

# Democratic Backsliding and Media Responses to Government Repression: Machine Learning Evidence from Tanzania

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One crucial feature of the ongoing global wave of democratic backsliding is that aspiring autocrats seek to influence the media, oftentimes through legal restrictions on the press and social media. Yet little research has examined how formal and social media respond to those legal restrictions targeting the free flow of information. We develop an original argument linking key characteristics of media sources to the regulatory environment and examine how the content and sentiment of their coverage responds to restrictive media laws. We test our claims using an enormous corpus of electronic media in Tanzania and employ two state-of-the-art neural network models to classify the topics and sentiment of news stories. We then estimate diff-in-diff models exploiting a significant legal change that targeted media houses. We find that critical news sources censor the tone of their coverage, even as they continue to cover the same issues; we also find that international news sources are unable to fill the hole left by a critical domestic press. The paper sheds light on the conditions under which the press can be resilient in the face of legal threats.

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# 1 Introduction

Across the world, aspiring and entrenched autocrats often seek to manipulate their countries' news environments. Given the global rise of these informational autocrats (Guriev and Treisman 2019), it is crucial to understand how different media sources and broader information ecosystems respond to government repression. We develop an original argument linking the ownership and initial pro- or anti-regime slant of news sources to how they respond to repressive legislation that targets media freedom. We also derive implications for the extent and sentiment of citizen-led discussions of government behavior on informal news sites, such as blogs and online forums. We test our argument by applying recent innovations in natural language processing to an enormous corpus of international, national and citizen-driven online news coverage in Tanzania over six years. We develop original models to detect topical coverage and the slant of news and online discussion bearing on civic space and exploit discontinuities associated with the government's passage of two laws that targeted different features of the information ecosystem. We parse the impact of these laws on both *what* different news sources cover and the *sentiment* (i.e., pro- or anti-government) with which they cover it. In doing so, our research provides important insights into the conditions under which the formal media *and* citizen-driven online forums can and cannot serve as bulwarks against rising authoritarianism.

Previous research has shown that ownership affects the content of media outlets (Archer and Clinton 2018; Baum and Zhukov 2019; Dunaway 2008; Dunaway 2011; Dunaway and Lawrence 2015). Private ownership and a healthy stream of advertising revenue, for instance, insulate the media from government pressure (Besley and Prat 2006; Gehlbach and Sonin 2014; Gentzkow, Glaeser, et al. 2006; Petrova 2011). Yet the largest outlets in many countries are increasingly owned by conglomerates whose diverse economic ties to semi-democratic and authoritarian regimes may compromise their independence. On the other hand, foreign-owned outlets have the potential to be resilient against attacks since they depend less on the government, even as they are often a target of legislation that restricts foreign ownership of domestic media. Our understanding of whether and why some types of outlets and ownership structures are more resilient to attacks on media freedom is still in its infancy, despite the prevalence of media crackdowns over the last decade. This is particularly true in the case of alternative news outlets, such as online forums and blogs, even though these platforms can provide space for citizens to express themselves outside of the traditional media ecosystem.

We develop an argument on how various types of media respond to the kind of restrictive legislation that has become so common during the current global trend toward autocracy. We argue that restrictive legislation can have a distinct impact on *what* the news covers and on the *sentiment* with which it is covered. We hypothesize first that the news media's response to restrictive legislation is conditioned by whether it is domestically or internationally owned. We hypothesize that international papers initially respond to

restrictive media laws by focusing on the repressive behaviors of the government with negative sentiment, but that their coverage of the country diminishes through time since international news sources tend to rely on national media to do much of the day-in-day-out journalism. Second, we hypothesize that formerly critical news sources will retain their emphasis on what they cover, including coverage of protests, government shake-ups and the like, but that their coverage will have less critical sentiment. Third and finally, we argue that much of the negative sentiment formerly expressed by critical national news sources will migrate to informal social network sites, but that these sources also become less critical when regimes specifically target them with legal restrictions. We develop more specific hypotheses on how social media users will adjust their behavior in the face of new restrictions specifically targeting online behavior.

We test these claims using an enormous corpus of electronic media and exploiting two significant legal changes that targeted different elements of information freedom in Tanzania. We employ a state-of-the-art neural network model, Bidirectional Encoder Representations from Transformers (BERT) (Devlin et al. 2018), to classify whether articles cover events bearing on the regime and civic spaces as well as the sentiment of the coverage. Our data consists more than 115,000 daily news articles published by 5 local and 16 international/regional media and nearly 42 million posts from a popular internet news forum during the period 2014 to 2021. We exploit two major restrictive legal changes in 2016 and 2018 to uncover their heterogeneous effects on news reporting in the country: the 2016 Media Services and Access to Information Acts and the 2018 Electronic and Postal Communications Act.<sup>1</sup> The first Act specifically targeted the formal press and gave authorities inordinate power to control the content and operations of media houses; the latter Act specifically targeted citizen-driven forums by requiring bloggers and online forums to register and gave the Tanzania Communications Regulatory Authority (TCRA) broad powers to control and prohibit information published on the internet. We focus on two aspects of the news coverage: content –i.e., the kinds of events the news outlets cover– and sentiment –i.e., the degree to which reporting is supportive or critical of the government. Our data allow us to assess changes in news coverage across a wide variety of news outlets, from international news organizations based in the developed world and other African countries to national newspapers and reputable online news forums. Our social media data allows us to follow thousands of individual users to test how different types of citizen posters behave. All told, our results shed light on the resilience of news organizations and online citizen debate in the face of advancing democratic backsliding across the world.

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<sup>1</sup>In this initial draft we focus only on the first legal change and the data from newspaper coverage.

## 2 The Media, Citizen Content and the Erosion of Democracy

A free media and an active, informed citizenry are crucial for the health of democracy. Indeed, an independent and robust media is so vital for the functioning of democracy that it is often considered an inherent ingredient of the very concept of democracy (Dahl 2020). It is hardly surprising, therefore, that aspiring autocrats in the current era of democratic backsliding have sought to capture media outlets and manipulate the information environment (Di Tella and Franceschelli 2011; Knight and Tribin 2019a; Knight and Tribin 2019b; Rozenas and Stukal 2019; Szeidl and Szucs 2021). Unlike the 20th century autocrats who often governed using crude repression, contemporary autocrats (aspiring and otherwise) often aspire to win hearts and minds. Thus, they deploy various methods to control the flow of information in order to divide the opposition, encourage nationalism, conceal repression and justify the rolling back of checks and balances. In many ways, this quest to control the information environment defines the global spread of these “informational autocrats” (Guriev and Treisman 2019).

While the precise methods differ across countries and information platforms, all such governments aim to manipulate the information ecosystem in favor of the government. For instance, Orbán in Hungary has used state advertising to control media outlets (Szeidl and Szucs 2021), Peru’s Fujimori bribed TV channels for privileged coverage (McMillan and Zoido 2004), and Turkey’s Erdoğan continues to distribute state contracts with an eye toward minimizing criticism in the media (Esen and Gumuscu 2020). The approaches to controlling formal media often are echoed in efforts to manage social media. For instance, Russian social media is filled with pro-government and anti-government bots (Stukal et al. 2019), and the Chinese government employs sophisticated methods to prevent users from accessing information with collective action potential (King et al. 2013).

The last 20 years have seen an enormous rise in government crackdowns on journalist’ and news outlets’ freedoms. According to the Varieties of Democracy Dataset (Coppedge et al. 2021), the annual incidence of significant censorship has quintupled over that period. In Figure 1, we present the number of countries whose censorship index worsened by more than 20% in a year. In 2017, for instance, more than 1/3 of the countries in the world experienced a significant increase in censorship.

