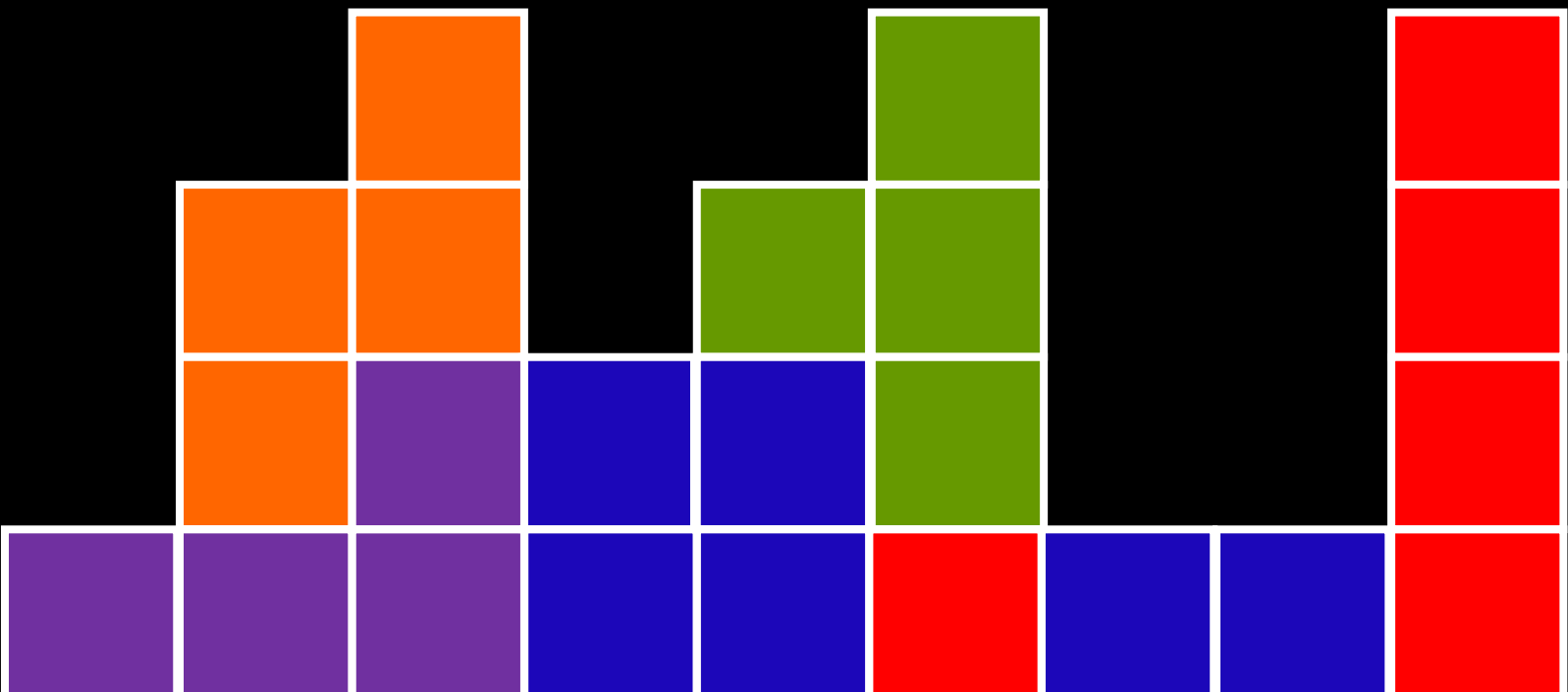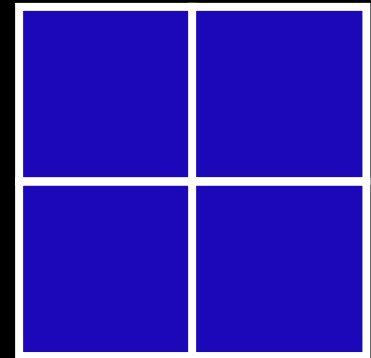# Changing Preferences for Brexit: Identifying the Groups with Volatile Support for 'Leave'

