Winning! Adjudication and Dialogue in Social Media

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This article introduces the concept of *adjudication* to define the act of granting or denying ownership of an outcome to individuals or groups in social media. We extend existing models of political dialogue to explain differences between winners and losers when elections are adjudicated. We use Twitter data on three elections in Argentina, Brazil, and the United States. We show an increase in event salience upon adjudication, followed by more extensive dialogue among winners and disengagement among losers. Further, we show differences in the network structure of dialogue, with dialogue in winning communities being less hierarchical and dialogue in losing communities being more hierarchical. Our model provides information about the quality of the adjudicator, information drift prior to adjudication, and the level of user engagement. Finally, we describe further extensions to areas of *toxic* speech and sports. We identify the causal effects of *adjudication* using a regression discontinuity design.

Dialogue | Content Activation | Social Media

Introduction: A Tale of Two Elections

"It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity." Dickens (2000). Election night, when one candidate is declared the winner of the electoral contest while other candidates recognize defeat, is a momentous occasion in democratic representation. As voters adjudicate victory to one of the parties or candidates, supporters rejoice or commiserate with each other. In politics, as in sports, winners celebrate and engage in dialogue with each other while losers quietly empty the scene. In this article, we introduce a theory of event *adjudication* and describe the effects of winning (and loosing) on social media engagement and dialogue.[1]

Our research presents a theory of how discourses propagate in social media when voters, judges, or nature, adjudicate victory to one of the interested parties. Existing theories of issue ownership and political dialogue purport that candidates should never "talk to each other" but rather that they should "talk past each other". Because *talking* about an issue or event raises its salience among voters (Fournier et al., 2003), candidates are expected to talk about issues on which they are perceived to have an advantage (Kaplan et al., 2006; Simon, 2002). Republicans should talk about taxes and democrats about entitlements. Labor candidates in the UK should talk about employment while the conservatives focus on crime.

As salience increases, however, dialogue emerges. Candidates talk "past each other" on low salience issues or events, but campaigns are forced to present competing narratives when salience increases, because failing to address important issues or events becomes evidence of *tone deft* or out-of-touch politics. After a major economic crisis, everyone talks about the economy. After 9/11, everyone talks about terrorism. In political dialogue models, issue *advantage* and issue *salience* jointly determine the extent to which parties communicate with voters and engage in political dialogue.

Absent in the literature, however, is the question of *adjudication*. That is, the moment when one of the competing candidates is recognized as being in control of an event. Election night is but one example, where voters adjudicate victory to one candidate. As the moment of adjudication approaches, salience peaks and users engage with each other, they *talk* about the event. At the time of adjudication, ownership of the campaign narrative is allocated to one of the parties, with the winning candidate eager to wag the finger in front of the opposing candidate while boasting "I told you so". In social media, winners become more active while losers quiet down. The propagation of messages, we show, follows an adjudication pattern. As salience increases, *sharing behavior* such as retweets speed up and activity increases. Upon adjudication, the social media presence of winners expands while that of the losers contracts.

More important, adjudication patterns provide critical information about the quality of the adjudicator ("are election results credible?") and information drift ("are election results updated by voters prior to adjudication?"). Analyses of the adjudication event provide interesting and valuable information to election experts interested in understanding how institutions shape social media use on Election Day.

There are interesting network effects as well. As dialogue among users in the winning community spikes, network exchanges become more horizontal and the relative importance of network authorities declines. Whereas Twitter networks are hierarchical in nature, dominated by *star* structures that

Significance Statement

Abstract: *Event adjudication*, the act of granting *ownership* of an outcome to individuals or groups in social media, has important implications for content propagation and *political dialogue*. In this article, we introduce readers to a model of adjudication which explains social media behavior when elections are decided in favor of one community. Our model provides information about the quality of the adjudicator, information leakage prior to adjudication, and the level of user engagement. We present results on three elections in Argentina, Brazil, and the United States.

[1]Later in this article we discuss how our theory of adjudication relates to, and differs from, existing research on political dialogue (Simon, 2002; Kaplan et al., 2006), critical events (Lin et al., 2014; Pride, 1995), and the winer-loser gap (Anderson et al., 2005; Nadeau and Blais, 1993; Curini et al., 2012)

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display a few nodes with high in-degree and many nodes with low in-degree, adjudication alters the authority patterns of the winning and losing communities.[2] As lower-degree users disengage from the loosing communities, authorities are expected to command a larger share of the conversation. By contrast, as lower degree users celebrate in the winning communities, authorities command a lower share share of the conversation.

To test the proposed model, we present a regression discontinuity design with *time-to-retweet* as our dependent variable and exemplify the proposed theory using Twitter data from presidential elections in the United States (2016), Brazil (2018), and Argentina (2019).

1. Models of Political Dialogue and Adjudication

Issue ownership has emerged as one of the most actively researched areas in political communication. The theory, first proposed by Budge and Farlie (1983) and later by Petrocik (1996), states that parties and candidates are perceived as having comparative performance advantages on distinct issue areas. If parties are perceived as having a performance advantage, increasing the salience of owned issue among the public will benefit them politically. Spikes in crime should benefit Republicans while spikes of unemployment should benefit Democrats. Therefore, parties should specialize in owned issues and raise their salience as the election approaches.

Issue advantage, however, may be contested. When no candidate or party is perceived as having a performance advantage, dialogue emerges (Simon, 2002). Candidates will talk about the same issues when those are too important to be ignored or when no party or candidate is perceived as a "better" performer. Election night is the perfect example of a salient and contested event, when "ownership" is undecided and everyone recognizes the importance of a positive result. While in models of issue "ownership" performance advantage is acquired over time,[3] we consider in this article the consequences of event *adjudication*, where control is granted instantaneously to one of the interested parties.

State of Dialogue. Consider a *state of nature* where an event is recognized as salient by all participants and where interested parties expect to be recognized as having an advantage. We define the moment before adjudication as a "state of dialogue", implying that all interested parties have an incentive to talk about the standing event.[4] Dialogue here is described narrowly as individuals engaging on the same topic, but does not imply that they are answering to each other (Kaplan et al., 2006).

