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The Inflation Reduction Act's Impact on the Future Cash Flow of Green Firms

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Abstract

The Inflation Reduction Act, representing the biggest step in U.S. climate policy, was a major realization of transition risk. Following its announcement, equity analysts anticipate significantly higher earnings for green firms over 3 to 5 years. This projection is primarily attributed to anticipated sales growth rather than cost reductions. While earnings forecasts adjust instantly, the impact on sales emerges with a two-month delay. Interestingly, these earnings increases have not significantly altered stock recommendations. Our research contributes to the understanding of green firm performance post-climate risk realization, focusing on the influence of legislative changes on cash flow dynamics.

Keywords – Inflation Reduction Act, cash flow forecasts, transition risk, green firms, brown firms, difference-in-difference, analyst recommendations

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1 Introduction

The Inflation Reduction Act (IRA) of 2022 is commonly regarded as the most ambitious climate policy action in U.S. history. In the coming decade, new tax credits and government spending will significantly support clean technologies and industries alongside incentives for U.S. households and firms to invest in reducing carbon emissions. While climate policy's economic and climate effects receive extensive coverage, the financial implications are significantly less examined (M. Bauer et al., 2023). Therefore, this paper aims to shed light on these financial consequences by examining the IRA's impact on U.S. green firms' expected future cash flow relative to brown firms.

The IRA marks a crucial development in managing transition risks associated with the shift to a low-carbon economy. It can potentially benefit green firms, characterized by their environmental innovation, low emissions and resource usage, through a combination of regulatory, technological, and market changes. Recent empirical studies support this expectation, showing positive abnormal stock returns for green firms following the IRA's implementation (M. Bauer et al., 2023). Considering the IRA's long-term focus and the role of earnings in stock valuation, we hypothesize an increase in green firms' future earnings following the IRA announcement. Additionally, the IRA's influence on demand and supply, via consumer subsidies and production tax credits (Bistline et al., 2023), leads us to hypothesize that higher sales and reduced costs will drive these future earnings gains.

After the IRA announcement, we find that equity analysts project notably higher earnings for green firms after 3 to 5 years, confirming our first hypothesis. In examining the economic mechanisms behind the forecasted increase in future earnings, we observed a significant expected long-term increase in sales while no significant changes in the costs. Hence, it is argued that the forecasted earnings growth is mainly attributed to projected sales increases rather than cost reductions, which partially aligns with our second hypothesis.

Our paper contributes to a growing literature on climate risk pricing in financial markets, focusing on the financial impacts of transition risks for green firms. Unlike broader studies on transition risk (M. D. Bauer et al., 2022; Bolton et al., 2022; Pástor et al., 2021),

we concentrate on the financial impact of climate risk realization, represented by the IRA passage. Furthermore, we contribute to the literature by examining the impact of climate policy on green firms' future *earnings*, an aspect less explored than the impact on stock prices (M. Bauer et al., 2023; Ramelli et al., 2021). Finally, we also contribute by examining the underlying economic mechanisms to future earnings: the sales and cost channel.

To investigate the IRA's effect on the cash flow channel, we combine analyst forecasts from IBES and Environmental ratings from Refinitiv, supplemented by financial ratios and fundamentals from Compustat. Using analyst forecasts as proxies for investors' earnings expectations is commonplace in empirical research (Trueman, 1994), and IBES is known for aggregating diverse analyst predictions on the future earnings of publicly traded companies.[1] We utilize their Earnings per Share, Sales, and Gross Margin estimates to break down and offer deeper insight to the findings of fluctuations in stock returns. Refinitiv's environmental ratings, a commonly used measure of a firm's environmental performance, help us categorize firms into 'green' and 'brown' firms based on their quartile rankings in Environmental scores. Our analysis focuses on industries specifically targeted by the IRA, forming our final sample.[2]

We apply a difference-in-differences regression model to identify the changes in cash flow predictions for green firms (the treated group) following the announcement of the IRA (the treatment). For consistency across firms, we scale Earnings per Share (EPS) estimates by share price, creating an earnings yield metric (EY). This measure indicates the proportion of stock price represented by earnings. Our estimates suggest that, in Year 3, green firms are projected to have an earnings yield that is 0.009 higher than brown firms. For instance, a firm with a $100 share price is expected to report $0.9 higher EPS in Year 3 compared to brown firms. This difference increases to 0.022 in Year 4 and 0.039 in Year 5. Sales forecasts show significance only in Year 5, with green firms anticipated to achieve 8.2% higher sales than their brown counterparts. However, we observe no significant impact on cost estimates.

[1] https://www.lseg.com/en/data-analytics/financial-data/company-data/ibes-estimates

[2] These industries include "Materials", "Utilities", "Transportation", "Capital Goods", "Technology Hardware & Equipment", "Semiconductors & Semiconductor Equipment", "Automobiles & Components". The "Energy" industry, consisting primarily of oil companies, is excluded due to market disruptions following the Ukraine War outbreak in February 2022.

To ensure the validity of our results and the robustness of our research design, we performed a series of tests across the three measures and five periods. This comprehensive approach includes evaluating parallel trends through visual and statistical tests, assessing if green and brown firms displayed similar patterns before the IRA event, and comparing exogenous variables between the groups. Although minor deviations in parallel trends are observed in certain models, the overall assumption remains valid. Additionally, we conduct placebo tests for event dates t = -4 and t = -12 to rule out the possibility that observed effects are due to unobserved time trends rather than the IRA announcement. Finally, to test the robustness of our models, we simulate estimations while systematically excluding an industry in turn, proving that no individual industry significantly skews our main estimate.

Furthermore, we have done two additional analyses where we first examine whether analysts adjusted their forecasts immediately after the IRA announcement. We hypothesize a delayed forecast adjustment due to the IRA's complexity, extensive scope, and still undetermined details. The results partly align with our hypothesis, indicating a lagged analyst reaction to sales but an immediate reaction to earnings, suggesting analysts were quicker to anticipate long-term earnings growth than to evaluate specific demand and supply effects of the IRA. Additionally, we examine whether analysts' recommendations, specifically advising to buy or sell a stock, shift in response to the IRA passage. Based on our hypothesis of increased earnings, we further anticipated a shift towards 'Buy' recommendations in analysts' views on green firms' stocks. Contrary to our expectations, we found no significant difference-in-difference estimator, indicating no major changes in recommendations.

Finally, we examine the implications of our findings within a broader economic context. First, the expected increase in green firms' earnings in response to the IRA is essential for facilitating a green transition, but it comes with substantial fiscal outlays. However, Rennert et al. (2022) estimates that the reduction of social costs by the estimated reduction in emissions outweighs the fiscal outlays, thereby increasing social welfare. Furthermore, our findings posit that green firms are more favourably positioned to reap benefits from the IRA than brown firms, which, Under extreme scenarios, could precipitate the emergence of stranded assets and trigger financial instability in carbon-dependent sectors (Carney,

2016). Despite these potential risks, the findings were not of a magnitude that indicates any risk of stranded assets and market disruptions. Finally, the projected earnings growth for U.S. green firms post-IRA raises European concerns about potential impacts on its competitive edge. Although some concerns may be justified, there are also highlighted opportunities for global and European firms due to the act (Kleimann et al., 2023).

1.1 Literature Review

Our paper contributes to the growing literature on the pricing of climate risks in financial markets, focusing on the financial impacts of transition risks for green firms. The relative pricing of transition risk and equity of green versus brown firms is an open question in climate finance (M. Bauer et al., 2023). Previous studies present mixed findings: some report a 'carbon premium' with higher returns for brown stocks (Bolton et al., 2022; Pástor et al., 2021), while others show green stocks outperforming (M. D. Bauer et al., 2022). These studies, broadly focusing on the pricing of transition risk, provide a contextual backdrop for our study's more focused approach: investigating the financial impact of climate risk realization, represented by the IRA, on green firms.

In the following, we identify particularly pertinent studies compared to our research. We will delineate similarities and differences, highlighting how our study contributes to and diversifies the existing literature.

First, we contribute to the literature by examining the financial impact of *realization* of climate risk on green firms. Most prior studies on climate policies' effect on financial markets have studied events with news about *possible* future climate action and shifts in perceived transition risks. Ramelli et al. (2021) analyzed the stock market's reaction to the 2016 and 2020 U.S. Presidential elections, categorizing them as "brown" and "green" events with possible future climate actions based on the candidates' environmental policies. They discovered better stock market performance of carbon-intensive firms following Trump's election win. Intriguingly, they also observed higher stock returns for firms with higher climate responsibility during Trump's and Biden's electoral victories. Furthermore, Monasterolo and De Angelis (2020) examined the changes in risk attributes for green and brown stock indices around the announcement of the 2015 Paris Agreement. Their findings indicated a consistent decrease in systematic risk for low-carbon indices, while

stock markets showed a mild reaction to high-carbon indices. While these and other studies have focused on news about possible future climate action and shifts in perceived transition risk, we contribute by examining clearly identified events with immediate climate policy action and climate risk realization.

Furthermore, our research enriches the literature by focusing on the impact of climate policy on green firms' future *earnings*, an aspect less explored than the more typical analysis of stock prices. A study by M. Bauer et al. (2023), which closely aligns with our research, examines the stock price reactions to green and brown events related to implementing the IRA, reflecting key aspects of climate policy transition risk. The study finds sizable abnormal stock returns that differ by industry and across firm-level measures of greenness, such as environmental scores and emission intensities. Our study extensively builds upon the work of M. Bauer et al. (2023), exploring the underlying factors contributing to enhanced returns following the IRA.

Finally, our study contributes to the literature by delving deeper into the mechanisms behind the earnings by examining the sales and cost channels. A study linking ESG events to these cost and sales channels is a recent paper by Derrien et al. (2021). Specifically, they investigate the expected consequences of negative ESG news on firms' future profits. After learning about negative ESG news, analysts significantly downgrade their forecasts at short and longer horizons and find that negative ESG news affects forecasts more strongly at longer horizons than other types of negative news. Furthermore, they find that the negative revisions of earnings forecasts following ESG news reflect expectations of lower future sales rather than higher future costs. Our and Derrien's study examines similar financial aspects concerning transition risk realization but focuses on two distinct types of events. While Derrien et al. focused on firm-specific ESG events, our study contrasts by examining the broader impact of climate policies. Additionally, our focus is more acutely oriented towards climate aspects, given that ESG events can encompass a range of issues beyond just climate-related matters.

2 Institutional Details

This section first addresses the Inflation Reduction Act, followed by a timeline of related key events. The act is then examined through the lens of demand and supply channels. Furthermore, transition risk is explained before we present our hypotheses.

2.1 Inflation Reduction Act

The Inflation Reduction Act of 2022 (IRA) is commonly regarded as the most ambitious climate policy initiative undertaken in U.S. history. It contains $500 billion in new spending and tax breaks that aim to boost clean energy, reduce healthcare costs, and increase tax revenues, whereby nearly $400 billion in federal funding is directed to clean energy to substantially lower the nation's carbon emissions by the end of this decade (Badlam, 2022). It is important to note that this is purely a budget; therefore, the actual sums may be larger or smaller. According to Bistline et al. (2023), the overall fiscal impact of the climate-focused sections of the IRA could reach approximately $1 trillion over the coming decade.

The act aims to jump-start research and development and the commercialization of leading-edge technologies, including carbon capture and storage and clean hydrogen, with funds allocated through tax incentives, grants, and loan guarantees (Badlam, 2022). These tax credits and direct government expenditures will, over the next decade and beyond, provide substantial financial support for clean technologies and industries, as well as strong direct incentives for U.S. households and firms to invest in the equipment and capital needed to reduce their carbon emissions (Bistline et al., 2023). The economic shifts brought about by the IRA's incentives are anticipated to lead to notable decreases in U.S. greenhouse gas emissions (Bistline et al., 2023).

According to a McKinsey report, clean energy production and transmission receive the most substantial funding, followed by clean transportation, notably electric vehicle incentives (Badlam, 2022). Furthermore, a study by Kleimann et al. (2023) highlights that subsidies in the IRA specifically target clean technology manufacturing, clean fuels and emission reduction, as well as building and industrial efficiency. M. Bauer et al. (2023) identify in their study the industries that stand to benefit from the provisions in the IRA, those

where demand will be boosted or production costs will be subsidized, such as producers of electrical equipment, utilities, and construction companies.

2.1.1 Timeline of Events

There was prolonged uncertainty regarding whether the IRA would receive support and be passed. Therefore, in line with M. Bauer et al. (2023) approach, we have compiled a timeline illustrating key events leading up to the passage of the IRA pertinent to our study presented in table 2.1.

