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Converging Media versus Diverging Politics - the Brexit Twitter on Debate

INTRODUCTION

In the public referendum held on 23 June 2016, 52 percent of the British electorate that turned out voted for Britain to leave the European Union. After the referendum, a new government formed around Prime Minister Theresa May and started preparing for negotiations with the EU. Although finally triggering Article 50 on 29 March 2017 and thus kicking off a two-year negotiation period, Theresa May called new elections at short notice to get a clearer Brexit negotiation mandate. Unfortunately, the poor election outcome for the government did not result in a clear mandate for the Brexit negotiations, but in a 'hung parliament', forcing the Tories into a coalition with the EU skeptical Northern Irish Democratic Unionist Party (DUP).

Furthermore, when negotiations began, it turned out that the British government had not come up with convincing answers to pressing questions like the green border in Ireland and the future trade regime with the EU. Although the negotiation period is slowly coming to an end and Britain will leave the EU - most probably in a transition period - no significant progress has been observed yet and the specter of a 'hard Brexit' leaving Britain with no institutional relationship with the EU continues to loom large.

The uncertainty resulting from the unsuccessful negotiations is partially reflected in public opinion on Brexit. In June 2018, 69 percent of the British believed Brexit was going badly *versus* only 16 percent who believed it was going well. Interestingly, a large majority of both remain (77 percent) and leave (58 percent) voters would blame the British government if Brexit did indeed turn out badly (YouGov 2018a). Another recent poll caused a stir with its estimate that 112 constituencies have switched from Leave to Remain, adding up to 53 percent of the votes for the Remain side. In Scotland and Wales, the majority of voters would also prefer Britain to remain a part of the EU (The Guardian 2018a). Only 21 percent of the respondents of a Deltapoll poll believe that

a hard border in Northern Ireland will be avoided (Deltapoll 2018). Moreover, 43 percent of the respondents of a YouGov poll in Scotland believe Brexit will make it more likely that Scotland leaves Britain - *versus* only 6 percent who think Scottish independence is less likely (YouGov 2018b).

In line with current research (Amador *et al.* 2017; Beauchamp 2017; Gorodnichenko *et al.* 2018; Grčar *et al.* 2017), this paper analyses twitter content as a proxy for the political and public debate. By applying a machine learning algorithm, we highlight textual and content-related changes in the public debate over time and build a Naïve Bayes classifier that sorts out key actors' tweets on a Leave-Remain scale. The classifier is trained by all tweets of the official Twitter accounts of the Remain and Leave campaigns, which remained active from the pre-referendum period until summer 2018. We identify an increasing approval rate for the Remain side in the media; and a further divergence on the Brexit topic between different politicians in recent months.

DATA DESCRIPTION AND METHODOLOGY

Providing a platform where users can publish brief statements - 'tweets' - and engage in public conversation, Twitter has become an increasingly important factor of public debate across the world (Eltantawy and Wiest 2017; Khatua and Khatua 2016). With the number of active Twitter accounts rising significantly in recent years, from 30 million monthly users in 2010 to 335 million in early 2017, the website's online conversations are bound to take on added political and social importance in coming years (Twitter 2018). Twitter usage has also ballooned among politicians everywhere: 90 percent of Members of Parliament in Britain now have an official Twitter account. This direct access bypasses gatekeepers who control content in a traditional media setting and allows influential persons with large networks to create digital echo chambers (Engesser *et al.* 2016; Ott 2017; Pariser 2011).

A Tweet's limit of 280 characters forces the user to get their point across concisely. There is little room for digression or verbosity, and users must include specific hash-tags, use well-known terminology, or mention specific other users to effectively engage and spread their beliefs. Thus, the individual words or hash-tags must have more rhetorical weight than an individual word in a speech or an article. This suggests that Twitter data and word-choice could be effectively used in a discrete, statistical model to determine opinion or sentiment.

Past work, especially on the Brexit debate, has managed to effectively classify Twitter data using the word choice or the hashtags present in a tweet: Khatua and Khatua (2016) built a rule-based classification algorithm looking at hashtags that were particular to one side of the Brexit debate, such as '#VoteLeave'



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or '#StrongerIn'. However, other research has shown that words outside of such hashtags can provide information that is useful for predicting political opinion (Amador *et al.* 2017).

