IMPACT OF POLITICAL ANNOUNCEMENTS ON THE EU ETS

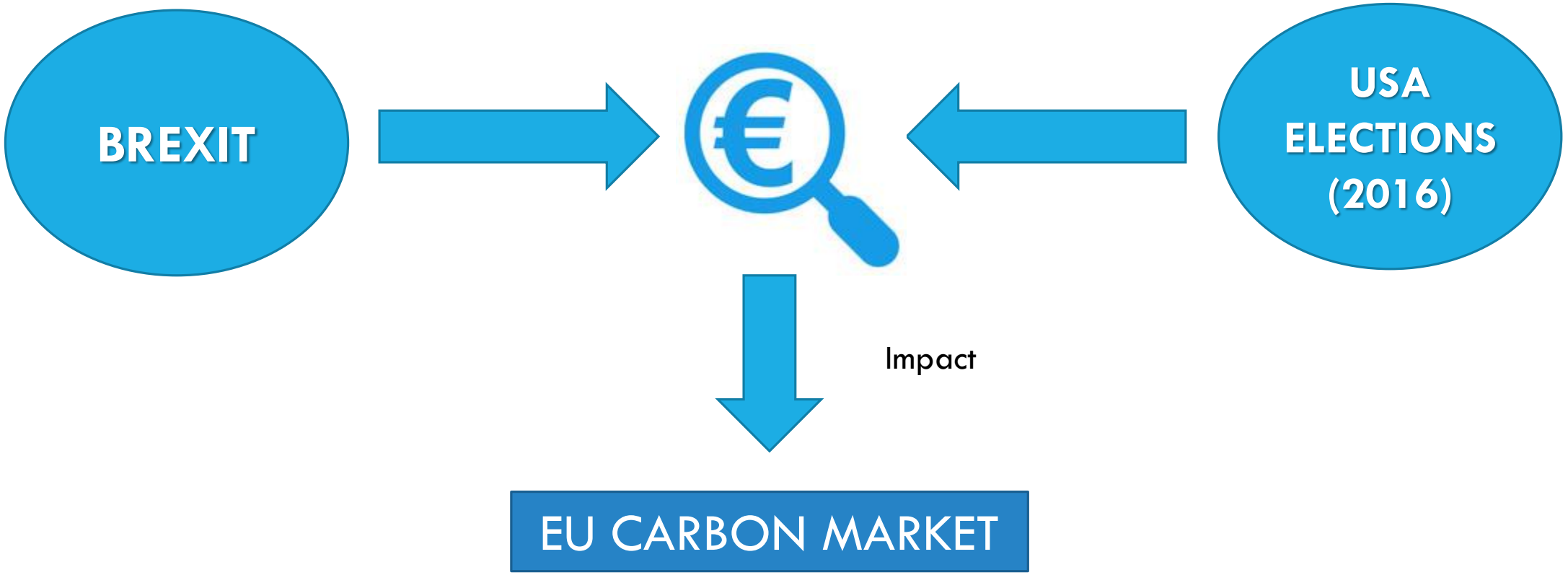
Juan Fernando López Hernández

Research based in the master thesis supervised by the Professor Johan Eyckmans, Economic Department of the College of Europe, Bruges.

