CUMULATIVE ABNORMAL TONE STUDY
THE CASE OF EARNING ANNOUNCEMENTS

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MOTIVATION

Tone/Sentiment derived from **text** has shown to be an important variable in finance and economics

Tetlock (2007), Das and Chen (2007), Loughran & McDonald (2011), Jegadeesh & Wu (2013), Baker & al. (2016), Ardia & al. (2018) for application in economics and finance

However, no framework currently allow to analyze **abnormal/unexpected tone**, especially around important **events**

MOTIVATION

We are interested in quantifying the **abnormal tone** about a group of (or individual) **entities** in response to a group of (or individual) events, where the tone is extracted from **textual communications** about the entities

Examples of events include corporate communications (e.g., **earnings announcement**, change of CEO, product recall), political communications (e.g., interest announcement by central banks, elections, political scandal), natural phenomenon (e.g., earthquakes, flooding, drought), among others

CONTRIBUTION

Analyze the event study econometric tools used for (Cumulative) **abnormal return** but in the **context of** (Cumulative) **abnormal tone**

Illustrate with an empirical application on the cumulative abnormal tone around **earning announcement**

AGENDA

1. METHODOLOGY
2. EMPIRICAL APPLICATION

METHODOLOGY

The tone of a firm *i* at time *t* is defined as the **normal tone** NT plus the **abnormal tone** AT:

$$T_{i,t} \equiv NT_{i,t} + AT_{i,t}.$$

Assuming normality

$$AT_{i,t} \overset{i.i.d.}{\sim} \mathcal{N}(0, \sigma_i^2).$$

To get the abnormal tone we **regress** the tone on **explanatory factors**. To that end we create a **weighted market tone index and industry tone index** to mirror the market model used in cumulative abnormal return study:

$$\boldsymbol{T_i} \equiv \mathbf{X}_i \boldsymbol{\beta_i} + \boldsymbol{AT_i}$$

METHODOLOGY

Given the parameter estimated during the **estimation window** (before the event), we can compute the **event window (ev)** abnormal tone estimate

The cumulative abnormal tone estimate from t1 to t2 (relative to the event):

$$\widehat{CAT}_i(t_1, t_2) \equiv \boldsymbol{\gamma}' \widehat{\boldsymbol{AT}}_i^{ev},$$

Again, assuming normality:

$$\widehat{CAT}_i(t_1, t_2) \overset{i.i.d.}{\sim} \mathcal{N}(0, \widehat{\sigma}^2_{i,(t_1:t_2)}).$$

$$\overline{CAT}(t_1, t_2) \equiv \frac{1}{N} \sum_{i=1}^{N} \widehat{CAT}_i(t_1, t_2),$$

EMPIRICAL APPLICATION

All firms that have been part of the S&P500 from 2000Q1 to 2016Q4 for about **713 unique firms**

