of unavoidable price spikes in energy costs for European businesses and households. By contrast, clean energy transition announcements focused

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<sup>6</sup> Our argument focuses on the downstream effects of European Commission announcements in terms of market responses. While recognizing the importance of political bargaining over the exact contents and timing of European Commission announcements, we leave the analysis of EU decisionmaking about its communication and sanctions strategy for future research.

on the renewables portion of the energy market, in particular, and served as tailored reassurances of the EU’s long-term commitment to a green renewal.

The difference in relative focus of these two types of announcements translates into different growth and profit expectations for fossil fuel-intensive and renewable energy companies. Credible policy announcements that promise to create business opportunities for some firms should see their stocks rise, while stocks for companies with grim prospects should drop ([McNamara and Newman, 2020](#)).

Since sanction packages restricted cheap energy supply to Europe from one day to the next, we expect that *European Commission sanctions announcements would increase stock market returns of energy producers of all types* (Hypothesis 1). The war in Ukraine reminded Europeans of the geopolitical importance and strategic value of secure energy access ([Meunier and Nicolaidis, 2019](#)). This endowed energy companies with considerable political leverage. Even though the EU and many of its member states champion the idea of climate leadership and net zero targets, they scrambled to quickly diversify their energy imports after the war had started. To keep the lights on, policymakers searched for alternatives—not necessarily green ones, as the German rush towards building liquefied natural gas (LNG) terminals in break-neck speed showed.<sup>7</sup> Sanction package announcements therefore should be promising news for the energy sector as a whole.

This contrasts with announcements that emphasize the need for an increased pace of economy-wide decarbonization. Political commitments by Brussels to a sustained clean energy transition creates justified growth expectations among financial investors for the renewables sector within the energy market. As a result, we hypothesize that *European Commission announcements in support of the clean energy transition would increase stock market returns only for renewable energy companies* (Hypothesis 2). The wedge in market responses to announcements about green renewal are similar to findings in the literature on green industrial policies that often simultaneously squeeze the market share of fossil fuel producers and open markets to non-incumbent firms

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<sup>7</sup> “[Germany: Scholz opens country’s first LNG terminal.](#)” *Deutsche Welle*, 17 December 2022.

([Meckling et al., 2015](#); [Bayer and Urpelainen, 2016](#)). Compared to sanction package announcements, which largely lack the capacity to differentiate between brown and green firms, we expect to see separation between brown and green firms from distributionally relevant announcements that are direct affirmations of the clean energy transition as an overriding policy vision.

## Case Study: Russia's Invasion of Ukraine

The European Commission's commitment to transition EU economies away from fossil fuels predates the Russian invasion of Ukraine by several years. The European Green Deal, launched by the Commission president von der Leyen in 2019, set out the vision of carbon neutrality by 2050. This long-term target was translated into the goal to reduce greenhouse gas emissions by 55% by 2030 in the “Fit for 55” package. These broader contours help contextualize the threat the war in Ukraine has been posing to the EU’s immediate decarbonization efforts as well as to its longer-term climate ambition.

At the beginning of the 2022 invasion of Ukraine, several EU countries were highly dependent on Russian oil and gas, including Central and Eastern European member states like Czechia, Hungary and Poland, as well as the EU’s economic powerhouses of Germany, France, and Italy ([Noël, 2022](#)). Since Russian natural gas figured prominently in the EU’s decarbonization strategy as a “transition fuel” away from more carbon intensive oil, some observers quickly pointed to the difficulties the war would create for the EU’s net zero plans.<sup>8</sup> Others, including the International Energy Agency ([IEA, 2022](#)), wanted the war to be harnessed as an opportunity to reduce reliance on Russian energy imports and, at the same time, increase domestic renewable production. Just days before the invasion, Kadri Simson, EU Commissioner for Energy, tweeted:

Just had a phone call w/ French minister @barbarapompili, to discuss #EU preparedness & to coordinate action on #energy security. We have to reduce dependency on Russian gas, diversify our suppliers & invest in #renewables.

<sup>8</sup> [“Russia’s Invasion of Ukraine Adds Urgency to Europe’s Green Power Transition.” Scientific American](#), 25 February 2022.

#EU is strong, united & stands in solidarity with #Ukraine.

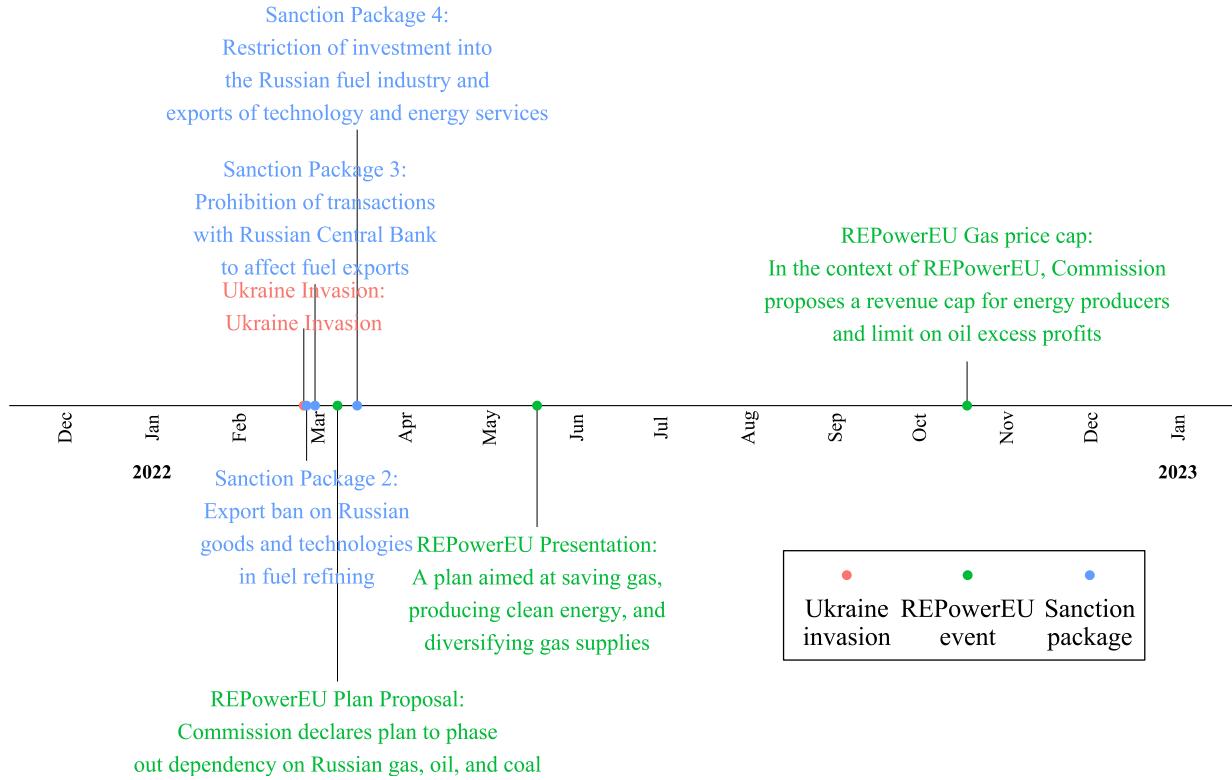
Financial actors were largely sympathetic. While investors expected the European Union to diversify gas supply to alternative sources outside Russia in the short term, they adopted an upbeat stance on investment in renewables and greater domestic production in the longer run. Notable private consultancy groups came to a similar conclusion when they found that the Russian invasion could be “a turning point in seizing the opportunity to address the globe’s unfolding climate crisis” ([McKinsey & Company, 2022](#)).

For our analysis, we draw on six key announcements by the European Commission in response to the Russian invasion of Ukraine on 24 February 2022 as shown in Figure 1. These events were identified through a review of the EU timeline events in 2022 as well as a content analysis of the packages themselves to establish their energy market relevance. In light of these decisions, we focus on announcements of sanctions packages 2-4 (the first package was already adopted on 23 February 2022, i.e., the day *before* the invasion), shown in blue, and three energy transition policy announcements as part of the REPowerEU plan, marked in green.<sup>9</sup>

On the first day after the attack (25 February, package 2), the EU announced an immediate ban of trade in Russian goods and services, including technologies for fuel refining. Three days later (28 February, package 3), in an effort to damage fuel exports, transactions with the Russian Central Bank were prohibited for all individuals and companies based in the EU. The next package of sanctions followed after another two weeks (15 March, package 4). It restricted new investments in the Russian energy sector, banned imports of Russian technology and energy services, and imposed trade restrictions on iron, steel, and luxury goods. Altogether we expect these packages to be meaningful information to energy market participants for short-run market transactions.

The announcements of sanctions were flanked by announcements about the then-new REPowerEU policy—a plan to speed up the clean energy transition and to improve EU member states’

<sup>9</sup> A full timeline of all EU response measures since the start of the war can be found here: <https://www.consilium.europa.eu/en/policies/eu-response-ukraine-invasion/timeline-eu-response-ukraine-invasion/>. Appendix C provides a list of other market relevant events to contextualize the broader policy environment.



**FIGURE 1:** *European Commission announcements by event type.* The figure marks announcement dates for sanction packages 2–4 in blue and REPowerEU policy measures in green. The red dot indicates the invasion of Ukraine.

energy security. This policy was initially proposed on 8 March 2022 (European Commission, 2022c). Afterwards, a more complete version of the plan, built on energy saving measures, increased renewables capacity, and reduced energy import dependence, was presented on 18 May 2022 (European Commission, 2022b). As part of wider policy adjustments under the REPowerEU umbrella, the European Commission eventually announced the enactment of emergency regulation on 18 October 2022 (European Commission, 2022a) to cap fossil fuel producers' revenues, which was intended to limit excess profits and ease budgetary pressures for energy customers. Important for our assumption that the announcements present indeed new information to markets, we found no evidence that the timing or contents of Commission announcements were leaked to the media

or news stations prior to their official release.

Our analysis leverages the occurrence of these six events, which we expect to shape market responses during the moments of geopolitical and macroeconomic instability in 2022, peaking in February 2022, right after the invasion.

## Research Design

We use a stock market event study design to test our expectations about the effects of European Commission announcements on energy markets. Our empirical analysis examines stock market returns for EU energy firms *on the day* of each of the six announcements identified above. We first present the sample and data, to then discuss the estimation approach and results.

### Sample and Stock Market Returns Data

We collect data on stock market returns for 66 fossil fuel and 49 renewable energy producers, which are either headquartered in Europe or primarily traded at a European stock exchange. We list these firms, their headquarters country, primary exchange, and industry in appendix tables A.1–A.4. Companies are classified as fossil fuel or renewable energy firms based on six-digit North American Industry Classification System (NAICS) codes. We code a company as a fossil fuel energy producer when its core activities are fossil fuel electric power generation; petroleum refining; natural gas or crude petroleum extraction; natural gas distribution; or underground, surface, bituminous coal, or lignite mining. Companies that operate as electric power generators from biomass, geothermal, hydroelectric, solar, wind or other renewable sources are classified as renewable energy producers. Our assignment process correctly identifies the largest European and non-European publicly traded fossil fuel companies—such as Aramco, BP, Chevron, Eni, Equinor, ExxonMobil, Marathon Petroleum, Phillips 66, Shell PLC, TotalEnergies, and Valero—as fossil fuel producers, while major renewables firms—e.g., NextEra, Jinko, and Brookfield Renewable—

are correctly classified as well.