1. OBJECTIVE

Identification of key political events

with potential impact on EU ETS



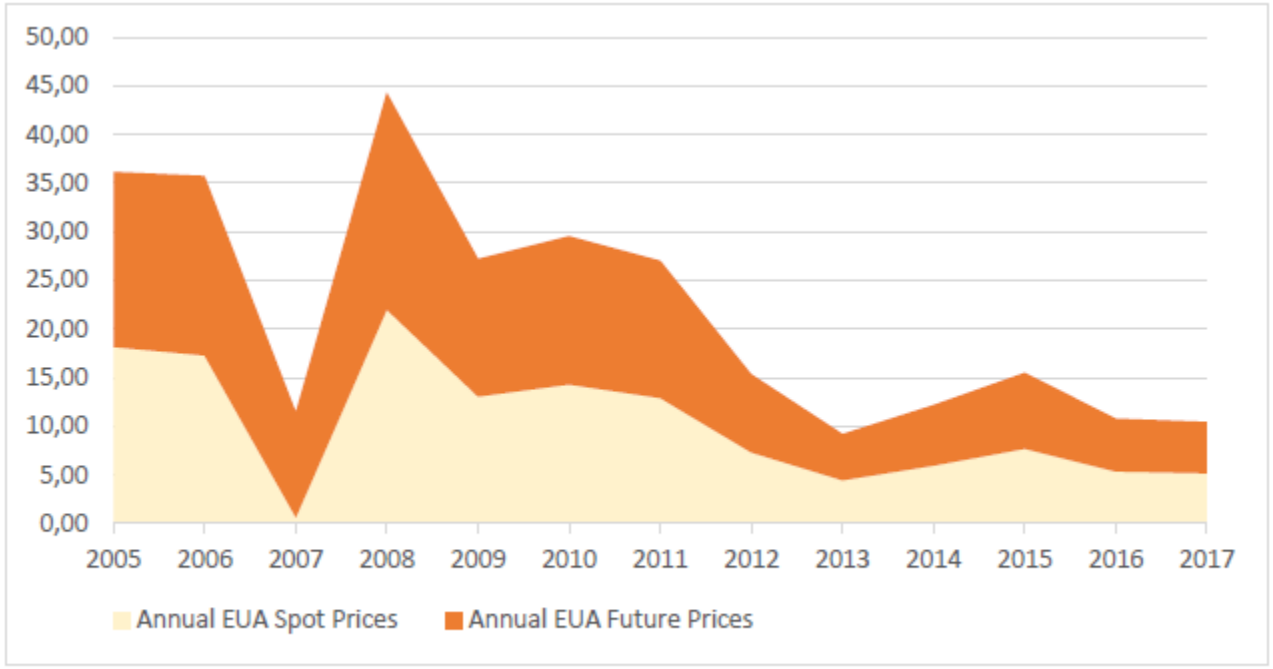
2. RESEARCH STRUCTURE

1. Look at EU ETS € evolution
2. Selection of variables
3. Regression model
4. Results & impact analysis

3. VARIABLES OF THE REGRESSION MODEL

EUAS INDEX

- Independent variable: Y
- Two types:
  - **Carbon spot prices:** Current prices of the EU carbon market emissions in any specific moment of time. They include just current values of the commodity.



GRAPH 6: EUAs Spot/Future Prices evolution 2005-2017

Source: ICE EUA Index

  - **Carbon future prices:** Established at current time to be delivered in future contracts. Current value + risk interest rate + time + storage cost of the commodity at a specific future date.

3. VARIABLES OF THE REGRESSION MODEL

MARKET INDEX

Market Index = EUAs Price Change x Market trade volume log

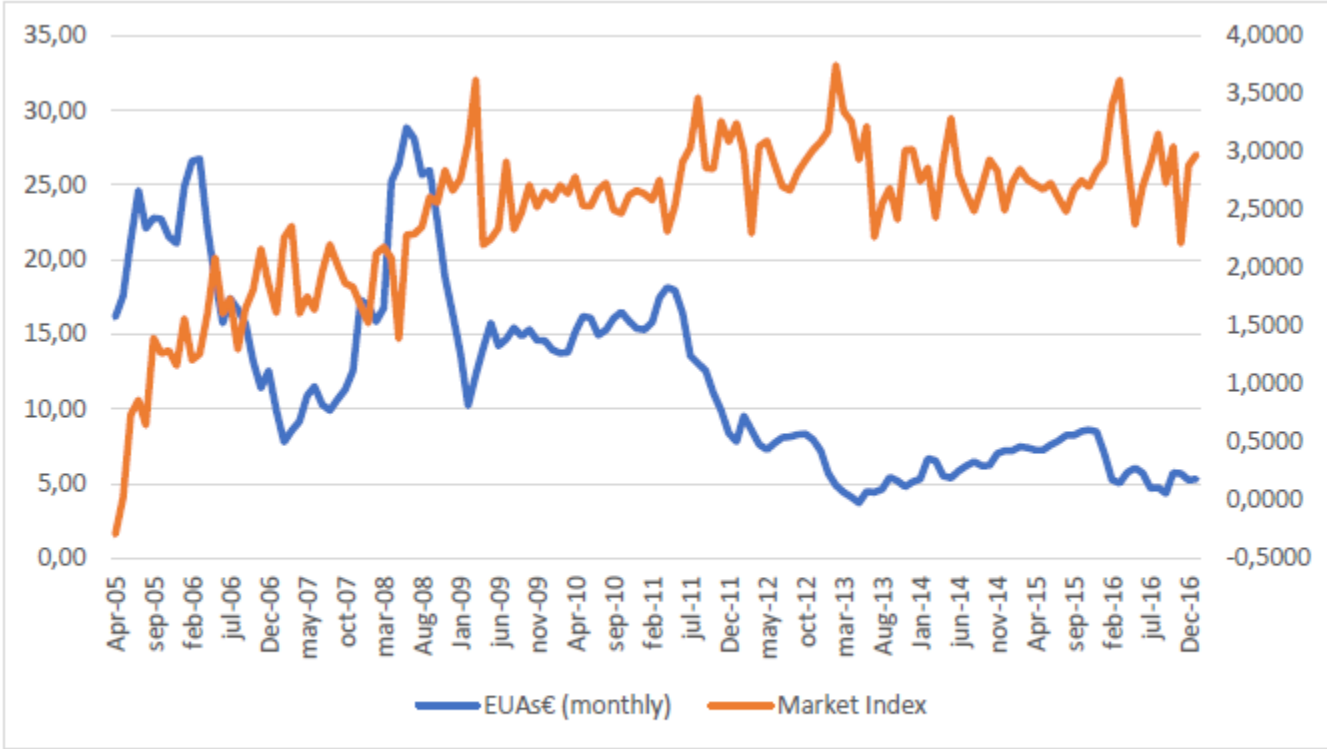
- Dependent variable X

- $EUAs\ Price\ Change = \frac{EUA\ index(n-1)}{EUA\ index\ (n)}$

  * Eliminates seasonal variation in the model.

- *Market trade (average daily) volume log = natural log of the EUAs traded volume.*

  * Assumes prices normally distributed.



GRAPH 9: EUAs Price / Market Emission Index 2005-2017 (monthly)

Source: ICE EUA Index

Δ N° of traded emissions → Δ Supply/demand → ▼ EUAs price

4. METHODOLOGY

EVENT STUDY METHODOLOGY EXPLAINED

Econometric analysis through **event study methodology:**

Why?

- Widely used to measure **company performance** due to external market factors.
- Allows us to assume that non-other factors are impacting the carbon emissions price if the impact is significant, but the **announcement** itself.

What?

- Impact of **market reactions** (company behaviour or return of a stock index).
- Effect of the announcement on the market through the effect of this on the **volatility of prices**, the closer to the day of the announcement.