Table 2.1: Timeline of key events in the passage of the Inflation Reduction Act (IRA)

Date	Event
19-Nov-21	House passes Build Back Better climate legislation
19-Dec-21	Manchin announces he will vote against Build Back Better
14-Jul-22	Press reports Manchin will not support new climate spending
27-Jul-22	Manchin and Schumer announces new climate bill: The IRA
07-Aug-22	IRA is passed in Senate
12-Aug-22	IRA is passed in House
16-Aug-22	President Biden enacts the IRA into Law

This table displays key events in the passage of the Inflation Reduction Act, drawing inspiration from the timeline presented by (M. Bauer et al., 2023)

In the lead-up to the announcement of the IRA, several key events significantly influenced the likelihood of new climate financing.

The first event occurred on December 19th 2021, when the press announced that the Democratic Senator Manchin, a key holdout for legislation, had rejected support for the Build Back Better climate legislation, which was an expansive package of climate change, tax reform, health care, and social safety measures (Shrestha et al., n.d.). Senator Manchin's withdrawal diminished expectations for a renewed climate initiative.

However, the narrative changed over the summer, as Senator Manchin and Chuck Schumer, the Democratic Party leader, resumed negotiations on a combined health care and climate bill, bolstering the odds of climate policy advancements (M. Bauer et al., 2023). Ultimately, a key event occurred on July 27th, 2022, marked by the unexpected announcement that Manchin had agreed with Democratic leaders on a new legislation aimed at combating climate change. This "green event," which unveiled the IRA for the first time, made it nearly certain that significant climate policy would ultimately be enacted into law

(M. Bauer et al., 2023). Consequently, the probability of climate action saw a significant shift from unlikely before the summer to highly likely on July 27th, before being enacted to law on August 16th, 2022, which offers a valuable opportunity to assess the impact of the IRA on firms' cash flows.

2.1.2 Demand and Supply-side

Bistline et al. (2023) highlight that understanding who benefits from the IRA tax credits and other provisions—whether the producers or the consumers—is relevant for assessing the IRA's impacts. From a theoretical perspective, the announcement of the IRA passage raised expected profitability for green firms through both the supply and demand channels. The IRA's subsidies for low-carbon product purchases are expected to result in a policy-driven rise in consumer demand for green goods and services (M. Bauer et al., 2023), thereby enhancing the sales, profits, and cash flows of green firms through the demand channel described by Pástor et al. (2021). Additional financial incentives in the IRA, such as tax credits and subsidies for clean energy production and investment, aim to reduce production costs and increase profits, constituting a supply channel. Firms that benefit from such subsidies see their marginal cost decline and their profits rise.

Based on the IRA's anticipated impact in these two channels, we expect that the announcement of the IRA and the realization of transition risk will positively affect future earnings and cash flows that vary with the overall greenness of a firm. While some IRA implementation details are yet to be finalized (M. Bauer et al., 2023), we consider the passage of the IRA as a realization of transition risk because it implements specific new climate policies. Given that some details are still pending and recognizing the time needed for these changes to be reflected in firms' financials, our analysis is oriented toward long-term horizons.

2.2 Transition Risk

The passage of the IRA represents a major realization of climate policy transition risk. Transition risk refers to companies' challenges in adapting to a low-carbon economy, including reducing greenhouse gas emissions and moving toward renewable energy sources (Environmental Protection Agency, 2022). This transition process entails changes in

policy and legal frameworks, technological advancements, and market shifts, all aimed at addressing the mitigation and adaptation requirements posed by climate change. These changes' nature, pace, and focus can lead to varying financial and reputational risks for organizations. Conversely, organizations that are low-carbon emitters or operate within the renewable energy or climate transition market may face market, technological, and financial opportunities instead, which will be the focus of this study.

2.3 Hypotheses

We present two hypotheses based on the existing literature and the institutional details. Firstly, we hypothesize that the observed positive financial returns of environmentally friendly companies, which correlate with green events and climate policies, are partially attributed to the expectation of higher future earnings. When this insight is merged with the fact that the IRA is the most extensive climate policy in U.S. history, featuring a wide array of initiatives aimed at enhancing clean energy in numerous industries over the coming decade, it leads us to propose the following hypothesis:

Hypothesis I: *Green firms' future earnings are expected to increase in the long term after the passage of the Inflation Reduction Act.*

Furthermore, it was established in the institutional details that the IRA has both a demand and supply side. The Inflation Reduction Act's subsidies are anticipated to boost consumer demand for low-carbon products, increasing sales for green firms. Additionally, IRA's tax credits and subsidies for clean energy are expected to lower production costs, thus benefiting firms financially on both the demand and supply sides. Based on this foundation, we also present the following hypothesis:

Hypothesis II: *The increase in long-term expected future earnings for green firms arises from higher sales and lower costs after the passage of the Inflation Reduction Act.*

3 Research Design and Data

Using a difference-in-difference (DiD) approach, we aim to assess the IRA's effect on green firms' expected future cash flows by examining financial projections for firms with varying levels of IRA impact - green versus brown firms. The following section will present our empirical strategy with the underlying assumptions for the model's validity and the data utilized in our analysis.

3.1 Regression Estimates

3.1.1 Difference-in-Difference

The DiD regression is a statistical method that emulates experimental designs using observational data, ideal for assessing the impacts of significant policy shifts (Ashenfelter & Card, 2010). This approach involves an interaction term between two binary variables: 'post', assigned a value of one for data post-treatment, here after July 27$^{\text{th}}$, 2022, and 'treatment', indicating inclusion in the treatment group, represented by green firms in the targeted industries (Columbia University Mailman School of Public Health, 2016).

Based on the provisions and incentives outlined in the IRA combined with green firms' presumably lower transition risk, we posit that green firms are likely to experience a more substantial treatment intensity relative to brown firms under the realization of transition risk, which the IRA represents. This assumption leads us to categorize green firms as the treatment group, reflecting their enhanced engagement with IRA measures. In contrast, brown firms are designated as the control group, presumably less impacted by these initiatives. To ascertain the IRA's causal effect on green firms, we compare them with brown firms in the same industries targeted by the IRA.

3.1.2 Simple Difference-in-Difference Model

We estimate the impact of the IRA on green firms' future earnings for time horizons spanning 1-5 years. Our basic DiD model employs group and post variables to determine the causal effect β_3. To ensure a more robust analysis, we incorporate fixed effects γ_i and λ_t at both the firm and time levels, accounting for effects invariant across different firms

and over time. This results in the following regression estimation for the simple model:

$$Y_{it} = \beta_0 + \beta_1 \text{Group}_i + \beta_2 \text{Post}_t + \beta_3 (\text{Group}_i \times \text{Post}_t) + \gamma_i + \lambda_t + \epsilon_{it} \tag{3.1}$$

for which $Y_{i,t}$ is the most recent consensus estimate for measure Y for firm i in month t. $Group_i$ is an indicator variable equalling one if the company i has an Environmental score in the top quartile in the treated industries (green firm), and zero if the company is in the bottom quartile of the treated industries (brown firm)[3]. $Post_t$ is an indicator variable equalling one if month t is after the announcement date, July 27$^{\text{th}}$, 2022. We consider t = {-4, -3, -2,-1, 1, 2, 3, 4} for our models, omitting t = 0 as we can not distinguish if the estimates in t = 0 have been submitted before or after the IRA announcement[4]. By starting the post-IRA window in t = 1, we ensure that our post-treatment window includes only forecasts made after the IRA's announcement on July 27$^{\text{th}}$, 2022.

3.1.3 Complete Difference-in-Difference Model

For the complete model, control variables are included to identify the IRA's effect more accurately and decrease the error variance in the estimations. We also analyze the economic mechanisms of earnings changes, focusing on variations in either sales or costs, to determine what the changes in earnings are primarily influenced by. To this end, in addition to the earnings estimations, 3.2 is applied to the forecasted data for Sales and Gross Margin analyst forecasts. We aim to identify the dominant driver behind the earnings fluctuations. $\text{X}_{i,t}$ represents a vector of all control variables for firm i in month t. This results in the following regression estimation:

$$Y_{i,t} = \beta_0 + \beta_1 \text{Group}_i + \beta_2 \text{Post}_t + \beta_3 (\text{Group}_i \times \text{Post}_t) + X_{i,t} + \gamma_i + \lambda_t + \epsilon_{it} \tag{3.2}$$

Where $X_{i,t}$ is defined as:

$$X_{i,t} = \beta_4 \text{log}(\text{MarketCap})_{i,t} + \beta_5 \text{BookToMarket}_{i,t} + \beta_6 \text{TotalDebtToInvestedCapital}_{i,t} \tag{3.3}$$

[3]Treated industries: GICS Industry Groups: “Materials", "Utilities", "Transportation", "Capital Goods", "Technology Hardware & Equipment", "Semiconductors & Semiconductor Equipment", "Automobiles & Components"

[4]t = 0 are estimates released August 18$^{\text{th}}$, 2022, containing consensus estimates from July 14$^{\text{th}}$, 2022, to August 18$^{\text{th}}$, 2022

We control for various firm-level characteristics in line with other studies investigating differences in transition risk and financial performance between green and brown firms (M. D. Bauer et al., 2022; Ramelli et al., 2021). Specifically, we use Book-to-Market, Market Cap, and Total Debt-to-Invested Capital as control variables. We particularly consider market cap as an important control variable, as studies have shown that larger companies have, on average, better ESG scores (Borokova & Wu, 2020). These control variables should account for the disparities between the green and brown firms, thereby enhancing the precision of our causal effect estimation.

The reliability of our DiD coefficients depends upon the assumption that in the absence of the event, the trajectories of brown and green firms would have been parallel. This key assumption is examined in detail in Section 4.3.

3.2 Data

3.2.1 ESG

Our main ESG data is collected from the Refinitiv database. The database has a reputation for data quality, transparency in scoring methodology, and regular updates, making its ESG scores a reliable and valuable tool for investors and analysts. Refinitiv produces standardized ESG investing information based on annual reports, company websites, NGO websites, stock exchange filings, CSR reports, and news sources. The ESG score of a company comprises three main pillars: Environmental, Social, and Governance. Each of these pillars is subdivided into specific measures individually scored relative to the firm's industry. Our analysis focuses on the Environmental pillar to categorize companies as green or brown. This environmental pillar's score derives from three key measures: Emissions, assessing CO_2 and other waste; Resource Use, centred on energy and water consumption; and Innovation, evaluating product innovation and green revenues. The environmental score is a common measure of a firm's greenness in the growing carbon finance literature (M. Bauer et al., 2023). We retrieve the latest Environmental Score before our analysis window for each US company to omit the look-ahead bias. In our analysis, we have deemed companies with an Environmental score older than December 2020 outdated, thereby excluding them.

Table 3.1 displays the characteristics of the 611 companies from the target industries. The final dataset will include the companies in the top and bottom quartile of the Environment Score.

Table 3.1: Summary Statistics: ESG Score

Variable	Mean	SD	Min	Q25	Median	Q75	Max	Obs
ESG Score	51.81	18.95	7.28	37.61	53.98	66.82	94.64	611
Environmental Pillar Score	42.65	25.95	0.16	20.39	42.79	64.56	97.57	611
Emissions Score	45.08	30.18	0.00	17.06	44.30	70.92	99.79	611
Resource Use Score	47.54	31.16	0.00	19.40	48.74	75.27	99.84	611
Environmental Innovation Score	35.38	30.86	0.00	0.00	34.23	56.13	96.73	611

This table reports the summary statistics of the latest ESG metrics on the firm level for the companies in the targeted industries four months before the announcement of the IRA. Emissions (29.5%), Resource Use (23.5%), and Environmental Innovation score (47%) comprise the Environmental Pillar score. The Environmental Pillar Score constitutes 34% of a company's total ESG (Environmental, Social, and Governance) score.

3.2.2 Analyst Forecasts - IBES

We gather monthly analyst consensus forecasts from the Institutional Brokers Estimate System (IBES), covering key metrics such as Earnings Per Share, Sales, Gross Margins, and stock recommendations. The horizon of these forecasts ranges from 1 to 5 years. Stock recommendations are rated on a 1 to 5 scale, where 1 is a strong recommendation to 'buy' and 5 is a strong recommendation to 'sell'.

To be included in our dataset, a company must be present in both ESG and IBES data. We align these datasets using the CUSIP number. If there's no CUSIP match, we merge data using stock tickers, accounting for potential changes in CUSIP numbers and ensuring company consistency.

