
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Finance Research Letters 36 (2020) 101578

Contents lists available at ScienceDirect

Finance Research Letters

journal homepage: www.elsevier.com/locate/frl

# Did Congress trade ahead? Considering the reaction of US industries to COVID-19

John W. Goodell[a,*], Toan Luu Duc Huynh[b]

[a] College of Business Administration, The University of Akron, Akron Ohio, USA, 44107
[b] School of Banking, University of Economics Ho Chi Minh City, Vietnam, Chair of Behavioral Finance, WHU - Otto Beisheim School of Management, Germany

ARTICLE INFO

*Keywords:*
COVID-19
US industries, Investor attention
Market reaction
Insider trading
Politics and trading

*JEL Classification:*
F15
F23
F36
G01
G02
G14
G15

ABSTRACT

During the ongoing COVID-19 pandemic in the US, there has been considerable media attention regarding several US legislators who traded stocks in late January through February 2020. The concern is that these legislators traded in anticipation of COVID-19 having a major impact on the financial markets, while publicly suggesting otherwise. We consider whether these legislator trades were in a time window, and of a nature, that would be consistent with trading ahead of the market. Towards this end, we assess the reactions of US industries to sudden COVID-related news announcements, concomitantly with an analysis of levels of investor attention to COVID. Results suggest that, at an industry-level, for legislator trading to be "ahead of the market" it needed to have been done prior to February 26, and involving the 15 industries we identify as having abnormal returns, especially medical and pharmaceutical products (positive); restaurants, hotels, and motels (negative); as well as services and utilities. These criteria are met by many of the legislator trades. Our results help to both parameterize concerns about this case of legislator trading; as well as provide insight into the reactions and expectations of investors toward COVID-19.

## 1. Introduction

During the ongoing COVID-19 pandemic in the US, there has been considerable public and media attention regarding several US legislators who traded stocks in late January through February 2020. The concern is that these legislators traded in anticipation of COVID-19 having a major impact on the financial markets, while publicly suggesting otherwise. Roughly, the scenario is that two US senators, Richard Burr and Kelly Loeffler both sold large amounts of stock in late January through mid February. This was when US markets were at peak values. Both Burr and Loeffler received non-public information about the global spread of coronavirus from White House officials, who had been briefing Senators regularly for some weeks. The concern is not that either Burr or Loeffler received specific, material, non-public information and then used it to trade specific stock (qualifications for insider trading), but rather that their concomitant public assertions of market optimism violated public trust. On Feb. 13, one week before U.S. stocks began sliding, Burr executed 33 trades, selling more than half a million dollars of shares (Blake, 2020). Burr and Loeffler may have executed the largest magnitude of trading but they are by no means the only legislators under scrutiny. For instance, representative Susan Davis sold several thousand dollars of shares in Alaska Air and Royal Caribbean Cruise Lines on February 11 (Sevens and O'Donnell, 2020).

* Corresponding author: College of Business Administration, The University of Akron, Akron Ohio, USA, 44107.
*E-mail address:* johngoo@uakron.edu (J.W. Goodell).

https://doi.org/10.1016/j.frl.2020.101578
Received 16 April 2020; Received in revised form 4 May 2020; Accepted 7 May 2020
Available online 31 May 2020

**Table 1**
Summary descriptive statistics

| No | Variable | Mean | Std. Dev. | Skewness | Kurtosis |
|---|---|---|---|---|---|
| 1 | Agriculture | 0.08 | 1.93 | -0.49 | 4.48 |
| 2 | Food Products | –0.16 | 0.88 | -0.74 | 5.34 |
| 3 | Candy & Soda | –0.02 | 1.03 | -1.43 | 8.81 |
| 4 | Beer & Liquor | –0.07 | 1.01 | -1.91 | 8.02 |
| 5 | Tobacco Products | –0.14 | 1.16 | -1.41 | 6.75 |
| 6 | Creation | –0.35 | 1.54 | -0.46 | 2.99 |
| 7 | Entertainment | 0.06 | 1.55 | -0.48 | 3.11 |
| 8 | Printing and Publishing | –0.16 | 1.42 | -0.08 | 4.65 |
| 9 | Consumer Goods | –0.12 | 0.95 | -2.29 | 10.72 |
| 10 | Apparel | –0.18 | 1.23 | -1.32 | 5.71 |
| 11 | Healthcare | –0.06 | 1.13 | -0.71 | 3.95 |
| 12 | Medical Equipment | –0.14 | 1.05 | -0.91 | 3.68 |
| 13 | Pharmaceutical Products | –0.07 | 0.91 | -1.16 | 5.45 |
| 14 | Chemicals | –0.30 | 1.34 | -1.13 | 5.05 |
| 15 | Rubber and Plastic Products | –0.16 | 1.08 | -0.85 | 4.13 |
| 16 | Textiles | –0.28 | 1.66 | -0.17 | 2.71 |
| 17 | Construction Materials | –0.15 | 1.14 | -1.05 | 4.28 |
| 18 | Construction | –0.07 | 1.29 | -1.01 | 4.77 |
| 19 | Steel Works Etc | –0.52 | 1.42 | -0.67 | 3.65 |
| 20 | Fabricated Products | –0.13 | 1.89 | -0.55 | 3.28 |
| 21 | Machinery | –0.11 | 1.36 | -0.63 | 4.04 |
| 22 | Electrical Equipment | –0.13 | 1.26 | -0.79 | 5.26 |
| 23 | Automobiles and Trucks | 0.20 | 2.53 | -0.30 | 6.25 |
| 24 | Aircraft | –0.29 | 1.36 | -1.20 | 5.71 |
| 25 | Shipbuilding, Railroad Equipment | –0.23 | 1.43 | -0.39 | 3.15 |
| 26 | Defense | –0.04 | 1.34 | -0.89 | 5.41 |
| 27 | Precious Metals | 0.16 | 1.72 | -0.95 | 5.43 |
| 28 | Non-Metallic and Industrial Metal Mining | –0.28 | 1.55 | -0.52 | 3.09 |
| 29 | Coal | –0.60 | 2.95 | 1.18 | 6.29 |
| 30 | Petroleum and Natural Gas | –0.44 | 1.69 | -0.73 | 4.93 |
| 31 | Utilities | –0.03 | 1.01 | -2.40 | 10.31 |
| 32 | Communication | –0.13 | 0.92 | -1.32 | 5.49 |
| 33 | Personal Services | –0.12 | 1.04 | -1.47 | 5.58 |
| 34 | Business Services | –0.06 | 1.10 | -1.56 | 6.18 |
| 35 | Computers | –0.14 | 1.49 | -0.92 | 4.07 |
| 36 | Computer Software | 0.04 | 1.28 | -1.62 | 6.75 |
| 37 | Electronic Equipment | 0.01 | 1.64 | -1.44 | 5.40 |
| 38 | Measuring and Control Equipment | –0.16 | 1.17 | -1.29 | 4.75 |
| 39 | Business Supplies | –0.22 | 1.01 | -0.46 | 4.51 |
| 40 | Shipping Containers | –0.12 | 1.34 | -0.93 | 5.42 |
| 41 | Transportation | –0.17 | 1.30 | -1.56 | 5.74 |
| 42 | Wholesale | –0.20 | 1.05 | -1.55 | 6.15 |
| 43 | Retail | –0.04 | 1.01 | -1.75 | 8.02 |
| 44 | Restaurants, Hotels, Motels | –0.11 | 1.06 | -1.46 | 5.51 |
| 45 | Banking | –0.23 | 1.28 | -1.49 | 5.96 |
| 46 | Insurance | –0.16 | 1.30 | -1.22 | 6.78 |
| 47 | Real Estate | –0.15 | 1.13 | -1.24 | 5.59 |
| 48 | Trading | –0.14 | 1.16 | -1.18 | 4.76 |
| 49 | Almost Nothing | –0.11 | 1.03 | -1.44 | 6.39 |
| 50 | Market return | –0.11 | 1.07 | -2.16 | 8.65 |
| 51 | ΔCorona | 0.06 | 0.24 | 0.69 | 4.57 |