Categorizing firms based on industry codes might misclassify fossil fuel producers that have started diversifying their assets towards renewables, partly because of climate policies, partly for fear of stranded assets. Even though such diversification has been slow, at least for major fossil fuel producers (Green et al., 2022), we check our classification against other work that uses Carbon Underground 200 and Clean 200 company lists to group energy firms into fossil fuel and renewable producers (Voeten, 2024), without a change in results.<sup>10</sup>

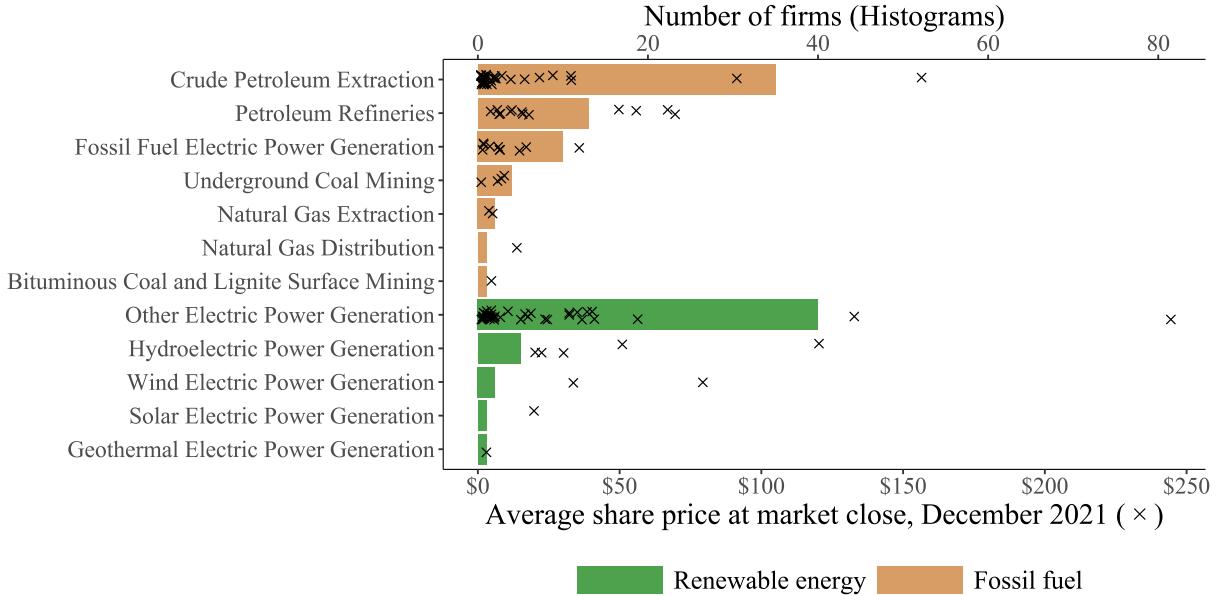
Another potential threat to our classification arises from a relatively large number of renewable energy firms belonging to the “residual” NAICS code of “Other electric power generation.” These firms are not primarily fossil fuel, nuclear, hydroelectric, wind, solar, or geothermal operators. Examples of firms in this category include tidal power generators or firms holding a diversified set of renewable assets. Both types of firms would be affected by industrial policy announcements that increase investor confidence into renewables.

Figure 2 provides a breakdown of European firms in our data by sector. Histograms show the number of companies in each sector, and crosses indicate companies’ average monthly share price in December 2021. Across fossil fuel (brown) and renewable (green) producers, companies are rather well balanced both in terms of the total number of firms and the share price distribution.

For each company, we measure stock *returns*: the percentage change in stock market closing prices between two consecutive trading days. Since, for any level of supply, increases in returns are driven by greater demand, positive returns correspond to higher profitability of holding these stocks, and *vice versa*. Changes in market valuations therefore capture the distributional effects of political announcements in the form of companies’ stock market performance.

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<sup>10</sup> Appendix figure D.6 shows that results hold when dropping the only four firms that get classified differently across both approaches.



**FIGURE 2:** Descriptive information for European fossil fuel and renewable energy firms. Histograms report the number of firms by NAICS sector code (top x-axis) and crosses show the average firm market price in December 2021 (bottom x-axis).

## Event Study Design

We use an event study design (MacKinlay, 1997) to estimate the effect of EU announcements on profit expectations for fossil fuel and renewable energy stocks. According to the market efficiency hypothesis, market prices perfectly reflect all the information that is available to investors at any point in time. New price-relevant information, hence, leads investors to update expectations about the profitability of the stocks they hold, causing prices (and returns) to rise or fall. We follow recent political science research (Pelc, 2013; Wilf, 2016; Kucik and Pelc, 2016; Aklin, 2018; Genovese, 2019) and use the methodology to assess the distributional effects of public statements by the European Commission in times of crisis on stock market returns.

At its core, an event study design aims at retrieving a firm-level counterfactual measure of returns. Each firm's observed end-of-day stock market return on an announcement day is compared to such counterfactual. This daily firm-level difference, which is called *abnormal returns*, is our

dependent variable. For each firm, it captures whether realized market returns over- or underperformed those returns that could be expected in the absence of the announcement.

A key challenge for any event study design is how to estimate counterfactual stock market returns on the announcement day for each ‘target firm’ of interest, whose market performance is presumably affected by new information. The simplest approach to address this problem is to use linear regression to model the relationship between stock market returns of the target firm as a function of a market-wide index of large firms over a predefined set of days before the announcement. Depending on the length of the estimation window, this approach uses co-variation over time between the daily, pre-announcement returns (most commonly for periods of 30-60 days) of a target firm and the market index to predict a target firm’s counterfactual return on the announcement day.

The quality of this out-of-sample prediction is, however, often poor because the market index averages returns over hundreds of companies and therefore, by design, cannot fit the market performance of each individual target firm well. Following [Wilf \(2016\)](#), we use a variable selection Lasso estimator to “custom build” a counterfactual for each target firm. Unlike the standard approach using the aggregate market index as a single main regressor, the Lasso models the returns of a target firm from the full set of all *individual* firms listed in the market index. This allows estimating counterfactuals more flexibly so as to ensure better model fit and more precise out-of-sample predictions.<sup>11</sup>

We favor using (US-traded) S&P 500 firms as the “donor pool” for modeling counterfactual estimates over European companies because, in globally integrated markets, US-traded firms are subject to broader economic trends and simultaneous events in the same way as European firms

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<sup>11</sup> The Lasso estimator is identified by restricting most regressor weights to zero. In doing so, we pick regressors that minimize the root mean square error ([Tibshirani, 1996](#)) and allow regressors to vary for each of the individual target firms. We exclude 24 firms from the list of 500 companies in the S&P 500 because they are also target firms, so the Lasso estimator would model their returns as a function of themselves. Appendix D shows that our results are not specific to using Lasso regression as a modeling strategy as results from a standard OLS approach are almost identical.

are, but they are less directly impacted by EU policies. As our inferential target is to estimate the distributional effects of EU policy announcements, S&P 500 firms provide us with a cleaner baseline to construct counterfactuals.<sup>12</sup>

We estimate *average abnormal returns* for European fossil fuel and renewable energy firms as the difference between observed market returns and S&P 500 Lasso-weighted counterfactual returns for each individual target firm, averaged over the respective group of fossil fuel and renewable energy producers. We calculate this quantity for each of the six announcement dates mentioned above and use simple *t*-tests to assess whether Commission announcements had statistically significant effects on market performance (Hypothesis 1). Difference-in-means tests help us evaluate the distributional nature of the announcements by producer type (Hypothesis 2).

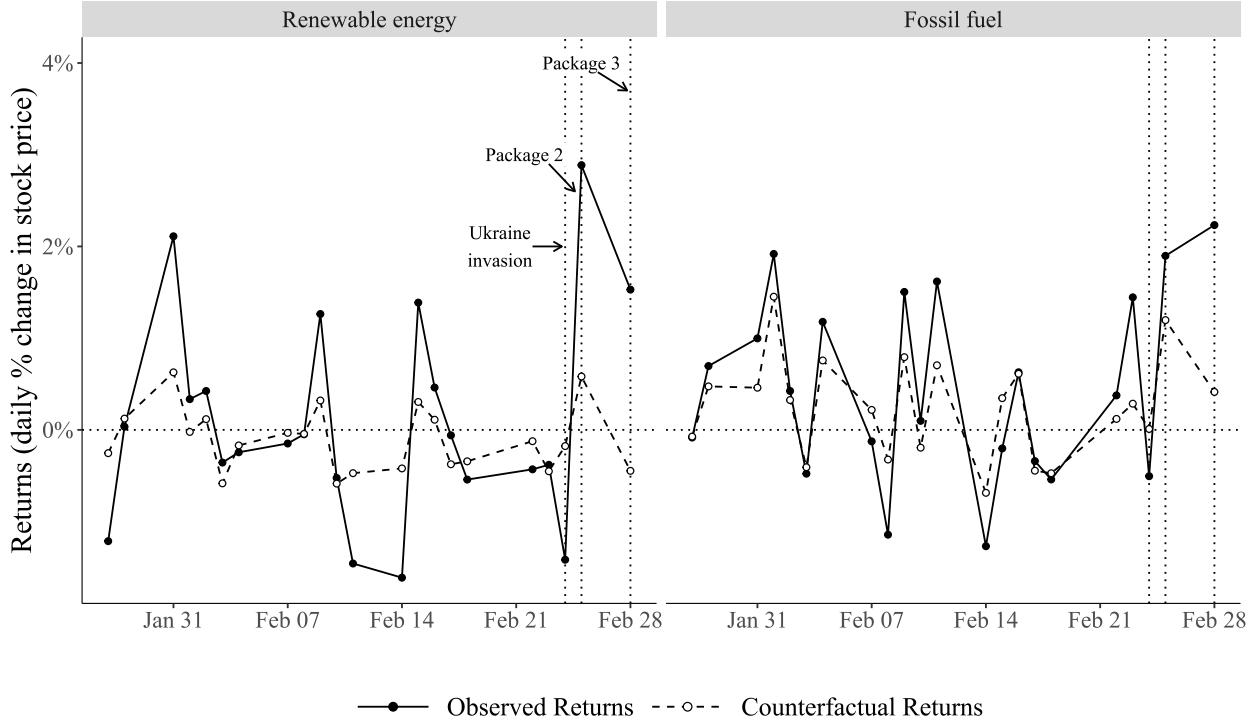
Because counterfactuals for each announcement are obtained from a moving window of 60 days immediately preceding the announcement, estimates represent the *marginal* effect that new information contained in the sanctions and REPowerEU packages has on market returns. Since the announcements happened in quick succession, estimates for later events are, by design, *net* of effects that earlier events had on market expectations.

Figure 3 exemplifies this logic by showing observed and counterfactual returns for sanction packages 2 and 3, which shortly follow the invasion of Ukraine in February 2022. When estimating average abnormal returns for sanctions package 3, which was announced on 28 February 2022, our estimation window includes the 60 days before and right up to 27 February 2022 as the day before the announcement, so it includes the announcement date of sanctions package 2. This ensures that any market-relevant information related to package 2 gets built into the counterfactual estimate. The estimate of package 3, therefore, captures effects on market returns due to any *additional* information that this package provides to markets *over and above* all information from any prior announcements, such as sanctions package 2, and the invasion of Ukraine as the primary event

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<sup>12</sup> Appendix D.1 shows that results are unchanged when using constituent firms from the European Stoxx 600 index instead of the S&P 500 to construct the counterfactual.

itself. For the same reason, estimates for package 2 are obtained net of the effect of the outbreak of the Ukraine invasion; they isolate the effect of the European Commission’s policy response on markets from the effects of the war.