By creating a Remain-Leave classifier, our paper builds upon the existing literature and looks at tweets specifically from the Leave and Remain campaigns' official Twitter accounts, 'Leave.eu'¹ and 'Open Britain'² between January 2016 and July 2018. These are the only two official Twitter accounts that have remained active long after the referendum. We use these tweets for our training data as instances of particularly opinionated text because they come from the official accounts of the respective campaign movements.

Our features – the variables for our further analysis – are textual unigrams, bigrams, and trigrams. This allows us to catch individual hashtags as well as phrases, such as 'Take back control', a typical refrain for the Leave campaign. There were a total of 6,070 tweets from the Open Britain campaign's account, with 371,770 total features, 164,820 of which were unique. Leave.eu tweeted more frequently, with a total of 8,369 tweets and 454,152 features, with 220,172 of them unique.

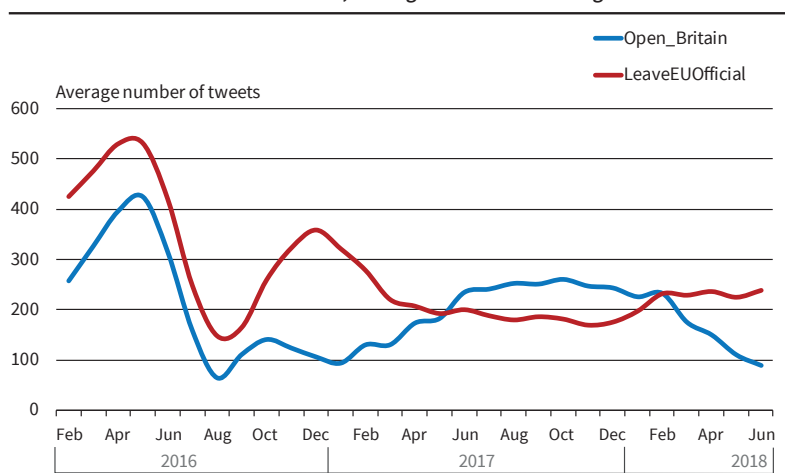
Leave.eu tweets more frequently than Open Britain for most of our time period. Figure 1 shows a graphical representation of the moving average of monthly tweets over time. Notably, there is a period of several months in 2017, centered on the general election in June 2017 and its aftermath, in which Open Britain is more active than Leave.eu. Given that our dataset extends well beyond the referendum, we are able to isolate particular sections of time and explore how the conversation changes.

In line with the analysis restricted to hashtags from Khatua and Khatua (2016), we find that the conversation does vary significantly during substantial

¹ @leaveeuofficial.

² @Open_Britain.

Figure 1
Tweets from the Accounts over Time, Rolling Three Month Average



Source: Twitter; authors' own representation.

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changes in the geopolitical context over the years and months.³ We identify strong changes in the debate both after the referendum in June 2016 and after the general election in June 2017. Figure 2 shows word-clouds for the most significant words for the classifier during these specific time periods. We calculate these words by finding the features that have the greatest probabilistic difference over our binary Naïve Bayes classifier. Words that are larger in the pictures have a greater effect on the classification.

The changes in these words reflect the evolving political situation. Before the referendum, a great deal of effort was spent on campaigning and spreading a common message. Thus, both parties use their characteristic hashtags – #VoteLeave and #LeaveEU for the Leave campaign and #strongerin for the Remain campaign. After the referendum the content-related Twitter discussion, especially on the Leave side, was replaced by references to people who agree with Brexit. Leave.EU devotes a good deal of coverage to Trump's similarly-populist campaign in the United States, which, after all, had attracted Nigel Farage to campaign with him. After the election Open Britain launched a new wave of campaigning and began to push '#peoplesvote' and focus on ensuring that the final deal is not a hard Brexit by demanding that the best possible deal be negotiated to keep Britain open to the EU.

