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Università Bocconi
BAFFI CAREFIN
Centre for Applied Research on International Markets, Banking, Finance, and Regulation

COLLECTIVE EMOTIONS AND PROTEST VOTE *

Carlo Altomonte[a], Gloria Gennaro[b], and Francesco Passarelli[c]

[a] *Bocconi University & Baffi-Carefin Centre*

[b] *Bocconi University*

[c] *University of Turin, CESIfo & Baffi-Carefin Centre*

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We leverage on important findings in social psychology to build a behavioral theory of protest vote. An individual develops a feeling of resentment if she loses income over time while richer people do not, or if she does not gain as others do, i.e. when her relative deprivation increases. In line with the Intergroup Emotions Theory, this feeling is amplified if the individual identifies with a community experiencing the same feeling. Such a negative collective emotion, which we define as aggrievement, fuels the desire to take revenge against traditional parties and the richer elite, a common trait of populist rhetoric. The theory predicts higher support for the protest party when individuals identify more strongly with their local community and when a higher share of community members are aggrieved. We test this theory using longitudinal data on British households and exploiting the emergence of the UK Independence Party (UKIP) in Great Britain in the 2010 and 2015 national elections. Empirical findings robustly support theoretical predictions. The psychological mechanism postulated by our theory survives the controls for alternative non-behavioral mechanisms (e.g. information sharing or political activism in local communities).

Keywords: electoral behaviour, protest vote, populism, relative deprivation, community cohesion, UK Independence Party.

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I. Introduction

Emotions are known to influence voting behaviour in a number of ways. Sentiments like frustration or anger can lead voters to cast a ballot with the intent of punishing incompetent or self-serving politicians. Do emotions play a role in protest vote and the emergence of populism?

Important findings in social psychology suggest that emotions can also be determined at the collective, rather than individual level. We refer here in particular to the Intergroup Emotions Theory, as formulated by Mackie et al. (2000). This theory builds on traditional theories of social identity and inter-group behaviour (e.g. Tajfel, 1974; Akerlof and Kranton, 2000) to study how identification leads to the emergence of collective emotions. Importantly, Mackie and Smith (2015) find that cohesive communities may experience group-wide aggrievement when they perceive a common threat. In this case, emotional reactions are tied to the experience of the community more than the experience of the individual, and group members' anger toward an out-group (the "others") can be a good predictor of the willingness to take action.

In this paper we explore whether and through which channels anger experienced at collective level may lead to protest vote. In doing so we provide two main contributions to the literature. First, we contribute to the emerging literature of behavioral political economy by introducing an emotional element in a model of protest vote.[1] In our model, heterogeneous individuals draw *material* utility from voting for a traditional party. They may also enjoy an *emotional* utility by casting a protest vote for an alternative party that proposes an anti-establishment platform. Protest vote is driven by the desire to take revenge against traditional politics, which is deemed responsible for the current situation. The higher the group-wide aggrievement, the higher the desire to take revenge, a mechanism which is consistent with the classical frustration-aggression hypothesis in psychology (Miller, 1941). As revenge against the traditional parties and the elites is common to populist rhetoric (Mudde, 2004; Van Kessel, 2015; Müller, 2017), we claim in this sense that protest motivations are also connected to the raise of populist parties. Accounting for emotions allows us to add new insights to the existing debate between economic and cultural motives driving protest vote and populism (e.g. Rodrik, 2018; Guiso et al., 2017; Inglehart and Norris, 2016). In this respect we are close to Enke (2018), who studies how communal moral values are related to populism, and to Grossman and Helpman (2018) who claim that shifts in patterns of social identification can lead to a raise in anti-globalization attitudes, a common

1. A large literature studies the role of emotions in affecting voting behaviour, e.g. Valentino et al. (2011) and Redlawsk et al. (2017), although not necessarily with reference to protest vote or collective emotions.

trait in populist platforms.

The second contribution of this paper is that, to the best of our knowledge, we are the first to propose and test a mechanism in which endogenous collective emotions lead to protest vote. In our model (and in the data), individual feelings are subject to strategic complementarity, as an individual identifying with a cohesive community is likely to "absorb" emotions experienced also by other members of the community (Akerlof and Kranton, 2000). Hence, an individual is more likely to be sucked into protest vote if she identifies more with her community, and if other members of that community are angrier. This channel may generate abrupt explosions of protest vote in response to even small changes in the income distribution.[2] This particular feature allows to shed some light on the mechanism through which recent economic shocks (e.g. globalization or technological shocks) have lead to protest vote and the emergence of nationalism (Colantone and Stanig, 2018b), rather than to support for more redistributive platforms. It also helps understanding the connection between economic crisis, income distribution, and cuts in welfare spending (as in Fetzer, 2018). Collective emotions hence generate patterns of "emotional contagion" that lead to significantly different predictions with respect to other models of protest vote. For instance, differently from us, in Myatt (2017) individuals are less prone to cast a protest vote if other people's enthusiasm for the protest issue is higher.

Central to our framework is the idea that emotions affect utility through resentment and aggrievement experienced at collective level.[3] We call resentment the emotional reaction that any individual experiences when she loses income over time while others do not, or when she does not gain as others do. This concept is related to the idea of relative deprivation, and has been widely explored in the literature of social psychology and sociology alike (e.g. Merton and Kitt, 1950; Runciman, 1966; Smith et al., 2012).[4] In our model, relative deprivation is defined as the cumulative difference between an individual's income and the income of richer individuals in a given period. Past levels of it act as a reference point. Any worsening in the level of relative deprivation, with respect to the reference point, triggers an individual feeling of resentment.

2. Rico et al. (2017) find that anger expressed over the economic crisis is consistently associated with variations in support for populist parties both between individuals and over time in Spain.

3. The emotional utility occurs in principle when protest voting results in unseating traditional politicians. In this sense, we are close to Kselman and Niou (2011) and Myatt (2017) in thinking of a protest vote as a targeted signal of dissatisfaction, although we focus here on emotional motives, rather than rational instrumental reasons. We also discuss the case of "warm glow", i.e. the act of casting a vote for the protest party yielding an emotional reward *per se*.

4. Recently, Pastor and Veronesi (2018) connect a related measure of inequality to the emergence of populism. In their paper, populism reflects a form of envy of the high consumption of economic elites, rather than compassion for the poor. Liberini et al. (2017) associate economic dissatisfaction to the vote for Leave in the Brexit referendum.

Crucially, individuals are also sensitive to resentment experienced by other members of the community they identify with. Identification leads them to develop a collective feeling that we call aggrievement. It is subject to strategic complementarity since individuals feel more aggrieved if they identify more strongly with a group where people experience on average higher resentment.[5] Such a complementarity has already been observed in the political economy literature on protest (Passarelli and Tabellini, 2017), while there is evidence of feelings of deprivation affecting the relationship between group-based anger and populist attitudes (Gaffney et al., 2018). This mechanism where the emotions of an individual depend on the emotions of others typically yields multiple equilibria. We characterize the equilibrium and its conditions of uniqueness. As mentioned before, the equilibrium can be highly convex in individuals' relative deprivation, leading to abrupt emotional explosions. In this sense, our results seem to be driven by a different mechanism than simple inequity aversion, as in Fehr and Schmidt (1999).

We characterize the equilibrium voting behavior of aggrieved voters in a three-party political system (two traditional parties and one protest party) with plurality rule. The system does not necessarily lead to a Duvergerian equilibrium with complete desertion. A significant share of voters might end up voting for the protest party. The latter can happen for two reasons. First, voters might receive noisy signals about the electoral situation, with partial coordination leading to the trailing contender receiving a positive share of votes in equilibrium (as in Myatt, 2017). We show that when the trailing contender is the protest party, it receives a larger support if the electorate is more aggrieved. Second, there can be "warm glow" in protest voting. Individuals may enjoy the act of casting a protest vote *per se*, in line with the empirical pattern recently studied by Pons and Tricaud (2018). We show how the two explanations actually interact: aggrievement may lead to more warm glow in protest voting, and the latter in turn might reduce the incentive to vote for a traditional party among those who vote strategically, thus reinforcing the protest outcome.

We test the main propositions of our theoretical model by exploiting the unprecedented increase in the UK Independence Party (UKIP) vote shares between the 2010 and 2015 national elections, when UKIP support quadrupled (raising from 3.1% to 12.6%). UKIP is largely acknowledged to be a protest or populist party (Mudde, 2004; Müller, 2017; Van Hauwaert and Van Kessel, 2018) whose policy platform is essentially identitarian, anti-European and anti-

5. Wuthnow (2018) studies an extensive group of Americans living in small towns across the country. He finds that these closely-knitted groups have developed a growing sense of aggrievement driven by the perception that "Washington" is threatening the way of life in small towns.

system in the tradition of single-issue parties (Betz, 1993; Mudde, 1999; Usherwood, 2008). We use detailed longitudinal survey data (*Understanding Society*) within each British district, and test the interaction between relative deprivation and community cohesion at the local level on the vote share to the UKIP in the 2010 and 2015 national elections, across the 380 Local Authority Districts (LADs). We find the vote share for the UKIP to be significantly larger in districts where both relative deprivation has worsened and identification with the community is higher, a finding that supports our theoretical predictions.

The empirical evidence is strong and consistent across various fixed effect specifications, the inclusion of controls, fully interacted models and additional robustness checks. Results are robust also when the analysis is performed at the individual level, confirming that those individuals who strongly identify with their communities and experience wide-spread relative deprivation are more likely to cast a protest vote. Importantly, we show that the emotional channel is distinct from alternative explanations of protest vote. The effect of collective emotions resists when we control for cuts to local welfare or trade and immigration shocks, suggesting that we are capturing something different from discontent with fiscal retrenchment (Fetzer, 2018), globalization (Colantone and Stanig, 2018a) or immigration (Becker et al., 2016). Our psychological mechanism survives controls for individual access to local information, thus excluding that our results are driven by higher information sharing among members of cohesive communities. We also show that the identification of an individual with a given community is independent of her experience of relative deprivation. All together, these findings suggest that collective emotions play an important and distinct role in the emergence of protest vote and populism.

The outline of the paper is as follows. Section II lays out the general theoretical framework and illustrates the mechanisms at work in a three party setting. Section III presents the empirical setting, the data sources and the main variables. Section IV reports our results at the aggregate level as well as some robustness checks. Section V tests the model with individual level data. Section VI concludes. The Appendixes at the end of the paper contain proofs, additional robustness checks and a table of data sources.

II. The model

Consider a society with a continuum of individuals/voters, heterogeneous in some parameter $t \in [0, 1]$. Sometimes we will refer to t as an individual's *ideological type*. However, t may reflect

any other factor affecting individual preferences (e.g., income, wealth, productivity, etc.). This society has to choose a unidimensional policy $q \in \mathbb{R}$.

There are three parties: two "traditional" parties, l and r, and one protest party, p.

Individual i draws *material* utility $V(t^i, q)$ if the policy q is implemented by a traditional party. The protest (or populist) party is different because it voices angry individuals who want to take revenge of traditional parties that disappointed them. Thus, if policy q is implemented by the protest party, individual i draws both material and *emotional* utility, $V(t^i, q) - c + e^i$. The emotional component attached to protest voting is e^i, while $c \geq 0$ is the material cost associated to the possible incompetence of the protest party. More on this below.

Let material utility $V(t^i, q)$ be continuously differentiable and concave in the policy, and let q^i be:

$$q^i \in \arg\max_q V(t^i, q) \tag{1}$$

We assume that $V_{qt}(.) > 0$. This amounts to assuming that, when it comes to material utility, higher types prefer higher policies.[6]

Let q^l and q^r be the platforms proposed by party l and r, respectively. One might think of q^l as a left-wing platform implying egualitarianism, large redistribution and centralization. Platform $q^r > q^l$ is a right-wing policy, advocating conservatism, reduced taxation, and low government spending. Thus a sufficiently low type likes policy q^l better than policy q^r either because she is materially more interested in q^l (e.g., she is relatively poor) and/or because she ideologically prefers a more egalitarian society implied by q^l.

Now consider platform q^p proposed by the protest party. Typically, political protest and populist rhetoric can be ubiquitous in nature. They can be attached to platforms on either side of the left-right political spectrum. To simplify the analysis, we assume that party p proposes a platform lying on the far-right part of the spectrum, i.e. $q^l < q^r < q^p$.[7]

In this model we crucially assume that protest vote is motivated by emotions. An angry

6. Specifically, by (1), q^i solves the optimality condition $V_q(t^i, q)0$, with strict equality implying an interior solution. The concavity of $V(.)$ takes care of the SOC. When q^i is interior, (1) holds with equality. Since $V_{qt}(t^i, q^i) > 0$, then implicit differentiating it yields $\frac{\partial q^i}{\partial t^i} = -\frac{V_{qt}(t^i, q^i)}{V_{qq}(t^i, q^i)} > 0$.

7. The assumption is also consistent with empirical evidence suggesting that UKIP supports a right-wing platform (Lucassen and Lubbers, 2012; Betz, 1993), and UKIP electoral success in recent elections mainly came at the expense of the Conservative Party (Ford et al., 2012; Fetzer, 2018). Colantone and Stanig (2018b) show that the large majority of protest parties recently emerged in Europe tend to occupy the far-right part of the political spectrum. Alternative frameworks with $q^l < q^p < q^r$ or $q^p < q^l < q^r$ would be straightforward extensions with qualitatively similar implications.

individual enjoys a psychological benefit by expressing anger at the ballot. This benefit is commensurate to the *aggrievement* e^i experienced by individual i against traditional parties.[8] Hereafter e^i will also denote her *emotional* type. For now, e^i is an exogenous idiosyncratic parameter. The next subsection derives e^i from an explicit formulation of i's expectations and her social interactions.

