Regulation during COVID-19:

News Sentiment Improved, While Uncertainty Remains

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Abstract

Scholars have identified various regulatory barriers hampering responses to the COVID-19 pandemic. For example, the regulatory approval required for drugs and medical devices has created "bottlenecks" for expanding the capacity of virus testing, ambiguous and often changing regulations "have served as hindrances" to the increasing use of telehealth, and patients have limited access to mobile narcotic treatment due to regulatory bans. Do these criticisms reflect the public's opinion toward regulation, and how did average public sentiment evolve with the spread of COVID-19? This article explores these questions by presenting a text-based sentiment analysis of news articles related to COVID-19 and regulation.

The analysis shows that the expression about regulation in the COVID-related news was negative in most days during the beginning of the virus outbreak, but it started to improve in mid-March. The improvement may suggest increased public confidence in regulatory responses to the pandemic, as the government started to take the virus more seriously and regulatory agencies started to issue temporary relaxations of regulations. However, the level of uncertainty expressed in the news shows no signs of diminishing, indicating persistent uncertainty surrounding regulation in the time of COVID-19. Further topic modeling of news articles suggests that sentiment and uncertainty vary across different regulatory issues. News covering quarantine and reopening, legislation (other than the stimulus bill), and testing and treatment revealed the most negative sentiment, and uncertainty was relatively high regarding testing and treatment, workplace safety, banking and lending, and oil prices.

Regulatory Insight

Why Does News Sentiment Matter?

Economic sentiments, measuring attitudes toward current and future economic conditions, have strong predictive power for many macroeconomic outcomes.[1] The most widely-used indicators of economic sentiments include the survey-based Michigan Consumer Sentiment Index and the Conference Board's Consumer Confidence Index. However, these indicators are released at a relatively low frequency. In the time of COVID-19, a measure of news sentiment with high-frequency information can be particularly useful for capturing and predicting rapidly changing economic conditions. Several studies have shown that news-based sentiment measures are strongly correlated with survey-based consumer sentiment measures, and thus can help understand real-time developments in the economy.

A measure of news sentiment specifically toward regulation can be used to estimate the effects of regulation on macro- and sector-level economic outcomes. As many of the current economic activities are subject to policy responses to the pandemic including quarantines and travel restrictions, news sentiment around regulatory policy may provide important information for understanding the rapidly evolving economic situation. Sentiment toward different regulatory issues could also operate as a sign for policymakers to guide regulatory and deregulatory actions supporting economic recovery.

As a special type of sentiment, uncertainty induced by COVID-19 is forecasted to cause a large contraction in U.S. real GDP, worsening the economic impact of the pandemic. Uncertainty about regulation could be particularly important, because regulation actually constrains the kinds of actions firms and individuals will be permitted to take. It thus affects not just what people are *willing* to do, but also what they are *permitted* to do. A great amount of uncertainty surrounding the implementation and persistence of regulatory responses to the pandemic remains. Healthcare facilities are uncertain about how they will get access to the drugs and devices for diagnosing and treating COVID-19 under FDA's emergency use authorization. Travelers do not know when the travel restrictions to the U.S. will be lifted. Tracking real-time regulatory policy uncertainty is particularly relevant now to ensure that it does not impose unnecessary burdens on individuals, businesses, and nonprofit organizations during and post COVID-19.

Sentiment around Regulation

The data used in this analysis include 3,149 news articles published by eight major U.S. news outlets between January and April 2020.[2] The full text and metadata of the articles were obtained from ProQuest TDM Studio, which provides a comprehensive collection of news content in a

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[1] For example, see Bram and Ludvigson (1998), Carroll, Fuhrer, and Wilcox (1994), and Souleles (2004).

[2] The news publishers covered in this analysis include The New York Times, The Washington Post, Bloomberg Wire Service, CNN Wire Service, The Examiner, USA Today, Los Angeles Times, and Daily Herald.

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machine readable format. An article from the eight news outlets was selected if it contained one or more terms related to COVID-19 (e.g., COVID-19, coronavirus, SARS-CoV-2, etc.) and one or more terms related to regulation (e.g., regulator, regulatory, deregulation, etc.).[3] Therefore, the resulting data set includes news articles that discuss both COVID-19 and regulation.

I used a lexicon-based approach for the sentiment analysis of the news articles. The lexicon-based approach assesses the semantic orientation (e.g., positive or negative) of a document based on the frequency of words or phrases with a particular semantic orientation that occur in the document. It requires dictionaries of opinionated words, such as a list of positive or negative words. There are several available sentiment dictionaries designed for general purposes, but domain-specific dictionaries are often preferred since the use of words can vary in different domains.

Although there is no existing dictionary designed specifically for regulatory news content, a relevant one is the Lexicoder Sentiment Dictionary (LSD) which is tailored primarily to political news, comprising 2,857 positive words and 1,709 negative words. I used LSD to assess the positive and negative tone of news articles in this analysis, but also used two other widely used dictionaries for comparison: the Harvard General Inquirer (GI) dictionary, which is a general-purpose dictionary, and NLTK's VADER sentiment analysis tool, which relies on a dictionary designed for social media.

Before counting positive and negative words in the articles, I implemented a series of standard preprocessing steps. These steps include tokenizing the text, removing all punctuations, converting all tokens to lowercase, and lemmatizing all tokens.[4] Further, I performed word negation to take into account negated positive and negative words. That is, if an English negation word, such as "not," "don't," or "cannot", occurs within three tokens before the opinionated word, then the opinionated word would be considered as the opposite orientation. For example, the word "helpful" in the sentence "It isn't helpful" would be considered as a negative word.

The sentiment score for an article is calculated as: $\frac{positive\ word\ count - negative\ word\ count}{total\ word\ count\ in\ the\ article} * 100$. In other words, the sentiment score represents the percentage-point gap between positive words and negative words in an article. A positive sentiment score means that the overall tone of the article is positive, and a negative score means an overall negative tone. Given the sample selection

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3   A caveat is that many sports articles also contain the term "regulation," which is used as a different meaning from government regulation. Therefore, news articles that were published in sports-related sections were removed from the analysis. The articles selected using this approach may still include some false positives (i.e., articles that contain terms such as "regulation" but are not related to government regulation). However, since all articles were selected in a systematic approach and the false positives are likely a small proportion of the data, it would not affect the analysis of over-time trends in sentiment and uncertainty.

