Impact of the Inflation Reduction Act on the United States stock market, the clean energy sector and the automotive industry

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Abstract

The present article evaluates the impact of the Inflation Reduction Act's (IRA) approval on the United States stock market, specifically on the renewable energy sector and in the automotive industry. The article applies the event study methodology by estimating a Mean-adjusted return model and a Market return model with dummy variables for the key events. The model is estimated around four key events related to the bill's presentation and approval. The article concludes that the stock market as a whole did not experience abnormal returns in the event windows related to the bill's approval. However, the renewable energy segment experienced an abnormal return of 1.93% around one of the key events that led to the approval of the bill. In the case of the automotive industry, it did not experience abnormal returns around the key events despite the IRA's considerable incentives for electric vehicle production.

1 Introduction

On September 27 of 2021, the US administration presented the Build Back Better Act, a bill containing a broad set of subsidies for the green energy sector, the automotive industry and the manufacturing sector in the United States. Almost one year later and after a long negotiation process, the bill was substantially transformed and was finally approved with the name of Inflation Reduction Act (IRA). The bill approved includes massive stimulus to accelerate investments in renewable energy and the production of electric vehicles in the United States.

According to the Penn-Wharton Budget Model (Huntley Ricco & Arnon 2022), the bill contains a total provision of \$384.9 billion for climate change and renewable energy, from which 63.7% is dedicated to renewable energies and 5.9% is dedicated to stimulating the electric vehicles adoption and production in the United States, 12.1% goes to the manufacturing industry, 11.8% goes to enviromenal policies, 5.3% to agriculture and 1.2% to water investments (Badlam et al. 2022). The bill is not only relevant for its financial volume but also for the magnitude of its impact on the United States CO_2 emissions. It is estimated that the IRA's impact on the United States emissions will be significant, as it will "cut annual emissions in 2030 by an additional 1 billion metric tons" (Jenkins, J.D. et al. 2022).

The present study uses the standard event study methodology to evaluate the impact of the bill's approval on the United States stock market. In particular, it analyses the impact on the renewable

energy sector and the automotive industry group. For that, I use two benchmark indexes: the Wilder Hill Clean Energy Index (ECO) and the S&P 500 Automobiles Industry Index.

The event study methodology is applied by estimating a Mean-adjusted return model and a Market return model with dummy variables for the key events. The model is estimated using 3 day window (1 day before, 1 days after, and the day of the event) around four key events: the presentation of the bill to Congress, the announcement of Senator's Manchin opposition to the bill, the agreement with Senator Manchin which was key to the approval, and the vote of the bill by the Senate. Normally, the use of event study methodologies to evaluate the impact of legislation approval has particular challenges, as the result of legislative approvals or rejections is known in advance given the number of representatives from each party. For this study, I take advantage of several particularities of the IRA approval that allowed to apply successfully the event study methodology.

2 Literature Review: Event study methodology and its application to legislative processes

2.1 The event study methodology

The event study methodology is well-established in the field of financial economics. There is plenty of literature that discusses and replicates the methodology, beginning in the late sixties until today. In their seminal article Fama Fisher, Jensen, and Roll (1969) evaluated how stock prices incorporate the information of stock splits. By doing so, they settled the basis of what we know today as event studies. To evaluate the price reaction to stock split, they estimate the regression $log_e(R_{ij}) = \alpha_j + \beta_j log_e L_t + \epsilon_{jt}$, where R_{ij} is the stock's return, and L_t is the market's return.

It is important to highlight that, Fama Fisher, Jensen, and Roll do not include the period of the analyzed event in the estimation. They estimate the parameters without the event´s period and then, with the estimated parameters, they calculate the error ϵ_{jt} for the event's dates, the mean of the error is considered as the measure of the abnormal return. The authors evaluate the different estimation methods, they conclude that even when the data is not normally distributed, OLS provides estimators that are unbiased and consistent. They also highlight the problems of the T-statistic for hypothesis testing given the non-normality of residuals.

In Brown and Warner's article (1980), the authors extend Fama Fisher, Jensen, and Roll's methodology. By using the same principle, they evaluate three different regression models for stock prices and evaluate the accuracy of each one of them. According to them, the notion of abnormal return requires a benchmark value for comparisons, which leads them to evaluate three possible benchmarks. The first model called the Mean Adjusted Return Model establishes that the expected return of an asset i is given by a constant $E(\tilde{R}_{it}) = K_i$, where the abnormal return of asset i on period t corresponds simply to the difference between the observed return and the mean return¿ $\epsilon_{i,t} = R_{i,t} - K_i$.