In general, for Open Britain, the economic impact is stressed; the EU presumably offers opportunity, lower prices, and more jobs, while leaving it would bring risk and injury. For the Leave campaign, problems created by the EU are stressed, including references to Greece, the unpopular TTIP deal, and various crises in the Eurozone; and specifically migration. Overall, the Remain campaigned appealed to reason more than emotion. Even although Leave.EU tweeted more frequently than Open Britain, the words 'would' and 'could' appear 144 times in Open Britain tweets, over twice as often as the 67 appearances in Leave.EU

tweets. The word 'expert' and 'analysis' appear 30 times in Open Britain Tweets before the referendum and only 4 times in Leave.EU tweets.

Classifying Data

We use our classifier over the tweets of players present in the Twitter debate. We have three groups of data in our analysis. The first group is tweets from individual politicians. We looked at all

³ What is more, Gorodnichenko *et al.* (2018) find that dissemination in the Brexit twitter debate runs particularly fast, with reactions news taking just 1–2 hours.

Figure 2
Evolution of Important Features in Pictures

A) Before the Referendum



B) From the Referendum to the General Election in 2017



C) From the General Election in 2017 to 1 August 2018



Source: Twitter; authors' own representation.

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the most frequently used 'key' words not specific to one of the campaign sides within the Brexit twitter debate: 'EU', 'Article 50', 'Referendum', 'Brexit', 'a50', 'peoplesvote', 'ukip', 'single market', 'trade deal', and 'final deal'. However, there are noticeable areas where some relevant tweets might be missed or irrelevant tweets admitted, such as tweets concerning referenda in Scotland or trade deals outside of the Brexit negotiations. We looked at various users, including Boris Johnson, Andrea Leadsom, Theresa May, Gisela Stuart, Nigel Farage, and many others. Some accounts, however, tweeted relatively infrequently about Brexit, making our results sporadic and potentially unrealistically extreme. Aggregating the accounts of like-minded individuals helps to overcome this issue.

In a second step, we try to map traditional media's positioning on Brexit. From the United States we know that both newspaper subscription (Gerber *et al.* 2009) and television supply influence political knowledge (Gentzkow *et al.* 2006) and decision making (DellaVigna and Kaplan 2007). In the Brexit debate, several newspapers have taken strong pro-Brexit positions

and even applied populist techniques designed to incite the pure people's will against a corrupt elite (Freeden 2016). Because many users follow the Twitter accounts of traditional media sources and because those accounts tend to mirror the opinion of the media source, we consider these media sources' Twitter activity relevant for the public debate. In Britain in particular, newspapers engaged in the public debate around Brexit. Only the six newspapers included in our analysis tweeted 26,198 times with reference to Brexit between January 2016 and June 2018. For the sake of comparability with politicians' tweets, we ignore newspapers' original articles that may use words completely different to those used by players on Twitter, which would make our training data less relevant. We define tweets about Brexit as those that contain our key words. We looked at various national and local papers, including the Guardian, the Independent, the Sun, the Irish News, and Wales Online.

Lastly, we used the data-

base on the 'MPs on Twitter' website, which stores and describes the Twitter use of British parliamentarians, to find tweets by parliamentarians grouped by party. We looked at all tweets tagged by that website as concerning 'Brexit' and the 'EU'. We particularly focused on the Conservative, Labour, and Liberal Democrats parties (mpsontwitter).