4   A token can be a word, punctuation symbol, whitespace, etc. Tokenizing the text is to convert the text into individual tokens. Lemmatization returns the base or dictionary form of a word; for example, the word "using" would become "use" after lemmatization. The Python library Spacy was used for the preprocessing: https://spacy.io/usage/spacy-101. However, the preprocessing was not conducted for the sentiment analysis using VADER, since VADER takes into account the use of punctuations and capital letters.
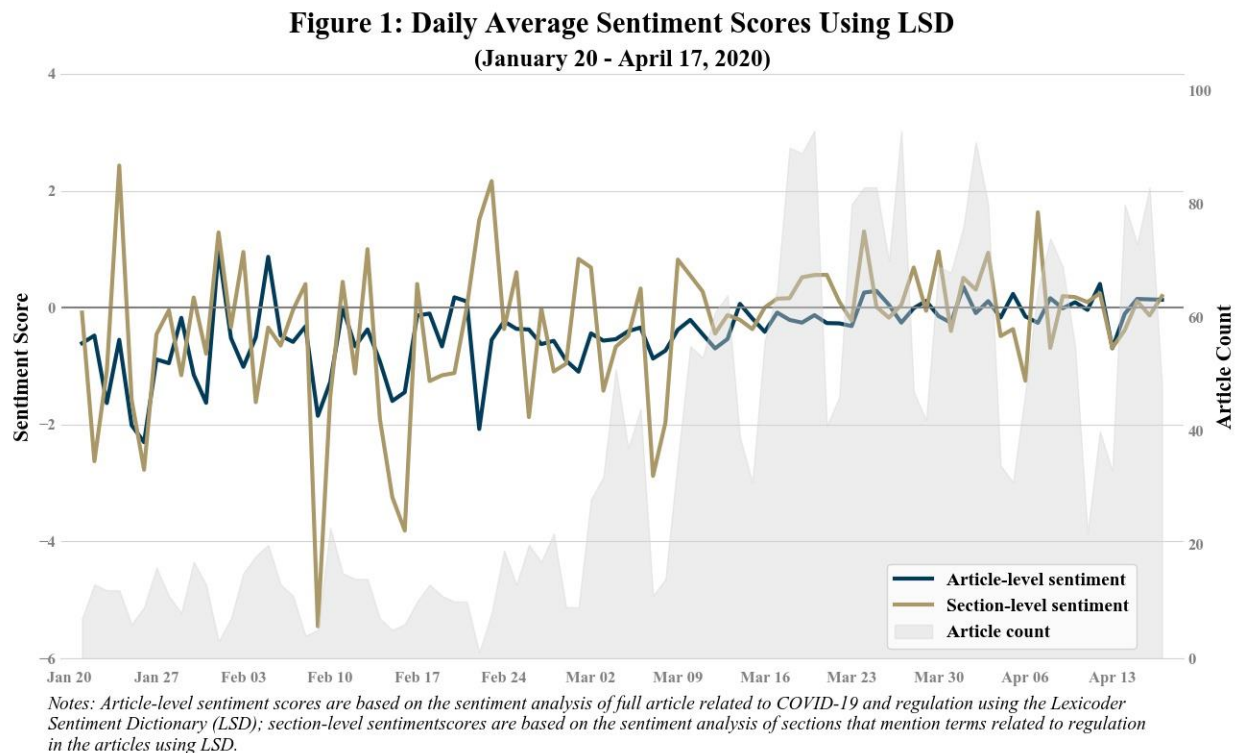
approach, the articles covered in this analysis mention terms related to COVID-19 and regulation, but the major theme of the articles may not be regulation. Therefore, in addition to calculating the sentiment score for the full article, I also conducted the same analysis for the specific sections that contain terms related to regulation in each article. The section-level sentiment score may be more focused on the tone toward regulation than the article-level score. An article's section-level sentiment score is calculated as: $\frac{positive\ word\ count - negative\ word\ count}{total\ word\ count\ in\ relevant\ sections} * 100$.

Among the 3,149 articles, 1,344 articles were estimated to have an overall positive tone, 1,725 articles were negative, and 80 articles were neutral. In terms of section-level sentiment scores, 1,259 articles were estimated to have positive scores, 1,295 articles were negative, and 595 articles were neutral. An example of the most positive sections that mention regulation is:

> Trantalis said that regulations in the agreement allowing the ships to dock will provide "strong safeguards" to the community. (USA Today, April 2)

An example of the most negative sections is:

> An emergency room doctor in a Downey hospital said the lax regulations have made her fearful to work, and she called the changes "so, so shortsighted." (Los Angeles Times, March 21)

Figure 1: Daily Average Sentiment Scores Using LSD
(January 20 - April 17, 2020)

Notes: Article-level sentiment scores are based on the sentiment analysis of full article related to COVID-19 and regulation using the Lexicoder Sentiment Dictionary (LSD); section-level sentimentscores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using LSD.

While the number of negative articles slightly exceeds the number of positive articles, the overall sentiment shows an upward trend over time. Figure 1 shows the average sentiment scores by publication date at both article and section levels and the daily number of articles related to COVID-19 and regulation from January 20 to April 17. In January and February, the daily average sentiment had large fluctuations due to the small number of related articles, but the overall news sentiment during this period was largely negative. Starting around mid-March, the daily average sentiment became more neutral or even positive in some days. Among the 40 days from January 21 through February 29, 36 days had negative daily average sentiment scores at the article level, and 28 days had negative section-level scores. Starting in March, the average sentiment started to improve. The number of days in March with negative article- and section-level sentiments became 26 and 18, respectively. In April, more than half of the 17 days analyzed had positive average sentiments (9 and 10 days at the article and section levels, respectively). These trends are also illustrated by the weekly average sentiment scores shown in Appendix 1.

With the spread of coronavirus in the U.S., it may be puzzling to see that news sentiment was turning positive over time. There are two possible explanations. One is that the articles analyzed in this study are the ones related to COVID-19 and regulation, possibly talking about regulatory policy responses to the pandemic. As the first confirmed case in the U.S. emerged on January 21, and the first reported death occurred on February 29, the overall negative tone in relevant news may reflect the lack of public confidence in government responses and criticisms of regulatory impediments to for virus testing in the beginning of the outbreak. For example, the New York Times on January 22 reported that:

> Health officials scrambled on Wednesday to contact more than a dozen people who may have been exposed to the United States' first case of the Wuhan coronavirus, even as regulators sought to assure the public there was little risk from an illness that has rapidly spread across Asia, killing at least 17 people.

Later on March 4, a Bloomberg article commented on coronavirus test kit shortage that:

> [T]he initial responsibility for the shortage appears to lie with the Centers for Disease Control and Prevention. Rather than adopt a test used overseas and recommended by the World Health Organization, the CDC chose to develop and distribute its own, according to reporting by ProPublica. That test didn't work, forcing a scramble by the Trump administration for alternatives.

Since mid-March, when President Trump declared a national emergency, and Congress passed the first stimulus package, the news sentiment started to recover.

Another factor that may have contributed to the negative news sentiment in January-February is the early news coverage of the coronavirus outbreaks overseas, which included criticisms of the governments and policies in China and other countries. For example, the New York Times stated

on January 25 that "While China can mobilize a huge national response to the outbreak, its response to the crisis is also a lesson in how the country's political weak points can carry grave consequences for world health."

The analyses using the GI dictionary and VADER also show similar upward trends (Appendices 2 and 3), verifying the robustness of the result. Interestingly, several existing Twitter sentiment analyses also suggest that the sentiment of COVID-related tweets became more positive from January to April.