Voter i enjoys e^i when she votes for the protest party *and* that party wins. Later, we will consider "warm glow": the act of casting a vote for the protest party yields a psychological reward *per se*, independently of the winner. We will argue that warm glow further strengthens the incentive to vote expressively for party p.

We assume that voting for a populist party comes at a cost, $c \geq 0$, which parametrizes the expected long-run negative consequences of current populist policies. Populist platforms are usually short-sighted. They often focus on salient issues (e.g. tax cuts, minimal wages, globalization, immigration) while failing to evaluate trade-offs, constraints and long-term consequences (Guiso et al., 2017). Moreover, the leaders of protest parties are often outsiders of traditional politics. Their valence as policy makers is sometimes harder to evaluate compared to traditional politicians.[9] Thus c may also capture the risk-premium attached to voting for a populist leader, whose valence has not been tested yet. Of course there might be idiosyncrasies in the perception of the leader's valence or long-term costs, i.e. c might not be the same for all individuals. As the latter is not a critical parameter for our results, however, for simplicity we assume that c is the same for everybody.

Summing up, the utility levels that voter i enjoys from the three platforms are the following:

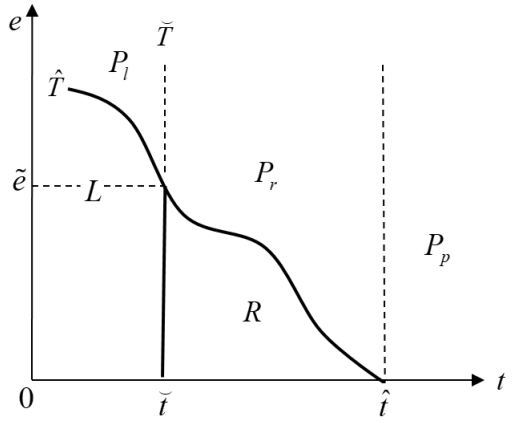
$$V(t^i, q^l)$$
$$V(t^i, q^r)$$
$$V(t^i, q^p) - c + e^i$$

Figure 1 provides an illustration of how voters rank the three platforms. Voters are located in a bi-dimensional type space. Each voter i is characterized by a point (t^i, e^i) which defines her "ideological type" t^i and her "emotional type" e^i. Voters in area L prefer party l. Voters in area R prefer party r. Voters in area $P \equiv P_p \cup P_r \cup P_l$ prefer the protest party.

8. Frequently the populist rhetoric is crafted to cultivate feelings of anger against elites and traditional politics (see e.g. Mudde, 2007). It fuels the desire to take revenge against those that should be blamed for the current situation.

9. Di Tella and Rotemberg (2018) argue that betrayal aversion may lead voters to prefer populist politicians, even though they expect them to be less competent.

FIGURE I: IDEOLOGICAL AND EMOTIONAL TYPES



Curve $\hat{T}$ shows the relationship between aggrievement and the ideological type $\hat{t}$ that is indifferent between the right platform q^r and the protest platform q^p. The indifferent type $\hat{t}$ solves the following indifference condition:

$$V(t, q^r) = V(t, q^p) - c + e \tag{2}$$

By (2), $\hat{t} = \hat{T}(c, e, \cdot)$. All individuals along $\hat{T}$ are indifferent between the right party and the protest party. Proposition 1 below shows that $\hat{T}_e < 0$. Thus $\hat{T}$ in figure 1 is negatively sloped. The reason is that the higher the aggrievement, the more individuals like the protest party. Thus the indifferent voter needs to be a lower ideological type. North-East of $\hat{T}$, individuals prefer the protest party. Individuals in P_p prefer it for "ideological" reasons. Their preference is independent of their aggrievement. Individuals in P_r prefer the protest party just because they are aggrieved to traditional politics. Absent that feeling, their first choice would be party r. By (2) we also have that $\hat{T}_c > 0$.

Let $\breve{t}$ be the ideological type of voters who are indifferent between q^l and q^r. The indifference condition which pins down $\breve{t}$ is the following:

$$V(t, q^r) = V(t, q^l) \tag{3}$$

$\breve{t}$ is independent of c and e. Thus the relationship between $\breve{t}$ and e is the vertical line denoted $\breve{T}$ in Figure I). Above $\tilde{e}$, aggrievement is so high that no individual prefers party r, while some left-wing types like party p better than party l because they are aggrieved (these are the individuals in P_l).

The following proposition summarize how the space is split based on voters' ideological and emotional types. It also says how voters' first-best depends on proposed platforms.

PROPOSITION 1. Assume $q^l < q^r < q^p$.

i) The ideological type $\hat{t}$ of voters who are indifferent between q^p and q^r: i.1) is decreasing in e; i.2) is increasing in c; i.3) is increasing in q^p and in q^r.

ii) The ideological type $\check{t}$ of voters who are indifferent between q^l and q^r: ii.1) is independent of e and of c; ii.2) is increasing in q^l and in q^r.

iii.1) There exists an aggrievement level $\tilde{e}$, such that a voter with ideological type $\check{t}$ and emotional type $\tilde{e}$, is indifferent among q^l, q^r, and q^p. iii.2) $\tilde{e}$ is increasing in c, and in q^p and it is decreasing in q^l.

(See Proof in Appendix 1)

Let $h(t,e) : [0,1] \times \mathbb{R}^+ \to \mathbb{R}^+$ be the joint density function of ideological and emotional types. It describes how individuals are located on the bi-dimensional type space. Curves $\check{T}$ and $\hat{T}$ split the space in three subsets (L, R, and $P \equiv P_p \cup P_r \cup P_l$ - see Figure 1).[10] The mass of individuals located in subset P is $\int \int_{(t,e)\in P} h(t,e)dtde$. It represents the share of voters who rank the protest party as their first choice.

Proposition 1 (and Figure I) help understand how individuals choose their first-best. When individuals are angrier, the marginal distribution of e assigns higher mass to high values of e. A positive mass of voters move "vertically" from subsets L and R to subset P. Thus more voters, while comparing emotional benefits from protest voting with material benefits from traditional voting, end up preferring the protest party. This also happens if people become ideologically closer to the protest party. In this case, they draw higher material benefit from platform q^p, compared to traditional platforms. The marginal distribution of t assigns higher mass to high values of t. The result is the same: a positive mass of voters shift "horizontally" from L and R to P.[11]

What happens if c changes? Suppose it decreases: populist leaders are less risky. Also in this case more people will rank party p first. This effect is captured by a rightward shift of $\check{T}$ (cf. Proposition 1-i.2). The joint distribution $h(t,e)$ does not change, but subset P becomes

10. Formally, $L \equiv \left\{ (t,e) | \, t \leq \check{t} \cap e < \hat{T}^{-1}(t) \right\}$; $R \equiv \left\{ (t,e) | \, \check{t} < t \leq \hat{T}(0) \cap e < \hat{T}^{-1}(t) \right\}$; $P \equiv [0,1] \times \mathbb{R}^+ \setminus L \setminus R$. Here we assume, without loss of generality, that when individuals are indifferent between party p and another party, they rank p first. When they are indifferent between party l and party r, they rank party l first.

11. Here we are assuming that e and t do not interact: a higher or lower level of aggrievement does not affect individuals' material utility, which only depends on e and t.

larger. Similarly, a decrease in q^l, q^r, and q^p will result in more voters ranking the protest party as their first choice.[12]

Thus, based on Proposition 1, we can compute the share of voters that prefer party p, and we can study how it depends on relevant variables. With sincere voting it also represents the share of votes for party p. However, in a "first-past-the-post" system, such as the UK, some voters might find it convenient to strategically switch away from their first-best candidate towards their second-best. In subsection II.B. we explore equilibrium voting behavior under strategic voting.

II.A. Emotions and community identity

This subsection derives aggrievement e^i from the relative position of an individual in the society and her identification with a local community. Let us start with i's relative position in the society. We define it as the cumulative difference between i's utility and the utility of individuals who enjoyed higher utility in a given period. Consider period -2; i's relative position is:

$$R^i_{-2} \equiv \int_{V^i_{-2}}^{MaxV_{-2}} V(t, q_{-2}) - V(t^i, q_{-2}) dG_{-2}(V_{-2})$$

where q_{-2} is the policy implemented in period -2; $V^i_{-2} \equiv V(t^i, q_{-2}) dG_{-2}(V_{-2})$ is the distribution of V in period -2; $MaxV_{-2}$ is the highest amount of utility in that period. Similarly, in period -1:

$$R^i_{-1} \equiv \int_{V^i_{-1}}^{MaxV_{-1}} V(t, q_{-1}) - V(t^i, q_{-1}) dG(V_{-1})$$

We assume that, if $R^i_{-1} > R^i_{-2}$, then i cultivates a feeling of resentment, r^i, which is commensurate to the worsening of her relative position:

$$r^i = \max\left[0, R^i_{-1} - R^i_{-2}\right] \tag{4}$$

This formulation implies that resentment stems from a measure of relative deprivation of i.[13]

It is important to note that in this framework a bad relative position does not trigger

12. In this paper we focus on voters' choices. Platforms are determined off-the-model. In an alternative (and perhaps more complex) model where parties' preferences and strategies are specified, the platforms q^l, q^p, and q^r would represent endogenous equilibrium policy proposals. In the equilibrium, voters would make their choices to maximize their utility functions given the equilibrium strategy of other voters. Parties would choose optimally their policy proposals taking into account voters' optimal behavior and the optimal reactions of other parties.

13. As already discussed, the idea of relative deprivation has been widely explored in the literature of social psychology and sociology as a powerful driver of aggressive actions (e.g. Runciman, 1966; D'Ambrosio and Frick, 2007). Moreover, relative deprivation has been found to mediate the relationship between group-based anger and populist attitudes (Gaffney et al., 2018), while feelings like envy of the richer (Pastor and Veronesi, 2018) have also been recently associated to populist vote.

resentment *per se*. It is the *worsening* of that position which matters. At time -1 an individual expects to be in a relative position that is not worse than R^i_{-2}. If her position R^i_{-1} falls short her expectations she develops resentment. Since the worsening is, at least partly, associated to past policy, resentments is directed against the political system.[14]

Here we assume that the relevant emotions triggering protest attitudes are (also) experienced at inter-group level. Intergroup Emotions Theory holds that when an individual identifies with a group, that ingroup becomes part of the self, thus acquiring social and emotional significance.[15] These findings in social psychology appear to be highly relevant for understanding the emotional motivations of protest vote and populism. We thus assume that the emotional benefit of casting a protest vote, e^i, is stronger if resentment is more widely shared by other ingroup members. Let λ^i parametrize individual i's "social relations". A higher λ^i implies that i identifies more strongly with her group or community of reference (we use the terms interchangeably). Let $\bar{r}^i$ be the average resentment within i's community. It is the average of $r^{ij} = \max\left[0, R^{ij}_{-1} - R^{ij}_{-2}\right]$, where j denotes a generic ingroup member of that community. We define aggrievement e^i as follows:

$$e^i \equiv \max\left[0, \lambda^i \pi^i \bar{r}^i + r^i\right] \tag{5}$$

π^i is the share of people experiencing a feeling of resentment in the community. Let $\varepsilon^i \equiv \bar{r}^i - r^i$ captures idiosyncratic components in resentment, and let $F^i(\varepsilon)$ be the distribution of ε over i's group. If, say $\varepsilon^i < 0$, then i's resentment is higher than the average resentment of the group. We assume $F^i(\varepsilon)$ is continuously differentiable and it is common knowledge; $f^i(\varepsilon)$ denotes the density function. The term $\lambda^i \pi^i \bar{r}^i$ in (5) accounts for collective emotion: individual i is more aggrieved when a larger share of group members experience resentment (higher π^i), when she identifies more strongly with the community (higher λ^i), and when on average resentment is higher across group members (higher $\bar{r}^i$).[16]

An individual is aggrieved if $\lambda^i \pi^i \bar{r}^i + r^i > 0$. It implies that $\varepsilon^i < (\lambda^i \pi^i + 1)\bar{r}^i$, which occurs with probability $\Pr(\varepsilon^i < (\lambda^i \pi^i + 1)\bar{r}^i) \equiv F^i((\lambda^i \pi^i + 1)\bar{r}^i)$. The share of ingroup members who

14. In social psychology blame attribution is central to the emergence of anger (Hewstone, 1990).

15. Blame attribution to outgroup members is more likely when individuals identify with a group (Mackie and Smith, 2015; Maitner et al., 2007; Hewstone, 1990).

16. Note that λ^i may also capture the size of i's community. A higher λ^i would then imply that i identifies with a larger community.

are aggrieved, π^i, is given by this probability:

$$\pi^i = F^i((\lambda^i \pi^i + 1)\bar{r}^i) \tag{6}$$

An equilibrium π^{*i} is then a fixed point of (6) such that $\pi^{*i} \in [0, 1]$. It represents the share of people in i's ingroup who would draw emotional benefit from protest voting (i.e. the share of individuals j such that $e^j > 0$).