The second model evaluated by Brown and Warner is the Market Return model in which the

expected return of an asset is equal to the market return $E(\tilde{R}_{i,t}) = E(\tilde{R}_{m,t})$. Finally the authors evaluate the Market and Risk Adjusted Return model in which the expected return of an asset is given by the CAPM model with $E(\tilde{R}_{it}) = E(\tilde{R}_{zt}) + \beta_i \left[E(\tilde{R}_{mt}) - E(\tilde{R}_{zt}) \right])$. Here the abnormal return is given by $R_{it} - R_{zt} - \beta_i \left[R_{mt}) - E(R_{zt}) \right])$.

The authors select randomly 250 securities and introduce artificial abnormal returns into the historical data using monthly returns, then they evaluate the capacity of the three models to identify the abnormal returns. Surprisingly they find that the models produce similar results and that "beyond a simple, one-factor market model, there is no evidence that more complicated methodologies convey any benefit. In fact, we have presented evidence that more complicated methodologies can actually make the researcher worse off" (Brown & Warner 1980).

Dyckman, Philbrick, and Stephan (1984) replicate Brown and Warner's simulation with daily data and include 2 additional return models: Scholes-Williams and Dimson models. The article concludes that the Market Return Model is slightly better than the Mean Adjusted Return and the Market Adjusted Return models in detecting abnormal returns. The Scholes-Williams and Dimson did not improve the capacity to detect abnormal returns, which reinforces the argument in favor of simple models. Finally, the authors conclude that the capacity to detect abnormal returns of models decreases considerably when the date is unknown and the portfolios are smaller. Dyckman, Philbrick, and Stephan also analyzed the potential problems of T-tests given the non-normality of residuals, they conclude that "nonnormality of individual-security daily-return residuals has little effect on the inferences drawn from the use of the t-test applied to portfolios" (Dyckman, Philbrick, and Stephan 1984).

In a second article, Brown and Warner evaluate again different return models using daily data and reinforce the evidence in favor of simpler return models. Additionally, the authors conclude that estimation methods different from OLS do not provide clear advantages for the return models. MacKinlay (1997) uses a market return model with the specification $R_{it} + \alpha_i + beta_i R_{mt} + \epsilon_{it}$ to evaluate the impact of news on the market return. The author highlights the limited gains of using multifactor models for event studies and concludes that a fundamental requirement for event studies to be successful is that the event date can be identified precisely, otherwise, the methodology loses much of its statistical power.

Blinder (1998) makes a review of the evolution of event studies methodology. Blinder underlines the increasing popularity at that time for an estimation method that includes the event period on the dataset while including at the same time a dummy variable for the analyzed events. This way, the return equation will be: $R_{i,t} = \alpha_i + \beta_i R_{mt} + \Sigma_{j=1}^{N} \gamma_j Dta + \epsilon_{it}$ where is the dummy variable equal to 1 for each event j and γ_j is the abnormal return parameter for event j. The existence or not of the abnormal return is evaluated by the significance of γ_j. One important warning of Blinder regarding this specification is that the hypothesis test will not be very powerful statistically speaking if the signs of the effects are different. In those cases, it is better to estimate different regressions for each event.

Khotari and Warner (2006) review the evolution of event studies through time. They conclude that the core methodology has not changed substantially since Fama, Fisher, Jensen, and Roll's (1969)

seminar article, however, new methodological consensus has appeared to improve estimations. For example, Khotari and Warner point out that events with long-horizon impacts have important limitations, while events with short-term impacts remain effective and statistically powerful.

2.2 Event study methodology applied to legislative processes

Ali and Kallapur (2001) apply the event study methodology to the bill approval process on the United States to determine the effects of the Private Securities Litigation Reform Act of 1995. They measured the price reactions of events that changed the likelihood of the approval of the law. The authors include a set of events that provided new information to markets regarding the law's approval, this included a presidential veto and its subsequent override by Congress.

Ali and Kallapur identify three particular challenges to applying the event study methodology for law approval processes: first, it is difficult to identify all the major events that affect the approval process. Second, It is necessary to identify the precise date in which that information is provided to the markets. Third, it is necessary to identify when the markets first anticipated the effects of such events. For the estimation they use the Market Return model with dummy variable for the dates of the events: $R_t = \alpha_0 + \Sigma_{j=1}^{N} \beta_j D_j + \epsilon_{it}$. The authors conclude there is evidence of negative market price reactions to events that increased the likelihood of the law's approval.