Uncertainty around Regulation

While the basic sentiment analysis often assesses the positive, negative, or neutral tone of a document, further analysis can identify more granular sentiment types such as fear, sadness, and anger. The Loughran and McDonald (LM) dictionary, designed for financial text using firms' 10Ks, covers several other sentiment categories including a list of 297 words related to uncertainty. Using a similar approach to the basic sentiment analysis, I used the LM uncertainty dictionary to gauge the level of uncertainty in the news related to COVID-19 and regulation. I calculated the article- or section-level uncertainty score as $\frac{uncertainty\ word\ count}{total\ word\ count\ in\ the\ article\ or\ sections} * 100$.
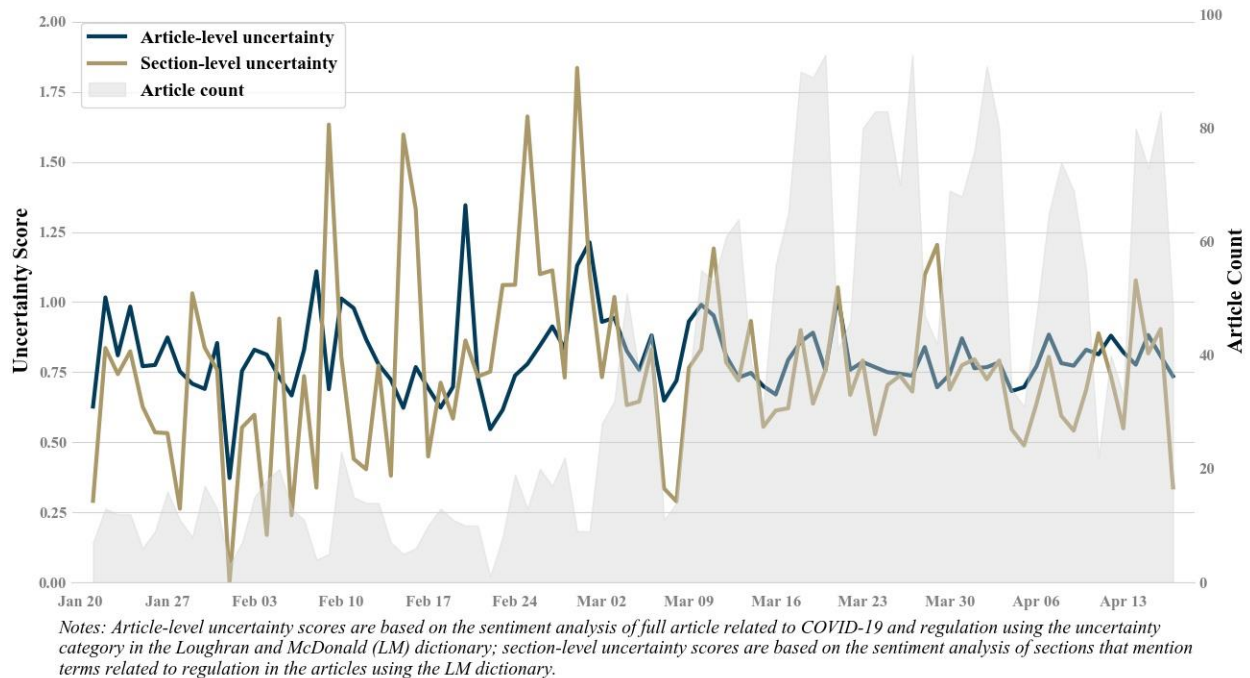
The uncertainty was not only about the lack of knowledge about this novel coronavirus, but also around how regulators would respond to the pandemic. For example, CNN reported on March 18 that:

> [Trump's executive] order also states that Health and Human Services Secretary Alex Azar may consult with other agency heads to determine "the proper nationwide priorities and allocation of all health and medical resources, including controlling the distribution of such materials ... in the civilian market, for responding to the spread of COVID-19 within the United States."

Unlike the recovering trend in sentiment, the daily average uncertainty score had several spikes in February but mostly remained stable since the beginning of March (Figure 2). Some of the spikes are due to the small daily number of articles and one or two individual articles containing a relatively large proportion of words from the LM uncertainty list. These spikes are attenuated when uncertainty scores are aggregated to the weekly level (Appendix 4). However, the week of February 24 marks a particularly high level of uncertainty according to the weekly average section-level scores, possibly suggesting a rise in uncertainty surrounding regulatory restrictions on virus testing as the first nontravel-related COVID-19 cases in the U.S. were confirmed during that week. As the Washington Post stated on February 25, "Part of the problem in the still-struggling United States is the tension between regulations intended to ensure a high-quality standard for tests and the need to roll out diagnostic capabilities very quickly."

Recent research has shown that various indicators of economic uncertainty reached their highest levels on record during the COVID-19 pandemic, including a measure of regulatory policy uncertainty. The daily trend shown in Figure 2 indicates that the uncertainty expressed by the news media reporting on COVID-related regulation remained as of mid-April, showing no signs of decreasing during the first three months of the crisis.

Figure 2: Daily Average Uncertainty Scores
(January 20 - April 17, 2020)

Notes: Article-level uncertainty scores are based on the sentiment analysis of full article related to COVID-19 and regulation using the uncertainty category in the Loughran and McDonald (LM) dictionary; section-level uncertainty scores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using the LM dictionary.

News Topics

To further explore whether and how sentiment and uncertainty vary across specific issues discussed in the news articles. I applied the Latent Dirichlet Allocation (LDA) method, one of the most popular topic modeling approaches, to analyze the 3,149 articles. LDA relies on probabilistic inference to identify the latent topics from a corpus of documents. In addition to the standard preprocessing steps mentioned above, I performed several other steps to clean the data. In particular, the performance of topic modeling was largely improved upon removal of customized stop words from the corpus of articles, including words that appear in only one article and words that appear in more than 30 percent of the articles.

The analysis resulted in 16 coherent topics (Table 3). LDA generates a set of probable terms related to each topic, and the terms within a topic tend to have similar semantic meanings. For example, Topic 6 is composed of terms including "mask," "ventilator," equipment," "shortage," and "patient," which are all linked to medical devices. Table 1 lists the sets of terms related to the 16

topics and the topic titles inferred from the terms. LDA labels an article with multiple topics and assigns a probability to each topic for the article. The representative article for each topic shown in Table 1 is the article with the highest probability assigned to the topic.

