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## The Gilets Jaunes: Offline and Online

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## The *Gilets Jaunes*: Offline and Online

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# The *Gilets Jaunes*: Offline and Online

## Abstract

We study the *Gilets jaunes* movement, which blocked most of France off in November 2018. We first analyze the complementarity/substitutability between the different forms of mobilization and find that blockades were planned online and later reinforced online activism. Second, we do textual analysis and show that online discussions evolved from local concerns to widespread critique. Finally, while the *Gilets jaunes* refused to designate candidates for the subsequent European elections, we ask whether the movement had electoral consequences nonetheless. We show that blockades boosted the performance of the government's party in its bastions, except when they nurtured further online dissent.

JEL-Codes: F150, J400, J600, J800, C830.

Keywords: gilets jaunes, yellow vests, protests, social media, spatial inequalities.

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# 1 Introduction

On the 17th of November 2018 (hereafter, 11/17), the first demonstration of a major protest movement known as the *Gilets jaunes* (Yellow vests) took place in France. Initially fueled by anger against a programmed increase in gasoline taxes, the movement rapidly became a full-blown protest against the government. While numerous protest movements had recently taken place in France, none arguably shaped the French public debate as deeply as the *Gilets jaunes*.

Two characteristics of the movement are striking and may prefigure new forms of political mobilization: its highly decentralized origins outside traditional parties and labor unions, and the use of social media and the Internet for mobilization. Whereas some aspects of the movement are characteristic of historical patterns,<sup>1</sup> the *Gilets jaunes* stand out as a bottom-up movement (demonstrators were urged to block traffic “closest to home”) that achieved a national outreach. On the first day of demonstrations, hundreds of blockades were organized around the country. We document 788 blockades, which affected half of the country’s municipalities.

However, road blockades only were the tip of the *Gilets jaunes* iceberg. Social media in general and Facebook in particular have played a key role in the organization and diffusion of the movement. First, a petition in favor of a decrease in gasoline prices, which had been dormant on the Change.org website for several months gained sudden exposure in October 2018 and eventually garnered more than one million signatures. Second, the movement created a whole new political affiliation system on Facebook, with the proliferation of groups with both national and local focus. By mid-December 2018, we count over three-thousand Facebook groups linked to the *Gilets jaunes*, totaling millions of participants. Finally, the movement remained very active on dedicated Facebook pages, where hundreds of thousands of posts were shared and commented on for several months. While large demonstrations such as the Arab Spring or “Occupy Wall Street” in 2011 had already been launched and catalyzed by social media, an event of this scale was unprecedented in France.

The *Gilets jaunes* provide an ideal setup to answer the following questions: first, are different forms of mobilization online and offline complements or substitutes? Second, what can be said about the different phases of a movement and the process through which opposition to a very specific tax transforms into a much more widespread critique? Finally, despite the movement’s decision to not run candidates in the following election, were there any electoral consequences? More specifically, did it hurt the incumbent

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<sup>1</sup>Fiscal policy is often mentioned as the cause of popular movements – see, e.g., Ponticelli & Voth (2020) – and tax revolts are recurrent in French history – e.g., Delalande (2011).

government’s party, which the Gilets jaunes were criticizing, or did it benefit it, suggesting that the “silent majority” ended up disapproving the movement?

To answer these questions, we bring together unique data documenting active involvement in online activities (both on Facebook and on the most popular online petition related to the start of the movement), involvement in the offline demonstrations (road blockades), and detailed administrative data at the local level.

First, using descriptive linear models, we show that local mobilization on Facebook and on Change.org prior to 11/17 are correlated with a higher likelihood of observing a blockade. We then look at the correlation between blockades and subsequent online activities. While offline mobilization has lasting effects on Facebook because the social network acts both as an organization device for subsequent protests and as a virtual Gilet jaune Agora, this is not the case of the petition: in a sense, the goal of the petition has been met with the blockades. Online mobilization on Facebook and offline mobilization are complements, while offline mobilization and online mobilization on Change.org are substitutes.

While street protests rapidly subsided, the mobilization stayed very active on Facebook. To better understand the evolution of the movement, which gradually cut ties with offline mobilization, we analyze a large corpus of online Facebook publications and associated comments posted on Gilets jaunes Facebook pages. Relying on a customized topic model for short texts, we document the different phases of the movement and the evolution of topics. At the movement’s start, Facebook was used as means to organize protests and share demands, but as conflicts with the police intensified, main topics of interest were progressively shifted towards police violence and government critiques.

Finally, we investigate whether the initial blockade surge had lasting political consequences, which we measure by focusing on the 2019 European Parliament election. We propose an instrumental variable strategy based on the spatial dispersion of roundabouts, a peculiar feature of the French urban landscape that is hardly ever necessary for road safety concerns and mostly reflects local idiosyncratic preferences. Roundabouts were heavily targeted by protesters because they allow to block several roads at a time and are easy to set camp on. Results show a backlash effect of the blockades, which boosted the electoral performance of the incumbent government’s party (*La République en Marche*, LREM). On average, the occurrence of a blockade increased the LREM vote by 0.4 p.p., that is, by 2%. The effect was concentrated in the more pro-Macron municipalities, where it amounted to 0.8 p.p. However, it was largely mitigated, if not reversed, in places where blockades had triggered a second wave of Facebook group creations. These findings suggest that the Gilets jaunes contributed to the polarization of French society.

The remainder of this paper is organized as follows. The next section discusses related

literature. Section 3 describes the background and the data. Section 4 provides descriptive evidence of the interaction between online and offline mobilizations. Section 5 uses results from textual analysis to document the evolution of concerns associated with the movement. Section 6 provides causal of the impact of the blockades on the performance of the ruling party in the following election. The last section concludes.

## 2 Related literature

Our paper contributes to the growing literature on the impact of social media and political mobilizations. Coordination is a recurrent determinant of successful collective action (Olson, 1965), and recent theoretical work has highlighted the potential importance of social media in the development of large protest movements (e.g., Edmond, 2013; Little, 2016; Battaglini, 2017; Barbera & Jackson, 2020). Recent empirical studies support these claims in the context of the Arab Spring (Acemoglu et al., 2018), in China (Qin et al., 2017), in Hong Kong (Bursztyn et al., 2019), or Russia (Enikolopov et al., 2020). As in Bursztyn et al. (2019), we find that political mobilization in our dynamic setting has especially high returns from early efforts: initial blockades and early online mobilization created a persistent political engagement on Facebook.

We also relate to the literature that studies the impact of social media and the Internet on trust in government – e.g. Guriev et al. (2019) and Algan et al. (2019) – turnout – e.g. Falck et al. (2014), Campante et al. (2018), Gavazza et al. (2019) and polarization of the electorate – see, e.g., Halberstam & Knight (2016), Boxell et al. (2017), Barrera et al. (2020), Henry et al. (2020), Manacorda & Tesei (2020).<sup>2</sup> Our textual analysis documents a situation where mobilization on Facebook becomes more radicalized over time, and tends to depart from its original goals, as anger grows among the remaining participants. We also show that the Gilets jaunes contributed to the polarization of French society in the 2019 European Parliament election.

Some studies have intended to assess the gains from online and offline electoral campaigning during elections. For example, Bond et al. (2012) and Broockman & Green (2014) show small, if not zero, effect of social media on turn-out and electoral preferences during elections. Conversely, ground work seems to be quite effective (see, e.g., Braconnier et al. (2017); Pons, 2018). Our evaluation of the impact of the road blockades on future elections shows that offline mobilization (blockades) may have a lasting effect, yet not necessarily in the intended purpose.

Turning to the Gilets jaunes themselves, this paper is the first one to bring together

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<sup>2</sup>See Zhuravskaya et al. (2020) and Allcott & Gentzkow (2017) for reviews.

universal data on signatories of the most important petition related to the movement, the dynamics on the movement on Facebook pages and groups, and administrative data at the local level. Previous papers investigate the determinants of the origins of Gilets jaunes, focusing on the first months of the movement (Boyer et al., 2020). Algan et al. (2019), Algan et al. (2020) and Davoine et al. (2020) enrich the analysis with survey data and wellbeing and social capital indicators. Using textual analysis methods, Sebbah et al. (2018) is an early attempt to identify the topics discussed by the Gilets jaunes.

### 3 Context and Data

The success of the Gilets jaunes movement and the 11/17 blockades results from the combination of chance and the social media ecosystem – see Appendix A.1. A petition against high gas prices, which has been dormant on the Change.org website since May 2018, is picked up by a local journalist on October 12. Her article catches the eye of the wife of a truck driver who has been planning a blockade on Facebook with fellow angry car users and who links the petition on Facebook. Thousands of local signatures and nine days later, a national newspaper publishes the two stories and signatures skyrocket all over the country – see Figures A.2 and A.3. On October 24, the yellow road security jacket, which every car owner is compelled by law to have in her trunk, is suggested as a rallying sign. Both practical and iconic, the “Gilet jaune” is instantaneously adopted by Facebook users, who create dedicated groups to plan the forthcoming blockades.

On 11/17, hundreds of blockades take place all over the country, organized by hundreds of thousands of protesters. Given many of these blockades are quickly evacuated, the movement then resorts to more conventional weekly demonstrations in the main cities. A climax of violence is reached on December 1 in Paris. The following Saturday, police tanks are mobilized and 2,000 people are arrested as a precaution. On December 10, President Macron announces a 10-billion-euro plan and the organization of a national debate. Some blockades become permanent and weekly demonstrations keep happening for months, but the number of participants soon becomes negligible, except in Paris where some large scale demonstrations still take place until March 2019. In recent years, no protest movement has shaped the French public debate as deeply as the Gilets jaunes and the mobilization remains active online to this day.



### 3.1 Data collection

**Petition.** We collected anonymized data on petition signatories thanks to an agreement with Change.org. The data includes what signatories had entered as their country of residence, city of residence and associated ZIP code. As of October 16, 2019, the petition garnered 1,247,816 signatures in total, including 1,043,337 with a valid ZIP code.

**Blockades.** Following a call for a national blockade of roads made on October 10 and the organization of several local demonstrations, a website ([www.blocage17novembre.fr](http://www.blocage17novembre.fr)) was created to coordinate the actions planned for 11/17. It provided a map of the organized blockades, updated in real time, which we collected in the evening of November 16. This map documents 788 announced blockades in metropolitan France. They all point to precise road infrastructures and include a specific description of the event.<sup>3</sup> Many places were chosen for their potential to block traffic and economic activity. As detailed in Section 6, the main targeted infrastructure was the *roundabout*. However, other infrastructures were targeted such as bridges, malls or highway ramps.

**Facebook.** The main websites that were associated with the organization of the movement (first [blocage17novembre.fr](http://blocage17novembre.fr) and then [gilets-jaunes.com](http://gilets-jaunes.com) as well as [giletsjaunes-coordination.fr](http://giletsjaunes-coordination.fr)) coordinated the demonstrations by listing local dedicated Facebook groups. To document online mobilization, we therefore looked for all Facebook groups related to the movement in the most comprehensive way. Using the methodology of Caren & Gaby (2011), we compiled a list of the Facebook groups that were still active one month after 11/17 by performing numerous search requests using a set of keywords linked to the movement, sometimes associated with location names – see Appendix B.3. For each group, we recorded the name of the group, creation date, number of members, and number of publications. We identify over three thousand groups in total, with over four million members.<sup>4</sup>

Finally, we also collected data on Facebook pages. We started the extraction by retrieving a list of relevant pages. To do so, we used the same method as for Facebook groups, searching manually for pages associated to the same keywords. We identified about 600 pages, and used Netvizz to retrieve their content: posts and their associated comments, interactions (such as likes and shares), and relevant metadata (such as the date and time of each message). This allows us to gather information on a large text corpus, featuring

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<sup>3</sup>Note that these are declarations of an intent to demonstrate. Yet, as the map was created to coordinate the Gilets jaunes' actions, there would have been little incentive to falsely declare an intent to demonstrate.

<sup>4</sup>Some members may belong to several groups.

over 121,000 posts, 2.1 million comments and 21 million interactions – See Tables A.2 and A.3.

**Three measures of online mobilization.** Our three main measures of online mobilization are the number of petition signatories, the number of Facebook group creations, and the number of interactions on Facebook pages. They are depicted as daily time series in Figure 1. Signatures mostly occur before 11/17, during the first wave of group creations. The main episode of group creation takes place the week after 11/17. Discussions on Facebook pages seem to be fairly inactive at the beginning, but they gain in importance in January 2019, and contrary to the other two measures they stay relatively constant during the following months.<sup>5</sup>

## 3.2 Levels of analysis

The movement was organized on several geographical levels, from the nearby blockade to massive demonstrations in the largest cities. We associate each Facebook group with a location by taking advantage of explicit geographical references in the group’s name – see Appendix B.3 for details. By default, we consider that groups target a national audience if their name does not include any geographical reference. Over two-thirds of the groups were associated with a geographical area and more than 40% of the total number of members belonged to these localized groups. Moreover, only 20% of the posts emanate from national groups, which suggests that local groups were the most active ones – See Table A.1.

Our largest scale of analysis is the *département* (department). It is especially useful for the study of Facebook groups, which are largely identified by this well-established and widely-used administrative division of the French territory: for this reason, we think that the definition of a “local group” may extend up to the *département*, which then concerns 2,332 groups out of 3,033.<sup>6</sup> However, more than half of the groups (1,608) are defined at a very local level, using names of counties, cities or blocking points. In Section 4, we will conduct our analysis of the interaction between online and offline mobilizations both *between* and *within* *départements* and show that both levels yield the same results.

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<sup>5</sup>Figure 1 suggests that we may have missed some of the latest groups associated with the second wave of creations. In addition, since we collected information on Facebook pages in 2019, we may be missing out some initially active pages. We use relative measures in order to address this issue in Section 5. Figure A.11 shows that the number of comments per post did not follow any particular trend.

<sup>6</sup>There are 94 *départements* in continental France, most of them created during the French Revolution. We also identify 171 groups related to the highest level of local government, *régions*. Some regions have a strong identity, but many of them are composite and were recently created for administrative purposes.