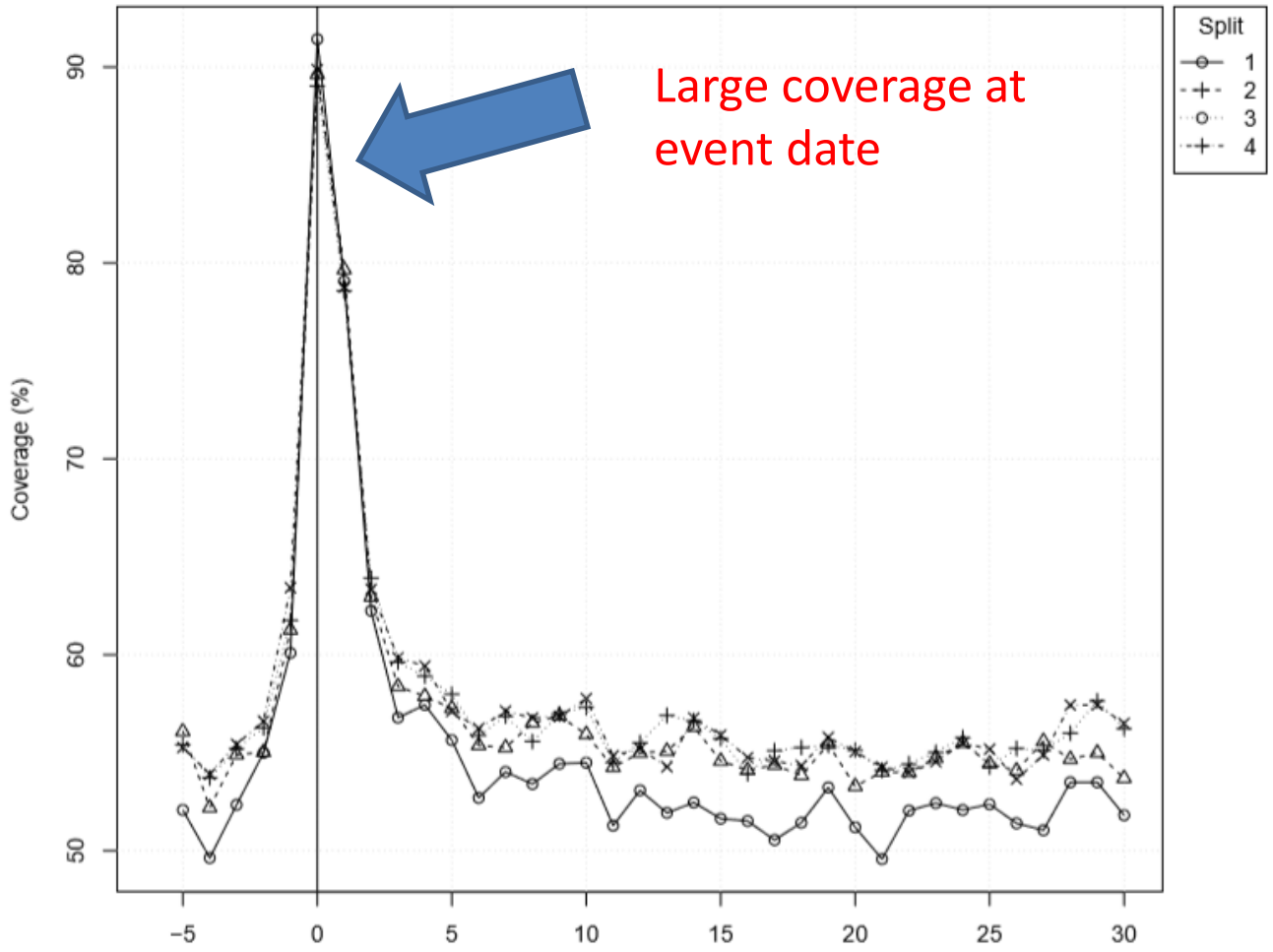
Total of **19,319** quarterly earnings announcements

About 3 millions text publications and the average daily coverage is 38% with minimum daily coverage of 1% and maximum daily coverage of 99%