We consider the "state of dialogue" as the *status quo* and, thereby, expect adjudication as a decision that grants a standing performance advantage to one of the interested parties. Failures in adjudication revert back to the "state of dialogue", meaning that the adjudication is not recognized by at least some of the contestants and interested parties are willing to continue talking about the event. Failure to adjudicate also indicates that event salience does not decline and it may in fact increase. For example, consider an election that is perceived by the loser as fraudulent. In such a situation, adjudication is render moot and losers do not disengage.

Before adjudication, dialogue is solely explained by the salience of an event. As salience increases or decreases, so does attention to the event (and dialogue) by social media users. Prior to adjudication, we expect differences in attention by different groups that are only explained as the result of anticipation, as users may have different prior expected probabilities of winning. We define differences in anticipation as *information drift*, which will be discussed later in this article.

Event Adjudication. We define adjudication as the moment when a candidate, party, or group is granted *ownership* of an *event*, where ownership describes a performance advantage that is declared by an *adjudicator* and is widely accepted by participants.

In our model, the *adjudicator* is recognized as the sole authority that decides who wins and who loses a contest or event, with decisions accepted as biding by all participants. A judge in legal proceedings, the voters in an election, or "nature" in a game of chance, are examples of adjudicators that decide who wins and who loses. We assume that those authorities are recognized before adjudication takes place. The decision of the adjudicator could be reported by any number of individuals, such as the winner, the loser, the media, among others. For example, Mauricio Macri recognized defeat in the 2019 Argentine election, but we consider voters as the adjudicators and Mauricio Macri as the bearer of the news.

Faulty Adjudicator. Challenges to the authority of the adjudicator reduce the information value of their decisions, preserving the state of dialogue that existed before adjudication. In an election, for example, accusations of fraud or manipulation will reduce the information value of the voters' decision. Loaded dices and tainted justices are also examples of adjudicators that are not recognized by all participants and, therefore, of decisions that may not settle a contest.

Similarly, decisions that do not conform to the rules of adjudication will preserve the state of dialogue that preceded adjudication. Before adjudication, the state of dialogue is only affected by the salience of the event, so we expect differences in participants' attention to be solely determine by salience. Upon adjudication, dialogue changes in intensity and in nature. The dynamics of networked conversations when conflicts are settled result in asymmetries in the levels of engagement as well as the overall patterns of dialogue.

Information drift. As noted above, failures in adjudication will result in users reverting to the state of dialogue. Fraudulent elections, biased justices, and "cheating" in nature's adjudication (games of chance) are all events that induce outcomes which revert to the state of dialogue.

The opposite is true about information drift, where anticipation by the winners and losers will increase engagement among likely winners and decrease it among likely losers. Staggered election results, which allow voters to update expectations over time, provides an example of rules that facilitate information drift, energizing likely winners and silencing likely loser before adjudication is realized.

[2] Lin et al. (2014) describe a similar phenomena in their analysis of "rising tides or rising stars". As described by the authors, high salience events increase the production of tweets by infrequent users as well as the concentration of information on high in-degree authorities (Pg.5). This generates a dual phenomena of "rising tides" of information (more debate) as well as "rising stars" (more homogeneous information). Our research concur with these findings, but notices that winners and losers are not subject to similar levels of engagement by infrequent users.

[3] For an excellent analysis of changes in party positions on issues see Karol (2009). For a general discussion on issue advantage see Vavreck (2009).

[4] The logic can be extrapolated to the study of "issues". However, our interest here is not on issue advantage but rather in decisive events where one of the parties is recognized as a "winner".

Information drift, therefore, results in users updating ownership of the event before the decision of the adjudicator is made public. Information could leak to the public, as experts report on the likely vote of justices, publishing credible surveys prior to an election, as well as the myriad of information markers that allow users to credible anticipate an outcome.

Connections to the Existing Literature. The proposed theory of event adjudication extends work on long lineage of research analyzing issue advantage and issue ownership in political science and political communication. The existing literature, however, understands issue advantage as a performance trait that is aquired over time. It is also recognized ex-ante by voters and use strategically to increase vote support in future elections. While there are significant similarities in the model of event adjudication we propose in this article, there are two important differences that carry substantive theoretical implications for social media dialogue.

First, the proposed theory has implications for dialogue that takes place upon winning an event (such as an election) rather than seeking to explain the election's result. Event adjudication, therefore, reflects expressive changes in dialogue rather than the strategic intent of parties to promote distinct issues. Indeed, participants in an election, a trial, or a game of chance are not hoping to change the attention of current users to distinct events, nor do they benefit electorally from raising the salience of a different event. In fact, as the election is now over, future gains are difficult to justify. This is more clearly described by cases of adjudication in sports, such as Soccer, where increased engagement by the winners can in no meaningful way affect future game results.

Second, because users are not raising the attention of the event for electoral gain, our model of event adjudication reflects differences in enthusiasm upon adjudication. The proposed model engages with theories of political behavior that have described how "enthusiasm" increases engagement while "anger" reduces engagement (Mason, 2016; Banks, 2014). Because there are asymmetries in "enthusiasm" and "anger" among leaders and followers, our analyses has implications for the study of network activation in political dialogue after adjudication.

The model of adjudication and dialogue we describe in this article also connects to the notion of *critical event* (Pride, 1995), which focuses the attention of the public on the event consequences and redefines a situation. As in the critical event theory, adjudication induces a change in dialogue that redefines the interpretation of the event. However, adjudication links the interpretation of the event to the narratives and fortunes of the winner. Different from the notion of critical event, salience precedes adjudication and dialogue changes to a different extent among users that align with the winner or the with the loser. By contrast, critical event theory redefines the situation for all individuals affected by the event.