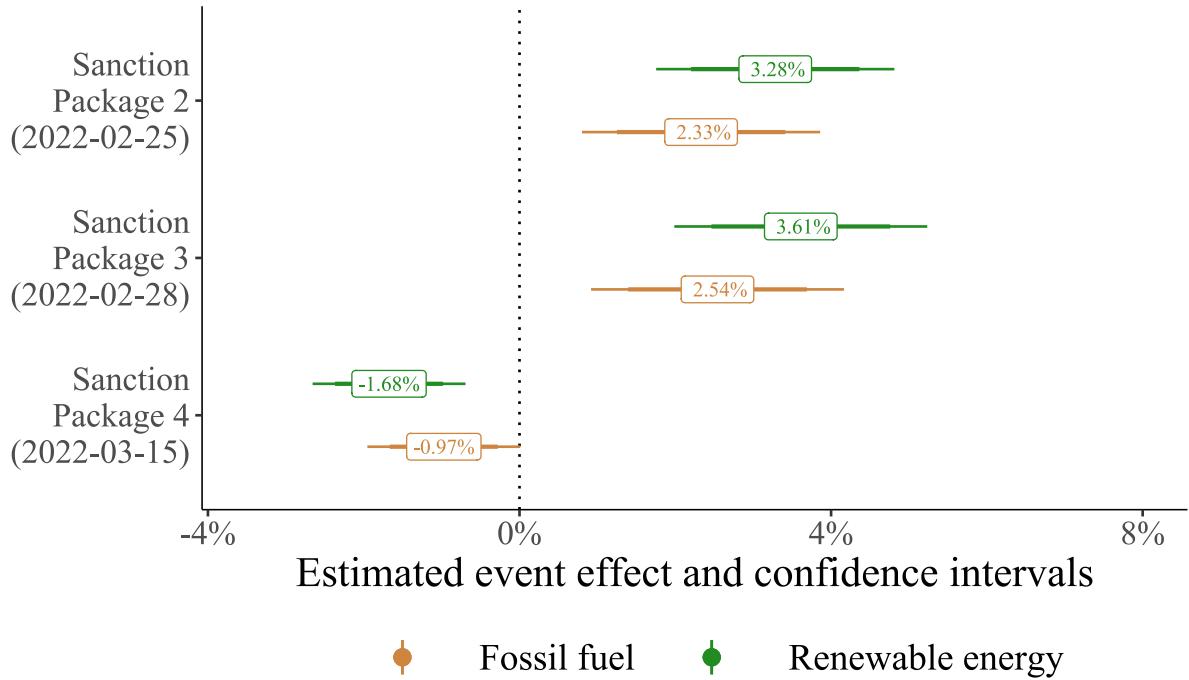


**FIGURE 3:** Average observed and counterfactual returns for fossil fuel and renewable energy producers during the week after the start of the war in Ukraine. The figure shows the average observed and counterfactual returns estimated by Lasso market models for energy companies based or traded in Europe on the days immediately preceding and following the Ukraine invasion and sanction packages 2 and 3, separately for renewable energy (left) and fossil fuel producers (right).

## Results

We first present the results for the announcements of European Commission sanction packages. In Figure 4, we show the estimated average abnormal returns for European energy companies distinguishing fossil fuel producers (brown) and renewable energy producers (green) for each of the relevant events, organized along the  $y$ -axis. We display 95% confidence intervals for adjudicating

whether point estimates are statistically distinguishable from zero at a 0.05 level of significance (Hypothesis 1). For testing whether point estimates for brown and green firms are statistically distinguishable from each other at the 0.05 level of significance (Hypothesis 2), we also report 83.4% confidence intervals.



**FIGURE 4:** Average abnormal returns for European fossil fuel and renewable energy producers for sanction packages. The figure shows the estimated average abnormal returns for energy companies based or traded in Europe on the day that a given sanction package was announced, separately for fossil fuel (brown) and renewable energy producers (green). Horizontal bars denote 95% and 83.4% confidence intervals: the former shows the difference between a point estimate and the 0 value, while the latter tests whether the point estimates for brown and green energy producers are statistically significantly different from each other at a 0.05 level of significance.

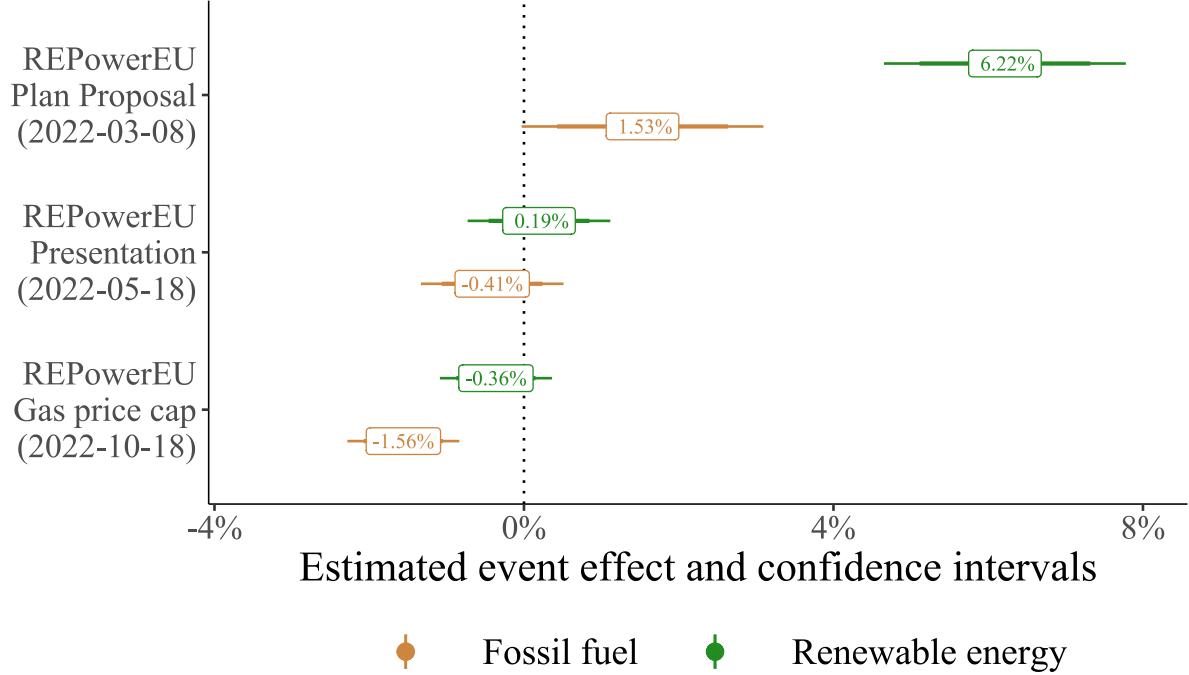
Consistent with our first set of expectations, the early sanction package announcements by the European Commission (second and third packages) moved market prices of European energy firms significantly and positively but to a similar degree across brown and green producers. EU sanctions against Russia, which targeted Russian energy links with the EU but did *not* directly reward decarbonization, increased investors' confidence in all energy producers indistinctly without any

indication for distributional effects. Point estimates across brown and green firms are remarkably comparable and statistically indistinguishable, as evidenced by the overlap of the 83.4% confidence intervals.

The second and third sanction packages, which followed within a week of the invasion, triggered positive responses among fossil fuel energy investors generating returns to these firms that were 2.33%-2.54% above market expectations. Likewise, renewable energy firms experienced returns that were 3.28%-3.61% above those from their market baselines on these days. Effects are negative for both fossil fuel and renewable energy firms for the fourth package. The negative sign is possibly related to the fact that this package hit technology and energy services, hurting primarily the supply side of energy markets. In combination, we find that, while investors clearly reacted to the announcements of the sanctions by taking interventions as relevant and credible signals in the short term, this evaluation did not discriminate between fossil fuel and green assets, hence not contributing to a green transition scenario where fossil fuel intensive energy production is punished at the expense of clean energy.

We now move to the distributional part of our expectations, which focuses on the more unambiguously green policy announcements after the Russian attack. Here, we perform the same analysis as above with respect to REPowerEU milestones. The main results are displayed in Figure 5. We find that the REPowerEU Proposal in early March generated a significantly positive response among investors. Consistent with our argument, we observe the distributional nature of EU interventionist announcements that set up a path towards energy transition that was uncharted by previous information. The plan proposal, indeed, strongly (and statistically significantly) separates “winning,” green companies from “losing,” brown companies based on the expectation that carbon-intensive business models are incompatible with ambitious climate action. For the Plan Presentation in May 2022, the estimated effects are much smaller, and we do not find statistically significant results. This is the case because the Plan Presentation was largely a confirmation of the March proposal and therefore did not provide markets with new information that had not al-

ready been internalized. The substantively much smaller, yet statistically significant effects for the announcement of the REPowerEU gas price cap is consistent with the same logic. New and somewhat unexpected information—relative to what markets already knew from previous REPowerEU announcements—that affected fossil fuel producers in a uniquely differential way translated into downward pressure on market prices for this producer type.



**FIGURE 5:** Average abnormal returns for European fossil fuel and renewable energy producers for RePowerEU milestones. The figure shows the estimated average abnormal returns for energy companies based or traded in Europe on the day that a given REPowerEU milestone was announced, separately for fossil fuel (brown) and renewable energy producers (green). Horizontal bars denote 95% and 83.4% confidence intervals: the former shows the difference between a point estimate and the 0 value, while the latter tests whether the point estimates for brown and green energy producers are statistically significantly different from each other at a 0.05 level of significance.

Among the events we consider, the REPowerEU plan proposal in March 2022 is the event with the largest effect on energy producers' returns. The effect size is remarkable: the Plan significantly boosted investors' profit expectations for European renewable energy producers, resulting in average abnormal returns of more than 6% above market expectations. European fossil fuel producers,

on the other hand, saw market returns increase much less (about 1.5%). We attribute this positive, albeit smaller, effect in response to a pointedly green policy proposal to the realization that fossil fuel energy production will undoubtedly be needed to satisfy European consumers' demand in the absence of Russian supply, even if only in the short term and as a "transition fuel." In an effort to delineate the scope conditions of our distributional logic, in other results in Appendix D.2 we show that, despite strong effects for European producers, the *same* announcement had much smaller effects for companies outside Europe. This offers compelling evidence that market participants reliably separate between the material consequences of Commission announcements for European and non-European firms. Given the focus of the REPowerEU program on infrastructure investment and green industrial policy in EU member states, most of the policy benefits will accrue to European-based companies or those linked to the bloc's Internal Energy Market.

It is noteworthy that announcements that were made five to six weeks after the invasion had overall much weaker effects, no matter the type. Neither the fourth sanctions package nor the formal presentation of the REPowerEU policy did move European energy stock markets much. The Gas Price Cap restricted windfall profits for fossil fuel producers by limiting maximum chargeable prices to gas customers, putting downward pressure on market valuations for fossil fuel producers in particular. These weaker effects can be explained by recalling the implication of the market efficiency hypothesis: estimates represent the marginal effect of price-relevant information supplied by an announcement, *net* of the information markets had already gathered and absorbed into a stock price. Null effects for later events imply these announcements did not provide sufficiently new, price-relevant information on the EU's net zero strategy beyond what was already known. In other words, markets had no reason to update stock prices.