Note that under this framework there is complementarity in collective emotions: an individual is more aggrieved when more people are aggrieved, and vice versa. This may lead to multiple equilibria in the share of aggrieved people. To ensure existence and uniqueness of equilibrium, we follow Passarelli and Tabellini (2017). They propose a related mechanism to explain complementarity in street protest participation. We assume:

$$F^i(\bar{r}^i) > 0 \qquad \text{and} \qquad F^i((\lambda^i + 1)^i \bar{r}^i) < 1 \tag{A1}$$

The first inequality says that the amplifying effect of complementarity is triggered only if there is at least one aggrieved individual in i's community. The second inequality says that there is a positive mass of individuals who are not aggrieved even if they expect the whole group is aggrieved.

To rule out multiplicity of equilibria, we assume that there is enough heterogeneity within the group, at least in a neighborhood of the equilibrium participation rate π^{*i}:

$$\lambda^i \bar{r}^i \cdot f^i((\lambda^i \pi^{*i} + 1)\bar{r}^i) < 1 \tag{A2}$$

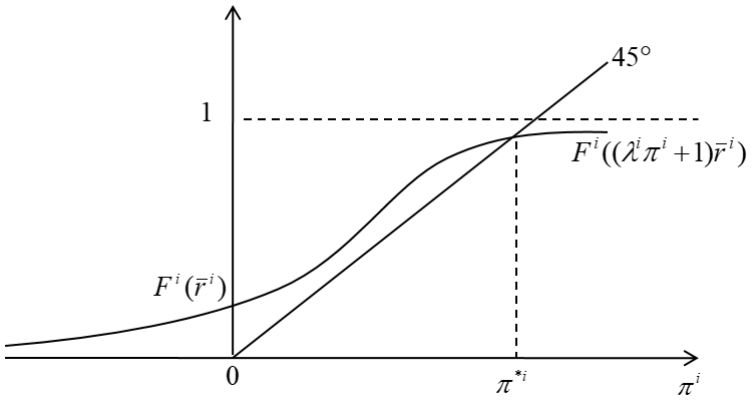
We then have:

Lemma 1. i) Under (A1) an equilibrium share of aggrieved people exists, $0 < \pi^{*i} < 1$. ii) The equilibrium is unique if (A2) also holds.

(See Proof in Appendix 1)

Figure II illustrates the equilibrium and the role of assumptions (A1) and (A2). The function $F^i(.)$ shows the share of individuals who are aggrieved for different values of the expected share of aggrieved people in the group. Under (A1), $F^i(.)$ intersects the 45° line at least once. Under

FIGURE II: EQUILIBRIUM PARTICIPATION RATE



(A2), the intersection occurs from above and hence it must be unique.[17]

How does the equilibrium share of aggrieved people depend on parameters? By Lemma 1 and by (6), π^{*i} is a function of $\bar{r}^i$ and λ^i. Thus:

$$(7) \qquad \frac{\partial \pi^{*i}}{\partial \bar{r}^i} = \frac{\lambda^i \pi^{*i} f^i((\pi^{*i}\lambda^i+1)\bar{r}^i)}{1-\bar{r}^i\lambda^i f^i((\pi^{*i}\lambda^i+1)\bar{r}^i)} > 0 \quad \text{and} \quad \frac{\partial \pi^{*i}}{\partial \lambda^i} = \frac{\bar{r}^i \pi^{*i} f^i((\pi^{*i}\lambda^i+1)\bar{r}^i)}{1-\bar{r}^i\lambda^i f^i((\pi^{*i}\lambda^i+1)\bar{r}^i)} > 0$$

The share of aggrieved people is larger if identification with the community is stronger or if resentment is higher on average. Moreover, π^{*i} is more sensitive to average resentment if:

- π^{*i} and λ^i are large. This is how complementarity leads to amplification: if an individual knows that more people are aggrieved, she develops a stronger feeling of aggrievement. The effect is stronger if community identity is stronger.

- $f^i((\pi^{*i}\lambda^i+1)\bar{r}^i)$ is large: high tension in the community can more easily rub off on other members if the density $f^i((\pi^{*i}\lambda^i+1)\bar{r}^i)$ is high in a neighborhood of the equilibrium. In other words, as the community becomes more homogeneous, the amplifying effect of complementarity becomes stronger.

- $\bar{r}^i$ is high: the share of aggrieved people reacts to average resentment at an increasing rate; this too reflects complementarity in collective emotions.

We can now see how in equilibrium the psychological incentive of an individual to vote for the protest party depends on her resentment and the resentment of other ingroup members. Take individual i. Suppose she is aggrieved (i.e. $e^i > 0$). Recall that $\varepsilon^i \equiv \bar{r}^i - r^i$. By (5), i's

17. The fact that uniqueness of equilibrium derives from group heterogeneity ties this model to other models of strategic complementarity (e.g. global games). For a survey and an equivalence approach to different classes of games with strategic complementarities see Morris and Shin (2003).

psychological benefit from protest vote is $e^i = r^i + \lambda^i \pi^{*i} \bar{r}^i$. We have that $\partial e^i / \partial r^i = 1$. This means that a higher individual resentment r^i immediately translates into a higher aggrievement. Now consider the second term, $\lambda^i \pi^{*i} \bar{r}^i$, which accounts for collective emotions. We have:[18]

$$\frac{\partial e^i}{\partial \lambda^i} = (\pi^{*i} + \lambda^i \frac{\partial \pi^{*i}}{\partial \lambda^i}) \bar{r}^i > 0, \quad \text{and} \quad \frac{\partial e^i}{\partial \bar{r}^i} = \lambda^i \pi^{*i} + \lambda^i \bar{r}^i \frac{\partial \pi^{*i}}{\partial \bar{r}^i} > 0$$

These inequalities imply that i may become more aggrieved even if her individual resentment, r^i, is unchanged. The reason is identification: she emphatically assimilates the emotions of her ingroup. If on average there is higher resentment in the community (higher $\bar{r}^i$) or if she identifies more strongly with it (higher λ^i), then she becomes more aggrieved, *independently* of r^i.

The following proposition summarizes the results so far.

PROPOSITION 2. An individual i develops a higher sense of aggrievement towards traditional parties if:

i) her resentment r^i is higher;

ii) she identifies more strongly with her community (higher λ^i);

iii) resentment within the community is higher on average (higher $\bar{r}^i$);

iv) the effects ii-iii are stronger if ingroup members share similar levels of resentment (higher $f^i(.)$).

(See Proof in Appendix 1)

Complementarity implies that the equilibrium relationship between individual emotions and the variables in the model can be highly non-linear, especially when individuals identify with large and homogeneous groups. Small changes in average resentment may cause abrupt emotional reactions, leading a large mass of individuals to enjoy protest voting.

Intuitively, their positions move upwards in the ideological-emotional space described by Figure I. The marginal distribution of e assigns higher mass to high values of e. Some individuals might "move" from areas R or L to area P. Their first-best party would no longer be a traditional party. They would prefer the protest party. Who are these individuals? Most likely, they are individuals with strong social connections with other aggrieved individuals, and with strong personal resentment because their relative position in the society has worsened.[19]

18. The second inequality follows from the fact that if there is one individual in group i who is aggrieved (other than individual i) then $(\lambda^i \pi^{*i} - 1) > 0$.

19. One might also imagine that social connections are not exogenous. They might be positively related to resentment. Individuals experiencing resentment might "seek" other aggrieved people in order to share common

II.B. Equilibrium voting

More aggrieved people draw higher utility from protest voting. Proposition 2 tells us who these people are and why they are aggrieved. However, in plurality rule elections even aggrieved voters might switch away from the protest party towards a second-best traditional party if they think the latter has more chance to win against the disliked third-best.

Indeed, most of existing models of strategic voting predict Duvergerian equilibrium with complete desertion: any electoral competition with three (or more) candidates competing for one seat resolves into a two-horse race with only two candidates getting votes and the other candidate(s) reduced to nearly zero support (Palfrey, 1989; Myerson and Weber, 1993; Cox, 1994).[20] Empirical evidence, however, contradicts this sharp theoretical prediction. UKIP captured 12.6% of votes in UK General Election in 2015, despite in no LAD the UKIP candidate was expected to be a front-runner.[21]

Thus at least some voters seem to vote sincerely. Why is that the case? We propose here two explanations. The first one follows Myatt's (2007) theory of partial coordination in strategic voting. Voters receive noisy signals about the electoral situation, and thus may form different beliefs about the likely support for the candidates. The result is partial coordination, with the trailing contender receiving a positive share of votes in equilibrium. We show that when the trailing contender is the protest party, it receives more support if the electorate is more aggrieved.

The second explanation assumes "warm glow" in protest voting. It is in line with the empirical evidence offered by Pons and Tricaud (2018). They show that in French first-past-the-post elections the presence of the third candidate decreases the share of the top two candidates in proportion to their ideological proximity to the third one. This pattern is consistent with the existence of "expressive" voters who abandon strategic considerations because their benefits are independent of the election outcome.

Partial coordination. Myatt (2007) describes coordination in strategic voting as a global game in which individuals use private signals to infer the identity of the leading challenger.

feelings of revenge against the government. This would amplify collective emotions even further. However, our empirical evidence suggests that individuals' social connections are not endogenously determined by resentment.

20. Non-Duvergerian equilibria with three vote-getting candidates are possible (but unlikely) when three or two candidates are expected to get nearly the same votes (cf. Cox, 1994, p. 612)

21. The BBC, in an *ex post* evaluation of the performance of the polls, shows how UKIP was fairly well predicted to score between 11 and 15% at the 2015 elections (https://www.bbc.com/news/uk-politics-32751993). Voters had no reason to expect that UKIP could be a front-runner.

Let M be the set of individuals who rank party l as their least preferred choice. Take voter i such that $(t^i, e^i) \in M$. If party r wins instead of the disliked party l, individual i in subset M gets additional utility $V(t^i, q^r) - V(t^i, q^l) > 0$. If party p wins instead of party l her additional gain is $\left[V(t^i, q^p) - c + e^i\right] - V(t^i, q^l)$. Let

$$\tilde{u}_i \equiv \log \frac{V(t^i, q^r) - V(t^i, q^l)}{[V(t^i, q^p) - c + e^i] - V(t^i, q^l)} \tag{8}$$

be a measure of her relative preferences. If $\tilde{u}_i < 0$, then i's first-best is party p and her second choice is party r. If $\tilde{u}_i > 0$ then her first-best is party r, and p is the second-best.

Suppose $\tilde{u}_i < 0$. In order to choose whether to vote sincerely for party p or strategically for party r, voter i needs to form beliefs $\hat{\eta}_i$ about the popularity of the two parties. Let the true median be η_m. If $\eta_m > 0$ then more than 50% of people in M rank party r as their first choice. This means that r is more popular than p. Voter i receives a signal s_i about the relative preferences of the median in M. The signal is drawn from a distribution with average η_m. Based on the signal s_i and on her preferences $\tilde{u}_i$ she updates her beliefs. If $\hat{\eta}_i > 0$ ($\hat{\eta}_i < 0$) then she beliefs that party r more (less) popular than p.[22]

Let $n + 1$ be the number of voters in M, and $\bar{x}$ the number of votes for party l. Following Myatt (2007), we assume $\bar{x}$ is a fixed number. Now voter i has to choose which party to vote for. Her choice affects the outcome only if she casts the $(\bar{x} + 1)\,th$ pivotal vote in a neck–and-neck race with party l. In this race with l, the contender might either be party r or party p. In a race between l and r, voter i is pivotal if party r collects a number of votes x that is exactly the same as the number of votes $\bar{x}$ collected by party l. This happens with probability $\Pr[x = \bar{x} | \hat{\eta}_i]$. By contrast, in a race between l and p she is pivotal if the protest party collects $n - x = \bar{x}$ votes. Such event occurs with probability $\Pr[x = n - \bar{x} | \hat{\eta}_i]$.[23]

Given the two pivotal probabilities, individual i votes for party p if she gets a higher expected utility than voting for r:

$$\Pr[x = n - \bar{x} | \hat{\eta}_i] \cdot \left[V(t^i, q^p) - c + e^i - V(t^i, q^l)\right] \geq \Pr[x = \bar{x} | \hat{\eta}_i] \cdot \left[V(t^i, q^r) - V(t^i, q^l)\right]$$

22. Following Myatt (2007), let $\tilde{u}_i \equiv \eta_m + \varepsilon_i$, where $\varepsilon_i \sim N(0, \xi^2)$ and η_m is the true median relative support of individuals in M. Besides $\tilde{u}_i$, voter i receives a second signal $s_i \sim N(\eta, \varsigma^2)$ that is independent across individuals. Her updated beliefs are $\hat{\eta}_i = \omega s_i + (1 - \omega)\tilde{u}_i$ (where $\omega = \frac{\xi^2 - \rho\xi\varsigma}{\xi^2 + \varsigma^2 - 2\rho\xi\varsigma}$ - cf. Myatt, 2007, Lemma 1).