Rezaee and Pankaj (2005) apply the event study methodology to the The Sarbanes-Oxley Act approval process in 2002. Using a three-day cumulative abnormal return window the authors evaluate 12 Congressional events using the Mean Adjusted Return Model with dummy variables for the events: $R_t = \alpha_0 + \Sigma_{j=1}^{N} \beta_j D_j + \epsilon_{it}$. Rezaee and Pankaj found positive significant abnormal returns around the events that increased the probabilities of the law's approval.

In both cases, the authors underscore that to apply the event study methodology analyzed events must provide new information that was not previously available to the market. As I will explain later, the particular circumstances surrounding the IRA's approval generated a set of events that comply with this requirement.

3 Data: daily data between January 2 of 2018 and December 30, 2022

The data used for the stock indexes and the market return corresponds to the daily closing values for the period between January 2 of 2018 and December 30, 2022. As the the IRA's investments focus mainly on the clean energy sector and the automotive industry group, I will analyze those two sectors. Following Reboredo, Rivera-Castro, & Ugolini (2016) and Song, Ji,Du & Geng (2019) I will use the Wilder Hill Clean Energy Index (ECO) to measure the impact on the clean energy sector. Computed by the American Stock Exchange for a set of companies involved in activities related with the use of cleaner energies and conservation, the Wilder Hill Clean Energy Index (ECO)is a consolidated benchmark. The data was extracted from Google Finance (ECO. 2023) .

For the automotive industry I will use the S&P 500 Automobiles Industry index. The index time series was extracted from Yahoo Finance using Python's yfinance Package (SP500-251020, 2023).

For the market return data I used Fama and French market daily risk premium and daily risk free return (Fama & French 2024). Fama and French calculate the market return variable using as basis the data from the Center for Research in Security Prices (CRSP), specifically from the CRSP US Total Market Index, which represents 100% of US equity market. However, the market index on Fama-French library refers to the market risk premium $R_m - R_{riskfree}$, therefore, to obtain the market risk return I added back the risk free rate. The data of the risk free rate was also obtained from Fama and French library (Fama & French 2024). The detail of the construction of the Fama-French library can be found on (Fama & French 2023).

Graph 1 presents the historical behavior of the variables, while table 1 presents basic descriptive statistics of the data.

Graph 1: Daily returns between January 2, 2018 and December 30 2022, 1 149 observations
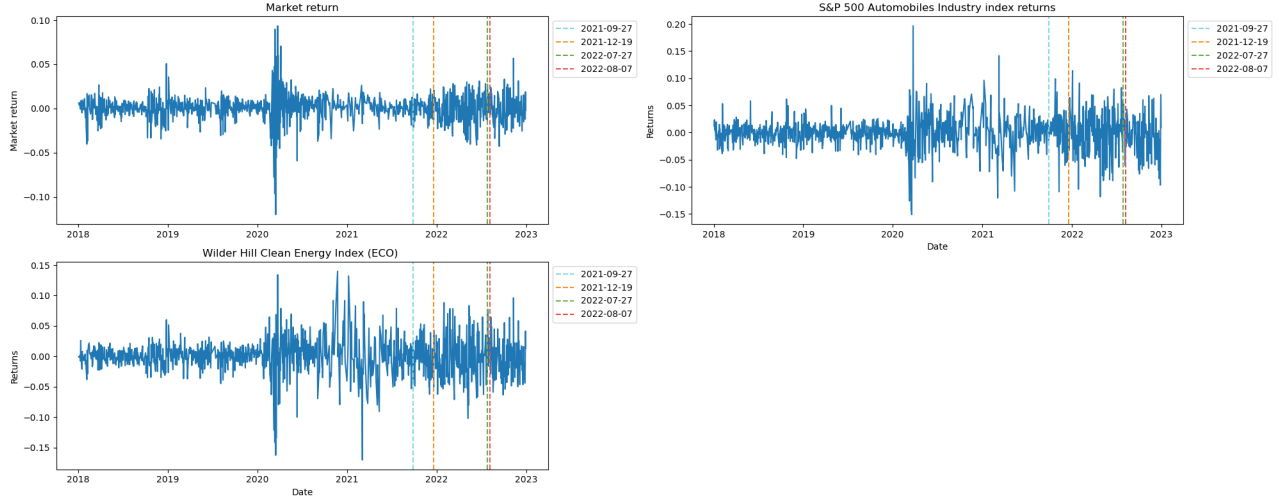
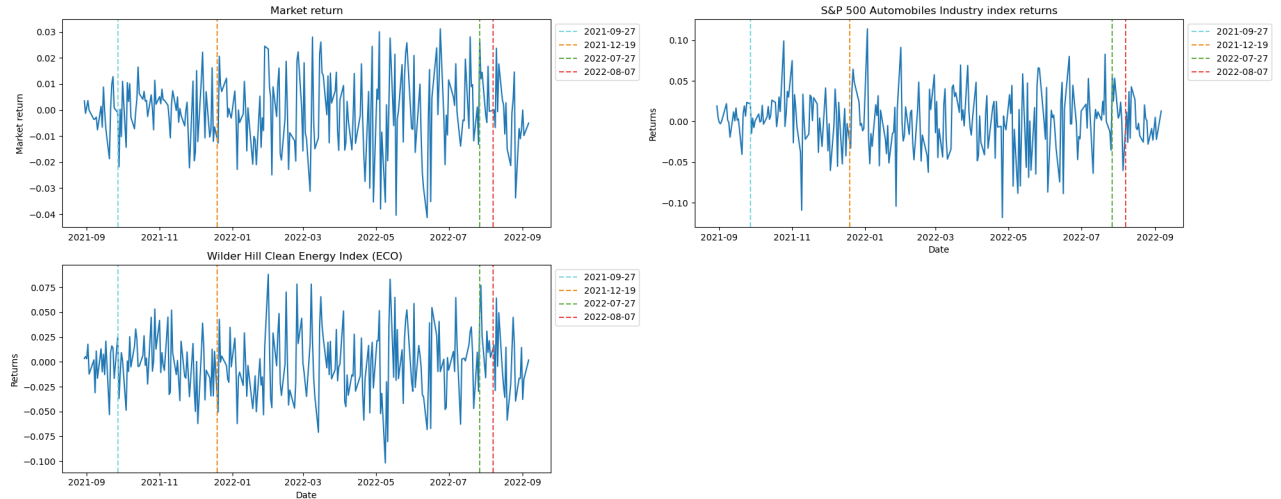Source: Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