**Notes:** Our sample covers the period from December 9, 2019 to February 28, 2020. Values are in % for US Industries

In some ways. the COVID-19 crisis presented an ideal environment for asymmetric information between government officials and the general public. Elected officials in the US were mindful of the political importance of economic and market optimism, while COVID-19 seemingly surprised many, particularly western, economies. Initially, many people evaluated the risk of COVID-19 as like a typical flu. Others, perhaps, may have regarded COVID-19 as an infectious disease, like SARS or MERS, would be mainly limited to some domestic outbreaks, especially in China (Fan et al., 2019).

It remains to be seen what changes COVID-19 will eventually bring to individuals, societies, and, to industries. There is already a flurry of academic interest in all aspects and implications of the COVID crisis (Baldwin and Weder di Mauro, 2020; Goodell, 2020). Academics are already addressing possible ways of mitigating economic damage (Gopinath, 2020)[1]; how markets will react and how

[1] See Abu-Ghunmi, Corbet, and Larkin (2020), Adda (2016); Zhu, Gao, and Sherman (2020).

markets have already suggested impacts (Ramelli and Wagner, 2020).[2] One early step in this process is to investigate market expectations of COVID-19's impact across industries. As has long been noted (Schwert, 1981), stock markets can offer insights into investor expectations. There is now particular attention on how recent market reactions may reflect economic expectations (Ramelli and Wagner, 2020). There is a great deal of literature on shocks impacting economies and markets. Particularly, oil shocks (Aggarwal, Akhigbe, and Mohanty, 2012; Elyasiani, Mansur, and Odusami, 2011; Nandha and Faff, 2008; Sakaki 2019; Zavadska, Morales, and Coughlan, 2018; Wang, Wu, and Yang, 2013; You et al., 2017); monetary transmissions (Ammer, Vega, and Wongswan, 2010; Bredin et al., 2009); and industrial accidents Corbet, Larkin, and McMullan, 2020).[3]

As noted by Goodell (2020), COVID-19 presents a new normal for investors. The extent of global impact, along with the likelihood of future occurrences; as well as the likelihood of survivability (compared to other catastrophe scenarios) suggests the next time there is a sudden appearance of a contagious respiratory illness, or a new flaring of COVID-19, there will concomitantly be substantial financial market reaction. COVID-19 will shape future investigations financial markets. It is important to understand how the unprecedented social distancing that has ensued from this enormous global event has impacted industries and financial market.

We consider whether the legislator trades in question were in a time window that would be consistent with trading ahead of the market. Did the trades occur before abnormal returns in particular industries that were identifiable with COVID? Toward this end, we assess the reactions of US industries to sudden COVID-related news announcements, concomitantly with an analysis of levels of investor attention to COVID. We analyze the abnormal returns of 49 industrial sectors from December 9, 2019–February 28, 2020, examining the market reactions of US industries to several key US-relevant COVID news announcements through an event study methodology (MacKinlay, 1997). Alternatively, we also examine the impact on industry returns of investor attention, via examining levels of COVID-related Google search term activity. (Da, Engelberg, and Gao, 2011).

We find that, post January 21, 2020, there was considerable public attention in the US on COVID-19. Further, for January 21–February 28 levels of this attention are associated with returns in several industries that are also later associated with abnormal returns around a February 26 COVID-related news announcement. Second, we analyze more specifically the market reactions to three notable news releases: 1) the first US confirmed cases (January 20, 2020); 2), the Public Health Emergency of International Concern announcement (January 30, 2020); and 3) the first local transmission case (February 26, 2020[4]). Overall, we find little evidence of abnormal returns until February 26, 2020. Results suggest that, at an industry-level, for legislator trading to be "ahead of the market" it needed to have been done prior to February 26, and involving the 15 industries we identify as having abnormal returns, especially medical and pharmaceutical products (positive); restaurants, hotels, and motels (negative); as well as services and utilities. These criteria are met by many of the legislator trades. Our results help to both parameterize concerns about this case of legislator trading; as well as provide insight into the reactions and expectations of investors toward COVID-19.