23. The sum of votes, x, in favor of party r is drawn from a binomial distribution with parameters k and n, where k is the expectation that any voter $j \neq i$ will vote for r. This expectation is conditional on i's updated beliefs, $\hat{\eta}_i$ (cf. Myatt, 2017, pp. 261-62).

or

$$\tilde{u}_i + \log \frac{\Pr\left[x = \bar{x} | \, \hat{\eta}_i\right]}{\Pr\left[x = n - \bar{x} | \, \hat{\eta}_i\right]} \leq 0$$

The first term captures her preferences; i.e. her incentive to vote sincerely. The second term captures the incentive to vote strategically. Myatt (2007 - Proposition 1) proves that if voters follow voting strategies, $v(\tilde{u}_i, \hat{\eta}_i)$, which are symmetric and monotonic in $\tilde{u}_i$ and $\hat{\eta}_i$, then the voting equilibrium is unique and it is such that

$$v(\tilde{u}_i, \hat{\eta}_i) = I(\tilde{u}_i + b^* \cdot \hat{\eta}_i \leq 0) \tag{9}$$

where I is the indicator function, and $b^* > 0$. Myatt's model yields a non-Duvergerian equilibrium in which any of the three parties receives a non-negligible share of votes.[24]

Let us focus on emotional motivations. The following proposition tells us who is more likely to cast a protest vote.

PROPOSITION 3. i) An individual i is more likely to vote *sincerely* for the protest party if: i.1) her relative position in the society has worsened substantially in the last period (higher r^i); i.2) she identifies more strongly with her ingroup (higher λ^i); i.3) her ingroup members are more aggrieved on average (higher $\bar{r}^i$); i.4) she has a stronger ideological preferences for the protest party (higher t^i).

ii) An individual is more likely to vote *strategically* for the protest party if: ii.1) aggrievement is stronger among voters who have to coordinate on either party p or r; ii.2) people assign higher weight to their beliefs (higher b^*).

(See Proof in Appendix 1)

Those who vote for the protest party might do it for three different (not mutually exclusive) reasons. First, they "ideologically" prefer party p's platform (statement *i.4*). Second, they are aggrieved. Statements *i.1-3* say that this is more likely to happen to individuals experiencing stronger resentment for their unlucky position and/or to individuals with stronger social ties with other aggrieved people. Third, they receive strong signals about the popularity of the protest party (statement *ii.1*). The latter suggests that in a society with many aggrieved people a substantial share of individuals who rank party p as their second-best might be sucked into

24. Strategic voting occurs if $\tilde{u}_i > 0$ (resp. $\tilde{u}_i < 0$) while $b^* \hat{\eta}_i \leq -\tilde{u}_i$ (resp. $b^* \hat{\eta}_i > -\tilde{u}_i$). In words, if an individual preferring party r (resp. party p) receives a sufficiently strong signal about the popularity of party p (resp. party r), she chooses to vote strategically for her second-best.

protest voting for strategic reasons.

Warm glow. We now assume that casting a protest vote yields emotional utility e^i *per se*, independently of the election outcome. With warm glow in protest voting, relative utility becomes:

$$\tilde{u}_i^{wg} \equiv \log \frac{V(t^i, q^r) - V(t^i, q^l) - e^i}{[V(t^i, q^p) - c + e^i] - V(t^i, q^l)} \tag{10}$$

Voters in subset M rank party l as their third-best, thus they have to coordinate on voting for either r or p. Consider voters in subset $M^{wg} \subset M$, such that their first-best is party p (i.e., $\tilde{u}_i^{wg} > 0$) and their gain from voting strategically for r is lower than the opportunity cost of "not-getting" warm glow e^i:

$$V(t^i, q^r) - V(t^i, q^l) < e^i \tag{11}$$

With no warm glow voters in M^{wg} might vote strategically for their second-best, party r, if they think it has more chance to win against party l. With warm glow they always vote sincerely for party p.

Now consider voters in $M^{nwg} \equiv M \setminus M^{wg}$. Warm glow is not sufficient to always lead them to vote for party p (i.e. the inequality above is not satisfied). These voters will have to coordinate in strategic voting. However, compared to no-warm-glow, voters have lower incentive to vote for party r, because in doing so they lose the benefit of warm glow. The following proposition summarizes this reasoning:

PROPOSITION 4. If individuals enjoy warm glow in protest voting,

i) there is a subset M^{wg} of individuals who always vote sincerely for the protest party. Their number increases if the society is more aggrieved.

ii) remaining individuals in M^{nwg} have lower incentive to vote for party r, compared to no-warm-glow case.

(See Proof in Appendix 1)

In sum, Propositions 1 and 2 predict that that emotional motivations to cast a protest vote depend on the interaction between the relative deprivation of an individual (i.e., her resentment) and the strength with which she identifies with her community. Propositions 3 and 4 show

how emotional motivations affect the equilibrium voting behavior in first-past-the-post electoral systems. The remaining of the paper empirically tests these predictions on the 2010 and 2015 UK general elections.

III. Data sources and main variables

Our main source of data is *Understanding Society* (Waves 1 to 6), an individual longitudinal survey launched in 2009 in the UK as the continuation and enhancement of the *British Household Panel Survey*. Some 40,000 households at wave 1 (around 51,000 individuals) are interviewed once every two years and asked about their socioeconomic characteristics, along with a series of questions organized in rotating modules.

In our baseline specification, we aggregate individual data at the level of the 380 Local Authority Districts (hereinafter LAD) in Great Britain (England, Scotland and Wales). We do not include Northern Ireland for lack of data. The LAD is the smallest geographical unit for which *Understanding Society* can be considered representative. We also exploit additional data obtained from the Office of National Statistics and other institutional sources, always at the LAD level of aggregation.[25] We combine those data with electoral outcomes from the UK Electoral Commission, retrieving party vote shares and turnout in general elections at the Westminster Parliamentary Constituency level. We aggregate Constituency data at the same LAD level and link them to our main dataset. A detailed list of data sources is provided in Appendix 4.

The available waves of *Understanding Society* span across the 2010 and 2015 UK general elections, whose results we use to test our theory.[26] In the considered period, UKIP competes in 363 LADs in 2010 and 372 LADs in 2015. We code the districts in which UKIP does not run as missing. We also exclude four districts for which we do not have survey respondents. The final sample in our LAD-level baseline specification is thus composed of 733 observations over the two election years.[27] Our main dependent variable is the UKIP vote share in the two general elections of 2010 and 2015, aggregated at the LAD-level. In this period the UKIP vote

25. Specifically, we have retrieved information on employment (*Annual Survey of Hours and Earnings*), migration (*Immigration Statistics*), trade (*OECD STAN Bilateral Trade*), crime (*Recorded crime data at Community Safety Partnership*), welfare (*Department for Work and Pensions*).

26. The 2017 UK general elections have been called in the aftermath of the Brexit referendum with the explicit intention to reinforce the Prime Minister's mandate. This hampers the comparability of the 2017 elections with previous rounds.

27. The choice of running or not in a district may introduce selection in our sample. However the number of districts in which UKIP does not run is very limited, and results are in any case robust to coding those districts as zeros and including them in our estimates.

share increased at the national level from 3.1% in 2010 to 12.6% in 2015.[28]

Our main covariates are directly derived from the theoretical model. In particular, as shown in equation (5), our theory of collective emotions states that an individual is more aggrieved when she experiences stronger resentment (higher r_i), when a larger share of group members also experience the same feeling (higher π^i), when she identifies more strongly with the community (higher λ^i), and where on average resentment is higher across group members (higher $\bar{r}^i$). In the baseline specification, our identification strategy exploits LAD-level variation in order to assess the drivers of the observed electoral outcomes. We start by considering the LAD-aggregated proxies of π^i and λ^i, as described below. In Appendix 3 we augment the baseline specification including the proxy of $\bar{r}^i$, with robust results. In Section V we test our results using individual-level data, thus also including a proxy of individual resentment r_i in our estimates.[29]

By equation (4), individual i's resentment r_i is caused by a worsening of her relative deprivation. At time t, she compares her income to the income of richer UK inhabitants. As in Chakravarty (1997), our proxy $IRD_{i,t}$ of relative deprivation is given by the sum of the distances between i's income and the income of richer individuals at time t, normalized by total income:

$$IRD_{i,t}(y) = \frac{\sum_{j \in B_{i,t}} (y_{j,t} - y_{i,t})}{n_t \bar{y}_t} \tag{12}$$

where $y_{i,t}$ is the income of individual i at time t; $B_{i,t}$ is the set of UK inhabitants who are richer than i; $\bar{y}_t$ is average income and n_t is the total number of UK inhabitants.[30] This measure of individual relative deprivation has the advantage of being sensitive to both the number and the distance of richer individuals in the income distribution. The change in IRD, computed as the increase in relative deprivation over two consecutive years (2009-2010 and 2014-2015), is then a proxy of r_i in 2010 and 2015, respectively.

We also derive a proxy $RD_{d,t}$ of people experiencing resentment in LAD d. It captures the

28. Despite the electoral success, due to the first-past-the-post electoral rule, UKIP obtained only one seat in the 2015 elections (their first one), in the House of Commons. A similar increase in vote shares for UKIP can be seen in European elections, from 16% in 2009 to 26.6% in 2014. The higher share of vote for the UKIP at European elections is not surprising, given the lower turnout (around 35%) and the specific electoral patterns of European vs. national elections (Usherwood, 2008; Mudde, 1999)

29. In the baseline model our units of observation are LADs because they are the smallest geographical units for which individual samples in *Understanding Society* are representative. The latter allows us to safely aggregate individual variables at the LAD level, and link them to official electoral outcomes, always measured at the LAD level. In the individual-level model of Section V the dependent variable is no longer the official share of votes for UKIP. It is respondents' reported political preferences.

30. We retrieve individual income from household gross annual income, normalized by the number of adults and children with weights 1 and 0.5 respectively. We then compare each respondent's income to the midpoints of the UK income distribution deciles, assuming that income within each decile is distributed as a uniform.

term π^i in (5):

$$RD_{d,t} = \frac{\sum_{i \in D_{d,t}} 1[IRD_{i,t} > (1 + sd_{IRD}) IRD_{i,t-1}]}{|D_{d,t}|} \tag{13}$$

The numerator is the sum across individuals of an indicator function equal to 1 if i's relative deprivation has significantly increased (by more than one standard deviation) over the previous time period, and 0 otherwise; $D_{d,t}$ is the set of respondents in district d at time t and $|D_{d,t}|$ indicates its numerosity. Hence we compare each respondent's relative deprivation in each election year (2010 or 2015) with her relative deprivation in the previous year (2009 or 2014). We then take for each LAD the share of respondents whose relative deprivation has significantly increased. This is the share of individuals experiencing resentment, our proxy of π^i.[31]

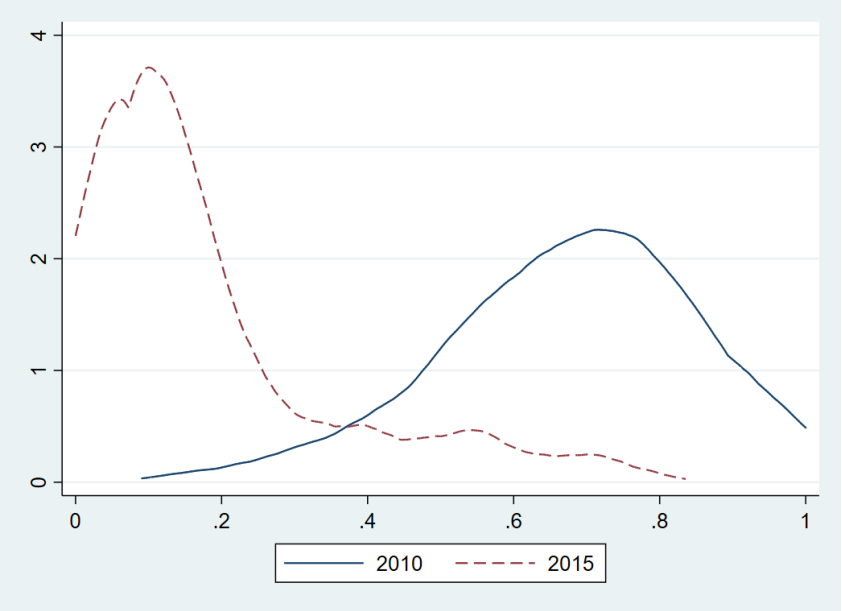
Figure III shows the distribution of our *RD* variable across LADs for the years 2010 and 2015. In 2010, following the financial crisis, on average almost 70% of inhabitants in each LAD experienced a worsening of their relative deprivation. The situation improved in 2015. Still in a non-marginal number of LADs in 2015 the share of individuals reporting a worsening of their relative deprivation remained above 40%. This is well captured by the skewness of the two distributions, which raises from -0.44 in 2010 to 1.55 in 2015.

We now proceed with building a proxy for the identification of an individual with her community, λ^i, another key element of aggrievement. The latter can be measured through variables like neighbourhood attachment, trust and care about fellow neighbours (Letki, 2008). Specifically, our proxy $CC_{d,t}$ for the strength of community cohesion is the share of people in LAD d who answered "yes" in year t to the question *"In the last 12 months, have you given any unpaid help or worked as a volunteer for any type of local, national or international organization or charity?"*. The latter is related to the idea that volunteering measures how much a respondent feels integrated in her community.[32] Note that the LAD does not need to coincide with the community an individual identifies with: our measure $CC_{d,t}$ only captures the *average* strength with which individuals living in LAD d tend to identify with their community in year t.