Table 1: Topic Modeling Results

Topic #	Inferred Topic	Top Keywords (Probability from high to low)	Representative Article
1	Quarantine and reopening	*governor, power, restriction, expert, Chinese, quarantine, claim, reopen, death, speak*	"Trump says he'll speak to all 50 governors and will be 'authorizing' reopenings. States disagree on his role" (USA Today, April 15)
2	Legislation (other than stimulus bills)	*bill, program, pass, charge, vote, fire, proposal, police, release, approve*	"Naperville cancels meeting on taxing possible pot sales" (Daily Herald, March 21)
3	Stimulus bill	*bill, money, program, payment, employee, relief, loan, fund, legislation, lawmaker*	"When are you getting your coronavirus stimulus check? Here's a new way to find out" (USA Today, April 14)
4	Food supply	*food, plant, water, product, restaurant, milk, animal, meat, store, farm*	"Meat shortage 2020: Coronavirus has led Smithfield, other plants to close, farmers to dump milk" (USA Today, April 16)
5	Residency and community	*resident, school, death, facility, county, confirm, community, die, governor, area*	"Drive-thru testing, insufficient gear, school closures: News from around our 50 states" (USA Today, March 16)
6	Medical device	*mask, ventilator, Chinese, equipment, shortage, patient, production, produce, nurse, factory*	"Ventilator Makers Can Speed Up But Face Shortages of Parts" (Bloomberg, March 24)
7	Oil price	*oil, price, percent, stock, trade, production, investor, growth, rise, investment*	"OPEC Proposes Slashing Oil Output Over Russian Resistance: [Business/Financial Desk]" (New York Times, March 6)
8	Bank and loan	*bank, loan, debt, mortgage, rate, lender, firm, credit, bond, program*	"Everything China Is Doing to Support Its Markets During Outbreak" (Bloomberg, March 2)
9	Cruise ship	*passenger, ship, quarantine, board, cruise, port, crew, cruise ship, die, symptom*	"Four dead, 138 sick on Holland America's MS Zaandam cruise in limbo amid coronavirus crisis" (USA Today, March 27)
10	President and election	*vote, election, sander, campaign, voter, democratic, candidate, primary, biden, win*	"Supreme Court struggles with independence of Consumer Financial Protection Bureau" (USA Today, March 3)
11	Testing and treatment	*patient, testing, infection, drug, vaccine, doctor, lab, study, develop, treatment*	"Study of Trump-touted chloroquine for coronavirus stopped due to heart problems, deaths" (USA Today, April 15)
12	Airline and hotel	*airline, flight, traveler, cancel, plane, refund, passenger, airport, student, hotel*	"Travel bailouts: Airlines, hotels and travel agents all got them. Shouldn't the public?" (USA Today, April 10)
13	Environmental standards	*climate, environmental, cost, energy, insurance, standard, car, emission, reduce, gas*	"Trump administration scraps Obama fuel-efficiency standard, opts for laxer rule" (USA Today, March 31)

| Topic #	Inferred Topic	Top Keywords (Probability from high to low)	Representative Article
14	Online shopping and entertainment	*product, sell, online, network, tech, technology, employee, store, app, user*	"Here's where to still buy hand sanitizer and the ingredients to make your own" (USA Today, March 10)
15	Schools and students	*school, student, child, feel, live, kid, video, friend, story, internet*	"How U-46 students got a special video from Goldie Video: U-46" (Daily Herald, April 17)
16	Workplace safety	*employee, safety, protect, employer, essential, guidance, standard, requirement, labor, driver*	"County fairs hurt financially by COVID-19 shutdowns Officials" (Daily Herald, April 1)

Figure 3 plots the distribution of articles by their dominant topics. An article's dominant topic is the topic with the highest probability of attachment to the article. Unsurprisingly, the topics related to quarantine and reopening, oil prices, and testing and treatment received the most attention in the news mentioning COVID-19 and regulation.

Figure 3: Article Count by Dominant Topic
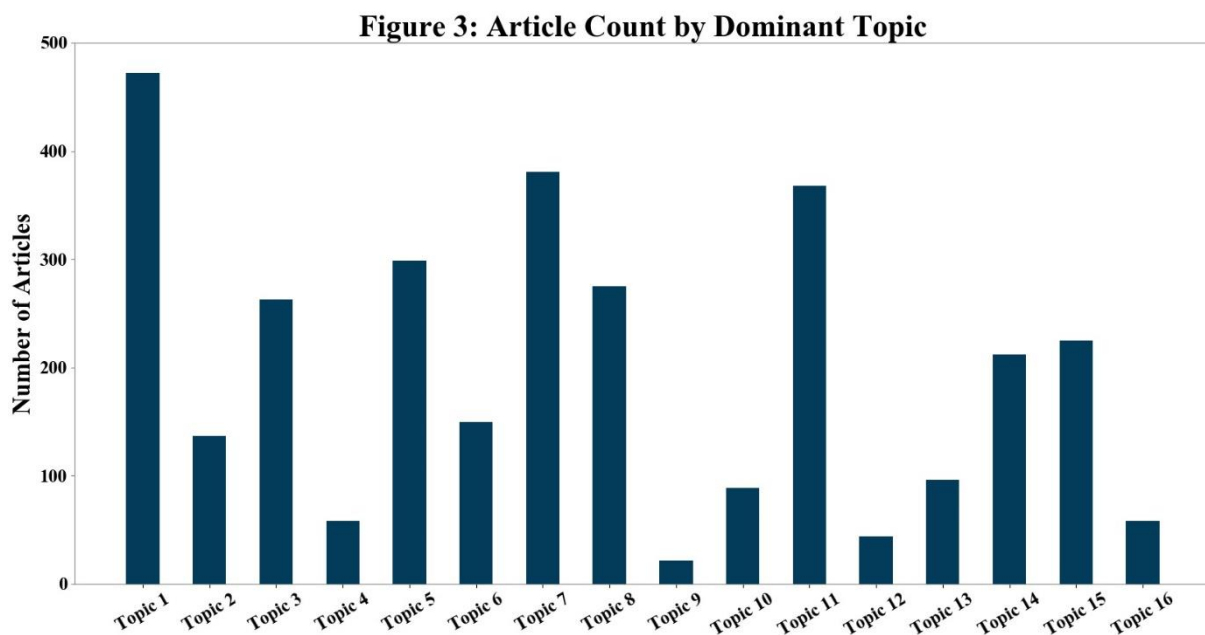
Sentiment by Topic

The average sentiment scores demonstrate substantive variations by topic (Figure 4). While there are some differences between article- and section-level sentiment scores, both show negative average sentiments for Topic 1 (quarantine and reopening), Topic 2 (other legislation), and Topic 11 (testing and treatment). Article-level estimates also indicate negative scores for Topic 7 (oil price) and Topic 9 (cruise ship), and section-level estimates suggest negative tone in the news related to president and election (Topic 10).

