

# CESifo AREA CONFERENCES 2021

## Economics of Digitization

Munich, 19 – 20 November 2021

### Trade-offs in Automating Platform Regulatory Compliance By Algorithm: Evidence from the COVID-19 Pandemic

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# Trade-offs in Automating Platform Regulatory Compliance By Algorithm: Evidence from the COVID-19 Pandemic

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October 23, 2021

## Abstract

In a static environment, using algorithms can help platforms more quickly and easily achieve regulatory compliance. However, in a dynamic context, the rigidity of complying with regulations by having to pre-specify the parameters that algorithms use as inputs, may pose challenges. We draw on the literature on the trade-offs between algorithmic and human decision-making to study the effect of algorithmic regulation of ad content in times of rapid change. To comply with local US laws, digital ad venues need to identify sensitive ads likely to be subject to more restrictive policies and practices. However, in periods of rapid change when there is a lack of consensus about which ads are sensitive and should be subject to previously drafted policies, using algorithms to identify sensitive content can be problematic. We collect data on European and American ads published in the Facebook Ad Library. We show that algorithmic determination of what constitutes an issue of national importance resulted in COVID-19-related ads being disqualified because they lacked an appropriate disclaimer. Our results show that ads run by governmental organizations designed to inform the public about COVID-19 issues are more likely to be banned by Facebook’s algorithm than similar ads run by non-governmental organizations. We suggest that algorithmic inflexibility towards categorization in periods of unpredictable shifts in the environment worsens the problems of large digital platforms trying to achieve regulatory compliance using algorithms.

**Keywords:** Algorithmic Decision-Making, Ad Ban, COVID-19, Human Intervention, IS and Crisis

**JEL Codes:** M3, K2

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# 1 Introduction

Algorithms are increasingly used for prediction and classification, and for these purposes have the potential to match or exceed human performance (Brynjolfsson *et al.*, 2021; Fu *et al.*, 2020). Though often research has focused on the advantages of algorithmic accuracy relative to human decision-making (Kleinberg *et al.*, 2018), another advantage of the use of algorithms is that they are inherently scalable (Berente *et al.*, 2021). This scalability is attractive to digital platforms trying to achieve regulatory compliance. Unlike traditional business models, regulatory compliance is often challenging on digital platforms, due to the sheer number, velocity and scale of interactions (Belloni, 2019; Rao and Reiley, 2012). Therefore, many digital platforms try to achieve regulatory compliance via algorithms that determine whether or not interactions on the platform are compliant with existing regulations.

However, in dynamic contexts, algorithms may be less effective at successful regulation, either because the inputs they were trained on are no longer pertinent, or because the outputs they produce are no longer appropriate (Agrawal *et al.*, 2018; Fu *et al.*, 2020). We investigate the potential consequences of this for the use of algorithms and information systems (IS) to achieve regulatory compliance on digital platforms. We study the specific context of advertising. Using algorithms for regulatory compliance in advertising markets has become especially significant, given recent controversies over the interaction between politics and advertising on digital platforms (Isaac, 2019). The response to these controversies show the difficulty of regulating potentially controversial political advertising on platforms. For example, Twitter has stopped accepting advertising with political content<sup>1</sup> and Facebook and Snapchat have implemented policies requiring labeling indicating the origin of all political ads.<sup>2</sup> However, to regulate ad content deemed of potential political significance, a digital platform must first identify algorithmically which ads are subject to political regulation. Platforms face the further challenge of implementing via algorithm regulations designed for an analog era. The scale and diversity of ads in the digital era is far greater than in the analog environment in which regulatory policies were developed.

In the present article, we study the use of algorithms to achieve regulatory compliance on Facebook.

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<sup>1</sup><https://business.twitter.com/en/help/ads-policies/prohibited-content-policies/political-content.html>, last accessed May 16, 2020.

<sup>2</sup><https://businesshelp.snapchat.com/en-US/article/political-issue-ad-guidelines> and <https://www.facebook.com/business/news/requiring-authorization-and-labeling-for-ads-with-political-content>, last accessed May 16, 2020.

Facebook has introduced an automated ad control procedure for all ad content related to “*Social Issues, Elections, or Politics*”; this includes health issues, which are classed as political. We study the performance of this automation of political ad regulation in the context of a large health-related systemic, namely the COVID-19 pandemic. We examine 1,145,072 ads recorded in the Facebook Ad Library from January to June 2020 that were either related to the COVID-19 pandemic, or were not related to the pandemic but were run by an organization which had published at least one ad related to the pandemic.<sup>3</sup> If the advertiser fails to disclose the ad payment source and if the algorithm classifies the ad as “*Social Issues, Elections, or Politics*,” the ad is disqualified.

Our data shows that ads related to COVID-19 are more likely to be disqualified in the period because the algorithm judges that they were about an issue of national significance but did not include a disclaimer. This does not seem driven by the likely intentions of the advertiser. We show that COVID-19-related ads posted by governmental organizations are more likely to be disqualified than those posted by non-governmental organizations. This might be because government employees believe that health-related content do not fall under the provisions of political ad rules. This suggests that well-intentioned attempts to regulate ads via algorithm that include content of public importance can have unintended consequences, due to advertisers lacking sufficient awareness of which ads should include a disclaimer, especially in unstable and uncertain periods.

We find also that this result is mainly driven by European governmental organizations. Given this, a likely mechanism of our findings is that Facebook’s sensitive issues ad policy is based on US regulation related to political ads, and that European organizations are unaware of all of the ad types which require a disclaimer. Alternatively, the algorithm might be correct in identifying that European government agencies are more likely to produce problematic ads. However, textual analysis of ad content shows that there was no substantive meaningful difference in the content of banned or allowed ads; COVID-19-related ads were not more likely to include misleading claims.

This highlights the difficulties involved in algorithmic regulation of potentially sensitive ad content in a global context. Algorithmic control of content might not adjust to new content in the context of a

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<sup>3</sup>Facebook and Snapchat have established libraries of ads with political and advocacy related content. See <https://businesshelp.snapchat.com/en-US/article/political-ads-library> and <https://www.facebook.com/ads/library>, last accessed May 16, 2020.

shock. This raises questions about the standards which platforms should apply when formulating their regulations, and whether analog-era regulations are appropriate for algorithmic evaluation of online advertising, especially in the area of public health. The importance of these issues is heightened by our finding that the prohibition of certain ads can be significant in terms of the managerial and policy implications and the fact that a banned ad is unlikely to be resubmitted.

Our article adds to our understanding of the negative implications of the use of algorithmic decision-making in a dynamic environment. The need to understand how algorithmic decision-making works in a crisis becomes even more urgent if the information being managed is related to matters of national significance. If successful, algorithmic determination of which ads needs more vetting may increase the transparency and trustworthiness of ads. However, algorithms may not be well able to judge whether the content is of national importance. Regulations based on automated decision-making may not be sufficient to allow appropriate judgments about banning ads during the COVID-19 pandemic or some other major exogenous shock. Overall, our results suggest that human intervention is needed to complement automated decision-making (Ransbotham *et al.*, 2020; Teodorescu *et al.*, 2021) to enable more trustworthy automated systems (Kane *et al.*, 2021b), when trying to achieve regulatory compliance at scale – and particularly in dynamic contexts.

Our paper is organized as follows. Section 2 provides theoretical implications of our work. Section 3 presents how the policy related to ads in “*Social Issues, Elections, or Politics*” works. Section 4 describes the data collected via the Facebook Ad Library API. Section 5 presents the results of the data analysis. Section 6 studies the mechanisms explaining our results. Section 7 provides additional results. Section 8 concludes.

## **2 Theoretical Grounding and Contribution to the Literature**

Our paper is informed by, and builds upon, four streams of the IS academic literature. First, we contribute to an IS literature that explores the role of information IT during crises. Early work such as Chen *et al.* (2008) explored how lack of interoperability of IS systems affected crisis response. More recently, the literature has covered examples of new IS technologies helping disseminate and coordinate information - for example, Nan and Lu (2014) focus on the creation of online communities after

an earthquake, and Vaast *et al.* (2017) look at the use of social media to induce collective action during an oil spill in the Gulf of Mexico. In the context of the pandemic, IS scholars have highlighted that COVID-19 has led to rapid technology adoption (Wade and Shan, 2020). In the context of the pandemic, digital ad platforms were required to react quickly in terms of curating health-related information (Zhang *et al.*, 2020), pandemic-related information (Bae *et al.*, 2021), misleading content and national emergency services (Cinelli *et al.*, 2020). However, a variety of thought-provoking research has emphasized that the COVID-19 pandemic has also laid bare some of the challenges of successfully using IS systems (Barrett and Orlikowski, 2021; He *et al.*, 2021; Kane *et al.*, 2021a; Venkatesh, 2020). We follow this literature by looking at the COVID-19 lens pandemic as a lens to understand how the use of algorithms to achieve regulatory compliance can be ineffective in a dynamic environment.