Jan Germen Janmaat, Gabriella Melis, Andy Green and Nicola Pensiero

LLAKES Research Paper 65

Changing Preferences for Brexit: Identifying the Groups with Volatile Support for 'Leave'

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Abstract

This paper explores the dynamics of support for the UK's departure from the EU over the course of 2016 and the first quarter of 2017. It further identifies groups with a particular profile in terms of political attitudes and behaviours and explores whether these groups show a marked change in their support for leave. The paper draws on two contrasting perspectives on voter volatility. While the first one considers the phenomenon to be a characteristic of whimsical, uninterested and disengaged people, the second one sees it in a more positive light as it associates volatility with the informed and emancipate citizen holding politicians to account. The study uses Waves 6, 7 and 8 of Understanding Society and conducts various analyses, including latent class analysis (LCA), to explore the research questions. LCA yields four groups with distinct political profiles. Only one of these groups, labelled "the highly engaged and satisfied", shows a significant increase in support for leave. The other groups, including "the non-engaged" and "the dissatisfied", are not becoming significantly more or less supportive of leave. The results are thus more in accordance with the second perspective.

1. Introduction

Based on the result of the EU referendum, held on the 23rd of June 2016, the British government decided that the United Kingdom should leave the European Union. As the majority in favour of Leave was so small (52% versus 48% preferring Britain to stay in the EU), one can legitimately ask whether the same result would be obtained if the plebiscite were held again. Particularly if it were demonstrated that voters change their opinion easily on this matter, the chance of a different outcome in a second vote would be quite large. If opinions indeed turn out to be fluctuating, it can be questioned how wise it was to base such a momentous decision on a single poll with such a small difference between supporters and opponents of Britain's continued membership of the EU.

For this reason the first objective of this study is to assess how volatile the opinions of the British electorate are on Britain's membership of the EU. Understanding Society data collected both before and after the referendum will be used for this purpose. There is some reason to believe that support for leaving the EU was not stable and has in fact declined after the referendum. The British Election Study Team (2016), for instance, found that 6 % of the people who voted leave regretted their decision compared to 1% of the people who voted remain. Referendum results abroad confirm the impression that voter preferences are not stable on issues to do with Europe. For instance, while the Irish electorate voted the Treaty of Lisbon down with a margin of 53.4% to 46.6% (with a turnout of 53%) in a referendum held on 12 June 2008, only one year later, in a second referendum on 2 October 2009, they approved it by 67.1% to 32.9% (with a turnout of 59%). Of course, in between these time points Ireland was hit particularly hard by the financial crisis, but even so the difference in results between the first and the second referendum is conspicuous.

Our second objective is to explore whether there are distinct groups showing a marked change in the preference for Leave as this can help us identify the possible causes of voter fluctuations. To inform our analyses for this objective we will draw on the literature on voter volatility. As the next section explains, there are two contrasting perspectives on this phenomenon, with one interpreting it as a threat to the stability of western democracies while another evaluates it more positively. Our analysis will engage with these perspectives. Analytically, we will address this objective in three ways. First, we describe changes in support for leave before and after the referendum for groups differing by education, income, age and gender. Second, we assess

whether the influence of these socio-demographic conditions is also significantly different between the respondents surveyed before and those surveyed after the referendum. This analysis will also include attitudinal factors concerning, for instance, satisfaction with income, political engagement, political efficacy, satisfaction with democracy and national identity. It is worthwhile to examine attitudes as Kaufmann (2016) found party preference and attitudes towards immigration, European integration and the death penalty to be particularly strong determinants. Thirdly, we conduct a latent class analysis to see whether particular groups of respondents can be identified combining political attitudes and behaviours with a preference for Leave or Remain. We will also assess whether some of these groups show more fluctuating support for either of these options comparing the pre- to the post-referendum group.