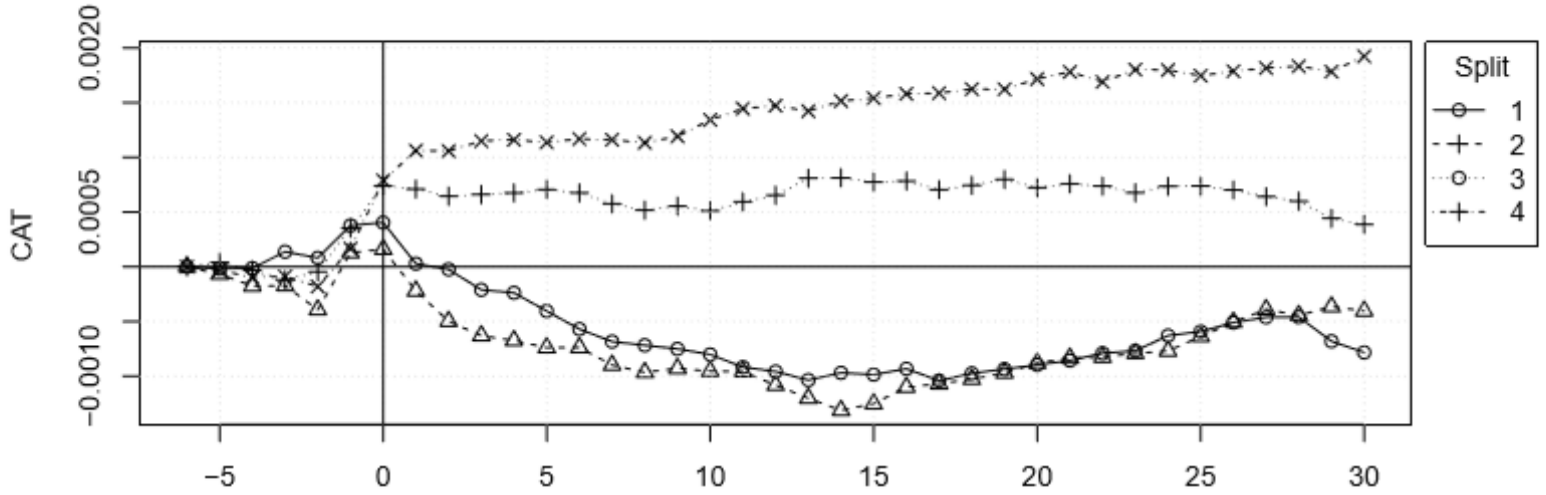
We compute the **average cumulative abnormal tone** around the quarterly earnings announcements across **four portfolios** where the firms are splitted according to the **earnings surprise**

We use the **Word Power** methodology of Jegadeesh & Wu (2013) to compute firms tone. Steps are taken to avoid look-ahead bias

COVERAGE


Large coverage at event date
Split
1
2
3
4
Coverage (%)
90
80
70
60
50
−5
0
5
10
15
20
25
30