## 2. Data and methodology

### 2.1. Data

This study covers the daily stock return of 49 industries in the United States, following the Ken French portfolio taxonomy. Industry portfolios are constructed by assigning each NYSE, AMEX and NASDAQ stock to an industry portfolio at the end of June of year t based on its four-digit SIC code at that time. COMPUSTAT SIC codes are used, with alternative CRSP SIC codes when necessary. To gauge general market performance, we utilize the S&P 500 Composite Index because it includes the largest market capitalization on the NYSE and NASDAQ. We calculate as the natural logarithmic first difference of the daily closing prices for the market index. Table 1 lists summary statistics for US industry for our period of study.

### 2.2. Methodology

#### 2.2.1. Google searches and industry returns

We use the Google search term "corona" as a proxy to examine the impact of investor attention on industry stock return.[5] Following Edmans, Garcia, and Norli (2007), we examine the impact of investor attention on the abnormal returns, measured by the "raw residual" in the conventional CAPM model. We estimate:

$$R_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt} + \varepsilon_{it} \quad (1)$$

where $R_{it}$ represents return of a specific industry i on day t which belongs to estimation window, $R_{mt}$ is the market return of the United States market on day t belonging to the same period, and $\varepsilon_{it}$ is an abnormal raw return, which is not captured by the Capital

[2] Including the impacts of subjective reactions (see Flori, 2019).

[3] See also Evans and Elphick (2005); Wu (2019) for systemic risks in general.

[4] "CDC Confirms Possible Instance of Community Spread of COVID-19 in U.S. https://www.cdc.gov/media/releases/2020/s0226-Covid-19-spread.html.

[5] We do not use the term "COVID-19" because the World Health Organization changed the name of "SARS-CoV-2" to "COVID-19" after February 12, 2020, while our investigation includes the longer period from December 9, 2019 to February 28, 2020. Additionally, we find, over the period of our investigation, a much greater prevalence of search-term hits on "corona" than on "COVID-19." Online Appendix 1 highlights that while "corona" tended to capture clearer evidence about investor attention than "COVID-19."

Asset Pricing Model. We subsequently employ ordinary least squares (OLS) to estimate $\hat{\beta}_A$ from:

$$\varepsilon_{it} = \beta_0 + \beta_A \Delta\text{Attention} + \beta_D \text{Dummy} + u_{it} \quad (2)$$

where $u_{it}$ is an error term that can be heteroskedastic and contemporaneously correlated across industries. The delta of attention represents the change in the standardized Google search term in the specific period from December 9, 2019 to February 28, 2020. In addition, "dummy" is a binary variable receiving "0" if return is before January 21, 2020th—the first confirmed case in the United States and "1" otherwise.[6]

*2.2.2. Event study*

We subsequently employ an event-study methodology to identify abnormal returns. We choose an estimation window of 250 trading days, excluding the 14 days preceding the event. Table 2 summarizes our event timeline for three events.

We estimate the expected return for each industry with a market model:

$$R_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt} + \varepsilon_{it} \quad (3)$$

In Equation 3, $R_{it}$ represents the return of a specific industry i on day t which belongs to estimation window, $R_{mt}$ is the market return of the United States market on day t belonging to the same period. $\hat{\alpha}_i$ and $\hat{\beta}_i$ are parameters in the regression for constant terms and coefficients, respectively. The expected return $E(R_{it})$ is calculated as follows:

$$E(R_{it}) = \hat{\alpha}_i + \hat{\beta}_i R_{mt} \quad (4)$$

Abnormal returns are estimated as follows:

$$AR_{it} = R_{it} - E(R_{it}) \quad (5)$$

In Equation 5, $AR_{it}$ denotes the abnormal return of one industry return on day t, which belongs to event window. To measure the total impact of an event over a particular period, we sequentially add up the individual abnormal returns to create a cumulative abnormal return (CAR) for each of the event windows. Due to data availability, we perform [-2, 2] and [0, 2] for the first domestic local transmission February 26, 2020. The other events are followed by longer event windows $[-3,3]$, [0,3] to examine persistent effects.

$$CAR_{it} = \sum_{t=t_1}^{t_2} AR_{i,t} \quad (6)$$

In Equation 6, $t_1$ and $t_2$ represent the start and end of event window. After constructing ARit and CAR, we perform t-tests to examine whether the ARs and CARs are different from zero.

## 3. Results

### 3.1. When did investor interest in COVID begin?

Fig. 1 highlights the levels of investor attention (proxied by levels of Google searches on "corona" by date. On January 21, there occurs the first strong indication of investor attention, as illustrated by the figure.

### 3.2. Impact of COVID-related investor attention

We consider the impact of investors' attention on specific industries by three main sub-categories: (i) full sample, (ii) before January 21, 2020, and (iii) after January 21, 2020. Table 3 summarizes OLS regressions for impact of the Google search term "corona" on 49 US industries. [7] Several key features of the role of investors' attention are worth highlighting. First, only four industries had significant coefficients before the day when the US had the first confirmed case.[8] Interestingly, the returns of the communication industry had a positive association (significant at 5%) with an increase in Google searches about corona prior to January 21, 2020. Perhaps investors were predicting social-distancing related growth in the communication industry?

Returns to entertainment, heavy industry (including steel, chemical, construction materials, machinery, electrical equipment, industrial metal mining, and coal), and services (including restaurants, hotels, motels; and insurance) are negatively associated with investors were paying more attention to the coronavirus. These results are intuitively consistent with these industries likely to face

[6] See online appendix figure for illustration of correlations of industries and Google searches over several sampling periods.