There is a rapidly expanding literature on the determinants of the preference for Leave and some studies have also sought to identify distinct voter profiles. An example of the latter is the Natcen report seeking to offer explanations for the Leave vote. This study identified "affluent Eurosceptics", "older working classes" and "economically deprived, anti- immigrant" as groups showing a marked preference for leave, and "middle class liberals" and "younger working class labour voters" as groups with a very pronounced and moderate preference for remain, respectively (Swales 2016: 25). However, to our knowledge so far no study examined changes in the effects of the predictors or in the propensity of certain groups to vote leave.

2. Literature Review on Voter Volatility

There is good reason to pose the question of voter instability as electoral volatility has been found to be generally increasing in western democracies (Drummond, 2006). More and more voters switch their support from one party to another between and during elections (van de Meer et al, 2013). Traditional theories, based on the cross-country study of electoral systems, suggest that this is due to a general weakening of party allegiance amongst voters (Leach et al, 2011); an increase in the number of political parties in many countries (Pedersen, 1979; Dejaeghere and Dassonneville, 2012); and to a related decrease in the ideological differentiation between parties (Pedersen, 1979). Different electoral systems are said to vary in their levels of electoral volatility (Pedersen, 1979) - with comparative studies showing both more (Dejaeghere and Dassonneville, 2012) and less (Pedersen, 1979) switching in more proportional electoral systems - but the trend is said to be common to many countries and electoral systems. In the United Kingdom there has been an increase in the number of smaller parties seriously contesting elections, as well as a long-term decline in support for the two main political parties. Support for the Labour and Conservative parties combined declined in elections, from 97% in 1951 to 72% in 1983, 74% in 1997 and 65% in 2010 (Leach et al 2011). While the average election swing over the long duration has been at around 3%, some more recent elections have seen exceptional swings, with a 10% swing from Conservative to Labour in 1997 and a 5% swing from Labour to Conservative in the 2010 election.

Scholars have evaluated this increasing volatility very differently. Some believe it has led to ineffective government, short term policies and populism as politicians need to respond constantly and immediately to capricious voters. They tend to portray volatile voters as uninterested and uninformed people responding to fads and being absorbed by their own interests (Walgrave et al 2010; Andeweg 1982). We label this as the pessimistic perspective. Others have a more positive take on the phenomenon. They see the changeable voter as an informed and engaged person willing to vote a government out of office if this government is seen as ineffective or not delivering on promises. Democracy, in their view, needs these critical emancipated citizens to remain responsive to its electorate and not degenerate into a sclerotic political system serving only the elites (Dalton 1984; 2004; van de Meer et al 2013). It has also been argued that people alternating between voting and non-voting need not be a cause of concern as these voters mainly represent critical "stand-by" citizens, i.e. people who only see the need to become engaged and participate in politics if they are dissatisfied about the

performance of the government (Amna and Ekman 2013). We call this the optimistic perspective.

Studies focussing on the characteristics associated with voter switching do not unequivocally support one or the other perspective. In an early account based on a study of a US Presidential election, Berelson et al (1963) argued that stability in voting patterns was 'characteristic of those interested in politics and instability of those not particularly interested' (p. 20). In a later comparative study of election survey data for 32 elections in different countries between 2000 and 2010, Dejaeghere and Dassonneville (2012) concluded that more knowledgeable voters tended to switch parties less often than less sophisticated voters (although, perhaps paradoxically, more educated voters switched more often). They also found that satisfaction with democracy and high levels of 'external political efficacy' suppress voter switching. These studies thus broadly support the pessimistic perspective. However, a recent study of voter volatility between 2006 and 2010 in the Netherlands (van de Meer et al, 2013) did not find a relationship between voter switching and lack of interest in politics, nor that voter switching was particularly prevalent amongst either the more or less educated. According to this study, voter volatility in the Netherlands occurs within wide layers of the electorate, with older voters and those with average levels of education and income being more volatile than other groups. Their findings suggest that most switching was between similar parties, with the less educated being the most likely to switch between dissimilar parties. Their study suggests greater support for the optimistic perspective as the authors concluded that "volatility reflects voter emancipation rather than disengagement" (*ibid* p 100).