CAT AND CAR


CAT
0.0020
0.0005
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−5
0
5
10
15
20
25
30
Split
1
2
3
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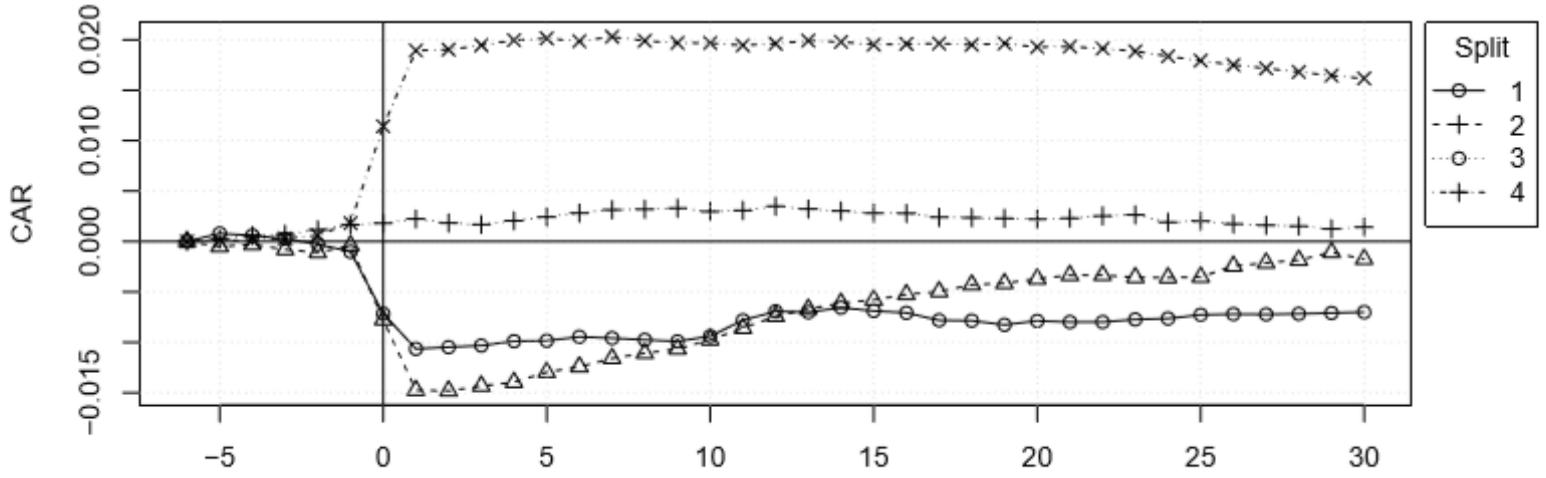