Other measures of mobilization are available at the ZIP code for Change.org data and the GPS location for blockades. Both can be matched with municipalities, the lowest level of administrative division in France, which allows for very detailed controls. Yet, this level is arguably too fine-grained for our purpose. The median municipality has fewer than 500 inhabitants and organizing a blockades is akin to a coordination problem. It is not useful nor practical to block each municipality. The more efficient strategy may well be to concentrate forces on the most central municipality in the area, which is often the largest. Therefore, we study blockades at a more aggregated scale: the life zone. A life zone is defined by the National Institute of Statistics and Economic Studies (INSEE) as the smallest area where all main services and facilities can be found. In 2019, there were 1,632 life zones in France, 551 of which were affected by a blockade on 11/17 (which corresponds to half of the municipalities). As shown in Figure A.6, blockades were indeed much more frequent in the largest municipality of the life zone, which suggests that they attracted protesters from nearby municipalities. In Section 6 where we assess the impact of blockades on electoral outcomes, we will consider electoral results at the municipal level, but define the treatment (presence of blockades) at the life zone level.

## 4 Interaction between online and offline mobilizations

We first study the dynamic of the movement and the interactions between online and offline activities. To do so, we exploit localized data on Facebook group creations and number of members before and after the start of the blockades, as well as data on the number of signatories on Change.org.<sup>7</sup>

### 4.1 From online to offline...

Table 1 documents the correlation between online and offline mobilizations, at the département level (Panel A) and at the life zone level controlling for département fixed effects (Panel B).<sup>8</sup> As shown in columns (1) and (2), higher online mobilization is indeed associated with more blockades: two more Facebook groups created before 11/17 are associated with one additional blockade in the département and with a 25 p.p. increase in the probability to observe a blockade in the life zone. This points towards the coordination potential offered by Facebook to organize the first day of the Gilets jaunes

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<sup>7</sup>Note that we cannot compute the number of members of Facebook groups prior to the blockades, because we do not know when they joined the group: for this dimension, we focus on groups that were created after the blockade.

<sup>8</sup>The main difference between the two panels lies in the measurement of blockades: it is equal to the total number in Panel A and to a dummy in Panel B.

movement.

Similarly, départements and life zones with more early signatories did witness more blockades. Interestingly, the coefficient associated with total population is no longer positive once we control for the number of signatories (column 2), which tends to show that it is less the size of total population that matters, but rather the size of the mobilized population, which is apparently well proxied by the number of signatories. To summarize, the petition seems to signal a latent potential for mobilization, and Facebook seems to be directly linked with the organization of the blockades.

## 4.2 ...and back to online!

While early online mobilization, both on Facebook and through the petition, seems correlated with offline mobilization, it is also interesting to look at the reverse mechanism, that is, whether the occurrence of a blockade has a lasting impact on online mobilization. As shown in Figure A.10, Google queries “Gilets jaunes Facebook” spike after 11/17. This aspect is documented in columns 3 to 8, where we look at the determinants of later online mobilization, through the number of Facebook groups created after 11/17 (columns 3 and 4), the number of members in these later groups as of mid-December (columns 5 and 6) and the number of later signatories (columns 7 and 8).

One should first note that there is a lot of persistence in the channels of online mobilization: locations with more early Facebook groups witness more group creations after 11/17 and locations with more early signatories have more late signatories (about one more new group or signatory for three early groups or signatories). More interesting is the correlation between the blockades and Facebook activity compared to Change.org: column 4 shows that one additional blockade in the département is associated with 0.4 new Facebook groups, which correspond to over four thousand new members (column 6). At the life zone level, the occurrence of a blockade is associated with 0.2 new Facebook groups and about 90 new members.<sup>9</sup> Conversely, if anything, blocked territories witness lower subsequent activity on Change.org: between 300 and 400 fewer signatories for each additional blockade in the département and about 20 fewer signatories in affected life zones (column 8).

Although this is just correlations, there are compatible with an interpretation whereby offline mobilization has lasting effects on Facebook because the social network acts as an organization device for later protests, contrary the petition: in a sense, the goal of the petition has been met with the blockades. In other words, online mobilization

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<sup>9</sup>As shown in Figures A.8 and A.9, Facebook groups were created all over the country after 11/17, while the distribution of the groups prior to 11/17 was much more dispersed.

on Facebook and offline mobilization are *complements*, while offline mobilization and online mobilization on Change.org are *substitutes*. For different reasons, blockades rapidly subsided following Acte I (see Figure A.5), but thanks to complementarity with Facebook, the movement remained alive. Did this new situation affect the *content* of the online mobilization? We now turn to this question.

## 5 Topical structures of Facebook posts and comments

In order to study the evolution of the movement over time, we uncover latent topical structures of Facebook posts and comments using natural language processing methods (Gentzkow et al., 2019). We document the content of 617 Gilets jaunes Facebook pages, between November 2018 and April 2019. Discussed topics are informative of the evolution of motivations and concerns, as the movement gradually ceased to combine online and offline mobilizations to come back to its purely online origins. We rely on a topic model tailored to the analysis of short text snippets (Demszky et al., 2019) – See Appendix C.1 for details. In our main specification, we allow for 15 different topics (see Table 2).<sup>10</sup> These topics are meaningful and can be interpreted. We group nine of them into four categories: concerns and demands, organization, support, critiques and violence.

Figure 2 plots the evolution of topic categories over time. Interestingly, messages related to organization surge on the week of the first mobilization, but then sharply decrease for the rest of the study period. Messages related to concerns peak in early December, before Macron’s measures to sustain households’ purchasing power, and then sharply decrease. Contrary to organization and concerns, messages related to critiques and violence increase over time, with a peak being reached on the week before the first violent clashes with the police (12/01). Finally, after a sharp increase up to the 11/17, support messages remain relatively stable over the study period, which seems to indicate that support for the movement does not fade away at the intensive margin.

To further investigate the text corpus, we use reactions to posted messages as a proxy for positive and negative sentiment – see Appendix C.3. Consistent with a deterioration of the situation between the government and protesters, negative sentiment increases over the period. This increase is not driven by sadness reactions, but mostly by anger reactions.<sup>11</sup> Given the long-lasting effect of blockades on online activities and the increased anger, we might expect the movement to affect voters’ preferences. However, a focus on election-related words in our text corpus shows that the coming European elections never were

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<sup>10</sup>Table A.4 reports results for 5, 10 and 20 clusters.

<sup>11</sup>Note that this observation may result from all participants becoming angrier over time, or from angry participants becoming more active in the discussions.

a major topic for the Gilets jaunes, even when they were about to take place – See Appendix C.2 for details. In addition, as detailed in Appendix A.1, the movement failed to propose a united list. It is therefore interesting to investigate the consequences of the protests on existing parties, which can be done by taking advantage of our fine-grained data.

## 6 Electoral consequences: the 2019 European Parliament election

We evaluate the impact of the 11/17 blockades on votes for the government’s party LREM during the May 26 European elections.<sup>12</sup> Since both variables are impacted by political sentiment, which is highly elusive, we resort to an instrumental variable strategy based on the local “supply” of easy-to-block locations, which we proxy by the local density of roundabouts.

### 6.1 Empirical strategy

Our unit of observation is the municipality, which allows for very precise controls. Yet, drawing from the observation that blockades were organized at a higher level than the municipality, we measure blockades and local roundabout density at the life zone level. Our econometric specification is the following: our first stage predicts the probability of a blockade in a given life zone as a function of local roundabout density,

$$B_{z(m)} = \gamma_1 + \gamma_2 R_{z(m)} + \gamma_3 X_m + \eta_m, \quad (1)$$

and the second stage estimates the impact of the blockades on the LREM vote share in the 2019 election:

$$LREM_m = \theta_1 + \theta_2 \widehat{B}_{z(m)} + \theta_3 X_m + \zeta_m, \quad (2)$$

where  $LREM_m$  is the LREM vote share in municipality  $m$ ,  $B_{z(m)}$  is a dummy variable set to 1 if there was a blockade in the life zone  $z$  municipality  $m$  is part of,  $R_{z(m)}$  is the density of roundabouts in life zone  $z$  (number of roundabouts per square kilometer), and  $X_m$  is a set of controls at the municipality level (including past election results, occupation and

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<sup>12</sup>The list was called Renaissance and included smaller allied parties. European elections are notoriously difficult for parties of government because their proportional representation system allows for expressive voting.

age structure, commuting patterns, economic and geographic variables, and the signature rate of the Change.org petition before protests started;  $X_m$  also contains dummies for each département) – the full list of controls is given in Appendix D.1.

A valid instrument needs to predict the treatment, to be independent and to affect the outcome of interest only through its effects on the treatment. Regarding the first stage, we use the fact that calls for demonstrations urged protesters to block roundabouts, which by design allow to block several roads at a time and are equipped with a central median strip which is very convenient to set camp on. Therefore, a higher density of roundabouts should have increased the probability of a blockade. Table 3 shows that roundabouts played a very important role in coordinating protests: after controlling for multiple possible confounding factors, we find that increasing the density of roundabouts in a life zone by one standard deviation increases the probability of a blockade by 21 percentage points (when the unconditional probability of a blockade in a life zone is close to 50%).

The history of roundabouts makes it likely that the conditional distribution of local roundabout density is random and reflects idiosyncrasies. Roundabouts are partly a French architectural fad, invented in 1906 by French urban planner Eugène Hénard.<sup>13</sup> While there are plausible reasons related to road safety to support them, they can almost always be replaced with traffic lights. We plot in Figure A.15 the prediction error of roundabout density at the municipality level, after an OLS regression including our controls, which appears to be randomly distributed. In addition, Table A.5 shows the adjusted R-squared of a regression explaining roundabout density with our other covariates, at the life zone level. The correlation between roundabout density and population density is 60%, while our complete specification yields a R-squared equal to 75%. Controlling for 94 département fixed effects only increases the R-squared by 7 p.p., which confirms the very local nature of this variable. Finally, controlling for the main drivers of political mobilization: education structure, political preferences and the petition signature rate, has virtually no impact on the predictive power of the model.

In support for the exclusion restriction and the identification of the impact of the blockades, we perform a placebo test of the impact of the blockades on the vote share for the incumbent government party (Parti Socialiste, PS) in the previous 2014 European elections. Results displayed in Table A.6 confirm null impact of the blockades.

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<sup>13</sup>There are more than sixty-thousand roundabouts in France, which is four times more than the United Kingdom. One third of French municipalities (over 11,000) has at least one roundabout – see Figure A.14 for details.

## 6.2 Results

Results from the estimation of Equations 1 and 2 are displayed in Table 3. *A priori*, we can expect two opposite forces: on the one hand, it is possible that anger associated with the movement spread and decreased the support for the government. On the other hand, there may have been a backlash effect from the silent majority who suffered from the blockades. We first look at the overall impact to see which effect dominates. As shown in column (2) we find that, on average, the backlash effect dominates. Exposing a life zone to a blockade increases its vote share for LREM by 0.4 percentage points (a 1.7% increase relative to the national average). This effect is reminiscent of other historical events, such as the elections following May 1968 in France.<sup>14</sup>

In order to disentangle between the two aforementioned forces, we then perform a heterogeneity analysis, focusing on two dimensions: political preferences and online involvement. Separately estimating the impact of blockades on the subsamples of municipalities with a vote share above and below the median vote share for Macron at the 2017 Presidential election, we find that our baseline effect is driven by municipalities with an already high LREM vote share (column (3)). We do not find any effect on municipalities with a low Macron vote share in 2017 (column (4)). This suggests that the Gilets jaunes movement had a polarizing effect. Even though blockades took place throughout the whole French territory, only a few hundred thousand protesters at most were involved and sympathy for the movement was soon lost among Macron’s supporters.<sup>15</sup> In addition, given the nature of the spatial coordination problem raised by the blockades, some municipalities suffered from being part of a blocked life zone, without participating themselves.

We then look at whether the impact depends on the online involvement, as Section 4 showed that the 11/17 blockades caused a large spike in Facebook group creation. To quantify the increase in online involvement following the blockades, we compute for each département a *Facebook reaction ratio*: the ratio of the number of Gilets jaunes Facebook groups created after 11/17 to the number of groups created before. In départements with a high Facebook reaction ratio, protesters organized themselves online to continue action after 11/17, in particular through online discussions described in Section 5. By doing so, they nurtured their opposition to the government. As expected, we find that the effect of the blockades is only positive in municipalities where this new mode of online dissent

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<sup>14</sup>Following the Grenelle accords concluded on May 27 and the success of a counter-demonstration two days later, De Gaulle dissolved the National Assembly and called for parliamentary elections for June 23. Violence evaporated almost as quickly as it arose, workers went back to their jobs, and the Gaullist party secured an even larger majority – see, e.g., Converse & Pierce (1986).

<sup>15</sup>Weekly opinion polls showed that until the end of December, around 70% of the population supported the movement, including 50% of Macron supporters. However, while support remained pretty high over time (about 50% after six months), a sharp decline in positive opinions emerged in February 2019, especially among Macron’s supporters – see Appendix A.2 for details.



did not take off.

These two dimensions of heterogeneity, which are regularly distributed (see Figures A.16 and A.17), are almost not correlated: at the municipality level, the correlation between the 2017 Macron vote share and the Facebook reaction ratio is 0.06. Therefore, as a final exercise, we estimate the effect on the four subsamples of municipalities defined by crossing these two criteria. In the two intermediate cases, the effect of blockades is not different from zero, which we interpret as a sign that the two effects (revenge of the silent majority and vocal online minority) offset each other (columns (7) and (10)). The positive effect of blockades on pro-Macron municipalities in départements with a low Facebook reaction ratio is three times higher than the average effect. On the contrary, in anti-Macron municipalities where blockades prompted a lot of online involvement, the effect of blockades is negative and significant, to the extent of 0.8p.p.

These results are robust to changes in the scale of analysis, from life zones to consolidated municipalities – see Table A.7.<sup>16</sup> As shown in Table A.8, the effects are also qualitatively unchanged when, instead of the effective LREM vote share, we consider the share of LREM voters in the whole population of potential voters. This measure effectively accounts for two extensive margins: the registration rate and the participation rate, and reinforces our interpretation whereby blockades did push more LREM supporters into voting for LREM, rather than more LREM opponents into abstaining from voting.

## 7 Conclusion

This paper sheds new light on the Gilets jaunes movement by documenting the dynamics and interactions between its online and offline manifestations, and by assessing its impact on electoral results.