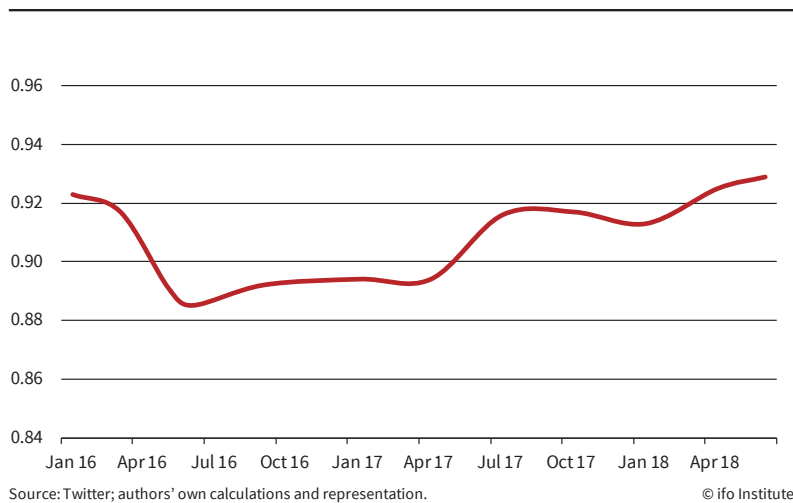
MODEL

To train and build our model, we isolated a specific section of time and only looked at tweets in that window. However, we ensured that we had at least 1,000 tweets to train on in any given window. Hence, neither the length nor the specific end dates of the respective window are fixed. We removed all stop-words from our texts.⁴

We employ cross-validation as a preliminary step in testing our model. Our model classifies 91.6 percent of all tweets correctly. Interestingly, the model is slightly better at classifying tweets from Leave.eu; its accuracy in classifying tweets from Leave.eu is

⁴ To do this, we used Python's NLTK library (Bird *et al.* 2009).

Figure 3
Accuracy over Time



92.9 percent, while its accuracy in classifying tweets from Open Britain is 89.9 percent. Over time, we see that this cross-validation accuracy maintains itself. Figure 3 shows the accuracy of our classifier for both sides over time. We see it is always within 2.5 percent of our total accuracy. Noticeably, we see the accuracy decreases after the referendum, when there was less to campaign on and then increases later, as Brexit moved into the political dialogue. These accuracy rates are in line with Amador *et al.* (2017), who use a multinomial Naïve Bayes classifier on a similar training set.⁵

There are risks that we over-fit the particular Twitter accounts in our training method. Given that we only look at the two campaigns and there are probably only a small number of authors tweeting, there are probably stylistic preferences that are coded into our classifier. Thus, if another actor tweets with a similar style to one of our accounts, our model might classify that actor accordingly, regardless of the actor's opinion. To get around this issue, we employ another method of looking at the results of our classifier. Because we have smaller amounts of training data that might feature major differences caused by different styles or vocabulary, we look at actors relatively. Thus, we can run the tweets of two actors through our classifier and see which one lines up relatively more with Leave.eu or with Open Britain. Using these tendencies to align rhetorically with one side or the other as a proxy for political opinion on the issue, we can make a quantitative representation of the scale of political opinion among actors.

More specifically, we downloaded the Brexit tweets of all members of parliament on Twitter. We then classified all of these comments using our Naïve Bayes classifier. To account for changes in style and

⁵ Although we could have achieved a higher cross-validation accuracy using another e.g. nonlinear model, such as a SVM, this would risk overfitting the data and would prevent us from examining the relative importance of particular features in our classification.

vocabulary over time when we classify other actors' tweets, we normalize their results by dividing them by the results of all classified parliamentary tweets over the same time window. Thus, we can see a relative difference in rhetoric between the actor and the parliament during a certain window. This difference can be used as a proxy for respective deviation of a political opinion from all parliamentarians.

RESULTS

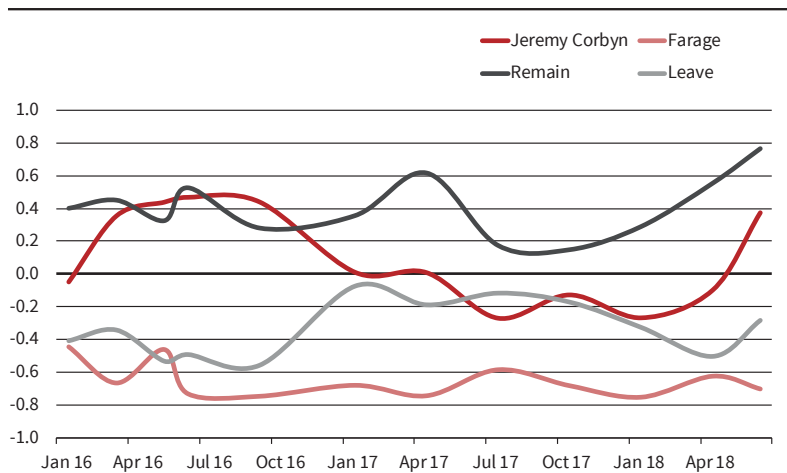
In order to justify our model beyond cross-validation, we will look at specific actors and their classification under our model. Firstly, to show a relative difference, we will take the total tweets from four pro-EU MPs and four Brexiteer MPs.⁶ Figure 4 depicts our results. We see that our model classifies tweets from Remain MPs as consistently closer to Open Britain than tweets by Brexiteer MPs.