Note: Market return was obtained from Fama-French data library (Fama & French 2024), which is built based on the Center for Research in Security Prices market index, which represents 100% of the US equity market.

Table 1: Descriptive statistics, 1 149 observations

	Mkt	Ret_^ECO	Ret_^SP500-251020
count	1149	1149	1149
mean	0.000	0.000	-0.001
min	-0.120	-0.170	-0.151
25%	-0.005	-0.013	-0.013
50%	0.001	0.001	0.001
75%	0.007	0.014	0.013
max	0.093	0.140	0.197
std	0.015	0.029	0.030
Kurtosis	4.594	4.790	10.344
Skewness	-0.121	-0.281	-0.545

Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

The visualization of the data show that the 3 variables are centered around 0, this is confirmed by the summary statistics on Table 1. It is possible to observe an important increase on volatility around the pandemic. In the period that encompasses the four events, there is also an increase of volatility, this may be explained by the increases of the United States Fed Fund rates, which begun on April 2022. Both indexes have very similar standard deviations, and both have higher volatility than the market. The variables present a Kurtosis higher than 3, specially the automotive industry index. To observe clearly the variables' behavior around the events dates, I present on Graph 2 a zoom around the analyzed events.

Graph 2: Daily returns between July 27 2021 and September 07 2022, 256 observations

Source: Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

Table 2: Correlation coefficients, 1 149 observations

	Ret_^SP500-251020	Ret_^ECO	Mkt
Ret_^SP500-251020	1.000	0.685	0.648
Ret_^ECO	0.685	1.000	0.716
Mkt	0.648	0.716	1.000

Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

Table 2 presents the correlation coefficient between the variables. We observe that the Wilder Clean Energy Index has a high correlation with the Maket return (0.716), while the S&P 500 automotive index has a higher correlation with the ECO index (0.685) than with the market return (0.648) .To evaluate the normality of the variables, I applied the Jarque-Bera normality test to the 3 variables. The results are presented in Table 2. As can be seen, the null hypothesis of normality is rejected for the three variables. In line with what was observed by Fama, Fisher, Jensen, and Roll (1969), the returns do not follow a normal distribution.

Table 3: Jarque-Bera normality tests, 1 149 observations

|	Mkt	Ret_^ECO	Ret_^SP500-251020
Statistic	5129.765	5129.765	5129.765
p-value	0.000	0.000	0.000

Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

The histogram and Kernel Density plots for each variable are presented on Graphs 3, 4 and 5.