The analysis of the determinants of the mobilization in the first months of the movement documents the importance of interactions between online and offline mobilizations. An analysis of a large corpus of online discussions on Facebook pages documents the different phases of the movement and the evolution of demands. Facebook gradually became the main place of mobilization for the Gilets jaunes, and discussions radicalized as the movement subsided in the streets. Finally, exploiting roundabouts' location as an instrument for blockades, the paper provides evidence of a backlash impact on electoral results:

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<sup>16</sup>Consolidated municipalities are less relevant because their boundaries do not always match relevant day-to-day constraints (Tricaud, 2019). However, their total number 1,222 is similar to that of life zones and they depict the same pattern as life zones whereby the main city is more often blocked (see Figure A.7).

blockades boosted the performance of the government party in the 2019 European Parliament election, especially in more government-friendly constituencies. However, this effect was largely mitigated, if not reversed, in places where blockades contributed to further nurturing of online dissent.

While there always was a conflict in urban planning between favoring policing (such as during Haussmann's renovation of Paris in the XIX<sup>th</sup> century) and favoring social contact, car-based urban planning has long stood by the policing side. In that regard, the occupation of roundabouts by the Gilets jaunes represents an ironic turn of events.

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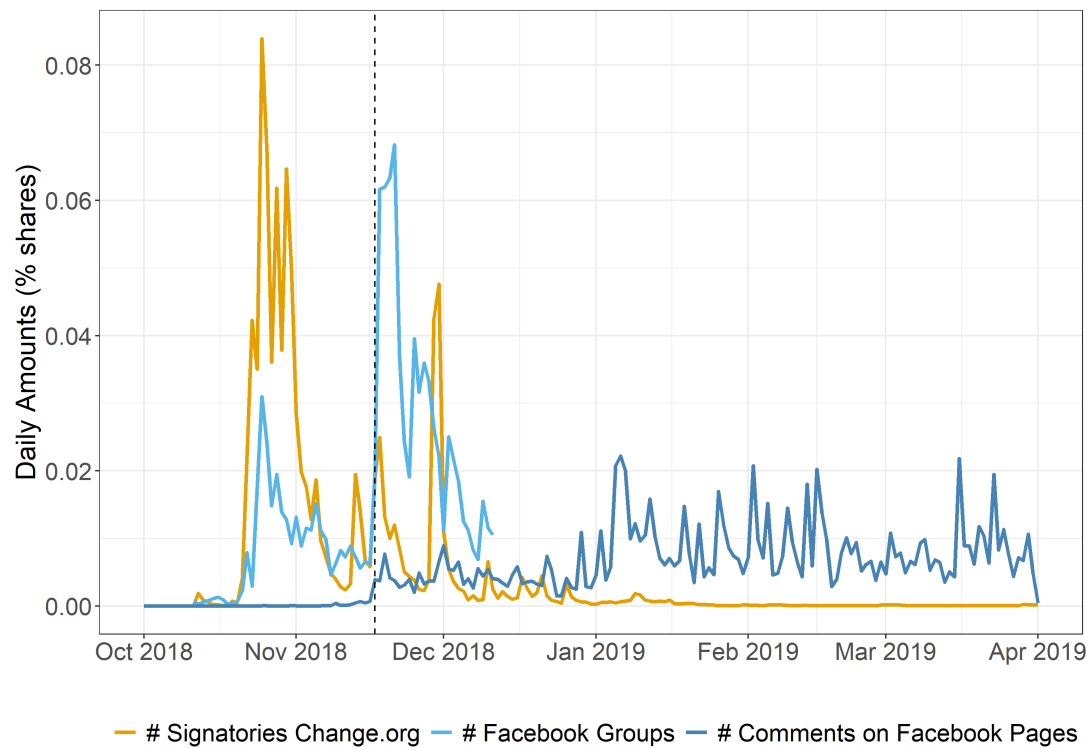
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## Figures and Tables

Figure 1 – Probability distribution of our three measures of online mobilization



**Notes:** Probability distribution of the daily number of signatures (orange), creation of Facebook groups (sky blue) and comments posted on Facebook pages (dark blue). The dashed line corresponds to 11/17.

**Sources:** Facebook.com and Change.org.

Table 1 – Offline-Online interactions at the start of the movement

Panel A: Interactions at the département level

	Number of Blockades on 11/17 (1)	(2)	Groups created after 11/17 (3)	(4)	Members of groups created after 11/17 (5)	(6)	Signatures after 11/17 (7)	(8)
Groups created before 11/17	0.596*** (0.104)	0.535*** (0.106)	0.757*** (0.161)	0.524** (0.176)	0.379** (0.123)	0.146 (0.131)	-0.0398** (0.0131)	-0.0176 (0.0141)
Signatures collected before 11/17		0.592* (0.287)	0.798+ (0.435)	0.540 (0.429)	0.330 (0.334)	0.0732 (0.319)	0.320*** (0.0355)	0.344*** (0.0344)
Number of blockades on 11/17	n.a.	n.a.		0.435** (0.155)		0.434*** (0.115)	(0.0355)	-0.0415** (0.0124)
Population	0.0313** (0.0102)	-0.0235 (0.0284)	0.0265 (0.0430)	0.0367 (0.0416)	0.0211 (0.0330)	0.0313 (0.0309)	0.0177*** (0.00350)	0.0167*** (0.00333)
R-squared	0.475	0.513	0.673	0.712	0.474	0.579	0.952	0.958

Panel B: Interactions at the life zone level, within the same département

	Occurrence of a Blockade on 11/17 (1)	(2)	Groups created after 11/17 (3)	(4)	Members of groups created after 11/17 (5)	(6)	Signatures after 11/17 (7)	(8)
Groups created before 11/17	0.105*** (0.019)	0.124*** (0.018)	0.397*** (0.040)	0.374*** (0.040)	0.099*** (0.028)	0.088** (0.028)	-0.027*** (0.002)	-0.025*** (0.002)
Signatures collected before 11/17		0.403*** (0.044)	0.836*** (0.097)	0.760*** (0.099)	0.500*** (0.068)	0.463*** (0.070)	0.477*** (0.006)	0.485*** (0.006)
Occurrence of a blockade on 11/17	n.a.	n.a.		0.189*** (0.055)		0.091* (0.039)	-0.020*** (0.003)	
Population	0.001*** (0.0002)	-0.003*** (0.0005)	0.003** (0.0010)	0.004*** (0.0010)	0.00003 (0.0007)	0.0003 (0.0007)	0.0003*** (0.0001)	0.0002*** (0.0001)
R-squared	0.185	0.227	0.677	0.679	0.426	0.428	0.987	0.987
Within R-squared	0.110	0.155	0.660	0.663	0.393	0.395	0.986	0.986

**Notes:** Panel A: unit of observation is the département (N=94); Panel B: unit of observation is the life zone (N=1,632), controlling for département fixed effects; Columns (1-2): Number of blockades on 11/17 (Panel A) and existence of a blockade (Panel B); Columns (3-4): Number of Facebook groups created after 11/17; Columns (5-6): Number of members of Facebook groups created after 11/17 (as of mid-December); Columns (7-8): Number of signatures on change.org after 11/17. Number of members, number of signatures and population (from 2016 Census) are divided by 10,000 in Panel A and by 1,000 in Panel B. In Panel A, regional Facebook groups are apportioned to each département by population (results are unchanged if we do not include them). OLS regression, standard errors in parentheses. Significance levels are denoted by +  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

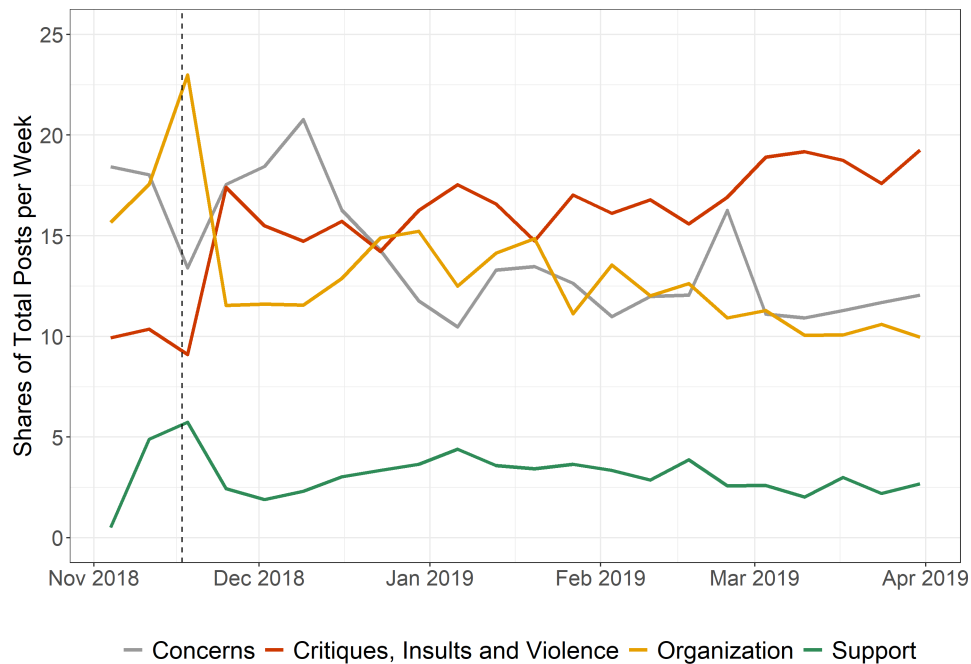
**Sources:** Blockade map, Facebook.com, Change.org and Census.

Table 2 – Results of the Topic Model

Category	Cluster Name	Associated words
Organization	Departements Dates/Places Diffusion	79, 69, 82, 88, 81, 41, 91, 78, millau, 04 jeudi, prevus, nimes, 19, samedi, mercredi, vendredi, paris, lundi, dimanche publier, twitter, diffusee, diffus, diffusion, fiable, diffuse, contenu, diffuser, publiee
Support	Support	bravo, courage, felicitation, soutien, courageux, formidable, super, genial, respect, fier
Demands and Concerns	Demands Concerns	etablir, global, lensemb, promouvoir, fonde, economique, exigence, definir, consequent, existant compenser, remboursement, exoneration, renouvellement, dividende, immobilier, beneficiaire
Critiques and Violence	Politics Police Insults	peuple, asservir, gouvernant, appauvrir, gouvernement, aneantir, destructeur, oligarchie agresseur, honte, honteux, cr, policier, innocent, frapper, flic, tabasser, inadmissible connard, merde, encule, bouffon, conard, crevure, baltringue, saloperie, pd, enculer
Miscellaneous	Socialization Actions Names Names (bis) Objects Foreign Language	bonsoir, coucou, cc, bonjour, bsr, bjr, salut, hello, bonjours, gabin faire, savoir, oui, aller, vouloir, voir, falloir, pouvoir, comprendre, forment dptm, orlane, baude, cottin, pauleau, jaze, ballari, berthoumieux, desforges, elliot fransz, villefrance, czowieka, bontazguillaume, etevenardmaxim, nasl, lecerveaujaun, destek chaussette, bitume, trotinette, trotinette, cendrier, poivre, peintur, saucisson, brosse, whisky played, finiscono, opresore, chiacchiere, sammeln, alzhieimr, gehalten, schafft, assets, schreiben

**Notes:** Associated words are the most central words in the cluster. See Appendix C.1 for details.  
**Source:** Facebook.com

Figure 2 – Evolution of Concerns and Motivations



**Notes:** Weekly shares associated with the four topics of focus (see Table 2 for details).  
The dashed line corresponds to 11/17.

**Source:** Facebook.com.



Table 3 – Effect of the blockades on the 2019 LREM vote share

	OLS (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Blockade dummy	0.0124 (0.0657)	0.418* (0.194)	0.767*** (0.227)	-0.319 (0.232)	0.117 (0.267)	0.957*** (0.250)	0.344 (0.310)	1.315*** (0.287)	-0.773** (0.282)	0.464 (0.323)
<i>Heterogeneity</i>										
Macron vote			High	Low			High	High	Low	Low
Facebook reaction					High	Low	High	Low	High	Low
<i>First stage</i>										
Roundabout density		0.21*** (0.02)	0.19*** (0.01)	0.29*** (0.03)	0.20*** (0.02)	0.22*** (0.03)	0.19*** (0.02)	0.20*** (0.02)	0.27*** (0.03)	0.32*** (0.05)
Signature rate		0.07*** (0.02)	0.07*** (0.02)	0.05 (0.04)	0.03 (0.03)	0.11** (0.04)	0.02 (0.03)	0.14*** (0.04)	0.04 (0.05)	0.07 (0.05)
F-statistic		195.9	227.29	86.33	152.29	62.01	149.45	76.53	73.89	37.36
Observations	31030	31030	15625	15382	15332	15698	7711	7914	7610	7772
Clusters	1629	1629	1532	1384	938	996	841	884	785	839

**Notes:** The dependent variable is the LREM vote share in the 2019 election at the municipality level. We include a simple OLS regression (column 1) along with nine IV regressions, using the density of roundabouts in the life zone as instruments. We define at the département level a Facebook reaction variable which is equal to the ratio of the number of Facebook groups created after Nov 17 to the number of Facebook groups created before Nov 17. We assign a municipality to the high (resp. low) Macron vote group if its vote share for Macron at the 2017 election was over (resp. under the median), and to the high (resp. low) Facebook reaction group when its Facebook reaction was above (resp. below) the median. We include at the bottom of the table estimates of the first stage for two variables: our instrument (the standardized density of roundabouts), and the signature rate of the Change.org petition before Nov 17 (expressed in percentage points). The F-statistic of the first stage is also reported. All controls are at the municipality level (see text) and Département fixed effects are included. Robust standard errors are clustered at the life zone level. Significance levels are denoted by +  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

**Sources:** Blockade map, Facebook.com, Change.org and data described in Appendix D.1.

# Online Appendix

## A Context

### A.1 Chronology of events

**Gas prices, speed limit, and general discontent.** In 2015, then-President François Hollande decided to gradually implement a carbon tax on top of the existing gas tax, in order to make diesel and gasoline after-tax prices converge.<sup>17</sup> The carbon tax was confirmed in 2017 by newly-elected President Emmanuel Macron, even though oil prices had been increasing since 2016 and car-related expenses had been increasing for several years.<sup>18</sup> A few months later, in January 2018, Prime Minister Philippe decided to decrease the speed limit on secondary roads from 90 km/h to 80 km/h, for road safety concerns. This latter decision was not part of Emmanuel Macron’s campaign manifesto and triggered the organization of many slow-downs throughout the country.<sup>19</sup> The new 80 km/h regulation went into effect on July 1, 2018.