However, there are still limitations to our model. Such analysis only makes logical sense when looking at actors in relation to one another. For example, we see those Brexiteer MPs are classified more closely to Open Britain in early 2016 than the average of all parliamentarians. However, this data point is from a time when the referendum was just being announced, before campaigning really got off the ground, and the rhetoric was still in flux. In this time period, even the feature 'Brexit' is a strongly weighted pro-Brexit feature, because the term had not yet achieved great popularity. As time goes on, however, we see the expected trend: pro-EU MPs are classified as pro-EU more than the average parliamentarian, and Brexiteer MPs are classified as pro-Brexit more than the average parliamentarian. In general, consistently over time the Leave Twitter output is closer to the average parliamentarians tweets than the Remain group. This could be due to the average parliamentarians tweeting being more pro-Brexit or because the Remain group is more radical in their tweets than its Leave counterpart.

Nigel Farage, who was a chief proponent of the Brexit cause, can be interpreted to be the far out pro-Brexit boundary. Figure 4 shows that this holds with our quantitative analysis. Farage's tweets are always classified more often as pro-Brexit than those

⁶ The pro-EU MPs were Anna Soubry, Chuka Umunna, Chris Leslie, and Steven Doughty. They tweeted a total of 4,231 times. The Brexiteer MPs were Gareth Snell, Gloria De Piero, John Redwood, Kate Hoey, Gisela Stuart, and Sammy Wilson. They tweeted a total of 1,981 times. They were chosen for being particularly involved in the Brexit debate and not being involved in Theresa May's cabinet or having other ties that might have swayed their opinion after the referendum.

Figure 4
Normalized Classification of Grouped Tweets over Time^a



^a Unfortunately, Theresa May did not tweet enough in the respective windows to have her Tweets being interpreted as her stance on Brexit.

Source: Twitter; authors' own representation.

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of pro-EU MPs, parliament as a whole, and even than those of other Brexiteer MPs. The one notable exception is the data point immediately after the referendum, when Farage is classified slightly more frequently as pro-EU than other Brexiteer MPs. However, this could result from a congruence of rhetoric from the Leave Campaign immediately before and after the referendum. Later on, however, Farage is always classified as a more hardline Brexiteer than his parliamentary comrades. Thus, we conclude our model effectively captures the relative opinion of individual actors and aggregated groups.

An interesting case is Jeremy Corbyn. Historically sceptical about the merits of the European Union, there have been questions regarding the minister's true stance on the EU and the Brexit referendum (Moseley 2016). However, Corbyn supported 'remaining' in the EU during the referendum. After the referendum, the Labour leader and his party went dark on the issue. There were calls across the British media for the party to describe their approach and perspective on the negotiations more thoroughly (Norman 2017; The Guardian 2018b). Instead of offering a hard opinion on one side or the other, Corbyn seemed to play the middle. Vague statements and consistent pushing back against May's government has led Europhile reporters to say Corbyn has finally 'seen the light' and declared his support for a soft-Brexit, while also placating hardliners by rejecting the Single Market and the European Economic Area (Toynbee 2017; Pickard *et al.* 2018). He advocated staying in the Customs Union, which provides 'a position for proponents of a softer Brexit and those still in favour of no Brexit' (Cooper and Mctague 2018). At the Labour Party's Annual Conference in 2018 he repeated this argument, but without endorsing the Remain side. On the whole, Corbyn's policy seems designed not as a solid and applicable European policy, but as a route to snatching support from both hard Brexiteers and

the pro-EU sympathizers away from Theresa May.