Altogether, this evidence suggests that the European Commission's timely and unambiguous promises to intervene in the economy in 2022 moved financial capital in energy markets. However, for the purposes of the energy transition, the only signals that gave momentum to green markets and created distributional effects were Green Deal announcements, while more indirect, yet still

energy-relevant signals did not have the same consequences. Furthermore, the results indicate that the Commission moving at the peak of historical uncertainty, i.e., right after the Russian attack, maximized the impact of these announcements.

### **Additional Results and Robustness**

Our main results capture abnormal returns on the day of the announcement itself. In the Appendix (Figure B.1), we show how abnormal returns accumulate over a symmetric time window of ten days before and after each event for European companies.<sup>13</sup> For sanction packages, we find strong effects across the board, yet cumulative abnormal returns are largest for fossil fuel producers. As with the main analysis, REPowerEU-related announcements separate brown and green energy companies strongly, yet only for the initial announcement. The evidence from cumulative abnormal returns thus suggests that, rather than an opportunity to fast-track the energy transition, investors understood sanction packages more as opportunities for fossil fuel energy producers to cash in on massive windfall profits from making up the shortfall of Russian supply contraction. Instead, when communication was directly targeted at credibly raising the bloc's decarbonization ambition through the REPowerEU package, this did result in considerable capital reallocation towards renewables. Commission announcements can hence credibly steer investment flows away from fossil fuels, but practically only in the short term and for companies that can directly benefit from green investments.

Other extensive robustness tests are presented in Appendix D. First, we show that we obtain similar results when using a sample of major European publicly traded firms as a baseline to generate counterfactual returns for European energy companies. Next, we probe our procedure for defining an energy firm as a European producer. We show that we find similar effects when we look

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<sup>13</sup>We obtain estimates of cumulative abnormal returns from a linear regression model which includes a post-event period dummy that is interacted with a fossil fuel/renewable firm dummy. We do not include firm fixed effects in these models as fixed effects are perfectly collinear with the time-invariant fossil fuel/renewable firm dummy. Since abnormal returns are calculated from firm-specific market models, firm characteristics are already absorbed in the estimation of our counterfactuals, so that firm-level fixed effects do not help improve identification further. Indeed, subsetting firms by sample and including firm fixed effects produces numerically identical results.

exclusively at firms which are European-based, European-traded, or otherwise just based or traded in a EU member state. Then, we change our classification of green/brown firms by discarding four firms that are coded as having fossil fuel assets by [Voeten \(2024\)](#) from our renewable energy sample. We continue by querying the validity of our market counterfactuals. We find similar or stronger results when considering only firms whose counterfactual is estimated with sufficient precision—that is, with  $R^2$  values above 0.10, 0.30, and 0.50. Results are robust to using standard ordinary least squares (OLS) regressions instead of Lasso, shorter (30 days) or longer estimation windows (180 days), or using raw returns.<sup>14</sup>

## Conclusion

This paper studies the pressing political economy question of when and how stock markets respond to policy announcements in the context of the new European turn towards greater financial market interventionism. This is an important area of research because volatile geopolitical conditions are increasingly incentivizing economic institutions to intervene in domestic markets. Furthermore, studying the behavior of markets in this new era is important given the financial sector’s critical role in moving capital for important macroeconomic projects such as the energy transition.

The paper claims that, especially in times when markets seek stability the most, institutional interventions can serve as credible signals to shape capital (re)allocation decisions in stock markets. We investigate such conditions by zooming in on interventions by the European Commission into energy markets wrestling with the climate transition. We argue that EU Commission announcements at the beginning of the Russo-Ukrainian war triggered distributional effects from aligning market incentives with the decarbonization challenge. In the immediate aftermath of the Russian attack, when European markets faced heightened policy uncertainty, we expect that Commission announcements should have made stocks move, and climate-targeted announcements in particular

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<sup>14</sup>We also show that our results for cumulative abnormal returns are robust to dropping imprecisely estimated counterfactuals and using different event window sizes.

should have rewarded green energy stocks. At the same time, we maintain that sustaining credible interventionist signals in the long run requires consistent political effort to provide qualitatively new information to markets that the Commission may not realistically be able to supply. We thus expect announcement effects to be short lived.

Focusing on a series of EU announcements in 2022 following the Russian aggression of Ukraine, we find that announced policy interventions that directly articulated the EU's decarbonization ambition substantially increased green but not brown European energy assets valuation. More generic energy-related sanction packages, on the other hand, boosted market valuations across the board without separation between fossil fuel and renewable energy producers. We take this as evidence that the EU sanctions were perceived as fuzzier signals that are only partially linked to the energy transition. Accordingly, sanctions that are not directly tied to the inherently distributional politics of the energy transition cannot quite sustain the efforts of weaning Europe off energy generation from fossil fuels.

In sum, we find that, while some of the EU announcements initially changed market expectations, this trend was short-lived and reverted quickly once policy details were more comprehensively absorbed by market actors. At the same time, the efficacy of the announcements in the short run indicates that, at least under some conditions, ambitious EU climate actions were successfully recognized as key elements of the green transition trajectory. We believe it was the inability of EU policy announcements to provide markets, over an extended period of time, with reliably high levels of *new* information, which limited the announcements' original policy momentum to largely spring 2022.

Our findings raise important questions for scholarship on the politics of climate change and political economy research on government-firm interaction in times of crisis. time-inconsistent preferences resulting from the temporal mismatch between election cycles and investment horizons for energy infrastructure are a major challenge for the global energy transition. Political announcements of long-term decarbonization goals as part of larger green industrial policy programs, such

as the Inflation Reduction Act in the United States or the Green New Deal in the European Union, help quell uncertainty and signpost the overall “direction of travel.” If these signals were taken onboard by markets, slow and incremental divestment away from fossil fuel producers to greener competitors would follow, helping break down opposition by incumbent carbon-intensive industry. Our paper builds on this intuition and finds empirical evidence in support of it, but currently remains silent on the exact mechanisms that map out how different types of political announcements translate into investors’ beliefs and investment decisions as a function of the announcements’ expected distributional effects on different types of firms.

Furthermore, the findings are relevant to the credibility of EU policies in a polycrisis world. In light of far-reaching debates about the effectiveness of institutions in the European politics literature, our findings suggest that EU pillars can generate important waves in financial markets if they leverage their interventionist power at the right time. As climate action remains a fundamental driver of EU internal and foreign policy, our paper suggests that leveraging opportunities to pass resolutions and pick winners and losers of the energy transition is fundamentally important for responding to the climate emergency.

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# Appendix

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

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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.<sup>1</sup> 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.<sup>2</sup> 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.<sup>3</sup>

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

<sup>1</sup> 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.

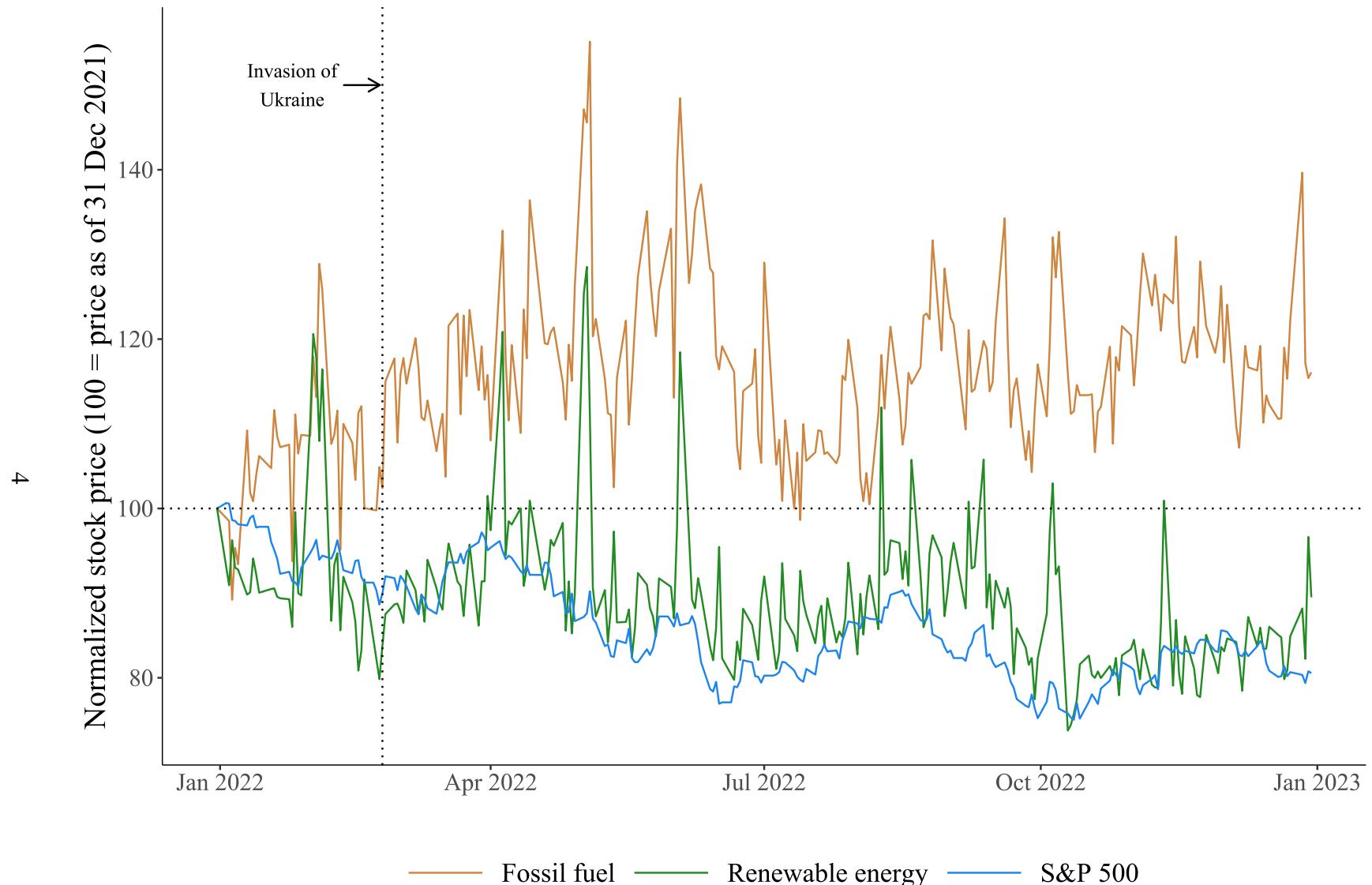
<sup>2</sup> We consider the following codes: “Crude Petroleum Extraction (211120)”, “Natural Gas Extraction (211130)”, “Fossil Fuel Electric Power Generation (221112)”, “Petroleum Refineries (324110)”, “Underground Coal Mining (212115)”, “Surface Coal Mining (212114)”, “Bituminous Coal Underground Mining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

<sup>3</sup> The sample does not include information on very large big oil companies that are not public, e.g. Sinopec which is state-owned.