3.2.3 Financial Fundamentals and Ratios

We obtain monthly financial fundamentals and ratios for U.S. firms from Compustat, merging this data with the joint IBES & ESG dataset using CUSIP and aggregation month. These financial fundamentals and ratios are utilized as control variables in our models. The following tables show the summary statistics and variations for exogenous variables between groups and across the periods before and after the event.

Table 3.2: Summary Statistics: Exogenous variables - Brown & Green firms full sample

	Brown Firms					Green Firms				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
Market Cap	2207	3771	50.93	24496	146	38943	66362	438	420995	154
Book to Market	0.67	0.57	0.01	2.86	151	0.44	0.30	0.02	1.49	150
TD to Invested Capital	0.32	0.25	0.00	1.40	150	0.47	0.22	0.01	1.41	153

This table shows summary statistics for the sample of targeted industries divided into Brown (Low E-score) and green firms (High E-score) for the full sample (April 2022 - December 2022). Market Cap is displayed in millions and rounded to the nearest million. TD to Invested Capital refers to the total debt to invested capital ratio. All variables are winterized at 99%.

Table 3.3: Summary Statistics: Exogenous variables - Brown firms before and after 27th of July

	Before IRA					After IRA				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
Market Cap	2320	4152	49	30639	143	2130	3548	52	21233	145
Book to Market	0.58	0.52	0.01	2.88	147	0.75	0.61	0.01	2.88	144
TD to Invested Capital	0.31	0.25	0.00	1.10	147	0.34	0.27	0.00	1.71	143

This table shows summary statistics for the sample of brown firms (Low E-score) in the targeted industries. The sample is divided into before and after the IRA announcement on the 27th of July 2022. Market Cap is displayed in millions and rounded to the nearest million. TD to Invested Capital refers to the total debt to invested capital ratio. All variables are winterized at 99%.

Table 3.4: Summary Statistics: Exogenous variables - Green firms before and after 27th of July

	Before IRA					After IRA				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
Market Cap	39892	68149	438	420994	154	37999	64820	437	420995	154
Book to Market	0.39	0.26	0.02	1.32	150	0.49	0.34	0.02	1.79	150
TD to Invested Capital	0.47	0.22	0.01	1.49	153	0.46	0.22	0.01	1.38	153

This table shows summary statistics for the sample of green firms (High E-score) in the targeted industries. The sample is divided into before and after the IRA announcement on the 27th of July 2022. Market Cap is displayed in millions and rounded to the nearest million. TD to Invested Capital refers to the total debt to invested capital ratio. All variables are winterized at 99%.

We can see that the groups are fairly similar. However, it is notable that green firms, on average, possess a significantly higher market capitalization than brown firms. We will discuss these implications when addressing the validity of our model in 4.3.

3.2.4 Construction of Variables

Our analysis assesses consensus forecasts for Earnings Per Share (EPS), Gross Margin (GRM), and Sales. During our analysis of the dependent variables, we observed a positive

skew in the distributions of Sales and EPS. We log-transform the Sales variable to minimize bias from non-normal residual distribution and reduce the impact of outliers. Additionally, we normalize EPS by scaling it against the share price before the start of our analysis period. This scaling produces the Earnings Yield (EY) metric, facilitating company comparisons irrespective of their share count. An increase in this metric indicates a larger share of earnings in the stock price. The Gross Margin, already presented as a percentage, does not require any scaling. These adjustments result in normalized distributions for all dependent variables. See appendix A.1 for visualization.

3.2.5 Construction of Sample

Following M. Bauer et al. (2023), we employ the Environmental Score as a proxy for firms' greenness, distinguishing between green and brown firms. We also follow Bauer's use of quartiles as separation for control and treatment groups: Firms in the bottom quartile are classified as brown, while those in the top quartile are classified as green.

Table 3.5: Sample construction based on Inflation Reduction Act target areas

IRA Target Areas	Corresponding GICS Sectors
Clean energy production and transmission	Utilities
Electrical equipment	Semiconductors & Semiconductor Equipment Technology Hardware & Equipment
Clean transportation	Transportation, Automobiles & Components
Clean technology manufacturing	Materials
Building and industrial efficiency	Capital Goods

This table displays areas the IRA targets, with the corresponding GICS sectors included in the sample to account for each target area.

Each company is identified through the four-tiered GICS hierarchical industry classification system. Our sample selection consists of industries that, according to the sectors identified in the McKinsey report (Badlam, 2022) and studies by M. Bauer et al. (2023) and Kleimann et al. (2023), are recipients of the most substantial funding allocations. We identify the sample industries as following GICS industry groups: "Materials", "Utilities", "Transportation", "Capital Goods", "Technology Hardware & Equipment", "Semiconductors & Semiconductor Equipment", "Automobiles & Components". Table 3.5 presents the reason for each Industry's inclusion in the sample. See the appendix A.1 for a complete overview of industry groups and industries included and excluded from the sample.

Despite the Inflation Reduction Act (IRA) being aimed at the energy sector, our study specifically excludes the CIGS Energy Industry, which primarily consists of oil and gas corporations. The decision is based on the substantial influence of the Russia-Ukraine conflict on oil supply and demand dynamics, as well as the resulting fluctuations in oil prices, as unveiled in (Zhang et al., 2023). Additionally, the timing of the window we study, beginning in April, is chosen to avoid the market instability caused by this crisis.

4 Results

This section analyses the primary outcomes derived from the DiD regressions. The focus is on how green firms' expected future cash flow changes relatively to brown firms due to the announcement of the IRA passage, using consensus analysts' earnings forecasts as a proxy for expected future cash flow. Specifically, we employed a DiD regression across various time horizons to determine if and how analysts anticipate an impact of the IRA on green firms' cash flows and if they expect the effects to materialize instantly or over a more extended period, potentially up to five years. For this analysis, we consider the forecasts for different horizons separately.

4.1 Simple Model

Our first hypothesis is that green firms' future earnings are expected to increase in the long term after the passage of the Inflation Reduction Act. We test this hypothesis by running equation 3.1 for Earnings estimates.

Table 4.1 reports the results of the simple DiD regressions, which indicate a significant increase in earnings for green firms in long-term horizons compared to the control group, specifically Years 3 to 5. The coefficients for Years 3 and 4 are 0.015 and 0.031, exhibiting statistical significance at the 5% level. Meanwhile, the coefficient for Year 5 is 0.038, demonstrating significance at a more stringent 1% level.

Table 4.1: Impact of the IRA on Earnings forecasts

	Y1	Y2	Y3	Y4	Y5
Green Firm x Post IRA	−0.003	0.005	0.015*	0.031*	0.038**
	(0.004)	(0.003)	(0.006)	(0.014)	(0.012)
Num.Obs.	2369	2325	1890	1173	773
R2	0.956	0.955	0.919	0.842	0.892
R2 Within	0.002	0.006	0.030	0.046	0.106
FE: Company	YES	YES	YES	YES	YES
FE: Date	YES	YES	YES	YES	YES

This table reports the results from the simple model DiD regression of Earnings estimates. The dependent variable is Earnings per Share divided by the share price before the first observation in the regression: $\frac{EPS}{p_{ts}}$ (EY), where $p_{i,ts}$ is share price for firm i for the month at the start of our window: April 2022. Post IRA takes the value of one if the estimate happened after the IRA announcement on July 27$^{\text{th}}$, 2022. Green Firm takes a value of one if the company is in the top quartile of the Environmental Pillar Score. The sample consists of monthly analyst consensus forecasts from 4 months before and after the event date. Firm- and time-fixed effects are included in the model. ***, **, * and + denote significance at the 0.1%, 1%, 5%, and 10% levels respectively. Robust standard errors are in parentheses.

The Earnings Yield (EY) coefficients can be understood as follows: An increase in earnings yield suggests a rise in EPS equivalent to the EY multiplied by the share price. For instance, the coefficient of 0.038 for Year 5 indicates that a green firm with a share price of $100 would experience a $3.8 higher increase in EPS in 5 years compared to a brown firm with an identical share price.

4.2 Complete Difference-in-Difference Model

Table 5.2 presents the results from the complete DiD model with control variables from 3.2 to identify the causal effect more precisely. The model controls for Book-to-Market ratio, Market Cap and Total Debt to Invested Capital, which, from the significant coefficients in the output, shows that these variables have explanatory value. These results more accurately identify the actual causal effect and are similar to the results from the simple DiD model. Year 3, 4 and 5 are still significant at the same level as in the simple model, with growing coefficients for each year of respectively 0.009, 0.022 and 0.031, still indicating an increase in earnings for green firms in the long-term horizons.

Table 4.2: Impact of the IRA on earnings forecasts accounting for control variables

	Y1	Y2	Y3	Y4	Y5
Green Firm x Post IRA	−0.005	0.003	0.009*	0.022*	0.031**
	(0.004)	(0.003)	(0.005)	(0.009)	(0.011)
Book to Market Ratio	−0.017	−0.057***	−0.049***	−0.039	−0.067*
	(0.013)	(0.009)	(0.012)	(0.025)	(0.032)
TD to Invested Capital	−0.022	−0.020	−0.157	−0.223*	0.060
	(0.022)	(0.020)	(0.111)	(0.110)	(0.090)
Market Cap	0.037***	0.020**	0.017*	0.032**	0.029**
	(0.008)	(0.007)	(0.008)	(0.012)	(0.009)
Num.Obs.	2282	2246	1839	1142	740
R2	0.961	0.965	0.933	0.863	0.880
R2 Within	0.096	0.198	0.187	0.173	0.191
FE: Company	YES	YES	YES	YES	YES
FE: Date	YES	YES	YES	YES	YES

This table reports the results from the complete model DiD regression of Earnings estimates. The dependent variable is Earnings per Share divided by the share price before the first observation in the regression: $\frac{EPS}{p_{ts}}$ (EY), where p_{ts} is share price for firm i for the month at the start of our window: April 2022. Post IRA takes the value of 1 if the estimate happened after the IRA announcement on July 27$^{\text{th}}$, 2022. Green Firm takes a value of 1 if the company is in the top quartile of the Environmental Pillar Score. The specifications include control variables for Book-to-Market, Market Cap, and Long-Term Debt-to-Invested Capital. Firm- and time-fixed effects are included. ***, **, * and + denote significance at the 0.1%, 1%, 5%, and 10% levels respectively. Robust standard errors are in parentheses.

4.2.1 Sales versus Costs

Our second hypothesis is that the increase in long-term expected future earnings for green firms arises from higher sales and lower costs after the passage of the IRA. To examine this sales and cost mechanism, we run the complete difference-in-differences regression analysis 3.2, using Sales and Gross Margin as the dependent variables. Table 4.3 presents the results from these regressions for the various time horizons, indicating that the expected long-term increase in earnings is due to increased sales.

Table 4.3: Impact of the IRA on Sales & Gross Margin forecasts with control variables

	Sales					Gross Margin				
	Y1	Y2	Y3	Y4	Y5	Y1	Y2	Y3	Y4	Y5
Green Firm x Post IRA	0.022	−0.014	−0.003	0.051+	0.082*	1.021	0.385	−0.423	−1.683	0.384
	(0.024)	(0.015)	(0.023)	(0.028)	(0.041)	(1.157)	(0.408)	(0.540)	(1.312)	(0.679)
Book to Market Ratio	0.013	−0.022	−0.075+	−0.157*	−0.187+	−1.420	−2.844**	−3.276*	−2.504	0.445
	(0.049)	(0.042)	(0.042)	(0.072)	(0.102)	(2.018)	(0.947)	(1.327)	(2.667)	(3.103)
TD to Invested Capital	−0.118	0.127	−0.101	−0.183	0.513*	−36.844	−22.879**	−2.063	23.040	−2.083
	(0.320)	(0.227)	(0.164)	(0.134)	(0.259)	(23.215)	(7.254)	(1.762)	(15.961)	(7.702)
Market Cap	0.150***	0.192***	0.250***	0.243**	0.287***	5.323*	3.329**	3.582***	7.322*	3.743*
	(0.031)	(0.028)	(0.056)	(0.074)	(0.067)	(2.362)	(1.041)	(1.028)	(3.123)	(1.668)
Num.Obs.	2288	2257	1872	1205	839	2054	2034	1599	798	472
R2	0.996	0.998	0.997	0.998	0.993	0.957	0.977	0.985	0.954	0.995
R2 Within	0.039	0.123	0.173	0.234	0.133	0.090	0.100	0.063	0.120	0.150
FE: Company	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
FE: Date	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

The dependent variables are Sales and Gross Margin for 1 to 5 years estimates. Post IRA takes the value of 1 if the estimate happened after the IRA announcement on the 27th of July 2022. Green Firm takes a value of 1 if the company is in the top quartile of the Environmental Pillar Score. The specifications include controls for Book-to-Market, Market Cap and Long-Term Debt-to-Invested Capital. Firm- and time-fixed effects are included. ***, **, * and + denote significance at the 0.1%, 1%, 5%, and 10% levels respectively. Robust standard errors are in parentheses.