Our results reflect Corbyn's long ideological journey through the Brexit debate: his Twitter rhetoric matches pro-EU MPs for the months leading to the referendum. However, after the referendum, his Twitter presence fell more into line with that of Parliament; and even became closer to that of Brexiteer Ministers. Much like the rhetoric of Theresa May and other government officials, Corbyn focused on ensuring he would make Brexit as good as possible for the British

people. His tweets included protests against May's 'chaotic Brexit', that the British people voted 'to refinance the NHS', and calls for 'a Brexit that is in the interests of the whole country' (Corbyn 2017a, 2017b and 2017c). He made a conscientious effort to accept the results of the referendum. This rhetoric falls into line with the boasting of Leave.EU, while Open Britain still worried about softening out Brexit as much as possible. The tide turns again during summer 2018, when Corbyn's Twitter activity is tracked towards being more pro-EU, even than that of parliament as a whole. This could be a result of his new commitment to a custom's union, or he could be tacking onto the winds of public opinion as polls shift across Britain.

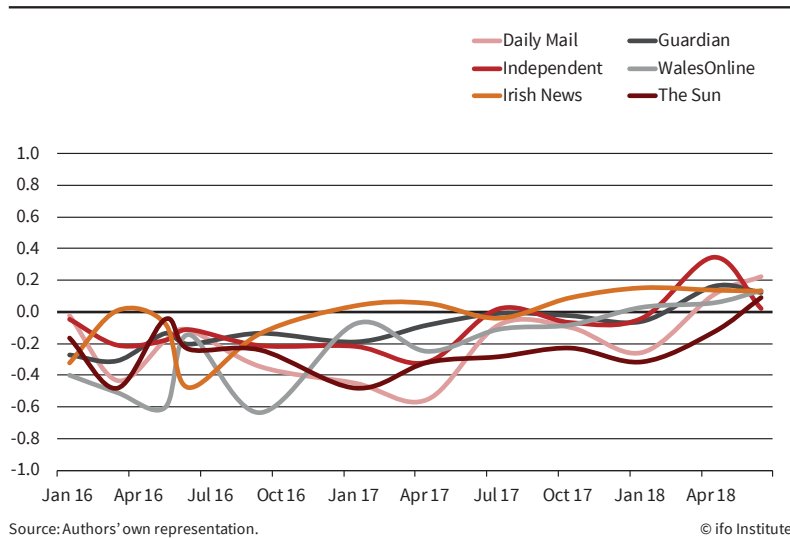
Figure 5 shows the same classification technique applied to the tweets of various newspapers. Much of the pattern is to be expected. The Guardian and the Independent are classified generally as more pro-EU than the Sun and the Daily Mail.⁷ When looking at local newspapers, an interesting pattern emerges. The Irish News is generally classified as more pro-EU than other newspapers. Before the referendum, WalesOnline is classified as generally more pro-Brexit. This falls into line with regional opinion on Brexit: Northern Ireland voted to remain, whereas Wales voted for Brexit.⁸

Interestingly, when looking at all newspapers together, there is a general turning away from pro-Brexit sentiment. Relative to all parliamentarians, every newspaper has become progressively more aligned with Open Britain in recent months. As the polls have become more favourable to the European Union, this

⁷ The Guardian and The Independent both supported remaining in the EU during the referendum. The Daily Mail and The Sun supported exiting the EU.

⁸ A notable exception is the Irish newspaper The Belfast News Letter, which often has an ideological stance in line with the Democratic Unionist Party (DUP), a notably Brexiteer party (O'Toole 2018). Thus, the representation of the media debate in Figure 5 can only be interpreted as a snapshot of the heterogeneous British media landscape.

Figure 5
Newspaper Bias over Time



perhaps has a very legitimate effect on the rhetoric of the newspapers on Twitter, as their stances may have changed along with that of the population.