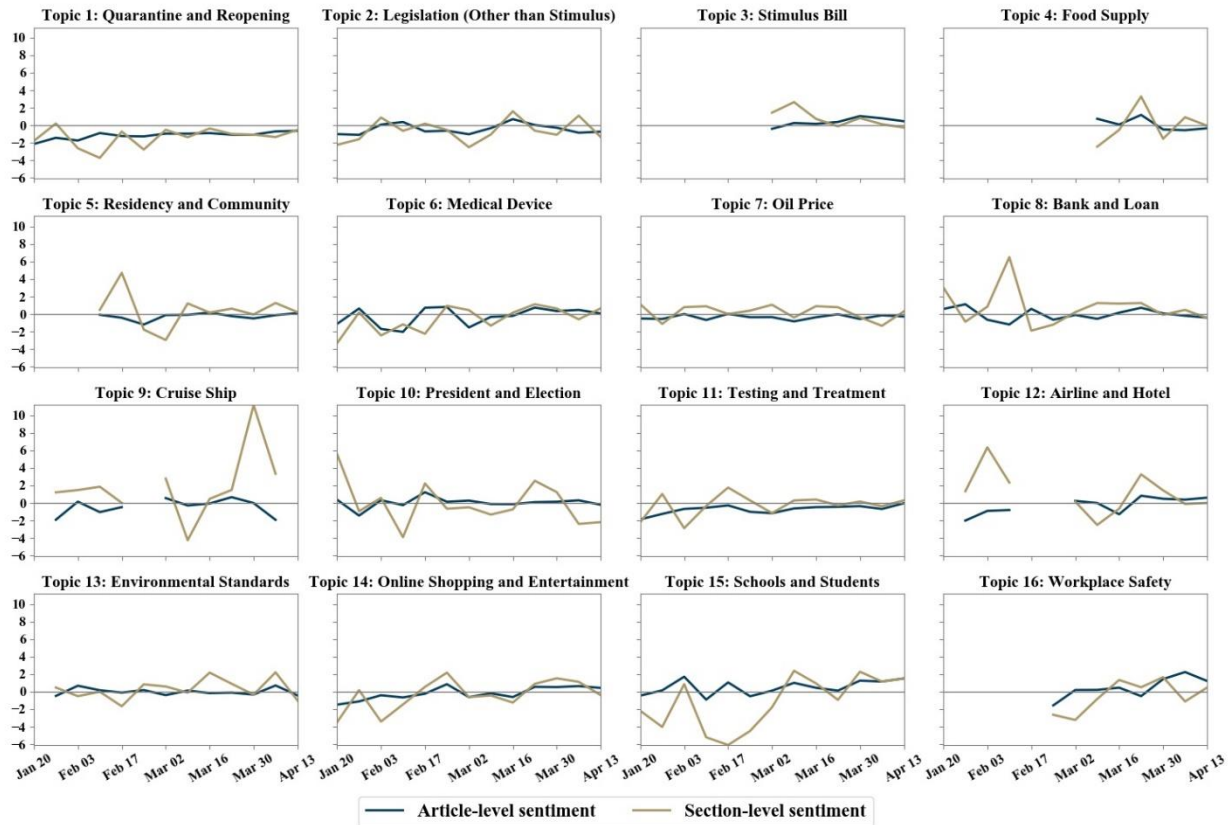**Figure 4: Average Sentiment Score by Dominant Topic**
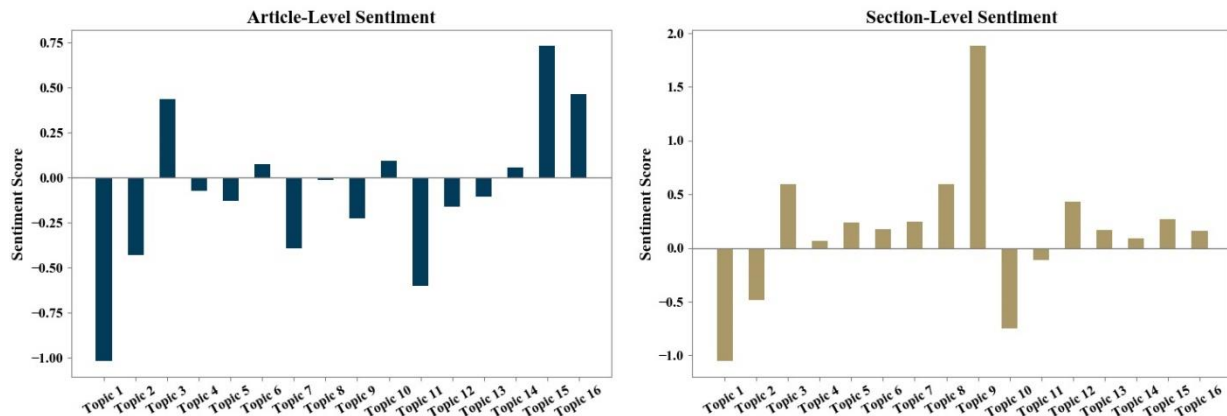
Notes: *Article-level sentiment scores are based on the sentiment analysis of full article related to COVID-19 and regulation using the Lexicoder Sentiment Dictionary (LSD); section-level sentiment scores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using LSD.*

The weekly average sentiment scores for the topics also present different trends over time (Figure 5). The recovering trend is observed for multiple topics such as medical device, testing and treatment, and online shopping and entertainment. Sentiments around quarantine and reopening also had slight improvements since January but remained negative as of mid-April. Average sentiments around workplace safety started low in February but gradually turned positive starting mid-March. The news articles discussing regulatory issues related to schools and students represented the most negative topic in February but quickly recovered in March. The trends in sentiments around oil prices, president and election, and environmental standards are relatively flat.

Several spikes in section-level sentiments for some topics may receive additional attention. The spike in the average sentiment for bank and loan in the week of February 10 is driven by a section in a Bloomberg article praising China's securities regulator for allowing greater flexibility on refinancing plans. The section-level sentiment for the topic related to cruise ships also had a large spike in week of March 30, because of two articles published by USA Today and CNN on April 2 commending Florida regulators' agreement to allow cruise ships carrying passengers with flu-like symptoms to dock.

**Figure 5: Weekly Average Sentiment Score by Dominant Topic
(January-April 2020)**

Notes: Dates on the x-axis indicate the start date of each week. Article-level sentiment scores are based on the sentiment analysis of full article related to COVID-19 and regulation using the Lexicoder Sentiment Dictionary (LSD); section-level sentiment scores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using LSD. Data were available until April 17, so the data for the week starting April 13 is incomplete.