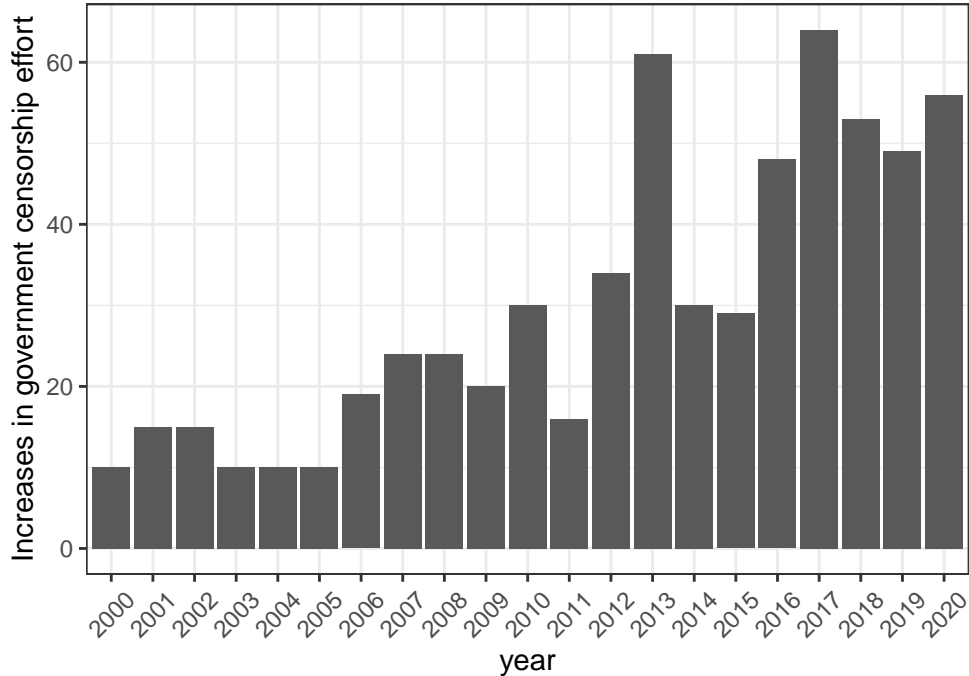


Figure 1: Number of Countries Experiencing Large Increases in Censorship

Given the widespread nature of media crackdowns, it becomes critical to understand which types of media are most resilient in the face of attacks. Indeed, knowing how media ownership (family-owned, conglomerate-owned, foreign-owned etc.), pre-existing editorial orientation toward the regime, and outlet types (online forums, newspapers) condition responses to legal attacks on information freedom is crucial for understanding media resilience and the prospects of informational autocrats’ intent on manipulating the informational environment and, ultimately, eroding democratic checks and balances (Guriev and Treisman 2019).

Previous research has shown that ownership affects how media outlets cover the news (Archer and Clinton 2018; Baum and Zhukov 2019; Dunaway 2008; Dunaway 2011; Dunaway and Lawrence 2015), but little work (Salazar 2019) specifically examines how media outlets respond when they face a repressive shift from the government. Indeed, the vast majority of systematic work on the media has focused on it in stable democratic countries where systemic threats to media autonomy are all but unknown. Thus, we have little insight into how different kinds of media ownership or editorial stances respond to attacks on media freedom. On one hand, we know that larger audiences and advertising revenues foster media autonomy from government pressure (Besley and Prat 2006; Gehlbach and Sonin 2014; Gentzkow, Glaeser, et al. 2006; Petrova 2011). On the other hand, outlets with larger audiences and advertising revenues are increasingly owned by conglomerates “whose interests in journalism is secondary to the defence of their personal interests”

(RSF 2016, p. 9). When these broader financial interests are at stake, conglomerate-owned outlets might cave in to attacks from the government that threaten their more important, non-media revenues. Similarly, while family-owned newspapers are more likely to value journalism and defend their independence, they are also more susceptible to threats from the government as they lack financial and legal resources to resist government crackdowns. Given this ambiguity around how the ownership of domestic media might condition their responses to repression, we focus our theorizing below on the clearer distinction between international and domestic news sources.

If we know little about how media houses respond to restrictive laws, we know even less about citizen-driven online outlets, such as forums and blogs. This is a crucial shortcoming, because these outlets have become enormously popular across the world, and especially in restricted media environments, they might be the only means of accessing independent opinions and information about the government. King et al. (2013) show that in settings where the internet itself is heavily censored, online forums provide some space for citizens to voice discontent, but very little means to coordinate citizen action. One advantage of our empirical setting, where different laws target formal media and citizen posting, is that it allows us to distinguish the effects of crackdowns on both types of digital media.

### 3 Ownership, Slant and the Impact of Restrictive Laws

We conceptualize media regulations and responses to them as a strategic game between autocratically-inspired governments, formal media organizations, and citizens. From the point of view of the government, the benefits of a restrictive information environment, including limits on the press and citizen's ability to criticize government behavior as well as increased capacity to proactively shape the information that citizens receive, must be weighed against its costs, including reduced capacity to gather information for its own monitoring purposes and common knowledge among the citizenry that reporting is biased, and therefore, unreliable. When threatened with new legal restrictions, media houses and citizens decide whether to test the regime's resolve by continuing to report and discuss as before, or self-censor what and how they discuss. These strategic interactions are iterative in the sense that government censors, the press and citizens all learn from each other, respond in turn, and thus the legal environment, media responses, and citizen reading online discussions evolve over time.

We focus our analytical attention on how the media and citizens respond to legal restrictions on the information environment once the government has decided to implement them. Consistent with previous work (Stanig 2015), we posit that the effect of restrictive legislation can work via its impact on what it is that the media and citizens cover and/or the tone in which it is covered. The former refers to the types of

news events that outlets cover, and the latter refers to the pro- or anti-regime sentiment of that coverage. We focus on how key features of media outlets condition their response to legal restrictions: their pre-existing slant vis-a-vis the government, their ownership structure, and whether or not they are formal or informal media.

Media outlets that are critical of incumbents have a difficult choice when faced with restrictive legal changes. The changes oftentimes target these critical outlets for censorship, shutdowns and other forms of repression. The editors might bow in the face of potential repression by reducing coverage of the regime and/or by reducing the critical sentiment of what is covered. Yet, readers of such outlets rely on them specifically for such coverage, and if the outlet becomes too pro-government it is likely to lose readers.

We hypothesize (H1) that when faced with this trade-off, editors of critical outlets are more likely to compromise on critical sentiment than on the topics and events they cover. In other words, they will continue to be more likely to cover civic space events such as protests, arrests and government shakeups than pro-government outlets, but they will do so in ways that moderates previously critical sentiment. We expect this for several reasons. First, the ongoing coverage of “real news” allows the outlet to claim ongoing credibility to its readership, and perhaps even to declare such coverage as an indication of brave resistance to the regime. Second, on a purely administrative level, it is more difficult to change the issues that journalists cover than it is to modify the sentiment with which articles are reported. The former is difficult because journalists can spend years building contacts and specialized knowledge to cover particular spheres of civic space, whether that be the judiciary, the police or civil society organizations; ceasing to cover a broad set of civic space events represents an enormous loss of those sunk investments. By contrast, softening editorial language might represent a difficult compromise of conscience, but as a practical matter it often can be achieved with changes to a handful of adjectives. Third and relatedly, editors of critical media might trust that many of their readers will provide their own critical interpretation of its coverage, in essence reducing the need for editorially-provided negative sentiment. Note that this argument has implications both for individual sources – critical outlets will alter their sentiment but not their coverage– and for the overall media environment. As formerly critical news sources reduce negative sentiment, the overall variance in sentiment in the news ecosystem will go down. We test both of these implications below.

Turning from media slant to ownership structure, we argue that, at least in the short-term, international media will cover contentious events and the regime with more critical tone than newly repressed domestic media in the aftermath of restrictive media laws. As noted above, while there may be reasons to distinguish different types of domestic media on the basis of their ownership (i.e., public vs. private, conglomerate-owned vs. not), the implications for regime coverage are ambiguous. On the other hand, most major international sources are headquartered in democracies, and they tend to report negatively on major initiatives against

information freedom, and civic space more generally. Baum and Zhukov (2015), for instance, find that media outlets in non-democracies are less likely to publish protest events from the Libyan civil war than their counterparts in democracies, and in separate work, we show that national and international sources cover different dimensions of civic space, with the latter more likely to report on contentious politics (Adiguzel et al. 2021). Given their attraction to dramatic events like new laws that restrict the press, we hypothesize (H2) that international media will be more likely to cover civic space events more critically than national media in the immediate aftermath of those laws.