By the end of the summer holidays, the yearly increase in the carbon tax was confirmed in the 2019 budget, despite growing discontent,<sup>20</sup> particularly among motorists.<sup>21</sup> A well-known association of car users, “40 millions d’automobilistes” launched the initiative “Coup de Pompe” encouraging everyone to send their gas bill to the President. Several petitions were also launched online to alert the government on the impact of gas prices on purchasing power. Other initiatives started on social networks, including videos totaling millions of views.<sup>22</sup> Although these various individual initiatives were pointing out the

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<sup>17</sup>See Pons & Corsi (2019) for another account of the movement, and Pons (2017) for the French political and economic background preceding the Gilets jaunes.

<sup>18</sup>In 2018, the Automobile Club Association estimated that car-related expenses (including gas, insurance, tolls, fines, technical control) had increased by 3% to 4.6% in a single year; see <https://www.automobile-club.org/espace-presse/communiqués/l-aca-publie-les-resultats-du-budget-de-l-automobiliste-2018>.

<sup>19</sup>See, for example, <http://www.leparisien.fr/societe/vitesse-limitee-a-80-km-h-des-milliers-de-motards-en-colere-contre-la-securite-rentiere-27-01-2018-7526337.php>.

<sup>20</sup>See, for instance, [https://www.lemonde.fr/societe/article/2018/12/05/niveau-de-vie-les-10-graphiques-de-la-colere\\_5392911\\_3224.html](https://www.lemonde.fr/societe/article/2018/12/05/niveau-de-vie-les-10-graphiques-de-la-colere_5392911_3224.html)

<sup>21</sup>See, for example, [https://www.francetvinfo.fr/economie/transports/prix-des-carburants/recit-mobilisation-du-17-November-comment-les-gilets-jaunes-ont-fait-le-plein-pour-bloquer-la-france\\_3030251.html](https://www.francetvinfo.fr/economie/transports/prix-des-carburants/recit-mobilisation-du-17-November-comment-les-gilets-jaunes-ont-fait-le-plein-pour-bloquer-la-france_3030251.html), [https://www.lemonde.fr/les-decodeurs/article/2019/10/22/un-an-apres-retour-sur-les-six-jours-qui-ont-vu-emerger-le-mouvement-des-gilets-jaunes-sur-facebook\\_6016485\\_4355770.html](https://www.lemonde.fr/les-decodeurs/article/2019/10/22/un-an-apres-retour-sur-les-six-jours-qui-ont-vu-emerger-le-mouvement-des-gilets-jaunes-sur-facebook_6016485_4355770.html), or [https://fr.wikinews.org/wiki/Cat%C3%A9gorie:Mouvement\\_des\\_gilets\\_jaunes](https://fr.wikinews.org/wiki/Cat%C3%A9gorie:Mouvement_des_gilets_jaunes).

<sup>22</sup>The video that received the largest audience was uploaded by Jacline Mouraud and totaled 6 million views by the end of year 2018; see <https://www.facebook.com/J.Mouraud/videos/10218147874947841/>

same discontent, they apparently failed to coordinate and gain momentum.

**The Seine-et-Marne cluster.** On October 12, a local newspaper of the Seine-et-Marne département (in the Greater Paris area) reported of a petition launched by a local motorist, Priscilla Ludosky.<sup>23</sup> The petition was initially launched in May 2018 on the platform Change.org<sup>24</sup> and had garnered fewer than 1,000 signatures by the time of the article. In Figure A.2, we plot the daily time series of signatories in each département. The first sharp increase represents the impact of the Press article on the number of signatures in Seine-et-Marne: the number of signatories went from less than 1,000 to 12,000 in one day.

Meanwhile, an association of car users called “Muster Crew” was planning to block the Parisian ring road to protest against the increase in compulsory car-related expenses.<sup>25</sup> The protest was scheduled on November 17. Eric Drouet, a Seine-et-Marne resident, was the leader of this initiative. He shared the Press article about Ludosky’s petition on the Facebook account of his association.

**The movement goes national.** On October 21, *Le Parisien*, a national newspaper, wrote an article about the petition, where it was explicitly linked with the planned blockade.<sup>26</sup> The petition was then reported everywhere and within five days, the number of signatures skyrocketed. By November 16, it had reached 724,225. The call for a mobilization on 11/17 started to generate interest on the Internet, where several videos were posted, mostly on Facebook or YouTube, to urge people to join the movement. A video published by Frank Buhler, from the southern département of Tarn-et-Garonne, soon became viral, with 4.7 million views.<sup>27</sup> On October 24, Ghislain Coutard, from the southern city of Narbonne, suggested that supporters should put their high-visibility vest under their windshield as a rallying sign.<sup>28</sup> This vest has been mandatory in cars since 2008 and is called a “*gilet jaune*” in French. The large audience of both the petition and the call to block the Parisian ring rapidly prompted people to plan their own local events for 11/17.

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<sup>23</sup>See [https://actu.fr/ile-de-france/savigny-le-temple\\_77445/seine-marne-une-habitante-savigny-temple-lance-une-petition-contre-prix-lessence\\_19032915.html](https://actu.fr/ile-de-france/savigny-le-temple_77445/seine-marne-une-habitante-savigny-temple-lance-une-petition-contre-prix-lessence_19032915.html).

<sup>24</sup>See <https://www.change.org/p/pour-une-baisse-des-prix-%C3%A0-la-pompe-essence-diesel>.

<sup>25</sup>Note that group’s name and members have changed since the initial announcement of the event; see <https://www.facebook.com/pages/category/Nonprofit-Organization/Blocage-National-Contre-La-Hausse-Du-Prix-Du-Carburant-195576681346661/>.

<sup>26</sup>See <http://www.leparisien.fr/economie/consommation/sa-petition-contre-la-hausse-des-carburants-fait-le-plein-21-10-2018-7924635.php>.

<sup>27</sup>See [https://www.facebook.com/PourNotrePatriePatriosphereInfo/posts/2219587064971757?\\_\\_tn\\_\\_=-R](https://www.facebook.com/PourNotrePatriePatriosphereInfo/posts/2219587064971757?__tn__=-R).

<sup>28</sup>See <https://www.facebook.com/ghislain.coutard/videos/10216601170797079/>.

A website ([www.blocage17novembre.fr](http://www.blocage17novembre.fr)) was created to coordinate the mobilization. It provided a map of the organized blockades, updated in real time. As of November 16, the map gathered 788 blockades. A lot of places were chosen for their potential to block traffic and economic activity, but the main targeted infrastructure was the roundabout (*rond-point* in French). Some large cities had multiple blocking points, for example one in the city center and another one in the outskirts, close to a shopping mall. The demonstrators wore the gilet jaune, giving the movement a strong visual identity. Many blockades took place in areas with no history of demonstration. In the absence of a national coordination, police officers simply recorded undeclared demonstrations and reported traffic violations. The Ministry of Interior reported that about 300,000 demonstrators had participated to the first Saturday of action.<sup>29</sup> The success of this day fostered the planning of following events, subsequently referred to as “Acts”, on both existing and new Facebook groups.

**A month of major mobilization.** The first Act was the peak of the offline mobilization, and was followed by a steady decrease in participation for every Saturday following 11/17 (see Figure A.5). The Ministry of Interior reported an important number of law violations in low-density areas and small cities during the first Saturday of protest (InterStat, 2019). However, on December 1, violence reached a climax around the symbolic round-about of the Arc de Triomphe in Paris and in some mid-sized cities, with substantial material damage. The Puy-en-Velay prefecture was partially burned down.<sup>30</sup>

The events of December 1 received considerable media coverage. As shown in Figure 1, almost nobody signs the Change.org petition afterwards. On December 8, police tanks were mobilized, the Élysée Palace was reinforced by steel fences and 2,000 people were arrested by the police as a precaution.<sup>31</sup> Two days later, Emmanuel Macron announced a 10-billion euros plan<sup>32</sup> and the organization of a national debate (“Grand Débat National”) to give protesters an opportunity to express their concerns. The following Act of the Gilets jaunes was very calm and violence decreased sharply during the holidays. In parallel with street demonstrations, some roundabouts were transformed into permanent camps. During the first two months of the movement, 10 people died, mostly while attempting to block traffic.<sup>33</sup> Many demonstrators were critically injured and international observers

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<sup>29</sup>“France Police - Policiers en colère” (a police association supporting the movement) reported over a million of protesters.

<sup>30</sup>For a brief summary of events, see <https://www.lefigaro.fr/actualite-france/2018/12/01/01016-20181201LIVWW00026-en-direct-gilets-jaunes-un-nouveau-samedi-de-manifestations-en-france-et-sur-les-champs-elysees.php> and [https://fr.wikinews.org/wiki/Gilets\\_jaunes:\\_samedi\\_1er\\_d%C3%A9cembre\\_2018](https://fr.wikinews.org/wiki/Gilets_jaunes:_samedi_1er_d%C3%A9cembre_2018).

<sup>31</sup>See [https://fr.wikinews.org/wiki/Gilets\\_jaunes:\\_samedi\\_8\\_d%C3%A9cembre\\_2018](https://fr.wikinews.org/wiki/Gilets_jaunes:_samedi_8_d%C3%A9cembre_2018).

<sup>32</sup>See [http://www.assemblee-nationale.fr/dyn/15/dossiers/mesures\\_urgence\\_economiques\\_sociales?etape=15-PROM](http://www.assemblee-nationale.fr/dyn/15/dossiers/mesures_urgence_economiques_sociales?etape=15-PROM).

<sup>33</sup>See <http://www.leparisien.fr/faits-divers/gilets-jaunes-dix-morts-le-lourd-bilan-d-un-mouvement-tres-accidentogene-22-12-2018-7975038.php>.

alarmed the French government about this unprecedented situation.<sup>34</sup>

**Follow-up and decline of the movement.** After the holidays, the government decided to evacuate the remaining camps on the roundabouts and protesters concentrated in large cities, where their number was much lower than during the first month, despite a temporary increase on January 12. Impressed by the political impact of the movement, labor unions had started supporting the mobilization at the end of 2018, and offered to supervise the organization of the demonstrations, in the absence of a clear organizational structure. However, since the beginning of the movement, participants were rejecting the idea of having a leader or a spokesperson. This feature made it particularly difficult for the government to negotiate and put a clear end to the protest.<sup>35</sup>

Since the beginning of the movement, demands and composition of the protesters had evolved. Initially fueled by anger against fiscal reforms, the movement progressively became a full-blown protest against the government and the political class. Concerns related to direct democracy and parliamentary oversight emerged and received some support. On January 15, the government launched the Grand Débat, the purpose of which was to collect grievances on four broad topics, proposed by Emmanuel Macron: taxes, ecology, democracy and public services.<sup>36</sup> Some Gilets jaunes reacted by launching an alternative platform with their own debate called *Vrai Débat* (literally, “True Debate”). The Grand Débat ended on March 15. The next day, an unauthorized demonstration on the Champs Elysées led to major acts of vandalism, including the burning of a famous restaurant (the Fouquet’s) and the ransacking of many luxury stores. However, this surge was short-lived and the next Saturdays were pretty quiet. On April 25, Emmanuel Macron held a press conference following up on the Grand Débat and, among other proposals, announced a reduction of the income tax and the re-indexing of small pensions to inflation.

In the following months, symbolic actions tended to replace weekly demonstrations and often targeted Emmanuel Macron’s public appearances.<sup>37</sup> At the end of the year, some Gilets jaunes took active part in the demonstrations against the pension reform.<sup>38</sup> The

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<sup>34</sup>See <https://www.amnesty.fr/liberte-d-expression/actualites/usage-excessif-de-la-force-lors-des-manifestations>, [https://www.europarl.europa.eu/doceo/document/TA-8-2019-0127\\_EN.pdf?redirect](https://www.europarl.europa.eu/doceo/document/TA-8-2019-0127_EN.pdf?redirect) and <https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=24166&LangID=E>.

<sup>35</sup>A branch of the Gilets jaunes was seeking for a more structured movement and created the so-called “Assembly of the Assemblies” (*Assemblée des Assemblées* in French), which brought together representatives from dozens of delegations, without major result.

<sup>36</sup>See <https://www.elysee.fr/emmanuel-macron/2019/01/13/lettre-aux-francais>.

<sup>37</sup>See <http://www.leparisien.fr/economie/14-juillet-des-gilets-jaunes-sur-les-champs-elysees-drouet-nicolas-et-rodrigues-interpelles-14-07-2019-8116374.php> and <https://www.lefigaro.fr/actualite-france/eric-drouet-evacue-du-salon-de-l-agriculture-lors-de-la-visite-de-macron-20200222>.

<sup>38</sup>See <https://www.lefigaro.fr/actualite-france/reforme-des-retraites-syndicats-et>

movement is active to this day, as shown by several unauthorized protests during the Covid-19 lockdown, where yellow vests were used as breathing masks.<sup>39</sup>

**The 2019 European Parliament election.** The European election campaign kicked off at the beginning of 2019, but it did not seem to generate a lot of interest among the *Gilets jaunes*. Since its inception, the movement had been reluctant to transform into a more classical political organization. On November 29 2018, some members had released an official statement announcing that based on a survey of about 30,000 members, they could bring forward 42 requests.<sup>40</sup> Most demands aimed at increasing the purchasing power of the middle class. The Prime Minister accepted to meet delegates of the movement. However, after those delegates began receiving threats from other protesters who wanted to avoid association with the government, the meeting was canceled.<sup>41</sup>

In December 2018, isolated members had announced their intent to run in the election.<sup>42</sup> On January 23, a list led by Ingrid Levavasseur, a popular figure of the movement was announced, but was met with skepticism by many *Gilets jaunes*. In early February, a controversial meeting between members of the list and Luigi Di Maio (Deputy Prime Minister of Italy and leader of the Italian Five Star Movement) triggered the dislocation of this list and on March 11, Levavasseur gave up on presenting a list.<sup>43</sup> Another popular figure, Jacline Mouraud, had launched a political party on January 27 but she wanted to bypass the European elections and focus instead on the 2020 Municipal elections.<sup>44</sup>

The election took place on May 26 and resulted in Marine Le Pen's far-right party (RN) and Emmanuel Macron's centrist party (LREM) both gaining a large share of the votes (respectively, 23% and 22%). The election was very damaging to the traditional right-wing party (LR), which only received 8% of the votes, a decrease by 12 p.p. compared to the score of the party's candidate in the 2017 Presidential election, and to the main far-left party (LFI), which received 6% of the votes against almost 20% two years before. The two lists making explicit reference to the *Gilets jaunes* collected less than 1% of the votes. By that time, imitation *Gilets jaunes* protests had spread to about 25 other

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[gilets-jaunes-manifestent-en-france-des-tensions-a-paris-20191228](#).