The estimates suggest that for Year 5, green firms will have an 8.2% increase in sales relative to brown firms. Notably, this significance level is modest at a 5% level, and for Year 4, it is only significant at a 10% level. This suggests a significant long-term sales increase, consistent with the Year 5 earnings rise. This pattern, however, is not evident for Years 3 or 4. In sum, the analysis indicates analysts' upward revisions of green firms' future sales for the longer term, though with limited significance, contributing to the enduring rise in earnings. Regarding gross margin, the regression analysis indicates a lack of statistical significance across all time horizons after the IRA's enactment. This outcome implies that analysts do not foresee cost factors significantly influencing the future earnings of green firms relative to brown firms after the announcement of the IRA

passage.

As we observe a significant increase solely in long-term sales, these results only partially align with our second hypothesis.

4.3 Test of Identifying Assumptions

In this subsection, we assess the validity of our findings by examining the parallel trend assumption and performing placebo tests, particularly focusing on years 3, 4, and 5, the periods from which our main results are derived.

4.3.1 Parallel Trend

The validity of a DiD coefficient relies on the parallel trends assumption, meaning that the green firms' and the brown firms' estimates would evolve in parallel, given an absence of treatment. Our analysis consists of multiple regressions across various measures and timeframes, necessitating the examination of several parallel trends.

To identify parallel trends, we first examine summary statistics for exogenous variables and analyze visual representations of the trends. The summary statistics provided in Section 3.2.3 reveal differences in the metrics across the samples, yet show comparable changes throughout the study period. Furthermore, the treatment and control groups are derived from the same sample of industries, enhancing their comparability. The noticeable differences in market capitalization is a recognized bias where studies show a positive correlation between companies' ESG scores and size. This can be explained by larger companies having more to invest in sustainability and, therefore, have higher ESG scores (Borokova & Wu, 2020). We addressed this bias by incorporating the log-transformed market cap as a control variable and using firm fixed effects in our model.

Furthermore, we perform tests to determine if the groups exhibit similar behaviours before the event and differing behaviours after. These tests involve estimating a model similar to the equation 3.1, but with a modification where the $group_i$ variable interacts with the specific months in our sample.

We anticipate that the coefficients for the period from t = -3 to t = -1 will be statistically insignificant in our DiD regression models, indicating consistent behaviour during the

pre-treatment phase and thus maintaining the parallel trends assumption. Conversely, we expect the coefficients to be statistically significant for the periods from t = 1 to t = 4, reflecting a discernible treatment effect in the complete DiD regressions. Table 4.4 confirms this for most models. However, the Sales model for Year 4 and the EY model for Year 3 suggest a potential violation of the parallel trend assumption as the treatment and control groups significantly differ in the pre-treatment window. This is displayed by significant differences before the event date in the Sales model, implying that the assumption may not be valid for this model.

Table 4.4: Parallel trend test

	EY			Sales			GRM		
	Y3	Y4	Y5	Y3	Y4	Y5	Y3	Y4	Y5
Green Firm x t = -3	0.004+	0.003	0.040	0.020	0.036*	0.058	0.503	2.037	−0.456
	(0.002)	(0.006)	(0.027)	(0.013)	(0.017)	(0.084)	(0.410)	(1.498)	(0.841)
Green Firm x t = -2	0.007*	0.007	0.049+	0.023	0.059*	0.058	0.517	2.239	−0.125
	(0.003)	(0.007)	(0.028)	(0.015)	(0.027)	(0.085)	(0.453)	(1.523)	(0.907)
Green Firm x t = -1	0.010**	0.010	0.055+	0.034+	0.062*	0.066	0.403	0.791	−0.063
	(0.004)	(0.008)	(0.030)	(0.020)	(0.032)	(0.092)	(0.601)	(2.400)	(0.906)
Green Firm x t = 1	0.020**	0.033*	0.075*	0.022	0.107*	0.115	−0.463	−0.474	−0.199
	(0.007)	(0.016)	(0.029)	(0.035)	(0.050)	(0.107)	(0.895)	(2.451)	(1.024)
Green Firm x t = 2	0.020**	0.032*	0.077**	0.023	0.128*	0.150	0.204	0.652	0.962
	(0.007)	(0.016)	(0.028)	(0.037)	(0.056)	(0.117)	(0.916)	(2.657)	(1.259)
Green Firm x t = 3	0.022**	0.048*	0.080**	0.052	0.185**	0.215+	1.034	1.125	1.033
	(0.008)	(0.021)	(0.029)	(0.039)	(0.059)	(0.117)	(0.653)	(2.742)	(1.392)
Green Firm x t = 4	0.019*	0.030**	0.079**	0.056	0.190**	0.206+	1.253+	1.329	0.568
	(0.008)	(0.012)	(0.028)	(0.038)	(0.060)	(0.116)	(0.649)	(2.573)	(1.512)
Num.Obs.	1890	1173	773	1942	1253	880	1663	835	496
R2	0.919	0.843	0.900	0.997	0.997	0.992	0.984	0.950	0.993
R2 Within	0.035	0.053	0.171	0.008	0.097	0.042	0.010	0.009	0.018

This table reports results from the parallel trend tests. The dependent variables are EY, Sales and GRM, for the periods Year 3 to 5. The sample consists of green and brown firms in treated industries A.1. ***, **, * and + denote significance at the 0.1%, 1%, 5%, and 10% levels respectively. Robust standard errors are in parentheses.

Finally, we evaluate the parallel trend plots presented in A.2, which generally suggest that the assumption holds. Some concerns arise in the Earnings models for Years 4 and 5 as the trends are volatile.

In conclusion, upon the numerical investigation of the parallel trend assumption, we observe a possible violation for Year 3, necessitating a cautious interpretation of this result. Furthermore, a potential violation of the parallel trend assumption for Years 4 and 5, identified by the visual test, casts some doubt over the results and warrants a cautious

interpretation of these findings. However, We put greater emphasis on the numerical outcomes of the parallel trends tests, as the visual interpretation proves more complex due to the short pre-treatment window and limited data points. Therefore, we regard the findings for Years 4 and 5 as reliable.

4.3.2 Placebo Event Date

In this subsection, we conduct placebo regressions by substituting the actual event date with two different dates. This approach helps determine if the observed cash flow effects stem from unobserved time trends rather than being directly attributable to the IRA. Significant interaction coefficients in these placebo tests would suggest that factors unrelated to the Act influence the results.

We chose two false event months: t = -4 and t = -12. The test results are presented in Table 4.5, displaying no significant coefficients for the Green Firms x Post IRA interaction for all our main results. The remaining placebo event test results are found in appendix A.4.

Table 4.5: Placebo event test

	t = -4						t = -12					
	EY		Sales		GRM		EY		Sales		GRM	
	4Y	5Y	4Y	5Y	4Y	5Y	4Y	5Y	4Y	5Y	4Y	5Y
Green Firms × Post IRA	−0.002	0.025	−0.036	−0.037	−0.145	−1.615	0.009	0.010	−0.030	0.014	0.606	−0.055
	(0.006)	(0.029)	(0.023)	(0.074)	(1.537)	(1.010)	(0.008)	(0.012)	(0.044)	(0.035)	(0.485)	(0.431)
Num.Obs.	1084	618	1176	735	756	399	974	647	1111	752	623	324
R2	0.845	0.845	0.997	0.984	0.942	0.991	0.904	0.947	0.995	0.998	0.985	0.991
R2 Within	0.018	0.084	0.022	0.012	0.027	0.037	0.026	0.025	0.006	0.009	0.039	0.056
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

This table reports results from the falsification tests. We consider two placebo event dates, 4 and 12 months before the actual event. The dependent variables are EY, Sales and GRM, for the periods Year 4 to 5. The sample consists of green and brown firms in treated industries A.1 for t = {-4, -3, -2, -1, 0, 1, 2, 3}. ***, **, * and + denote significance at the 0.1%, 1%, 5%, and 10% levels respectively. Robust standard errors are in parentheses.

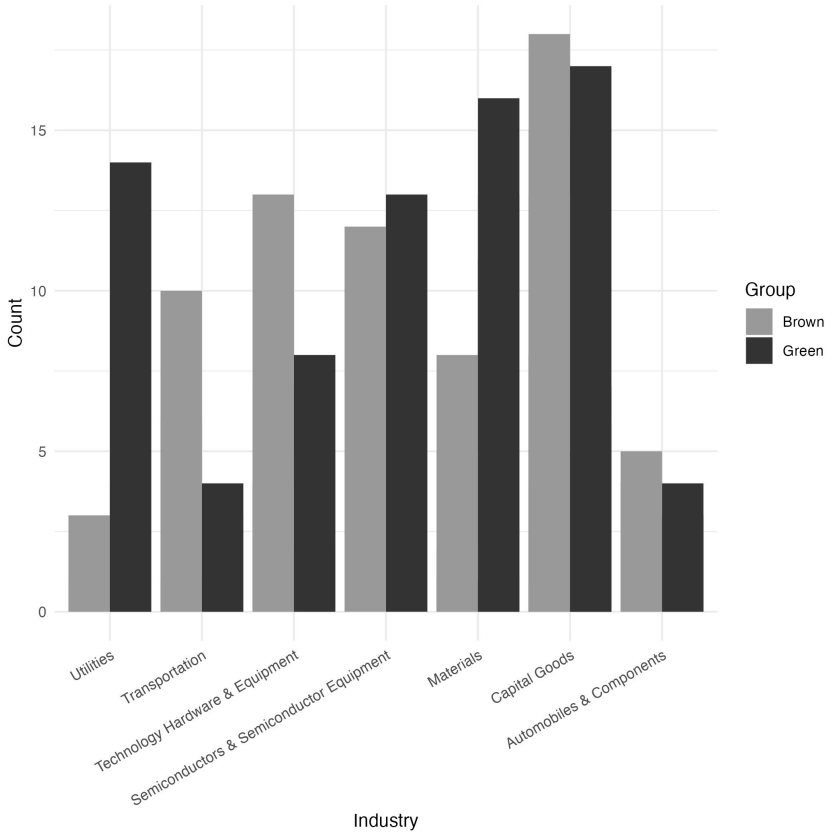
4.4 Robustness

In this subsection, we will explore the robustness of our findings. Specifically, we aim to determine whether specific industries significantly influence our results.

A point of concern is that the IRA incentives, being industry-specific, might lead to our

main observed effects being disproportionately driven by green firms in a few concentrated industries, potentially skewing our overall estimates. Figure 4.1 illustrates that the distribution of 'green' and 'brown' firms varies notably across some industry groups, indicating an uneven representation. To address this, we conducted a robustness check by rerunning Model 3.2 across each measure and forecast period, systematically excluding a different industry in each iteration.[5] The outcomes of these iterations, displayed in A.5, demonstrate that the coefficients remain similar to our original model for most iterations. These findings suggest that no individual industry significantly skews our main estimate, underscoring the robustness of our results.

Figure 4.1: Frequency of GICS Industry Groups in sample



[5]For each iteration, we exclude one GICS Industry. Our sample consists of 27 GICS industries

5 Discussion

Our DiD analysis reveals a statistically significant rise in the projected earnings of green firms over long-term horizons. Dissecting earnings into sales and cost channels, we observe a significant increase in sales in Year 5, but not in gross margin. In the following section, we contextualize these findings, aligning them with the hypotheses outlined in Section 2.3 and linking them to existing research to provide a broader interpretation of the outcomes.

First, we examine how our results align with our first hypothesis that the IRA will lead to a long-term increase in the future earnings of green firms. Next, we explore the economic mechanisms underlying the results, assessing how they correspond with our second hypothesis, stating that the IRA's passage leads to increased long-term expected future earnings for green firms, driven by higher sales and reduced costs. With that, the economic mechanism behind the earnings through the sales and cost channels will be discussed.

5.1 IRA and Earnings

The DiD analysis reveals a long-term relative increase in expected earnings for green firms following the IRA's enactment, aligning with Hypothesis I. Conceptually, this anticipated rise in future cash flows acts as a key driver in elevating stock prices, a finding in accord with the significant positive abnormal returns for green firms identified in M. Bauer et al. (2023)'s event study. Both studies utilize the Refinitiv Environmental Score and the same threshold to classify green firms, ensuring methodological consistency.