31. Note that, with respect to our theoretical model, we use an indicator function in (13) to generate a proxy for π^i within each LAD. The latter does not consider the average resentment experienced by the members (the term $\bar{r}^i$). This is done in order to avoid a triple interaction in our baseline model, once we also control for the strength of the identification of an individual with her community (the term λ^i). In one of our robustness checks we show that our results are robust to the inclusion of $\bar{r}^i$ (see Appendix 3).

32. Besides identification, volunteering could also be correlated with trust or social capital (e.g. Putnam, 2001). Therefore we experiment with a number of alternative measures of community identification (cf. Table II). These measures refer to the strength of individual attachment to the neighborhood and always produce robust results (cf. Appendix 3).

FIGURE III: RESENTMENT (RD) ACROSS LADS



Note: The figure shows kernel density distributions of $RD_{d,t}$ measured across LADs in 2010 and 2015.

Table I reports means and standard deviations of our dependent variable (i.e., the share of UKIP votes at LAD level) and our two main covariates *RD* and *CC*, for 2010 and 2015. As already noted, the UKIP vote share more than triples between the two elections. Conversely, relative deprivation decreases significantly over the considered time period, as shown in Figure III. Community cohesion remains instead fairly stable across time; this is not surprising, as community cohesion tends to be a persistent feature of local culture (Guiso et al., 2008).

TABLE I: SUMMARY STATISTICS

		Count	Mean	Sd	Min	Max
2010	UKIP Vote Share	363	0.033	0.016	0.007	0.123
	RD	377	0.692	0.146	0.091	1.000
	CC	375	0.181	0.073	0.000	0.500
2015	UKIP Vote Share	372	0.126	0.058	0.010	0.338
	RD	377	0.269	0.210	0.000	0.836
	CC	377	0.211	0.091	0.000	0.600

Notes. The Table reports descriptive statistics on the main variables computed at the LAD-level starting from survey data. The survey sample is representative of the adult population.

Table II shows the correlation of our proxies *RD* and *CC* with some meaningful economic variables. Panel A shows that RD is negatively correlated with income and positively with un-

TABLE II: Correlates of RD and CC

Panel A	(1)	(2)	(3)	(4)	(5)
Dep. Var.	RD	RD	RD	RD	RD
Indep. Var	Income	Unemployment	Poverty	Inequality	Inequality 2
	-1.193***	0.744***	0.383***	-0.056	-0.033
	[0.456]	[0.024]	[0.035]	[0.037]	[0.022]
Observations	747	755	755	585	715
R-squared	0.54	0.78	0.36	0.42	0.12
Panel B	(1)	(2)	(3)	(4)	(5)
Dep. Var.	CC	CC	CC	CC	CC
Indep. Var.	Local trust	Mutual help	Get along	Belong to nbr	General trust
	0.443***	0.315***	0.357***	0.178***	-0.117
	[0.066]	[0.049]	[0.051]	[0.052]	[0.119]
Observations	753	753	753	739	680
R-squared	0.23	0.19	0.22	0.09	0.08

Notes. In Panel A, the dependent variable *RD* is relative deprivation computed as in Eq. (13) in each LAD-Year. *Income* is income deciles, *Unemployment* is the share of unemployed respondents, *Poverty* is the share of respondents declaring less than 60% of the national median income, *LAD Inequality* is the LAD interquartile range of income, *LAD Inequality 2* is LAD-level median over mean income. In Panel B, the dependent variable *CC* is the average share of respondents reporting a volunteering activity in each LAD-Year. *Local Trust* is the share of respondents declaring that people in the neighborhood can be trusted, *Mutual Help* is the share declaring that people help each other in the neighborhood, *Get Along* is the share declaring that people in the neighborhood get along, *Belong to nbr* is the share declaring that they feel they belong to the neighborhood, *General Trust* is the share declaring that they are happy with how democracy works. All variables range from 0 to 1. All regressions include region and year fixed effects. Standard errors are clustered at the LAD level; regressions are weighted by the square root of LAD sample size. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

employment and poverty across LADs. Consistently with the idea that our collective mechanism is different than simple inequity aversion (Fehr and Schmidt, 1999), our measure of RD is not correlated with different measures of inequality within LADs (cf. Columns 4 and 5). Panel B in Table II shows that Community Cohesion is positively correlated with a number of survey measures of neighborhood cohesion. Interestingly, it is not correlated with generalized trust, measured as the share of people declaring that they are happy with how democracy works. Hence CC actually seems to capture dynamics that take place at community level.

IV. Aggrievement and Protest Vote

IV.A. Baseline results

We follow our theory of collective emotions and explore whether a possible interplay between the share of people experiencing resentment in the community (RD) and community cohesion (CC) at the LAD level leads to vote for the protest party. We adopt different fixed effect specifications in our estimates, in order to capture different possible sources of bias. Our baseline model is:

$$UKIP_{d,t} = \alpha + \beta_1 RD_{d,t} + \beta_2 CC_{d,t} + \beta_3 RD_{d,t} \times CC_{d,t} + \Gamma_{r,t} + \epsilon_{d,t} \tag{14}$$

where the subscripts d, r and t indicate respectively the LAD, the region and the election year.[33] The dependent variable $UKIP_{d,t}$ is UKIP vote share over total valid votes casted. $CC_{d,t}$ is community cohesion and $RD_{d,t}$ is aggregate resentment in the community, as defined in equation (13). The term $\Gamma_{r,t}$ summarizes different sets of geography and time fixed effects that we employ in our estimations.

In our first specification (cf. Table III, Columns 1 and 2), we introduce region r and time t fixed effects, i.e. we identify our coefficient exploiting the residual variation across LADs within regions. This specification does not capture omitted variables that vary both across time and locations. For instance, trade-induced labour market disruptions may differently affect regions over time. Hence in Table III, Column 3, we estimate a second model including regional time trends, i.e. $\Gamma_{r \times t}$. In a third specification (cf. Table III, Column 4) we further restrict the variance used in the estimation to control for possible sources of bias that vary within regions and across

33. Regions are defined at the NUTS-3 level of the Eurostat classification, and encompass different LADs.

LADs, thus introducing LAD and year fixed-effects $\Gamma_{r=d,t}$, i.e. identifying only through the within-LAD variation over time.

Even the latter specification, although restrictive, may still suffer from omitted factors that vary within LADs and over time. Thus, in Table III, Column 5 we include controls for the most relevant factors that may affect both $UKIP$ and $RD \times CC$, always keeping LAD and time fixed effects:

$$UKIP_{d,t} = \alpha + \beta_1 RD_{d,t} + \beta_2 CC_{d,t} + \beta_3 RD_{d,t} \times CC_{d,t} + Controls_{d,t} + \Gamma_{d,t} + \epsilon_{d,t} \tag{15}$$

where $Controls_{d,t}$ is a vector of LAD-year varying variables. In particular, we include variables that may affect at the same time the level of Community Cohesion and UKIP support (i.e. UKIP campaign intensity, share of white people, share of religious people), or Relative Deprivation and UKIP support (income, change in income, unemployment, poverty, trade shock, Welfare payments), or both (crime rate, education, immigration). Details of the control variables are available in Appendix 2. Finally, in Table III, Column 6 we specify a model in which we interact all control variables with CC_{dt}. The latter excludes the possibility that our main interaction captures heterogeneous effects of our controls across community cohesion levels.[34]

In all specifications, standard errors are clustered at the LAD level. Moreover, since our main independent variables are constructed from survey respondents, regressions are weighted by the squared root of the survey sample numerosity within each LAD. The aim is to give more weight to those districts for which we have better average estimates. Results are robust to non-weighting and to dropping LADs with fewer survey respondents, as shown in Appendix 3.

Our main hypothesis is tested through the interaction term $RD \times CC$. The interaction is statistically significant in all specifications of Table III and has a positive sign.[35] These results show that in communities where cohesion is stronger, a higher share of people experiencing resentment turns into a positive support for UKIP.[36] These findings are entirely consistent with our theoretical model. The sign of the RD coefficient is significant and negative in all specifications. As RD is positively correlated with measures of economic uncertainty (see Table II), the sign of its coefficient plausibly captures a demand for redistribution, typically not a

34. Interacting our control variables with RD yields similar results.

35. Column 5 and 6 have a lower number of observations due to missing data in the control variables. The full set of coefficients for these columns is reported in Appendix 2.

36. Specifically, the linear combination of the direct and indirect effects of RD turns positive for levels of CC close to 0.42, i.e. in the upper quartile of its distribution.

chracterizing issue of UKIP's political platform. Additional suggestive evidence in this direction is discussed in the next section. *CC* is negatively correlated with the UKIP vote share. This seems consistent with existing empirical work showing that high shares of individuals belonging to associations are negatively associated with populism (Boeri et al., 2018).

TABLE III: Baseline results

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Ukip	Ukip	Ukip	Ukip	Ukip	Ukip
RD × CC		0.134***	0.123***	0.247***	0.254***	0.281*
		[0.039]	[0.034]	[0.085]	[0.096]	[0.162]
RD	-0.029***	-0.056***	-0.050***	-.086***	-0.105***	-0.104**
	[0.008]	[0.011]	[0.009]	[0.027]	[0.035]	[0.042]
CC	-0.061***	-0.131***	-0.115***	-0.153***	-0.131**	0.397
	[0.013]	[0.027]	[0.023]	[0.047]	[0.054]	[2.657]
Year FE	✓	✓	✓	✓	✓	✓
Region FE	✓	✓	✓			
Region × Year FE			✓			
Lad FE				✓	✓	✓
Controls					✓	✓
Fully Interacted						✓
Observations	734	734	734	734	546	546
R-squared	0.73	0.73	0.80	0.78	0.92	0.92

Notes. Each column shows the result of regressing the UKIP vote share in each LAD-Year on the interaction of community cohesion (*CC*) and aggregate resentment (*RD*), controlling for both variables separately. All variables range from 0 to 1. Column 1 reports the main variables without interaction; column 2 uses model (14) with region and year fixed effects; columns 3 and 4 use the same model with region × year or LAD and year fixed effects, respectively; columns 5 and 6 test model (15). *Controls* include *UKIP activism*, *White Share*, *Religiosity*, *Education*, *Income*, *Crime Rate*, *Income change*, *Unemployment change*, *Poverty change*, *Welfare benefits*, *Trade shock* and *Immigration*. The full set of coefficients for these controls is reported in Appendix 2. Standard errors are clustered at the LAD level; regressions are weighted by the square root of LAD sample size. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

IV.B. Robustness

In this section, we first verify that *CC* is not endogenous to *RD*. Second, we propose a placebo specification, where we estimate our baseline model for other political parties.

1. Endogeneity. Our key identification assumption is that any change in *RD* does not systematically affect the average strength with which an individual identifies with her commmunity (*CC*). Two potential mechanisms might challenge this assumption. First, it may be true that in

more disadvantaged areas we observe more volunteering in poverty relief or charity, and hence a positive correlation between economic outcomes (possibly correlated with RD) and community cohesion CC. Second, it might be the case that UKIP campaign activists are more engaged in raising support in areas where resentment is more widespread: the latter leads to both higher levels of CC (when measured as volunteering) and UKIP vote shares in LADs characterized by higher RD. To address these issues, we first assess whether LADs with higher levels of RD also experience higher levels of CC. We then analyze whether any correlation between RD and CC is influenced by UKIP political activism.

In Table IV, the first column reports the regression coefficient of CC used as dependent variable on RD, controlling for region and year fixed effects; this is far from being statistically significant. In Column 2, the specification is augmented with the interaction between RD and a time trend to check for differential effects over time. Again we find no correlation. In Column 3, we further add a measure of UKIP campaign intensity to the specification, calculated as the share of respondents contacted by UKIP (in any form) during the electoral campaign: nothing is significant.

TABLE IV: Resentment vs. Community Cohesion

	(1)	(2)	(3)
Dep. Var.	CC	CC	CC
RD	0.001	-0.017	-0.016
	[0.021]	[0.026]	[0.026]
RD × 2015		0.040	0.041
		[0.038]	[0.038]
UKIP activism			0.022
			[0.033]
Observations	753	753	753
R-squared	0.12	0.12	0.12

Notes. Columns show the result of regressing community cohesion (CC) on aggregate resentment (RD), its interaction with a time trend ($RD \times 2015$) and UKIP political activism, calculated as the share of respondents contacted by UKIP (in any form) during the electoral campaign. Variables range from 0 to 1. All regressions include region and year fixed effects. Standard errors are clustered at the LAD level; regressions are weighted by the square root of LAD sample size. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

We can thus conclude that RD and CC are independent of each other in the considered sample. This result supports the validity of the exclusion restriction and our causal interpretation of

the results in line with the theoretical model. Some additional robustness checks can be found in Appendix 3, where we show that all our results are robust, among others, to fixing the value of Volunteering to 2010, to alternative proxies of community cohesion or relative deprivation, and to the inclusion of the average resentment across group members ($\bar{r}^i$). We also discuss the sensitivity of our results to sample restrictions.