The second stream of literature we build on and are informed by, focuses on platforms and content regulation. Platforms have an underlying coring need to use technologies to make interactions go well (Gawer and Cusumano, 2015; Tucker, 2020), and, as platforms' use of data increases, it is hard to scale such coring activities (Agarwal and Dhar, 2014). Möhlmann *et al.* (2020) show for example, how on ride-sharing platforms, algorithms can help ensure interactions between workers and riders go well. Not only do such algorithms help platforms scale, but they may help algorithms prevent bias in interactions (Fu *et al.*, 2021). However, beyond the business imperative to make interactions on platforms go well, platforms also have to comply with regulations. For example, political advertising is regulated in the US. There has been less research on the question of how algorithms fare in implementing regulatory compliance. De Vaujany *et al.* (2018) articulate the need for more research on the operation of the regulatory process as it becomes increasingly computer-mediated, but there has been little research on how algorithms actually perform at the task of regulatory compliance. We therefore contribute to this literature by studying the use of algorithms to implement compliance with regulations at scale.

The third literature we build on, and contribute, studies the interactions between human and algorithms. Ransbotham *et al.* (2020) show the intrinsic link between algorithmic recommendations and their implementation by humans. Interactions between humans and artificial intelligence profits from their different advantages and reduces both their weaknesses (Kane *et al.*, 2021b; Van den Broek *et al.*, 2021; Teodorescu *et al.*, 2021). Though these papers have a positive slant, we also build on some recent insights that reflect more negative interactions between humans and algorithms. For example, human

behavior can lead algorithms to be more successful at spreading misinformation (De Alves *et al.*, 2021). Reflecting this, several studies focus on the so-called ‘algorithmic arms race’ (Burrows, 2017; Dräger and Müller-Eiselt, 2020; Wilkes and Fletcher, 2012), where bots and humans compete to try to affect the spread of misinformation. We contribute to this latter literature by considering a situation where algorithms are designed to inform users about potentially biased advertising. We share the novel insight that in times of crisis, it is harder to use algorithms to prevent the spread of misleading ads.

The final literature we build on is on the use of algorithms for classification, and potential distortions therein. Algorithm-based prediction is an important issue which has received much research attention (Ahsen *et al.*, 2019; Fang and Hu, 2018; Shmueli and Koppius, 2011). However, this article tackles the role of algorithms in information (mis)classification. Understanding how IS can help to manage AI (Berente *et al.*, 2021; Li *et al.*, 2021) involves not only emphasizing the positive effects but mitigating negative outcomes (Marabelli *et al.*, 2021). We contribute to this body of work by highlighting the risks of data mis-classification due to scarce data, which tends to be exacerbated in a dynamic context contributing to data scarcity.

Our findings have two implications for the IS field. First, our results suggest that any attempts to regulate ad content and use algorithms to decide whether it falls into the “*Social Issues, Elections, or Politics*” category are bound to be problematic. It is difficult for platforms and advertisers to reach a mutual understanding about what content is a matter of national importance, and what content requires disclosures similar to political ads. Second, in the context of an unexpected shock such as the COVID-19 pandemic, this ambiguity increases as governmental organizations advertise more, unaware that the ads will be subject to algorithmic regulation based on US policies on political ads. The problems related to using algorithmic regulation are worsened in a dynamic context; in the context of an unexpected shock, ad content is likely to be challenged more often because it is unfamiliar to the algorithms. This emphasizes the extent to which in the digital age all those who interact with IS systems need to develop algorithmic competencies (Li *et al.*, 2021).

Our study has several implications for policy. Lefouili and Madio (2021) emphasize that policy makers should take account of certain economic trade-offs when designing a platform liability regime. The EU Digital Services Act requires online platforms to adopt higher standards of transparency and ac-

countability in relation to moderation of content and advertising, and algorithmic processes (Cabral *et al.*, 2021). Content curation on online platforms is described in terms of *proactive oversight*, which implies that the algorithm makes the final decision about outcomes, and multiple fairness metrics including control of misinformation (Shore *et al.*, 2018), avoidance of discrimination (Imana *et al.*, 2021), and regulation imposed to achieve fairness (Teodorescu *et al.*, 2021). We contribute to this debate and to the IS literature in particular by showing that algorithms trained on regulations designed for the analog era will be unable to correctly classify ad content on digital platforms, and that this results in economic inefficiencies from the platform perspective. We observed that many entities included in the political ad space found it difficult to determine what is likely to be governed by political ad policy. This suggests the need for an advertiser learning process. It suggests also that algorithmic based control of information needs some human input. From a regulatory perspective, more research is needed on standards for the regulation of health related content on social media platforms.

The somewhat paradoxical finding that COVID 19-related ads run by governmental organizations are more likely to be disqualified compared those submitted by non-governmental organizations supports our recommendations. Despite governmental organizations' willingness to inform the population about the spread of the virus and provide coronavirus guidance, governmental organizations' information campaigns are often not displayed due to algorithmic bans. This suggests the need for more IS research into automated systems which apply advertising rules formulated in the analog era to digital platforms (Agarwal and Dhar, 2014). Finally, we contribute by identifying some of mechanisms underlying the banning of COVID 19-related ads. Our findings in this case are driven mainly by governmental organizations based in Europe. This raises questions for policy makers and IS practitioners about whether platforms should adapt to local regulation, at the cost of delaying the display of content on urgent subjects. Should platforms use human monitoring to identify and control advertising deemed of national importance in periods of crisis?



### 3 Advertising Regulation Designed for the Analog Era Applied to the Digital Era

Facebook regulates all advertising that it considers to be of national significance, whether the ad is posted on behalf of a political candidate or when the ad content is related to health or social issues. The breadth of this categorization can be seen in that Facebook applies its rules to all ad content which “*relates to any national legislative issue of public importance in any place where the ad is being run.*” This echoes language used in traditional US regulation of political advertising on television channels (Oxenford, 2019), including 47 USC s. 315, “Candidates For Public Office,” which requires the licensee to maintain and make available for public inspection, a complete record of requests to purchase broadcast time which “*communicates a message relating to any political matter of national importance.*” This can be done manually in an analog context format where the high costs of TV or radio ads limit the number and variety of ads. However, in a digital context it is impossible to review all ads manually. For example, in the second quarter of 2020, Facebook has 9 million active advertisers on its platform.<sup>4</sup> Ads on digital platforms tend to be more varied and numerous simply because the cost of targeting and distribution is much lower in the digital space which requires platforms to use algorithms to automate content evaluation.

Facebook advertisers whose ads fall under the “*Social Issues, Elections or Politics*” category are required to undertake an ad authorization process which has to indicate their identity, location, and Facebook page address in order to have a “*Paid for by*” label that can be attached to a given ad. The platform verifies the identity of the advertiser and authorizes them to run an ad with matter of national significance.<sup>5</sup> This authorization process for ads in this category is based on the political ad policy. The disclaimer must identify in a transparent and easily understandable format the organization paying for the ad and should not include URLs or acronyms, offensive language, or opaque words or phrases.

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<sup>4</sup><https://www.statista.com/statistics/778191/active-facebook-advertisers/>, last accessed November 21, 2020.

<sup>5</sup><https://www.facebook.com/business/m/one-sheeters/ads-with-political-content-EU>, last accessed May 2, 2020.

### 3.1 The Facebook Ad Library

The Facebook Ad Archive was created in 2018 for American ads related to social and political issues. In 2019, it was replaced by the Facebook Ad Library,<sup>6</sup> which includes all ads published in Brazil, the EU, India, Israel, Ukraine and the US. It includes a special category for ads related to the “*Social Issues, Elections or Politics*” category. The Facebook Ad Library API provides different ad characteristics and permits searches using various criteria, including keywords, ad status, targeted location and advertiser name.<sup>7</sup> Figure 1 depicts how ads are shown in the Facebook Ad Library.

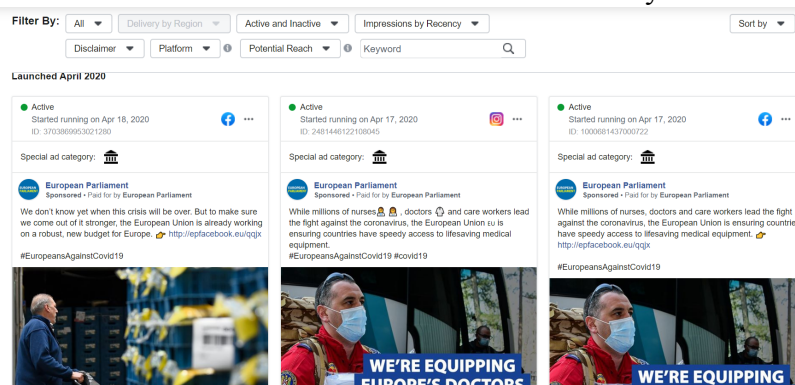


Figure 1: Platform Appearance

Alongside characteristics such as content, day of creation and location of targeted users, the Facebook Ad Library gives detailed performance information. Impressions are broken down by age group, gender, and location. Location is broken down further into European regions and US states as shown in Figure 11 in Appendix A. The amount spent on the ad and the platform on which it is posted (Facebook, Instagram, Facebook Audience Network and Facebook Messenger) are also included. The Facebook Ad Library API gives access only to ads placed on Facebook and Instagram.