Uncertainty by Topic

The level of uncertainty expressed in the news also demonstrates some variations across topics. As shown in Figure 6, both the article- and section-level uncertainty scores are relatively high for Topics 11 (testing and treatment), 16 (workplace safety), 8 (bank and loan), and 7 (oil price), while the scores assessed at the section level also suggest rising uncertainty around regulatory issues related to Topics 15 (schools and students) and 12 (airline and hotel).
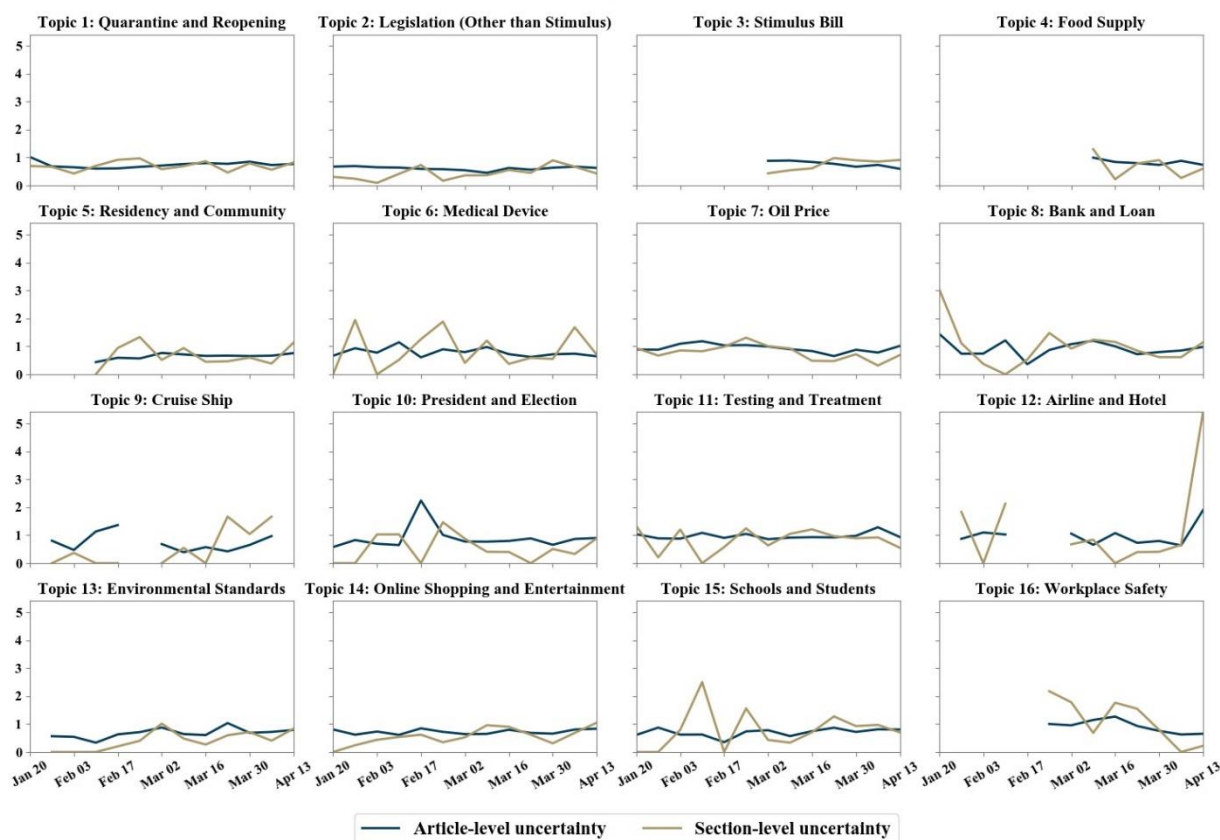
Figure 6: Average Uncertainty Score by Dominant Topic
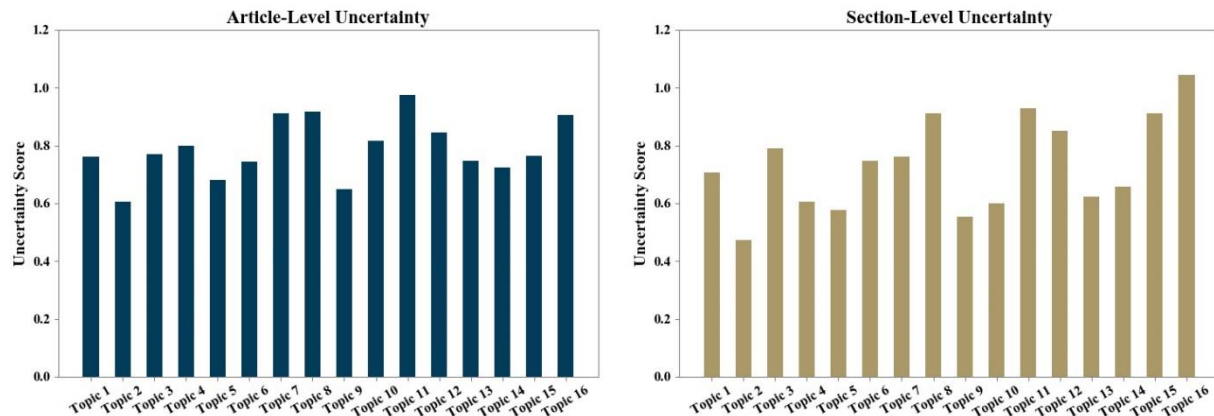
Notes: *Article-level uncertainty scores are based on the sentiment analysis of full article related to COVID-19 and regulation using the uncertainty category in the Loughran and McDonald (LM) dictionary; section-level uncertainty scores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using the LM dictionary.*

Most of the topics followed the overall trend in uncertainty shown in Figure 2, maintaining at a steady level from January to April (Figure 7). The only obvious decrease in uncertainty is observed in news related to workplace safety, possibly because many companies allowed (or required) their employees to work from home during quarantines. While most of the topics had a flat trend, the two travel-related topics, Topics 9 (cruise ship) and 12 (airline and hotel), presented increasing uncertainty in April. The relevant news articles highlight persistent uncertainty surrounding travel restrictions. For example, a Washington Post article on April 14 said that "It's not only international travel that could severely disrupt your plans. Because state regulations can change without much warning, travelers may find themselves having to follow new protocols like self-quarantining for 14 days on arrival."

**Figure 7: Weekly Average Uncertainty Score by Dominant Topic
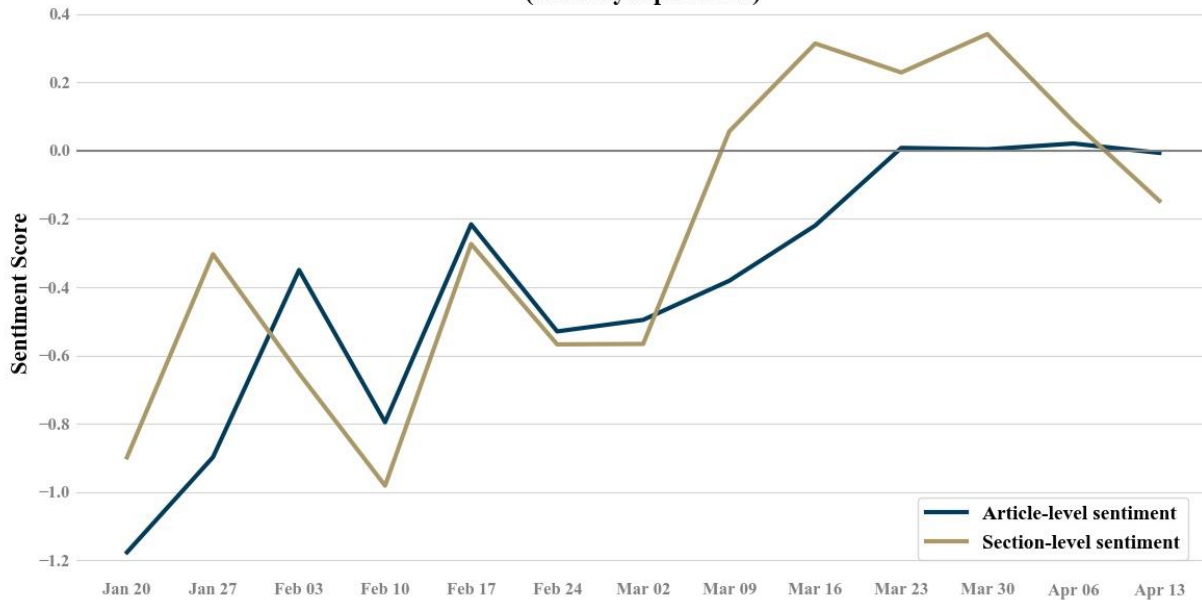(January–April 2020)**