CAR
0.020
0.010
0.000
−0.015
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0
5
10
15
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25
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Split
1
2
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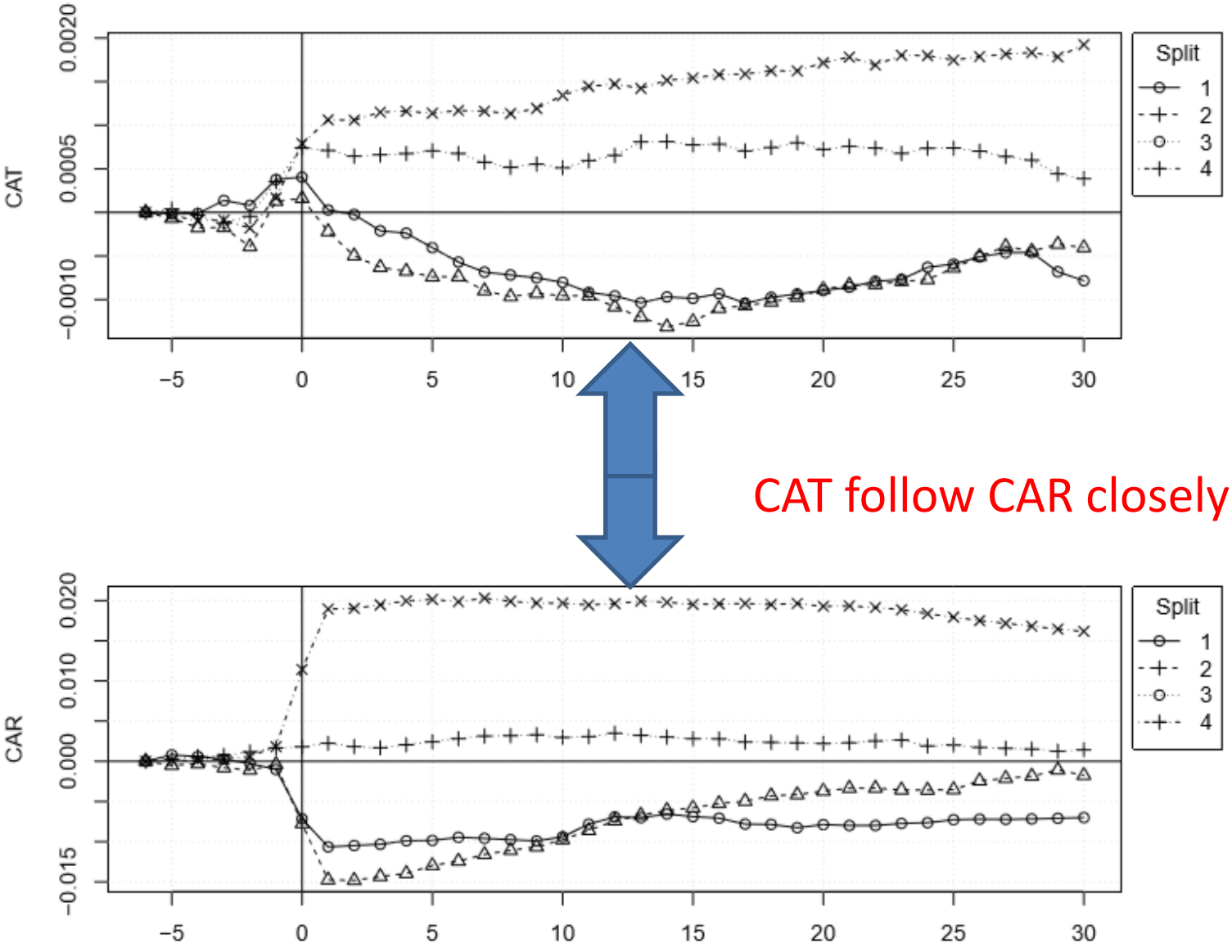
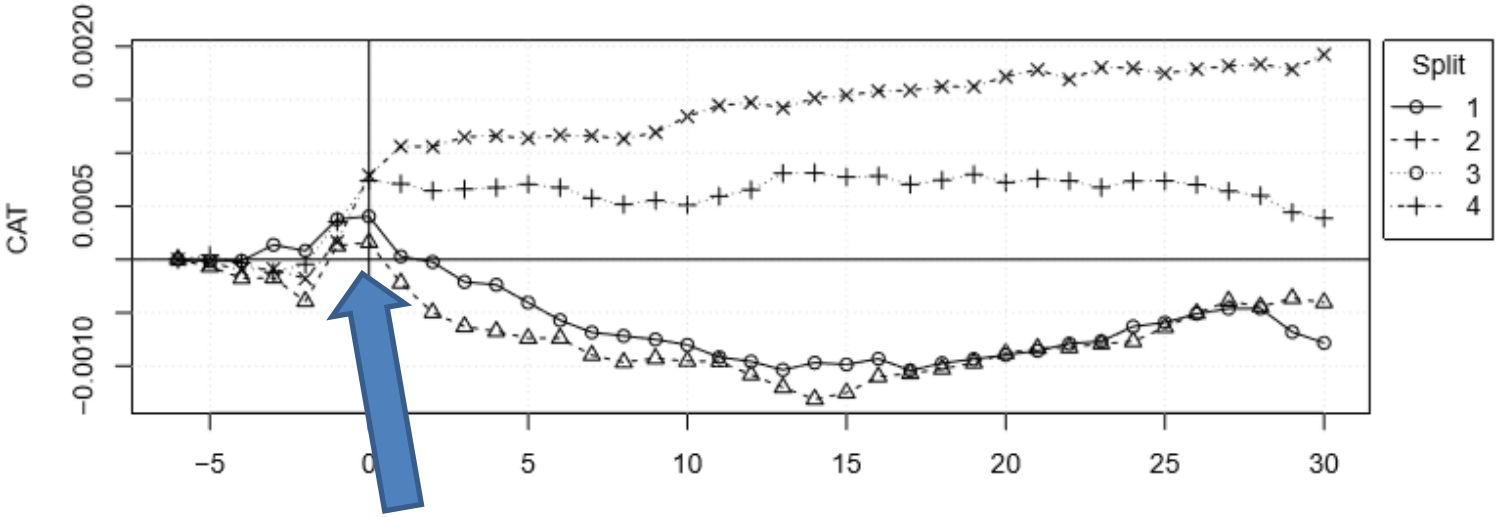
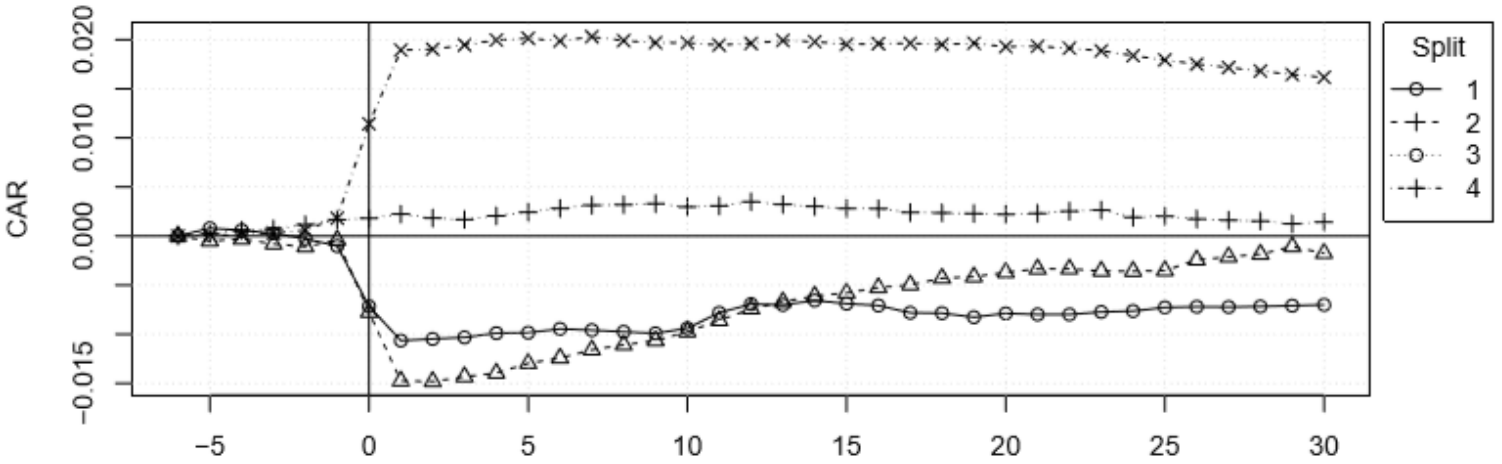
CAT AND CAR