How?

- Assessment through **abnormal or excess returns** accompanying specific events.

4. METHODOLOGY

EVENT STUDY METHODOLOGY EXPLAINED

Return = Difference of stock index in different periods of time.

$$Return = \frac{Ending\ price - Starting\ price}{Starting\ price}\ x\ 100$$

(Motley Fool, 2017)

Abnormal return = Expected return – Actual or simple return

- Because of the volatility of the market traded volumes and prices.
- Regression model.
- Estimation window: Total number of days (t) considered in the regression to calculate the abnormal returns.
- Event window: Specific number of days (t) before and after of the announcement within the estimation window, in which the impact is analysed.

4. METHODOLOGY

EVENT STUDY METHODOLOGY APPLIED

1. Daily abnormal returns (**AR**) for the EUA Index through a **market model:**

$$Rit = \alpha + \beta i\ Rmt + uit$$

- where Rit is return of EUA Index.
- Rmt is return of Market Index on i during day t

- **Predicted**/Expected values (Stata) of the **Return of EUA Index.**
- Abnormal Returns (**AR**) = Predicted Return of EUA Index - Returns of EUA Index.

$$AR_{it} = r_{it} - (\alpha + \beta_i R_{mt}) + u_{it}$$

4. METHODOLOGY

EVENT STUDY METHODOLOGY APPLIED

2. Daily Cumulative Abnormal Return $(\mathrm{CAR})_{\mathrm{T}} = \sum_{t=1}^{T} AR$

"representing the sum of the (…) **abnormal returns to a point in time,** shows the impact of the event over time" (Schweitzer, 1989).

- **CAR as a better indicator** (vs AR): It takes into consideration **fluctuations** that naturally occur over a given period.

3. **Significance test** of the model (stata **t-test**):

The Null is: $H_0 : AR_{i,t} = 0,$ $\quad H_0 : CAR_i = 0$

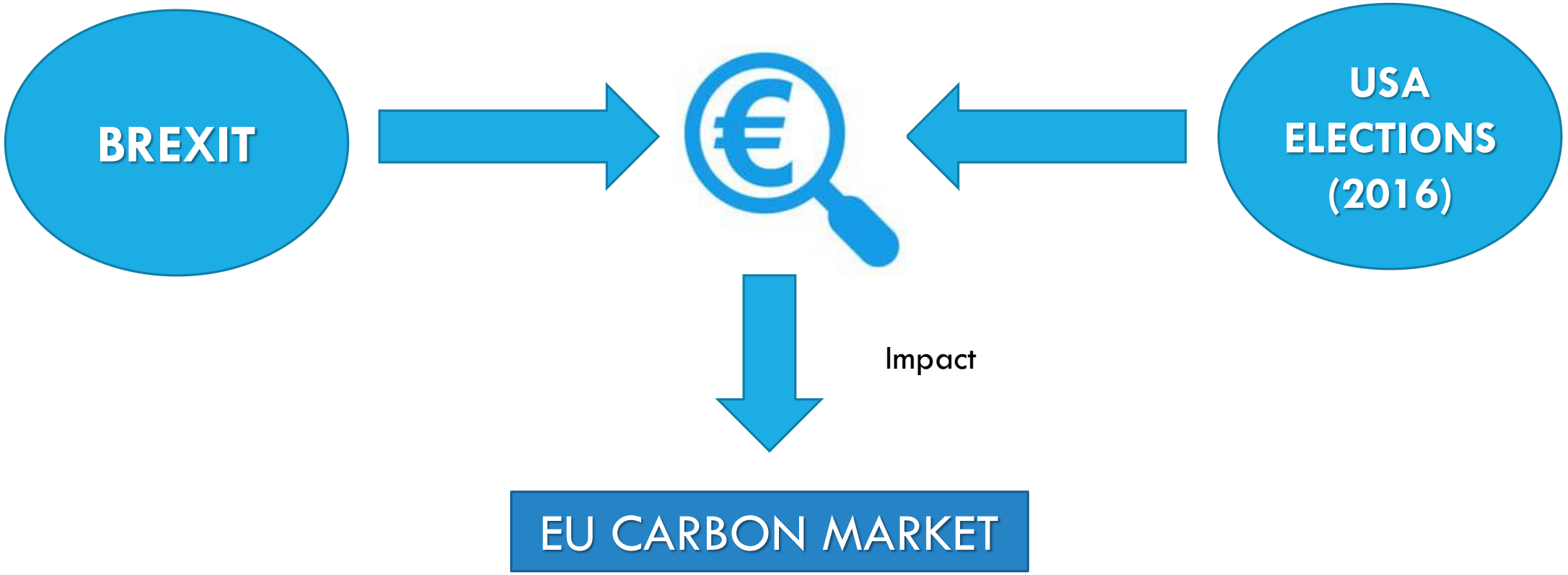
$$t_{AR_{i,t}} = \frac{AR_{i,t}}{S_{AR_i}}, \qquad t_{CAR} = \frac{CAR_i}{S_{CAR}},$$

(Muller,2015)

Slide Reminder

OBJECTIVE

Identification of key political events with potential impact on EU ETS



5. IMPACT OF BREXIT ON THE EU ETS PRICES

H0: "No impact of BREXIT on the EU ETS market"