Finally, the model of adjudication connects to a significant literature on the winner-loser gap (Anderson et al., 2005; Nadeau and Blais, 1993; Curini et al., 2012), concerned with the effect of losing elections on trust in the government and satisfaction with democracy. Recent research has pointed to the importance of information for calibrating how elections shape the perceived legitimacy of democracy among losers (Lelkes, 2016). As noted by Lelkes (2016), increases in available political information accentuates findings from the winner-loser

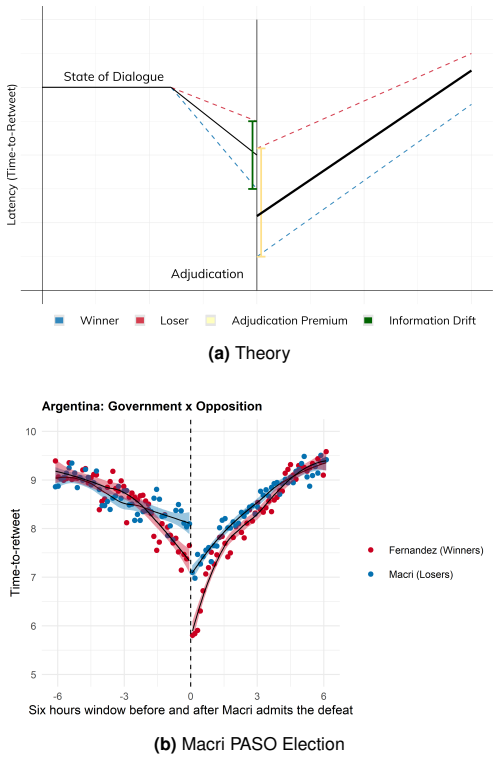


Fig. 1. Adjudication and Latency. Figure 1(a) describes the expected decline in latency, faster Time-to-Retweet, when electoral victory is adjudicated. Figure 1(b) describes the observed evolution of Time-to-Retweet in the observational data, Mauricio Macri defeat on October 11, 2019.

gap scholarship. There is also research showing that voters who support the loser of an electoral contest are considerably more likely to perceive fraud than those who support the winner (Beaulieu, 2013). This is true both in consolidates democracies with credible electoral authorities as well as in competitive authoritarian systems that hold unfair elections. Results from this literature raises the possibility that differences in the trustworthiness of the adjudicator are the result of motivated scepticism (Taber and Lodge, 2006), which should reduce the effect of adjudication. This will be discussed in greater detail in the section on *toxic dialogue* in adjudication events.

While there are clear connections to existing research in Communication and Political Science, no theory that we are aware of models dialogue and disaffection at the time of adjudication. We take on this task in the next section, describing the logic of voter adjudication in social media.

2. The logic of Voter Adjudication

We begin our description of event adjudication by considering electoral contests, where the final determination of event ownership rests in decisions made by voters on Election Day. In an election process, contestants are certified by an electoral authority and the validity of the adjudicator, the voters, requires trust in the rules of the electoral process to be expected in free and fair elections.

Theoretically, the logic of electoral adjudication begins with users in a state of dialogue, as shown in Figure 1. As voting places close and the tally begins, anticipation reduces latency in social media sharing. Therefore, in our data, we

expect time-to-retweet to decline, reflecting higher levels of user engagement. In Figure 1, therefore, more engagement and dialogue is indicated by a declining score in the y-axis, as lower latency means faster engagement.

Figure 1(a) also describes the effect of information drift on the latency of social media sharing, with likely winners increasing engagement at a faster rate than likely losers. The expected information drift is, we argue, a function of how credible and abundant is the data that is available to anticipate the winner of the election before adjudication takes place. As we will show, this information drift can be estimated from observational data, providing researchers with evidence of changes in the odds of winning that result from differences in electoral institutions and rules.

Upon adjudication, Figure 1(a) describes an expected discontinuity, with both winners and losers increasing their intent to share the results of the election (lower latency or time-to-retweet). We expect a larger discontinuity among winners, controlling for the information drift that may decrease the value of adjudication. Finally, users will revert back to the initial state of dialogue, as the salience of the event declines.

In Figure 1(a), the green vertical line before adjudication describes the difference between the likely winners and losers, the *total information drift*, just before adjudication. The vertical yellow solid line immediately after adjudication, on the other hand, describes the differences between the winners and losers when election results are made public. We label the discontinuity after adjudication as the *total adjudication premium*.

Each of these different parameters can be empirically estimated and compared across election events, allowing us to understand how accepted is the adjudicator (divergence in dialogue), how sharp is the disclosure of the election results (low information drift), as well as the magnitude of disaffection on among losers (total adjudication premium). Each of those parameters of interests, therefore, allows researchers to better understand social media behavior on Election Day.

Figure 1(b) provides a vivid example of our model of adjudication, with twitter data collected during the electoral loss of President Mauricio Macri in Argentina, on October 11 of 2019. Figure 1(b) evaluates adjudication, with a windows of 6 hours before and six hours after President Macri admits electoral defeat.

We may use Figure 1(a) to understand the behavior of the data in Figure 1(b). On the left side of Figure 1(b), we see an slow decline in latency that is the sole result of increased salience. Users that are aligned with the future winner (Fernandez) or loser (Macri), increase dialogue and engagment as we approach adjudication. One hour prior to adjudication, however, we see evidence of information drift, where the soon-to-be winners and losers update their beliefs and their time-to-retweet diverges. The PASO election of 2019 provides a narrower drift than other election nights, as President Macri recognized defeat at 9:20 PM, before any electoral results was disclosed by the Electoral Authority (DINE).

As President Macri recognized defeat, we see a sharp discontinuity among winners and losers, with a larger drop in time-to-retweet among those that celebrate (*enthusiasm*) and a lower discontinuity among the losers (*disaffection*). Of course, this is a relatively trivial result, as we always expect enthusiasm among winners and disaffection among losers. However, we call the attention of readers to the value of understanding the magnitude of the information drift and the importance of the adjudication premium, which are of extraordinary comparative value to understand information propagation and dialogue in social media.