<sup>39</sup>See <https://www.20minutes.fr/societe/2780391-20200516-deconfinement-quelques-centaines-gilets-jaunes-bravent-interdiction-manifester>.

<sup>40</sup>See <https://www.nouvelobs.com/politique/20181129.0BS6307/gilets-jaunes-on-a-decortique-chacune-des-42-revendications-du-mouvement.html>.

<sup>41</sup>See <https://www.lefigaro.fr/politique/2018/12/03/01002-20181203ARTFIG00334-une-delegation-de-gilets-jaunes-renonce-a-sa-reunion-a-matignon.php>.

<sup>42</sup>See [https://en.wikipedia.org/wiki/2019\\_European\\_Parliament\\_election\\_in\\_France#cite\\_ref-314](https://en.wikipedia.org/wiki/2019_European_Parliament_election_in_France#cite_ref-314).

<sup>43</sup>See <https://www.rtl.fr/actu/politique/gilets-jaunes-ingrid-levavasseur-renonce-a-presente-une-liste-aux-europeennes-7797179696>.

<sup>44</sup>See <https://www.ouest-france.fr/elections/europeennes/europeennes-pas-de-liste-pour-les-emergents-le-parti-de-la-gilet-jaune-jaceline-mouraud-6198416>.

countries.<sup>45</sup>

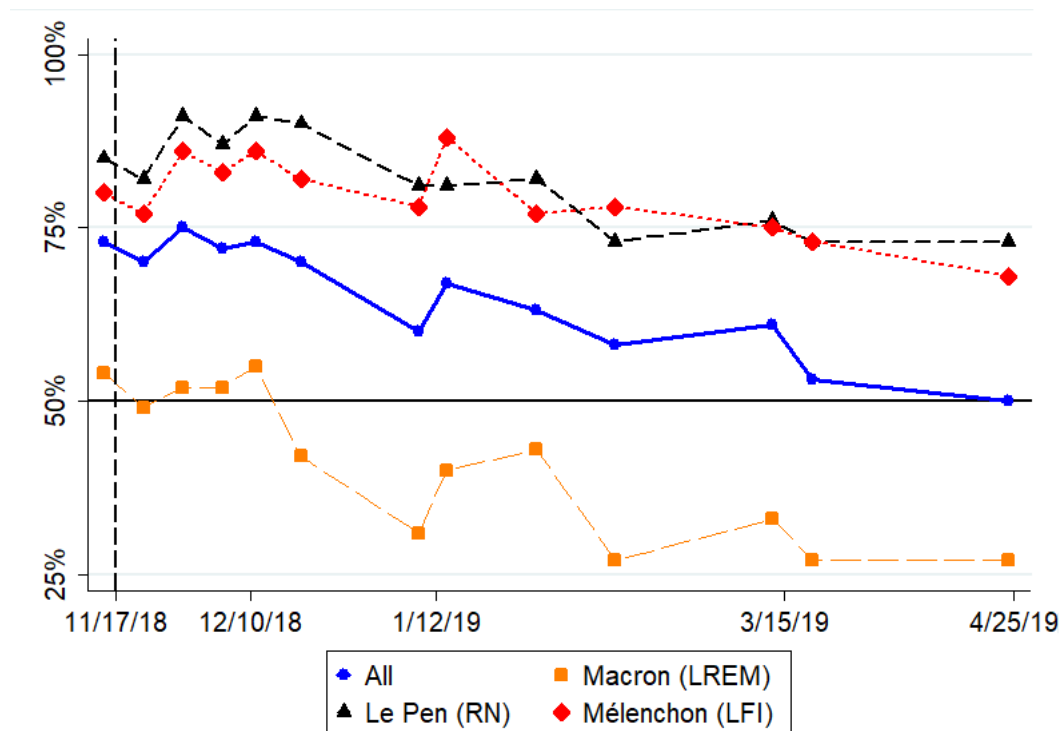
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<sup>45</sup>See <https://www.euronews.com/2018/12/05/gilets-jaunes-which-other-countries-has-the-french-protest-movementspread-to>.

## A.2 Polls on the evolution of support for the movement

We report here polling results on the evolution of support for the Gilets jaunes movement. Data comes from ELABE, a polling institute which conducted several polls between November 2018 and April 2019 for the news Channel BFMTV.<sup>46</sup>

Figure A.1 – Evolution of the support for the Gilets jaunes



**Notes:** Share of respondents who declare they are supportive or sympathetic to the Gilets jaunes movement, according to their votes in the first round of the 2017 presidential election. The solid blue line corresponds to the full sample; dashed lines correspond to subsamples who have voted for Le Pen (far-right, in black), for Mélenchon (far-left, in red) and for Macron (orange). Sample size is between 980 and 1,010 for the full sample and around 200 for each of the three subsamples. Confidence intervals are not reported. The vertical dashed line corresponds to 11/17.

**Source:** ELABE, polls from 11/14/2018, 11/21/2018, 11/28/2018, 12/5/2018, 12/11/2018, 12/19/2018, 1/9/2019, 1/14/2019, 2/13/2019, 3/13/2019, 3/20/2019 and 4/24/2019.

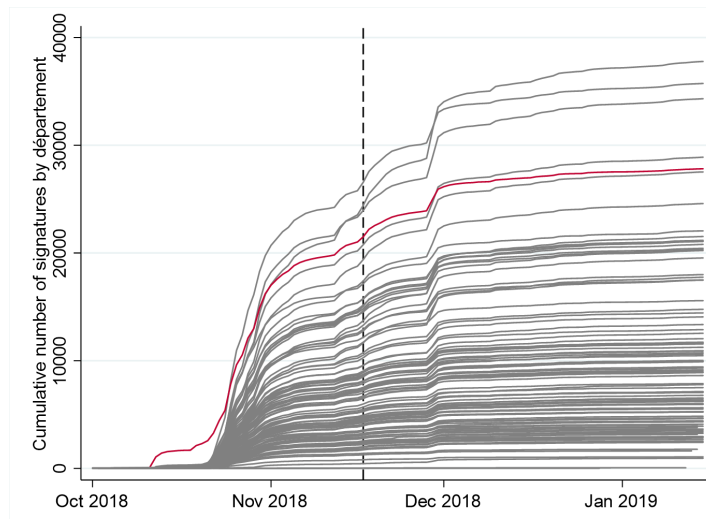
<sup>46</sup>Other institutes, such as ODOXA, IFOP or OPINIONWAY also conducted polls, with similar results, as can be seen on the dedicated Wikipedia page ([https://fr.wikipedia.org/wiki/Mouvement\\_des\\_Gilets\\_jaunes](https://fr.wikipedia.org/wiki/Mouvement_des_Gilets_jaunes)).



## B Data

### B.1 Change.org

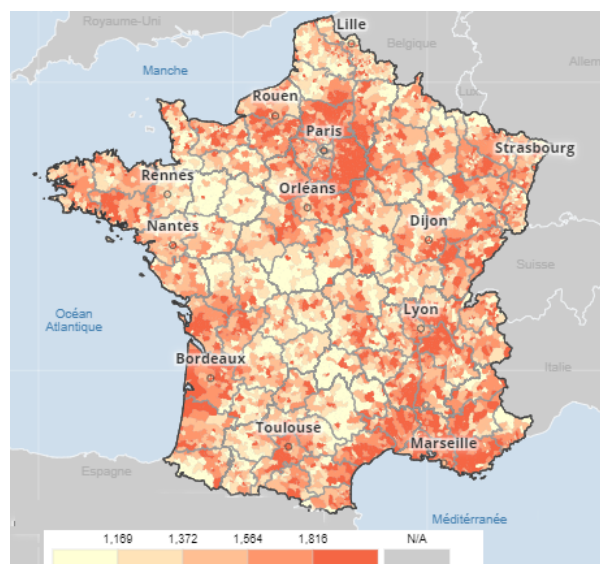
Figure A.2 – Cumulative distribution of petition signatories, by département



**Notes:** The first département to take off is Seine-et-Marne (in red), where the petition initiator lived and where the local newspaper wrote the first article on 10/12. The national newspaper which reported the story did so on 10/21. The dashed line corresponds to 11/17.

**Sources:** Change.org.

Figure A.3 – Map of the share of petition signatories, by municipality

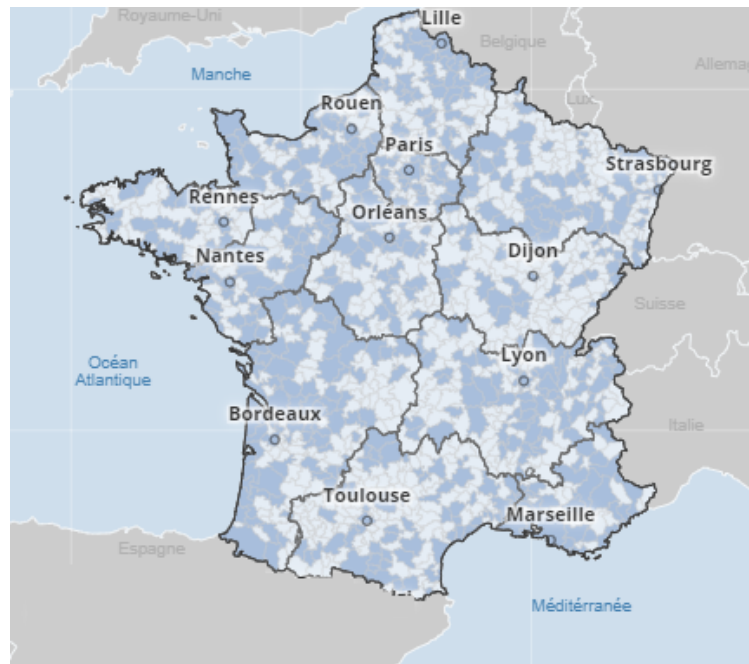


**Notes:** Signature rate at the municipality level.

**Sources:** Change.org.

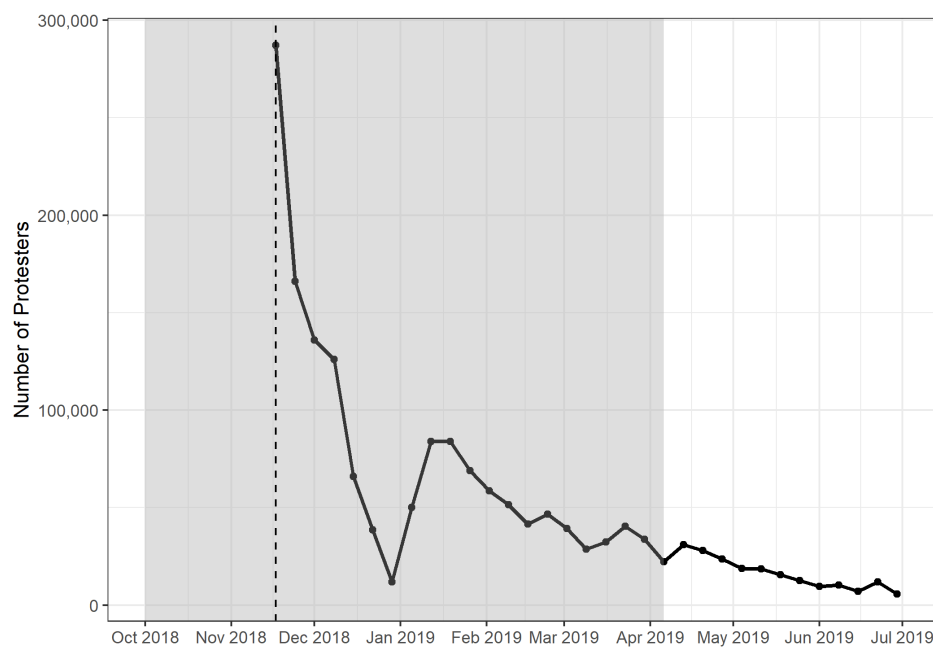
## B.2 Blockades and protests

Figure A.4 – Blocking half of France at first try



**Notes:** Darker areas are consolidated municipalities affected by a blockade on 11/17.  
**Sources:** Blockade map.

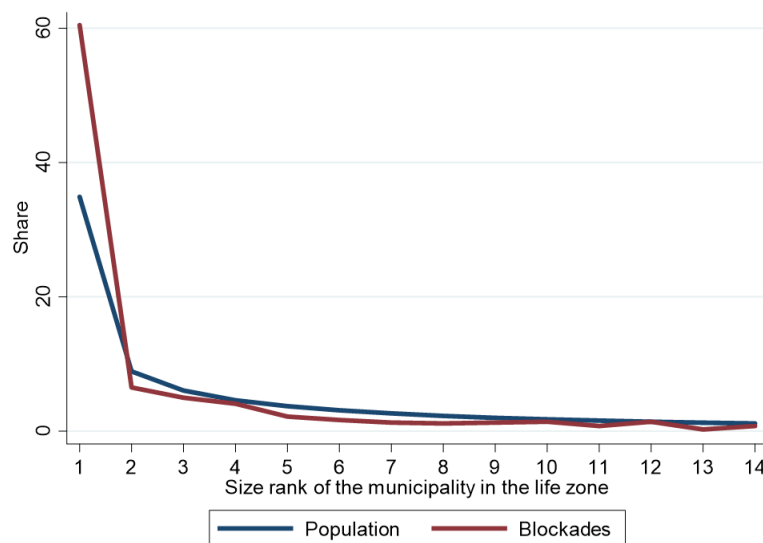
Figure A.5 – The quick disappearance of offline protests



**Notes:** The grey area corresponds to the period of our data. The dashed line corresponds to 11/17.  
**Sources:** Ministry of the Interior.