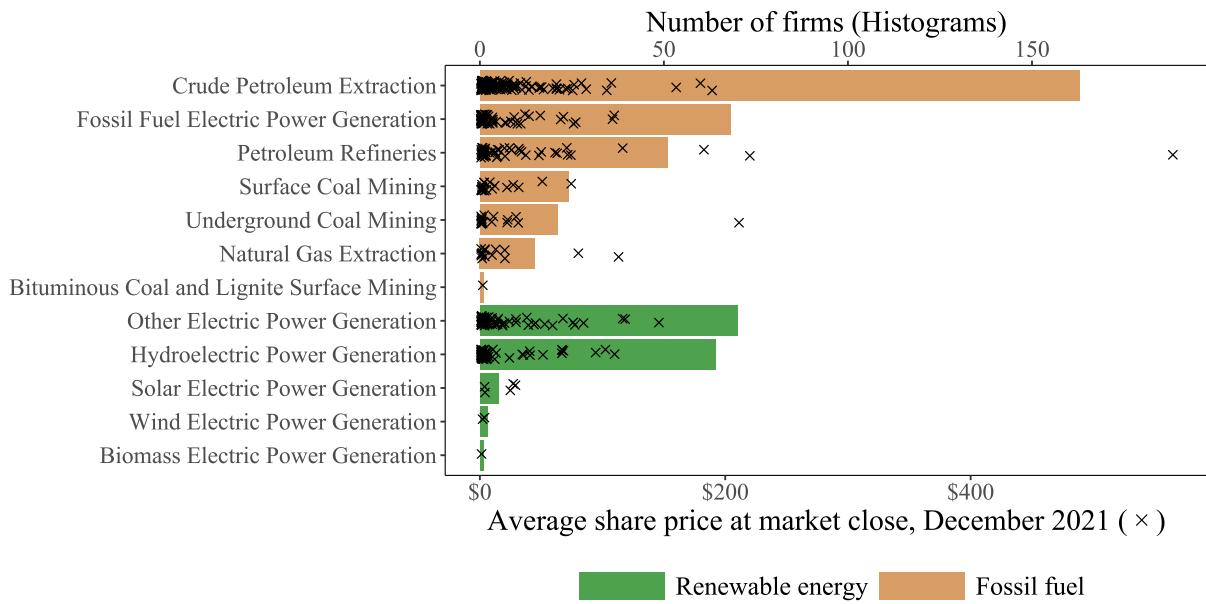
primary markets for all companies we considered, from January 1, 2016 until February 21, 2023. All prices are expressed in current dollars. We then measure each firms' daily stock *Returns* as the percentage change in stock price between the value observed at the close of a given trading day and that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

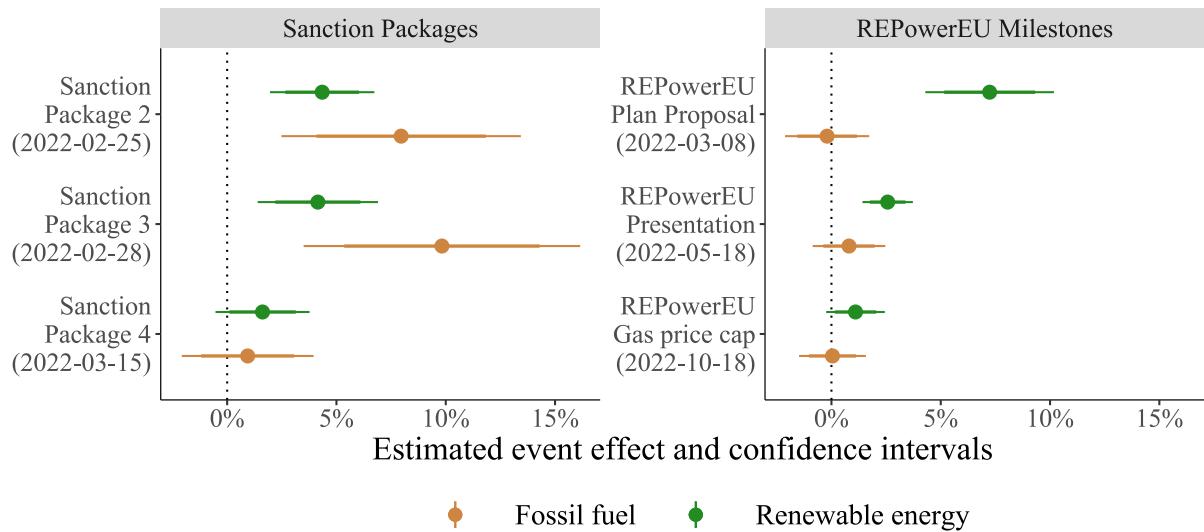
N	Company name	Headquarter country	Primary exchange	NAICS-6 code name
1	7C Solarparken AG	Germany	XETRA	Other Electric Power Generation
2	A2A SpA	Italy	BORSA ITALIANA	Other Electric Power Generation
3	Adev Wasserkraftwerk AG	Switzerland	NA	Other Electric Power Generation
4	Advanced SolTech Sweden AB (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	Eenefit 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
6	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.<sup>4</sup> 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.

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<sup>4</sup> 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
<b>24-02-2022</b>	<b>Russian invasion of Ukraine</b>
25-02-2022	Sanctions package 2
28-02-2022	Sanctions package 3
07-03-2022	European Commission proposes a ban of Russian coal imports
<b>08-03-2022</b>	<b>REPowerEU Plan proposal</b>
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
<b>18-05-2022</b>	<b>REPowerEU Plan presentation</b>
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
<b>18-10-2022</b>	<b>REPowerEU Gas Price Cap</b>

**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.

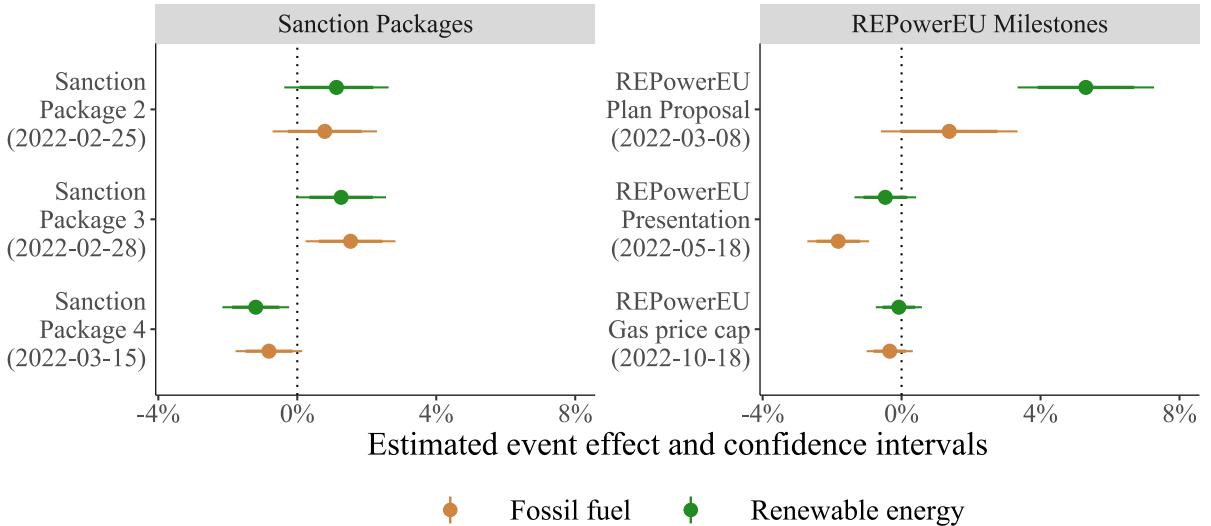
## D Robustness tests

### 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,<sup>5</sup> PetroChina has large contracts on the European continent,<sup>6</sup> Brookfield Renewable markets to consumers in several European countries, including Ireland and Spain,<sup>7</sup> and NextEra has large offshore wind projects in the Baltic and North Sea.<sup>8</sup> 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.

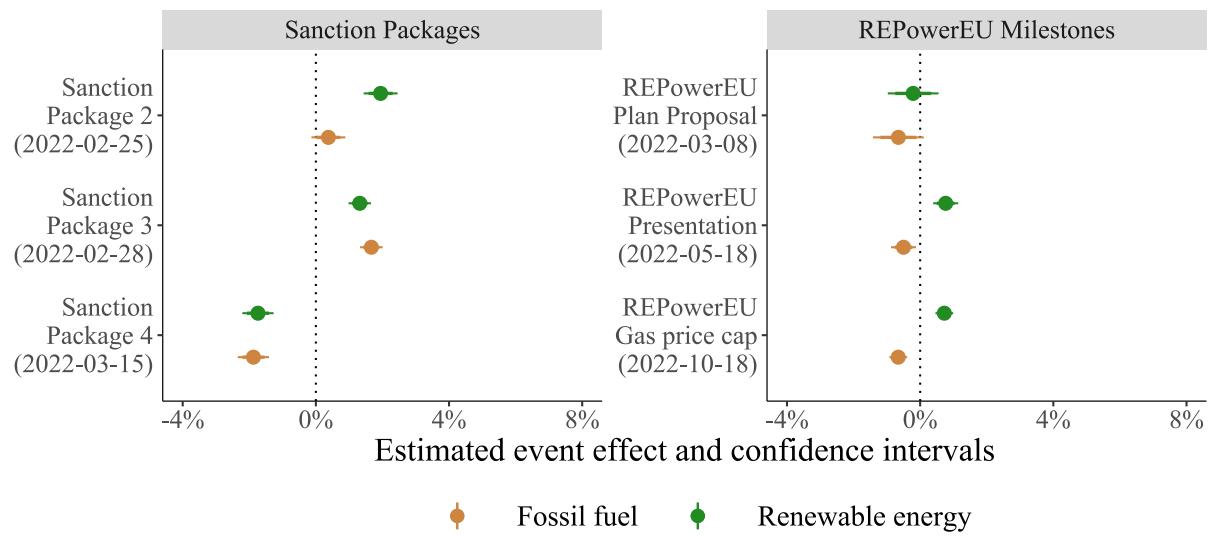
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<sup>5</sup> See: <https://corporate.exxonmobil.com/locations/european-region>.

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

<sup>7</sup> See: <https://www.brookfield.com/news-insights/insights/onshore-wind-portfolio-one-europe-s-strongest-wind-resource-locations> and <https://brookfieldrenewableus.com/explore-market/iberia/>.

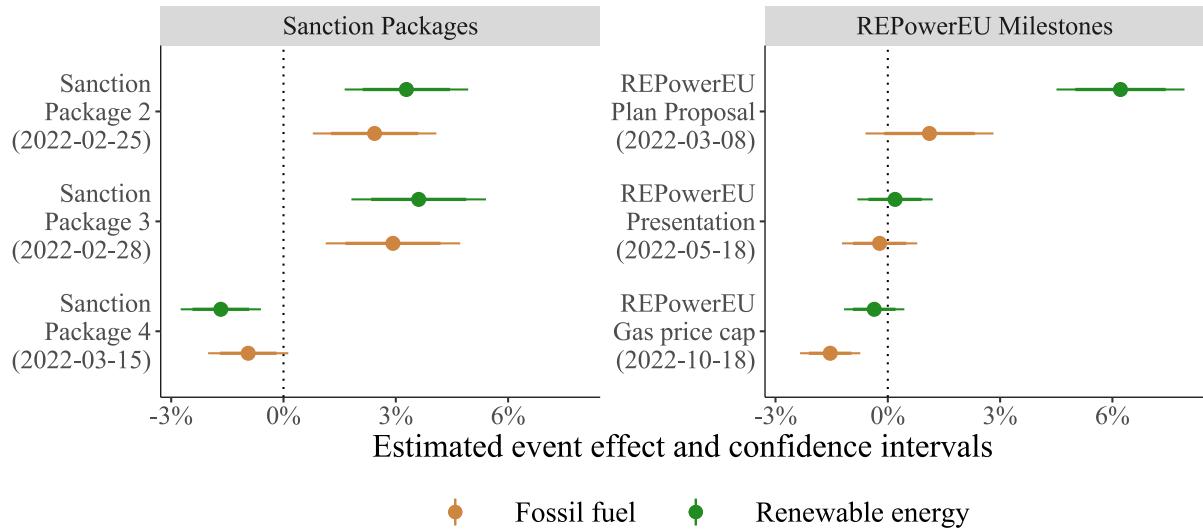
<sup>8</sup> See: <https://www.roi-nj.com/2022/09/08/industry/energy-utilities/nextera-energy-transmission-signs-mou-with-subsidiary-of-most-experienced-offshore-wind-firm-in-europe/>.