Finally, over time, salience declines as well as the *enthusiasm* or *disaffection* by users, which prompt us back to a state of dialogue, subject to the overall salience of the event after adjudication and to the circadian rhythm of social media usage.

3. Adjudication Results in three Elections: Trump, Bolsonaro, and Macri

The theory of event adjudication we describe above, connects models of dialogue and social media engagement at the time that ownership of an event is granted to one of the parties in contention. The value of the proposed model, we argued, is both as an analytic theory that describes engagement in social media and also, more important, in how it opens the possibility of comparing adjudication events in structured ways. This includes the comparative study of different election processes as well as its relationship to adjudication in judgments and games of chance.

In this section we compare adjudication processes in three different electoral events in Argentina, Brazil, and the United States; with attention two different groups of users (high level authorities and low level authorities) that speak to the relationship between network structure and dialogue. In all three cases, we compare (and explain) differences in adjudication, the total information drift, and the total adjudication premium.

Three Election Nights. Argentina, Brazil, and the United States held Presidential elections on October 11 of 2019, October 7 of 2018, and November 8 of 2016 respectively. In all three cases, we selected the first *round* of the Presidential Election, when voters have limited information on the likely outcome of the race. The first round of the Argentine presidential election of 2019 was the *Open and Simultaneous Presidential Primary Election*, known by its acronym *PASO*. This is a compulsory national election where all adult citizens are required to cast a vote. Different from the second round of October 27, the *PASO* provides a mechanism to select presidential nominees. However, all important argentine candidates ran unopposed in 2019, in what was *de facto* the first of a three-round presidential race.[5] The timeline of the Argentine election was short and relatively simple, with voting ending at 6PM and results expected to be reported starting at 9PM by the National Direction of Elections (DINE). On election night, however, a slower than usual tally of the votes meant that by 10:20PM the dashboard of the election authorities was still showing no data. At 10:32 PM, President Mauricio Macri recognized defeat still with no electoral results being reported to the public. Within the hour, the official numbers begun to be reported to the public.

[5] While the Argentine general presidential election of October 27 could also provide an interesting case, voters knew in October 27 that Alberto Fernandez defeated Mauricio Macri by a wide margin in the PASO election. Our theory considers information drift as critical to understanding changes in dialogue, where voters anticipate the likely results. Therefore, the first round of the election (P.A.S.O.) provides a case that is comparable to the first round in Brazil and to the general election of Donald Trump in the United States.

The first round of the Brazilian presidential election on October 7 of 2018 is also a compulsory election where all adults are required to vote. As in the case of Argentina, failure to vote is met with a legal fine or the requirement to justify a no-vote, something that will often consume a fair amount of time. Results of the Brazilian election are known within three hours of closing of the ballot boxes, as a single e-vote device is used in all 32 states. The timeline of the Brazilian is even shorter than in Argentina, with voting ending at 6PM and partial results expected within the hour. On election night, notice of a convincing victory by Jair Bolsonaro were reported immediately after the closing of the ballots. Just two hours later, at 8:02 PM, with 96% of the votes tallied, Bolsonaro was leading the second most voted candidate, Haddad, by almost twenty points. As in Argentina, the race was defined by a significant larger margin than the anticipated by most pollsters. Finally, at 22:04PM Bolsonaro gave a victory speech to his supporters.

The third and final election, the United States Presidential Election, is a single round contest where all registered voters have the option to cast a vote. The winner is decided by a majority of electoral college votes, with reporting taking place over many hours, as each State reports their own results. A long tally with staggered results allows more significant information drift, compared to the cases of Argentina or Brazil. On November 8 of 2016, critical battle ground states were reported over the course of several hours, beginning with the critical victory of Trump in Ohio at 10:39 PM Eastern Time, followed by reported victories in Florida (10:53 PM), North Carolina (11:14 PM), and Pennsylvania (1:35 AM). Finally, at 2:35 AM Hillary Clinton called Donald Trump to congratulate him on his victory, which was given ample space in the media. Different from the cases of Argentina and Brazil, the US reporting of election results is considerable longer, allowing voters to update their expectations on the likely winner. As we will show, this is clearly visible in the increasing difference in the time-to-retweet of Democrats and Republicans on Election night.

Data Collection. To analyze adjudication and dialogue, we followed the same procedure in all three countries. First, we collected a large sample of tweets from the beginning of the Election Day until at least one day after the election (6,7 million tweets from Argentina, 4.9 million tweets from Brazil, and 5,2 million tweets from the US). We filtered singletons (one time users), retain only those tweets posted in the country's language, and retained the primary connected cluster of each country. These primary connected clusters contained, in all three cases, the main political networks that were politically engaged. Using *random.walk* community detection in *igraph* (Csardi et al., 2006), we identified the main political groups as well as the two most important political communities. In all three cases, those communities corresponded to the top two candidates. The Supplemental Information File provides the list of the top 30 users in each of the communities, which were validated by the authors to ensure the had the leading authorities of the candidates' communities.

While we use the full primary connected network to estimate the communities of the politically engaged users in Twitter, the analyses of engagement use a 12 hour window, six hours before and six hours after adjudication. Therefore, we use all the network data to identify the community of the users, to benefits from a larger sample, but study political dialogue at the time of adjudication.[6]