Economically, this outcome holds substantial significance, as it seems reasonable that greener companies are more likely to benefit from the IRA's measures due to their presumed lower transition risk. The long-term nature of the increase in expected earnings is also economically logical. The IRA's details are still being finalized, its measures are not implemented all at once, and it naturally takes time for these policies to reflect in a firm's financial performance, especially as firms adapt to the new climate policy framework. The gradual increase in earnings coefficients from Year 3 to 5, aligns with this argument. However, the results, especially for year 3, may violate the parallel trend assumption as discussed in 4.3.1, necessitating a cautious interpretation.

5.2 IRA and The Demand and Supply Channel

Our analysis of the drivers behind the earnings increase observed in the DiD regression shows that a significant long-term horizon increase in sales, not cost reductions, contributes to this increase. This finding partially aligns with our second hypothesis: it supports the sales channel part of the hypothesis but not the cost channel part. However, this observation holds only for Year 5, considering that Sales for Year 4 exhibit significance only at a 10% level, and Year 3 shows no statistical significance. When interpreting the relationship between sales and earnings for Year 3 and 4, it is important to exercise prudence and avoid overemphasizing their importance, as the parallel trend assumption for earnings in Year 3 and sales in Year 4 is questionable. However, the expected future sales increase for Year 5 aligns with expectations from (M. Bauer et al., 2023) that the IRA's subsidies for low-carbon products would spark a policy-driven consumer increase in demand for green goods and services, benefiting green firms that exhibit lower transition risk. Thus, for Year 5, the result is economically meaningful, confirming both economic and theoretical expectations.

The latter part of Hypothesis II diverges from our findings, as we observed no significant changes in gross margin across any horizons. This outcome is unexpected, particularly considering the IRA incentives such as tax credits and subsidies. These were anticipated to reduce future marginal costs for green firms and increase future profits given their low transition risk, constituting a cost channel.

Nonetheless, isolating the IRA's effect on future costs may be challenging, as these costs are potentially more susceptible to external macroeconomic factors, such as interest rates, labour, and materials costs. Among various scenarios, Bistline et al. (2023) propose a scenario wherein the IRA could potentially lead to an increase in interest rates, driven by heightened investment demand combined with a rise in labour and materials costs. They argue that such a scenario may substantially negatively affect clean energy investment. For example, the study documents that the costs for clean electricity generating plants, for whom IRA includes large subsidies, are more sensitive to interest rates than conventional fossil fuel generators. In addition, continued supply constraints, permitting delays, and other factors may increase costs and reduce the pace of clean energy deployment, depressing take-up for IRA incentives. Hence, the lack of observable changes in gross margins may

suggest that analysts might anticipate such a scenario or aspects of it, which could neutralize the intended cost-reducing impact of the IRA's tax credits and subsidies.

6 Additional Analysis

6.1 Dynamic Difference-in-Difference Model

The IRA introduces a complex package of federal spending initiatives structured as a 10-year plan, indicating that its impacts will emerge progressively rather than instantly.[6] The full details of the act were not disclosed at the time of its announcement and remain partially undisclosed to this day. We therefore hypothesize that analysts will not immediately react by adjusting their forecasts in response to the announcement of the act's passage. Empirically, we address this by enhancing our complete model (see Model 3.2) with an interaction term for all post-event dates, allowing us to analyze the effects month by month:

$$\begin{aligned} Y_{i,t} = \beta_0 + \beta_1 \text{Group}_i + \beta_2 \text{Post}_t + \delta_1(\text{Group}_i \times \text{Post}_{t=1}) + \delta_2(\text{Group}_i \times \text{Post}_{t=2}) \\ + \delta_3(\text{Group}_i \times \text{Post}_{t=3}) + \delta_4(\text{Group}_i \times \text{Post}_{t=4}) + X_{i,t} + \gamma_i + \lambda_t + \epsilon_{it} \end{aligned} \tag{6.1}$$

where δ_1, δ_2, δ_3, δ_4 represent the coefficients for the impact the IRA has for the post-treatment months t = {1, 2, 3, 4}, where t = 0 is omitted from the sample.

Table 6.1 displays the results from the regression estimate 6.1, which aims to investigate the timing of the analysts' reaction to the announcement of the IRA passage, specifically examining whether their response is immediate or if there is a noticeable lag in their reaction. We observe an immediate impact on earnings as the table displays significant positive coefficients from t = 1. The effect is stable, with a coefficient around 0.03 for Year 5, and it increases for Year 4 from 0.23 in the first month to 0.32 in the third month. The coefficients from the sales model in Year 5 do not show significance until Month 3, with a coefficient of 0.110 for Year 5 and 0.076 for Year 4, which also loses their significance in the following month. The Gross Margin models show no significant effect similar to the previously displayed results. In summary, our findings are congruent with our hypothesis regarding sales, yet they reveal a more immediate impact on earnings.

A possible explanation for these results, which show a more immediate impact on earnings than on sales forecasts, is that analysts are more confident early on about the increase

[6] https://www.irs.gov/inflation-reduction-act-of-2022

in long-term earnings but require additional time to assess the specific mechanisms contributing to this increase given IRA's demand and supply side incentives. However, it is counterintuitive that analysts would upgrade earnings forecasts without adjusting the underlying effects. Nonetheless, such effects may emerge when considering the aggregate of all analyst forecasts collectively.

Table 6.1: The dynamic impact of IRA on the cash flow channel

	EY			Sales			GRM		
	Y3	Y4	Y5	Y3	Y4	Y5	Y3	Y4	Y5
Green Firm × t = 1	0.012*	0.023*	0.030**	0.003	0.032	0.064	−1.111	−2.238	−0.345
	(0.005)	(0.011)	(0.011)	(0.023)	(0.029)	(0.041)	(0.836)	(1.422)	(0.573)
Green Firm × t = 2	0.011*	0.023*	0.030**	−0.008	0.042	0.077+	−0.622	−1.803	0.637
	(0.005)	(0.011)	(0.011)	(0.023)	(0.030)	(0.045)	(0.772)	(1.634)	(0.914)
Green Firm × t = 3	0.009+	0.032**	0.033*	−0.001	0.076*	0.110*	0.017	−1.139	0.900
	(0.005)	(0.012)	(0.013)	(0.026)	(0.032)	(0.044)	(0.432)	(1.292)	(0.834)
Green Firm × t = 4	0.005	0.011	0.031*	−0.007	0.057+	0.083*	0.159	−1.436	0.511
	(0.005)	(0.012)	(0.012)	(0.027)	(0.031)	(0.041)	(0.411)	(1.169)	(0.785)
Num.Obs.	1839	1142	740	1872	1205	839	1599	798	472
R2	0.933	0.864	0.880	0.997	0.998	0.993	0.985	0.954	0.995
R2 Within	0.189	0.180	0.192	0.173	0.237	0.134	0.068	0.121	0.160

This table reports the dynamic impact regression estimation results. The dependent variables are the scaled EPS, log-transformed Sales, and Gross Margin Estimates. The interaction terms are the four months studied after the announcement. Green Firm takes a value of 1 if the company is in the top quartile of the Environmental Pillar Score. The specifications include control variables for Book-to-Market, Market Cap, and Long-Term Tebt-to-Invested Capital. Firm- and time-fixed effects are included. ***, **, * and + denote significance at the 0.1%, 1%, 5%, and 10% levels respectively. Robust standard errors are in parentheses.

6.2 Recommendations

Building on our initial hypothesis of rising earnings, we further hypothesize a resultant shift in analysts' recommendations towards "Buy" for green firms' stocks. However, our findings do not support this hypothesis as we did not observe the significance DiD estimator (see table 6.1). While we identified an increase in long-term future earnings—a critical determinant for buy recommendations—it's essential to note that these recommendations also consider other factors, including the cost of capital and fluctuations in stock prices. The cost of capital is not within the scope of this study; however, it is pertinent to consider the recommendations in light of M. Bauer et al. (2023)'s findings of the IRA's impact on green firms' stock returns.

Table 6.2: The impact of the Inflation Reduction Act on recommendations

	1	2
Green Firm x Post IRA	0.023	0.031
	(0.023)	(0.023)
Book to Market Ratio		0.025
		(0.054)
TD to Invested Capital		0.114
		(0.121)
Market Cap		−0.245***
		(0.056)
Num.Obs.	2408	2275
R2	0.942	0.946
R2 Within	0.002	0.085

This table reports the results from a difference in difference regression of recommendations of firms from analysts on scale 1 (strong buy) to 5 (strong sell). The main dependent variable is the consensus recommendations from analytics. (1) is the simple model, while (2) is the regression model with control variables. The time frame is 4 months before and after the announcement of the IRA July 27$^{\text{th}}$, 2022. ***, **, * and + denote significance at the 0.1%, 1%, 5%, and 10% levels respectively. Robust standard errors are in parentheses.

M. Bauer et al. (2023) observed rapid and positively abnormal stock returns following the passage of the IRA, indicating that the expected increase in future earnings was quickly incorporated into the stock valuation. Consequently, analysts might conclude that the stock has reached its true value by the time the recommendation was issued, thereby not leading to any changes favouring a buy recommendation. This could be particularly relevant, considering our analysis is based on monthly data and excludes the month following the IRA passage, as detailed in the data section.

7 Policy Implications

In the following, our findings are examined within a broader economic context, highlighting three essential implications.

7.1 Social Welfare

As delineated our study posits that the IRA exerts a notable influence on green firm's future long-term earnings. A crucial premise for achieving a green transition is that climate policy aimed at stimulating such a transformation effectively impacts and materializes in firms' profitability. Nonetheless, this advancement entails substantial fiscal outlays by the government, manifesting through extensive tax credits and subsidies aimed at both producers and consumers. Bistline et al. (2023) suggest that the initial estimates of the fiscal costs may be understated in several areas and that the total budgetary effects of IRA's climate provisions are $900 to $1,200 billion cumulatively through 2031. However, even at the higher end of fiscal costs, IRA tax credits reduce CO2 emissions at an average abatement cost of $36-87 per metric ton for the power sector—considerably less than recent estimates of the social cost of carbon dioxide emissions, even before accounting for avoided air pollution damages and other co-benefits (Rennert et al., 2022). In this context, the green transition, facilitated by the Inflation Reduction Act (IRA), may contribute to enhanced social welfare, both for the American society and the global community at large.

7.2 Stranded Assets

Our study indicates that green firms within the IRA-targeted industries are likely to benefit from the IRA relatively to the brown firms, which aligns with M. Bauer et al. (2023) and Bistline et al. (2023)'s findings. However, this benefit is not detrimental to other firms and sectors. The major realization of transition risk associated with the IRA could lead to the creation of stranded assets if investor expectations abruptly adjust to new climate policies. This scenario, involving adverse revaluations of carbon-dependent assets, may have serious consequences for financial solvency and stability, mirroring what former Bank of England governor Mark Carney described as a "climate Minsky moment" (Carney, 2016). Although we observed an increase in long-term earnings for green firms relative

to brown firms, the magnitude of this effect was relatively constrained. Concurrently, M. Bauer et al. (2023)'s research analyzed both green and brown firms and found no significant repricing events resembling a "climate Minsky moment." Thus, despite the IRA's significance in U.S. climate policy, neither our study nor Bauer's recorded any overwhelming or destabilizing shifts in future earnings or equity prices between green and brown firms at the firm level.

However, this conclusion comes with caveats. Financial analysts and investors may have under reacted or may anticipate a future policy reversal. Yet, considering the IRA's enactment's broad scope and timing, it is difficult to find a more definitive set of circumstances for assessing climate transition risk.

7.3 IRA Outside the U.S.

While the IRA facilitates a green transition in the U.S., it has sparked concerns globally, particularly in Europe, as it appears to favour American firms and potentially disadvantage European companies (Vejgaard, 2023). Our study, supported by recent literature, indicates that the IRA boosts long-term earnings for U.S. green firms compared to brown firms. This disparity is a key factor underlying Europe's growing concern about the IRA's impact on the global green technology race. Additionally, the IRA's protectionist stance, evident in its subsidies favouring domestic producers, could disrupt Europe's green tech supply chain and prompt European firms to relocate to the U.S. (European Parliament, 2023).