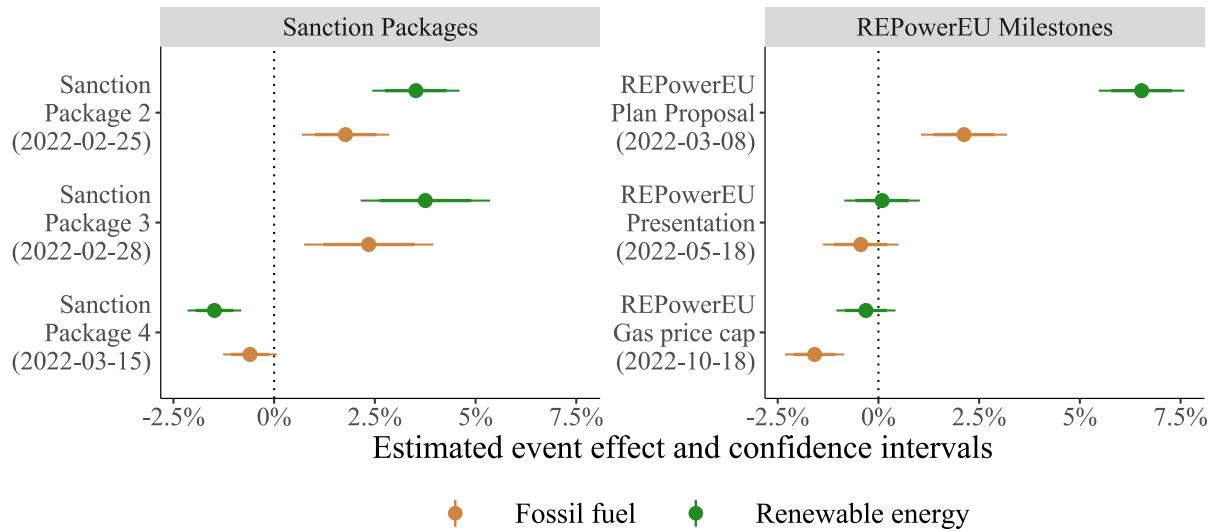
**FIGURE D.2:** Effects on *Abnormal Returns* obtained when considering firms that are neither headquartered nor primarily traded in a EU member

### D.3 Alternative definitions of European-relevant sample

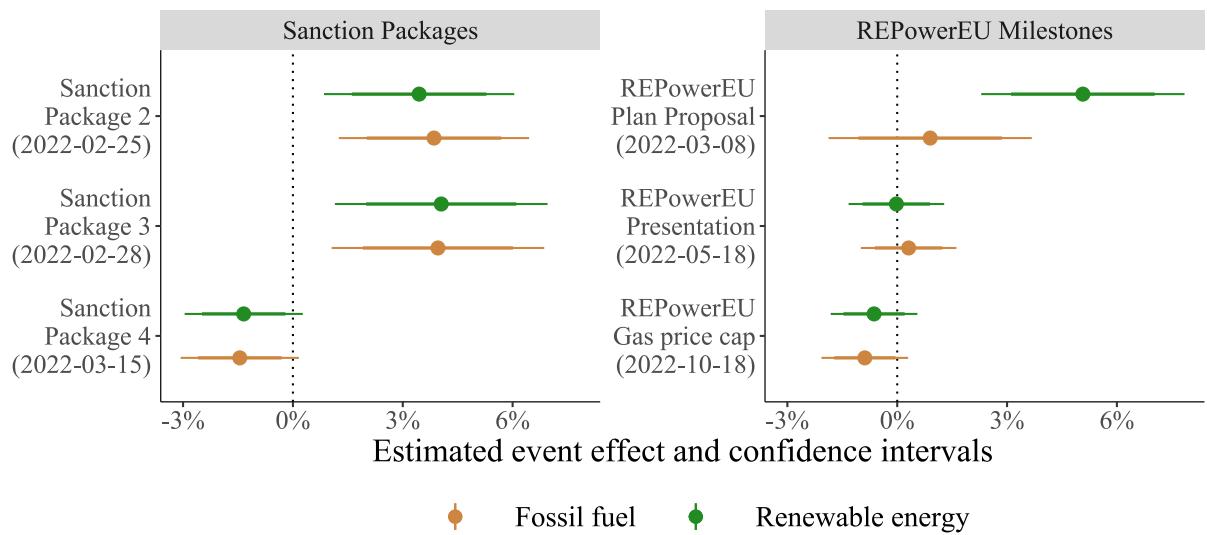
We probe our definition of the relevant sample of European energy firms by considering only European-based firms (Figure D.3), only European-traded firms (Figure D.4), and firms based or traded in EU member countries (Figure D.5).



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



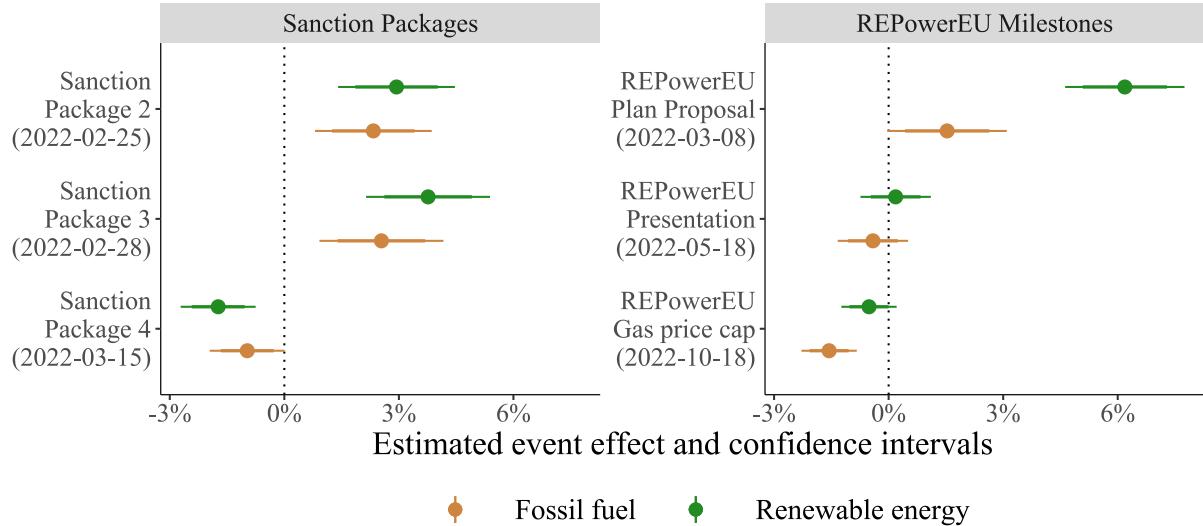
**FIGURE D.4:** Effects on *Abnormal Returns* obtained when considering only firms that are primarily traded in a European country



**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)

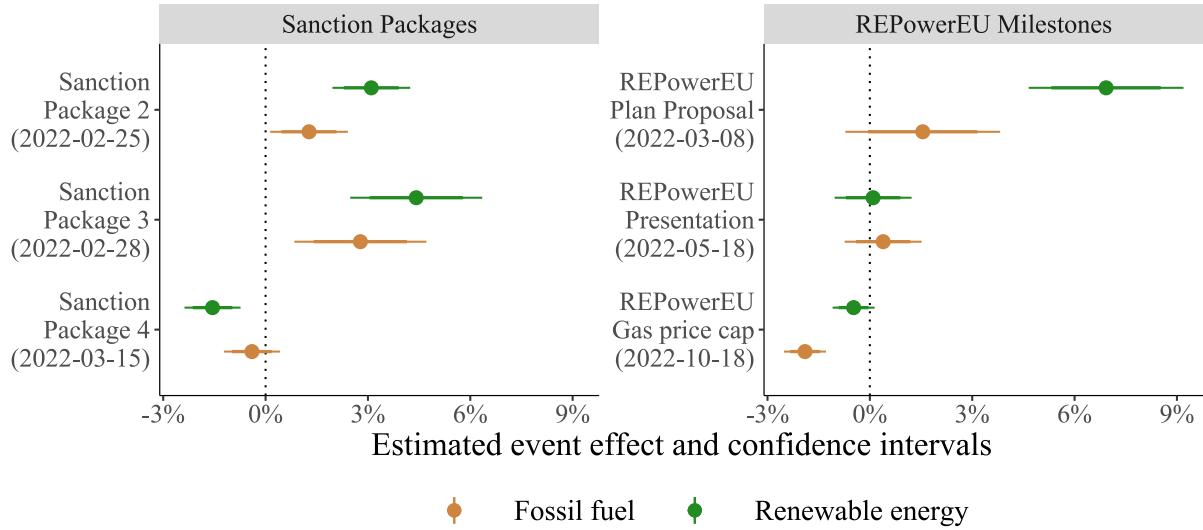
We exclude from our analysis firms that we classify as renewable energy producers and which [Voeten \(2024\)](#) classifies as fossil fuel. Results are in Figure D.6.



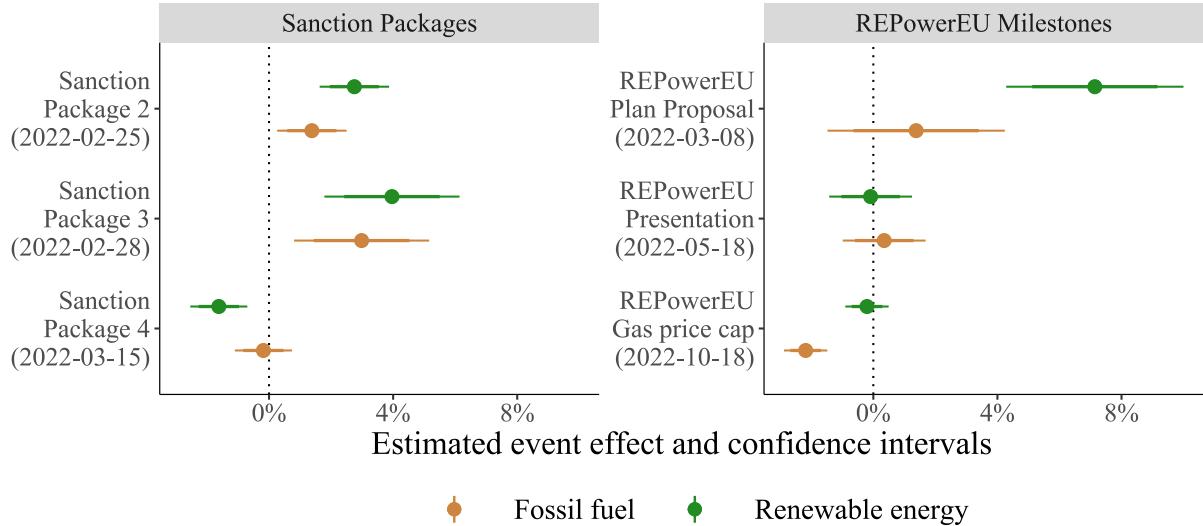
**FIGURE D.6:** Effects on *Abnormal Returns* obtained when excluding firms mis-classified based on data by [Voeten \(2024\)](#)