Notes: *Dates on the x-axis indicate the start date of each week. Article-level uncertainty scores are based on the sentiment analysis of full article related to COVID-19 and regulation using the uncertainty category in the Loughran and McDonald (LM) dictionary; section-level uncertainty scores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using the LM dictionary. Data were available until April 17, so the data for the week starting April 13 is incomplete.*

Regulatory reform efforts continue to reduce unnecessary burdens and allow for more flexibility during this difficult time. However, the remaining uncertainty around regulatory policy may suppress hiring, investment, new business formation, and expenditures on consumer durables. With advanced textual analysis techniques such as those shown in this article, it is possible to track the historical and real-time regulatory policy uncertainty and provide firms, consumers, and policymakers with forward-looking information for their decision making.
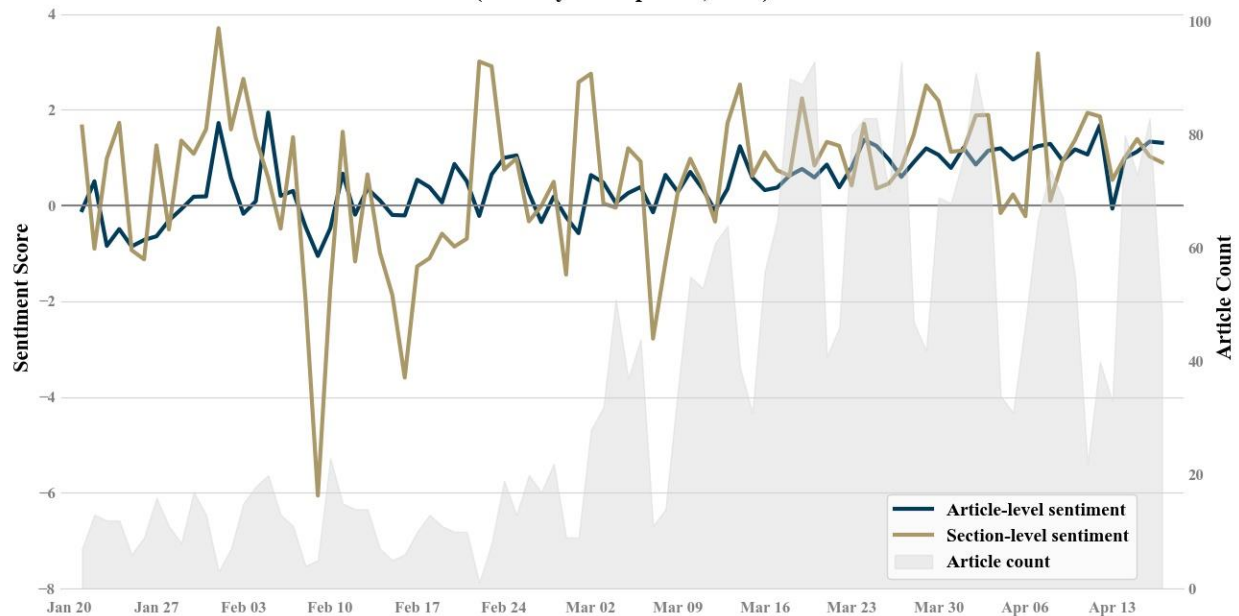
Appendices

Appendix 1: Weekly Average Sentiment Scores Using LSD
(January-April 2020)

Notes: Dates on the x-axis indicate the start date of each week. Article-level sentiment scores are based on the sentiment analysis of full article related to COVID-19 and regulation using the Lexicoder Sentiment Dictionary (LSD); section-level sentiment scores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using LSD. Data were available until April 17, so the data for the week starting April 13 is incomplete.
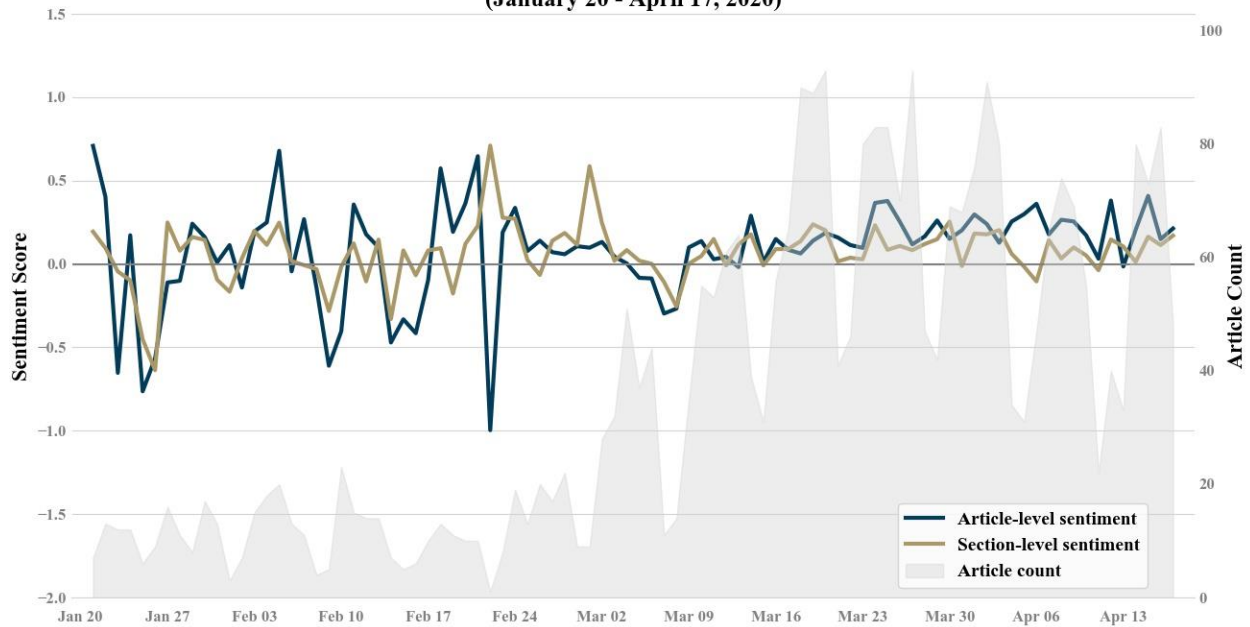
Appendix 2-A: Daily Average Sentiment Scores Using GI
(January 20 - April 17, 2020)

Notes: Article-level sentiment scores are based on the sentiment analysis of full article related to COVID-19 and regulation using the General Inquirer (GI) dictionary; section-level sentimentscores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using the GI dictionary.