### 3.2 Algorithmic Determination of National Significance

We next present the review process of ads in the “*Social Issues, Elections or Politics*” category. All paid ads are reviewed before publication by an automated ad-screening system to verify compliance with Facebook’s general advertising policy. Ads whose content includes a matter of national significance are subjected to an additional review process to verify compliance with the rules governing political

<sup>6</sup>In response to controversies associated to political elections in the US and the UK and to ensure ad transparency, ad platforms created their own publicly available ad archives. <https://www.nytimes.com/2018/09/02/technology/03adarchive.html>, last accessed April 21, 2020.

<sup>7</sup>The archive includes both active and inactive ads. See <https://www.facebook.com/ads/library/api>, last accessed April 21, 2020.

ads on traditional media.<sup>8</sup> “*Social Issues, Elections or Politics*” content covers a broad category of ads. This includes social issues ads which are defined as paid content that “*seek to influence public opinion by including ad content that discusses, debates or advocates for or against a social issue*”.<sup>9</sup> These rules have been applied to COVID-19-related ads since the virus first emerged and began to spread.<sup>10</sup>

To indicate that the ad includes social issues, elections, or politics content, the advertiser checks the box “*This ad is about social issues, elections and politics*” (see Figure 3). Then, the algorithm determines whether or not the content falls under this category. If the automated ad-screening system determines that the ad content is political or relates to a social issue, the ad is subjected to Facebook’s political ad regulation. The algorithm confirms if the advertiser is authorized to run the ad in this category. Finally, the algorithm checks for the inclusion of an appropriate disclaimer.



Figure 2: Example of an Ad Run Without a Disclaimer

If the ad is identified as political or relating to a social issue but does not include a disclaimer, it is rejected and labeled “*This ad ran without a disclaimer;*” as illustrated in Figure 2. In this case, the advertiser is notified about the ban on the grounds of non-compliance with the “*Social Issues, Elections or Politics*” rules. While there are direct economic consequences of banning commercial ads, banning social and health ads run by governmental organizations can delay the diffusion of information related

<sup>8</sup><https://medium.com/centerforcooperativemedia/what-small-publishers-need-to-know-about-facebooks-policy-on-ads-with-political-content-180874bf63c3>, last accessed May 2, 2020.

<sup>9</sup>[https://www.facebook.com/business/help/213593616543953?locale=en\\_GB](https://www.facebook.com/business/help/213593616543953?locale=en_GB), last accessed October 31, 2020.

<sup>10</sup>These rules were slightly adapted during the pandemic. See <https://www.advertisemint.com/the-list-of-covid-19-ads-and-posts-banned-by-facebook/>, last accessed October 31, 2020.

to COVID-19 with important social and health consequences for the population. The World Health Organization has identified the COVID-19 “*infodemic*” as a research priority (WHO, 2020).

Even before the COVID-19 pandemic, Facebook’s political ad policy was considered broad and included health content. For example, a health center was initially blocked for running ads without a disclaimer to raise awareness of PrEP, an FDA-approved anti-HIV medication sold under the brand name Truvada.<sup>11</sup> In the US, UK and EU, any ad is categorized as being related to social issues if it includes civil and social rights, crime, economic, environmental politics, health, immigration, political values and governance, security, and foreign policy content. In the US, there are additional categories of education and guns.<sup>12</sup>

### 3.3 COVID-19 Ads

Health-related ads fall into the “*Social Issues, Elections or Politics*” broad category to ensure advertisers are transparent about ad origin. It is possible that the advertisers and in particular governmental organizations were unaware that health-related ads were subject to the Facebook’s political advertising policy based on US political ad regulation. COVID-19-related ads were only allowed on the platform if they include “*Paid for by*” disclaimer. Figure 3 shows that the checkbox mentions political content.

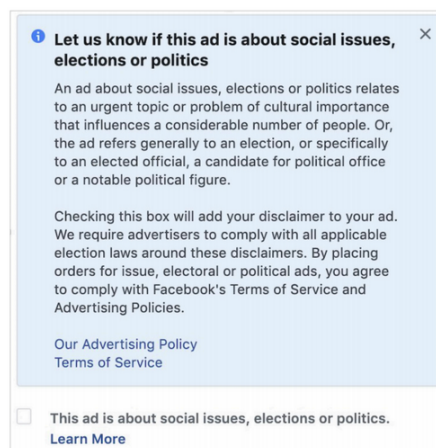


Figure 3: Ads Related to “*Social Issues, Elections or Politics*”: Checkbox from Facebook

In our empirical setting, we can measure whether ads in the “*Social Issues, Elections, or Politics*” category were barred. We are also able to identify the type of entities that posted all ads. This includes

<sup>11</sup><https://www.theguardian.com/technology/2019/oct/31/facebook-prep-ads-instagram-political>, last accessed May 16, 2020.

<sup>12</sup>[https://www.facebook.com/business/help/214754279118974?id=288762101909005&helpref=faq\\_content](https://www.facebook.com/business/help/214754279118974?id=288762101909005&helpref=faq_content), last accessed May 16, 2020.

public authorities such as the European Parliament, the European Committee of the Regions, and the U.S. House of Representatives which used social media platforms to diffuse COVID-19-related information to inform citizens about the dangers related to COVID-19 and advise about how to avoid infection. Governmental organizations are increasingly posting ads to communicate with individuals.<sup>13</sup> For example, the European Parliament was the governmental body that spent the most on Facebook ads in France, Italy and Germany between March 2019 and December 2020.<sup>14</sup> Therefore, it is useful to understand how they navigate the need to self-regulate in the context of promoting health-related content on social media platforms such as content related to the spread of COVID-19.

## 4 Data

We gathered data on pandemic-related ads using the Facebook Ad Library API which provides access to all ads available in the category “*Social Issues, Elections or Politics*”. To identify ads related to COVID-19, we searched on the keywords “*coronavirus*” and “*covid*”<sup>15</sup> which were the most frequently searched terms on Google Trends in March 2020. We collect ads posted in the US and in Europe from January (when the first COVID-19-related ads were published) through June 2020.<sup>16</sup> Next, based on this initial sample, we collect a unique identifier for each advertiser. We consider only those advertisers that ran more than one ad related to COVID-19 during the period January-June 2020.<sup>17</sup> This empirical strategy allows us to compare advertisers who were “*equally*” active in extensive outreach. We identify Facebook pages for 10,825 out of the 11,122 advertisers. We retrieved all ads posted by a given advertiser, including ads unrelated to the pandemic which we used as the reference group. To collect more information on the advertiser running the ad, we scraped advertisers’ Facebook pages to identify the entity’s category. To increase transparency, in 2013 Facebook introduced the “*verified badge*” (also called “*blue check*”) for advertiser pages. The blue check (see Figure 6 in Section 6) certifies accounts

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<sup>13</sup><https://blog.hootsuite.com/social-media-government/>, last accessed December 26, 2020.

<sup>14</sup>In our sample the European Parliament spent on average €1,394 on COVID-19-related ad campaigns (with a total budget spent of €581,218) and the European Parliament spent €1,601 on ad campaigns not related to COVID-19 (with a total budget spent of €674,758).

<sup>15</sup>These two words do not need to be translated as they are used both in English and other European languages.

<sup>16</sup>For each ad, we collect different performance measures including total number of impressions (as a range) and amount spent on the campaign. The Facebook Ad Library API breaks down ad performance data by gender, age category, and region (state) targeted.

<sup>17</sup>This threshold corresponds to the 5th percentile distribution lower bound which corresponds to 8,822 advertiser pages. We exclude SmartNews which is the largest advertiser in our initial sample, since it used an excessive number of variations of wording to localize each of its ads, and as such it dwarfed other advertisers. It represented 233,855 ads running during our sample period.

as belonging to the public figure, celebrity, global brand, institution, etc. We also checked whether the advertisers' Facebook page had a verified badge.

As we restrict our sample to advertisers displaying at least two COVID-19-related ads, we do not include the more general pool of advertisers. This empirical strategy results in rather conservative measures since we exclude advertisers who are more familiar with general product ads and less familiar with health-related ads. We believe that our sample provides at worst lower bound results. Advertisers who choose to advertise COVID-19-related ads are more likely to be familiar with health and social issues, and therefore are more likely to be aware of Facebook ad regulations. This suggests that ads run by these governmental organizations should be less likely to be banned. While the overall percentage of disqualified ads is low, it should be noted that a quarter of the advertisers in our sample are disqualified at least once. That is, even among the advertisers most likely to be informed about Facebook's specific rules for this type of content, a significant number of advertisers are disqualified.

