

Market disappointment with central bank announcements

Matthieu Picault* and Julien Pinter**

** *University of Minho, NIPE, Braga*

* *Univ. Orléans, LEO*

January 14, 2023

Abstract

The response of asset prices to central bank announcements has been the subject of numerous studies over the past decade. Most of them have focused on financial measures of surprises in central bank announcements and their effects on various asset prices. This paper aims to investigate a dimension of central bank announcements that has not yet been studied: the emotional disappointment of the market. To measure disappointment, we use the content of key financial newspapers and use the latest text-mining methods to detect sentences indicating a disappointment of the market. We do so both for the Federal Reserve and the European Central Bank. We then analyze how disappointment weighs on next-days market performance. We find evidence that disappointing central bank announcements lead to lower subsequent stock market returns for both the Fed and the ECB. They also lead to lower volume of transactions on stock market related indexes in the US, and to higher volatility in Europe. This is true controlling for standard monetary policy surprises indicators. The findings are consistent with the associated psychological literature, but also indicate that disappointing central bank announcements lead to fundamental market re-adjustments.

Keywords : monetary policy surprises; asset prices; European Central Bank; Federal reserve; investor sentiment; financial news media; content analysis; efficient markets

JEL Classification : D84, E02, E52, E31

1 Introduction

"Volatility picked up in a massive way overnight, as traders reacted by repositioning their portfolios as disappointment set in when no definitive action was announced from the ECB." (Financial Times)

Central bank announcements are among the most important events driving stock markets. The average stock market returns and Sharpe ratios in the USA have been found to be 20 to 40 times higher on days when central bank announcements are made than on days without such announcements (Brusa et al. (2019), Savor & Wilson (2013), Lucca & Moench (2015)).

The response of asset prices to central bank announcements has given rise to many research over the past years. Most of this research used measures of financial surprises to capture the content of central bank announcements, which were built by identifying in the data factors which have well-established fundamental interpretations.¹ Other research has focused on the textual information vehiculated through the press conference (Hubert & Labondance 2021), or on the informational content on the economy of monetary policy announcements (Jarociński & Karadi 2020). Interestingly, to our knowledge, no research has investigated the emotional aspect in the reaction to the central bank announcement. It is all the more so surprising as emotional reactions, in the sense of reactions which are not justified by the fact at hands, have been widely recognized to matter in a general context (Baker & Wurgler 2007). In addition, it is evident to readers of central bank news that central banks often euphorize or disappoint market participants. Thus, one may ask whether and to which extent the emotional reaction of the market to central bank announcements helps explain stock markets movements.

This paper intends to fill the above-mentioned gap by investigating whether and how the (emotional) disappointment of the market participants vis-à-vis the central bank announcement affects the market. The focus is on disappointment, a negative reaction, rather than on its opposite, delightment or euphoria, insofar as research usually recognizes that negative aspects weigh more on individual's decisions than the positive ones (Soroka 2006). We focus on disappointment rather than disgust, fear or other negative emotional reactions insofar as our identification strategy allows for a particularly good identification for this emotion. Disappointment is also often also referred

¹Gürkaynak et al. (2005) for example distinguished between "target" and "path" surprises in central bank announcements, while Swanson (2021) further added the "large-scale asset purchases" surprises to this distinction. The former surprises are intended to capture a factor related to the interest rate decision, the second ones a factor related to the communication on future interest rates, the third one a factor related to the implementation of asset purchases programs.

to as a specific emotion in psychology, affecting subsequent behavior (Zeelenberg et al. 1998).

Our strategy to investigate the effect of disappointment first relies on the construction of an index of disappointment with the central bank announcement. We rely on the key financial newspapers for that purpose, and capture all the sentences indicating a market disappointment.² To do so, we first manually read all the reports from the Financial Times on the days of monetary policy announcements for the European Central Bank (ECB), and isolate those reporting a market disappointment. Among those, we manually select sentences that report a disappointment of the market vis-à-vis the central bank announcement. We then use machine-learning techniques, complemented by a sensible human approach, to detect all sentences that translate a market disappointment in the reports related to the Fed and the ECB in the Wall Street Journal and the Financial Times.

Our approach to disentangle the *ceteris paribus* effect of disappointment will then be to analyze the effect of such disappointment on a range of stock market variables, controlling for the effect of the standard monetary policy surprises. Doing so will not only ensure that the effect we capture is *not* reflecting a negative surprise on fundamental aspects of monetary policy announcements, but will also allow us to deal with the plausible criticism that our disappointment index may partly capture a fundamental information about the surprising changing stance of monetary policy.