**The main city blockade premium** We rank municipalities in each life zone according to their size. For each rank, we then find the proportion of the population living in municipalities of this rank, and the proportion of blockades organized in these municipalities: 60% of the blockades took place in the main cities, where only 36% of the population lives. This premium is only observed for municipalities ranked first. We also run the same exercise for consolidated municipalities (EPCIs), which serve as an alternative level of spatial analysis.

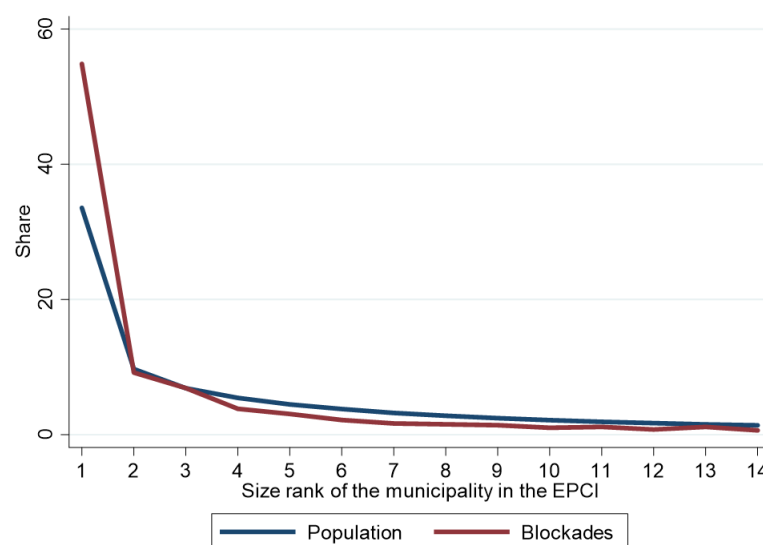
Figure A.6 – Blockades and city rank within life zones



**Notes:** Probability to observe a blockade and population share by population rank of each municipality in affected life zones.

**Sources:** Blockade map and Census.

Figure A.7 – Blockades and city rank within consolidated municipalities



**Notes:** Probability to observe a blockade and population share by population rank of each municipality in affected EPCIs.

**Sources:** Blockade map and Census.

## B.3 Facebook

Because of the limitations of the Facebook API, we had to look for groups and pages manually, between December 12 and December 15, 2018 for groups and between March 21 and March 23, 2019 for pages. We used Netvizz to retrieve content between April 2 and April 10, 2019.

**Geocoding of Facebook groups.** In their names, most Facebook groups mention a geographic area. We geolocate them relying on a character-based matching method. We use two data sources: a database of French localities, and a list containing the names of all Facebook groups we documented. We proceed in four steps:

1. **Preprocessing** – We remove from the text accents, punctuation and lowercase all characters. In French, it is common to replace some words with an abbreviation (‘saint’ becomes ‘st’, ‘sainte’ becomes ‘ste’). We replace all abbreviations relating to ‘saint’ and ‘sainte’ by their associated full-length word. After manual inspection, we also remove from the matching misleading numbers and commune names.<sup>47</sup>
2. **Matching** – For each Facebook group, we list all names of municipalities, départements, regions, as well as all the administrative geographic identifiers that appear in the group name.
3. **Choice of the best candidate** – We prefer complete names matched over geographic numeric identifiers, and we prefer matches at the most fine-grained geographic level. If several cities appear in the name of the Facebook group, we take the longest match (in terms of characters in the string).<sup>48</sup>
4. **Manual check** – We conduct manual check and adjustment for mismatching or unmatched, as some names were for instance the name of inhabitants instead of the name of the location or some major infrastructure like “Pont de Nomandie”.

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<sup>47</sup>We remove the following tokens: ‘loire’, ‘contre’, ‘azur’, ‘pont’, ‘grand’. We also remove 11, 17 and 18 as these numbers generally refer to the date of the first mobilization and not a geographic area.

<sup>48</sup>This simple rule largely reduces the number of false positives. Note also that, as multiple cities may have the same name, we consider a version of the matching where we drop all homonyms, and a version of the matching in which we associate the Facebook group to the most populated city.

Table A.1 – Characteristics of Facebook groups

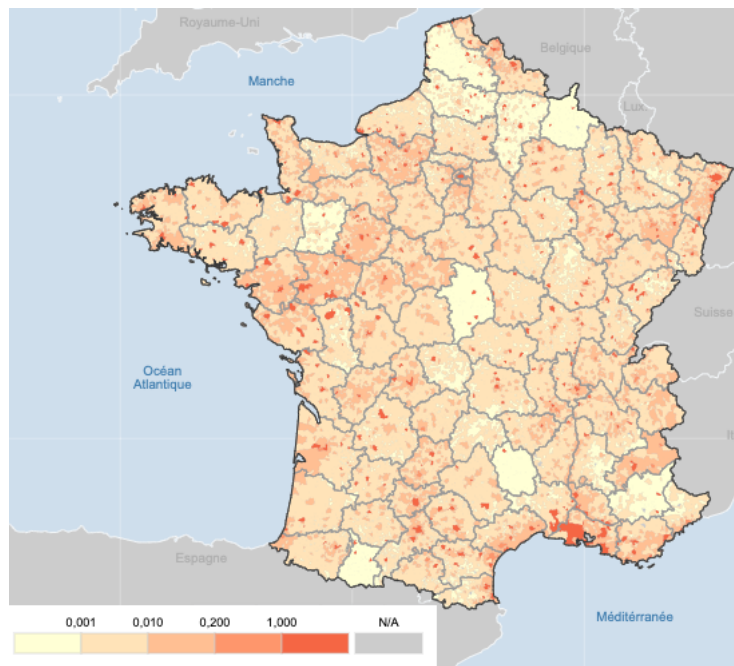
<b>Targeted Audience</b>	<b>Groups</b>	<b>Members</b>	<b>Publications</b>
<b>National</b>	520 (64%)	2,381,562	264,034
<b>Regional</b>	171 (81%)	249,516	138,367
<b>Departemental</b>	724 (81%)	528,500	336,437
<b>Local</b>	1,608 (65%)	949,342	714,882
<b>Total</b>	3,033 (70%)	4,109,325	1,453,878

**Notes:** Number of groups (in parentheses, share of the number of groups created after 11/17), Number of members and Number of Publications (this number is capped to 10,000 publications per group by Facebook). Total includes 10 “foreign” groups, 9 of which created after 11/17, including 405 members and associated with 158 publications.

**Sources:** Facebook.com

## Interaction between online and offline mobilization

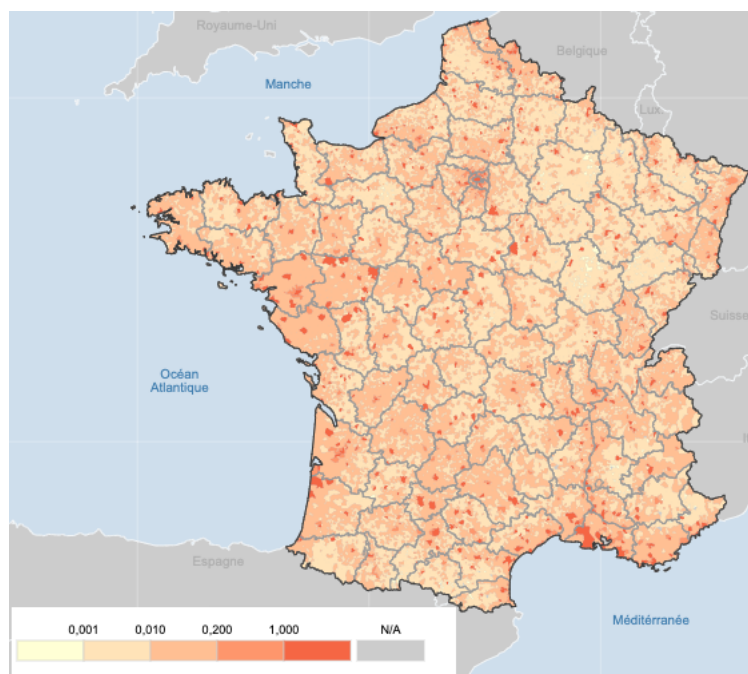
Figure A.8 – Facebook groups created before 11/17



**Notes:** Number of Facebook groups created before 11/17, per municipality. Groups of higher layers are apportioned with respect to population.

**Sources:** Facebook.com.

Figure A.9 – Facebook groups created after 11/17

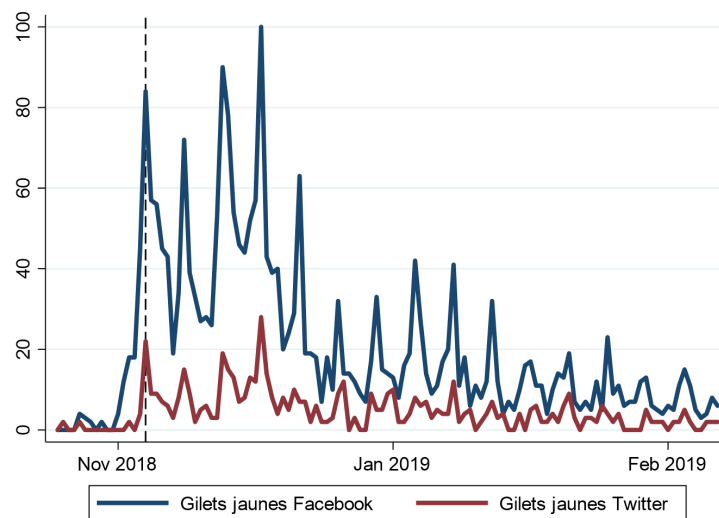


**Notes:** Number of Facebook groups created after 11/17, per municipality. Groups of higher layers are apportioned with respect to population.

**Sources:** Facebook.com.

## Blockades and interest for Facebook groups.

Figure A.10 – Evolution of Google searches

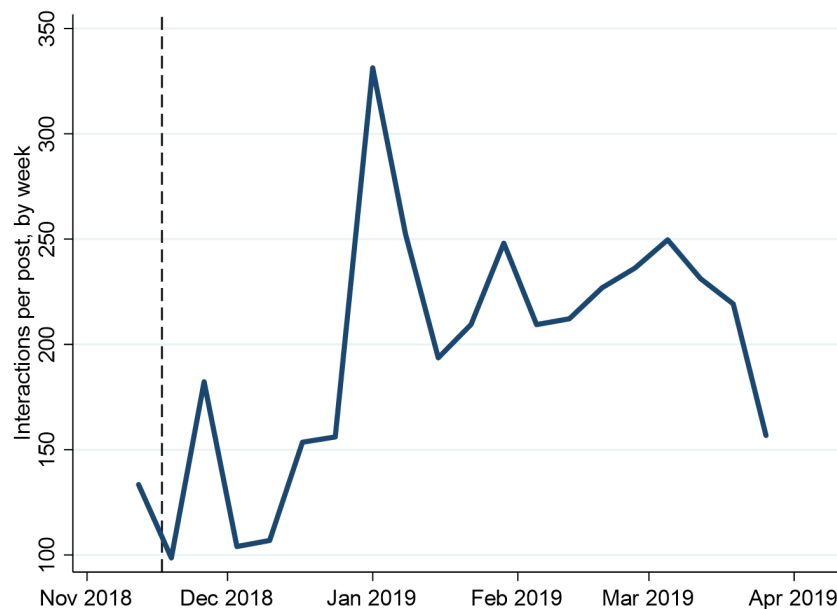


**Notes:** Index of Google Search intensity for the keywords “Gilets jaunes Facebook” and “Gilets jaunes Twitter”. The dashed line corresponds to 11/17.

**Sources:** Google Trends.

## Evolution of interactions on Facebook pages.

Figure A.11 – Number of interactions per post on Facebook pages



**Notes:** Weekly average number of likes, reactions, shares and comments associated with a single post on a Facebook page. The dashed line corresponds to 11/17.

**Sources:** Facebook.com.

**Additional details on Facebook pages.** Contrary to groups, Facebook pages, which are public, have been more used to share stories about the protests, videos and political contents. As shown in Table A.2, posts can be separated into four types: *Statuses* (messages posted by users, without any additional content), *Links* (either to other Facebook posts or to external content), *Photos* (mostly, caricatures or texts incorporated in a picture, such as quotes and jokes) and *Videos* (mostly, of the ongoing protests and video selfies of protesters commenting the movement):

Table A.2 – Posts types in our dataset

Type of message	Number of posts	%
Status	31,541	26.0
Link	30,391	25.1
Photo	29,934	24.7
Video	29,248	24.1
Total	121,114	100

**Notes:** Facebook classifies posts into statuses (text content), images, videos (directly uploaded to Facebook, including live streams) and links (which correspond to contents external to Facebook shared on the platform, e.g. news articles, petitions, external videos...).

**Sources:** Facebook.com

We retrieved the domain name of each shared link. Table A.3 lists the 13 most-linked domains. A substantial number of links come from self-mediation of the movement by the yellow vests themselves, with *Gilets jaunes actu*.

Table A.3 – The 13 most-shared domain names

Link domain	Links	Shares	Comments	Reactions	Likes	Type
youtube.com	6,669	29,034	8,442	49,249	32,390	video
francetvinfo.fr	1,249	25,512	7,898	34,566	14,466	national tv news
gilets-jaunes-actu.fr	766	102	55	478	323	gilets jaunes media
ouest-france.fr	688	24,218	4,608	29,718	17,799	regional newspaper
lemonde.fr	625	46,895	6,973	42,285	18,911	national newspaper
francais.rt.com	590	22,123	5,824	30,898	15,699	online news
france3-regions.	560	37,470	4,892	32,757	16,363	regional tv
bfmtv.com	553	36,455	10,309	40,782	19,483	national tv news
20minutes.fr	545	38,528	8,164	37,883	15,958	free newspaper
mesopinions.com	542	11,064	3,434	14,063	10,893	petition
lefigaro.fr	488	31,051	8,716	32,895	13,446	national newspaper
l.leparisien.fr	434	20,921	6,876	25,642	9,305	national newspaper
francebleu.fr	407	25,322	3,650	23,460	12,371	regional radio

**Notes:** We extracted in each post links to external content, and retrieved the domain name associated with each link. For each domain name, we show the total number of links to this domain name contained in the posts of our dataset, the total number of times these posts were shared, the total number of comments, reactions and likes to these posts. We also provide a brief description of each domain.