Our final sample includes 1,145,072 ads posted on Instagram and Facebook, across European Economic Area (EEA) countries and the US. We collected detailed characteristics of each advertiser and the ads posted. The sample includes both active and inactive ads. Table 1 provides summary statistics for the data.

Our key dependent variable *Disqualified ads* is a binary variable which takes the value 1 if a given ad was rejected for not having a disclaimer and 0 otherwise. *COVID-19 ad* measures whether the ad is related to the pandemic and takes the value 1 if the ad contains either of the terms "covid" or "coronavirus." We identify governmental organization using the categories indicated on the advertisers' Facebook page and include the classes "Public & Government Service" or "Governmental Organization". This information allowed us to construct the variable *Governmental Organization* which takes the value 1 if the Facebook page belongs to a governmental organization and 0 otherwise. Examples of governmental organizations in our dataset are the World Bank, State Representatives, European Parliament and the European Commission. We do not include in this category politicians or political parties. To determine whether the advertiser page is official, we use the variable *Verified badge*. It is a binary variable which takes the value of 1 if the ad is paid by an organization with the verified "blue check" mark and 0 otherwise. To identify whether the ad was published in Europe or in the US, we create the

dummy variable *Europe*.

Table 1: Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Disqualified ads	0.014	(0.119)	0	1	1,145,072
COVID-19 ad	0.164	(0.37)	0	1	1,145,072
Governmental Organization	0.011	(0.106)	0	1	1,145,072
Verified badge	0.535	(0.499)	0	1	1,145,072
Europe	0.237	(0.425)	0	1	1,145,072

Notes: This table indicates that in our sample 1.4% of ads are disqualified and 16.4% are COVID-19 related.

## 5 Results

Figure 4 depicts our main result. It shows that overall COVID-19-related ads were more likely to be disqualified. The y-axis shows the proportion of disqualified ads in our sample. It shows the proportion of disqualified ads according to whether they are related to the COVID-19 pandemic - an event that was unexpected and whose categorization as a political issue or not was somewhat ambiguous at the time of the initial outbreak of the virus. We interpret this to mean that organizations running COVID-19-related ads were less likely than other advertisers to realize that they needed to include a disclaimer.

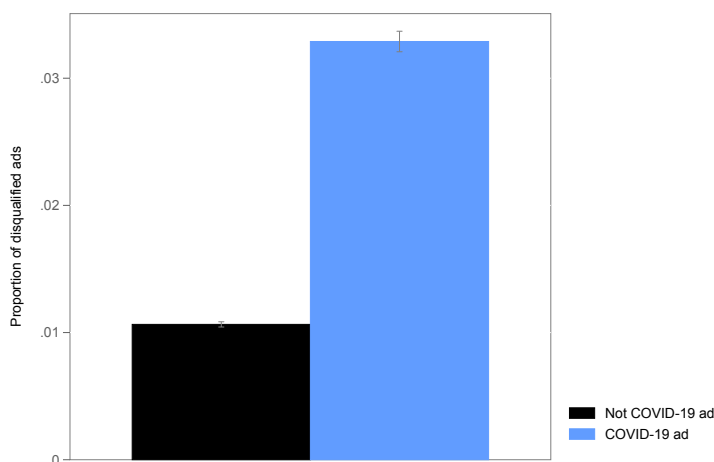


Figure 4: Proportion of Disqualified Ads by COVID-19-related ads

Figure 5 shows the proportions of disqualified ads run by governmental and non-governmental organizations. The y-axis shows the proportion of disqualified ads in our sample. Ads posted by governmental organizations were more likely to be disqualified than ads placed by non-governmental organizations. This pattern of COVID-19-related ads being disqualified is even greater if it was a governmental orga-

nization that was placing the ad. This suggests that governmental organizations running COVID-19-related ads are less likely than other advertisers to understand the need to include a disclaimer. This is surprising as governmental organizations are often law-making bodies and might be expected to be more compliant with social media advertising rules.

It might reflect that governmental organizations tend to make more of a distinction between health-related ads and ads related directly to partisan politics or elections. This might reduce the realization that a disclaimer is needed for COVID-19-related ads. On the other hand, the platform’s automated controls are not able immediately to adjust decision-making and publish this type of ads which is relevant to public health and should be accessible to individuals. However, this does not seem driven by the likely intentions of the advertiser. In period of rapid change when there is a lack of consensus about the definition of sensitive ads that should be subject to earlier policies, an algorithmic definition of sensitive content may be problematic. These findings are consistent with our theoretical framework which underlines that in a dynamic context evaluation of ads may require human intervention.

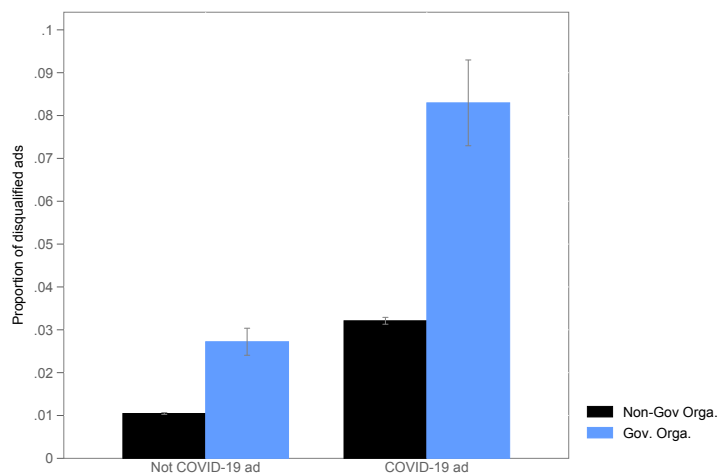


Figure 5: Proportion of Disqualified Ads by Governmental Organizations

## 6 Mechanism: Is it Due to Lack of Knowledge about Facebook Functionality or to Regulation?

Our results suggest that governmental organizations are not aware of what is considered to be a matter of national importance, and therefore is governed by political advertising regulations. To assess whether this in turn reflects a lack of knowledge about Facebook’s “*Social Issues, Elections or Politics*” advertising policy, we look at whether the organization attempted authentication before placing



the ad. To do this, we measured the presence of a verified badge which would confirm authentication by Facebook of an account of a public figure, media company, or brand. We use this data to measure whether organizations less knowledgeable about Facebook rules were more or less likely not to include a disclaimer.



Figure 6: Example of Page with Verified Badge

Figure 7 depicts the proportions of disqualified ads placed by advertisers with and without a verified badge. The y-axis shows the proportion of disqualified ads in our sample. Figure 7 shows that for entities with no verified badge, COVID-19-related ads published by a non-governmental organization were more likely to be disqualified compared to non-COVID-19-related ads. Among the sub-sample of advertisers with a verified badge, Figure 7 shows that the share of disqualified ads is higher if the ad was placed by a governmental organization, and especially if it was COVID-19-related. This suggests that the large proportion of disqualified ads cannot be explained by the fact that the governmental organization was not known to Facebook, or was unable to follow the verified account procedure. We suggest rather that it was the result of a governmental organization being less likely to appreciate that public health messages might be considered a “*national legislative issue of public importance*” and thus falling under political ad rules.

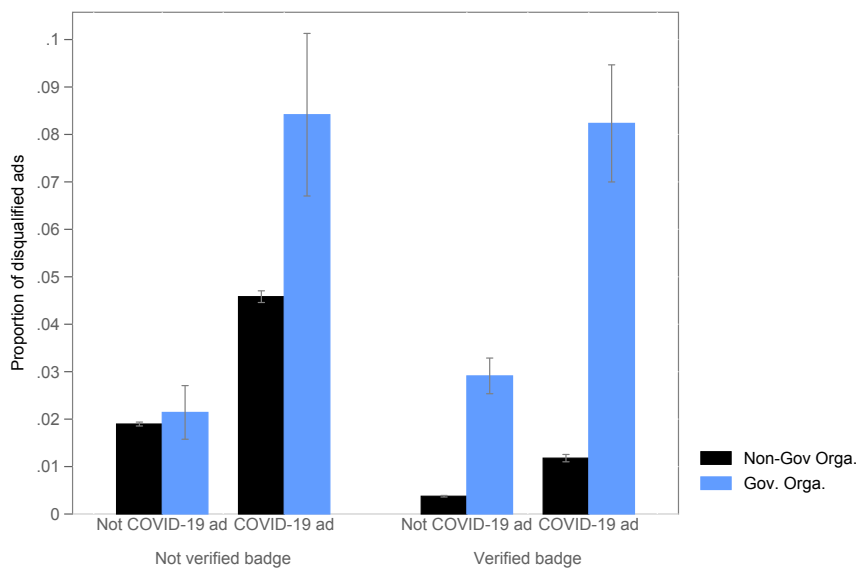


Figure 7: Proportion of Disqualified Ads Placed by Verified Advertisers

To further explore the mechanism leading to this result, we explore whether the proportions of COVID-19-related disqualified ads are the same in the US and in Europe. We distinguished ads displayed in the US and in Europe. If the ad was run in both the US and Europe, we attribute it to the US. Ads run only in Europe account for 23.66% of the overall sample. Figure 8 depicts the proportions of disqualified ads in Europe and the US and shows that COVID-19-related ads run by governmental organizations based in Europe were more likely to be disqualified than ads run in the US. One interpretation of this pattern is that European governmental organizations are less familiar with Facebook’s political advertising policy, which is based on US law and echoes language used in US regulation of political advertising, and therefore may not have realized that their ad would be judged by the algorithm as potentially subject to regulation. In a novel and dynamic context such as the COVID-19 pandemic, the lack of available knowledge and experience to train algorithms can lead to excessive numbers of banned ads, especially in Europe. Appendix B Table 6 presents estimates of the probability of an ad being disqualified. The results of the econometric estimation corroborate our main findings.