Yet international newspapers have weak roots in many countries. In lieu of permanent in-country staff, they rely on domestic media for day-in-day-out reporting and to instruct them on when and if events are particularly critical for civil society. Indeed, Adiguzel et al. (2021) show that while international media cover high profile elections and conflictual events, such as civic violence and protests, at higher rates than national sources, they under-report on the day-to-day political, legal and civic activities that underpin civic space. In short, international media are deeply reliant on domestic media in many countries. By implication, if national sources become less likely to cover contentious event or self-censor their editorial tone as a result of legal restrictions, international news will, over the long run, have less to work with and will themselves become either less likely to cover the country, or to cover it in a critical way (H3). One important implication of this claim is that international sources headquartered in countries with free media environments might be an important corrective to national sources in countries with repressive media environments where the press is unable to cover key aspects of civic space, but only over the short-run.

Lastly, we turn to how citizens respond when governments target freedom of expression on social media. Although many have emphasized social media's potential to serve as a free space for citizen debate and discovery, there is little research on how everyday citizens respond to laws that limit expression online, compromise anonymity or otherwise threaten online speech (Pan and Siegel 2020). While citizens can reduce their consumption of formal media newly biased and/or silenced by legal restrictions in favor of social media, the government can also target online spaces. Recent research (King et al. 2013; Stukal et al. 2019) shows that autocratic governments can do so by filling online fora with pro-government content bots and trolls, strategically banning critical content, or preventing access altogether. While some evidence shows that social media can provide spaces for the opposition to coordinate (Clarke and Kocak 2020; Enikolopov et al. 2020), most work has focused on how governments repress online activity rather than how citizens respond to those efforts.

We hypothesize that legal changes directly targeting social media will have two effects. First, many critical users/posters will reduce the amount and critical sentiment of their posts (H4). While a small number of highly visible opposition figures are likely to maintain a strong presence online as part of their



public activism, the many less prominent critics are less likely to risk crossing the authorities. Second, many of those critics are likely to adapt by opening new accounts under pseudonyms (H5). Thus, we expect an increase in new users, many of whom will post critically on the government. Broadly speaking, this behavior would be consistent with recent evidence from Saudi Arabia indicating that the arrest of online dissenters does not dissuade opposition over Twitter or online (Pan and Siegel 2020), even as we parse a specific mechanism (i.e., the creation of new individual accounts) through which that opposition might manifest.

## 4 The Media, Online Discussion and Regime Dynamics in Tanzania

We test these hypotheses in the context of Tanzania. VDem identifies Tanzania as one of 25 countries undergoing a process of *autocratization* or democratic backsliding in the past decade, along with prominent examples of this trend such as Turkey and Brazil (Hellmeier et al. 2021). According to the Economist Intelligence Unit’s Democracy Index, Tanzania is considered a hybrid regime, a system where elections exist, but are not necessarily free or fair, and the government harasses the opposition (Unit 2020). Although the political situation began deteriorating rapidly with the election of President John Magufuli in 2015,<sup>2</sup> the country had been characterized by a lack of political competition since the end of one-party rule in the early 1990’s. Indeed, the Chama Cha Mapinduzi (CCM) has won every presidential election and retained a majority in the National Assembly since 1995.

In recent years, the government of Tanzania has enacted several laws aimed at restricting free press and the dissemination of public information more generally. We focus on two in particular. First, the November 2016 Media Services Act, which required the registration and licensing of newspapers, provided wide leeway for the government (and the Minister of Information, in particular) to restrict the publication of material, and made it mandatory for private broadcasters to transmit news bulletins produced by the public media broadcaster. It also directly targeted journalists by requiring state-approved licensing and accreditation with vague rules that provide considerable leeway for the government to suspend journalists. The International Center for Not-for-Profit Law summarizes that, “Especially for private media outlets, such powers infringe on their independence to determine editorial policy and thus their rights to media freedom, opinion and expression. Further, the public is denied the right to access information from a wide range of sources and varied shades of opinion.”<sup>3</sup> In the aftermath of the law, Tanzania fell 12 spots in Reporters without Borders’

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<sup>2</sup><https://www.hrw.org/world-report/2019/country-chapters/tanzania-and-zanzibar>

<sup>3</sup>ICNL 2019: p.19

World Press Freedom rankings.

The second law we exploit is the Electronic and Postal Communications Act of 2018, which more directly targeted social media. It gave the Tanzania Communications Regulatory Authority (TCRA) broad power to oversee material published on the internet, and it required all online forums and bloggers to register. This latter power gave the TCRA the capacity to *not* register any voices that it did not want heard. The law also targeted internet service providers by requiring them to register and monitor online content to ensure that posts are consistent with the law’s vague language against ‘obscene’ or ‘false’ claims. In the year following the act, Tanzania fell a further 25 spots in the World Press Freedom rankings. Though these were not the only regulatory changes bearing on information freedom over the last decade in Tanzania, we focus on them because the first one so clearly targets the formal media, while the latter targeted the robust social media criticisms that targeted the regime.<sup>4</sup>

## 5 Research Design

Testing our argument requires overcoming two major challenges: First, there is little existing data on the broad range of activities that bear on the health of civic space. While prominent hand-coded event datasets, such as the Armed Conflict Location and Event Data Project (ACLED) and the Uppsala Conflict Data Project Georeferenced Event Dataset (UCDP GED) do collect data on protests and violence that are relevant to civic space, they do not cover other important events bearing on civil society, including arrests, defamation cases, legal changes, etc. Second, existing approaches to measuring slant or bias in media coverage rely on keywords developed for the measurement of partisan politics in the specific context of stable, OECD democracies (Gentzkow and Shapiro 2010).

We address these challenges by developing new models of event detection and sentiment that rely on the latest innovations in natural language processing. To address the first challenge, we develop an original model of civic space event detection. Previous event detection projects like the Integrated Crisis Early Warning System (ICEWS) and the Global Database of Events, Language, and Tone (GDELT) hold millions of events. However, every machine-coded event dataset in the social sciences relies on the same basic — often flawed — process for generating events. Each sentence is parsed for syntax with a rule-based or statistical parser and then the components are checked against an expansive list of rules and exceptions for possible events. This approach requires exhaustive and inflexible rules, and it limits the flexibility of the system when applied to

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<sup>4</sup>Other relevant laws include the 2015 Cybercrimes Act which, among other things, legalized practices that violate both privacy and freedom of expression, and the 2016 Access to Information Act, which constrained access to and the use of public information from government institutions. We address these laws empirically below, but note here that if they bias our results, they bias them to zero.

translated speech, new empirical settings, or novel event descriptions, such as those we describe below.

Our solution draws on the recent emergence of general language models based on the Transformer. Transformer models like the Bidirectional Encoder Representations from Transformers (BERT), the Generative Pre-trained Transformer (GPT), and their many variants, represent the state-of-the-art for many NLP tasks such as translation, passage summarization, and text classification (Devlin et al. 2018). These models greatly out-perform the models that are currently standard in most social scientific applications of NLP. Transformer models excel by learning the structure of human language and the context-dependent meaning of words from being trained on enormous corpora of online text.<sup>5</sup> This approach lets researchers train the models on enormous amounts of text data using a semi-supervised approach before fine-tuning the base model for specific tasks. This approach, generally called ‘transfer learning’, drastically decreases the resource demands of model creation while maintaining the high-performance of the original models.