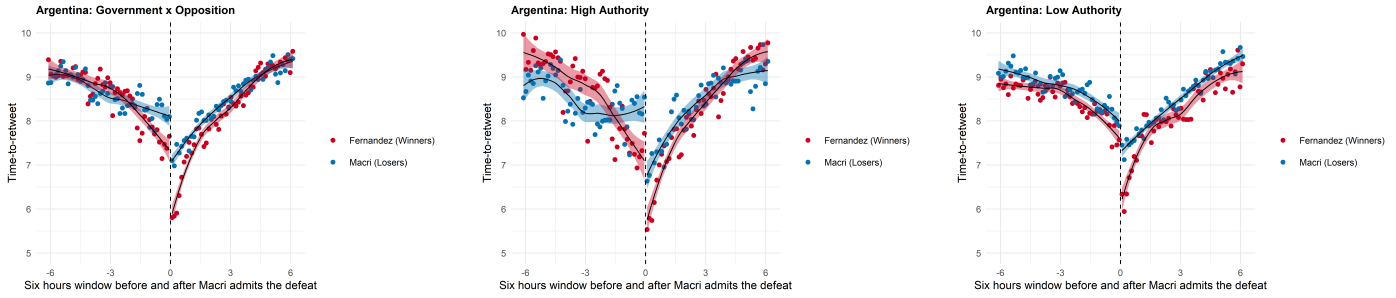
The Statistical Model. To determine the effects of event adjudication, we use an interrupted time series analysis, a variety of regression discontinuity designs (RDD) in which the running variable is time (Morgan and Winship, 2015). Twitter data are ideal for this approach because of the granularity and high-frequency of tweets. Our primary parameter of interest is the change social media users' latency upon adjudication, the time-to-retweet. The precise time of the event Adjudication represents the cut-off of the regression model.

Regression discontinuity models assume effects are continuous at the cutoff (De la Cuesta and Imai, 2016). When dealing with time as the running variable, the continuity assumption requires that no omitted variable that systematically affects the outcome - time-to-retweet - also changes upon adjudication. Given that we have the precise minute when Adjudication takes place, and consider data only six hours around the cutoff, it is easy to assume this assumption holds. The granularity of the data together with the precise measurement of the event makes the identification strategy highly plausible.

To estimate the models, we follow the recommended setting of using non-parametric local linear regression (LLR) to approximate the treatment effect at the cutoff point (Gelman and Imbens, 2018). We employ a local polynomial with one degree to fit two separate regression functions above and below the cutoff Adjudication, with the treatment effect set as the difference in the limits of the cutoff. In other words, we model the intercepts from each direction. We a employ triangular kernel weights and employ a data-driven search to select an optimal bandwidth for the estimation. To address potential bias on the treatment effects due to approximation errors, we report the robust treatment effects and confidence intervals developed by Calonico et al. (2014). To assure results are robust to different modeling choices, we further present a variety of model specifications in the supplemental information file (SIF). We also propose a few different placebo checks to ensure internal validity of the RD design.

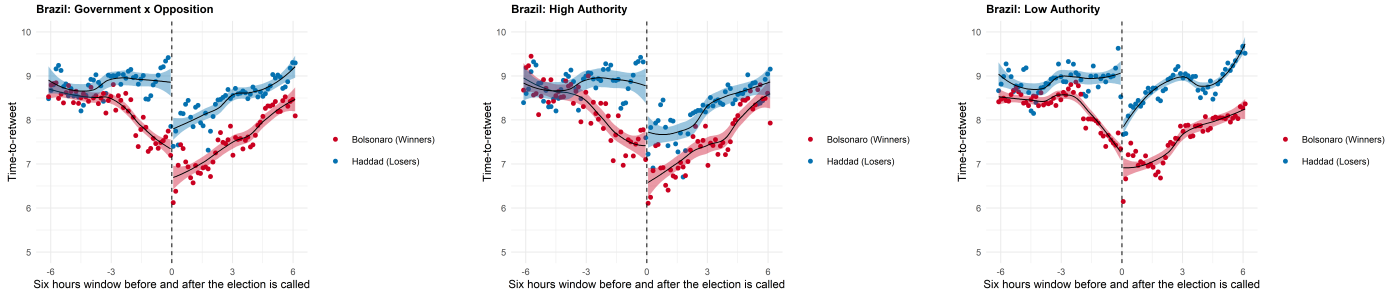
A potential threat to validity of the models relates to the concept of information drift. Since some might anticipate the event adjudication, users can change their behavior before the adjudication is announced. Given that we expect the effects of adjudication to increase users' activity, any anticipation of the treatment is likely to go on the same direction. Therefore, it would underestimates of treatment effects, meaning the true effects of adjudication are likely even stronger. More important, the information drift that attenuates such discontinuity is theoretically important and part of the model discussion. Therefore, anticipation is treated as a theoretical parameter - information drift - rather than a estimation challenge for the model.

[6] See the Supplemental Information File (SIF) for further details on the countries' networks



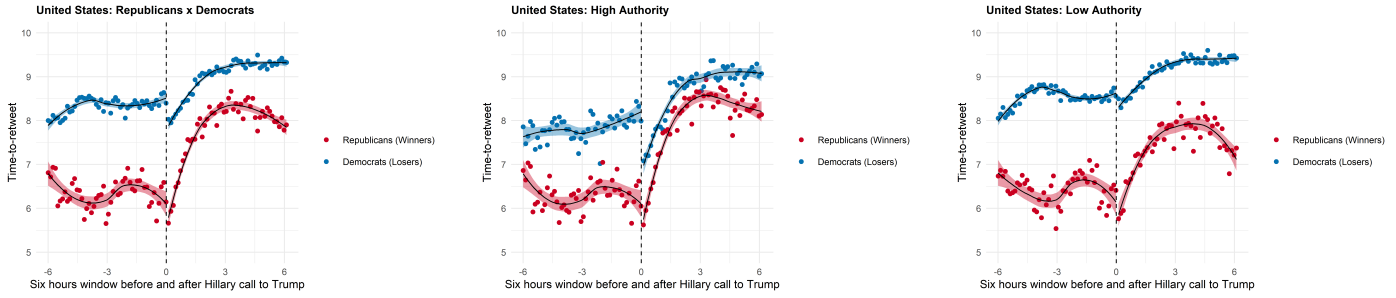
(a) Winners vs Losers (b) High Authority Users (c) Low Authority Users

Fig. 2. Time-to-Retweet in the Argentine Election. Centering on October 12, 2019, at 11:21 PM, when Mauricio Macri gives his concession speech.