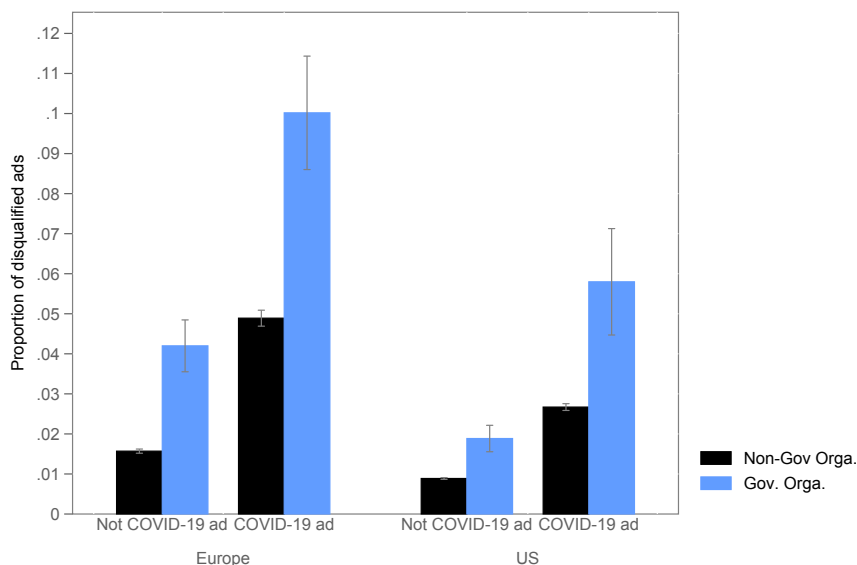


Figure 8: Proportion of Disqualified Ads Placed by European and US Advertisers

## 6.1 Can Advertisers Correct the Initial Disqualification?

Our results suggest something problematic - that algorithmic sorting of ads as subjected to political ad policy (or not) may hinder dissemination of important health information. If the ad is rejected for not including a disclaimer, the advertiser is notified of this decision and can edit it by checking the disclaimer box and republishing the ad.<sup>18</sup>

We checked the sample of disqualified ads to see how many ads were not resubmitted to the platform after the initial ban. Table 2 details the descriptive statistics. We find that 79.8% of disqualified ads were not resubmitted to the platform. This means that only 20.2% are re-submitted. When we narrowed our focus to COVID-19 disqualified ads, we find that 82.2% of them were not resubmitted, and out of those disqualified ads run by governmental organizations, 94.2% of them were not resubmitted to the platform. Among disqualified ads related to COVID-19, 94.1% of European ads and 74.7% of US ads are not resubmitted.

This suggests that the algorithmic rejection of ads did have a systematic and prolonged effect on the type of ads that were shown on Facebook and Instagram. This result refers to a mis-classification issue exacerbated in a dynamic context as current algorithms have not been trained to evaluate pandemic-related data.

<sup>18</sup><https://medium.com/fee-marketing-insights/facebooks-political-content-disclaimer-and-what-to-do-when-your-ads-get-rejected-8ac17396d03f>, last accessed March 18, 2021.

Table 2: Not Many Advertisers Resubmitted Disqualified Ads

	% (1)	Nb of Ads Disqualified (2)
<b>Not Resubmitted Disqualified Ads</b>	79.8	16,369
COVID-19 ad	82.2	6,184
Governmental Organization	94.2	242
Non-Governmental Organization	81.7	5,942
Europe	94.1	2,373
US	74.7	3,811
Not COVID-19 ad	78.4	10,185
Governmental Organization	69.1	278
Non-Governmental Organization	78.7	9,907
Europe	79.9	3,617
US	77.6	6,568

*Notes:* Column (1) shows the percentage of ads that do not get resubmitted. Column (2) shows the total number of disqualified ads presented in our total sample.

## 7 Robustness Checks

### 7.1 Text Analysis of Ad Content

Our results show that COVID-19-related ads run by governmental organizations are more likely to be banned. We are able to measure ads disqualified due to lack of an appropriate disclaimer; however, it might also be that they include additional content that breaches the general Facebook advertising policies and include misleading information.<sup>19</sup> We assume that ads submitted by governmental organizations to inform the population about the spread of the virus will be very unlikely to include misleading information, and more especially if the organization submitting the ad is included in the verified category of advertisers. To check the robustness of our results, we conducted a text analysis of ad content using an approach similar to that proposed by Büschken and Allenby (2016) and including only English language ad content. English ad content accounts for 80.32% of the sample. We deleted stop words, removed all punctuation, and transformed upper case into lower case characters. Appendix D provides an analysis of the word count statistics.

Using Latent Dirichlet Allocation (LDA), we conduct a topic analysis of the sub-sample of disqualified COVID-19-related ads submitted by governmental organizations and non-governmental organizations (Blei *et al.*, 2003). This is a generative probabilistic model used to describe collections of text doc-

<sup>19</sup>See <https://www.facebook.com/policies/ads/overview>, last accessed April, 2021.

uments or other discrete data types. LDA belongs to the category of models known as topic models, which seek to reveal thematic structures. We investigate use of the latent topics to check for potentially misleading claims in the disqualified ads. We use GridSearch optimization which allowed us to define the number of topics. We test between 2 and 15 topics, and to enable comparison we identify three topics (T=3) for each sub-analysis.

Table 3 presents the top 10 words associated with the LDA analysis for COVID-19 disqualified ads submitted by governmental organizations. Topic 1 “*Coronavirus*” includes words related to health information and emergency responses suggesting that disqualified ads include content that might hinder the dissemination of important health information. Topic 2 “*Public authorities*” includes a set of words associated with governmental organizations’ actions (“*census*”, “*service*”, “*emergency*”). Topic 3 “*Protection*” includes issues related to safety (“*protection*”, “*help*”, “*order*”). We compare this result with COVID-19-related ads run by governmental organizations that were not disqualified and observe no differences (see Table 8 in Appendix D). This suggests that these disqualified ads did not include any misleading claims. Disqualified ads were mostly likely to inform individuals about the pandemic and the need to protect themselves and their families. Therefore, it seems that automated ad control is likely to reduce the diffusion of messages aiming to inform individuals.

Table 3: Top 10 Words from the Topic Analysis LDA-Rating Model: Subsample of COVID-19 Disqualified ads Run by Governmental Organization

Rank	Topic 1 “ <i>Coronavirus</i> ”	Topic 2 “ <i>Public Authorities</i> ”	Topic 3 “ <i>Protection</i> ”
1	state	count	product
2	county	census	protection
3	health	service	help
4	coronavirus	determine	order
5	measure	water	family
6	information	county	brand
7	people	committee	description
8	emergency	city	abuse
9	court	emergency	know
10	family	money	cost

Table 4 presents the results of the topic analysis for the sub-sample of COVID-19 disqualified ads run by non-governmental organization. We highlight the difference with the previous analysis. Topic 1 “*News*” includes a collection of words associated with news such as “*news*”, “*breaking*” and “*live*”.

Topic 2 “*Coronavirus and Business*” includes various issues related to the commercial implications of the pandemic and includes words such as “*help*”, “*support*” and “*business*”. Topic 3 “*Business*” is a description of business-related content. The topic analysis of this set of disqualified ads suggests that the content of these ads is completely different compared to the ads included in Table 3.