We rely on a refinement of the BERT model, known as RoBERTa, by training and fine-tuning it on a corpus of double-blind, human-coded newspaper articles hand built for our purposes. The training data for the civic space event counts covers 2,800 articles over 18 event types.<sup>6</sup> While we exploit all those event types in the analysis below, we focus specifically on three of them: protests, arrests, and censorship. We focus on protests because of evidence that authoritarian governments are particularly sensitive to expressions of collective action (King et al. 2013; Lorentzen et al. 2013). We focus on arrests and censorship with the expectation that tracking these two coercive activities can tell us something about whether and when has the government reigned in on activists and the opposition.

We also fine-tuned another RoBERTa model to classify articles based on their sentiment towards the government. Similar to our civic space model training, we created a training data with three classes: neutral, anti-government, and pro-government. We labeled an article as “anti-government” when it directly criticizes an existing policy, law, official statements or the members of the government themselves. We also label articles as “anti-government” whenever they praise opposition parties or their officials. Lastly, scandals within the government are also coded as “anti-government”. Similarly, we label articles as “pro-government” whenever the story praises/promotes government policies or actions or talks favorably about government members. Any story that criticizes the opposition party and their officials or any coverage of scandals from the opposition party is coded as “pro-government” too since such stories indirectly help boost the government’s image. Any news article that does not fit these categories is coded as “neutral”. However, this creates an imbalanced class distribution since the number of neutral stories outweigh pro-government and

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<sup>5</sup>The original models were developed and trained by researchers at Facebook and Google.

<sup>6</sup>Appendix A provides a description of each of the 18 civic space event types. Out-of-sample accuracy of our classifier is very high, averaging 90% across civic space event categories.

anti-government stories. We labeled 133 and 104 pro-government and anti-government articles, respectively, and we undersample neutral stories, keeping only 150 of them in the final training data to increase the model’s predictive accuracy. As a result, our training data has 387 observations. The overall accuracy of the model is 70%.

Our data comes from a large data collection effort associated with the Machine Learning for Peace project (MLP)<sup>7</sup>, and allows us to assess changes in news coverage across a wide variety of media news outlets, from international news organizations based in the developed world and other African countries, to domestic newspapers. We have scraped all news events published by 5 different media outlets in Tanzania –*Habarileo*, *Daily News*, *The Citizen*, *MTanzania* and *IPP Media*–, and all news coverage about Tanzania published by two regional African sources –*theeastafrican.co.ke* and *africanews.com*– and 14 major international sources in the period to 2012-2021.<sup>8</sup> The choice of sources is based on two fundamental characteristics: the importance of a source in terms of its circulation and the size of its readership base, and the reliability of its online coverage over time. For Tanzanian newspapers, our identification procedure began with a careful examination of Tanzania’s most important newspapers based on circulation, but we also include high-quality online newspapers. Then, from among this list of major newspapers in Tanzania we chose those that met the following criteria: (i) the source must be machine scrapable, (ii) it must publish its content in a language that can be translated to English using either Huggingface translation models or Google Translate, (iii) it must have some level of historical activity in reporting events of interest –preferably going as far back as 2012– and (iv) it must produce original content.<sup>9</sup>

Using the list of international, regional and national domains, we first check GDELT and the Internet Archive for available links, pull the available web pages from the Common Crawl and from the websites directly. We then initialize Scrapy spiders to recursively scrape all available pages from the target domains (from sitemaps when available). We process the parsed stories collected from the archives and publishers through a slightly modified version of the news article extraction system “news-please”<sup>10</sup> to extract the publishing date, title, and story text from each article. Whenever we encounter issues with the quality of the scraped data (e.g., mistakes in date parsing, or problems with the content scraped), we make use of custom scrapers designed to tackle the specific issues. These stories are then translated into English via Google

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<sup>7</sup><https://www.devlabduke.com/machinelearningforpeace>

<sup>8</sup>The list of international sources includes well-known western media outlets such as the New York Times, the Washington Post, the Wall Street Journal, BBC, Reuters, the Guardian, France24, Le Figaro, Liberation, Le Monde, El País, and the Christian Science Monitor, as well as large media organization from Russia (the Moscow Times), and the Middle East (Al Jazeera).

<sup>9</sup>We followed a similar procedure when choosing international sources. For more information, please refer to our website: <https://www.devlabduke.com/machinelearningforpeace>.

<sup>10</sup><https://github.com/fhamborg/news-please>

Translate or Hugging Face translation models. In the particular case of the sources in Swahili, we employed Google Translate API. In order to make sure that the scraped articles refer to news that actually took place in Tanzania, we assign a location tag to each of them using `Mordecai`<sup>11</sup>, a python geoparsing library that extracts locations from the title and text of the articles.

This extensive process of data collection and processing results in more than 115,000 daily news articles published by 5 local and 16 international/regional media and nearly 42 million posts from a popular internet news forum during the period 2014 to 2021.<sup>12</sup> To examine the effect of key legal changes targeting freedom of expression, we date the passage of the key Acts described in the section above to the day. We then deploy a traditional difference in difference estimator to assess the impact of the legal changes on the probability that a given article posted in a given source, be it a newspaper or an online forum, reports on a civic space event. Figure 2 below provides basic descriptive information on the share of monthly news articles reporting on arrests, protests and censor events across time, with the two major laws highlighted as vertical dashed lines. Similarly, Figure 3 shows the relative pro-government slant over time for all news sources. We define relative pro-government bias as the log of the ratio between pro-government and anti-government articles for each month.

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<sup>11</sup><https://github.com/openeventdata/mordecai>

<sup>12</sup>We will add analysis of forum postings on future versions of this paper. The number of articles available to us from domestic sources before 2012 is rather small. Therefore, we restrict our analysis to the post-2014 period.

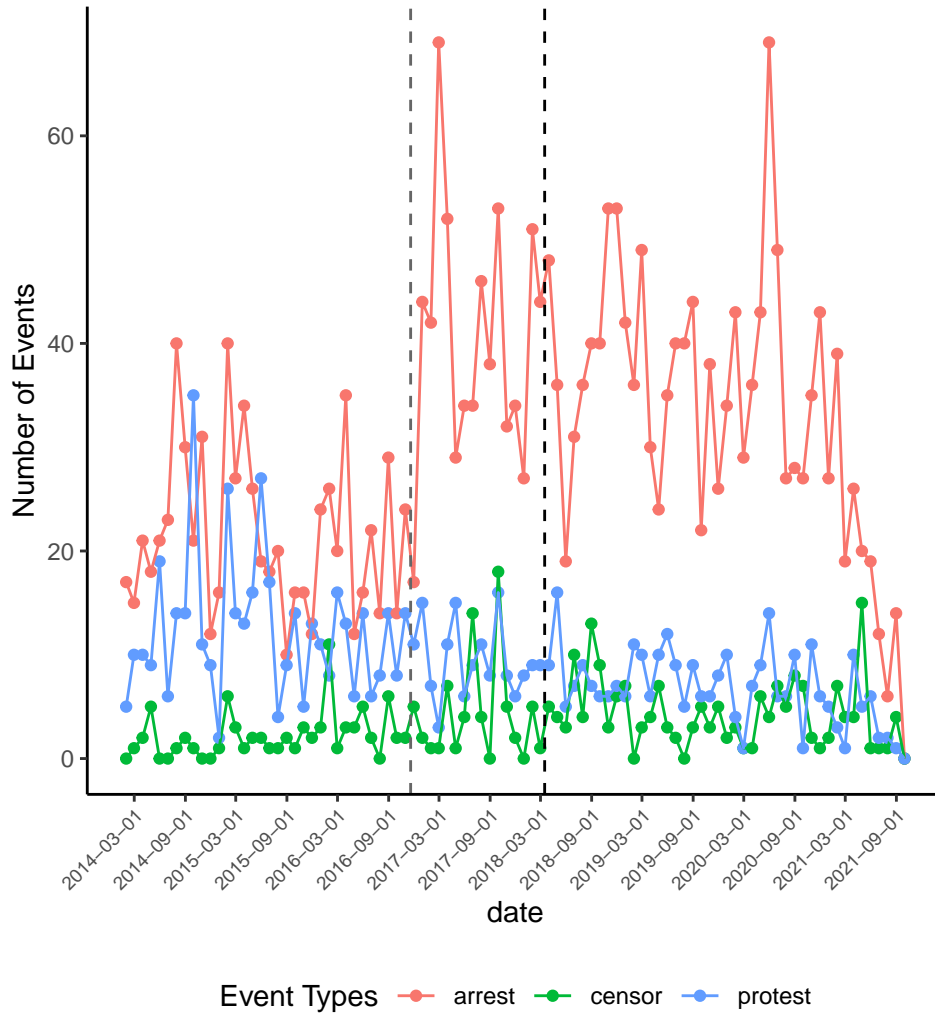


Figure 2: Shares of articles reporting on arrests, protests, and censor events over time