[7] Because of the notable change in investor attention on January 21, Table 2 presents results for three different samples: the full-sample period; 2) before January 21; and 3) after January 21.

[8] Construction materials and computer software industries exhibited a weak decline in abnormal return when investors paid more attention to coronavirus. Perhaps COVID-related disruption in trading activities of these materials led to a decrease in stock return due to the potential loss in the expected future cash flow. Electronic and construction materials are top trading sectors between the US and China (Burggraf, Fendel, and Huynh (2019)).

**Table 2**
Summary of event, estimation window and excluded days

| No | Event | Estimation window | Excluded |
|---|---|---|---|
| 1 | The first confirmed case January 20, 2020 | January 02, 2019 to December 27, 2020 | 14 days |
| 2 | Public Health Emergency of International ConcernJanuary 30, 2020 | January 11, 2019 to January, 08, 2020 | |
| 3 | The first domestic local transmission February 26, 2020 | February 07, 2019 to February 04, 2020 | |

Following MacKinlay (1997)

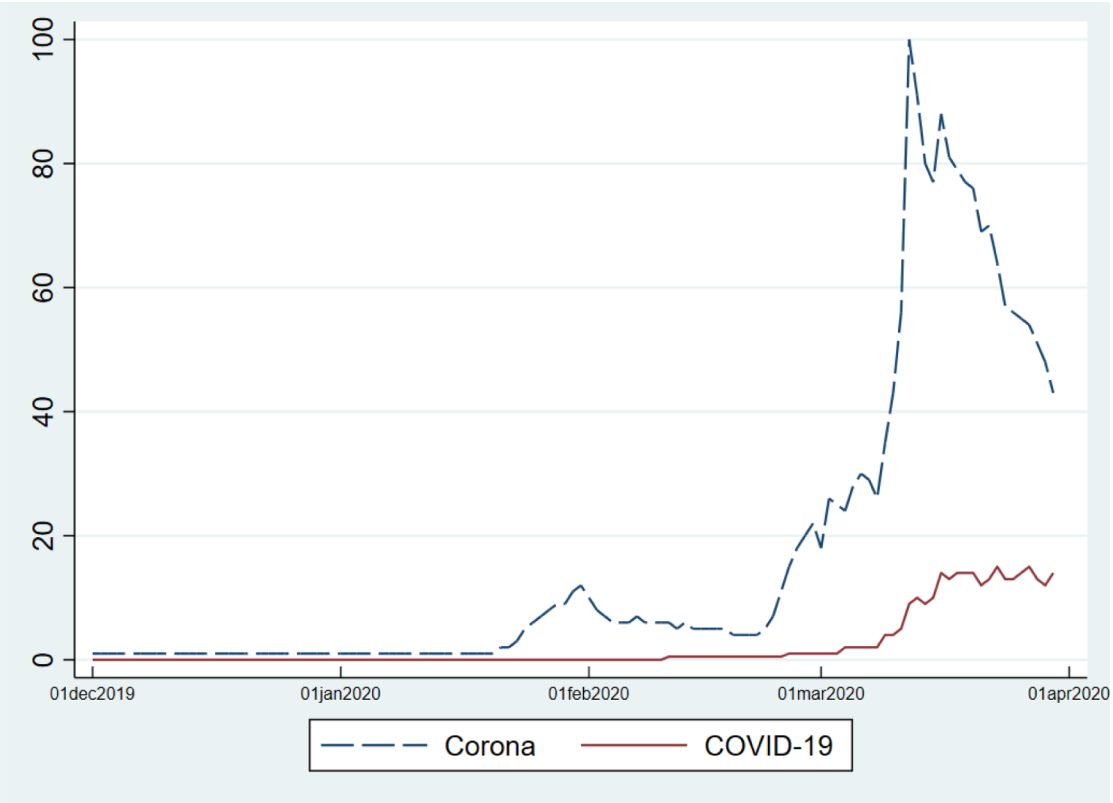



**Fig. 1.** The time varying of Corona and COVID-19 searching terms in the United States.

difficulties with importing and exporting the materials from China.

While evidence of past research is mixed with whether Google search terms can predict abnormal returns (e.g., Donadelli and Gerotto, 2019; Kim et al., 2019; Swamy, Dharani, and Takeda, 2019), we evidence that levels of searches on "corona" had an association with industry-level returns.[9] The results of this section help confirm that our results outlined in next section for the abnormal returns associated with three key COVID-related news announcements are indeed reactions to concern about COVID-19.

### *3.3. Abnormal returns*

Table 4 demonstrates the abnormal return in the first column on February 26, 2020, representing the first domestic case confirmed in California with no travel history. We evidence 15 US industries' returns reacting to this news. Except for tobacco, all industries exhibited a negative abnormal return on this day.[10] We also find three primary industries, namely precious metals, utilities; and restaurants, hotels, motels, experienced both abnormal return from the first domestic COVID-19 confirmed case, but also cu-

[9] See also Broadstock and Zhang (2019); as well as Philippas et al. (2019).

[10] We only observe the positive abnormal return for tobacco on one day. February 26, 2020 was the first day that several tobacco companies in the US, implemented price increases, possibly engendering expectations of higher future cash flows.