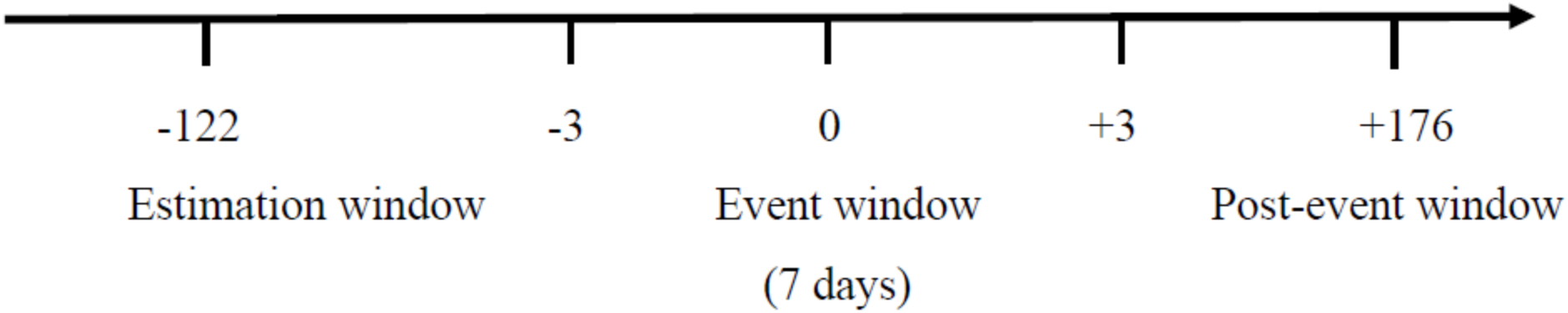
H1: "Impact of BREXIT on EU ETS market".

- Clear **impact of BREXIT** on the **financial markets** (Wright W., 2016).
- Thus we could **expect impact** on behaviour of companies which trade in the **EU ETS** carbon market.
- **Negative** expected impact of BREXIT on carbon prices.

5. IMPACT OF BREXIT ON EU ETS PRICES

BREXIT KEY DATES

- 24 June 2016 event date considered to study the market reaction. t = 0
- National Declaration of victory of the referendum to leave the EU and the resignation of the Prime Minister, David Cameron.
- Event window t=-3 , t=+3 to reduce the event uncertainty (Andres et al, n.d).



5. IMPACT OF BREXIT ON EU ETS PRICES

RESULTS OF THE IMPACT OF BREXIT DURING THE EVENT WINDOW – **SPOT PRICES**

TABLE 1: EUA SPOT PRICES

Abnormal and Cumulative Returns around the BREXIT announcement

t	AR	t-stat	CAR	t-stat
-3	-4.67%	-0.93	-4.67%	-0.93
-2	2.10%	0.42	-2.57%	-0.51
-1	-0.71%	-0.14	-3.27%	-0.65
0	-11.91%	-2.37*	-15.19%	-3.02*
1	1.83%	0.36	-13.36%	-2.65*
2	-7.01%	-1.39	-20.36%	-4.05*
3	-3.54%	-0.70	-23.90%	-4.75*

Source: Own elaboration

In red, significant values for a 95% level of confidence (p-value of +- 1.96)

AR

- Impact during the event window is only significant the day of the announcement t=0.