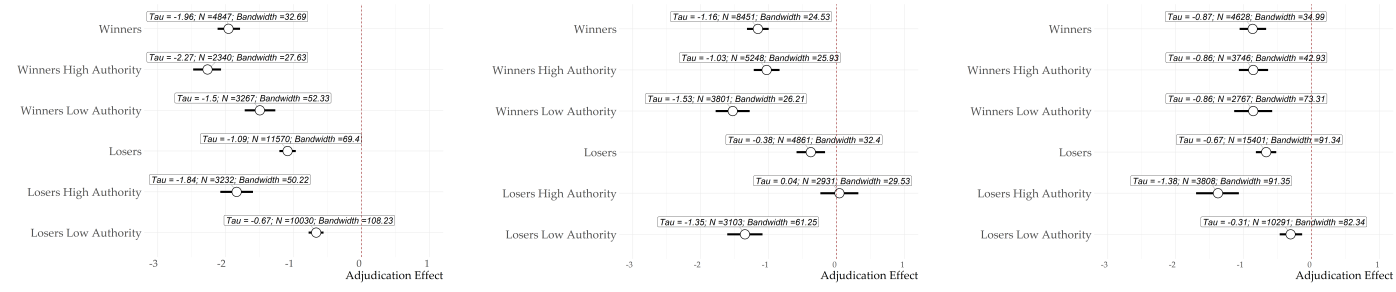
(a) Winners vs Losers (b) High Authority Users (c) Low Authority Users

Fig. 3. Time-to-Retweet in the Brazil Election. Centering on October 7, 2018, at 20:04 PM, when Bolsonaro is declared the winner by the TSE.



(a) Winners vs Losers (b) High Authority Users (c) Low Authority Users

Fig. 4. Time-to-Retweet in the US Election. November 8, 2016, at 2:35 AM Eastern Time, when Hillary Clinton calls Donald Trump to congratulate him on his victory.



(a) Macri Defeat (b) Bolsonaro Election (c) Trump Election

Fig. 5. Adjudication Effect at cutoff estimated with local linear regression with triangular kernel and MSE-optimal bandwidth. The figure reports 95% robust confidence intervals for the point estimates (Calonico et al., 2014)

Table 1. Adjudication Parameters: Information Drift and Adjudication Premium

Condition	Argentina		Brazil		United States	
	Information Drift	Adjudication Premium	Information Drift	Adjudication Premium	Information Drift	Adjudication Premium
Winners x Losers	−0.46	−1.32	−0.76	−1.45	−1.99	−2.15
High Authority	−0.57	−1.01	−0.42	−1.40	−1.84	−1.34
Low Authority	−0.52	−1.36	−1.67	−1.84	−2.20	−2.69

Adjudication Results. Using the data described above, we estimate nine regression discontinuity models. The parameters of interest of the adjudication model are measured at the time that Mauricio Macri accepts defeat on national television (Argentina), at the time that Jair Bolsonaro gives his acceptance speech in front of supporters (Brazil), and when it is made public that Hillary Clinton called Donald Trump to congratulate him on his victory (United States). In all three cases, those are the defining moments of adjudication and they coincide with the highest level of engagement by users.

Figures 2, 3, and 4 provide vivid images of the adjudication process in all three countries. The vertical axes reports the log of the time-to-retweet, with lower values indicating that users are more engaged (lower latency). The horizontal axes has a range of twelve hours, six hours before and after adjudication. We use a LOESS smoother fit separately before and after adjudication. To make visualization easier, we binned the data over time. Readers can readily observe how the behavior of users emulates (and how it differs) from the theoretical model in Figure 1(a).

Let us first consider Figure 2, which presents the overall adjudication plot on the left, 2(a), as well as samples for the time-to-retweet when the original tweet was published by a higher degree authority (above the log-median number of followers) and by a lower degree authority (below the log-median number of followers).

Figure 2(a) is identical to Figure 1(b) in the theory section, with a very small information drift and a sharp discontinuity at the time that Mauricio Macri acknowledges defeat in the PASO election. As noted in our prior discussion of this graph, electoral results had not been formally relayed by the National Electoral Directorate (DINE), which resulted in continued social media dialogue until half an hour before adjudication. As the campaign of the opposition candidate Alberto Fernandez begins to report that they have won convincingly, users that support him begin to more actively tweet messages and retweet each other. The information drift of the last half hour is then followed by a large adjudication premium at the time of Macri's news conference.

Figure 2(b) and 2(c) show similar behavior, with similar information drifts before and after adjudication. However, it is worth highlighting how time-to-retweet was faster among users that shared posts by authorities in the Mauricio Macri community until information becomes available. Readers can appreciate that in the initial *state of dialogue*, authorities supporting Macri garner more engaged responses than those of Fernandez, 2(b) while the opposite is true among low authority users, 2(c). In other words, low-degree users are more engaged with each other among the winners and less engaged among the losers. This feature of the graphs speaks directly to differences in social media networks. In all, engagement is more dependent on high-authority nodes among the losers and more dependent on low-authority nodes among the winer. This results in engagement that is more hierarchical among losers and more horizontal among winners.

The Bolsonaro election provides an example of an election that allows for more information drift before adjudication, as results of the election were reported to the public for over two hours. With a higher information drift we also observe a smaller adjudication effect in each of the communities. It is interesting to know that the state-of-dialogue that preceeds adjudication remains almost flat until the closing of the voting places. Immediately after that, the pro-Bolsonaro users begin to engage while the losers disengage. A small up-swing three hours prior to adjudication, when voting ends, shows the immediate effect of the "boca da urna" that is reporting by the media indicating a likely victory by Bolsonaro.

As in the case of Mauricio Macri, Figures 3(b) and 3(c) show higher sensitivity among low-authority users, who more readily disengage when losing and more activaly retweet each other when wining. As in the case of Mauricio Macri, we can visually observe the network of the losing candidate as becoming more hierarchical while the opposite is true among supporters of the winner.