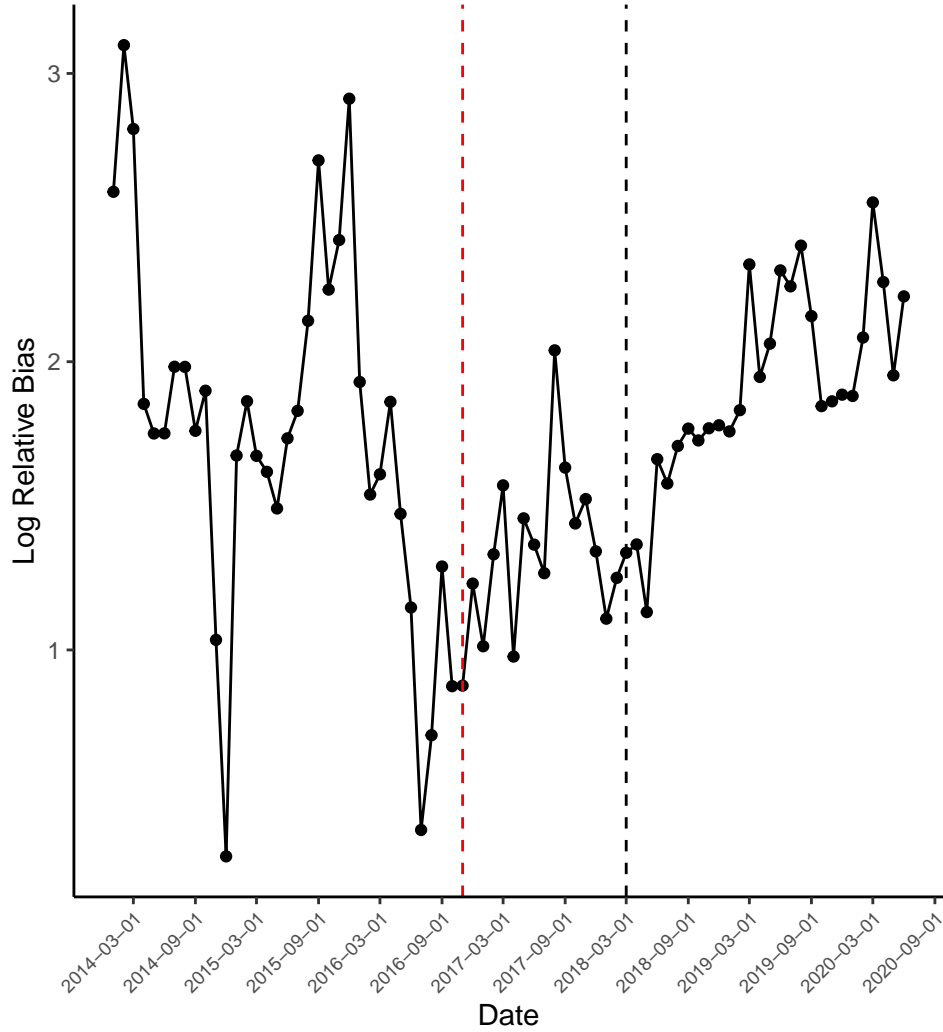


Figure 3: Relative pro-government bias over time

## 6 Estimation Strategy

According to H1, we should expect that the 2016 legal change enacted by the government brought about changes in the sentiment with which critical newspapers report news, rather than in the kinds of news events they cover. To test whether this is the case, we estimate the following linear probability model, with individual articles as the unit of analysis.

$$y_{sit} = \beta_1 \text{legal change}_t + \beta_2 \text{Critical Outlet}_{st} + \beta_3 \text{legal change}_t \times \text{Critical Outlet}_{st} + \gamma_s + \lambda_t + \epsilon_{sit} \quad (1)$$

When assessing bias or slant,  $y_{sit}$  is a dummy variable that refers to whether a given article published by source  $s$  is classified as neutral, anti- or pro-government. When assessing event type,  $y_{sit}$  is a dummy variable that refers to whether a given article published by source  $s$  is classified as the event of interest (protest, arrest, or censor).  $legal\ change_t$  equals one for all articles published after the introduction of the legal change, and zero for those published before. Critical Outlet $_{st}$  is a dummy for whether the outlet is critical of the government before the legal change.<sup>13</sup>  $\gamma_s$  and  $\lambda_t$  stand for source and year fixed effects, respectively. Standard errors are clustered at the source-month level.

According to H2, international media will be more likely to cover civic space events more critically than the national media in the immediate aftermath of the enactment of the 2016 law. To test whether this is the case, we divide our sample according to civic event (protest, arrest, or censor) and estimate the following equation in each sub-sample:

$$y_{sit} = \beta_1 legal\ change_t + \beta_2 Intl.\ Outlet_{st} + \beta_3 legal\ change_t \times Intl.\ Outlet_{st} + \gamma_s + \lambda_t + \epsilon_{sit} \quad (2)$$

Again,  $y_{sit}$  is a dummy variable that refers to whether a given article published by source  $s$  is classified as neutral, anti- or pro-government.  $legal\ change_t$  equals one for all articles published after the introduction of the legal change, and zero for those published before. Intl. Outlet $_{st}$  is a dummy for whether the source is an international newspaper.  $\gamma_s$  and  $\lambda_t$  stand for source and year fixed effects, respectively. Standard errors are clustered at the source-month level.

H3 refers to the long-run reduction in international coverage and changes in slant in the aftermath of the legal change. To examine these effects we focus on the subset of articles published by international sources and estimate the following linear probability model

$$y_{sit} = \beta_1 legal\ change_t + \gamma_s + \lambda_t + \epsilon_{sit} \quad (3)$$

When assessing bias,  $y_{sit}$  is a dummy variable that refers to whether a given article published by source  $s$  is classified as neutral, or as anti- or pro-government. Instead, when assessing event coverage,  $y_{sit}$  is a dummy variable that refers to whether a given article published by source  $s$  is classified as the event of interest (protest, arrest, or censor).  $legal\ change_t$  equals one for all articles published after the introduction of the legal change, and zero for those published before.  $\gamma_s$  and  $\lambda_t$  stand for source and year fixed effects,

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<sup>13</sup>The newspapers that published critical content before the legal change are *Daily News*, *IPP Media*, and *The Citizen*.



respectively. Standard errors are clustered at the source-month level.

## 7 Results

We present our results focusing on the enactment of the 2016 Media Services Act and its effects on the coverage of protests, censorship and arrests, as well as on the relative pro-government bias of the articles. Analysis of the effect of the 2018 Electronic and Postal Communications Act on social media thematic coverage and bias –and, therefore, of hypotheses 4 and 5– will be included in future versions of this paper.

First, according to H1 the 2016 legal change will reduce the anti-government sentiment of reporting by critical newspapers, but not their thematic coverage of civic space events. To test H1, we focused on the period one year before and after the legal change, so our sample includes articles from November 2015 to November 2017.<sup>14</sup> The results in Table 1 show that there are clear changes in the slant of the articles published by critical newspapers. The positive and significant (at 0.1 level) interaction in Column 3 shows that the legal change increases the likelihood that a given article published by a critical newspaper is neutral. Similarly, the interaction coefficient in column Column 2 shows that legal change decreases the likelihood that a given article published by a critical newspaper conveys an anti-government sentiment. We do not observe an effect on pro-government sentiment after the legal change. Similarly, we do not see important changes in the thematic composition of the coverage. Results in Columns 4 to 6 of Table 1 show that critical newspapers are not less likely to report on protest, arrest, or censorship events after the legal change.