Figure 6 shows the process of classification described above as applied to three political parties: Conservatives, Labour, and Liberal Democrats. These are three of the biggest parties in the current UK parliament and produce the most tweets.⁹ It can be noted that the Twitter activity of the Conservative party tends to be more pro-Brexit, whereas Labour tends to be more pro-EU. These are unsurprising results given that a far greater share of Labour MPs (95 percent) than Conservative MPs (58 percent) voted to remain in the EU in the referendum (Bloom 2016). Similarly, it is unsurprising that the Liberal Democrats appear to consistently be the most pro-EU, as a cornerstone of the current platform is to guarantee a second referendum on the final Brexit deal, and they openly declare 'Britain is better off in the EU' (Liberal Democrats 2018).

Interestingly, all parties seem to condense together during the General Election in July 2017. All three parties pinch right around the average of parliament as a whole, before branching off again afterwards. This could signify that all parties softened their stances in an effort to strengthen their presence in parliament, as the electorates' wishes have never been parti-

⁹ The Conservatives have 316 seats in Parliament and contribute 21,782 tweets to our analysis. Labour has 258 seats and 30,878 tweets. The Liberal Democrats have 12 seats and account for 3,151 tweets (Twitter; UK Parliament)

cularly stable in any region and the median voter is suspected to be fairly undecided, and even indifferent about Brexit in some cases.

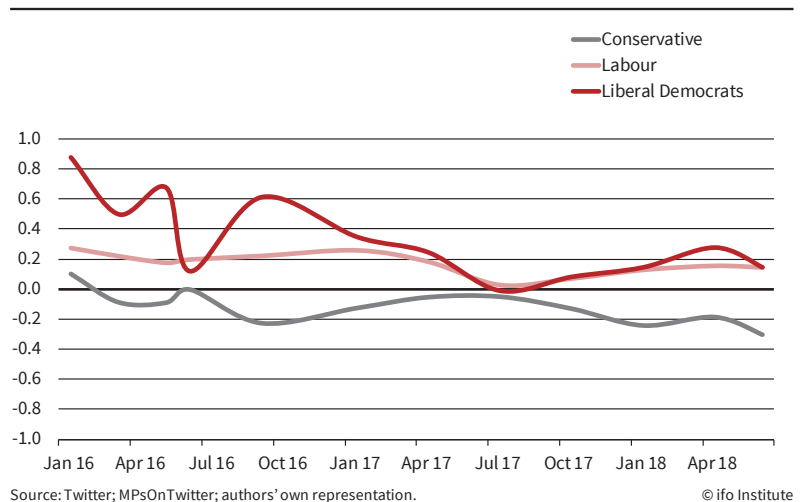
CONCLUSION

The damage might already have been done. With recent polls showing increases in support for a people's vote on the final Brexit deal,¹⁰ which has given Open Britain its first major hashtag since before the referendum, patience with the Brexiteer faithful seems to be waning (YouGov 2018c). The general rhetoric coming out of the newspapers seem

to be more closely aligned with that of the Remain campaign as time goes by – the same holds for Jeremy Corbyn's tweets. Interestingly, however, this does not seem to be reflected in the parliamentary debate. After the parliament debate returned to a level consistent with the period prior to the election in our classification results, we see the parties retain a strong degree of the division that they always demonstrated. Significant differences between the Conservatives, Labour, and the Liberal Democrats remain over Brexit. In fact, despite a little push back in spring 2018, when Conservatives became slightly less pro-Brexit than they had previously been, this division now seems to be widening. Given our analysis and classification technique, it seems that the UK Parliament and the political campaigns are drifting away from other sources of debate: they are diverging from the opinions expressed in news-

¹⁰ A July 2018 YouGov poll found 42 percent of Britons favour a second referendum, while 40 percent do not.

Figure 6
Classification of Parties over Time



papers and polls, as well as showing internal divisions.

Our model has developed a quantitative way to determine where the public debate stands relative to the various sides in it and the main actors in the campaign. We can look at individual actors across the political field through their Twitter accounts and see how they develop over time. When combined with qualitative analysis to determine and explore the causes and machinations behind our results, we are able to discover and better understand large-scale trends in the rhetoric of these various players.

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