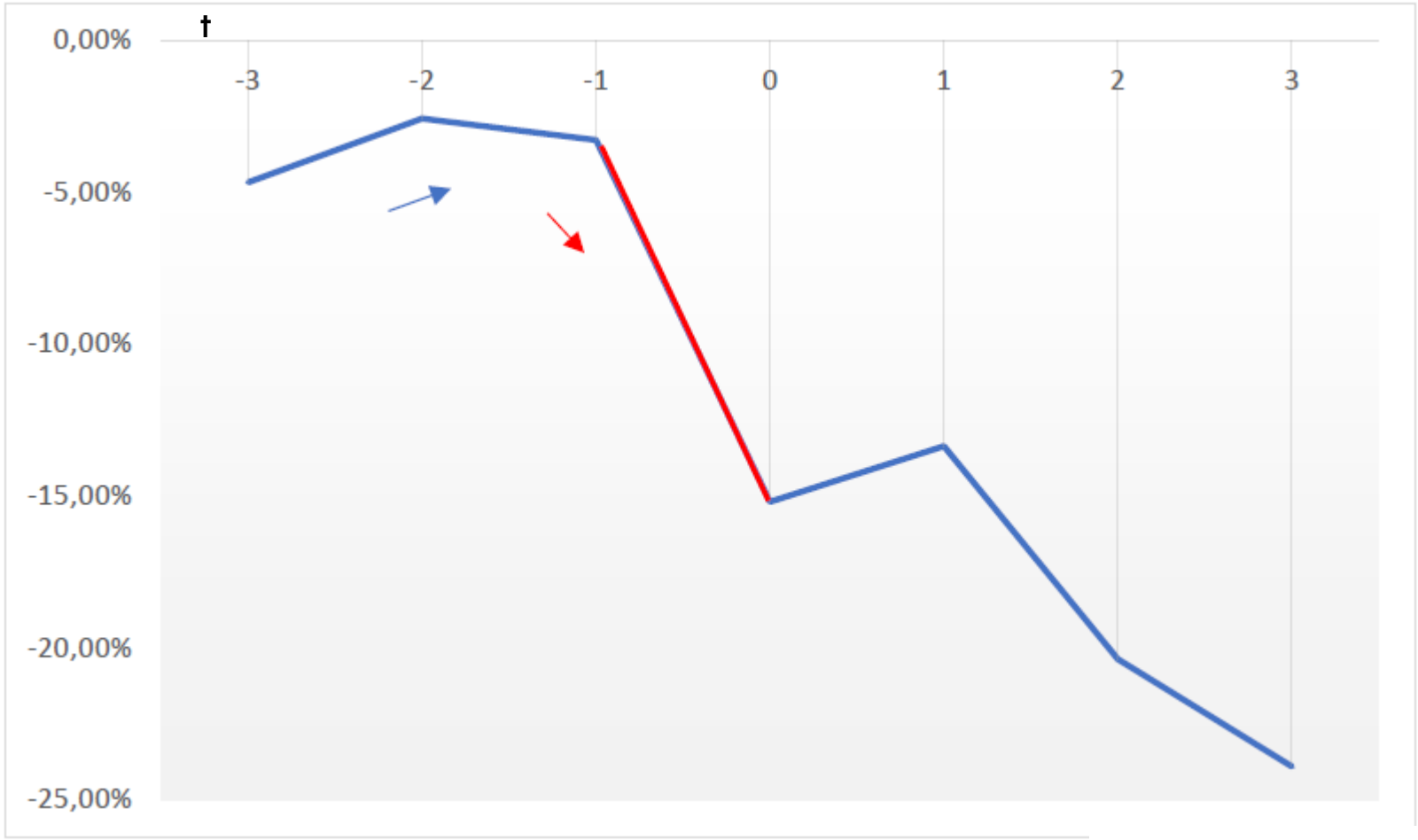
CAR

- Impact of the announcement being significant also for all the three consecutive days after the announcement, t=1, t=2, t=3.
- Negative impact higher 10% after the announcement.

5. IMPACT OF BREXIT ON EU ETS PRICES

RESULTS OF THE IMPACT OF BREXIT DURING THE EVENT WINDOW – **SPOT PRICES**

GRAPH 11: CAR % during the event days (spot prices)



Source: Own elaboration

H1: "Impact of BREXIT on EU ETS market".

- Brexit impact on carbon market.
- Significant and (-).
  - t = 0, **Around – 10 % ▼** EUAs spot price.
  - t = 3, Around –20 % ▼.

5. IMPACT OF BREXIT ON EU ETS PRICES

RESULTS OF THE IMPACT OF BREXIT DURING THE EVENT WINDOW – FUTURE PRICES

TABLE 2: EUA FUTURE PRICES

Abnormal and Cumulative Returns around the BREXIT announcement

t	AR	t-stat	CAR	t-stat
-3	-3.33%	-0.75	-3.33%	-0.75
-2	-1.39%	-0.31	-4.71%	-1.06
-1	1.89%	0.43	-2.82%	-0.63
0	-12.07%	-2.71*	-14.88%	-3.35*
1	-1.53%	-0.34	-16.41%	-3.69*
2	-1.64%	-0.37	-18.05%	-4.06*
3	-5.61%	-1.26	-23.66%	-5.32*

Source: Own elaboration

In red, significant values for a 95% level of confidence (p-value of +- 1.96)

AR

- Impact during the event window is only significant the day of the announcement t=0.

CAR

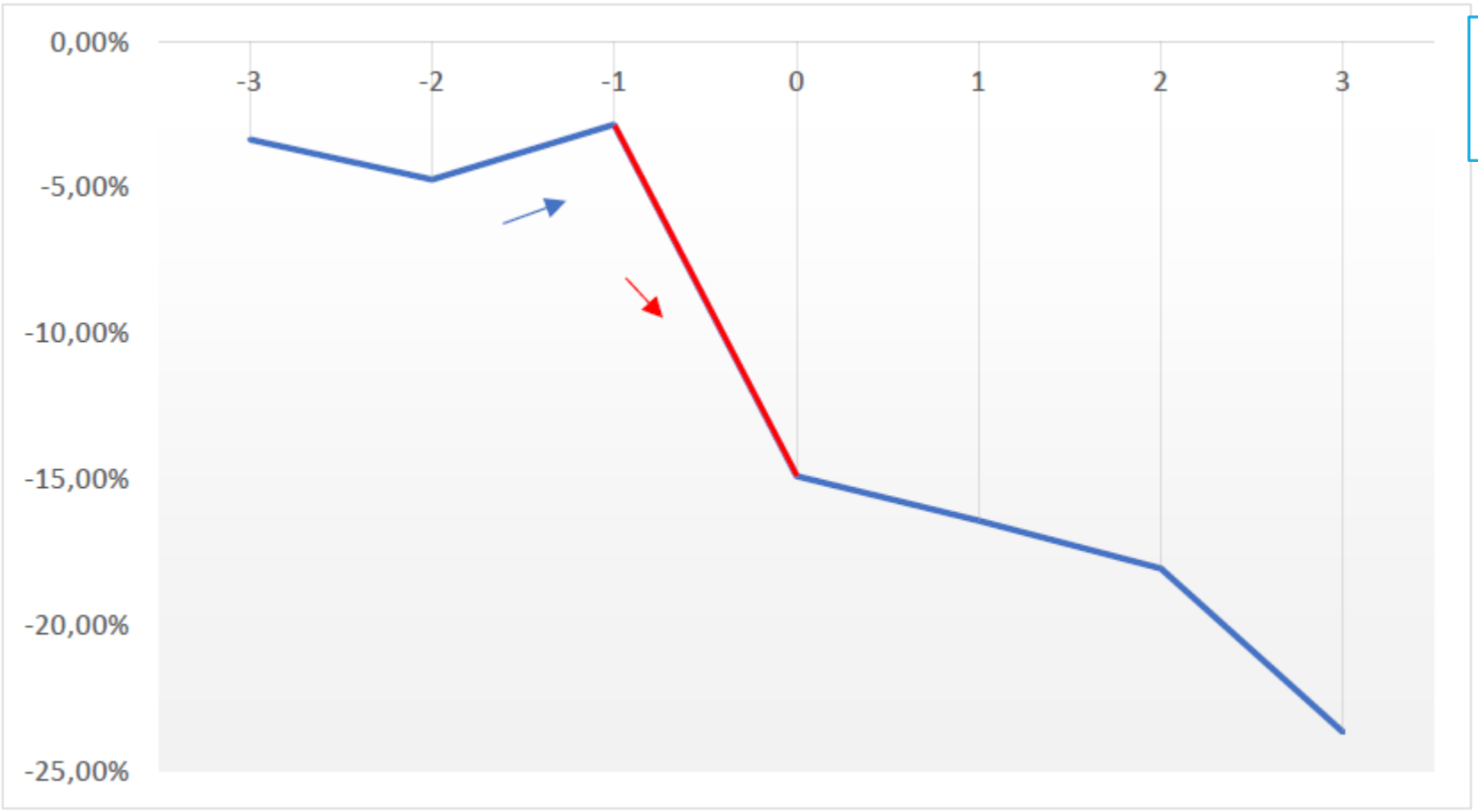
- Impact of the announcement being significant also for all the three consecutive days after the announcement, t=1, t=2, t=3.