	Government Sentiment			Civic Event Coverage		
	Pro-Gov	Anti-Gov	Neutral	Protest	Arrest	Censor
Critical Newspapers	-0.122** (0.055)	0.136*** (0.015)	-0.014 (0.057)	-0.004 (0.004)	0.003 (0.006)	-0.003 (0.002)
Post-2016 law	0.045 (0.035)	-0.025*** (0.009)	-0.020 (0.034)	0.001 (0.003)	0.006 (0.006)	-0.004** (0.002)
Critical Newspapers x Post-2016 law	-0.042 (0.034)	-0.027* (0.014)	0.069* (0.037)	-0.002 (0.003)	-0.006 (0.004)	0.002 (0.002)
Num.Obs.	27839	27839	27839	27856	27856	27856
R2	0.217	0.074	0.118	0.002	0.003	0.001
R2 Adj.	0.216	0.073	0.117	0.002	0.002	0.001
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Media Outlet FE	Yes	Yes	Yes	Yes	Yes	Yes

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Standard errors are clustered at the newspaper-month level

Table 1: The effect of 2016 law on government sentiment and civic event coverage

<sup>14</sup>The results are similar when we use the whole sample. See Table 4 in the Appendix.

In Figure 4, we use the Anti-Gov model in Table 1 to calculate the predicted probabilities of publishing an anti-government article before and after the legal change. The results show that the predicted probability of publishing an anti-government article was 16.3% before the legal change [14.4, 18.1]. However, after the legal change, the probability decreases to 11.1% ([10.3, 11.9]), amounting to a 32% overall decline.

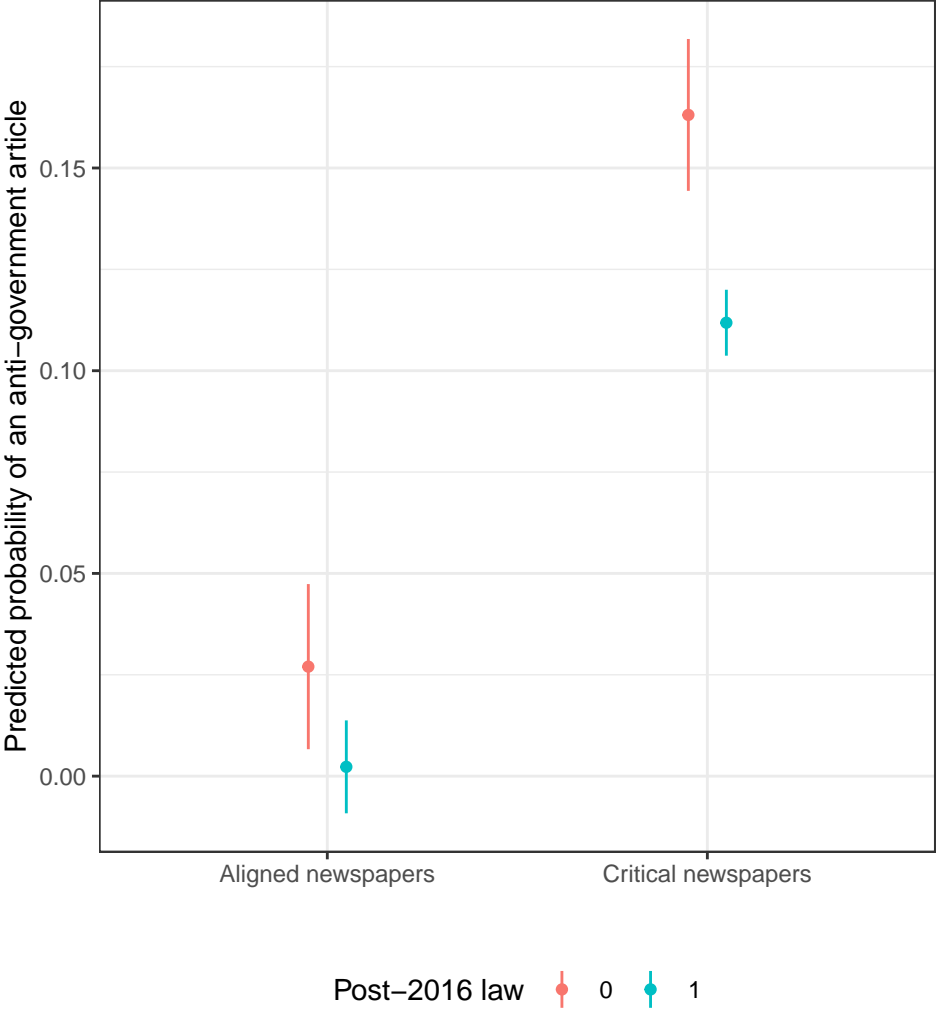


Figure 4: The predicted probability of publishing an anti-government article across local newspapers

H2 and H3 outline expectations regarding the editorial choices of international media when covering a country that just experienced a repressive legal change. H2 leads us to expect an increase in the anti-government sentiment of civic space reporting by international newspapers, relative to local sources. Table 2 contains the results from estimating equation separately on the samples of articles covering protests, arrests and censorship events, respectively. Note that our sample size decreases considerably given the relatively

low number of articles covering these kinds of events. With that caveat in mind, models in Column 1 and Column 3 suggest that in the aftermath of the legal change, articles by international newspapers covering protest or arrest are more likely to have an anti-government slant. Estimates in Columns 2, 4 and 6, albeit not statistically significant, suggest that civic space coverage by international sources is less likely to be pro-government after the legal change. While this is evidence in favor of our argument, the statistical imprecision of most of our estimates in 2 is indicative of the need for improving the accuracy of our sentiment model by adding more training data.

	Protest Events		Arrest Events		Censor Events	
	Anti-Gov	Pro-Gov	Anti-Gov	Pro-Gov	Anti-Gov	Pro-Gov
Post-2016 law	-0.043 (0.163)	0.057 (0.101)	-0.040 (0.043)	0.035 (0.073)	-0.356*** (0.110)	0.671*** (0.118)
International Media	-0.359** (0.150)	-0.161*** (0.047)	-0.176*** (0.033)	-0.192*** (0.025)	-0.854*** (0.301)	-0.107 (0.087)
Post-2016 law x International Media	0.164* (0.085)	-0.010 (0.036)	0.111* (0.063)	-0.020 (0.039)	0.474 (0.303)	-0.102 (0.098)
Num.Obs.	761	761	2315	2315	223	223
R2	0.254	0.397	0.059	0.448	0.287	0.209
R2 Adj.	0.234	0.380	0.049	0.443	0.224	0.139
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Media Outlet FE	Yes	Yes	Yes	Yes	Yes	Yes

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Standard errors are clustered at the newspaper-month level

Table 2: The effect of 2016 law on government sentiment and civic event coverage (international vs. national media)

According to H3, if national sources become less likely to cover contentious event or begin self-censoring their editorial tone as a result of legal restrictions, international news organizations will, over the long run, have less to work with and will themselves provides less coverage of the country, and when they do, cover it in a less critical way (H3). Table 3 contains results from fitting equation to our sub-sample of articles published by international sources both before and after the legal change. While we do not find conclusive evidence regarding changes in pro- or anti-government sentiment, models in Columns 4 and 5 show that the enactment of the 2016 Media Services Act decreases coverage of protests and arrests in the months after the legal change. In the post-reform period, an article published by an international source is 4.2 and 3.3 percent less likely to cover a protest or an arrest in Tanzania, respectively.