Appendix 2-B: Weekly Average Sentiment Scores Using GI
(January-April 2020)

Notes: Dates on the x-axis indicate the start date of each week. Article-level sentiment scores are based on the sentiment analysis of full article related to COVID-19 and regulation using the General Inquirer (GI) dictionary; section-level sentiment scores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using the GI dictionary. Data were available until April 17, so the data for the week starting April 13 is incomplete.
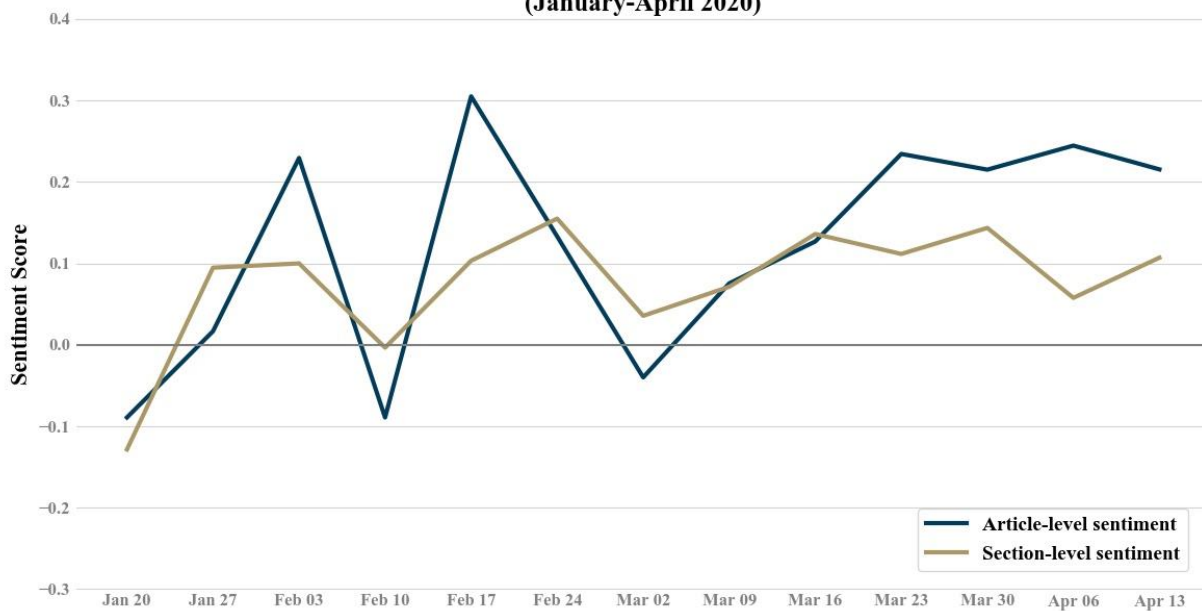
Appendix 3-A: Daily Average Sentiment Scores Using VADER
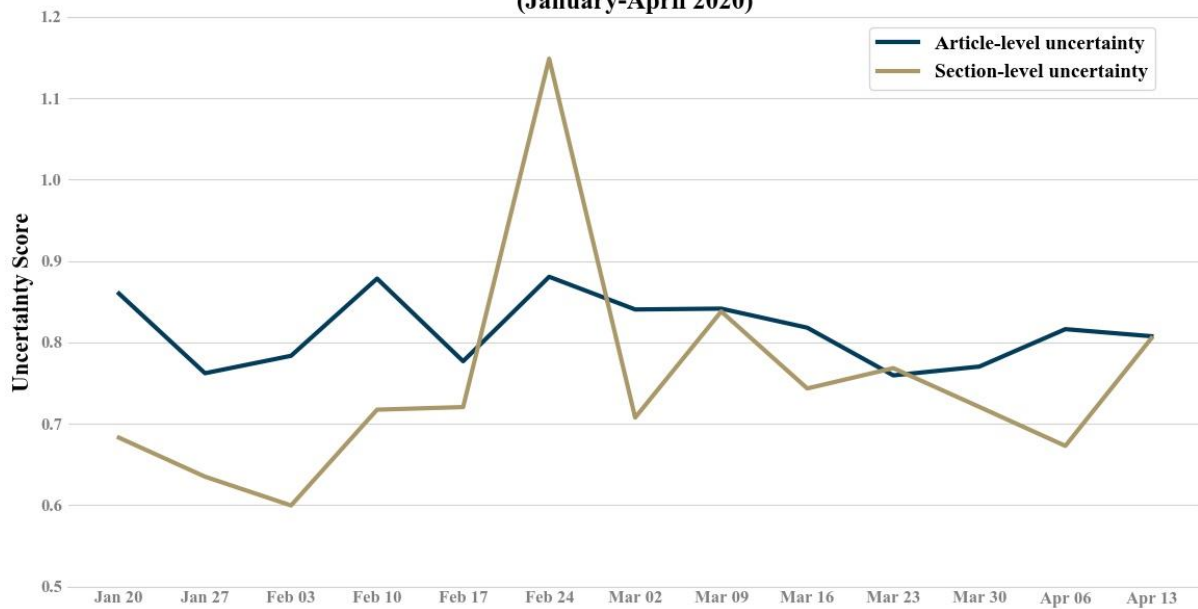### (January 20 - April 17, 2020)

Notes: Article-level sentiment scores are based on the sentiment analysis of full article related to COVID-19 and regulation using VADER; section-level sentiment scores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using VADER.

Appendix 3-B: Weekly Average Sentiment Scores Using VADER
(January-April 2020)

Notes: Dates on the x-axis indicate the start date of each week. Article-level sentiment scores are based on the sentiment analysis of full article related to COVID-19 and regulation using VADER; section-level sentiment scores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using VADER. Data were available until April 17, so the data for the week starting April 13 is incomplete.

Appendix 4: Weekly Average Uncertainty Scores
(January-April 2020)

Notes: Dates on the x-axis indicate the start date of each week. Article-level uncertainty scores are based on the sentiment analysis of full article related to COVID-19 and regulation using the uncertainty category in the Loughran and McDonald (LM) dictionary; section-level uncertainty scores are based on the sentiment analysis of sections that mention terms related to regulation in the articles using the LM dictionary. Data were available until April 17, so the data for the week starting April 13 is incomplete.