- Negative impact higher 10% after the announcement.

5. IMPACT OF BREXIT ON EU ETS PRICES

RESULTS OF THE IMPACT OF BREXIT DURING THE EVENT WINDOW – FUTURE PRICES

GRAPH 12: CAR % during the event days in future prices



Source: Own elaboration

H1: "Impact of BREXIT on EU ETS market".

- Brexit impact on carbon market.
- Significant and (-).
  - t = 0, Over – 10 % ▼ EUAs future price.
  - t = 3, Around –23 % ▼.

6. IMPACT OF USA ELECTIONS ON EU ETS PRICES

H0: "No impact of USA Elections on the EU ETS market"

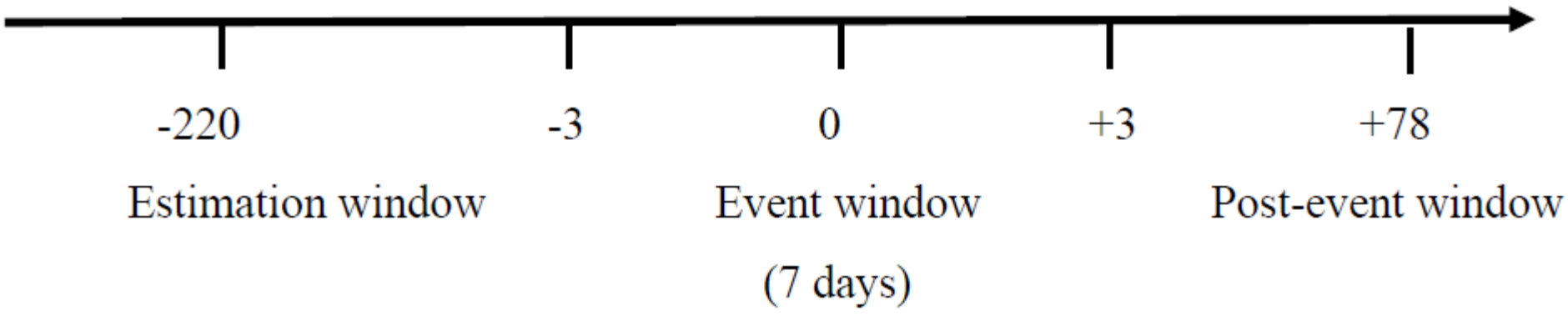
H1: "Impact of USA Elections on EU ETS market".

- International **Paris Agreement.**
- Objective of decreasing the global average temperature below 2°C.
- **Link with ETS** through 43% 2030 **reduction emissions target** (compared with 2005 levels).
- Donald Trump announcement to **revoke the international agreement** (before winning elections).
- **Media** worriedness about meeting the Agreement target.
- Potential **negative impact** on carbon market prices.
- Still impact not as clear as with **BREXIT.**

6. IMPACT OF USA ELECTIONS ON EU ETS PRICES

USA ELECTIONS KEY DATES

- 9 November 2016 event date considered to study the market reaction. t = 0
- Republican party won the United Sates presidential elections.
- Event window t=-3 , t=+3 to reduce the event uncertainty (Andres et al, n.d).



6. IMPACT OF USA ELECTIONS ON EU ETS PRICES

RESULTS OF THE IMPACT OF USA ELECTIONS DURING THE EVENT WINDOW – SPOT PRICES

TABLE 3: EUA SPOT PRICES

Abnormal and Cumulative Returns around the USA Election announcement

t	AR	t-stat	CAR	t-stat
-3	-1.55%	-0.98	-1.55%	-0.98
-2	-2.77%	-1.74	-4.33%	-2.72*
-1	-1.03%	-0.65	-5.36%	-3.37*
0	-0.38%	-0.24	-5.74%	-3.61*
1	-3.34%	-2.10*	-9.08%	-5.71*
2	-4.09%	-2.58*	-13.17%	-8.28*
3	-4.57%	-2.88*	-17.74%	-11.16*

Source: Own elaboration

AR

- Significant negative impact just after the announcement t=0.