Finally, results from the US election provide consistent evidence of an adjudication that takes place once voters are in full knowledge of the winner of the race. The lengthy process of counting votes in the United States allows both communities to slowly diverge. Indeed, the state-of-dialogue is outside of the six hour window and the ebbs and flows of the State results that are reported to the public explain smaller shifts in engagement as we approach adjudication. Once adjudication takes place, however, we can see a rapid decline in engagement.

A result that is worth highlighting is that, different from the Argentine and Brazilian cases, the two communities never fully return to the state of dialogue. As we described earlier, this is likely due to the fact that the Trump election was the only one that provided a true final determination, as both in Argentina and Brazil the winner of the election had to still win a second time. Both Alberto Fernandez and Jair Bolsonaro would win comfortably their next race, closing the election cycle in their respective countries.

Table 1 presents the summary numerical results of the Information Drift and Adjudication Premium across all three cases. As it was described in the plots, results show a much larger information drift in the election won by Trump and lost by Clinton (-1.99), and a much smaller information drift in the election won by Fernandez and lost by Macri (-.46). The

overall adjudication premium is also larger in the United States and smaller in Argentina, although it is clear that country differences are smaller in the overall premium of the winner.

As important, in all three cases we can also see that the total adjudication premium is larger among low authority users and smaller among high authority users. This is reflective of the more hierarchical nature of dialogue among losers and the more horizontal dialogue among winners. The largest network effect is in the US, where the adjudication premium is twice as large among low authority users. The proportional network effect in Argentina and Brazil is similar, although the absolute value is larger in Brazil.

4. Extensions

The analyses of the previous section introduced readers to three cases of electoral adjudication, where voters made the final determination of who the winner was. We favored one central mechanism for the differences in engagement, with increases in engagement among winners and decreases among losers that is driven by *enthusiasm* and *anger* respectively. We explore this mechanism via a study of toxicity in the content of the tweets shared by Democrats and Republicans on the night of the election. Then, in the following subsection, we provide a comparative example of adjudication in Sports, where "nature" makes the final determination of who the winner is.

***Toxic* Dialogue and Adjudication.** Results of the 2016 Presidential Election in the United States showed Democrats increasingly disengaged. The opposite was true of Republicans, who were more eager to communicate with each other, as reflected by lower latency in sharing social media posts.

In a recent article, Lilian Mason stated that "Partisan emotions tend to arise in response to political actors or messages that have the power to affect the ultimate status of a person's party—whether the party wins or loses (Mackie et al., 2000). Threats to a party's status tend to drive anger, while reassurances drive enthusiasm."(Mason, 2016) Mason provides experimental evidence to show the effect of anger, which is defined as an emotional response to a perceived threat to the status of the group (Page 5). In similar vein, Groenendyk and Banks (2014) note that strong partisans overcome collective action constraints and engage in politics because they are activated by strong emotions such as *anger* and *enthusiasm*.

To evaluate whether losers are activated by anger we take advantage of recent developments in text analyses that measure the level of toxicity in user comments. We consider the sample of twelve hours around adjudication in the Donald Trump victory and score each tweet by their level of *toxicity*. To this end, we use Google's API *Perspective*, a content moderating tool that is the industries' standard for automatic detection of toxic content in written comments. Perspective uses a convolutional neural net model to score the toxicity of an input text. Toxic is defined as "a rude, disrespectful, or unreasonablecomment that is likely to make one leave a discussion.". The model was built using millions of comments from the internet, using human-coders to rate the comments on a scale from "very toxic" to "very healthy", and using this large data as training information for the machine learning algorithm. We uploaded the content of the tweets in twelve hour windows and compare the differences in toxicity among Democrats and Republicans.

Figure 6 presents a visual representation of the toxicity scores before and after adjudication. It is worth considering Figure 6 in concert with the adjudication results in Figure 4. As we noted before, adjudication in the US Presidential Election is preceded by a lengthy tally were voters constantly update their expectations about the likely winner. Figure 6 is revealing, as it shows that the increasing enthusiasm by the winners is accompanied by higher toxicity scores for the loser. As shown in Figure 6, the difference in toxicity grows monotonically as we approach adjudication. While the average toxicity score among Republicans was close to .15, this value was close to three times higher among democrats.

Because the *toxicity* scores by *Perspective* have a range between 0 and 1, the increase from .32 to .58 in the toxicity score of democrats at the time of adjudication is both statistically and substantively significant. It is also telling the sharp discontinuity in toxicity among Republicans at the time of adjudication.

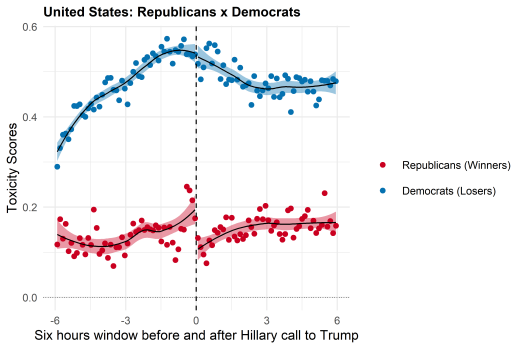


Fig. 6. Toxicity Scores reported by *Perspective* on the text of the Tweets of the US Presidential Election. Lower values indicate less toxicity in the text of the tweets. Adjudication describes the moment that it is made public the congratulatory call from Hillary Clinton to Donald Trump.

In all, the information gathered from the text of the tweets is both informative and consistent with differences in anger and enthusiasm that drive activity by Democrats and Republicans at the time of adjudication. Not only there is clear evidence of information drift in the time-to-retweet of both communities, but there is also evidence that the information that explains this information drift reflects different emotions by partisans that support each candidate.

Adjudication in Sports. There are a number of other events where justices or nature adjudicate victory to one of the parties in contention. Different from adjudication in politics, where results have long lasting implications, adjudication in sports should produces immediate effect with a shorter shadow of the future. After all, one has to live for many years with the positive or negative outcomes of an election but, by contrast, there are few long term effects for any game unless we made very large bets with shady individuals.