## D.5 Exclusion of firms with imprecise estimation

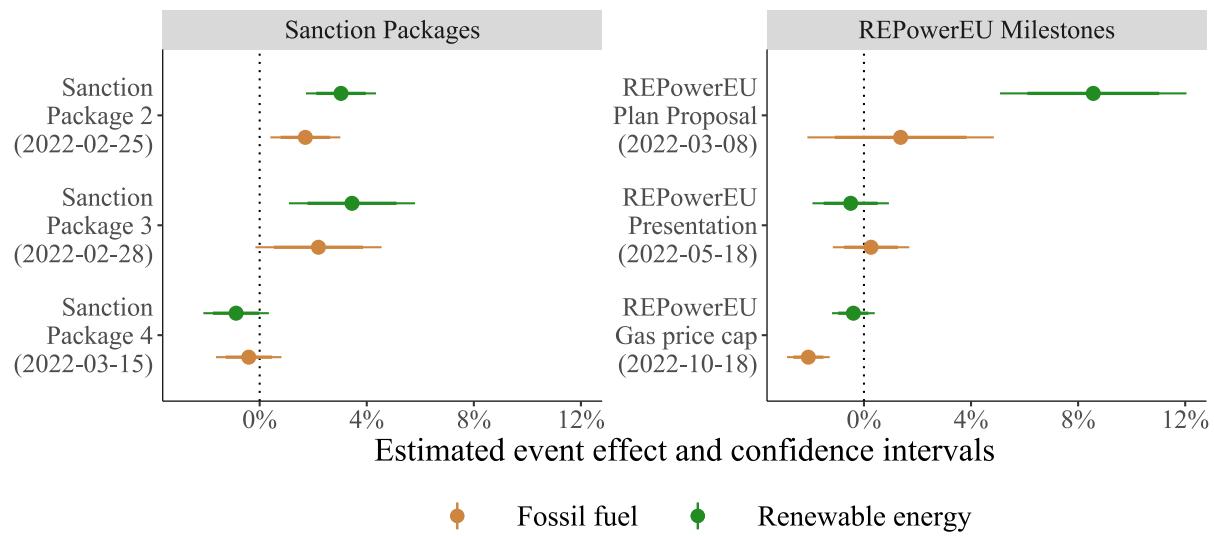
We test robustness of our results to the exclusion of firms whose counterfactual is based on market models with weak explanatory power. In Figures D.7, D.8, and D.9 we drop firms whose LASSO market models resulted in R2 lower than 0.10, 0.30, and 0.50 respectively. We still detect significant distributional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



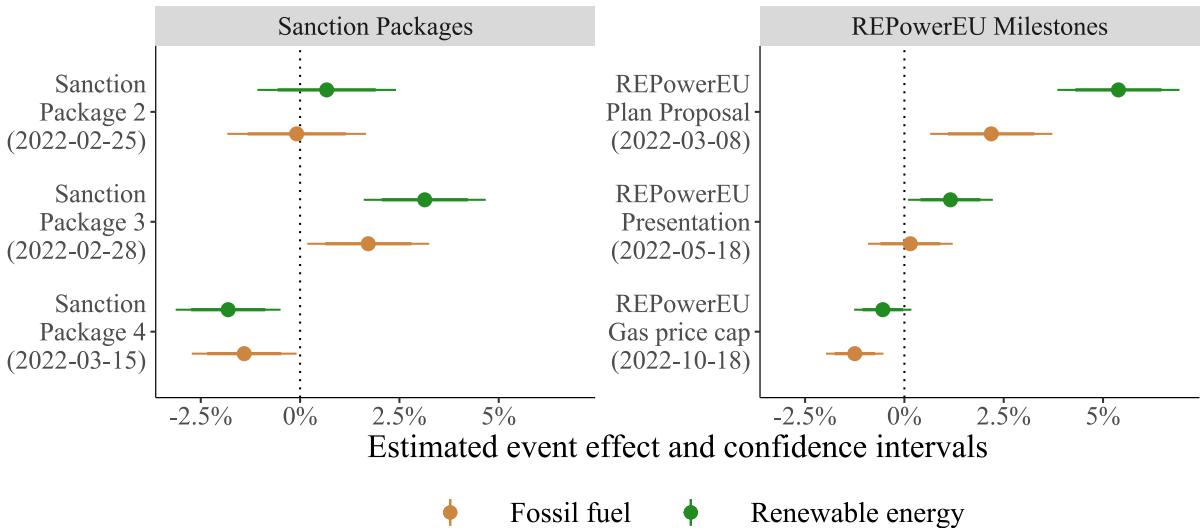
**FIGURE D.9:** Effects on *Abnormal Returns* obtained when excluding firms whose counterfactual is based on market models with R2 smaller than 0.50

## 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.

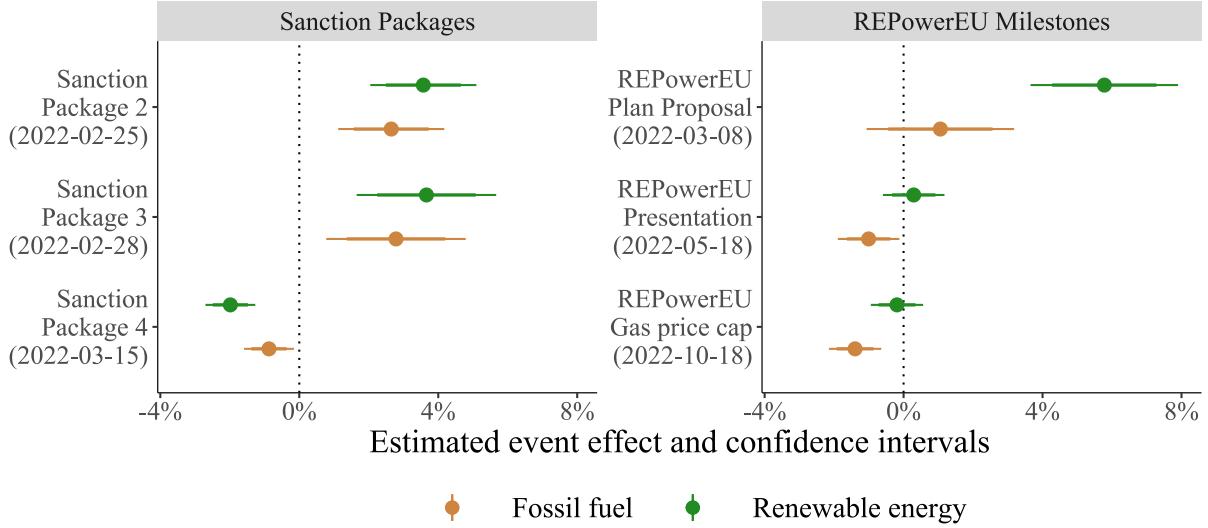
Figure D.10 reports our findings. We find similar effects as in our main analysis. The plan presentation of REPowerEU still has detectable distributional effects among EU companies, favoring renewable firms more than fossil fuel ones. Similarly, the plan presentation and October gas price cap had distributional (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.



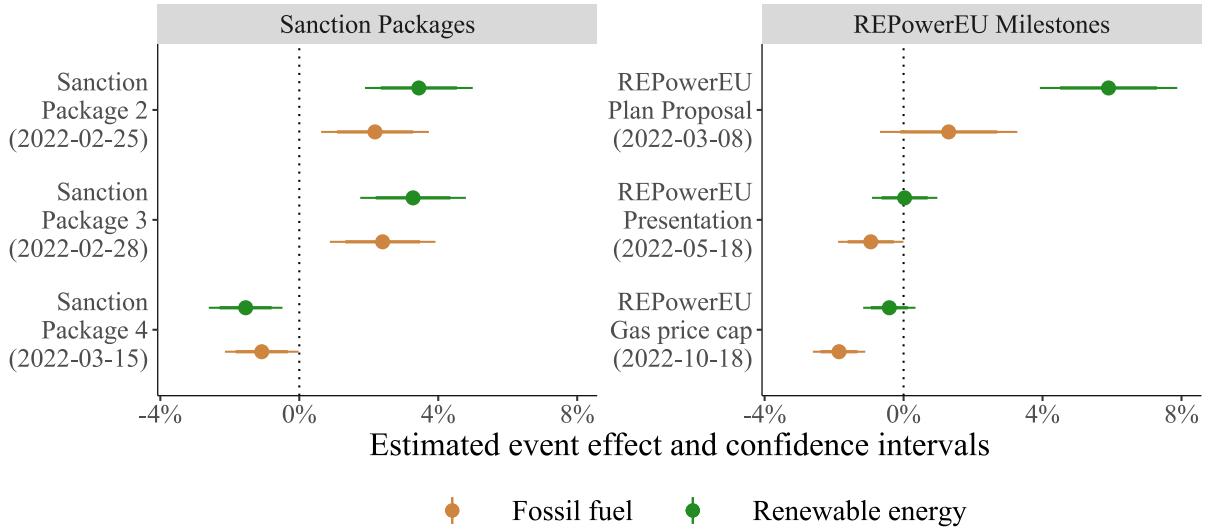
**FIGURE D.10:** Effects on *Abnormal Returns* obtained when using firm-level counterfactuals imputed using OLS models and market-wide indexes

## 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

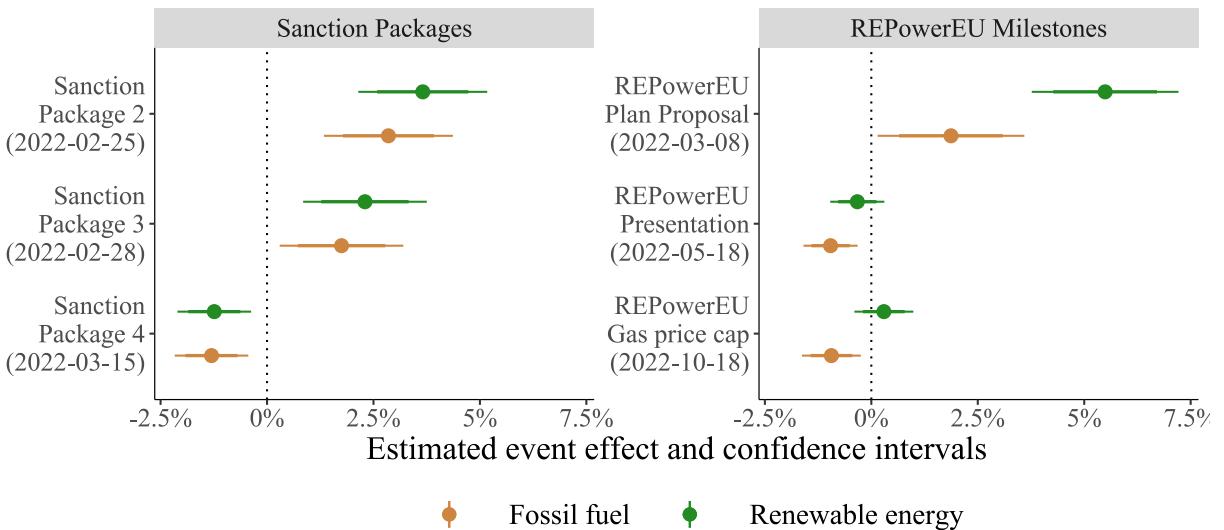
Results are consistent with those presented in the main text. Regardless of the estimation window length, sanction packages 2 and 3 exhibited a positive effect on energy firms (fossil fuel or