CAR

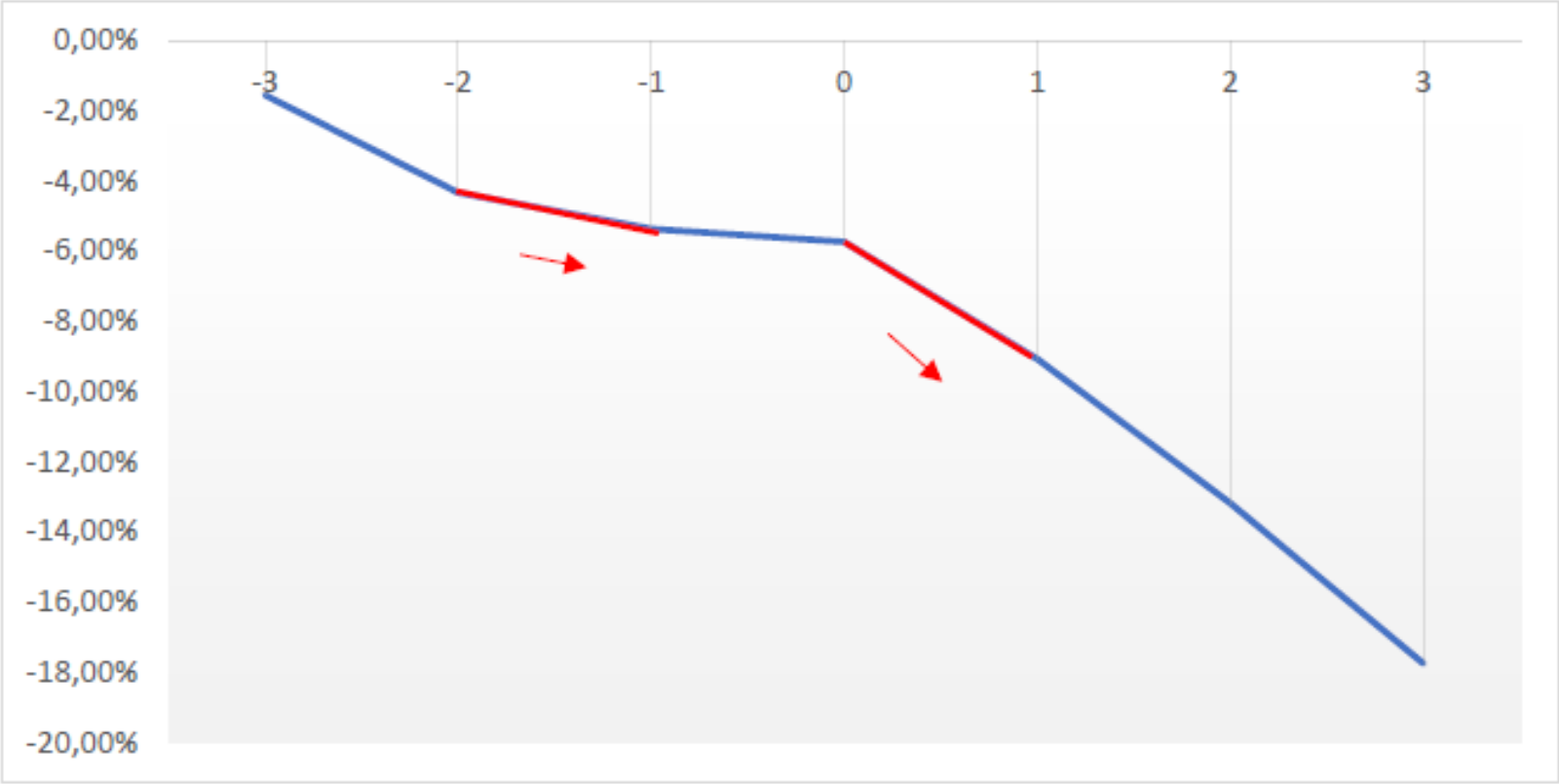
- Impact of the announcement being significant for almost the whole estimation window.
- The victory announcement of the Republicans always generates a negative impact on the carbon market.

In red, significant values for a 95% level of confidence (p-value of +- 1.96)

6. IMPACT OF USA ELECTIONS ON EU ETS PRICES

RESULTS OF THE IMPACT OF USA ELECTIONS DURING THE EVENT WINDOW – SPOT PRICES

GRAPH 13: CAR % during the event days in spot prices



Source: Own elaboration

H1: "Impact of USA Elections on EU ETS market".

- Impact on carbon market (clear change of tendency after announcement).
- Significant and (-).
  - t = 0, Over – 5 % ▼ EUAs future price.
  - t = 3, Around –18 % ▼.

6. IMPACT OF USA ELECTIONS ON EU ETS PRICES

RESULTS OF THE IMPACT OF USA ELECTIONS DURING THE EVENT WINDOW – FUTURE PRICES

TABLE 4: EUA FUTURE PRICES

Abnormal and Cumulative Returns around the USA Election announcement

t	AR	t-stat	CAR	t-stat
-3	0.44%	0.28	0.44%	0.28
-2	-1.19%	-0.74	-0.75%	-0.47
-1	-3.40%	-2.11*	-4.15%	-2.58*
0	-1.63%	-1.01	-5.77%	-3.59*
1	-1.30%	-0.81	-7.08%	-4.40*
2	-2.51%	-1.56	-9.59%	-5.97*
3	-4.46%	-2.77*	-14.05%	-8.74*

Source: Own elaboration

In red, significant values for a 95% level of confidence (p-value of +- 1.96)

AR

- Impact during the event window is only significant 1 the day before and 3 days after the announcement t=0.