**Graph 3: Market return histogram and Kernel density plot, 1 149 observations**
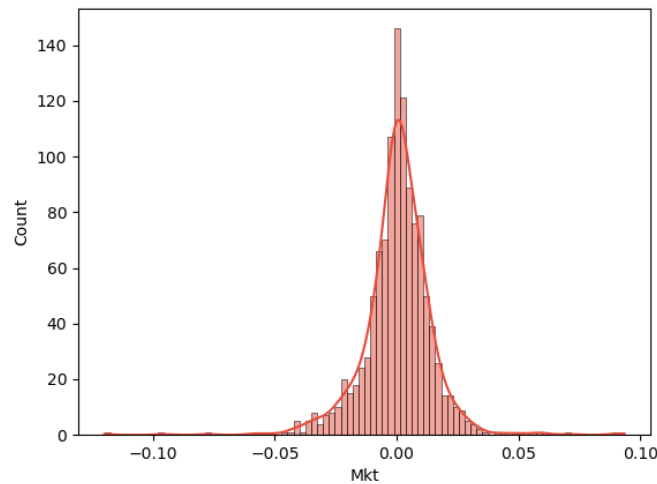
Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

Graph 4: Wilder Hill Clean Energy Index (ECO) histogram and Kernel density plot, 1 149 observations
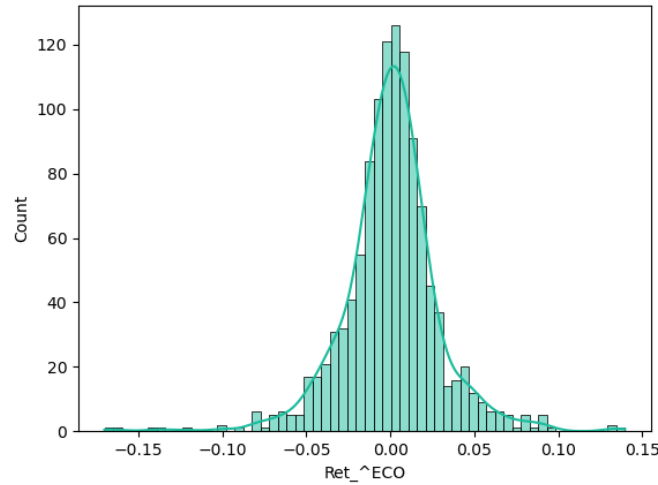
Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

Graph 5: S&P 500 Automotive Industry index histogram and Kernel density plot, 1 149 observations
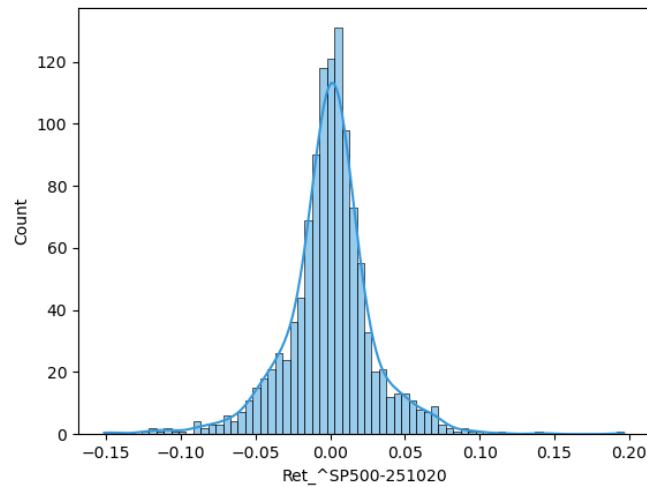
Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

4 Methodology

To determine the existence of abnormal returns, it is necessary to compare an asset or portfolio with a benchmark, normally, the benchmark commonly used is the market portfolio. However, if the Benchmark used also experienced abnormal returns, the event study would fail to identify the abnormal returns of the analyzed asset. Therefore, in this case, it is necessary to evaluate in first place if the market portfolio experiences abnormal returns. Following Rezaee and Pankaj (2004), I

evaluate this possibility using the Mean Adjusted Return model as proposed by Brown and Warner (1980) with additional dummy variables for the events. The estimated model is:

$$R_{m,t} = \alpha_{i,0} + \Sigma_{j=1}^{4}\beta_{i,j}D_j + \epsilon_{i,t} \tag{1}$$

Where:

- $R_{m,t}$ is the market return for period t.

- $\alpha_{i,0}$ is the average market return.

- D_j is the dummy variable for the event j.

- β_j is the abnormal return of the event j.

Following Fama, Fisher, Jensen and Roll(1969) and Dyckman, Philbrick, & Stephan (1984), I will estimate the model using OLS estimators and apply the T-test for significance as the indexes evaluated give shape to portfolios big enough to avoid the problems generated by non-normality.