Kleimann et al. (2023) suggests a more optimistic view, arguing that while the IRA may pose initial challenges to Europe's competitiveness, it will ultimately aid the global climate transition. They argue that the IRA's influence on supply chain reorganization could boost the EU's competitiveness and lead to long-term benefits through reduced costs in clean technology. Werner Hoyer, President of the European Investment Bank, recognizes the IRA's benefits in supporting green sectors and fostering a sustainable alliance between the U.S. and Europe (Hoyer, 2023). He advocates for Europe to embrace U.S. advancements in renewable energy and suggests that strategic investments and open dialogue with the U.S. could mitigate the IRA's downsides. Additionally, Hoyer points out that the IRA's emphasis on low-carbon infrastructure offers new business opportunities for European firms, particularly in strong sectors like wind energy.

8 Conclusion

Our study complements evidence from recent climate finance studies on how climate policy impacts firm financials and valuation. We find that analysts anticipate a long-term increase in earnings for green firms relative to brown firms after the passage of the IRA. Delving into the underlying economic mechanisms, we identify a sustained increase in sales as the primary contributor to this earnings growth. The increase in long-term sales for green firms indicates that green firms benefit primarily through IRA's demand channel. These results align with transition risk theory, illustrating that green firms are better positioned to leverage the advantages of incentive-based climate policy. In our additional analysis, we identified a delayed response in analysts' sales forecasts compared to an immediate adjustment in EY, after the IRA passage. Additionally, our findings indicate no notable changes in analysts' recommendations for green firms consequent to the IRA.

To sum up, our main findings indicate that when firms are exposed to major realization of climate risk like IRA, green firms - with lower transition risk than brown firms - are expected to generate higher long-term earnings.

We acknowledge that the application of causal analysis techniques relies on a set of assumptions. Yet, as substantiated by the tests and evidence outlined in section 4.3, we contend that our results maintain internal validity for most of the regression, except for EY in Year 3 and Sales in Year 4, possibly violating parallel trends. Furthermore, time-series data often result in autocorrelation and heteroskedasticity within error terms. Although robust standard errors are employed to address this issue, a careful and critical approach is advised when evaluating the significance of various variables.

A limitation of our study is that analyst forecasts are speculative and cannot definitively predict future cash flows. However, it is widely used in literature, and we regard it as a good proxy indicating future cash flows. Another limitation is that our pre-treatment window is short due to the outbreak of the Ukraine-Russia war's impact on energy and financial markets shortly before the IRA passage. This limits our ability to test for different pre-treatment lengths as robustness checks. Considering our limitations and outcomes, further research could prove valuable by assessing actual future responses across different time horizons as they materialize and contrasting these with initial projections.

Moreover, the unexpected lack of significant shifts in gross margin presents an intriguing area for deeper analysis. Investigating the cost channel through alternative methodologies and proxies could offer valuable insights.

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Appendices

A Appendix

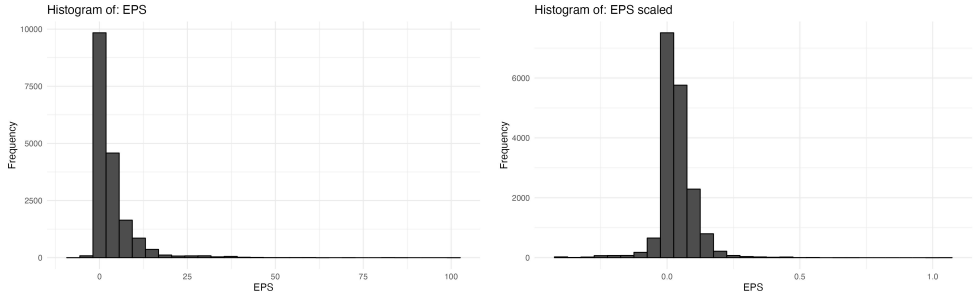
A.1 Sample Industries

Table A.1: Industries included and excluded from sample

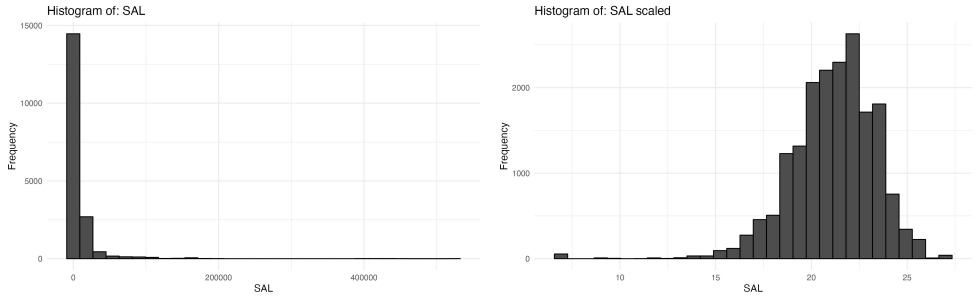
	GICS Industry Group	GICS Industry	Sample
1	Automobiles & Components	Automobile Components	TRUE
2	Automobiles & Components	Automobiles	TRUE
3	Capital Goods	Aerospace & Defense	TRUE
4	Capital Goods	Building Products	TRUE
5	Capital Goods	Construction & Engineering	TRUE
6	Capital Goods	Electrical Equipment	TRUE
7	Capital Goods	Industrial Conglomerates	TRUE
8	Capital Goods	Machinery	TRUE
9	Capital Goods	Trading Companies & Distributors	TRUE
10	Materials	Chemicals	TRUE
11	Materials	Construction Materials	TRUE
12	Materials	Containers & Packaging	TRUE
13	Materials	Metals & Mining	TRUE
14	Materials	Paper & Forest Products	TRUE
15	Semiconductors & Semiconductor Equipment	Semiconductors & Semiconductor Equipment	TRUE
16	Technology Hardware & Equipment	Communications Equipment	TRUE
17	Technology Hardware & Equipment	Electronic Equipment, Instruments & Components	TRUE
18	Technology Hardware & Equipment	Technology Hardware, Storage & Peripherals	TRUE
19	Transportation	Air Freight & Logistics	TRUE
20	Transportation	Ground Transportation	TRUE
21	Transportation	Marine Transportation	TRUE
22	Transportation	Passenger Airlines	TRUE
23	Utilities	Electric Utilities	TRUE
24	Utilities	Gas Utilities	TRUE
25	Utilities	Independent Power and Renewable Electricity Producers	TRUE
26	Utilities	Multi-Utilities	TRUE
27	Utilities	Water Utilities	TRUE
28			FALSE
29	Banks	Banks	FALSE
30	Commercial & Professional Services	Commercial Services & Supplies	FALSE
31	Commercial & Professional Services	Professional Services	FALSE
32	Consumer Discretionary Distribution & Retail	Broadline Retail	FALSE
33	Consumer Discretionary Distribution & Retail	Distributors	FALSE
34	Consumer Discretionary Distribution & Retail	Specialty Retail	FALSE
35	Consumer Durables & Apparel	Household Durables	FALSE
36	Consumer Durables & Apparel	Leisure Products	FALSE
37	Consumer Durables & Apparel	Textiles, Apparel & Luxury Goods	FALSE
38	Consumer Services	Diversified Consumer Services	FALSE
39	Consumer Services	Hotels, Restaurants & Leisure	FALSE
40	Consumer Staples Distribution & Retail	Consumer Staples Distribution & Retail	FALSE
41	Energy	Energy Equipment & Services	FALSE
42	Energy	Oil, Gas & Consumable Fuels	FALSE
43	Equity Real Estate Investment Trusts (REITs)	Diversified REITs	FALSE
44	Equity Real Estate Investment Trusts (REITs)	Health Care REITs	FALSE
45	Equity Real Estate Investment Trusts (REITs)	Hotel & Resort REITs	FALSE
46	Equity Real Estate Investment Trusts (REITs)	Industrial REITs	FALSE
47	Equity Real Estate Investment Trusts (REITs)	Office REITs	FALSE
48	Equity Real Estate Investment Trusts (REITs)	Residential REITs	FALSE
49	Equity Real Estate Investment Trusts (REITs)	Retail REITs	FALSE
50	Equity Real Estate Investment Trusts (REITs)	Specialized REITs	FALSE
51	Financial Services	Capital Markets	FALSE
52	Financial Services	Consumer Finance	FALSE
53	Financial Services	Financial Services	FALSE
54	Financial Services	Mortgage Real Estate Investment Trusts (REITs)	FALSE
55	Food, Beverage & Tobacco	Beverages	FALSE
56	Food, Beverage & Tobacco	Food Products	FALSE
57	Food, Beverage & Tobacco	Tobacco	FALSE
58	Health Care Equipment & Services	Health Care Equipment & Supplies	FALSE
59	Health Care Equipment & Services	Health Care Providers & Services	FALSE
60	Health Care Equipment & Services	Health Care Technology	FALSE
61	Household & Personal Products	Household Products	FALSE
62	Household & Personal Products	Personal Care Products	FALSE
63	Insurance	Insurance	FALSE
64	Media & Entertainment	Entertainment	FALSE
65	Media & Entertainment	Interactive Media & Services	FALSE
66	Media & Entertainment	Media	FALSE
67	Pharmaceuticals, Biotechnology & Life Sciences	Biotechnology	FALSE
68	Pharmaceuticals, Biotechnology & Life Sciences	Life Sciences Tools & Services	FALSE
69	Pharmaceuticals, Biotechnology & Life Sciences	Pharmaceuticals	FALSE
70	Real Estate Management & Development	Real Estate Management & Development	FALSE
71	Software & Services	IT Services	FALSE
72	Software & Services	Software	FALSE
73	Telecommunication Services	Diversified Telecommunication Services	FALSE
74	Telecommunication Services	Wireless Telecommunication Services	FALSE

This table presents the GICS Industry Groups and their corresponding GICS Industries, outlining which are included in the sample. It encompasses a total of 7 GICS Industry Groups and 27 subordinate GICS Industries.

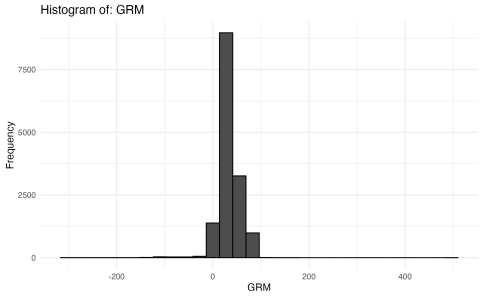
A.2 Dependent variable distribution



(a)



(b)



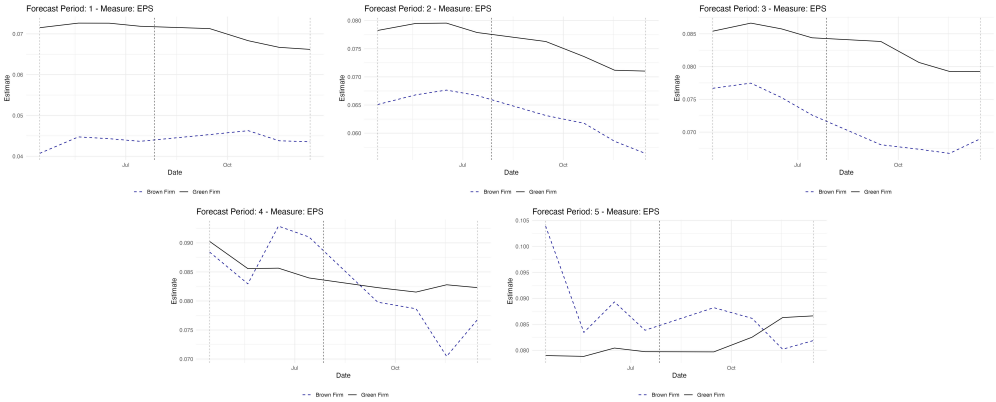
(c)

Figure A.1: Distribution of Dependent Variables

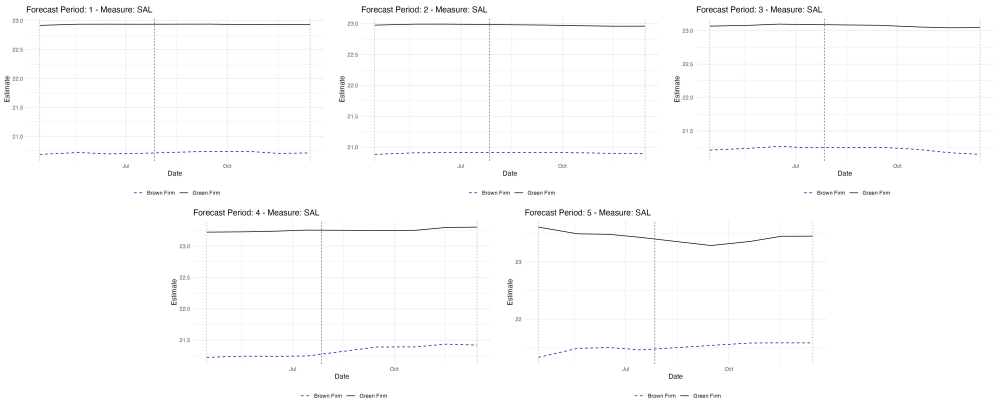
(a)The figure on the left displays the distribution of EPS estimates, while the figure on the right illustrates the Earnings Yield. (b) The figure on the left displays the distribution of SAL estimates, while the figure on the right illustrates the log-transformed SAL estimates. (c) The figure on the left displays the distribution of GRM estimates.