CAR

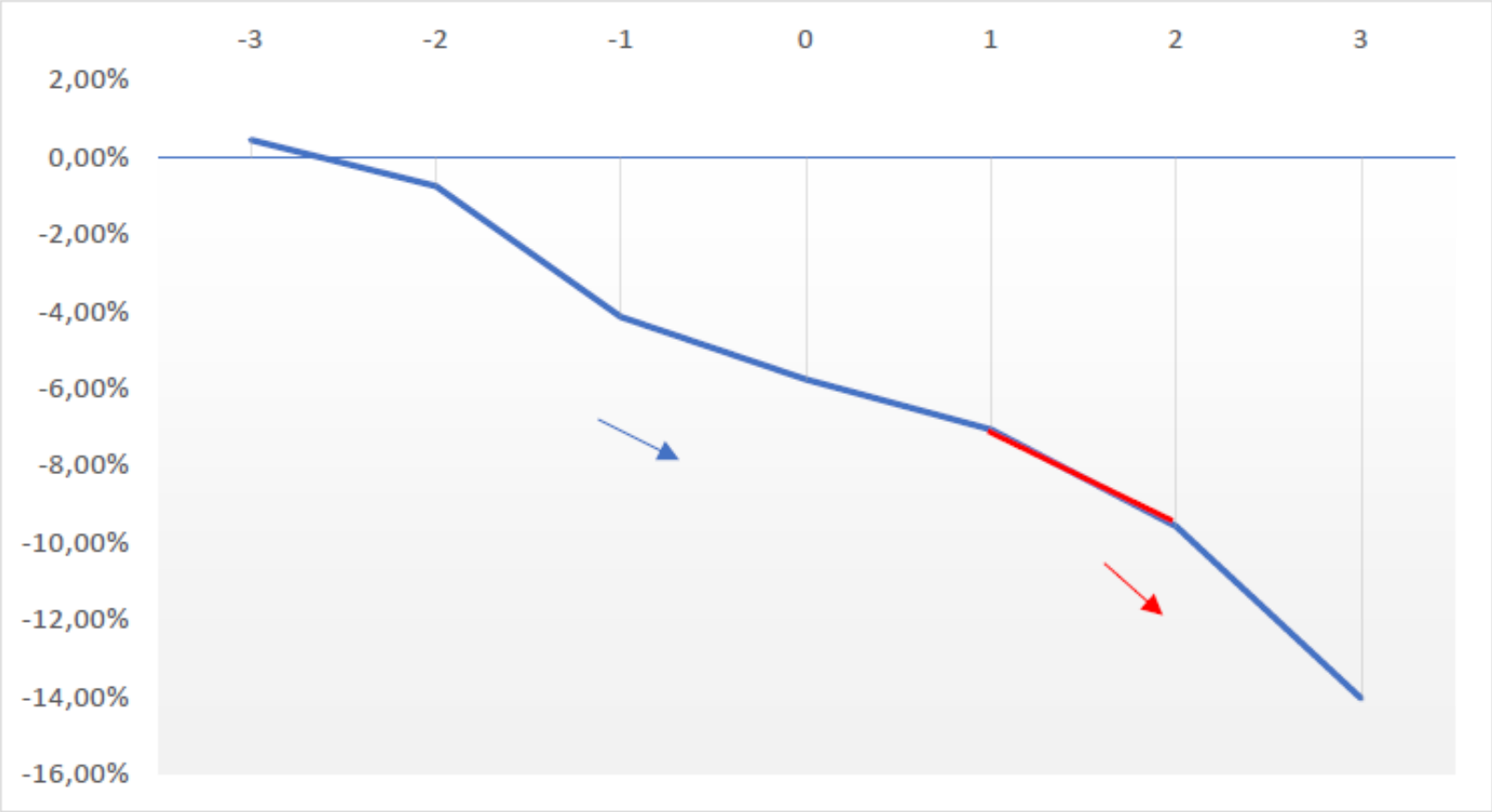
- Impact of the announcement being significant for all days after one day before the announcement.

- Negative impact always lower than 15%.

6. IMPACT OF USA ELECTIONS ON EU ETS PRICES

RESULTS OF THE IMPACT OF USA ELECTIONS DURING THE EVENT WINDOW – FUTURE PRICES

GRAPH 14: CAR % during the event days in future prices



Source: Own elaboration

H1: "Impact of USA Elections on EU ETS market".

- Impact on carbon market (change of tendency not so clear).
- Significant and (-).
  - t = 0, Over – 6 % ▼ EUAs future price.
  - t = 3, Around –14 % ▼.

6. CONCLUSSION

- Study of the evolution of ETS prices is complex: **Multiple factors** can affect its tendency and volatility.

- This research shows that when political announcements take place, the **carbon market** is **also exposed to** the impact of **these announcements.**

- BREXIT: Negative impact on the market which provokes a decrease in the general level of prices the day in which the announcement takes place and after this day, for both spot and future markets.

- **Negative impact of BREXIT was much higher vs USA Elections 2016.**
  - USA Election of 2016: Severity of this negative impact in comparison whit BREXIT has been shown not to be so strong.
  - In **BREXIT** there is a **positive to negative change of tendency in t=0** while in the **USA** Election this change of the evolution of prices is **not so clear.**

- At the current negotiation process of **the IV Phase of the EU ETS, investors and notably policy makers** of the EU ETS need to consider **impact of political announcements** on carbon prices.


The End.