2. Other Political Parties and Turnout. An alternative way to validate our results is to look at how our variables affect other parties' electoral performances in the UK. Our theory posits that traditional parties are unable to convey emotional utility, e_i. Supports for these parties should thus be uncorrelated with our proxy for aggrievement, as captured by $RD \times CC$. To that extent, Table V reports our baseline model estimated for other parties. We only include parties that obtained some parliamentary representation in 2010 or 2015; also, we exclude regional parties (e.g. the Scottish National Party). All columns are estimated through a Seemingly Unrelated Regression Model, to account for correlations in the error terms across the different specifications. The drop in the number of observations with respect to Table III is due to the fact that the Green party was not competing in all LADs.

TABLE V: Other Political Parties and Turnout

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Ukip	Conservatives	Labour	LibDem	Green	Turnout
RD × CC	0.149***	0.028	-0.170	0.177	-0.032	0.057
	[0.052]	[0.177]	[0.201]	[0.132]	[0.033]	[0.071]
RD	-0.066***	-0.147***	0.215***	-0.031	0.026***	-0.067***
	[0.013]	[0.045]	[0.051]	[0.033]	[0.008]	[0.018]
CC	-0.147***	0.375***	-0.408***	0.115	0.036*	0.186***
	[0.030]	[0.101]	[0.115]	[0.076]	[0.019]	[0.040]
Observations	581	581	581	581	581	581
R-squared	0.75	0.49	0.51	0.59	0.39	0.35

Notes. Each column shows the result of regressing the vote share for the indicated party in each LAD-Year on the interaction of community cohesion (CC) and aggregate resentment (RD), controlling for both variables separately. Variables range from 0 to 1. The models are estimated through Seemingly Unrelated Regressions. All regressions include region and year fixed effects. Standard errors are clustered at the LAD level; regressions are weighted by the square root of LAD sample size. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Results suggest that, apart from UKIP, no other parties enjoy electoral gains because of

aggrievement. It is interesting to observe that the UK party that traditionally collected protest vote in the past, i.e. the Liberal Democrats (Birch and Dennison, 2017), displays a positive coefficient in the interaction $RD \times CC$ that comes close to the 10% significance level (see column 4). Moreover, in line with the conjecture that RD might capture a demand for redistribution, an increase in RD at the LAD level is positively and significantly associated with the Labour Party and the Green vote shares, and negatively so with the Conservative Party.

In Column 6 we report results using as a dependent variable the electoral turnout recorded in the two general elections that we consider in our sample. Turnout has been identified by Guiso et al. (2017) as an important driver of populist parties' success across European countries. We find that turnout is positively signed but not significantly correlated with $RD \times CC$. Thus, our behavioral channel does not seem to influence significantly electoral participation. The latter instead increases in CC and decreases in RD when considered separately, consistent with results in Guiso et al. (2017).[37]

V. Individual level analysis

We now turn our attention to additional tests of our theory that can only be performed using individual level data. We start with addressing a possible ecological fallacy in our baseline analysis as stemming from the use of LAD-level data. Then, we test our individual-level model.

1. Ecological Fallacy (Kramer, 1983). Given the aggregated nature of the data, a potential identification issue is that our results are observationally equivalent to the coexistence of deprived non-cohesive and non-deprived cohesive groups in the same LAD. To rule out this possibility, we generate four types of individuals, by combining the indicator variable $1[IRD_{i,t} > (1 + sd_{IRD})IRD_{i,t-1}]$ with the individual dummy measure CC_i. We then calculate the shares of each type in each LAD-year.[38] Table VI reports the regressions of UKIP vote share on the shares of the four respondent types by LAD and year. Results show that the share of UKIP votes is correlated only to the share of types who identify with her community and, at the same

37. Guiso et al. (2017) document a negative association between economic shocks, potentially associated with a worsening of relative deprivation, and the incentive of supporters of mainstream parties to participate in elections. Including turnout as a control in our main specification does not change results.

38. Specifically, $RD = 1$ $CC = 1$ is the share of people in the LAD that experience both resentment and cohesion; $RD = 1$ $CC = 0$ is the share of people in the LAD that experience resentment but not cohesion; $RD = 0$ $CC = 1$ is the share of people in the LAD that experience cohesion but not resentment; $RD = 0$ $CC = 0$ is the share of people in the LAD that experience neither cohesion nor resentment

time, experience resentment. No other combination has a positive and significant coefficient. Again, this result supports our theoretical predictions.

TABLE VI: Interaction at the Individual Level

	(1)	(2)	(3)	(4)
Dep. Var.	Ukip	Ukip	Ukip	Ukip
Indep. Var.	RD=1 CC=1	RD=1 CC=0	RD=0 CC=1	RD=0 CC=0
	0.092***	0.014	-0.099**	0.039
	[0.035]	[0.012]	[0.039]	[0.033]
Observations	734	734	734	734
R-squared	0.73	0.73	0.73	0.73

Notes. Each column shows the result of regressing the vote share for UKIP in each LAD-Year on the share of LAD inhabitants with specific RD and CC combinations, controlling for RD and CC levels in the LAD. Variables range from 0 to 1. In Columns 1, $RD = 1$ $CC = 1$ is the share of people in the LAD that experience both resentment and cohesion; in Column 2, $RD = 1$ $CC = 0$ is the share of people in the LAD that experience resentment but not cohesion; in Column 3, $RD = 0$ $CC = 1$ is the share of people in the LAD that experience cohesion but not resentment; in Column 4, $RD = 0$ $CC = 0$ is the share of people in the LAD that experience neither cohesion nor resentment. All regressions include region and year fixed effects. Standard errors are clustered at the LAD level; regressions are weighted by the square root of LAD sample size. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

2. Full individual model. We cannot directly test a model of individual voting behavior because information on the actual vote cast is not available. Therefore, we use interviews on voting intentions collected before elections. Information on the propensity to vote for UKIP is however only available for the 2015 election period, as UKIP was not among the parties of choice in the 2010 wave of *Understanding Society*. We thus restrict the sample to respondents interviewed in 2015. This procedure results in a sample of 4254 respondents, interviewed between January 1st and May 6th 2015. For each of them we know their LAD of residence, and the month when the interview has been carried out.

Equation (16) allows to test our main predictions using individual level data:

$$\begin{aligned} UKIP_i = \alpha + \beta_1 RD_d \times CC_i + \beta_2 CC_i + \beta_3 IRD_i \\ + \beta_4 IRD_i \times CC_i + Controls_i + \zeta_d + \epsilon_i \end{aligned} \tag{16}$$

Our dependent variable is a dummy equal to one if the respondents answers 'UKIP' in their voting intentions.[39] In terms of covariates, RD is, as before, a proxy for the share of people

39. Specifically, the respondent answers either one of the two following questions: *"If there were to be a general election tomorrow, which political party do you think you would be most likely to support?"*, and/or *"Generally speaking do you think of yourself as a supporter of any one political party? [Or] Do you think of yourself as a*

experiencing resentment in the community, while CC is now an individual-level dummy variable equal to one if the respondent has done some volunteering over the previous year, a proxy for her attachment to the local community. As usual our main variable of interest is the interaction between these two covariates. Note that we include RD only in the interaction term because the stand-alone variable is now absorbed by the ζ_d fixed effects at the LAD-level added to the cross-sectional estimation across individuals. Importantly, we can now include in our estimates also individual resentment r_i, another component of aggrievement, and thus test the full model subsumed by Propositions 4 and 5. As already discussed, individual resentment is proxied by individual relative deprivation IRD calculated as in equation (12).

Table VII reports the estimates of our individual level model. Errors are always clustered at the household level. In Column 1 we include only our main covariates. As expected, the interaction of CC and RD is positive and statistically significant: individuals who feel strongly attached to their communities respond to an increase in LAD-level relative deprivation with a strong preference for a protest party. The coefficient of CC is negative and significant, coherently with aggregate results in Table III. In Column 2 we add individual relative deprivation, IRD, and its interaction with CC. While our main interaction remains significant, IRD has a positive direct effect on support for UKIP. This is consistent with our theory: the amplification channel captured by $RD \times CC$ remains significant across specifications, while the individual experience of resentment captured by IRD positively contributes to aggrievement but appears to be less robust to the inclusion of additional controls (columns 3 to 6). Again, this supports our idea that emotions matter more when experienced at the community level. Also note that IRD has no indirect effect through CC, as shown by the non significant interaction $IRD \times CC$. The latter should be intended as a falsification test: strategic complementarities are not channeled by individual resentment, they occur only when resentment is widespread in the community.

In Column 3, on top of the usual socio-demographic characteristics used as controls, we include a dummy for political activism (*"Are you currently a member of any of the kinds of organizations on this card? Which one? [Political Party]", or "Whether you are a member or not, do you join in the activities of any of these organizations on a regular basis? [Political Party] "*); we also include a dummy equal to one if the respondent moved to her neighborhood less than 5 years before. The first variable accounts for a potential omitted factor problem induced by the self-selection of politically active respondents into volunteering. The second

little closer to one political party than to the others? [If Yes] Which one?"

variable controls for the potential self-selection of people who experience a deterioration of their economic condition and move into areas characterized by higher levels of community cohesion.

TABLE VII: Individual Level Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Ukip	Ukip	Ukip	Ukip	Ukip	Ukip
$\text{RD}_d \times CC_i$	0.078**	0.083**	0.094**	0.097**	0.093**	0.093**
	[0.032]	[0.033]	[0.040]	[0.040]	[0.041]	[0.041]
CC_i	-0.051***	-0.029	-0.031	-0.030	-0.031	-0.031
	[0.012]	[0.021]	[0.023]	[0.024]	[0.024]	[0.024]
$\text{IRD}_i \times CC_i$		-0.039	-0.033	-0.035	-0.034	-0.034
		[0.035]	[0.038]	[0.039]	[0.039]	[0.039]
IRD_i		0.066***	0.007	0.016	0.089	0.089
		[0.020]	[0.064]	[0.064]	[0.054]	[0.054]
Controls			✓	✓	✓	✓
Local News				✓	✓	✓
Internet					✓	✓
Contact w UKIP						✓
Observations	5019	5019	4127	4050	4054	4054
R-squared	0.13	0.13	0.17	0.17	0.16	0.16

Notes. Each column shows the result of regressing reported support for UKIP on the interaction of CC, LAD-level resentment RD and controls. Observations are individual respondents, interviewed in 2015 before the election day. The subscripts i and d indicate respectively individual and LAD level variables. Column 1 reports the main interaction controlling for CC separately; Columns 2 to 4 include controls; Column 3 includes individual resentment IRD_i; Column 4 adds the interaction between IRD_i and CC_i. *Controls* include *Gender*, *Marital Status*, *Education*, *Being British*, *Income*, *Income Squared*, *Age*, *Age Squared*, *Religiosity*, *Ethnicity*, *Employment Status*, *Moved Recently* and *Political Activism*. All regressions include LAD and month fixed effects. Standard errors are clustered at the household level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

In Columns 4, 5 and 6 we test an alternative channel of protest vote. It might be the case that a higher level of identification of individuals with their community fosters coordination in voting strategies within that community. Thus, the positive effect of $RD \times CC$ would capture a rational, rather than emotional, behaviour in which exchange of information within the community about the state of the world (e.g. ability/inability of political leaders) might lead to better coordination on protest vote. To control for this alternative channel, in Column 4 we introduce a dummy equal to one if the respondent indicates as her main source of information any channel among personal experience, friends, relatives, word of mouth, or local newspapers. In Column 5 we add

a dummy equal to one if the respondent indicates as her main source of information internet or the web. In Column 6 we also introduce a dummy equal to one if the respondent reports having been contacted by the UKIP campaign organizers. When these variables are included, the coefficient of $RD \times CC$ is unchanged. We can therefore exclude that these informational-related factors mediate our main emotional effect.

Finally, in Table VIII we provide a counter-factual analysis of our channel, testing the extent to which our main interaction $RD \times CC$ in equation (16) is associated to individual measures of negative emotions (i.e. measures of frustration towards the political system, as well as perceived mental health - cf. Notes in Table VIII). We find all these measures to be broadly correlated with $RD \times CC$. This provides suggestive evidence that our proxy for aggrievement is correlated with negative emotions at the individual level.

TABLE VIII: Emotional correlates of $RD \times CC$

	(1)	(2)	(3)	(4)	(5)
Dep. Var.	Pol1	Pol2	Health1	Health2	Health3
$RD_d \times CC_i$	0.231**	0.412*	0.243**	0.623**	0.351*
	[0.118]	[0.211]	[0.098]	[0.316]	[0.190]
Observations	4138	4090	4052	1673	4049
R-squared	0.17	0.18	0.12	0.24	0.11

Notes. Each column shows the result of regressing the dependent variable on the interaction of CC_i, LAD-level resentment RD_d and controls. Observations are individual respondents, interviewed in 2015 before the election day. The dependent variables report different emotional measures. *Pol1* is a dummy equal to one if the respondent reports agreeing with the statement *"People like me don't have any say in what the government does"*. *Pol2* is constructing summing *Pol1* to a dummy equal one if the respondent reports agreeing with the statement *"Public officials don't care much about what people like me think"*. *Health1* is a dummy equal to one if the respondents reports feeling unhappy or depressed more than usual (*'Have you recently been feeling unhappy or depressed?"*). *Health2* is the standard GHQ Subjective Wellbeing scale (in logarithm), with higher values indicating higher levels of mental distress. *Health3* is the sum of dummies equal one if the respondents report bad mental health for most of the time in the last four weeks (*"Have you felt downhearted and depressed?"*, *"Mental health meant accomplished less"*, *"Mental health meant worked less carefully"*). All regressions include Controls (as in Table VII), as well as LAD and Month fixed effects. Standard errors are clustered at the household level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

VI. Conclusion

In this paper, we have build a psychological theory of protest vote and tested it. If people feel aggrieved they vote for the protest party as a way to take revenge against traditional politics. Crucially, aggrievement leading to protest vote is experienced at the collective level because,

as suggested by social psychology, individuals identifying with a community tend to absorb the emotions of other community members.