**Table 3**
The impact of public focus on "corona" on industry returns

| Industry | Δ Corona | | | Industry | Δ Corona | | |
|---|---|---|---|---|---|---|---|
| | Full sample | After Jan 21 | Before Jan 21 | | Full sample | After Jan 21 | Before Jan 21 |
| Agriculture | -0.707 [-0.748] | -1.394 [-1.47] | 0.857 [0.391] | Defense | 0.737 [1.36] | 1.445** [2.874] | -0.814 [-0.722] |
| Food Products | 0.414 [1.466] | 0.338 [1.266] | 1.086 [1.248] | Precious Metals | 0.249 [0.319] | 0.268 [0.295] | 0.342 [0.166] |
| Candy & Soda | 0.524* [1.917] | 0.607** [2.45] | 0.323 [0.394] | Non-Metallic and Industrial Metal Mining | -1.196 [-2.381] | -1.446** [-2.599] | -0.089 [-0.08] |
| Beer & Liquor | 0.561* [1.856] | 0.692*** [3.486] | 0.2 [0.164] | Coal | -2.973** [-2.076] | -3.329* [-1.745] | -1.565 [-0.616] |
| Tobacco Products | 0.07 [0.128] | 0.436 [0.717] | -0.529 [-0.647] | Petroleum and Natural Gas | -0.315 [-0.425] | -0.573 [-0.58] | 1.115 [0.94] |
| Creation | 0.329 [0.503] | 0.482 [0.53] | 0.525 [0.493] | Utilities | 0.555 [1.569] | 0.571 [1.539] | 0.955 [0.962] |
| Entertainment | -0.932 [-1.649] | -1.363** [-2.236] | 0.063 [0.079] | Communication | 0.258 [1.115] | 0.099 [0.309] | 0.858** [3.052] |
| Printing and Publishing | -0.656 [-1.363] | -0.947 [-1.541] | 0.411 [0.494] | Personal Services | -0.831* [-1.975] | -0.844 [-1.581] | -0.513 [-0.973] |
| Consumer Goods | 0.124 [0.402] | 0.076 [0.253] | 0.336 [0.404] | Business Services | -0.204 [-0.735] | -0.149 [-0.423] | -0.562 [-1.677] |
| Apparel | -0.472* [-1.703] | -0.667 [-1.69] | 0.515 [1.176] | Computers | -0.592* [-1.884] | -0.332 [-0.908] | -1.021 [-1.434] |
| Healthcare | -0.182 [-0.542] | -0.343 [-0.862] | 0.252 [0.374] | Computer Software | -0.297 [-1.028] | -0.258 [-0.643] | -0.752* [-1.727] |
| Medical Equipment | 0.026 [0.08] | 0.079 [0.178] | -0.053 [-0.196] | Electronic Equipment | 0.406 [0.971] | 0.616 [1.21] | -0.185 [-0.249] |
| Pharmaceutical Products | -0.198 [-0.547] | -0.265 [-0.615] | 0.145 [0.185] | Measuring and Control Equipment | -0.24 [-1.147] | -0.412* [-1.727] | 0.533 [1.265] |
| Chemicals | -0.315 [-0.772] | -0.787* [-1.95] | 1.169 [1.349] | Business Supplies | -0.239 [-0.688] | -0.277 [-0.692] | 0.64 [0.907] |
| Rubber and Plastic Products | -0.393 [-0.917] | -0.515 [-1.037] | 0.43 [0.545] | Shipping Containers | 0.033 [0.053] | -0.13 [-0.169] | 0.356 [0.352] |
| Textiles | -0.274 [-0.396] | -0.51 [-0.702] | 0.455 [0.208] | Transportation | -0.48 [-1.406] | -0.683* [-1.717] | 0.381 [0.582] |
| Construction Materials | -0.651** [-2.257] | -0.702* [-1.901] | -0.592* [-2.028] | Wholesale | 0.137 [0.499] | 0.139 [0.415] | 0.279 [0.417] |
| Construction | 0.267 [0.446] | 0.038 [0.052] | 1.122 [1.027] | Retail | 0.136 [0.478] | 0.006 [0.015] | 0.131 [0.281] |
| Steel Works Etc. | -0.756 [-1.154] | -1.659** [-2.404] | 1.917* [1.928] | Restaurants, Hotels, Motels | -0.644** [-2.277] | -0.665* [-1.89] | -0.438 [-0.979] |
| Fabricated Products | -1.164 [-1.34] | -0.851 [-0.765] | -1.351 [-1.085] | Banking | -0.241 [-1.081] | -0.292 [-1.234] | -0.163 [-0.327] |
| Machinery | -0.391 [-1.41] | -0.662* [-1.852] | 0.273 [0.605] | Insurance | -0.353 [-1.278] | -0.371* [-1.002] | -0.487 [-0.86] |
| Electrical Equipment | -0.393 [-1.58] | -0.698** [-2.27] | -0.018 [-0.044] | Real Estate | -0.492 [-1.308] | -0.711 [-1.749] | 0.173 [0.232] |
| Automobiles and Trucks | -0.569 [-0.367] | -1.286 [-0.571] | 0.421 [0.328] | Trading | -0.027 [-0.135] | 0.15 [0.627] | -0.527 [-1.191] |
| Aircraft | 0.184 [0.375] | 0.149 [0.265] | -0.093 [-0.084] | Almost Nothing | -0.069 [-0.24] | -0.038 [-0.094] | -0.273 [-0.681] |
| Shipbuilding, Railroad Equipment | -0.658 [-1.587] | -0.753 [-1.571] | -0.128 [-0.121] | | | | |

**Notes:** * < 0.1, ** < 0.05, *** < 0.01. T-statistics are in the bracket. There are 49 industries in three period such as the full sample (December 9, 2019 to February 28, 2020), before the first case (December 9, 2019 to January 21, 2020), after the first case (January 21, 2020 to February 28, 2020).