We thus analyze, through Jorda local projections, how disappointment weighs on future market performance, controlling for the above-mentioned monetary policy surprises. Doing so, we find strong evidence that disappointing central bank announcements lead to lower subsequent stock market returns for both the Fed and the ECB. The persistence of the effect differs, and are more indicative of a fundamental market re-adjustment when it comes to the ECB. Disappointing central bank announcements also lead to lower volume of transactions on stock market related indexes in the US, and to higher volatility in Europe. The findings are consistent with the associated psychological literature, although the somewhat persistent effect indicates that disappointing central bank announcements lead to fundamental market re-adjustments.

The paper mainly contributes to the literature on the effect of central bank announcements on the market. Most studies consider standard measures of monetary policy surprise to proxy for the impact of the central bank announcement (Kuttner (2001), Gürkaynak et al. (2005), Swanson (2021)). We add to this well-furnished literature by considering a new aspect, the emotional disappointment of the market, and showing that it helps explain substantially important moves in

²A key assumption will therefore be that the newspapers translate the average market sentiment. Or in other words, that the newspapers have, overall, access to a representative panel of investors, from which they honestly transcript the average sentiment in their report. The extent to which these assumptions are credible makes this strategy better than using social media, which may not represent well the average market player.

key financial variables, days after the announcement.

The paper also contributes to the literature on the effect of investor sentiment on stock market variables. These have mainly considered investor sentiment generally defined, see e.g. the pioneering work of Tetlock (2007), or Garcia (2013). We add to this literature by considering specifically the impact of investor sentiment vis-à-vis monetary policy announcements, which are a key aspect for markets.

The rest of the preliminary draft is organized as follows. Section 2 explains how we build our disappointment index. Section 3 explains our methodology to investigate the effect of investors' disappointment on several market variables, and section 4 presents the results. There is no conclusion and robustness tests for this preliminary version.

2 A disappointment index

2.1 General approach

Building an indicator of market disappointment requires having access to the emotional reaction of a representative panel of investors to the central bank announcement. The ideal approach would thus be to survey a representative panel of investors after the central bank announcement. This has, to the best of our knowledge, not been done. Existing surveys, such as those from Bloomberg or Reuters, focus solely on interviewing market participants before the central bank announcement, to shed light on the overall expected move, but not after.

However, media constantly interview market participants to build their reports on the central bank announcement. Doing so, they inquire about investors' analysis and sentiment vis-à-vis the central bank announcement. If a subsequent share of market participants surveyed convey disappointment with the central bank's decision, we expect professional media to have an incentive to consistently report it. To the extent that media consider a representative set of investors, or that the investors surveyed by them report the view of the overall market, analyzing the media content should allow us to capture significant market disappointment with the central bank announcement. While relying on media reports also has its flaws, which will be discussed in subsequent parts of this paper, it constitutes to our view the best way to capture market sentiment vis-à-vis the central bank announcements over a long time period from the 1990s.

For our analysis, we will rely on two main financial newspapers: the Financial Times, and the Wall Street Journal. Using Factiva, we collect articles from these two newspapers containing the

word "European Central Bank" or "ECB" for the ECB; and "Federal Reserve" or "the Fed" or "Federal Open Market Committee" or "FOMC" for the Federal Reserve. Only articles on the day of the announcement and the subsequent day are considered, leading us to consider close to 9789 articles on the period 2004-2021 for the ECB, and 11869 articles for the Fed for 2003-2019. Out of these reports, our goal is to isolate all sentences relating a market disappointment vis-à-vis the monetary policy announcements.

2.2 Isolating sentences conveying disappointment

We do so in several steps. We first manually read all the reports from the Financial Times on the days of monetary policy announcements for the European Central Bank (ECB), and isolate those reporting a market disappointment. Among those, we manually select sentences that report a disappointment of the market vis-à-vis the central bank announcement. This allows us to get a sensible knowledge on the way disappointment is usually conveyed in the media.