CAT
0.0020
0.0005
−0.0010
−5
0
5
10
15
20
25
30
Split
1
2
3
4
CAT follow CAR closely
CAR
0.020
0.010
0.000
−0.015
−5
0
5
10
15
20
25
30
Split
1
2
3
4

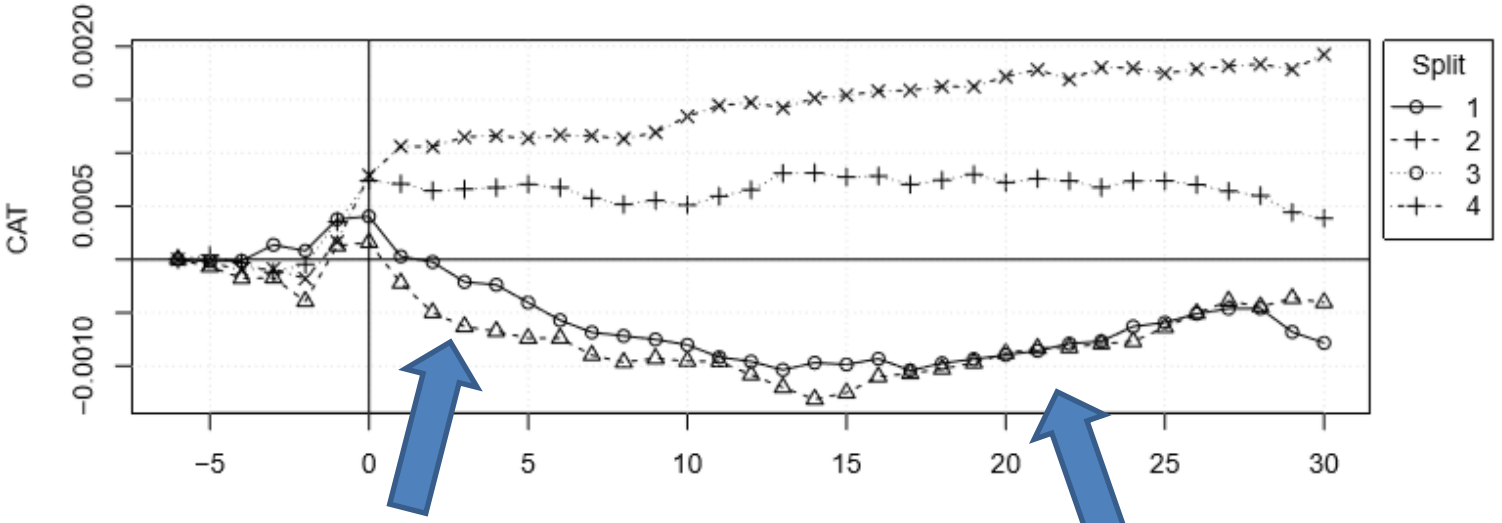
CAT AND CAR



An upward CAT even for negative earnings surprise at the event date

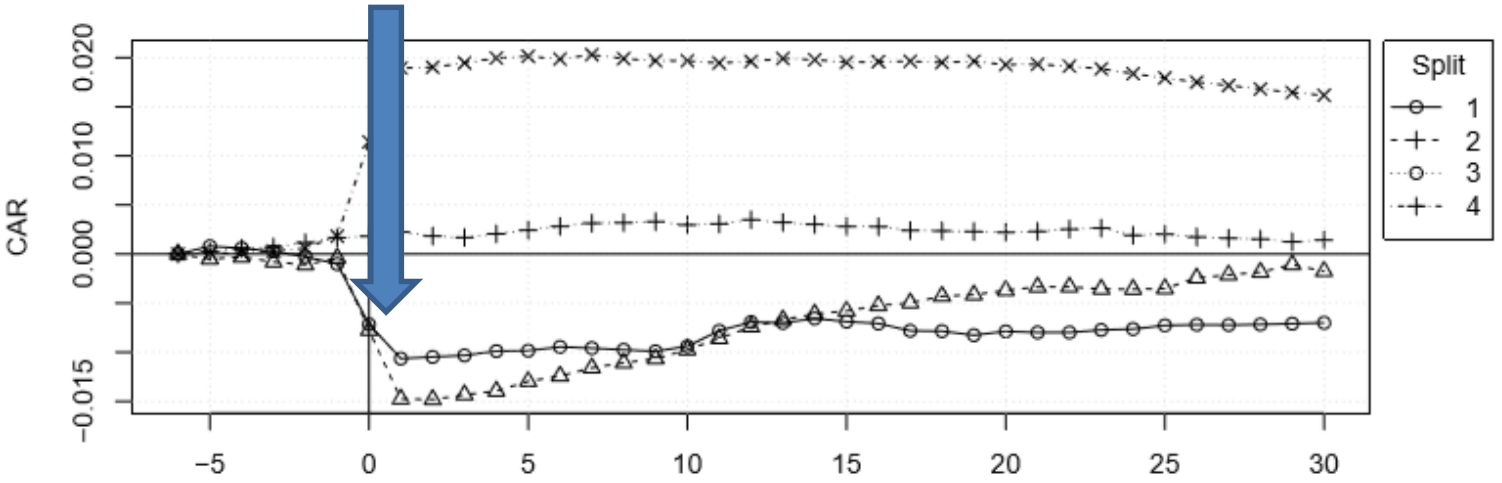


CAT AND CAR



Slow downtrend for CAT,
not consistent with CAR

Followed by an upward pressure



FURTHER QUESTIONS

Bias in reporting of negative earning surprise by some news outlets?

If yes, which ones are the culprit?

(e.g., Arslan-Ayaydin et al. (2016) demonstrate that managers with equity-based incentives tends to inflate the tone of earnings press release.)

For a good analysis of firm's tone and return predictability using tone, we may need to avoid bias in news and/or sources. At the very least, we need to be aware of them

Still an ongoing investigation

Thank you for listening!

REFERENCE

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