**Sources:** Facebook.com.



# C Topical structures of Facebook posts and comments using natural language processing

## C.1 Methodology

We use with a corpus of Facebook posts and comments. We first remove emojis, links, accents, punctuation, Facebook notifications (e.g., "Gilets jaunes changed their profile picture") and stopwords. We also lower-case the text and lemmatize words. We choose to work at the unigram-level.

We then produce word embeddings for the corpus and represent each sentence as a vector in the embedding space. We train a Word2Vec model using Gensim's implementation, with moving windows of eight tokens and ten iterations of training. Following Arora et al. (2017), we build sentence embeddings as the weighted average of the constituent word vectors, where the weights are smoothed inverse term frequencies (to assign higher weights to rare/distinctive words).

The resulting embeddings are useful because they can be used for interpretable dimension reduction. We use vector clustering in the embedding space for this purpose. The goal is to have different clusters for different topics in the text. We rely on the K-Means algorithm, and use the ten closest words to the cluster centroids to label topics. We also considered alternative labeling options, such as term frequency - inverse cluster frequency, which also work well and led to similar human interpretations of topics.

Note that some sentences may be very distant from any centroid. As K-Means assigns every vector to a cluster, they could be forcefully assigned to an irrelevant topic. To limit false assignments, we manually inspect topic coherence and choose a maximum distance to the centroid accordingly. If a sentence embedding is further away from the centroid than this threshold, it is labeled as noise. Results are left unchanged even when forcefully assigning all sentences to a cluster.

Table A.4 – Results of the Topic Model for alternative numbers of clusters

Panel 1: Results of the Topic Model for 5 clusters

Associated words
pouvoir, global, consequent, promouvoir, economique, politique, potentiel, contrainte, contribue, devoir connard, merde, flic, putain, saloperie, mec, encule, honte, con, batard devam, pdblucas, sevina, annen, vernerey, muncind, foamea, katalyna, fransz, dello nimes, nante, chambery, 08, 04, lorient, alentour, valence, 05, brest bravo, courage, soutien, felicitacion, super, genial, formidable, bonsoir, bisous, gabin

Panel 2: Results of the Topic Model for 10 clusters

Associated words
faire, voir, savoir, vouloir, aller, pouvoir, falloir, oui, comprendre, forcement compenser, renouvellement, remboursement, immobilier, renovation, paiement, annuel, reduction, exoneration, beneficiaire pourriture, honte, connard, saloperie, crevure, pourritur, ordure, salopard, merde, salaud bonsoir, bonjour, live, messenger, mp, gabin, contacte, communiquer, contactez, telegram played, finiscono, chanuka, chiacchiere, sammeln, opresore, killthecops, belastingbetaler, sabir, jvienne bravo, courage, felicitacion, soutien, courageux, formidable, genial, super, lache, fier devam, karel, vernerey, fransz, pdblucas, annen, yada, meyko, katalyna, esin promouvoir, democratique, global, economique, institutionnel, gouvernance, exigence, fonde, politique, rejet chaussette, bitume, trotinette, trotinette, attrape, fume, petard, gazeuse, brosse, dedan millau, 08, chambery, lorient, nimes, 69, 94, 41, 82

Panel 3: Results of the Topic Model for 20 clusters

Associated words
mondialiste, asservir, peuple, oligarchie, caste, dirigeant, gouvernement, mondialisme, apatride, dictat bonsoir, coucou, cc, bonjour, bsr, hello, salut, bjr, gabin, bonjours faire, savoir, pouvoir, vouloir, comprendre, aller, falloir, voir, forcement, devoir cendrier, trepieds, rechaud, whisky, detendeur, poivre, saucisson, coussin, chips, enrouler courage, lacher, unir, lacherer, vaincre, determination, fier, abandonner, lache, solidaire connard, crevure, encule, pourritur, conard, saloperie, pourriture, merde, salope, batard compenser, remboursement, exoneration, dividende, renouvellement, beneficiaire, reduction, immobilier, taxation, paiement honte, honteux, lamentable, ecoeurer, ignoble, inadmissible, hont, honteux, inhumain, horrible dptm, orlane, baude, cottin, pauleau, jaze, ballari, berthoumieux, desforges, elliot fransz, villefrance, czowieka, bontazguillaume, etevenardmaxim, lauraguai, lecerveaujaun, destek, swiat, direnin hendaye, guingamp, millau, douai, pontivy, lorient, bayonne, arras, poitier, loudeac publier, twitter, diffusion, diffus, diffusee, diffuse, publiee, publie, fiable, diffuser played, assets, opresore, chiacchiere, alzhier, privatecontrol, dementia, killthecops, jvienne, onestunis mdr, lol, mec, rigoler, rigole, pfff, putain, mdr, connard, taire cr, policier, flic, agresseur, police, frapper, manifestant, charger, fdo, gendarme etablir, global, fonde, definir, promouvoir, exigence, lensemb, processus, economique, representativite oui, ok, accord, effectivement, justement, ouai, malheureusement, ben, voyon, lol 41, 69, 82, 79, 58, 61, 38, 47, 74, 52 bravo, courage, felicitacion, soutien, courageux, respect, formidable, super, admire, soutien

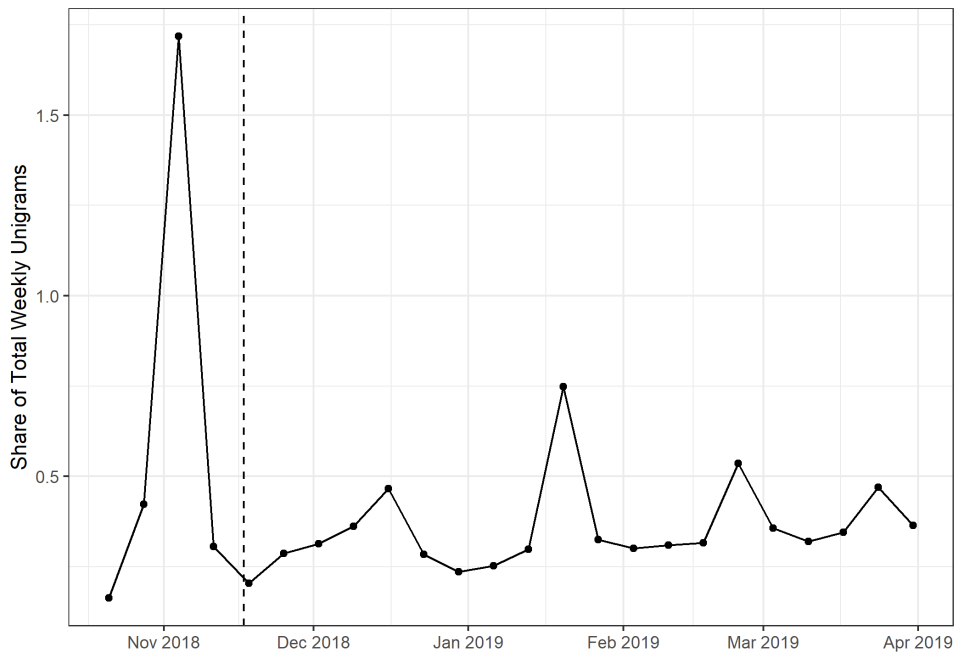
**Notes:** Clusters selected by the custom topic model when restricting the number of clusters to 5, 10 and 20. Associated words are the most central words in each cluster.

**Sources:** Facebook.com

## C.2 Focus on European elections

We follow a dictionary-based approach to explore the salience of the upcoming European elections on Facebook pages. We track over time the number of occurrences of a set of tokens commonly associated to these elections. The dictionary is composed of the following tokens and their associated plurals: ‘liste’, ‘election’, ‘europeenne’, ‘election’, ‘vote’, ‘voter’, ‘candidat’, ‘europe’, ‘europeen’. We work with the processed version of the corpus, which has already undergone dimension reduction procedures (lemmatization, etc.). The occurrences of these tokens represent 0.35% of the word occurrences in the entire corpus. Figure A.12 shows the share of the tokens in the dictionary relative to the total number of tokens written per week. Apart from a peak in early November, the dictionary’s share remains stable over time and does not increase as the European elections come closer. These results suggest the elections were not a major subject of discussion on the Facebook pages under scrutiny. This is consistent with our topic model, which does not output a topic related to the European elections.

Figure A.12 – Evolution of the share of election-related words



**Notes:** Weekly share of the words described in the text (in %). The dashed line corresponds to 11/17.

**Sources:** Facebook.com.

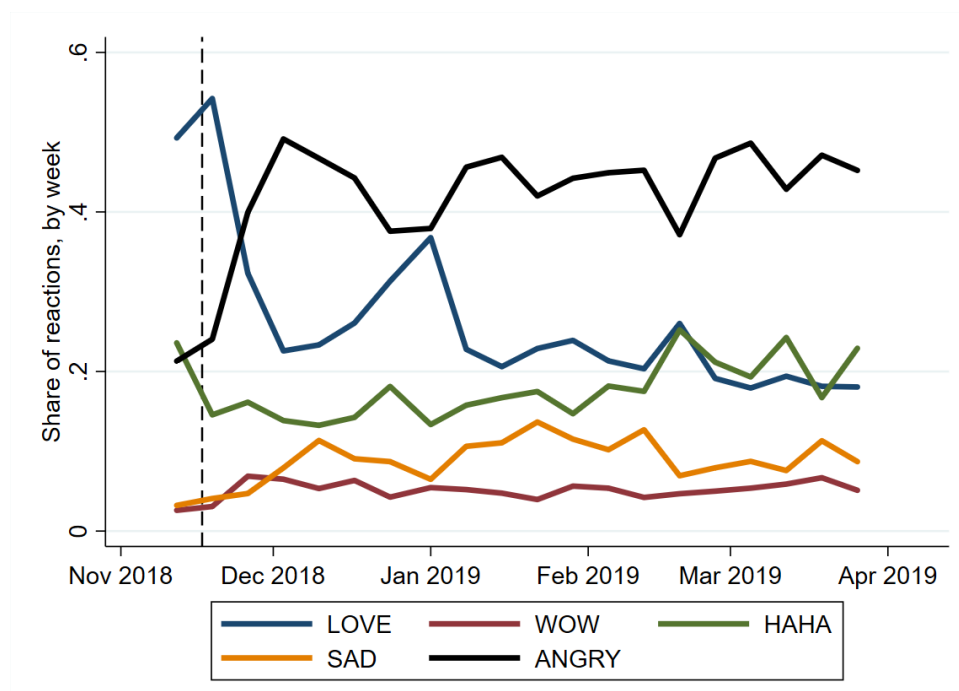
### C.3 Sentiment analysis

The classical approach to sentiment analysis is dictionary-based. To determine which words are used in which context, one has to rely on “training sets”, where messages have been manually labeled as positive, negative or neutral. This method has some drawbacks in the context we are interested in:

- Irony (a well-known feature of the French psyche) can lead to poor predictions. The following messages may be classified as positive by the method described above despite being negative: "Making America Great Again gave us everything but good"; "Congratulations to the government, #1 in keeping peaceful demonstrators out of the streets".
- Training sets in French are not as widely available as in English.
- Training sets are often extracted from very different contexts (for example, movie reviews).

To overcome these problems, we take advantage of the fact that users can react to Facebook posts, using the following reactions: *love*, *haha*, *wow*, *angry*, *sad*. For each post in our corpus, we compute the weekly share of each of these reactions, displayed in Figure A.13.

Figure A.13 – Evolution of sentiment on Facebook pages



**Notes:** Weekly share of reactions to Facebook posts. The dashed line corresponds to 11/17.

**Sources:** Facebook.com.

## D Election consequences: the 2019 European Parliament election

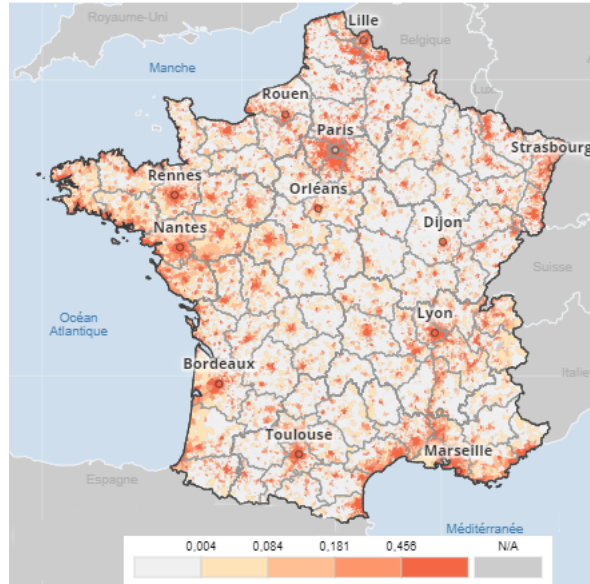
### D.1 Control variables

The set of municipal controls included in equations (1) and (2) may be grouped as follows:

- **Geography** includes the population of the municipality, its density, the distance to the closest city with over 20,000 inhabitants and 100,000 inhabitants.  
*Source: Census (RP, complementary exploitation), 2016, INSEE.*
- **Transport** includes the shares of the employed population commuting by car and public transportation, as well as the median commuting distance.  
*Sources: Census 2016, INSEE. Déclarations Annuelles de Données Sociales (DADS), 2015, INSEE.*
- **Economy** include the local unemployment rate, the fraction of employees with a non-permanent contract, mean income, and population immigrant share.  
*Sources: Census 2016, INSEE. DADS, 2015, INSEE.*
- **Occupation** includes the share of the different *catégories socio-professionnelles*, defined by INSEE: executive, independent, middle-management, employee, manual worker and agriculture.  
*Source: Census 2016, INSEE.*
- **Age** includes the shares of the population in the following groups: 18-24 y.o.; 25-39 y.o.; 40-64 y.o.; over 65 y.o.  
*Source: Census 2016, INSEE.*
- **Education** includes the shares of the population without the baccalauréat, and with a university degree.  
*Source: Census 2016, INSEE.*
- **Vote** includes the vote share for the five major candidates in the 2017 presidential election (Macron, Le Pen, Fillon, Mélenchon, Hamon), as well as the share of abstention.  
*Source: Ministry of the Interior.*
- **Signature** is the local signature rate of the Change.org petition before 11/17.  
*Source: Change.org.*
- **Département** is a set of 94 dummies for départements.