Table 4: Top 10 Words from the Topic Analysis LDA-Rating Model:  
Subsample of COVID-19 Disqualified ads Run by Non-Governmental Organization

Rank	Topic 1 “ <i>News</i> ”	Topic 2 “ <i>Coronavirus and Business</i> ”	Topic 3 “ <i>Business</i> ”
1	news	coronavirus	estate
2	county	help	market
3	break	need	time
4	stay	health	investor
5	app	support	start
6	million	time	create
7	trust	people	foreclosure
8	install	business	need
9	live	covid	invest
10	breaking	make	people

## 7.2 Are These Results Robust to the Inclusion of Other Keywords?

We address the concern that our data collection strategy might restrict our sample to sub-sample of COVID-19-related ads as follows. We searched for ads published during January to June 2020 adding additional keywords which included the COVID-19-related keywords “*Handwashing*”, “*Hydroalcoholic gel*”, “*Masks*”, “*Social distancing*”, “*Stay at home*”.<sup>20</sup> This data collection strategy allows us to collect a wider range of COVID-19-related ads. Overall, the sample includes 1,165,647 different ads. The keywords “*coronavirus*” and “*covid*” represent the large majority of ads related to the pandemic – accounting for 94.42% of the sample with the other keywords accounting for only 5.58%. In the figures, the y-axis is the proportion of disqualified ads in the samples. Figure 9 shows that COVID-19-related ads are more likely to be disqualified and especially if they are submitted by a governmental organization (see Figure 10). The robustness check suggests that the effect we are studying is governmental rather than non-governmental organization-driven. This empirical evidence is particularly useful in our setting because it shows that our results are not driven by a narrow set of ads.

<sup>20</sup>See appendix C in Table 7. We translate them in the five main European languages - English, French, German, Italian and Spanish - We also added the keyword “*SARS*”.

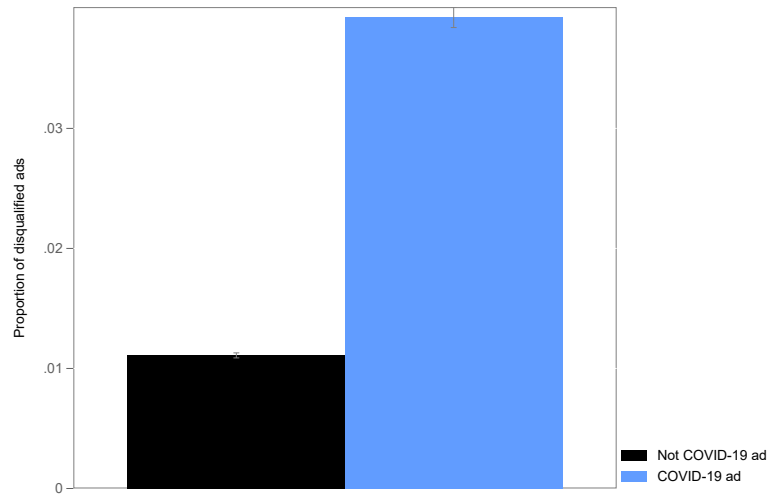


Figure 9: Proportion of Disqualified Ads by COVID-19-related Ads: Sample with Large Set Keywords

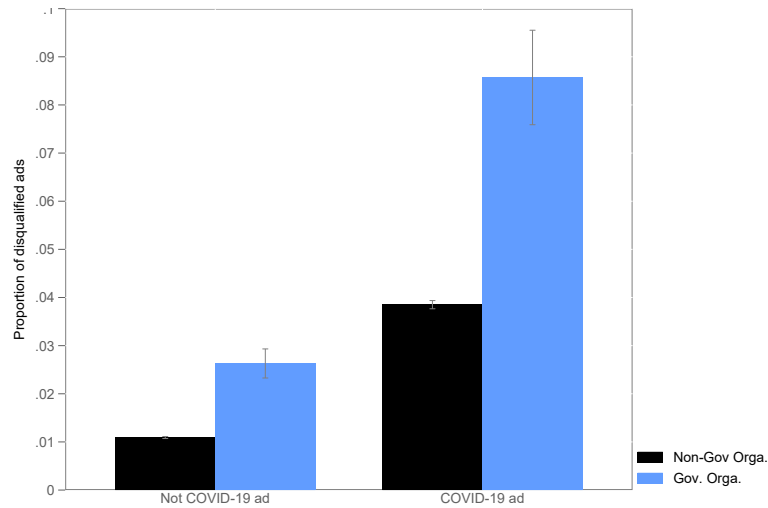


Figure 10: COVID-19-related Ads Run by Governmental Organization Are Still more Likely to be Disqualified: Sample with Large Set Keywords

We checked the sensitivity of our results to the advertiser running the ad. We studied searches on Google Trend across the world during the months included in our data collection period - January to June 2020. Without specifying particular keywords, we collected the 25 most frequent topics and search queries in a given period which allowed us to identify keywords or topics which although they might seem unrelated were associated with the COVID-19 pandemic. Appendix E table 9 presents the results for the top 25 Google Trend searches. There is also no observable search pattern suggesting links to misleading information which indicates that our strategy excludes topics related only indirectly to the pandemic.

### 7.3 COVID-19-Related Ads not Included in the “*Social Issues, Elections or Politics*” Ad Category

We were interested also in whether the ad category had an effect on the judgement about a COVID-19-related ad. At the time of the data collection, the Facebook Ad Library gives access to US but not European data in the categories “*Housing*”, “*Employment*”, and “*Credit*”. In Europe, the Facebook Ad Library has only two ad categories: “*All ads*” and “*Social Issues, Elections or Politics*” ads. Our data collection effort might exclude COVID-19-related ads not included in the “*Social Issues, Elections or Politics*” ad category.

To try to mitigate this issue, we search ads in the US “*Housing*”, “*Employment*” and “*Credit*” categories using the keywords “*covid*” and “*coronavirus*” during the period January to June 2020. Table 5 presents the number of ads included in each category. We identify 12 pandemic-related ads not included in the category “*Social Issues, Elections or Politics*” ads. “*Housing*” accounted for 11 ads and “*Employment*” included only one ad. We do not find any ads related to COVID-19 in the category “*Credit*”. All of this suggests that our empirical strategy is likely to identify all ads relevant to COVID-19.

Table 5: Number of Ads in Other Categories available in the Facebook Ad Library in the US from January to June 2020

Number of Ads in the Categories: Housing, Employment and Credit			
	Housing	Employment	Credit
Covid	8	1	0
Coronavirus	3	0	0

## 8 Conclusion

Global digital platforms use algorithms and automated rules to govern advertising on political and societal issues. Our results suggest that algorithmic inflexibility with respect to categorization in a dynamic environment complicates regulatory compliance. We show that in a dynamic environment, Facebook’s algorithmic management of information can have unintended consequences for COVID-19-related ads. We find that although overall the percentage of ads disqualified by the algorithm was small, COVID-19-related ads are more likely to be disqualified, and the probability increases if the ad is run by an European governmental organization.



Algorithmic determination of what should be categorized as a political or social issue and governed by the corresponding policy led to COVID-19-related ads being barred for lack of an appropriate disclaimer. This occurred because the regulation which Facebook applies uses an algorithm and regulation designed for the analog era. In particular, determining whether a new topic, such as COVID-19, is a matter of national significance and therefore subject to strict ad rules ultimately is subjective. This subjectivity is aggravated by the lack of knowledge among European governmental organizations about US rules related to political advertising, and lack of knowledge that these public health messages will be categorized as political advertising, and therefore should include a disclaimer.

Using algorithms to achieve ad content classification especially during periods of crisis could result in wrong decisions and blocks on the spread of vital information. We observe that algorithmic decision-making in a period of rapid change failed to properly classify content due to lack of availability and training on pandemic-related data. This highlights the need for more human-machine interaction in periods of instability, and underlines the challenges related to using IS to manage information in crises.

Our results have some important practical implications for managers and policy makers. First, the research highlights an unexpected effect not clearly understood by advertisers of the imposition of political ad rules on the evaluation of social and health ads. The fact that our findings are based on a restricted sample of governmental organizations which regularly run health and social ads suggests that this result is likely to be robust to other advertisers. Second, policy makers should consider that imposing political ad regulation involves use of automated controls to categorize ad content due to the huge amounts of information that must be evaluated. Policy makers should consider the unintended and unexpected consequences of this regulation.

Our study has three main practical implications. First, our findings provide evidence that algorithms are unable to make appropriate judgments in fast changing environments such as the COVID-19 pandemic. Second, we show that automated algorithmic content filtering has drawbacks when trying to categorize content. This raises questions about standards for and regulation of health-related content on digital platforms and the extent to which it should be part of what is considered political because it is an area of policy controversy in the US. Third, our results highlight that in times of crises there may be more need for intervention to manage algorithms

This research has some limitations. First, it is based on data collected between January and June 2020 which was a period of excessive turmoil. Second, we did not try to reverse-engineer the algorithm process determining whether the ad has political or social content and requires a disclaimer. However, we believe our paper makes a useful contribution to work in the IS literature on the role of automated algorithmic control of information in a period of crisis, and on the potential negative effect of applying analog-era advertising rules to digital platforms.