From this first step of the analysis, we observe that part of the sentences referring to market disappointment can be very well captured by a simple rule. For example, sentences containing the triple (i) "disappoint" or "disappointed" or "disappointing" or "reacted badly" or "recoiled" (ii) "investor(s)" or "market(s)" or "traders" and (iii) "European Central Bank" or "ECB" or "Trichet" or "Draghi" or "Lagarde" or "central bank(s)" almost all capture market disappointment vis-à-vis the ECB announcement. An example of such sentence is:

"(Says BBH's Marc Chandler:) Ultimately, and profoundly the ECB disappointed, and this has rarely been seen in Draghi's tenure, and hit a market that had amassed a significant short euro position over the past several weeks." (Financial Times, March 2015 announcement)

We thus consider such relevant characteristics to isolate the sentences conveying disappointment.³

For a substantial part of the sentences, there is no clearly apparent structure that could be used to accurately capture market disappointment. These tend to contain one of the words belonging to the above-mentioned triple, but if we were to select all sentences containing one of them, we would select a large share of irrelevant sentences and ultimately have an inaccurate index of disappointment. We complement our above-stated approach with an NLP deep learning model to detect sentences for which the structure is not as clear as the above-documented one. We use the

³In doing so, we essentially follow the approach of other studies using newspapers' articles to capture relevant dimensions of monetary policy, e.g. Husted et al. (2019).

BERT (Bidirectional Encoder Representations from Transformers) model, developed by Google and pre-trained on the set of unpublished books and English Wikipedia pages. BERT is a type of transfer-learning model, i.e. a model pre-trained on a known task that has learned contextual relationships between words. We use this model as it has often been found to outperform alternative machine-learning techniques in the context of text-analysis (Shapiro et al. 2022). We will re-train the model with sentences capturing market disappointment to update BERT initial pre-trained parameters to classify our set of sentences.⁴

In practice, we select a random subset of 800 sentences containing one of the words indicated in the above-mentioned triple. Among those, we indicate to BERT which ones relate to market disappointment. We then use this sample within the BERT model to "train" it to classify a sentence among the different sentiment categories. More specifically, as is best practice, we split the labeled dataset into a training set, a validation set, and a test set. The latter have 100 observations each, leaving 600 observations for the training set. Hyper-parameter optimization is then done through grid search, using cross-validation to evaluate model performance for each possible set of hyper-parameters, and retaining the model with the best accuracy. The ultimately selected model has an accuracy of **% in our testing sample (note for Ifo: we need to re-do this part). Looking at type 1 and type 2 risks ... (note for Ifo: we need to re-do this part).

2.3 Resulting index

Once a maximum of sentences relating to market's disappointment are isolated, we build a disappointment index as such. We start by summing the mentions of market disappointment vis-à-vis the ECB in each article for each newspaper. Figure 1 below shows the index presenting the average number of mentions of disappointment with the ECB announcement, among the two newspapers.

We then make an indicator capturing the first principal component of the indexes for each newspaper. In effect, this is an alternative to the indicator presented in Figure 1 (which we show in this section in order to give the reader an idea of the number of sentences spotted with our methodology). This alternative is likely to be more robust to outlying observations from one newspaper, and thus be more representative of a representative market.

⁴We redirect the reader towards Shapiro et al. (2022) for a more comprehensive discussion about BERT and the associated references.

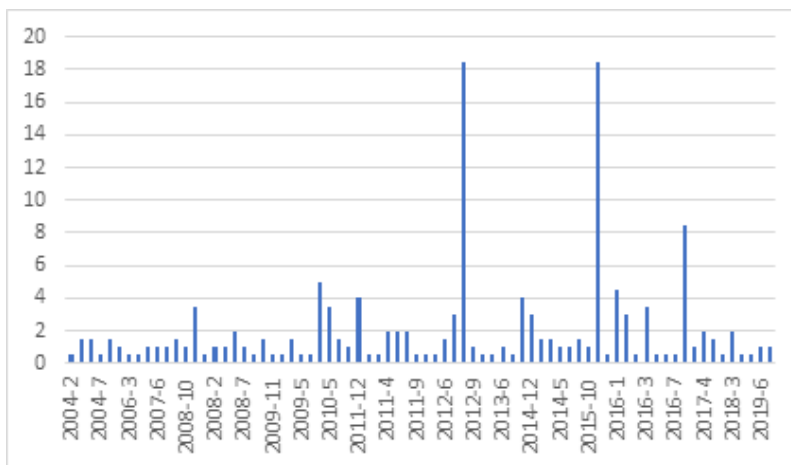


Figure 1: Average mentions of disappointment with the ECB announcement

Notes: Only dates with at least a mention are present. The arithmetic average number of mentions is shown, considering the Financial Times and the Wall Street Journal.

discuss the index

3 Investigating the effect of investors' disappointment: methodology

3.1 Data

Our data selection is first inspired by the literature on psychology, emphasizing that disappointment may result in a subsequent decrease in risk taking actions Zeelenberg et al. (1998). It is also inspired by the recent paper of Gorodnichenko et al. (2021), looking at the reaction of the emotional aspects of central bank communication. Consequently, we will investigate the potential effect of disappointment on several variables that are particularly connected with monetary policy, and likely to be relevant in our case.