## D.2 Instrumental variable

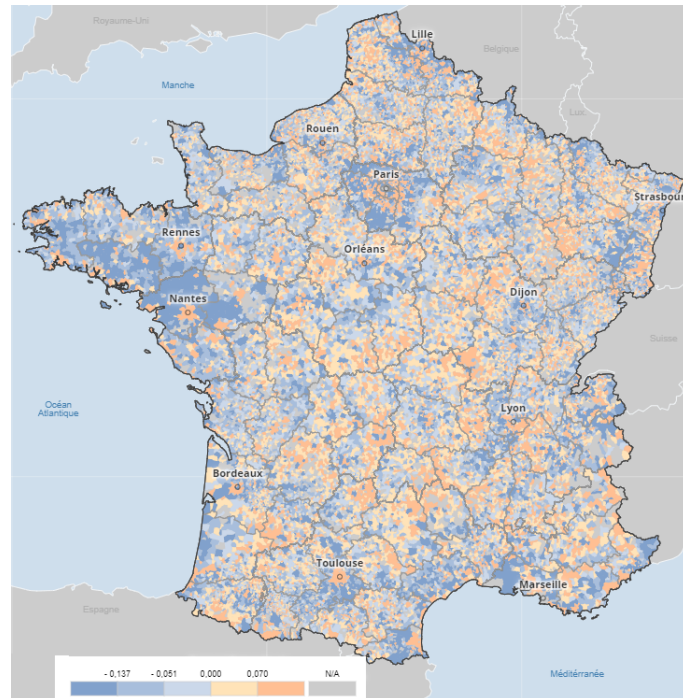
Figure A.14 – Roundabout density



**Notes:** This map represents the density of roundabouts  $B_m$  at the municipality level. Our dataset counts 63,383 roundabouts in mainland France, with 11,198 municipalities with at least one roundabout, and 23,232 without. Average roundabout density is 0.12/km<sup>2</sup>.

**Sources:** OpenStreetMap.

Figure A.15 – Residual roundabout density



**Notes:** This map represents the residual from the OLS regression of roundabout density  $B_m$  at the municipality level on the set of controls  $X_m$ .

**Sources:** Same as in Table 3.

Table A.5 – Explaining the density of roundabouts at the life zone level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Adjusted R-squared	0.600	0.669	0.671	0.682	0.691	0.699	0.723	0.731	0.749	0.749
<i>Factor decomposition (%)</i>										
Population and density	100	86.1	82.6	78.4	73.6	65.7	56.8	56.4	57.6	57.7
Département		13.9	13.5	15.0	14.2	11.4	11.9	10.3	9.7	10.1
Geography			3.9	5.6	4.2	3.3	4.2	3.3	1.2	1.2
Transport				1.0	0.7	4.3	4.2	4.5	2.5	2.4
Economy					7.2	7.9	8.3	9.6	10.5	10.1
Occupation						7.4	12.7	1.8	0.7	0.0
Age							1.9	1.8	0.1	1.3
Education								12.2	15.7	15.4
Vote									1.9	1.8
Signature										0.0
Observations	1632	1632	1632	1632	1632	1632	1632	1632	1632	1632

**Notes:** variance decomposition of an OLS regression of the density of roundabouts on the other control variables described in Appendix D.1.

**Sources:** Blockade map, Change.org and data described in Appendix D.1.

Table A.6 – Placebo check: effect of the blockades on the 2014 PS vote share

	Columns (2) to (10): IV using roundabout density in the life zone as an instrument									
	OLS (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Blockade dummy	-0.0764 (0.0771)	0.156 (0.247)	0.297 (0.290)	0.0367 (0.261)	0.0735 (0.266)	0.171 (0.439)	0.264 (0.293)	0.311 (0.541)	-0.266 (0.348)	0.365 (0.356)
<i>Heterogeneity</i>										
Macron vote			High	Low			High	High	Low	Low
Facebook reaction					High	Low	High	Low	High	Low
<i>First stage</i>										
Roundabout density		0.21*** (0.02)	0.19*** (0.01)	0.29*** (0.03)	0.2*** (0.02)	0.22*** (0.03)	0.19*** (0.02)	0.2*** (0.02)	0.27*** (0.03)	0.32*** (0.05)
Signature rate		0.07*** (0.02)	0.07*** (0.02)	0.05 (0.04)	0.03 (0.03)	0.11** (0.04)	0.02 (0.03)	0.14*** (0.04)	0.04 (0.05)	0.07 (0.05)
F-statistic		195.88	227.29	86.29	152.29	61.98	149.45	76.53	73.89	37.33
Observations	31031	31031	15625	15383	15332	15699	7711	7914	7610	7773
Number of Clusters	1629	1629	1532	1384	938	996	841	884	785	839

**Notes:** The dependent variable is the LREM vote share in the 2019 election at the municipality level. We include a simple OLS regression (column 1) along with nine IV regressions, using the density of roundabouts in the consolidated municipality as instruments. We define at the département level a Facebook reaction variable which is equal to the ratio of the number of Facebook groups created after Nov 17 to the number of Facebook groups created before Nov 17. We assign a municipality to the high (resp. low) Macron vote group if its vote share for Macron at the 2017 election was over (resp. under the median), and to the high (resp. low) Facebook reaction group when its Facebook reaction was above (resp. below) the median. We include at the bottom of the table estimates of the first stage for two variables: our instrument (the standardized density of roundabouts), and the signature rate of the Change.org petition before Nov 17 (expressed in percentage points). The F-statistic of the first stage is also reported. All controls are at the municipality level (see text) and Département fixed effects are included. Robust standard errors are clustered at the life zone level. Significance levels are denoted by <sup>+</sup>  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

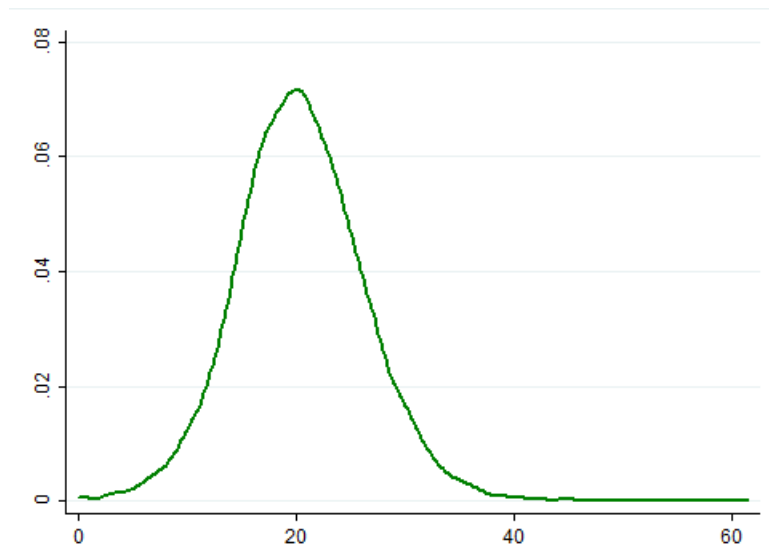
**Sources:** Blockade map, Facebook.com, Change.org and data described in Appendix D.1.



### D.3 Heterogeneity analysis and robustness

Figures A.16 and A.17 display the distribution of the two variables we use to conduct heterogeneity analysis. The 2017 Macron vote share is computed at the municipal level and the Facebook reaction ratio is computed at the département level.

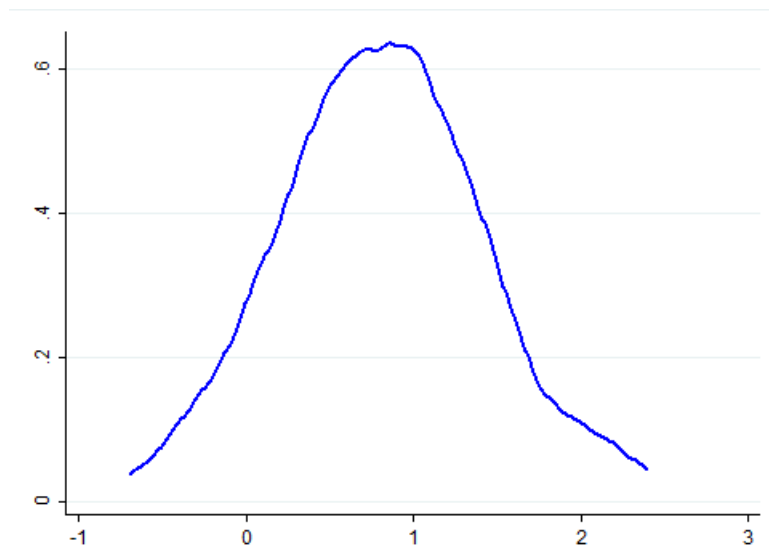
Figure A.16 – Distribution of the 2017 Macron vote share



**Notes:** Unweighted distribution of the share of votes for Emmanuel Macron during the first round of the 2017 presidential election at the municipality level.

**Sources:** Elections

Figure A.17 – Distribution of the Facebook reaction to the blockades



**Notes:** Unweighted distribution of our measure of Facebook reaction to the blockades. This measure is defined at the département level as  $\log(1 + \text{number of groups created after 11/17}) - \log(1 + \text{number of groups created before 11/17})$ .

**Sources:** Facebook.com and Blockade map.

Table A.7 – Effect of the blockades on the 2019 LREM vote share: robustness to scale of analysis

	OLS (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Blockade dummy	0.0463 (0.0615)	0.460 <sup>+</sup> (0.256)	0.828* (0.337)	-0.461* (0.225)	0.330 (0.409)	0.767** (0.252)	0.239 (0.532)	1.346*** (0.359)	-0.290 (0.321)	-0.369 (0.306)
<i>Heterogeneity</i>										
Macron vote			High	Low			High	High	Low	Low
Facebook reaction					High	Low	High	Low	High	Low
<i>First stage</i>										
Roundabout density		0.14*** (0.03)	0.12*** (0.03)	0.26*** (0.04)	0.13** (0.04)	0.15*** (0.04)	0.11** (0.04)	0.12*** (0.03)	0.22*** (0.05)	0.34*** (0.06)
Signature rate		0.08*** (0.02)	0.08*** (0.02)	0.07* (0.03)	0.07* (0.03)	0.08** (0.03)	0.04* (0.02)	0.12** (0.04)	0.09* (0.04)	0.04 (0.04)
F-statistic		44.6	37.2	52.9	25.1	16.4	17.2	18.6	24.4	38.4
Observations	31030	31030	15625	15382	15332	15698	7711	7914	7610	7772
Clusters	1222	1222	1192	1094	629	639	606	613	558	570

**Notes:** The dependent variable is the LREM vote share in the 2019 election at the municipality level. We include a simple OLS regression (column 1) along with nine IV regressions, using the density of roundabouts in the consolidated municipality as instruments. We define at the département level a Facebook reaction variable which is equal to the ratio of the number of Facebook groups created after Nov 17 to the number of Facebook groups created before Nov 17. We assign a municipality to the high (resp. low) Macron vote group if its vote share for Macron at the 2017 election was over (resp. under the median), and to the high (resp. low) Facebook reaction group when its Facebook reaction was above (resp. below) the median. We include at the bottom of the table estimates of the first stage for two variables: our instrument (the standardized density of roundabouts), and the signature rate of the Change.org petition before Nov 17 (expressed in percentage points). The F-statistic of the first stage is also reported. All controls are at the municipality level (see text) and Département fixed effects are included. Robust standard errors are clustered at the life zone level. Significance levels are denoted by <sup>+</sup>  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

**Sources:** Blockade map, Facebook.com, Change.org and data described in Appendix D.1.

Table A.8 – Effect of the blockades on the share of potential voters who voted for LREM

OLS	Columns (2) to (10): IV using roundabout density in the life zone as an instrument									
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
Blockade dummy	0.0524 (0.0475)	0.553*** (0.160)	0.679*** (0.188)	-0.0500 (0.176)	0.478* (0.196)	0.797*** (0.219)	0.522* (0.248)	0.884*** (0.234)	-0.293 (0.201)	0.386 (0.308)
<i>Heterogeneity</i>										
Macron vote		High	Low		High	Low	High	High	Low	Low
Facebook reaction				High			High	Low	High	Low
<i>First stage</i>										
Roundabout density		0.21*** (0.02)	0.19*** (0.01)	0.29*** (0.03)	0.20*** (0.02)	0.22*** (0.03)	0.19*** (0.02)	0.20*** (0.02)	0.27*** (0.03)	0.32*** (0.05)
Signature rate		0.07*** (0.02)	0.07*** (0.02)	0.05 (0.04)	0.03 (0.03)	0.11** (0.04)	0.02 (0.03)	0.14*** (0.04)	0.04 (0.05)	0.07 (0.05)
F-statistic		195.9	227.29	86.33	152.29	62.01	149.45	76.53	73.89	37.36
Observations	31030	31030	15625	15382	15332	15698	7711	7914	7610	7772
Clusters	1629	1629	1532	1384	938	996	841	884	785	839

**Notes:** The dependent variable is the number of LREM votes in the 2019 election divided by the number of inhabitants over 18 years old in the municipality. We include a simple OLS regression (column 1) along with nine IV regressions, using the density of roundabouts in the life zone as instruments. We define at the département level a Facebook reaction variable which is equal to the ratio of the number of Facebook groups created after Nov 17 to the number of Facebook groups created before Nov 17. We assign a municipality to the high (resp. low) Macron vote group if its vote share for Macron at the 2017 election was over (resp. under the median), and to the high (resp. low) Facebook reaction group when its Facebook reaction was above (resp. below) the median. We include at the bottom of the table estimates of the first stage for two variables: our instrument (the standardized density of roundabouts), and the signature rate of the Change.org petition before Nov 17 (expressed in percentage points). The F-statistic of the first stage is also reported. All controls are at the municipality level (see text) and Département fixed effects are included. Robust standard errors are clustered at the life zone level. Significance levels are denoted by +  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

**Sources:** Blockade map, Facebook.com, Change.org and data described in Appendix D.1.