**Table 4**
The abnormal return and cumulative abnormal returns across industries on February 26, 2020

| No | Industry | Window [0] | | Window [-2, 2] | | Window [0, 2] | |
|---|---|---|---|---|---|---|---|
| | | AR | T-stats | CAR | T-stats | CAR | T-stats |
| 1 | Agriculture | -0.007 | -0.875 | 0.038 | 1.126 | 0.004 | 0.117 |
| 2 | Food Products | -0.011 | -1.999** | -0.027 | -1.142 | -0.028 | -1.208 |
| 3 | Candy & Soda | -0.012 | -0.721 | -0.040 | -0.579 | -0.021 | -0.302 |
| 4 | Beer & Liquor | -0.015 | -1.098 | -0.007 | -0.124 | -0.024 | -0.419 |
| 5 | Tobacco Products | 0.045 | 2.983*** | 0.037 | 0.591 | 0.059 | 0.958 |
| 6 | Creation | -0.020 | -2.001** | 0.021 | 0.504 | 0.000 | 0.010 |
| 7 | Entertainment | -0.030 | -4.097*** | -0.054 | -1.7742* | -0.017 | -0.553 |
| 8 | Printing and Publishing | -0.017 | -1.107 | -0.010 | -0.162 | 0.003 | 0.056 |
| 9 | Consumer Goods | -0.010 | -1.717* | 0.002 | 0.064 | 0.010 | 0.389 |
| 10 | Apparel | -0.007 | -0.804 | 0.025 | 0.720 | 0.024 | 0.684 |
| 11 | Healthcare | -0.010 | -1.027 | -0.002 | -0.064 | 0.000 | -0.006 |
| 12 | Medical Equipment | -0.004 | -0.484 | 0.061 | 1.708* | 0.046 | 1.302 |
| 13 | Pharmaceutical Products | -0.001 | -0.112 | 0.067 | 1.651* | 0.050 | 1.245 |
| 14 | Chemicals | -0.008 | -0.969 | 0.007 | 0.218 | 0.011 | 0.350 |
| 15 | Rubber and Plastic Products | 0.003 | 0.248 | 0.057 | 1.060 | 0.054 | 1.000 |
| 16 | Textiles | -0.005 | -0.345 | -0.023 | -0.403 | -0.022 | -0.375 |
| 17 | Construction Materials | -0.014 | -1.862* | 0.005 | 0.177 | -0.002 | -0.057 |
| 18 | Construction | -0.027 | -3.162*** | -0.039 | -1.085 | -0.028 | -0.778 |
| 19 | Steel Works Etc | -0.008 | -0.698 | 0.062 | 1.402 | 0.033 | 0.750 |
| 20 | Fabricated Products | -0.012 | -0.948 | 0.057 | 1.107 | 0.044 | 0.861 |
| 21 | Machinery | -0.005 | -0.677 | 0.040 | 1.267 | 0.025 | 0.813 |
| 22 | Electrical Equipment | -0.009 | -1.008 | 0.004 | 0.118 | -0.004 | -0.099 |
| 23 | Automobiles and Trucks | -0.009 | -0.860 | 0.014 | 0.312 | 0.015 | 0.338 |
| 24 | Aircraft | -0.018 | -2.347** | -0.049 | -1.554 | -0.019 | -0.608 |
| 25 | Shipbuilding, Railroad Equipment | -0.007 | -0.546 | 0.049 | 0.953 | 0.035 | 0.681 |
| 26 | Defense | -0.005 | -0.477 | -0.008 | -0.181 | 0.003 | 0.056 |
| 27 | Precious Metals | 0.017 | 0.753 | -0.349 | -3.696*** | -0.203 | -2.152** |
| 28 | Non-Metallic and Industrial Metal Mining | -0.004 | -0.333 | -0.016 | -0.306 | -0.001 | -0.025 |
| 29 | Coal | -0.046 | -2.471** | 0.174 | 2.2907** | 0.124 | 1.636 |
| 30 | Petroleum and Natural Gas | -0.031 | -1.591 | 0.022 | 0.269 | 0.016 | 0.196 |
| 31 | Utilities | -0.014 | -2.368** | -0.084 | -3.540*** | -0.069 | -2.926*** |
| 32 | Communication | -0.013 | -1.528 | 0.014 | 0.394 | 0.001 | 0.040 |
| 33 | Personal Services | -0.019 | -2.549** | -0.001 | -0.037 | 0.001 | 0.033 |
| 34 | Business Services | -0.010 | -2.139** | -0.004 | -0.235 | -0.004 | -0.209 |
| 35 | Computers | -0.021 | -2.679*** | -0.007 | -0.218 | -0.006 | -0.192 |
| 36 | Computer Software | -0.002 | -0.399 | 0.031 | 1.344 | 0.021 | 0.906 |
| 37 | Electronic Equipment | -0.012 | -1.885* | 0.031 | 1.135 | 0.014 | 0.519 |
| 38 | Measuring and Control Equipment | 0.001 | 0.180 | 0.023 | 0.942 | 0.028 | 1.144 |
| 39 | Business Supplies | -0.009 | -0.920 | 0.011 | 0.297 | 0.009 | 0.247 |
| 40 | Shipping Containers | 0.009 | 0.982 | -0.009 | -0.240 | 0.011 | 0.290 |
| 41 | Transportation | -0.020 | -2.460** | -0.008 | -0.246 | 0.003 | 0.078 |
| 42 | Wholesale | 0.002 | 0.365 | 0.033 | 1.248 | 0.029 | 1.116 |
| 43 | Retail | -0.015 | -1.614 | 0.009 | 0.235 | 0.005 | 0.137 |
| 44 | Restaurants, Hotels, Motels | -0.033 | -6.097*** | -0.062 | -2.772*** | -0.051 | -2.279** |
| 45 | Banking | -0.003 | -0.484 | -0.003 | -0.121 | -0.012 | -0.499 |
| 46 | Insurance | -0.007 | -1.608 | -0.024 | -1.438 | -0.026 | -1.511 |
| 47 | Real Estate | -0.018 | -2.437** | -0.024 | -0.806 | -0.031 | -1.022 |
| 48 | Trading | -0.005 | -0.985 | 0.015 | 0.659 | -0.004 | -0.165 |
| 49 | Almost Nothing | -0.005 | -0.725 | -0.002 | -0.081 | -0.003 | -0.095 |

Notes: This table represents the cumulative average abnormal returns for 49 industries in the American market. CAR demonstrates the cross-sectional average of CAR returns over industry indices obtained for different event windows. We test the null hypothesis of $H_0$: CAR = 0 with the t-statistics and *, **, *** denote for the significance level at 10%, 5%, and 1%, respectively.

mulative average abnormal returns in the event window [0, 2], consistent with a delayed market reaction. However, the event window [-2, 2] of these sectors has a downward trend, consistent with the market processing previous information about COVID-19 before the first domestic confirmation. We also weakly evidence for medical equipment and pharmaceutical products a positive abnormal return in the event window [-2, 2], consistent with evolving investor expectations about the potential profit from these industries in the pandemic.