A.3 Identifying Assumptions

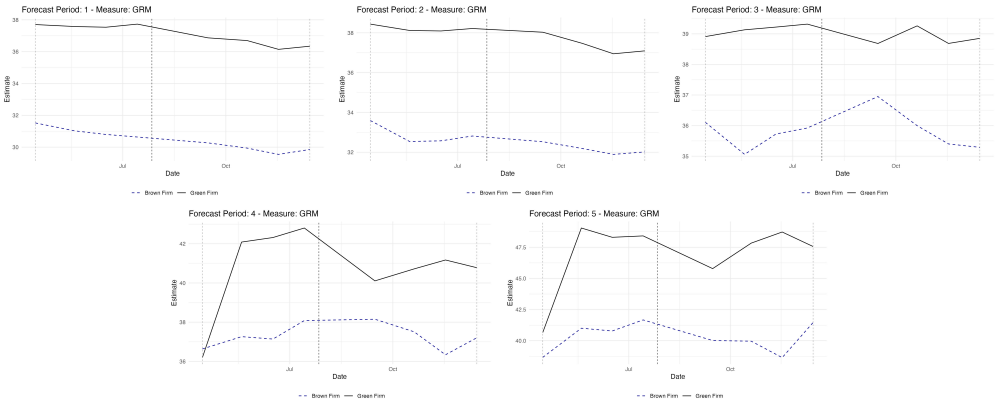
A.3.1 Parallel Trend Plots



(a) Parallel Trends - Earnings (All Periods)



(b) Parallel Trends - Sales (All Periods)



(c) Parallel Trends - Gross Margin (All Periods)

The figures display the parallel trend estimates for EPS. We see that the trends are generally parallel for the

Figure A.2: Comprehensive Parallel Trends Analysis

A.3.2 Parallel Trend Tables

Table A.2: Parallel Trend Test - EPS

	1 Year	2 Years	3 Years	4 Years	5 Years
Green Firm x t = -3	−0.003	0.000	0.001	0.000	0.042
	(0.003)	(0.002)	(0.003)	(0.007)	(0.031)
Green Firm x t = -2	−0.003	0.000	0.003	0.001	0.049
	(0.003)	(0.003)	(0.003)	(0.007)	(0.031)
Green Firm x t = -1	−0.001	0.001	0.008+	0.006	0.059+
	(0.003)	(0.003)	(0.004)	(0.008)	(0.032)
Green Firm x t = 1	−0.002	0.004	0.015*	0.024+	0.073*
	(0.005)	(0.003)	(0.006)	(0.013)	(0.033)
Green Firm x t = 2	−0.006	0.002	0.014*	0.024+	0.073*
	(0.005)	(0.003)	(0.006)	(0.013)	(0.031)
Green Firm x t = 3	−0.008	0.003	0.012*	0.034*	0.077*
	(0.006)	(0.004)	(0.006)	(0.013)	(0.035)
Green Firm x t = 4	−0.010	0.002	0.008	0.012	0.075*
	(0.006)	(0.004)	(0.006)	(0.013)	(0.034)
Num.Obs.	2282	2246	1839	1142	740
R2	0.962	0.965	0.933	0.864	0.890
R2 Within	0.098	0.198	0.191	0.180	0.257

Table A.3: Parallel Trend Test - SAL

	1 Year	2 Years	3 Years	4 Years	5 Years
Green Firm x t = -3	0.020	0.013+	0.013	0.025	0.108
	(0.013)	(0.008)	(0.012)	(0.016)	(0.069)
Green Firm x t = -2	0.019	0.016	0.019	0.049+	0.102
	(0.017)	(0.010)	(0.015)	(0.026)	(0.065)
Green Firm x t = -1	0.024	0.018	0.039+	0.069*	0.130+
	(0.017)	(0.011)	(0.022)	(0.034)	(0.074)
Green Firm x t = 1	0.040	0.005	0.021	0.069	0.156+
	(0.027)	(0.017)	(0.032)	(0.043)	(0.085)
Green Firm x t = 2	0.028	−0.012	0.010	0.078+	0.169+
	(0.027)	(0.017)	(0.031)	(0.044)	(0.087)
Green Firm x t = 3	0.047	0.003	0.017	0.111**	0.202*
	(0.039)	(0.019)	(0.032)	(0.043)	(0.084)
Green Firm x t = 4	0.036	−0.003	0.010	0.092*	0.175*
	(0.035)	(0.020)	(0.031)	(0.040)	(0.080)
Num.Obs.	2288	2257	1872	1205	839
R2	0.996	0.998	0.997	0.998	0.993
R2 Within	0.040	0.124	0.176	0.245	0.144

This table displays the results of Parallel Trend Test, where Sales is the dependent variable. ***, **, * and + denote significance at the 0.1%, 1%, 5%, and 10% levels respectively. Robust standard errors are in parantheses.

Table A.4: Parallel Trend Test - GRM

	1 Year	2 Years	3 Years	4 Years	5 Years
Green Firm x t = -3	−0.330	0.406	0.337	1.985	−0.599
	(0.634)	(0.771)	(0.439)	(1.594)	(0.837)
Green Firm x t = -2	−0.366	0.367	0.314	2.015	−0.746
	(0.683)	(0.785)	(0.475)	(1.612)	(0.905)
Green Firm x t = -1	1.193	0.941	0.352	1.047	−0.306
	(1.176)	(0.932)	(0.613)	(2.410)	(0.924)
Green Firm x t = 1	0.767	1.023	−0.854	−0.931	−0.802
	(1.427)	(0.960)	(0.913)	(2.420)	(1.142)
Green Firm x t = 2	1.405	0.759	−0.366	−0.490	0.180
	(1.682)	(0.927)	(0.922)	(2.682)	(1.161)
Green Firm x t = 3	1.098	0.516	0.272	0.177	0.438
	(1.780)	(0.825)	(0.565)	(2.341)	(1.183)
Green Firm x t = 4	1.323	0.951	0.414	−0.115	0.048
	(1.824)	(0.891)	(0.549)	(2.172)	(1.108)
Num.Obs.	2054	2034	1599	798	472
R2	0.957	0.977	0.985	0.955	0.995
R2 Within	0.092	0.102	0.068	0.125	0.163

A.4 Placebo Event Date Tests

Table A.5: Placebo Event Test - EPS

	t = -4					t = -12				
	1Y	2Y	3Y	4Y	5Y	1Y	2Y	3Y	4Y	5Y
Green Firms × Post IRA	−0.004	−0.003	0.000	−0.002	0.025	−0.002	0.003	0.006	0.009	0.010
	(0.004)	(0.002)	(0.002)	(0.006)	(0.029)	(0.003)	(0.002)	(0.004)	(0.008)	(0.012)
Num.Obs.	2286	2256	1816	1084	618	2180	2165	1800	974	647
R2	0.921	0.956	0.926	0.845	0.845	0.939	0.953	0.914	0.904	0.947
R2 Within	0.066	0.095	0.027	0.018	0.084	0.039	0.076	0.040	0.026	0.025
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.6: Placebo Event Test - SAL

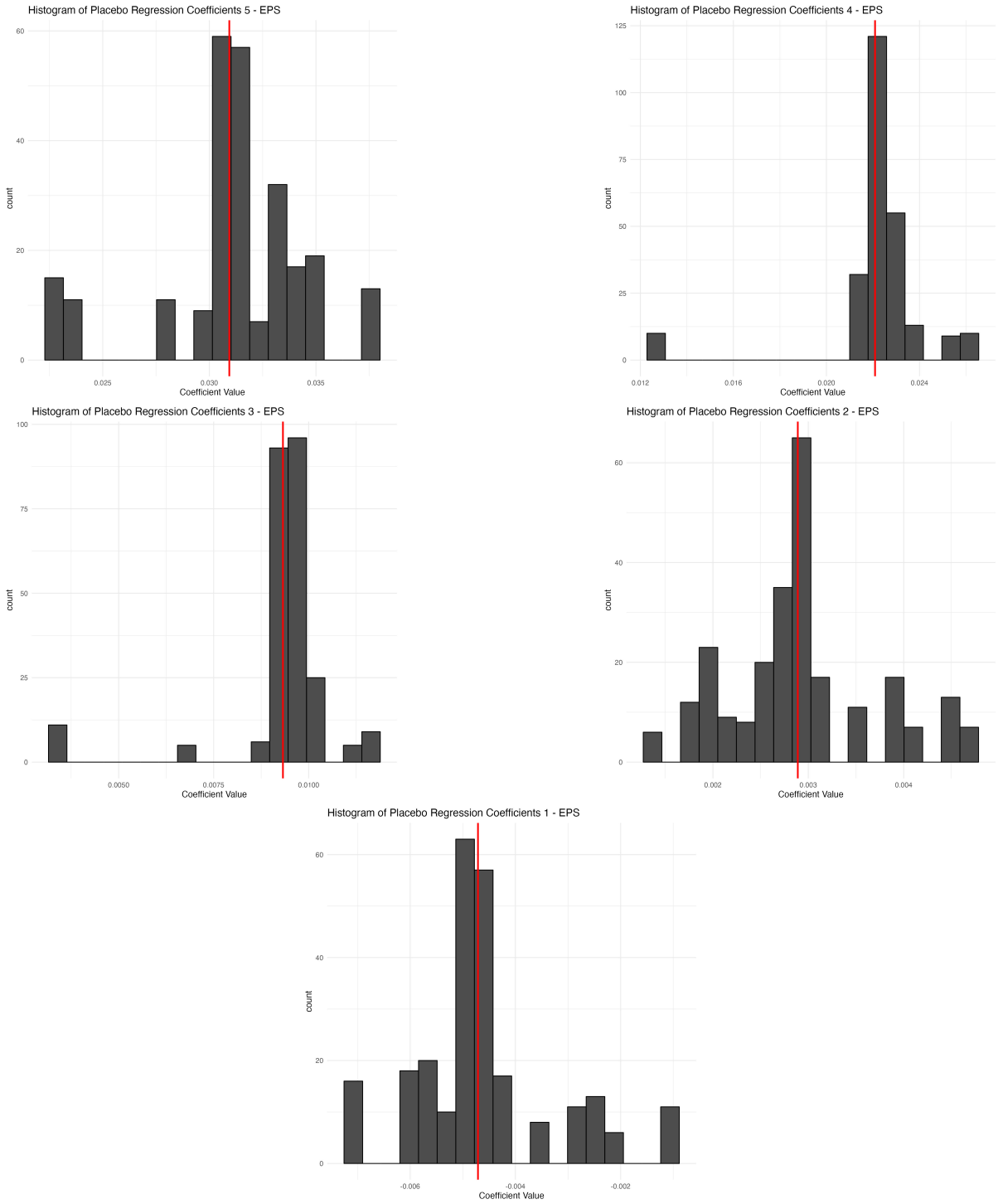
	t = -4					t = -12				
	1Y	2Y	3Y	4Y	5Y	1Y	2Y	3Y	4Y	5Y
Green Firms × Post IRA	−0.085**	−0.054**	−0.044**	−0.036	−0.037	−0.028	−0.013	−0.004	−0.030	0.014
	(0.031)	(0.017)	(0.017)	(0.023)	(0.074)	(0.020)	(0.010)	(0.012)	(0.044)	(0.035)
Num.Obs.	2289	2260	1864	1176	735	2192	2171	1816	1111	752
R2	0.986	0.996	0.997	0.997	0.984	0.992	0.996	0.998	0.995	0.998
R2 Within	0.026	0.048	0.047	0.022	0.012	0.002	0.006	0.001	0.006	0.009
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table A.7: Placebo Event Test - GRM

	t = -4					t = -12				
	1Y	2Y	3Y	4Y	5Y	1Y	2Y	3Y	4Y	5Y
Green Firms × Post IRA	−0.771	−0.732	−0.618	−0.145	−1.615	0.592	0.426	0.118	0.606	−0.055
	(0.678)	(0.687)	(0.466)	(1.537)	(1.010)	(0.518)	(0.431)	(0.453)	(0.485)	(0.431)
Num.Obs.	2054	2034	1575	756	399	1974	1959	1539	623	324
R2	0.965	0.970	0.989	0.942	0.991	0.954	0.974	0.974	0.985	0.991
R2 Within	0.023	0.025	0.016	0.027	0.037	0.015	0.009	0.014	0.039	0.056
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