## References

- Agarwal, R. and Dhar, V. (2014). Editorial—Big Data, Data Science, and Analytics: The Opportunity and Challenge for IS Research. *Information Systems Research*. 25(3), 443–448.
- Agrawal, A., Gans, J. and Goldfarb, A. (2018). Prediction Machines: The Simple Economics of Artificial Intelligence. *Harvard Business Press*.
- Ahsen, M. E., Ayvaci, M. U. S. and Raghunathan, S. (2019). When Algorithmic Predictions Use Human-Generated Data: A Bias-Aware Classification Algorithm for Breast Cancer Diagnosis. *Information Systems Research*. 30(1), 97–116.
- Bae, S., Sung, E. and Kwon, O. (2021). Accounting for Social Media Effects to Improve the Accuracy of Infection Models: Combatting the COVID-19 Pandemic and Infodemic. *European Journal of Information Systems*. 30(3), 342–355.
- Barrett, M. and Orlikowski, W. (2021). Scale Matters: Doing Practice-based Studies of Contemporary Digital Phenomena. *MIS Quarterly*. 45(1), 467–472.
- Belloni, M. (2019). *Detecting Scams Using AI*. Retrievable at <https://towardsdatascience.com/detecting-scams-using-ai-for-real-6c96e712cf09>.
- Berente, N., Gu, B., Recker, J. and Santhanam, R. (2021). Managing Artificial Intelligence. *MIS Quarterly*. 45(3), 1433–1450.
- Blei, D. M., Ng, A. Y. and Jordan, M. I. (2003). Latent Dirichlet Allocation. *The Journal of Machine Learning Research*. 3, 993–1022.
- Brynjolfsson, E., Wang, C. and Zhang, X. (2021). The Economics of IT and Digitization: Eight Questions for Research. *MIS Quarterly*. 45(1), 473–477.
- Burrows, L. (2017). *An Economy of Algorithms*. ComputeFest 2017 Tackles the Future of the Computational Economy.
- Büschken, J. and Allenby, G. M. (2016). Sentence-Based Text Analysis for Customer Reviews. *Marketing Science*. 35(6), 953–975.
- Cabral, L., Haucap, J., Parker, G., Petropoulos, G., Valletti, T. M. and Van Alstyne, M. W. (2021). The EU Digital Markets Act: A Report from a Panel of Economic Experts. *Publications Office of the European Union, Luxembourg*.
- Chen, R., Sharman, R., Chakravarti, N., Rao, H. R. and Upadhyaya, S. J. (2008). Emergency Response Information System Interoperability: Development of Chemical Incident Response Data Model. *Journal of the Association for Information Systems*. 9(3/4), 200–230.
- Cinelli, M., Quattrociocchi, W., Galeazzi, A., Valensise, C. M., Brugnoli, E., Schmidt, A. L., Zola, P., Zollo, F. and Scala, A. (2020). The COVID-19 Social Media Infodemic. *Scientific Reports*. 10(1), 1–10.
- De Alves, C., Salge, C., Karahanna, E. and Thatcher, J. (2021). Algorithmic Processes of Social Alertness and Social Transmission: How Bots Disseminate Information on Twitter. *Forthcoming at MIS*

*Quarterly*.

- De Vaujany, F.-X., Fomin, V. V., Haefliger, S. and Lyytinen, K. (2018). Rules, Practices, and Information Technology: A Trifecta of Organizational Regulation. *Information Systems Research*. 29(3), 755–773.
- Dräger, J. and Müller-Eiselt, R. (2020). *We Humans and the Intelligent Machines: How algorithms shape our lives and how we can make good use of them*. Verlag Bertelsmann Stiftung.
- Fang, X. and Hu, P. J.-H. (2018). Top Persuader Prediction for Social Networks. *MIS Quarterly*. 42(1), 63–82.
- Fu, R., Huang, Y. and Singh, P. V. (2020). Artificial Intelligence and Algorithmic Bias: Source, Detection, Mitigation, and Implications. In *Pushing the Boundaries: Frontiers in Impactful OR/OM Research*. (pp. 39–63). INFORMS.
- Fu, R., Huang, Y. and Singh, P. V. (2021). Crowds, Lending, Machine, and Bias. *Information Systems Research*. 32(1), 72–92.
- Gawer, A. and Cusumano, M. A. (2015). Platform Leaders. *MIT Sloan Management Review*, 68–75.
- He, W., Zhang, Z. J. and Li, W. (2021). Information Technology Solutions, Challenges, and Suggestions for Tackling the COVID-19 Pandemic. *International Journal of Information Management*. 57, 102287.
- Imana, B., Korolova, A. and Heidemann, J. (2021). Auditing for Discrimination in Algorithms Delivering Job Ads. In *Proceedings of the Web Conference 2021*. April. 3767–3778.
- Isaac, M. (2019). *Why Everyone Is Angry at Facebook Over Its Political Ads Policy*. Retrievable at <https://www.nytimes.com/2019/11/22/technology/campaigns-pressure-facebook-political-ads.html>.
- Kane, G. C., Nanda, R., Phillips, A. N. and Copulsky, J. R. (2021a). *The Transformation Myth: Leading Your Organization Through Uncertain Times*. MIT Press.
- Kane, G. C., Young, A. G., Majchrzak, A. and Ransbotham, S. (2021b). Avoiding an Oppressive Future of Machine Learning: A Design Theory for Emancipatory Assistants. *MIS Quarterly*. 45(1), 371–396.
- Kleinberg, J., Lakkaraju, H., Leskovec, J., Ludwig, J. and Mullainathan, S. (2018). Human Decisions and Machine Predictions. *The Quarterly Journal of Economics*. 133(1), 237–293.
- Lefouili, Y. and Madio, L. (2021). *The Economics of Platform Liability*. Working paper. TSE Digital Center Policy Paper Series.
- Li, J., Li, M., Wang, X. and Thatcher, J. B. (2021). Strategic Directions for AI: The Role of CIOs and Boards of Directors. *MIS Quarterly*. 45(3), 1603–1643.
- Marabelli, M., Vaast, E. and Li, J. L. (2021). Preventing the Digital Scars of COVID-19. *European Journal of Information Systems*. 30(2), 176–192.
- Möhlmann, M., Zalmanson, L., Henfridsson, O. and Gregory, R. (2020). Algorithmic Management of Work on Online Labor Platforms: When Matching Meets Control. *Forthcoming at MIS Quarterly*.
- Nan, N. and Lu, Y. (2014). Harnessing the Power of Self-Organization in an Online Community during Organizational Crisis. *MIS Quarterly*. 38(4), 1135–1158.
- Oxenford, D. (2019). *FCC Issues “Clarifications” of Political Broadcasting Public File Disclosure Requirements – Significantly More Disclosures to Be Required on Issue Ads*. Retrievable at <https://www.broadcastlawblog.com/2019/10/articles/fcc-issues-clarifications-of-political-broadcasting-public-file-disclosure-requirements-significantly-more-disclosures-to-be-required-on-issue-ads/>.
- Ransbotham, S., Khodabandeh, S., Kiron, D., Candelon, F., Chu, M. and LaFountain, B. (2020). Expanding AI’s Impact With Organizational Learning. *MIT Sloan Management Review and Boston Consulting Group*, 1–15.
- Rao, J. M. and Reiley, D. H. (2012). The Economics of Spam. *Journal of Economic Perspectives*.

- 26(3), 87–110.
- Shmueli, G. and Koppius, O. R. (2011). Predictive Analytics in Information Systems Research. *MIS Quarterly*, 553–572.
- Shore, J., Baek, J. and Dellarocas, C. (2018). Network Structure and Patterns of Information Diversity on Twitter. *MIS Quarterly*. 42(3), 849–872.
- Teodorescu, M. H., Morse, L., Awwad, Y. and Kane, G. C. (2021). Failures of Fairness in Automation Require a Deeper Understanding of Human-ML Augmentation. *MIS Quarterly*. 45(3), 1483–1499.
- Tucker, C. (2020). *Comment on Digital Infrastructure*, University of Chicago Press, chap. 8. 1–7. Retrieval at <http://www.nber.org/chapters/c14361>.
- Vaast, E., Safadi, H., Lapointe, L. and Negoita, B. (2017). Social Media Affordances for Connective Action: An Examination of Microblogging Use During the Gulf of Mexico Oil Spill. *MIS Quarterly*. 41(4), 1179–1205.
- Van den Broek, E., Sergeeva, A. and Huysman, M. (2021). When the Machine Meets the Expert: An Ethnography of Developing AI for Hiring. *MIS Quarterly*. 45(3), 1557–1580.
- Venkatesh, V. (2020). Impacts of COVID-19: A Research Agenda to Support People in Their Fight. *International Journal of Information Management*. 55, 102197.
- Wade, M. and Shan, J. (2020). Covid-19 Has Accelerated Digital Transformation, but May Have Made it Harder Not Easier. *MIS Quarterly Executive*. 19(3), 213–220.
- WHO (2020). *A Coordinated Global Research Roadmap: 2019 Novel Coronavirus*. Retrieval at <https://www.who.int/publications/m/item/a-coordinated-global-research-roadmap>.
- Wilkes, T. and Fletcher, L. (2012). The Algorithmic Arms Race. *Special Report: Reuters*.
- Zhang, D., Zhou, L. and Lim, J. (2020). From Networking to Mitigation: The Role of Social Media and Analytics in Combating the COVID-19 Pandemic. *Information Systems Management*. 37(4), 318–326.