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

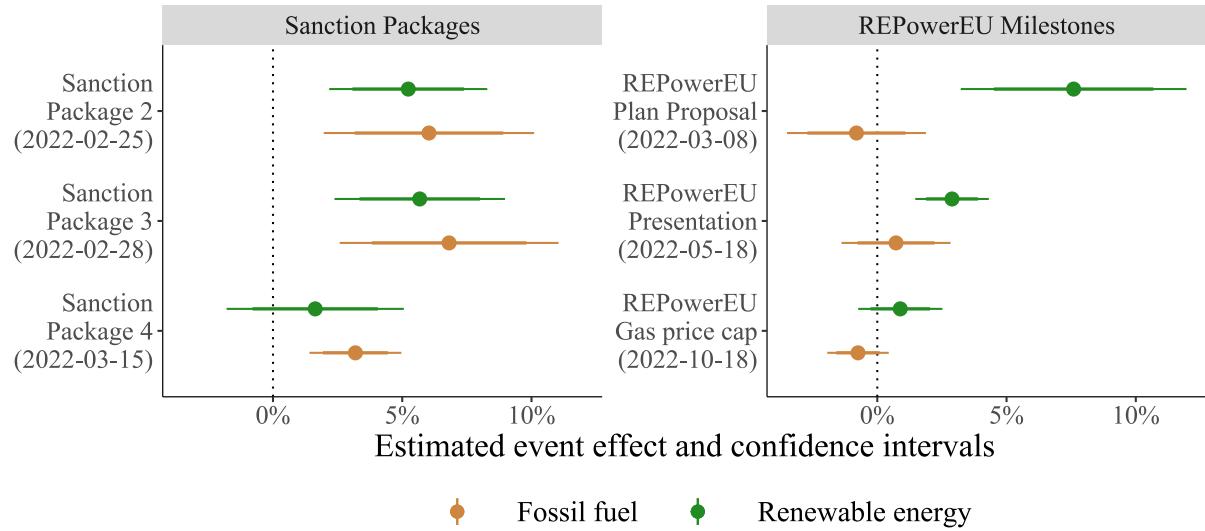
For transparency, we report our findings when studying average raw firm *Returns* on the event days in Figure D.13. Although most effects are in line with those estimated using *Abnormal Returns*, we caution readers from interpreting these effects substantively as many of them change significantly once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



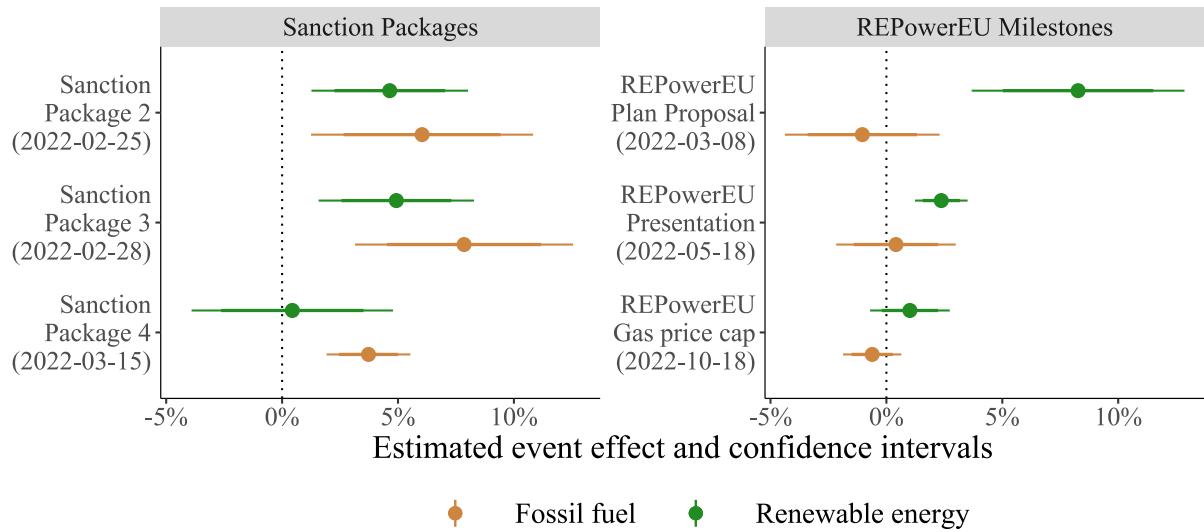
**FIGURE D.13:** Event effects on *Returns*. These estimates are obtained without discounting observed *Returns* from the market baseline.

## D.9 CAR analysis when excluding firms with imprecise estimation

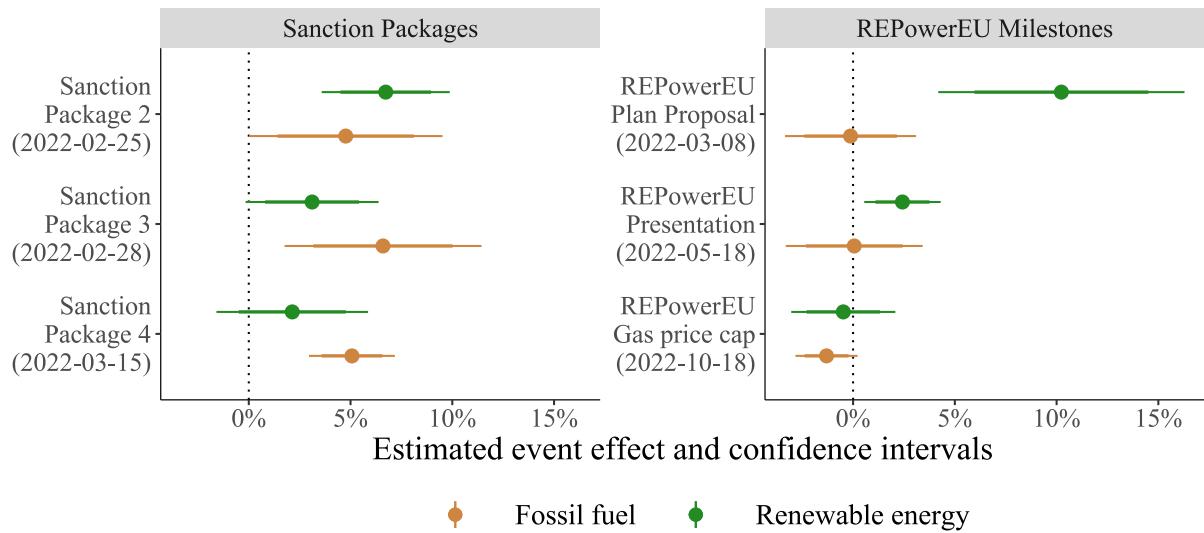
Similarly to what we did above, in Figures D.14, D.15, and D.16 we replicate our *Cumulative Abnormal Returns* analysis after excluding firms whose counterfactuals are based on LASSO market models with R2 smaller than 0.10, 0.30, and 0.50 respectively (all these analyses use windows of ten days to the 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



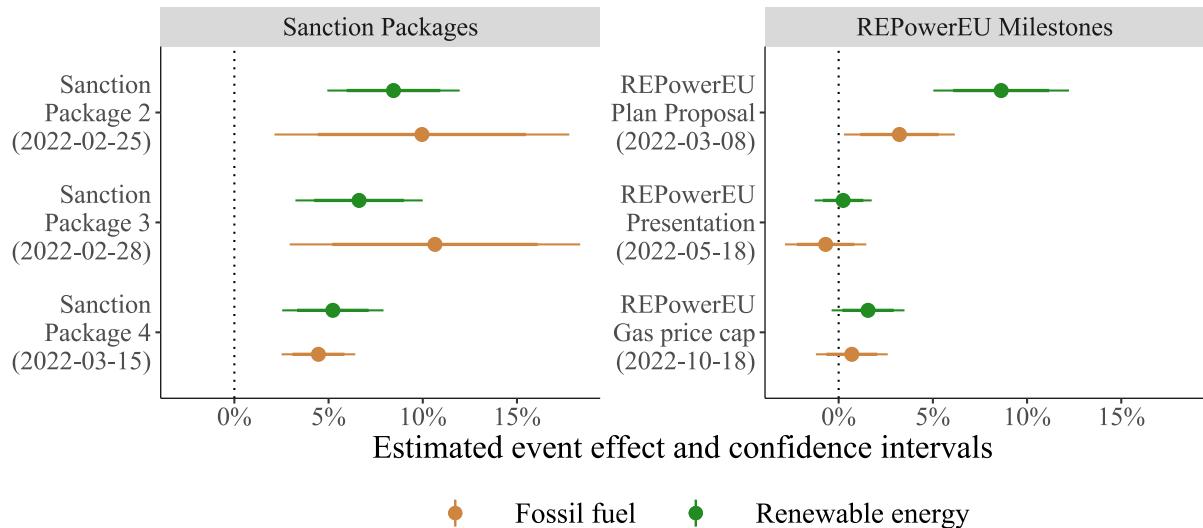
**FIGURE D.15:** Effects on *Cumulative Abnormal Returns* obtained when excluding firms whose counterfactual is based on market models with R2 smaller than 0.30



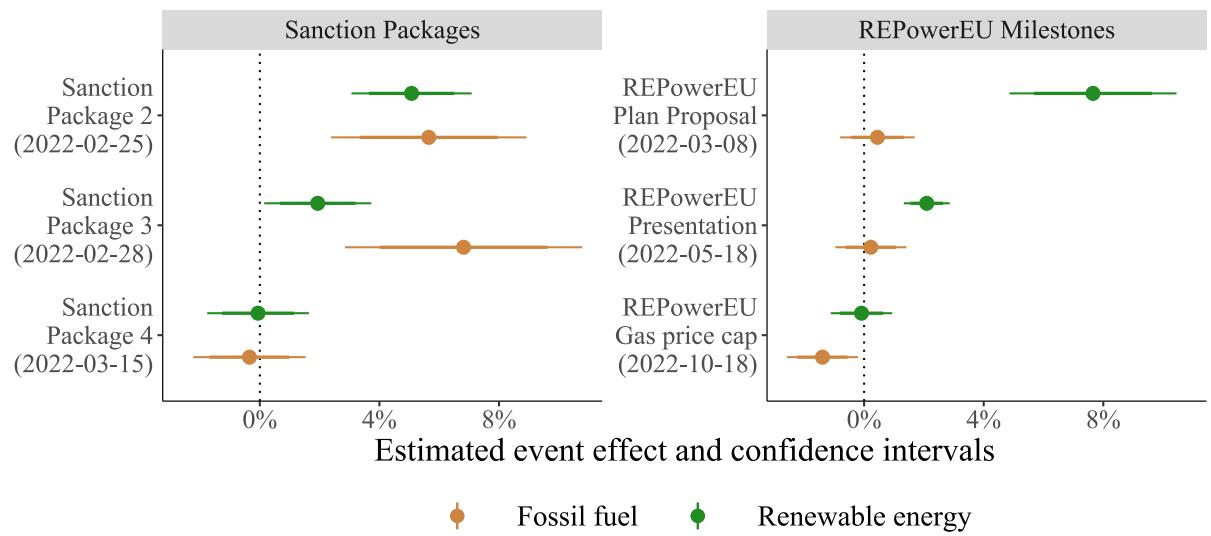
**FIGURE D.16:** Effects on *Cumulative Abnormal Returns* obtained when excluding firms whose counterfactual is based on market models with R2 smaller than 0.50

## 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