More specifically, we look at a wide range of variables ranging from: stock prices, term spreads, exchange rates, volume of transactions on stock market related instruments, volatility (intraday vol, close-to-close, VIX or VSTOX) and the cross-sectional dispersion of returns.

describe more in detail

3.2 Empirical approach

In line with Gorodnichenko et al. (2021), we use Jorda local projections, where the dependent variable is, in turn, related to one of the above-mentioned variables. We consider cumulative values, corresponding to cumulative returns for example for the case of the stock market values.

Because one may be naturally concerned that our disappointment index at least partly captures negative surprises on the central bank policy, it is particularly important in our context to control for monetary policy surprises. Thus, we use the standard measures of monetary policy surprises (Swanson 2021) as controls in our regression.

Another important aspect that one may be concerned about is that media may report disappointment when strong market reactions arise, as a justification for the important move. If that is indeed the case, a correlation between any stock market variable and disappointment may not convey any causality from the latter to the former aspect. To avoid this well-known concern, we follow the literature (Tetlock 2007) and only look at the impact of the central bank disappointment on the next-day relevant variable.

Ultimately, our econometric specification is thus the following:

$$Y_{t+n}^m - Y_t^m = \alpha + \beta_0(Y_{t+n}^m - Y_t^m) + \beta_1 \text{DISAP}_t + \beta_2 \text{Target}_t + \beta_3 \text{Path}_t + \beta_4 \text{LSAP}_t \quad (1)$$

where $Y_{t+n}^m - Y_t^m$ corresponds to the cumulative change in the relevant financial variable (denoted by m), DISAP_t is the disappointment index (that we will standardize in the regressions to trace out the impact of a one-standard deviation shock), Target_t , Path_t and LSAP_t are the standard measures of monetary policy surprises (Swanson 2021), capturing the surprise of the market vis-à-vis, respectively, the current level of the interest rate, the future path of the interest rate, and the large-scale purchase programs.

4 Results (preliminary, for Ifo submission)

We trace below the impulse response of a one-standard deviation shock in the (standardized) disappointment index. The time unit is days, and we vary the horizon of the traced response according to what we find the most relevant. In all cases, we consider the response on several days, in line with (Swanson 2021) (who consider up to 80 days) or (Gorodnichenko et al. 2021) (who consider up to 15 days).

4.1 Results for the ECB

At this stage, we have the following preliminary results:

- We find that a disappointment shock leads to a lower level in the Eurostoxx (i.e. a negative cumulative return), starting from 5 days after the announcement, and persisting up to 35 days after (see Figure 4). The Eurostoxx persistently decreases from 2% after a disappointing central bank announcement. Such a long term effect is similar in essence with the effect found in (Swanson 2021), and may mean that disappointment leads to fundamental adjustments.
- We find that a disappointment shock leads to a higher level in the VSTOXX (i.e. a positive cumulative change), starting from 3 days after the announcement, and persisting up to 12 days after (see Figure 5). The VSTOXX can increase from up to 4%.

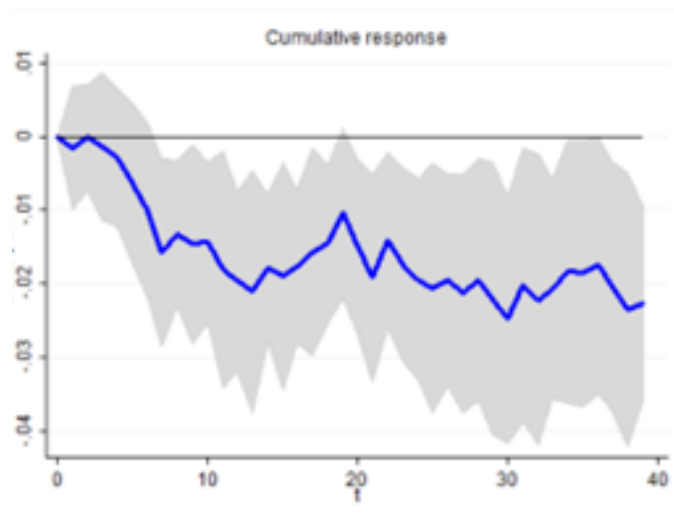


Figure 2: Cumulative response of the Eurostoxx (in log), after a disappointing central bank announcement