There are three main conclusions regarding US industries' reaction in the first domestic case confirmed. First, effects happened quite strongly on this event date, with thirty percent of all industries having a negative abnormal return. Notably, services and utilities had the most sensitive reaction, while a particularly positive outlook was in medical and pharmaceutical products. Restaurants, hotels, and motels; as well as utilities, experienced negative reactions. Of particular interest for this paper, the transportation industry, which includes airlines and cruise lines, had a significantly negative abnormal return on February 26. However this effect was not persistent, with the CARs not significant.

We also calculated abnormal returns and cumulative abnormal returns on two other dates: 1) the first US confirmed cases (January 20, 2020); and 2), the Public Health Emergency of International Concern announcement (January 30, 2020). However, perhaps surprisingly, the market was without any reaction on these dates. Overall, results strongly suggest that the market did not react to the COVID-19 crisis until February 26, 2020. Therefore, the trades made by legislators prior to February 26 are consistent with being ahead of the market.

## 4. Conclusions

During the ongoing COVID-19 pandemic in the US, there has been considerable public and media attention regarding several US legislators who traded stocks in late January through February 2020. The concern is that these legislators traded in anticipation of COVID-19 having a major impact on the financial markets, while publicly suggesting otherwise. We consider whether these legislator trades were in a time window that would be consistent with trading ahead of the market. Towards this end, we assess the reactions of US industries to sudden COVID-related news announcements, concomitantly with an analysis of levels of investor attention to COVID. We analyze the abnormal returns of 49 industrial sectors from December 9, 2019–February 28, 2020, examining the market reactions of US industries to several key US-relevant COVID news announcements through an event study methodology (MacKinlay, 1997). Alternatively, we also examine the impact on industry returns of investor attention, via examining levels of COVID-related Google search term activity. (Da, Engelberg, and Gao, 2011).

We find that, post January 21, there was considerable public attention in the US on COVID-19. Further, for January 21–February 28 levels of this attention are associated with returns in several industries that are also later associated with abnormal returns around a February 26 COVID-related news announcement. Second, we analyze more specifically the market reactions to three notable news releases: 1) the first US confirmed cases (January 20, 2020); 2), the Public Health Emergency of International Concern announcement (January 30, 2020); and 3) the first local transmission case (February 26, 2020). Overall, we find little evidence of abnormal returns until February 26, 2020. Results suggest that, at an industry-level, for legislator trading to be “ahead of the market” it needed to have been done prior to February 26, and involving the 15 industries we identify as having abnormal returns, especially medical and pharmaceutical products (positive); restaurants, hotels, and motels (negative); as well as services and utilities. These criteria are met by many of the legislator trades.

Regarding the movement of industries with Google search activity, we find that an increase of one percentage point in the search term would predict a 0.651% decrease in construction material returns over the period from December 9, 2019 to February 28, 2020. As Google searches on corona in the US were increasing rapidly, this is consistent with there being a significant economic benefit of trading prior to February 26 (our abnormal return announcement date) in this industry.

In summary, our results help to parameterize concerns about this case of legislator trading; as well as provide insight into the reactions and expectations of investors toward COVID-19. We assist policy makers to identify industries that had COVID-related abnormal returns. We identify that trading ahead of the market in these industries would be economically meaningful. We also identify particularly February 26, 2020 as a key date with regards to general US market reaction to COVID-19. This is the date that the US Centers for Disease Control and Prevention (CDC) announced a possible first community transmission of COVID-19 in the US.[11] This information will be of interest to policy makers interested in the reactions and trading of various market actors to COVID-19.

There has been already much ongoing interest in the impact of global economic shocks on industries. The COVID-19 crisis, with its perhaps unprecedented global reach and scale will no doubt prompt a great deal of future research in this area (Goodell, 2020). This paper presents one of the first analyses of how investors react to the news announcement regarding the COVID-19 at the industry level.

## Acknowledgements

The authors are grateful to the Editor and anonymous reviewers. We thank BLINDED for excellent research assistance. But our errors remain our own.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.frl.2020.101578.

[11] “CDC Confirms Possible Instance of Community Spread of COVID-19 in U.S. https://www.cdc.gov/media/releases/2020/s0226-Covid-19-spread.html.

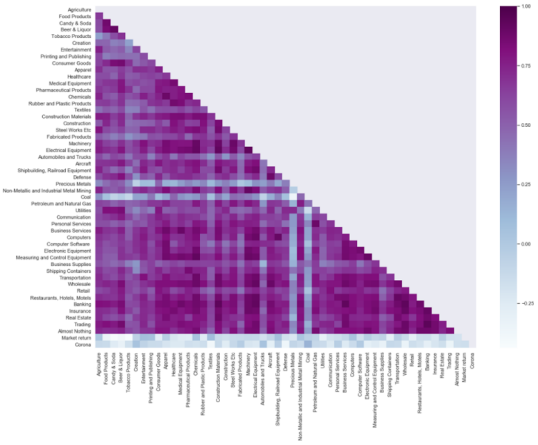
## Appendix

See Fig. A1.

(a) Full sample



(b) Before January 21, 2020



(c) After January 21, 2020

**Fig. A1.** Correlation among 49 industries return with market and Google search term.

## References


Abu-Ghunmi, Diana, Corbet, Shaen, Larkin, Charles, 2020. An international analysis of the economic cost for countries located in crisis zones. Research in International Business and Finance 51.