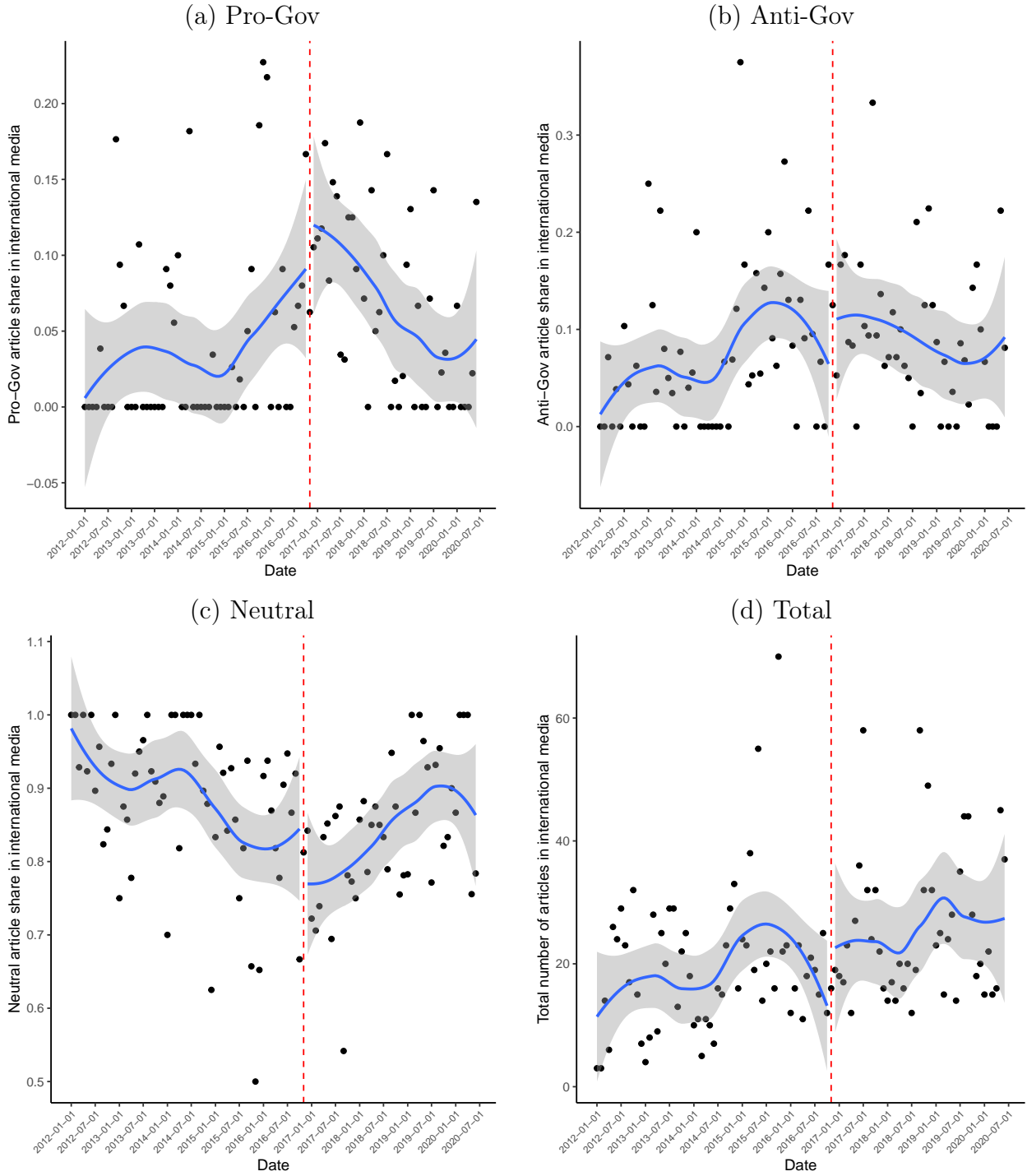
	Government Sentiment			Civic Event Coverage		
	Pro-Gov	Anti-Gov	Neutral	Protest	Arrest	Censor
Post-2016 law	0.021 (0.039)	0.032 (0.057)	-0.053 (0.043)	-0.042*** (0.015)	-0.033** (0.015)	-0.001 (0.001)
Num.Obs.	2256	2256	2256	2256	2256	2256
R2	0.019	0.023	0.029	0.022	0.010	0.014
R2 Adj.	0.012	0.015	0.021	0.014	0.002	0.006
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Media Outlet FE	Yes	Yes	Yes	Yes	Yes	Yes

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Standard errors are clustered at the newspaper-month level

Table 3: The effect of 2016 law on government sentiment and civic event coverage (international media)

Figure 5 shows how the monthly share of articles with an anti- or pro-government bias, and the monthly share of neutral articles, changes around the the enactment of the 2016 Media Services Act. It also shows how total international coverage changes around that cut-off. We may take away the following points: (i) the share of pro-government coverage appears to trend downwards after the legal change; (ii) the share of neutral coverage, in contrast, appears to trend upwards in that same period and (iii) there is a moderate increase in the total number of articles covering Tanzania after the legal change.



Notes. Panels (a), (b), and (c) graphically display the share of neutral, anti- and pro-government articles published by international sources before and after the 2016 legal change. Panel (d) shows the total amount of articles per month published by international sources about Tanzania. All plots exclude Chinese sources.

Figure 5: Bias of International Coverage of Tanzania

## 8 Conclusion

In this paper we have developed an original argument linking the ownership and initial pro- or anti-regime slant of news sources to how they respond to repressive legislation that targets media freedom. To test our argument we exploit a discontinuity associated with the Tanzanian government’s passage of a law that targeted the formal media. We parse the impact of this law on both *what* news sources cover and the *sentiment* (i.e., pro- or anti-government) with which they cover it. We built a large data set of 115,000 daily newspaper articles published online by Tanzanian newspapers as well as both international and regional newspapers, and employed state-of-the-art natural language processing models for text classification.

Our findings suggest that critical media are less likely to change *what* they report on, but they do soften the sentiment with which they cover it. Thus, they continue to report on important civic space events such as protests, arrests and instances of censorship at rates similar to the period before the legal change, but that coverage becomes less critical of the government. Similarly, we find some evidence suggesting that international newspapers become more critical of the government in their coverage of civic space events relative to domestic news sources. We also find that international sources *decrease* their coverage of relevant civic space events after the enactment of the repressive law, likely because of international sources’ reliance on the work of local journalists to cover domestic news.

This paper makes empirical and theoretical contributions to the study of the relationship between governments, the media and regime dynamics. First, our significant data collection effort allows for the first high-frequency assessment of changes to the legal order bearing on the media. Second, we develop two original models to classify news articles by topic and to detect the slant of news coverage bearing on civic space that are significant improvements on most such efforts in the social sciences. These models enable us to gain important insights into how newspaper editors and journalists adapt their coverage to a more restrictive domestic environment. Third and finally, in doing so our research provides important insights into the conditions under which the formal media can and cannot serve as a bulwark against rising authoritarianism.

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# Appendix

## A Civic Space Event Types and Model Performance

**Arrests:** An institution within the government-controlled security apparatus –i.e., the police, the military, or other– apprehends people or groups of people who are part of an opposition movement or party, a civil society organization, a foreign NGO, a media organization, or a protest.

Example: "The Police in Abia on Wednesday arrested 51 persons suspected to be members of the proscribed Indigenous People of Biafra, claiming they ‘operate as members of Judaism,’ in Umuahia."

**Censor:** The government actively prevents free speech by individuals in the media, in public or online. This includes banning certain content from individual speech or news stories, dictating how certain concepts or people can be referred to in public speech, or directly dictating agenda setting for media organizations. This category also includes the government censoring internet websites, internet shutdowns, fines on independent media, limitations on foreign ownership of media outlets, and political actors gaining influence within media organizations. Magnitude is a scale (see below; try to determine the importance of the target with information given).

Example: "The Tanzanian government has suspended newspaper The Citizen for seven days after the publication ran a story on the falling value of the Tanzanian shilling."

**Changes to Elections:** The executive alters the rules around elections, usually with the aim of benefiting electorally. This includes rescheduling/postponing/cancelling regularly-scheduled elections, calling irregular elections or constitutional referenda, hamper the work of independent election observers, erode the autonomy/authority of the electoral commission, as well as any other institutional change that directly affects the electoral process.