Notes: Jorda local projections, next-day responses to a disappointment shock arising at time $t=0$, 90% confidence bands

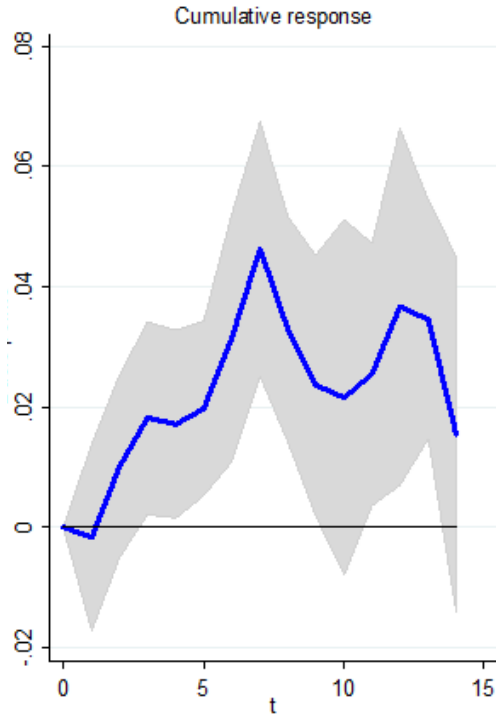


Figure 3: Cumulative response of the VSTOXX index (in log), after a disappointing central bank announcement

Notes: Jorda local projections, next-day responses to a disappointment shock arising at time $t=0$, 90% confidence bands

4.2 Results for the FeD

At this stage, we have the following preliminary results, considering similar variables to Gorodnichenko et al. (2021):

- We find that a disappointment shock leads to a slightly lower level in the SPY (i.e. a negative cumulative return), an ETF fund that tracks the SP 500 index used in Gorodnichenko et al. (2021), the day after the announcement, and persisting up to 5 days after (see Figure 4), for a maximum of minus 0.3%.
- Considering the volume of transactions related to the above-mentioned ETF, we find that a disappointment shock leads first to a higher volume of transactions, before then leading to a persistent decrease in the volume of transactions, reaching up to minus 1.8% (see Figure 5).

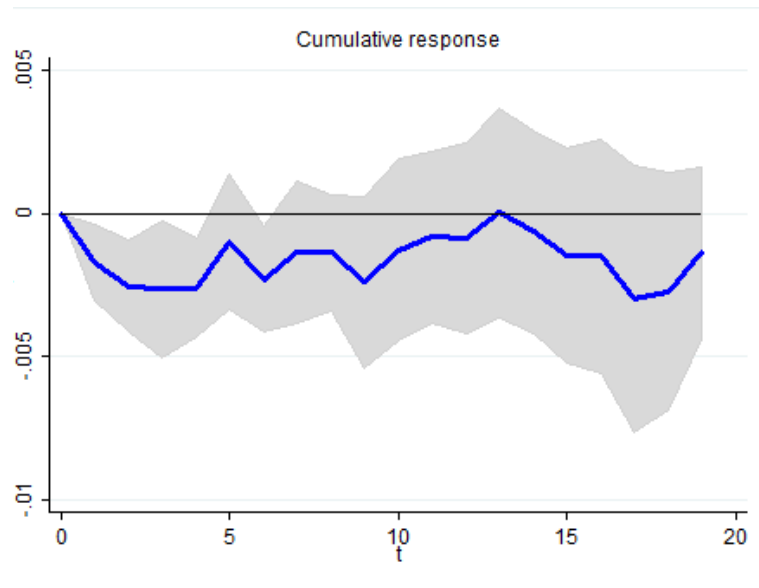


Figure 4: Cumulative response of the log of SPY (ETF fund tracking the SP 500, used in Gorodnichenko et al. (2021)), after a disappointing central bank announcement

Notes: Jorda local projections, next-day responses to a disappointment shock arising at time $t=0$, 90% confidence bands