The theory is confirmed by the data. Support for UKIP in 2010 and 2015 was stronger in districts where more people actively interacted with their local community and where more people had been losing their income positions relative to the richer part of the UK population.

We have focused on psychological motivations and emphasized collective mechanisms triggering aggrievement against traditional parties. One might see our work as a complement of existing research on populism, which mostly investigates material motivations and economic factors. Our work is possibly one of the first attempts to study the complex but important connections between people's perception of their position in the society, the way they form political expectations, and the way they react to unmet expectations.

References

Akerlof, G. A. and Kranton, R. E. (2000). Economics and identity. *The Quarterly Journal of Economics*, 115(3):715–753.

Becker, S. O., Fetzer, T., et al. (2016). *Does Migration Cause Extreme Voting?* CAGE Working Paper No. 306.

Betz, H.-G. (1993). The new politics of resentment: Radical right-wing populist parties in western europe. *Comparative Politics*, pages 413–427.

Birch, S. and Dennison, J. (2017). How protest voters choose. *Party Politics*.

Boeri, M. T., Mishra, M. P., Papageorgiou, M. C., and Spilimbergo, M. A. (2018). *Populism and Civil Society*. IMF Working Paper No. 18/245.

Chakravarty, S. R. (1997). Relative deprivation and satisfaction orderings. *Keio Economic Studies*, 34:17–31.

Colantone, I. and Stanig, P. (2018a). Global competition and brexit. *American Political Science Review*, 112(2):201–218.

Colantone, I. and Stanig, P. (2018b). The trade origins of economic nationalism: Import competition and voting behavior in western europe. *American Journal of Political Science*, 62(4):936–953.

Cox, G. W. (1994). Strategic voting equilibria under the single nontransferable vote. *American Political Science Review*, 88(3):608–621.

Di Tella, R. and Rotemberg, J. J. (2018). Populism and the return of the "paranoid style": Some evidence and a simple model of demand for incompetence as insurance against elite betrayal. *Journal of Comparative Economics*, 46(4):988–1005.

D'Ambrosio, C. and Frick, J. R. (2007). Income satisfaction and relative deprivation: An empirical link. *Social Indicators Research*, 81(3):497–519.

Enke, B. (2018). *Moral values and voting*. NBER Working Paper No. 24268.

Fehr, E. and Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114(3):817–868.

Fetzer, T. (2018). *Did Austerity Cause Brexit?* CAGE Working Paper No. 381.

Ford, R., Goodwin, M. J., and Cutts, D. (2012). Strategic eurosceptics and polite xenophobes: support for the united kingdom independence party (ukip) in the 2009 european parliament elections. *European Journal of Political Research*, 51(2):204–234.

Gaffney, A., Hackett, J. D., Rast, D. E., Hohman, Z. P., and Jaurique, A. (2018). The state of american protest: Shared anger and populism. *Analyses of Social Issues and Public Policy*, 18(1):11–33.

Grossman, G. M. and Helpman, E. (2018). *Identity Politics and Trade Policy*. NBER Working Paper No. 25348.

Guiso, L., Herrera, H., Morelli, M., Sonno, T., et al. (2017). *Demand and Supply of Populism*. CEPR Discussion Paper No. DP11871.

Guiso, L., Sapienza, P., and Zingales, L. (2008). Social capital as good culture. *Journal of the European Economic Association*, 6(2-3):295–320.

Hewstone, M. (1990). The 'ultimate attribution error'? a review of the literature on intergroup causal attribution. *European Journal of Social Psychology*, 20(4):311–335.

Inglehart, R. and Norris, P. (2016). *Trump, Brexit, and the rise of populism: Economic have-nots and cultural backlash*. HKS Working Paper No. RWP16-026.

Kramer, G. H. (1983). The ecological fallacy revisited: Aggregate-versus individual-level findings on economics and elections, and sociotropic voting. *American Political Science Review*, 77(1):92–111.

Kselman, D. and Niou, E. (2011). Protest voting in plurality elections: a theory of voter signaling. *Public Choice*, 148(3-4):395–418.

Letki, N. (2008). Does diversity erode social cohesion? social capital and race in british neighbourhoods. *Political Studies*, 56(1):99–126.

Liberini, F., Oswald, A. J., Proto, E., and Redoano, M. (2017). *Was Brexit Caused by the Unhappy and the Old?* IZA Discussion Paper No. 11059.

Lucassen, G. and Lubbers, M. (2012). Who fears what? explaining far-right-wing preference in europe by distinguishing perceived cultural and economic ethnic threats. *Comparative Political Studies*, 45(5):547–574.

Mackie, D., Devost, T., and Smith, E. (2000). Intergroup emotions: Explaining offensive action tendencies in an intergroup context. *Journal of Personality and Social Psychology: Interpersonal Relations and Group Processes*, 79:602–616.

Mackie, D. M. and Smith, E. R. (2015). Intergroup emotions. In Mikulincer, M. and Shaver, P. R., editors, *APA Handbook of Personality and Social Psychology*, pages 263–293. American Psychological Association.

Maitner, A. T., Mackie, D. M., and Smith, E. R. (2007). Antecedents and consequences of satisfaction and guilt following ingroup aggression. *Group Processes & Intergroup Relations*, 10(2):223–237.

Merton, R. K. and Kitt, A. S. (1950). Contributions to the theory of reference group behavior. In *Continuities in social research: Studies in the scope and method of "The American Soldier"*, pages 40–105. The Free Press Glencoe, IL.

Miller, N. E. (1941). The frustration-aggression hypothesis. *Psychological Review*, 48(4):337.

Morris, S. and Shin, H. S. (2003). Heterogeneity and uniqueness in interaction games. In Blume, L. E. and Durlauf, S. N., editors, *The Economy As an Evolving Complex System, III: Current Perspectives and Future Directions*, pages 207–242. Oxford University Press.

Mudde, C. (1999). The single-issue party thesis: Extreme right parties and the immigration issue. *West European Politics*, 22(3):182–197.

Mudde, C. (2004). The populist zeitgeist. *Government and opposition*, 39(4):541–563.

Mudde, C. (2007). *Populist Radical Right Parties in Europe*. Cambridge University Press.

Müller, J.-W. (2017). *What is populism?* Penguin UK.

Myatt, D. P. (2007). On the theory of strategic voting. *The Review of Economic Studies*, 74(1):255–281.

Myatt, D. P. (2017). A theory of protest voting. *The Economic Journal*, 127(603):1527–1567.

Myerson, R. B. and Weber, R. J. (1993). A theory of voting equilibria. *American Political Science Review*, 87(1):102–114.

Palfrey, T. R. (1989). A mathematical proof of duverger's law. In Ordeshook, P. C., editor, *Models of Strategic Choice in Politics*, pages 69–92. University of Michigan Press.

Passarelli, F. and Tabellini, G. (2017). Emotions and political unrest. *Journal of Political Economy*, 125(3):903–946.

Pastor, L. and Veronesi, P. (2018). *Inequality Aversion, Populism, and the Backlash Against Globalization*. NBER Working Paper No. 24900.

Pons, V. and Tricaud, C. (2018). Expressive voting and its cost: Evidence from runoffs with two or three candidates. *Econometrica*, 86(5):1621–1649.

Putnam, R. D. (2001). *Bowling alone: The collapse and revival of American community*. Simon and Schuster.

Redlawsk, D. P., Pierce, D., Arzheimer, K., Evans, J., and Lewis-Beck, M. (2017). Emotions and voting. In Arzheimer, K., Evans, J., and Lewis-Beck, M. S., editors, *Sage Handbook of Electoral Behaviour*, pages 406–432. SAGE Publishing.

Rico, G., Guinijoan, M., and Anduiza, E. (2017). The emotional underpinnings of populism: How anger and fear affect populist attitudes. *Swiss Political Science Review*, 23(4):444–461.

Rodrik, D. (2018). Populism and the economics of globalization. *Journal of International Business Policy*, 1:12–33.

Runciman, W. G. (1966). Relative deprivation and social justice: Study attitudes social inequality in 20th century england. *Social Forces*, 45(4):596–597.

Smith, H. J., Pettigrew, T. F., Pippin, G. M., and Bialosiewicz, S. (2012). Relative deprivation: A theoretical and meta-analytic review. *Personality and Social Psychology Review*, 16(3):203–232.

Tajfel, H. (1974). Social identity and intergroup behaviour. *Information (International Social Science Council)*, 13(2):65–93.

Usherwood, S. (2008). The dilemmas of a single-issue party–the uk independence party. *Representation*, 44(3):255–264.

Valentino, N., Brader, E., Groenendyk, K., and Hutchings, V. (2011). Election night's alright for fighting: The role of emotions in political participation. *Journal of Politics*, 73(1):156–170.

Van Hauwaert, S. M. and Van Kessel, S. (2018). Beyond protest and discontent: A cross-national analysis of the effect of populist attitudes and issue positions on populist party support. *European Journal of Political Research*, 57(1):68–92.

Van Kessel, S. (2015). *Populist Parties in Europe: Agents of Discontent?* Palgrave Macmillan UK.

Wuthnow, R. (2018). *The Left Behind: Decline and Rage in Rural America*. Princeton University Press.

Appendix 1

Proof. **Proposition 1**

i) By (2), $\hat{t} = \hat{T}(c, e, q^l, q^p)$.

i.1) Implicit differentiation of (2), yields $\hat{T}_e = -\frac{-1}{V_t(\hat{t},q^r)-V_t(\hat{t},q^p)} < 0$. The inequality follows from the fact that the sign of the denominator is negative because $V_{qt} > 0$ and $q^r < q^p$.

i.2) Following the same steps, $\hat{T}_c = -\frac{1}{V_t(\hat{t},q^r)-V_t(\hat{t},q^p)} > 0$.

i.3) $\hat{T}_{q^p} = -\frac{-Vq(\hat{t},q^p)}{V_t(\hat{t},q^r)-V_t(\hat{t},q^p)} > 0$, where the sign of the numerator is positive because the bliss point of the indifferent type is lower than q^p, thus $V(\hat{t}, q^p)$ is decreasing in q at q^p. $\hat{T}_{q^r} = -\frac{Vq(\hat{t},q^r)}{V_t(\hat{t},q^r)-V_t(\hat{t},q^p)} > 0$, where the sign of the numerator is positive because the bliss point of the indifferent type $\hat{t}$ is higher than q^r, thus $V(\hat{t}, q^r)$ is increasing in q at q^r.

ii) By (3), $\hat{t} = \hat{T}(q^l, q^p)$. Statement in ii.1) is trivial. Statement ii.2) is easily proved by following the same steps as above.

iii.1) By definition, $\tilde{e}$ solves (2) while also (3) holds; thus $\tilde{e}$ exists and it is such that $\hat{t} = \check{t}$. By ii.1) an increase in c does not affect $\check{t}$. Thus, by (2) and holding $\hat{t} = \check{t}$ constant, the increase in c implies a one-to-one increase in $\tilde{e}$. An increase in q^p does not affect $\check{t}$; therefore, holding $\hat{t} = \check{t}$ constant, if q^p increases $\tilde{e}$ must increase in order to meet (2). The proof that $\tilde{e}$ and q^l are negatively related follows a similar argument, thus we omit it. ■

Proof. **Lemma 1** i) The inequalities in (A1) ensure that the fixed point(s) are not on the boundaries; i.e. $\pi^{*i} > 0$ and $\pi^{*i} < 1$, respectively. In addition, the continuity of $F^i(.)$ ensures that equation (6) has at least one solution in $(0, 1)$ (cf. Brouwer's fixed-point theorem).

ii) (A2) requires that $F^i(.)$ crosses the 45^o line from above in all solutions. Since the 45^o line and $F^i(.)$ are continuous, the crossing points must be from above and from below, alternately. It follows that the solution must be unique.

Now we prove that (A1-A2) are also necessary conditions. Observe that $\lim_{\pi^i \to -\infty} F^i(.) = 0$ and $\lim_{\pi^i \to +\infty} F^i(.) = 1$. If $\pi^{*i} \in (0, 1)$, neither $\pi^i = 0$ nor $\pi^i = 1$ can be a solution. This implies (A1); i.e. $F^i(\bar{r}^i) > 0$, and $F^i((\lambda^i + 1)\bar{r}^i) < 1$. Moreover, since the solution(s) lie in $(0, 1)$, $F^i(.)$ crosses π^i from above at least once. If the solution is unique, then this must be the case; i.e. also (A2) holds. ■

Proof. **Proposition 2** The proof coincides with our comparative statics and our discussion in the main text. Thus we omit it. ■

Proof. **Proposition 3** An individual i votes sincerely for party p if $\tilde{u}_i < 0$ and $I(\tilde{u}_i + b^* \cdot \hat{\eta}_i \leq 0) = 1$. By (8) this is more likely to happen if e^i is larger and $V(t^i, q^p)$ is higher. By proposition 2 e^i is larger if r^i is higher or λ^i is higher, or $\bar{r}^i$ is bigger. This proves statements i.1-i.3. Statement i.4 is straightforward.