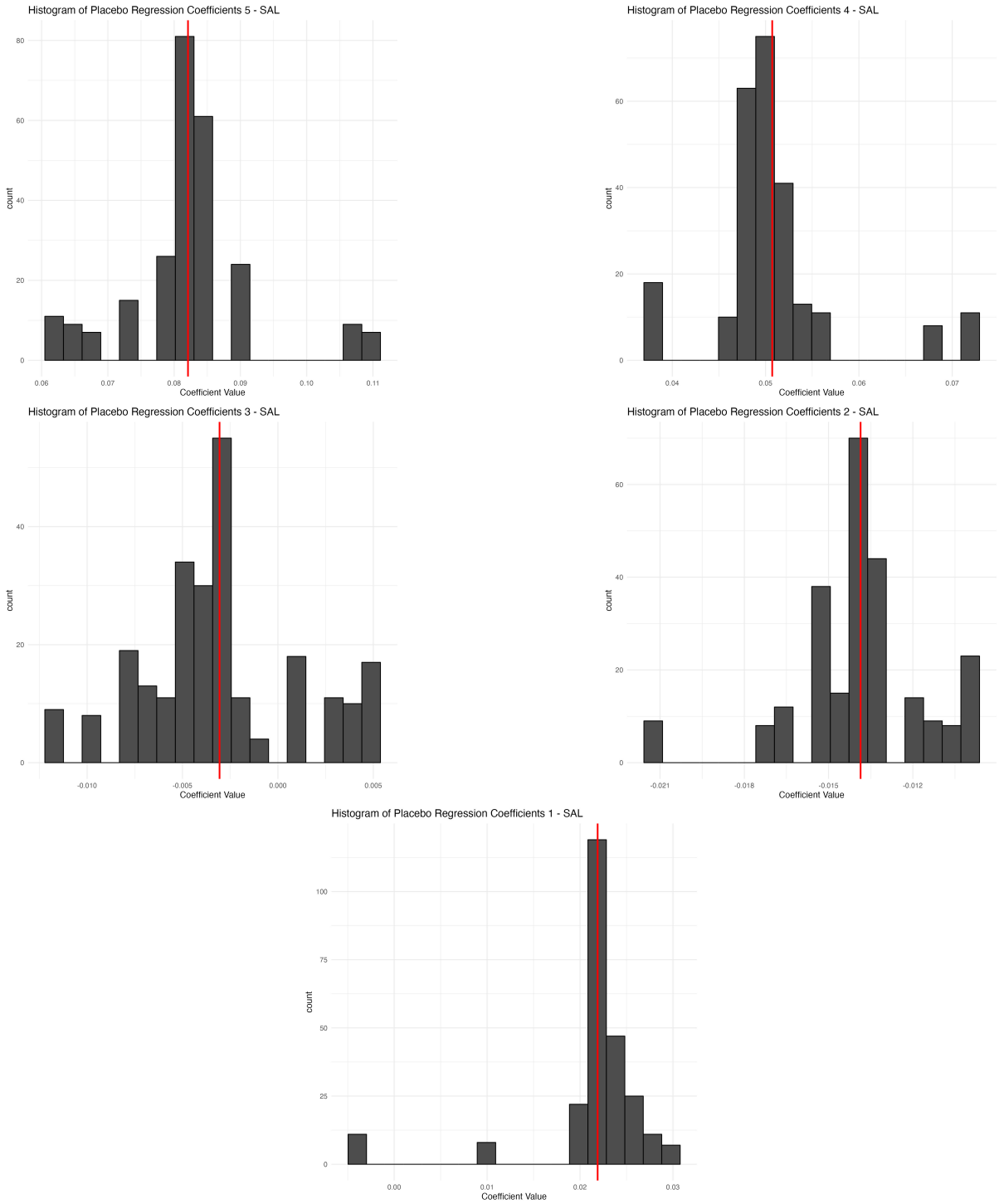
These tables reports results from the falsification tests. We consider two placebo event date, 4 and 12 months prior to the actual event. The dependent variables are EPS, Sales and GRM, for the periods Year = {1, 2, 3, 4, 5}. The sample is green and brown firms in treated industries A.1 for t = {-4, -3, -2, -1, 0, 1, 2, 3}. ***, **, * and + denote significance at the 0.1%, 1%, 5%, and 10% levels respectively. Robust standard errors are in parentheses.

A.5 Model Robustness



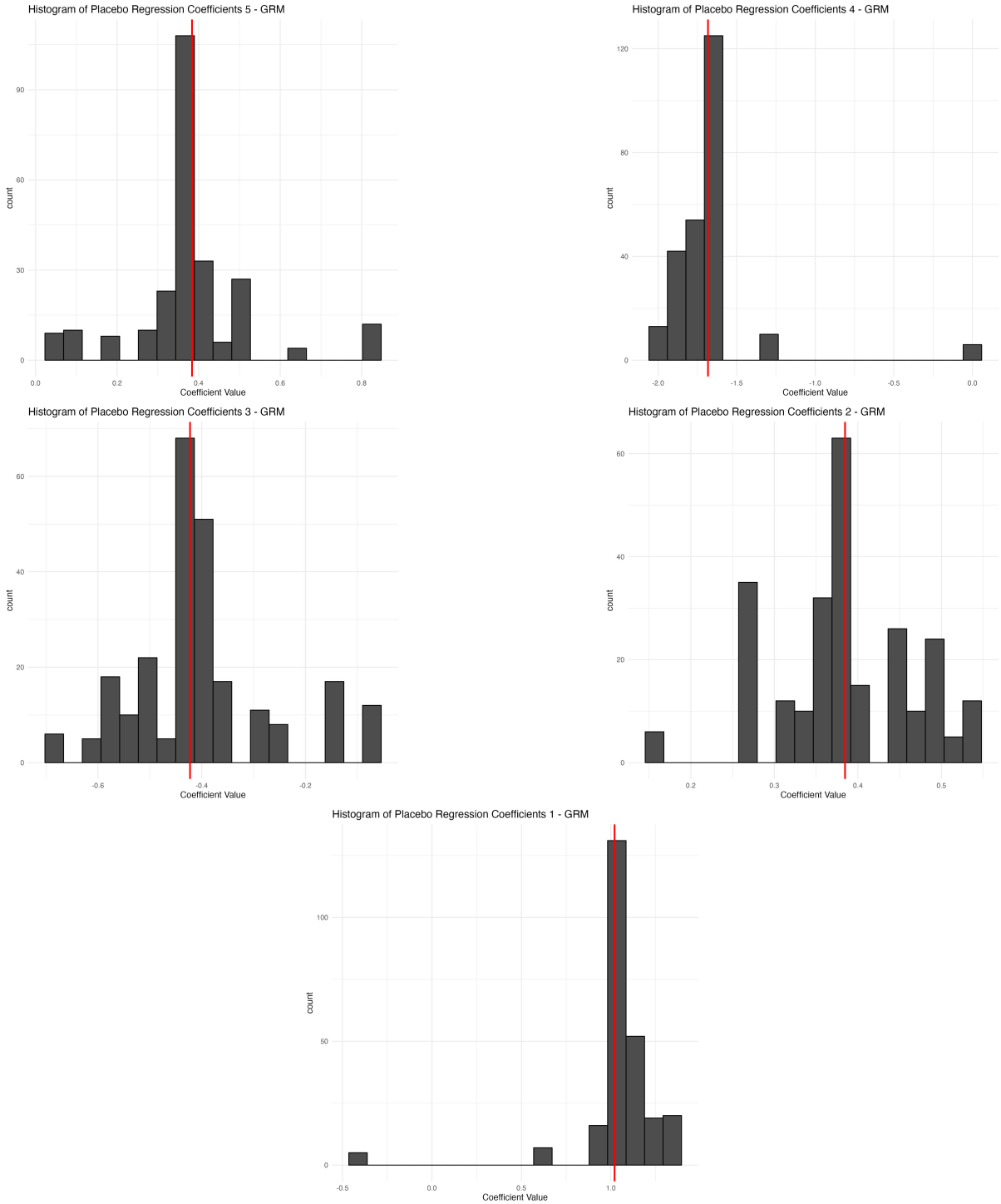
The figures display the distribution of interaction coefficients from simulating the difference in difference regression 250 times, removing one of 27 GICS Industries per iteration for periods t = {1, 2, 3, 4, 5} for measure EPS.

Figure A.3: Robustness - Removing industries, Earnings



The figures display the distribution of interaction coefficients from simulating the difference in difference regression 250 times, removing one of 27 GICS Industries per iteration for periods t = {1, 2, 3, 4, 5} for measure Sales.

Figure A.4: Robustness - Removing industries, Sales



The figures display the distribution of interaction coefficients from simulating the difference in difference regression 250 times, removing one of 27 GICS Industries per iteration for periods t = {1, 2, 3, 4, 5} for measure Gross Margin.

Figure A.5: Robustness - Removing industries, Gross Margin

A.6 Industry Sample count

Table A.8: Industries: Count

	GICS Industry.Group.Name	GICS Industry.Name	Treatment	Count
1	Utilities	Electric Utilities	Green	16
2	Utilities	Gas Utilities	Brown	3
3	Utilities	Gas Utilities	Green	1
4	Utilities	Independent Power and Renewable Electricity Producers	Brown	1
5	Utilities	Independent Power and Renewable Electricity Producers	Green	2
6	Utilities	Multi-Utilities	Green	4
7	Utilities	Water Utilities	Brown	2
8	Utilities	Water Utilities	Green	3
9	Transportation	Air Freight & Logistics	Brown	1
10	Transportation	Air Freight & Logistics	Green	3
11	Transportation	Ground Transportation	Brown	9
12	Transportation	Ground Transportation	Green	4
13	Transportation	Passenger Airlines	Brown	6
14	Transportation	Passenger Airlines	Green	1
15	Technology Hardware & Equipment	Communications Equipment	Brown	7
16	Technology Hardware & Equipment	Communications Equipment	Green	6
17	Technology Hardware & Equipment	Electronic Equipment, Instruments & Components	Brown	12
18	Technology Hardware & Equipment	Electronic Equipment, Instruments & Components	Green	9
19	Technology Hardware & Equipment	Technology Hardware, Storage & Peripherals	Brown	4
20	Technology Hardware & Equipment	Technology Hardware, Storage & Peripherals	Green	2
21	Semiconductors & Semiconductor Equipment	Semiconductors & Semiconductor Equipment	Brown	12
22	Semiconductors & Semiconductor Equipment	Semiconductors & Semiconductor Equipment	Green	15
23	Materials	Chemicals	Brown	8
24	Materials	Chemicals	Green	18
25	Materials	Construction Materials	Brown	2
26	Materials	Construction Materials	Green	1
27	Materials	Containers & Packaging	Brown	1
28	Materials	Containers & Packaging	Green	11
29	Materials	Metals & Mining	Brown	5
30	Materials	Metals & Mining	Green	14
31	Materials	Paper & Forest Products	Green	2
32	Capital Goods	Aerospace & Defense	Brown	7
33	Capital Goods	Aerospace & Defense	Green	6
34	Capital Goods	Building Products	Brown	3
35	Capital Goods	Building Products	Green	7
36	Capital Goods	Construction & Engineering	Brown	8
37	Capital Goods	Construction & Engineering	Green	5
38	Capital Goods	Electrical Equipment	Brown	14
39	Capital Goods	Electrical Equipment	Green	7
40	Capital Goods	Industrial Conglomerates	Brown	1
41	Capital Goods	Industrial Conglomerates	Green	3
42	Capital Goods	Machinery	Brown	17
43	Capital Goods	Machinery	Green	19
44	Capital Goods	Trading Companies & Distributors	Brown	13
45	Capital Goods	Trading Companies & Distributors	Green	5
46	Automobiles & Components	Automobile Components	Brown	4
47	Automobiles & Components	Automobile Components	Green	4
48	Automobiles & Components	Automobiles	Brown	4
49	Automobiles & Components	Automobiles	Green	3

This table displays how the firms in the sample are distributed across Industry Group, Industry and Treatment.