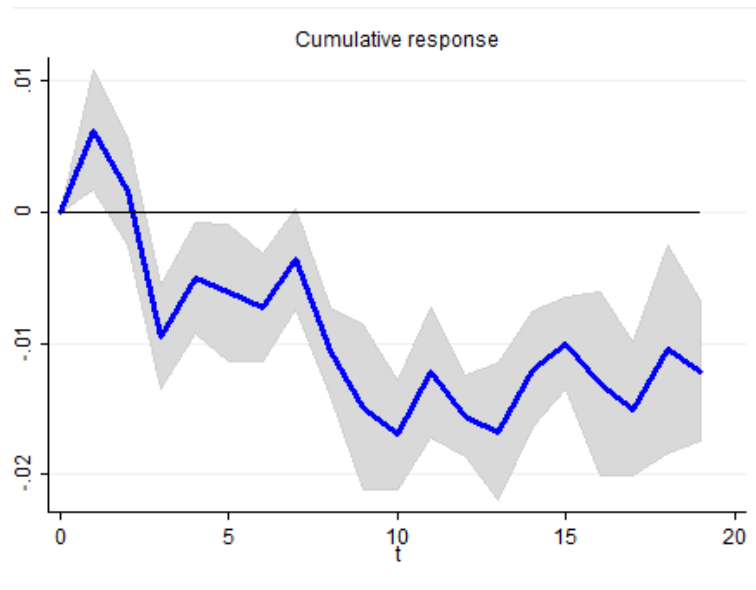


Figure 5: Cumulative response of the volume of the SPY (ETF fund tracking the SP 500, used in Gorodnichenko et al. (2021)), after a disappointing central bank announcement

Notes: Jorda local projections, next-day responses to a disappointment shock arising at time $t=0$, 90% confidence bands

5 Robustness and interpretation:

under construction

6 Conclusion

under construction

References

- Baker, M. & Wurgler, J. (2007), ‘Investor sentiment in the stock market’, *Journal of Economic Perspectives* **21**(2), 129–152.
- Brusa, F., Savor, P. & Wilson, M. (2019), ‘One Central Bank to Rule Them All*’, *Review of Finance* **24**(2), 263–304.
- Garcia, D. (2013), ‘Sentiment during recessions’, *The Journal of Finance* **68**(3), 1267–1300.
- Gorodnichenko, Y., Pham, T. & Talavera, O. (2021), The Voice of Monetary Policy, NBER Working Papers 28592, National Bureau of Economic Research, Inc.
- Gürkaynak, R. S., Sack, B. & Swanson, E. (2005), ‘Do Actions Speak Louder Than Words? The Response of Asset Prices to Monetary Policy Actions and Statements’, *International Journal of Central Banking* **1**(1).
- Hubert, P. & Labondance, F. (2021), ‘The signaling effects of central bank tone’, *European Economic Review* **133**, 103684.
- Husted, L., Rogers, J. & Sun, B. (2019), ‘Monetary policy uncertainty’, *Journal of Monetary Economics* .
- Jarociński, M. & Karadi, P. (2020), ‘Deconstructing monetary policy surprises—the role of information shocks’, *American Economic Journal: Macroeconomics* **12**(2), 1–43.
- Kuttner, K. N. (2001), ‘Monetary policy surprises and interest rates: Evidence from the fed funds futures market’, *Journal of Monetary Economics* **47**(3), 523–544.
- Lucca, D. O. & Moench, E. (2015), ‘The Pre-FOMC Announcement Drift’, *Journal of Finance* **70**(1), 329–371.
- Savor, P. & Wilson, M. (2013), ‘How Much Do Investors Care About Macroeconomic Risk? Evidence from Scheduled Economic Announcements’, *Journal of Financial and Quantitative Analysis* **48**(2), 343–375.
- Shapiro, A. H., Sudhof, M. & Wilson, D. J. (2022), ‘Measuring news sentiment’, *Journal of Econometrics* **228**(2), 221–243.

- Soroka, S. N. (2006), ‘Good news and bad news: Asymmetric responses to economic information’, *Journal of Politics* **68**(2), 372–385.
- Swanson, E. T. (2021), ‘Measuring the effects of federal reserve forward guidance and asset purchases on financial markets’, *Journal of Monetary Economics* **118**, 32–53.
- Tetlock, P. C. (2007), ‘Giving content to investor sentiment: The role of media in the stock market’, *The Journal of Finance* **62**(3), 1139–1168.
- Zeelenberg, M., van Dijk, W. W., S.R.Manstead, A. & der Pligt, J. (1998), ‘The experience of regret and disappointment’, *Cognition and Emotion* **12**(2), 221–230.