As a further extension of our analyses, we introduce readers to two adjudication events in soccer, where "nature" decides who the winner is. The semifinal soccer games of the *Libertadores*, the most important inter-club competition in the Americas, provides an interesting adjudication model. Soccer, Basket, Baseball, and other competitive sports also yield winners and losers, where "nature" makes the final determination

at games' end. In what follows, we describe how our theory explains the process of adjudication in sports' results.

As in the three elections we analyzed before, we gathered twitter data in the days before and after adjudication. In this case, collection covered the second leg of the semi-final games between Boca and River (October 22, 2019) and Flamengo-Gremio (October 23, 2019) of the the Libertadores cup. Comparison was facilitated by the unexpected sorting of the teams, with two of them from Argentina (Boca and River) and two of them from Brazil (Flamengo and Gremio). As before, we restricted our observations to spanish and portuguese respectively, filtering singletons and selecting nodes in the primary conected clusters of the Argentine and the Brazilian datasets. The primary connected cluster of the Argentine network included distinct communities that supported Boca and River while the primary connected cluster in Brazil included well defined communities that supported Flamengo and Gremio.

Different from the election, we restricted our discontinuity analyses to three hours before and three hours after the end of the game. Different from an election, the result is known instantaneously at games end, with information drift taking place in real time as changes in the score would alter the level of enthusiasm among supporters. Because this was the second leg of the game, supporters of Boca knew that they needed to score two or more goals for their team to make it to the final of the Libertadores cup. Meanwhile, Flamengo and Gremio were all squared, as the first game between them ended up with a 1-1 tie.

Figure 7 presents clear indication of how the development of the game. In the case of Boca-River, 7(a), a goal near half time drove fans to the edge of their seats, as a 2-0 win would mean the difference between going to the final or not. A partial win of 1-0 would keep "nature" guessing until the game's end, with the final result likely to change if either team scored. By the end, Boca won 1-0, a victory that was not enough to allow the team to reach the final. Boca's slim victory failed to prevent River's success in the Libertadores, which resulted in large discontinuities on adjudication.

Very different was the story of Flamengo-Gremio, which ended in a resounding victory of Flamengo, 5-0. A goal at 42' meant that activity at half time increased, followed by two more goals in quick succession. By the '67, twenty five minutes before the end of the game, the tally was already 4-0. A most interesting feature of adjudication in this game is that the likely loser is more engaged before adjudication and less engaged after adjudication. Different from politics, it would seem, the more volatile and unpredictable nature of sports would seem to prevent the type of information drift we observe in politics.

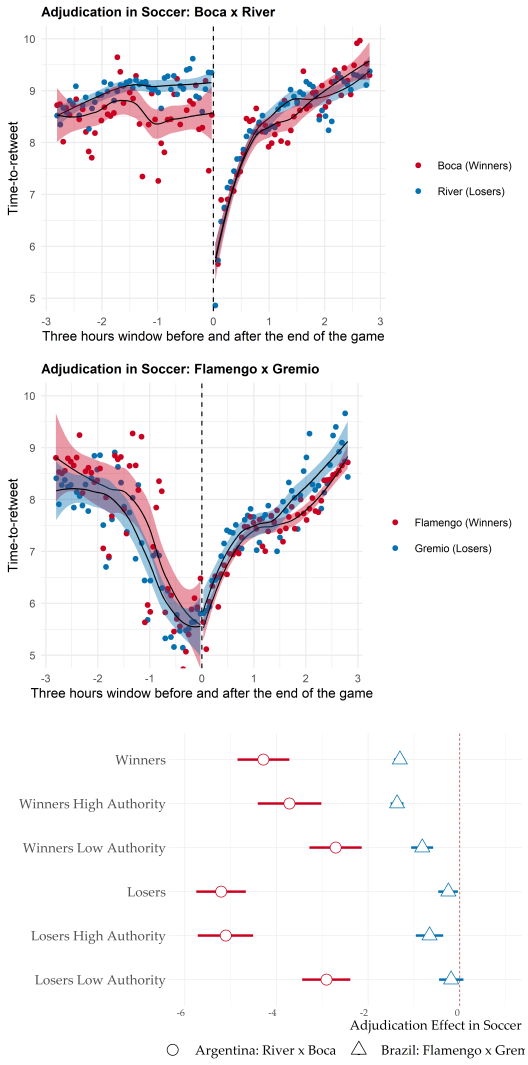


Fig. 7. Time-to-Retweet in Soccer. The top two figures show the adjudication graphically. The bottom plot reports 95% robust confidence intervals for the point estimates (Calonico et al., 2014)

5. Concluding Remarks

In this article we introduce readers to a model of event adjudication and dialogue in social media. The theory we proposed has close ties to the model of issue ownership and dialogue proposed by Simon (2002) as well as to Kaplan et al. (2006). Different from the existing research, however, we focus on the moment in which one party is granted a performance advantage by an adjudicator, such as voters, justices, or nature.

The model of event adjudication and dialogue proposed here has clear theoretical implications for scholars interested in social media engagement. We argue that attention to an event determines a state-of-dialogue and that, as winners and losers anticipate adjudication outcomes, they engage or disengage from dialogue with each other.

The theory of adjudication is predicated of the fact that winners and losers will react with enthusiasm and anger to positive or negative election results. Differences in institutional rules and procedures, we argued, allow information to leak at different rates and explain variations in information drift and adjudication.

The proposed model provides a blueprint for scholars interested in understanding how information affects engagement, showing that the three elections under scrutiny had results that were anticipated to a different extent. Information drift and adjudication premiums, we argue, should facilitate structured comparisons between adjudication events.

Extensions of the proposed model to judicial decisions, fact-checking, and sports are among the most promising future developments of a theory of adjudication and dialogue. We provide some preliminary results to that effect in our analyses of the Libertadores semi-final, but hope that more structured

future comparisons will allow us to better understand differences in social media dialogue across issue areas.

Adjudication and dialogue, we think, are major areas of theoretical development at the intersection of Communication Studies and Political Science. As such, is one area where future inter-disciplinary collaboration is particularly promising.

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