Individual i votes strategically for party p if $\tilde{u}_i > 0$ and $I(\tilde{u}_i + b^* \cdot \hat{\eta}_i \leq 0) = 1$. This happens if $\hat{\eta}_i \leq 0$ and $|b^* \cdot \hat{\eta}_i| \geq \tilde{u}_i$, which is more likely to happen if she receives a stronger signal s_i about the popularity of p (i.e., a lower s_i). Since $s_i \sim N(\eta_m, \varsigma^2)$, the lower η_m the bigger the chance that i receives a strong signal about the popularity of party p. If group M is on average more aggrieved, then η_m is lower. This proves ii.1. Statement ii.2 is straightforward. ■

Proof. **Proposition 4** Statement i) follows from inequality (11): for any $i \in M_p^{wg}$ the gain to vote strategically for party r is always negative. If all individuals become more aggrieved, then the inequality is satisfied for more of them. Thus more individuals will vote expressively for party p.

ii) By (8) and (10), we have that $\tilde{u}_i^{wg} < \tilde{u}_i$, for any $i \in M_p^{nwg} \cup M_r$. The incentive to vote for party r is lower for all i. ■

Appendix 2

Table A1 reports the full set of controls that are used to estimate columns 5 and 6 in Table III. The order in which controls are introduced minimizes missing values at each step. All controls vary across LADs and years, and their data source is reported among brackets.

- *UKIP activism* is the share of respondents contacted by UKIP (in any form) during the electoral campaign (*Understanding Society*).
- *White share* is the share of white respondents (*Understanding Society*).
- *Religiosity* is the share of respondents declaring that they belong to a religious denomination (*Understanding Society*).
- *Education* is the average level of education among respondents; diplomas are ordered from the lowest to the highest (*Understanding Society*).
- *Income* is the logarithm of average gross annual income (*ONS*).
- *Crime Rate* is the number of offences (all types) over total population (*ONS*).
- *Trade (d5)* is the 5-year change in import, measured as imports in goods from the rest of the world. Imports from specific industries are assigned to LAD-year observations; weights reflect the share of local employment by industry (*OECD*).
- *Immigration (d5)* is the 5-year change in immigration, measured as long-term international and internal migration component of population change (*ONS*).
- *Income (d)* is the annual percentage change in *Income* (*Understanding Society*).
- *Unemployment (d)* is the annual percentage change in unemployment rate for adult population (*ONS*).
- *Poverty (d)* is the annual percentage change in respondents declaring less than 60% of median income (*Understanding Society*).
- *Welfare* is the logarithm of welfare spending in the LAD, that accounts for around 97% of total DWP national expenditure. This includes also Housing Benefit and Council Tax Benefit (*Department of Work and Pensions*).

TABLE A1: Aggrievement, Community Cohesion and Protest Vote: Full Specification with Controls

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var	Ukip	Ukip	Ukip	Ukip	Ukip	Ukip
RD × CC	0.230***	0.235***	0.233***	0.202**	0.254***	0.281*
	[0.077]	[0.078]	[0.077]	[0.078]	[0.096]	[0.162]
RD	-0.102***	-0.102***	-0.111***	-0.104***	-0.104***	-0.104**
	[0.028]	[0.028]	[0.028]	[0.028]	[0.035]	[0.042]
CC	-0.147***	-0.136***	-0.128***	-0.113***	-0.128**	0.397
	[0.044]	[0.045]	[0.042]	[0.043]	[0.055]	[2.657]
UKIP activism	0.097**	0.091**	0.074**	0.075**	0.076*	0.091
	[0.039]	[0.038]	[0.036]	[0.038]	[0.042]	[0.094]
White share	-0.097**	-0.104**	-0.106**	-0.109**	-0.117**	-0.133*
	[0.044]	[0.044]	[0.043]	[0.043]	[0.046]	[0.072]
Religiosity	0.009	0.003	-0.000	-0.008	0.002	-0.037
	[0.037]	[0.037]	[0.039]	[0.041]	[0.046]	[0.084]
Education	0.010	0.006	0.003	0.001	-0.001	0.015
	[0.012]	[0.012]	[0.011]	[0.012]	[0.014]	[0.028]
Income		0.106*	0.157***	0.151***	0.141	0.111
		[0.054]	[0.053]	[0.052]	[0.089]	[0.103]
Crime rate			0.090	0.106*	0.165**	0.161
			[0.057]	[0.055]	[0.083]	[0.126]
Trade (d5)				0.003*	0.003*	0.000
				[0.002]	[0.002]	[0.005]
Immigration (d5)				-0.023	-0.016	0.011
				[0.032]	[0.035]	[0.094]
Income (d)					-0.000	0.001
					[0.001]	[0.002]
Unemployment (d)					-0.005	0.019
					[0.008]	[0.020]
Poverty (d)					-0.012	0.009
					[0.010]	[0.016]
Welfare					0.003	0.008
					[0.003]	[0.010]
Fully Interacted						✓
Observations	734	726	632	619	546	546
R-squared	0.88	0.88	0.91	0.91	0.92	0.92

Notes. Each column shows the result of regressing UKIP vote share on the interaction of community cohesion (CC) and aggregate resentment (RD), controlling for both variables separately. All variables range from 0 to 1. All regressions include region and year fixed effects. Standard errors are clustered at the LAD level; regressions are weighted by the square root of LAD sample size. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Appendix 3

1. Alternative measures of Community Cohesion Table A2 reports in column 1 the estimates of our baseline model using volunteering as a proxy for community cohesion. In columns 2 to 5 we substitute it with the following alternative proxies:

- *Volun 2010* is Volunteering measured in 2010 and kept fixed for each LAD in both 2010 and 2015.
- *Local trust* is the share of respondents answering "*Agree*"or "*Strongly Agree*"to the statement "*People in this neighbourhood can be trusted*".
- *Mutual help* is the share of respondents answering "*Agree*"or "*Strongly Agree*"to the statement "*People around here are willing to help their neighbours.*".
- *Get along* is the share of respondents answering "*Disagree*"or "*Strongly Disagree*"to the statement "*People in this neighbourhood generally don't get along with each other.*".
- *Belong to nbr* is the share of respondents answering "*Agree*"or "*Strongly Agree*"to the statement "*I feel like I belong to this neighbourhood.*".
- *General trust* is the average of respondents' scores on a 1 to 4 Likert scale to the question "*On the whole, are you very satisfied, fairly satisfied, a little dissatisfied or very dissatisfied with the way democracy works in this country?*".

These questions, with the exception of *General trust* where only asked starting on 2011; hence, we use the 2011 values as a proxy for 2010.

The interaction between community cohesion and relative deprivation is always positive and statistically significant across specifications. In column 1, we use volunteering measured in 2010 as a proxy for community cohesion in 2010 and in 2015, as this measure is exogenous to any change in volunteering occurring during the 2015 campaign mobilization.[40] In columns 2 to 5 all measures that refer to neighborhood cohesion report a positive and significant interaction with relative deprivation. In column 6, we perform a placebo test: if our theory is true, only measures that proxy the strength of social ties of an individual with her community, and not generalized trust, should predict Ukip vote shares. Results confirm this intuition.

40. This variable is not available for 2009. The earliest measurement of volunteering in *Understanding Society* is precisely in 2010.

TABLE A2: Alternative Measures of Community Cohesion

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Ukip	Ukip	Ukip	Ukip	Ukip	Ukip
CC as	Volun 2010	Local trust	Mutual help	Get along	Belong to nbr	General trust
RD × CC	0.110**	0.108***	0.090**	0.107**	0.073*	0.042
	[0.048]	[0.040]	[0.039]	[0.046]	[0.040]	[0.027]
RD	-0.051***	-0.106***	-0.098***	-0.112***	-0.079***	-0.053***
	[0.012]	[0.029]	[0.029]	[0.036]	[0.028]	[0.016]
CC	-0.112***	-0.067**	-0.060**	-0.076**	-0.060**	-.030
	[0.035]	[0.028]	[0.028]	[0.033]	[0.027]	[0.019]
Observations	734	734	734	734	724	665
R-squared	0.73	0.73	0.72	0.73	0.73	0.72

Notes. Each column shows the result of regressing UKIP vote share in each LAD-Year on the interaction community cohesion (CC) and aggregate resentment (RD), controlling for both variables separately. All variables range from 0 to 1. All regressions include region and year fixed effects. Standard errors are clustered at the LAD level; regressions are weighted by the square root of LAD sample size. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

2. Alternative measures of relative deprivation. Table A3 reports estimates of our baseline model where the RD variable is substituted with the following proxies:

- $RD_{lad} \times RD$ is the interaction between our standard measure of relative deprivation calculated as in Eq.(13) and the average relative deprivation within LADs. The former captures the share of people experiencing a worsening of their relative deprivation within each LAD, while the latter captures the intensity of resentment in the community. Defining resentment as a composition of these two measures precisely reproduces the components laid out in our theoretical framework.

- *Income* is the logarithm of average gross annual income (*ONS*).

- *Unemployment* the unemployment rate for adult population (*ONS*).

- *Poverty* is the share of respondents declaring less than 60% of median income (*Understanding Society*).

- *Inequality 1* is the median over mean income for each LAD and Year (*ONS*).

- *Inequality 2* is the logarithm of the interquartile range of income for each LAD and Year (*ONS*).

The positive and significant coefficient of $RD_{lad} \times RD$, in turn interacted with CC, confirms our main theoretical finding also when a triple interaction is used in the model. Also in line with

TABLE A3: Alternative Measures of Relative Deprivation

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Ukip	Ukip	Ukip	Ukip	Ukip	Ukip
RD as	RD_{lad}×RD	Income	Unemployment	Poverty	Inequality 1	Inequality 2
RD × CC	0.161***	-0.121**	0.725	0.032	-0.008	-0.169***
	[0.061]	[0.051]	[0.475]	[0.088]	[0.112]	[0.054]
RD	-0.075***	-0.000	-0.174	-0.042*	-0.010	0.011
	[0.017]	[0.015]	[0.106]	[0.022]	[0.030]	[0.014]
CC	-0.118***	1.186**	-0.111***	-0.091**	-0.051	1.620***
	[0.024]	[0.521]	[0.031]	[0.036]	[0.141]	[0.536]
Observations	734	726	683	734	695	570
R-squared	0.74	0.73	0.72	0.73	0.72	0.73

Notes. Each column shows the result of regressing UKIP vote share in each LAD-Year on the interaction community cohesion (CC) and aggregate resentment (RD), controlling for both variables separately. All variables range from 0 to 1. All regressions include region and year fixed effects. Standard errors are clustered at the LAD level; regressions are weighted by the square root of LAD sample size. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

TABLE A4: Restricted Sample

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Ukip	Ukip	Ukip	Ukip	Ukip	Ukip
RD × CC		0.192***	0.159***	0.335**	0.371**	0.501*
		[0.062]	[0.053]	[0.164]	[0.160]	[0.270]
RD	-0.019**	-0.058***	-0.049***	-0.112**	-0.135**	-0.139**
	[0.008]	[0.015]	[0.013]	[0.049]	[0.057]	[0.070]
CC	-0.056***	-0.169***	-0.142***	-0.231**	-0.250**	-2.899
	[0.014]	[0.043]	[0.037]	[0.106]	[0.109]	[3.850]
Region FE	✓	✓	✓			
Year FE	✓	✓	✓	✓	✓	✓
Region × Year FE			✓			
Lad FE				✓		
Controls					✓	✓
Fully Interacted						✓
Observations	443	443	443	443	375	375
R-squared	0.72	0.73	0.79	0.90	0.94	0.95

Notes. Each column shows the result of regressing UKIP vote share in each LAD-Year on the interaction community cohesion (CC) and aggregate resentment (RD), controlling for both variables separately. All variables range from 0 to 1. The sample only includes LADs with more than 50 respondents. All regressions include region and year fixed effects. Standard errors are clustered at the LAD level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

our priors is the finding that classical measures of income, poverty or inequality at the LAD level do not seem to fuel resentment, as shown by the non significant (or negative) interactions reported in columns 2 to 6.

3. Sample restrictions. Throughout the paper, we use regression weights proportional to the square root of the LAD-Year sample size of respondents. This is intended to give more weight to LADs with a higher number of respondents and where, presumably, the main variables are better measured. Here we show that results are robust to eliminating the weights and restricting the sample to LADs with more than 50 respondents. Table A4 reproduces on this restricted sample the same estimates as in Table III.

Appendix 4

List of data sources:

- 2010-2015 General Election Results. *Electoral Commission.* Available at: electoralcommission.org.uk
- Individual level survey data. *Understanding Society.* Available at: understandingsociety.ac.uk
- Employment (aggregated and by industry). *Annual Population Survey, Labour Force Survey, Business Register and Employment Survey.* Available at: nomisweb.co.uk
- Income. *Annual Survey of Hours and Earnings.* Available at: nomisweb.co.uk
- Trade. *STAN database.* Available at: stats.oecd.org
- Crime rate. *Recorded crime data at CSP.* Available at: ons.gov.uk
- Immigration. *Local Area Migration Indicators.* Available at: ons.gov.uk
- Welfare. *Department for Work and Pensions.* Available at: gov.uk