For the estimation I will use an abnormal return model with dummy variables for the 4 events of interests, therefore, the event period is included in the estimation. Following Ali and Kallapur (2001) and Khotari and Warner (2006),the specification of the model to estimate is:

$$R_{i,t} = \alpha_{i,0} + \beta_{i,1}R_{m,t} + \Sigma_{j=1}^{4}\beta_{i,j}D_j + \epsilon_{i,t} \tag{2}$$

Where:

- R_t is the return of the correspoding index.

- R_{mt} is the market return.

- D_j is the dummy variable for the event j.

- β_j is the abnormal return of the event j.

As mentioned, one of the main challenges of event study for law approvals as highlighted by Ali and Kallapur (2001)is that the dates of the events analyzed must be identifiable and they must provide new information that was not previously available. However, the information regarding the approval process of a law or regulation is something known in advance given the congressional composition and the previous stances of congress members. As I will explain, due to particular situations surrounding its approval, the Inflation Reduction Act approval process had several events clearly identifiable that provided new information to markets.

During the period of the bill debate Democrats had a comfortable majority on Congress, with 235 Democrats vs. 200 Republicans. However, in the Senate the composition was 50 Senators for Democrats and 50 for Republicans. In this situations the Vicepresident had the tie-breaker vote, which implied that the bill required all the 50 Democrat votes to be approved. However, on December 19 of 2021, after the bill had been approved by the Congress, Democrat Senator

Bill Manchin publicly announced its vote against the bill and forced a negotiation with the Administration. This announcement made through a public statement represented a surprise and provided new information to the market as the bill could not be approved without Senator Manchin's vote.

During several weeks Senator Manchin's negative to vote the bill created incertitude whether it will be approved or not. On July 27 of 2022, the White House announced an agreement with Senator Manchin to pass the bill. My hypothesis is that the announcements of Manchin vote against and later in favor, provide new information for markets to internalize.

Consequently I will analyze 4 key dates related with the Inflation Reduction Act approval process:

- First, the bill's presentation on September 27 of 2021 under the original name of the Build Back Better act.

- Second, the Senator Manchin's announcement of its opposition to the Build Back Better act on December 19 of 2021.

- Third the agreement with Senator Manchin on July 27 of 2022.

- And fourth, the Senate approval on August 7 of 2022.

Around this 4 key dates I will evaluate a window of one day before and after the events, for a total of three trading days including the event. For the hypothesis test I will use ordinary T statistics to evaluate the significance of the event parameters, this in line with Dyckman, Philbrick, and Stephan (1984). In the case of the Senate approval on August 7 of 2022, the event occurred on a non trading day, therefore I use as event day the next trading day which is August 8, August 5 and August 9 were used as the previous and next trading days respectively.

5   Results

First I evaluate if the market in general experienced abnormal returns during the analyzed events. The estimation results for Equation 1 are presented in Table 4. As it can be observed, the parameters for the events' dummy variables are not significant, which means that the market as a whole did not experience abnormal returns during the events, and therefore market return can be used as a benchmark.

Table 4: OLS estimation of equation 1 for daily Market abnormal returns between January first 2018 and December 30 2022

No. Observations:		1149		R-squared:		0.002
Dep. Variable:		Mkt		Adj. R-squared:		-0.002
Model:		OLS		F-statistic:		0.4819
Covariance Type:		nonrobust		Prob (F-statistic):		0.749
	coef	std err	t	P>|t|	[0.025	0.975]
const (alpha)	0.000	0.000	0.962	0.336	0.000	0.001
sept_24_to_sept_28_2021	-0.008	0.008	-0.922	0.357	-0.024	0.009
dec_17_to_dec_21_2021	0.000	0.008	0.006	0.995	-0.016	0.017
jul_26_to_jul_28_2022	0.008	0.008	0.982	0.326	-0.008	0.025
aug_05_to_aug_09_2022	-0.003	0.008	-0.329	0.742	-0.019	0.014
Omnibus:		267.745		Durbin-Watson:		2.333
Prob(Omnibus):		0		Jarque-Bera (JB):		5168.087
Skew:		-0.551		Prob(JB):		0
Kurtosis:		13.331		Cond. No.		19.7

*sept_24_to_sept_28_2021 corresponds to the original bill presentation, dec_17_to_dec_21_2021 is the event window when Senator Manchin announced its opposition to the bill, jul_26_to_jul_28_2022 corresponds to the agreement with Senator Manchin, and aug_05_to_aug_09_2022 is the event window of the bill's approval by Senate.

Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

In the next step, I estimated equation 2 using the OLS method to evaluate the presence of abnormal returns on the Wilder Hill Clean Energy Index (ECO). Results presented in Table 5 indicate that the Beta is significant with a value of 1.407. In the case of the event dummy variables, for three of them, the estimated parameters are not significant, which means that the analyzed events did not generate significant abnormal returns. The events are the original bill presentation, Senator Manchin's announcement of his opposition to the bill, and the bill's approval by the Senate.

However, the results indicate that the agreement with Senator Manchin generated significant abnormal returns of 1.9% with a significance level of 0.1. This result validates the hypothesis that the announcement of the agreement provided new information to the market, generating abnormal returns to the clean energy sector. Graph 6 presents the scatter plot between the daily market returns and the Wilder Hill Clean Energy Index daily returns.

Table 5: OLS estimation of equation 2 for daily ECO index abnormal returns between January first 2018 and December 30 2022

No. Observations:		1149		R-squared:		0.514
Dep. Variable:		Ret_^ECO		Adj. R-squared:		0.512
Model:		OLS		F-statistic:		241.5
Covariance Type:		nonrobust		Prob (F-statistic):		4.41E-176
	coef	std err	t	P>|t|	[0.025	0.975]
const (alpha)	0.000	0.001	-0.484	0.629	-0.001	0.001
Mkt (Beta)	1.407	0.041	34.634	0.000	1.327	1.486
sept_24_to_sept_28_2021	0.001	0.012	0.107	0.915	-0.021	0.024
dec_17_to_dec_21_2021	0.001	0.012	0.043	0.966	-0.022	0.023
jul_26_to_jul_28_2022	0.019	0.012	1.669	0.095	-0.003	0.042
aug_05_to_aug_09_2022	0.001	0.012	0.097	0.923	-0.022	0.024
Omnibus:		171.83		Durbin-Watson:		1.854
Prob(Omnibus):		0		Jarque-Bera (JB):		2407.701
Skew:		0.01		Prob(JB):		0
Kurtosis:		10.092		Cond. No.		68.9

*sept_24_to_sept_28_2021 corresponds to the original bill presentation, dec_17_to_dec_21_2021 is the event window when Senator Manchin announced its opposition to the bill, jul_26_to_jul_28_2022 corresponds to the agreement with Senator Manchin, and aug_05_to_aug_09_2022 is the event window of the bill's approval by Senate.

Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

Graph 6: Scatter plot between daily Market returns and the Wilder Hill Clean Energy Index (ECO) daily returns
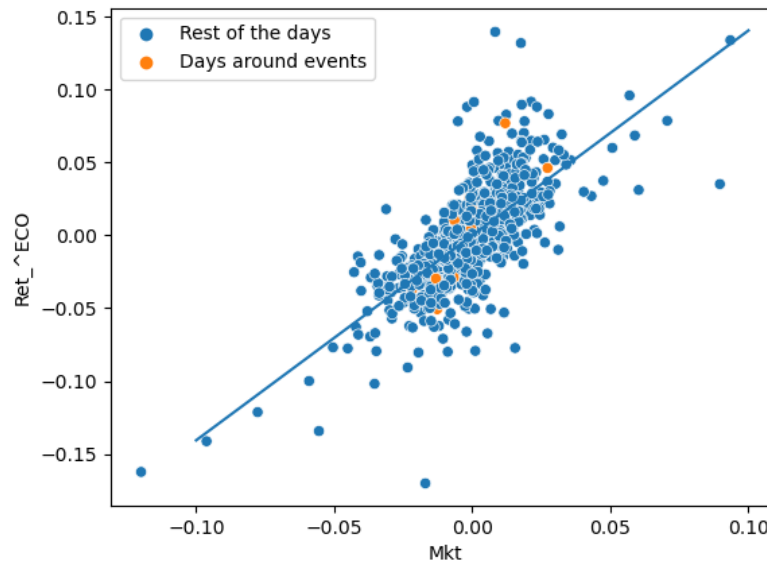
Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

In the case of the automotive industry represented by the S&P 500 Automobiles Industry Group Index, the results of the estimation of equation 2 are presented in Table 5. The results show that all the parameters for the event dummy variables are non-significant. Therefore, the S&P 500 Automobiles Industry Group index did not experience abnormal returns during any of the events related to the approval of the Inflation Reduction Act. Graph 7 presents the scatter plot between the daily market returns and 500 Automobiles Industry Group daily returns.