Adda, Jérôme, 2016. Economic activity and the spread of viral diseases: Evidence from high frequency data. Quarterly Journal of Economics 131 (2), 891–941.

Aggarwal, Raj, Akhigbe, Aigbe, Mohanty, Sunil K, 2012. Oil price shocks and transportation firm asset prices. Energy Economics 34 (5), 1370–1379.

Ammer, John, Vega, Clara, Wongswan, Jon, 2010. International transmission of US monetary policy shocks: Evidence from stock prices. Journal of Money, Credit and Banking 42, 179–198.

Baldwin, Richard, Beatrice Weder di Mauro, 2020. "Mitigating the COVID Economic Crisis: Act Fast and Do Whatever It Takes. (Centre for Economic Policy Research, London).

Blake, Aaron, 2020. How damnng are Richard Burr's and Kelly Loeffler's coronavirus stock trades? Let's break it down. Washington Post (Washington) March 20, 2020.

Bredin, Don, Hyde, Stuart, Nitzsche, Dirk, O'reilly, Gerard, 2009. European monetary policy surprises: the aggregate and sectoral stock market response. International Journal of Finance amd Economics 14 (2), 156–171.

Broadstock, David C, Zhang, Dayong, 2019. Social-media and intraday stock returns: The pricing power of sentiment. Finance Research Letters 30, 116–123.

Burggraf, Tobias, Fendel, Ralf, Huynh, Toan Luu Duc, 2019. Political news and stock prices: evidence from Trump's trade war. Applied Economics Letters 1-4.

Corbet, Shaen, Larkin, Charles, McMullan, Caroline, 2020. The impact of industrial incidents on stock market volatility. Research in International Business and Finance 52.

Da, Zhi, Engelberg, Joseph, Gao, Pengjie, 2011. In search of attention. Journal of Finance 66 (5), 1461–1499.

Donadelli, Michael, Gerotto, Luca, 2019. Non-macro-based Google searches, uncertainty, and real economic activity. Research in International Business and Finance 48, 111–142.

Edmans, Alex, Garcia, Diego, Norli, Øyvind, 2007. Sports sentiment and stock returns. Journal of Finance 62 (4), 1967–1998.

Elyasiani, Elyas, Mansur, Iqbal, Odusami, Babatunde, 2011. Oil price shocks and industry stock returns. Energy Economics 33 (5), 966–974.
Evans, Nigel, Elphick, Sarah, 2005. Models of crisis management: An evaluation of their value for strategic planning in the international travel industry. International Journal of Tourism Research 7 (3), 135–150.
Fan, Yi, Zhao, Kai, Shi, Zheng-Li, Zhou, Peng, 2019. Bat Coronaviruses in China. Viruses 11 (3), 210.
Flori, Andrea, 2019. News and subjective beliefs: A Bayesian approach to Bitcoin investments. Research in International Business and Finance 50, 336–356.
Goodell, John W., 2020. COVID-19 and finance: Agendas for future research. Finance Research Letters, 101512 Available online 12 April 2020.
Gopinath, Gita, 2020. Limiting the economic fallout of the coronavirus with large targeted policies. In: Baldwin, Richard, Mauro, Beatrice Weder di (Eds.), Mitigating the COVID Economic Crisis: Act Fast and Do Whatever It Takes. Centre for Economic Policy Research, London, pp. 41–48.
Kim, Neri, Lučivjanská, Katarína, Molnár, Peter, Villa, Roviel, 2019. Google searches and stock market activity: Evidence from Norway. Finance Research Letters 28, 208–220.
MacKinlay, A.Craig, 1997. Event studies in economics and Finance. Journal of Economic Literature 35 (1), 13–39.
Nandha, Mohan, Faff, Robert, 2008. Does oil move equity prices? A global view. Energy Economics 30 (3), 986–997.
Philippas, Dionisis, Rjiba, Hatem, Guesmi, Khaled, Goutte, Stéphane, 2019. Media attention and Bitcoin prices. Finance Research Letters 30, 37–43.
Ramelli, Stefano, Wagner, Alexander, 2020. What the stock market tells us about the consequences of COVID-19. In: Baldwin, Richard, Mauro, Beatrice Weder di (Eds.), Mitigating the COVID Economic Crisis: Act Fast and Do Whatever It Takes. Centre for Economic Policy Research, London, pp. 63–70.
Sakaki, Hamid, 2019. Oil price shocks and the equity market: Evidence for the S&P 500 sectoral indices. Research in International Business and Finance 49, 137–155.
Schwert, G William, 1981. Using financial data to measure effects of regulation. Journal of Law and Economics 24 (1), 121–158.
Sevens, Maggie, O'Donnell, Katy, 2020. House members, Senate aids traded stocks in early days of coronavirus. Politico March 21, 2020.
Swamy, Vighneswara, Dharani, M, Takeda, Fumiko, 2019. Investor attention and Google Search Volume Index: Evidence from an emerging market using quantile regression analysis. Research in International Business and Finance 50, 1–17.
Wang, Yudong, Wu, Chongfeng, Yang, Li, 2013. Oil price shocks and stock market activities: Evidence from oil-importing and oil-exporting countries. Journal of Comparative Economics 41 (4), 1220–1239.
Wu, Fei, 2019. Sectoral contributions to systemic risk in the Chinese stock market. Finance Research Letters 31.
You, Wanhai, Guo, Yawei, Zhu, Huiming, Tang, Yong, 2017. Oil price shocks, economic policy uncertainty and industry stock returns in China: Asymmetric effects with quantile regression. Energy Economics 68, 1–18.
Zavadska, Miroslava, Morales, Lucía, Coughlan, Joseph, 2018. Brent crude oil prices volatility during major crises. Finance Research Letters forthcoming.
Zhu, Sheng, Gao, Jun, Sherman, Meadhbh, 2020. The role of future economic conditions in the cross-section of stock returns: Evidence from the US and UK. Research in International Business and Finance, 101193.