Example: "Nigeria’s electoral authority has delayed presidential and national assembly elections by one week amidst protests from the two main opposition parties. The government alleged logistical problems with ballot delivery to justify the delay."

**Cooperation:** Political or social actors collaborate on one or a range of issues or demonstrate an intent to do so. Cooperation indicates a willingness for local actors to work together to resolve important issues, while a lack of cooperation may hinder resolution.

Example: "Opposition movement NJPE has pledged to work together with President Muhammad to reduce rampant poverty in the capital’s outskirts."

**Coup:** Changes in government that are not the result of a free and fair election called in accordance to the rules laid out in the constitution. Coups or a power grab after an unfair election are examples of this event type. Peaceful government transitions are nonviolent transfers of power or legitimate continuity of government elected by democratic means and accepted by a majority of political forces. Code peaceful change as ‘1’ in the direction column. Speech is the pledge to accept the result of an election (a threat of a coup falls under ‘political threat’).

Example: "Forces loyal to Turkey’s president quashed a coup attempt in a night of explosions, air battles and gunfire that left at least 161 people dead and 1,440 wounded, yesterday. President Recep Tayyip Erdogan vowed that those responsible “will pay a heavy price for their treason”.

**Defamation Case:** Cases in which an individual or a group related to the opposition, CSOs or members of the media are accused, usually by the government or one of its agencies, of: (1) criminal behavior or incompetence; (2) directly defaming the government or one or some of its members; (3) strategic lawsuits against public participation.

Example: "A Phnom Penh court on Friday found veteran opposition chief Sam Rainsy guilty of defaming Prime Minister Hun Sen and ordered him to pay damages of \$1 million, the latest blow to an opposition crippled by legal cases this year."

**Leadership Changes:** Changes in government that are the result of a standard election process called in accordance to the rules laid out in the constitution. This includes situations where the incumbent party retains power. Normal election results are an example of this event type. Specifically, this includes peaceful government transitions that are nonviolent transfers of power or legitimate continuity of government but does not include coups, which are accounted for separately.

Example: “The President of the Executive Board of the Serbian Progressive Party, Darko Glisic, said that the SNS won a convincing victory with 60.2 percent of the votes, based on the processed 221 out of 231 polling stations where the voting for the parliamentary elections in Serbia was repeated.”

**Legal Action:** Legal action refers to the prosecution or investigation of crimes and criminal activity as well as the trials that result. This specifically does not include arrests. Defamation cases are a subset of legal action that are broken out separately after initial coding.

Example: “Kosovo President is Indicted for War Crimes for Role in War with Serbia.”

**Legal Change:** Government enacts laws or implements regulations and policies that directly restrict the rights of people, press, NGOs or political groups. This also modifications to the constitution passed by the ruling party, legal changes to increase term limits for the incumbent, or any action taken by the government or ruling party to alter the balance between different government branches.

Example: “Venezuelan President Nicolas Maduro approved a resolution yesterday creating a new Constituent Assembly. The move is intended to sideline the opposition-controlled National Assembly, the country’s main legislative body.”

**Lethal Violence:** Any action of aggression by a government entity, organized group or individual that results in the death of one or more people.

Example: “The Kaduna state government, Friday evening, disclosed that 33 women and children were killed by rebels in Kajuru local government of Kaduna state, less than twenty-four hours to the conduct of the presidential and parliamentary elections.”

**Martial Law:** The executive branch declares a state of emergency and suspends, temporarily or indefinitely, the ability of citizens to gather or protest against it.

Example: “On Wednesday, President Duterte approved the extension of martial law in the country’s volatile south by a year due to continuing threats by Islamic State group-linked militants and communist insurgents.”

**Mobilize Security Forces:** An event in which the government mobilizes police forces, military troops or government-affiliated militias in unusually large numbers. This is often done to respond to some form of threat to domestic security or in anticipation of events that may cause disruptions to public order.

Example: “More than 500 security personnel have being mobilised for Saturday’s governorship election in Sokoto State, says the state commissioner of police (CP), Alhaji Adisa Bolanta.”

**Non - Lethal Violence:** Any action of aggression by a government entity or organized group that physically harms one or more people or property but does NOT result in death.

Example: “At least four persons were injured at Oruk Anam Local Government Area of Akwa Ibom State on during yesterday’s national election. Reports claim that unknown assailants attempted to snatch ballot boxes while voting was still ongoing.”

**Praise:** Defined as verbal expressions of admiration or approval of actors such as elites (political, economic, social), political groups or minorities. Examples include extolling the virtues of key political figures, applauding the political positions of policy makers, expressing admiration for certain business leaders, etc. This is a speech only category.

Example: “During his visit to Chennai, PM Narendra Modi praised the Tamil language and invoked the Tamil pride in his speeches. It is being seen as an attempt to assuage anti-Hindi sentiment prevalent across the state.”

**Protest:** Planned or spontaneous public mobilization of a large group of people to express strong objection to an official policy or course of action. Labor strikes, political rallies and riots are also included in this category. Speech includes discussions (code explicit threats as ‘political threats’) about a potential protest, labor strike or rally. Magnitude is an integer for the reported number of protesters.

Example: “A reported two thousand people took to the streets yesterday in Nairobi to protest rising fuel prices, which have doubled since the beginning of the year.”

**Purge/Government Shakeup:** Purging refers to the abrupt removal of individuals from a government position. Examples include creating new positions in a target organization, extending the term limits for politically allied individuals, and calling irregular elections to achieve favorable results. Speech is discussing or advocating such a purge, action is carrying out such an action. This description applies to purging of a target such as the bureaucracy, courts, military, police, or members of party, among others.

Example: “Poland’s government carried out a sweeping purge of the Supreme Court on Tuesday night, eroding the judiciary’s independence, escalating a confrontation with the European Union over the rule of

law and further dividing this nation.”

**Raid:** Individuals or organizations are assaulted or aggressively coerced. Their property may be encroached or damaged as a result. Examples include a raid on newspaper offices. Victims themselves suffer no physical harm. This category also includes the government shutting down opposition organizations, NGOs, etc.

Example: "A Vanguard newspaper office located on Bassey Duke Street was, yesterday afternoon, raided by hoodlums, who carted away large sums of money and destroyed computers and other equipment.”

**Threats:** A statement of a clear and explicit intention to inflict pain, injury, damage, or other hostile action on someone. This category includes threats of both lethal and nonlethal violence. For instance, the threat of a coup would be a political and not a violent threat unless the message issued clearly specifies an intent to harm or kill –coups can be, and often have been, bloodless. This is a speech only category. Threats can also be political and nonviolent in nature. These threats include, but are not limited to: staging a protest or a labor strike, legal action against political groups or minorities, censorship, etc. This is a speech only category.

Example: “Nigeria’s main labor unions threatened a nationwide strike over recent increases in gas prices.”

## A.1 Extra Result

	Government Sentiment			Civic Event Coverage		
	Pro-Gov	Anti-Gov	Neutral	Protest	Arrest	Censor
Critical Newspapers	-0.128*** (0.030)	0.148*** (0.007)	-0.019 (0.031)	-0.007*** (0.002)	0.002 (0.003)	-0.001 (0.001)
Post-2016 law	-0.014 (0.023)	0.015* (0.009)	-0.001 (0.022)	-0.001 (0.003)	0.010* (0.005)	-0.002 (0.001)
Critical Newspapers x Post-2016 law	0.032** (0.014)	-0.075*** (0.008)	0.042** (0.017)	0.001 (0.002)	-0.010*** (0.002)	-0.001 (0.001)
Num.Obs.	112388	112388	112388	112522	112522	112522
R2	0.200	0.069	0.107	0.002	0.002	0.001
R2 Adj.	0.200	0.069	0.107	0.002	0.001	0.001
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Media Outlet FE	Yes	Yes	Yes	Yes	Yes	Yes

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

Standard errors are clustered at the newspaper-month level

Table 4: The effect of 2016 law on government sentiment and civic event coverage