## A Facebook Ad Library: Ad Performance

Figure 11 shows how Facebook Ad Library breaks down ad performance. We have information on the display of the ad based on gender, age group and location.

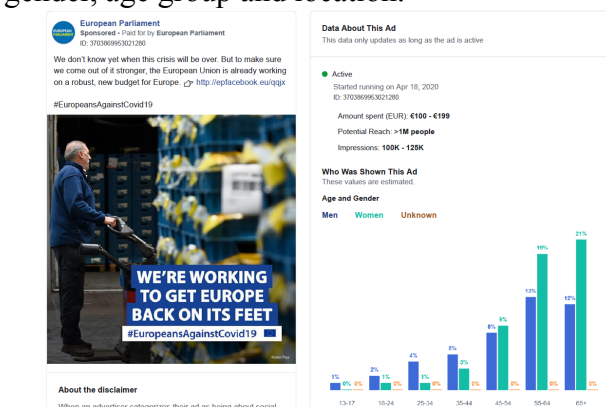


Figure 11: Facebook Ad Library for Detailed Ad Performance

## B Logit Estimates

To study the relationship between COVID-19-related ads and the probability of an ad to be disqualified, we use our cross-sectional data to estimate a logistic model. Table 6 presents the results of the estimates. Column (1) shows that COVID-19-related ads are more likely to be disqualified. This finding is in alignment with previous graphical evidences. The likelihood of being disqualified also increases when ads are run by governmental organization. Ads posted by advertisers based in Europe are also more likely to be disqualified. Then, we estimate the probability model of disqualified ads separately for ads posted by governmental organization and non governmental organization. In columns (2)–(3), we show that the results about COVID-19-related ads and European advertisers remain robust when we split the estimates by whether the advertiser is a governmental organization (column (2)) or not (column (3)). The estimates suggest that ad posted by European governmental organizations are more likely to be disqualified where the variable *Europe* has larger coefficient estimates for the subsample of governmental organization.

Table 6: Ads Run by Governmental Organizations Are More Likely to Be Disqualified

	Dependent Variable: Disqualified Ads		
	Overall	Gov. Org	Non-Gov. Org
	(1)	(2)	(3)
COVID-19 ad	1.104*** (0.107)	1.031*** (0.111)	1.112*** (0.019)
Governmental Organization	0.878** (0.421)		
Europe	0.559*** (0.176)	0.649*** (0.112)	0.558*** (0.017)
Constant	-4.475*** (0.257)	-4.654*** (1.006)	-4.466*** (0.076)
Log-Likelihood	-80509.557	-1881.946	-78455.166
Wald chi-squared test	500.14	728.03	11839.30
Observations	1,145,072	12,979	1,131,938

*Notes:* Logit Estimates. Dependent variable is whether the ad is disqualified because it does not include the appropriate disclaimer. Column (1) reports the robust standard errors clustered at the advertiser level. Column (2) omits 155 observations as during the last week of January 2020 there were no COVID-19 ads run by governmental organizations. Column (2) and (3) report robust standard errors in parentheses. All columns include week fixed effects. Significance levels: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

## C Additional Keywords

We also assessed the robustness of our results using a larger sample of keywords than just “*coronavirus*” and “*covid*”. These keywords are presented in Table 7 which we have translated into five different languages. The translation of the keywords into French, German, Italian and Spanish is presented in columns (2), (3), (4) and (5) respectively.

Table 7: Translation of Other COVID-19-related Keywords in Five European Languages

	Languages				
	English (1)	French (2)	German (3)	Italian (4)	Spanish (5)
Keywords	Handwashing	Lavage de mains	Händewaschen	Lavare le mani	Lavarse las manos
	Hydroalcoholic gel	Gel hydroalcoolique	Alkoholisches handgel	Gel mani alcolico	Gel antiséptico
	Masks	Masque	Masken	Maschere	Mascarillas
	Social distancing	Distanciation sociale	Soziale Distanzierung	Distanza sociale	Distanciamiento social
	Stay at home	Restez chez vous	Bleiben se zuhaus	Resto a casa	Yo me quedo en casa

## D Analysis of the Words Counts

We provide a simple analysis of word frequencies based on ad text analysis. Table 8 presents a list of the top 10 words in our sample which is split between COVID-19-related and not COVID-19-related ads. We then split these sub-samples into ads submitted by governmental organizations and non governmental organizations and examined the most frequent words in the accepted and disqualified ads. The COVID-19-related ads are associated with the terms “*coronavirus*”, “*covid-19*” and “*help*” which means that these terms are not responsible for an ad being banned. The keyword analysis identified no great difference among published and disqualified COVID-19 related-ads (see respectively column (1) and column (2)) run by governmental organizations. We find few differences in the wording of disqualified ads compared to not disqualified ads. This suggests that there is no evidence that disqualified ads include misleading claims. In the subsample of COVID-19 related-ads run by non-governmental organization, the most frequent words were “*real*”, “*time*” and “*estate*” whereas in the non-COVID-19-related ads the most frequent terms were associated with elections and more general interest issues.

Table 8: Most Frequently Used Words Used in Our Sample

COVID-19 ad				Not COVID-19 ad			
Gov. Orga.		Non-Gov. Orga.		Gov. Orga.		Non-Gov. Orga.	
Disqualified (1)	Not Disqualified (2)	Disqualified (3)	Not Disqualified (4)	Disqualified (5)	Not Disqualified (6)	Disqualified (7)	Not Disqualified (8)
covid19	covid19	covid19	covid19	count	census	news	trump
public	coronavirus	real	coronavirus	protection	fill	county	us
pandemic	stay	estate	help	safe	health	local	need
help	help	news	need	services	care	break	president
protection	absentee	time	real	determines	get	breaking	help
county	health	investing	estate	census	us	informed	today
available	together	people	people	water	counted	app	vote
family	ballot	market	us	county	take	millions	sign
coronavirus	information	help	trump	help	everyone	latest	make
health	safe	coronavirus	time	important	nyc	stay	time

## E Most Frequent Topics and Queries Searched on Google Trend During the Pandemic

Column (1) presents the top 25 topics searched and column (2) presents the top 25 queries. It can be seen from column (1) that during the data collection period, the most searched topics were pandemic related with “*Coronavirus - Virus*” ranked first and “*Coronavirus disease 2019*” ranked 22nd. Column (2) shows that the most frequent COVID-19 search queries were “*coronavirus*” and “*covid 19*”. We do not observe any topics or queries related indirectly to COVID-19 which might be linked to COVID-19-related ads.

Table 9: Top 25 Related Topics and Related Queries in the World on Google Trend from January to June 2020

Rank	Related Topics (1)	Related Queries (2)
1	Coronavirus - <i>Virus</i>	Google
2	Weather - <i>Topic</i>	Facebook
3	2020 - <i>Topic</i>	Coronavirus
4	Film - <i>Topic</i>	Youtube
5	Video - <i>File Format</i>	News
6	Google - <i>Technology Company</i>	Weather
7	Google Search - <i>Website</i>	Amazon
8	Facebook - <i>Social Media Service</i>	Translate
9	YouTube - <i>Video Sharing Company</i>	Instagram
10	Translation - <i>Topic</i>	Gmail
11	Facebook - <i>Social Networking Service Company</i>	Videos
12	News - <i>Broadcast Genre</i>	Whatsapp
13	Price - <i>Topic</i>	Traductor
14	Download - <i>Topic</i>	Mp3
15	English language - <i>Spoken Language</i>	Hotmail
16	Song - <i>Composition Type</i>	Netflix
17	Game - <i>Topic</i>	Clima
18	Car - <i>Transportation Mode</i>	Yahoo
19	Google Translate - <i>Website</i>	Twitter
20	Woman - <i>Topic</i>	Covid-19
21	Child - <i>Topic</i>	Google Translate
22	Coronavirus disease 2019 - <i>Disease</i>	Tiempo
23	Amazon.com - <i>E-commerce Company</i>	погода
24	Instagram - <i>Social Networking Service</i>	Whatsapp Web
25	Recipe - <i>Topic</i>	Meteo

Notes: In Column (1) the categories of topic provided by Google Trend are indicated in italics.