Table 6: OLS estimation of equation 2 for daily S&P 500 Automobiles Industry index abnormal returns between January first 2018 and December 30 2022

No. Observations:		1149		R-squared:		0.4220
Dep. Variable:		Ret_^SP500-251020		Adj. R-squared:		0.4200
Model:		OLS		F-statistic:		167.0
Covariance Type:		nonrobust		Prob (F-statistic):		3.50E-133
	coef	std err	t	P>|t|	[0.025	0.975]
const (alpha)	-0.001	0.001	-1.735	0.083	-0.002	0
Mkt (Beta)	1.329	0.046	28.802	0	1.238	1.419
sept_24_to_sept_28_2021	0.021	0.013	1.612	0.107	-0.005	0.047
dec_17_to_dec_21_2021	0.001	0.013	0.078	0.938	-0.025	0.027
jul_26_to_jul_28_2022	0.006	0.013	0.417	0.677	-0.02	0.031
aug_05_to_aug_09_2022	-0.021	0.013	-1.562	0.119	-0.046	0.005
Omnibus:		117.518		Durbin-Watson:		1.898
Prob(Omnibus):		0		Jarque-Bera (JB):		802.844
Skew:		-0.142		Prob(JB):		4.62E-175
Kurtosis:		7.085		Cond. No.		68.9

*sept_24_to_sept_28_2021 corresponds to the original bill presentation, dec_17_to_dec_21_2021 is the event window when Senator Manchin announced its opposition to the bill, jul_26_to_jul_28_2022 corresponds to the agreement with Senator Manchin, and aug_05_to_aug_09_2022 is the event window of the bill's approval by Senate.

Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

Graph 7: Scatter plot between daily Market returns and the S&P 500 Automobiles Industry Group Index daily returns
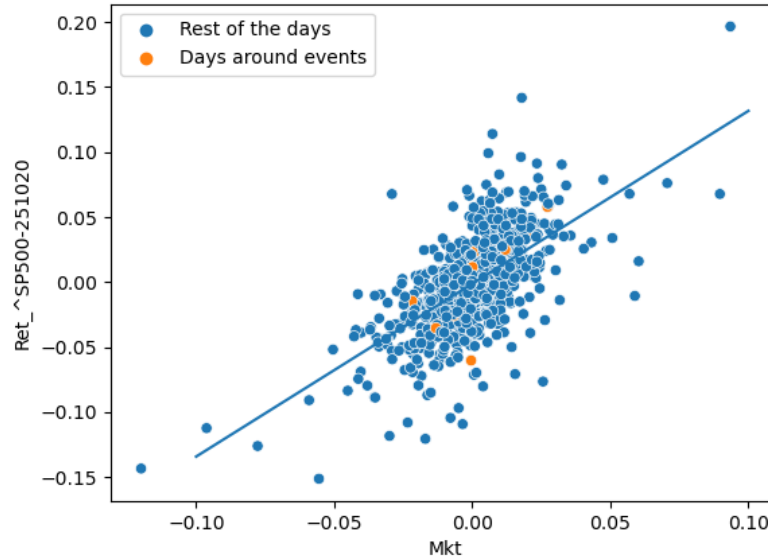
Source: Own elaboration with data from Fama & French (2023), ECO. (2023) and SP500-251020, (2023)

6 Conclusions

The Inflation Reduction Act represents one of the major policy decisions in history to address climate change and reduce emissions. It has an estimated total investment of $384.9 billion (Huntley Ricco and Arnon 2022) during

the next 10 years, mainly on renewable energies and electric vehicles. The present article applied the event study methodology to analyze the impact of the bill on the US stock market specifically on the renewable energy segment and in the automotive industry.

By analyzing the abnormal returns of the market in general, the renewable energy sector, and the automotive industry group, the present study concludes that the market as a whole did not experience abnormal returns during the main events related to the bill approval.

Despite the bill's incentives for the production and adoption of electric vehicles in the United States, the present article concludes that the key events related to the Act's approval did not generate abnormal returns on the S&P 500 Automotive Industry group index.

In the case of the Wilder Hill Clean Energy Index which represents the clean energy sector, the article found that there were no abnormal returns around three key events related to the IRA's approval process. The three events are the original bill presentation, Senator Manchin's announcement of his opposition to the bill, and the bill's approval by the Senate. However, the results indicate that the agreement with Senator Manchin generated significant abnormal returns of 1.9% with a significance level of 0.1. Therefore, I conclude that the announcement of Senator Manchin's support for the bill provided new information to the market and generated positive abnormal returns of 1.9% to the clean energy sector, represented by the Wilder Hill Clean Energy Index.

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