Given the short time that has elapsed since the June 2016 referendum in the UK, there is inevitably rather little literature on which to draw a study of changing support for the UK leaving or remaining in the European Union. There are however, some studies of longer term changes of attitudes towards the EU amongst people in the UK, as well as a few recent studies which look at the effects of the referendum campaign on support for Leave and Remain.

In their recent study of 'Why Britain voted to leave the European Union', Clarke, Goodwin and Whiteley (2017) trace attitudes towards the EU back to 2004 and remind us how volatile popular opinion has been on this subject. Using the monthly ECMS surveys which asked respondents if they approved of Britain's membership of the EU, Clarke et al found that over 12 years an average of 44.7% approved and 42.9 % disapproved. However, there were

considerable fluctuations in the UK population's attitudes towards the EU. Approval varied from a low of 34.7% in June 2011 to a high of 52.3% in June 2005. Disapproval varied from of low of 34.4% in March 2005 to a high of 53.5% in June 2011 (p.65).

In their analysis of the factors affecting these fluctuations the authors are skeptical about explanations based on changes in perceptions of national identity, which they maintain are relatively stable. Instead they base their explanations on the 'valence theory' advanced by Butler and Stokes in 1969 which contends that voting is primarily determined by how well voters believe different parties deliver on the policy issues on which there is a broad consensus about desirable outcomes. The authors therefore argue that support for the EU is to a large degree dependent on perceptions of the effectiveness of the EU in delivering the objectives that people agree are desirable – such as prosperity, security and value for money. The second 'valence' issue, they say, relates to Government effectiveness in controlling immigration. Thus people are more supportive of the EU when the UK economy is doing well and less supportive when it is floundering and when immigration is seen to be out of control. On this account the increase in anti-EU attitudes after 2011 is best explained by a widespread belief that the Eurozone was experiencing multiple crises which it was not managing well, including in relation to debt, security and refugees, and that the UK Government was failing to control immigration. Valence Theory could be considered to be one of the 'Optimistic Perspectives'. Valence theory presupposes informed and critical voters holding the government to account and also believing that changing their vote makes sense. We will investigate whether groups of people with such a profile can be identified and whether they are indeed more inclined to change voting preferences than other groups. This is the contribution of this paper to the literature.

Nevertheless, at the outset of the EU referendum campaign support for Leave and Remain appeared to be relatively evenly balanced. What is of most relevant, therefore, for this analysis of changes in patterns of support between January 2016 and January 2017, is what happened during and after the referendum campaign. The research literature on this is inevitably still quite limited, but the report from NatCen on 'Understanding the Leave Vote' (Swales, 2017), provides a useful starting point. Their analysis notes that repeated British Social Attitude surveys between 1992 and 2016 show a long-term increase in Euroscepticism, rising from 10% in 1992 to 28% in 2015 on their chosen measure, with the sharpest increase after the 2008 financial crisis. But they also note that there was a tipping point after May 2016. Their main

explanation lies with the effects of the referendum campaign itself. Voters, they argue, were not convinced by the economic case against leaving the EU put forward by the Remain campaign and this led to a clear softening of support for Remain during the campaign. The Leave campaign, on the other hand, increased its support by building a wider coalition of voters favouring Leave for a variety of reasons, including concerns about immigration.

3. Data, variables and methods

Data

The data used in this study are from Waves 6 (2014), 7 (2015) and 8 (2016 and 2017) of the UK Household Longitudinal Study (UKHLS). This dataset includes the subsamples collected during the first year of each wave and comprises half of the Understanding Society general population sample, the BHPS sample and the Northern Ireland sample. The total across the three waves is 19845 cases, for whom information on the EU membership referendum is available. The EU membership question was asked in Wave 8, and we made use of the previous two waves in order to gather information on theoretically relevant predictors such as income, voting behaviour, political efficacy and trust in UK institutions. It is important to highlight that the membership question was asked throughout 2016 and the first quarter of 2017. This enables us to compare respondents interviewed before and after the referendum of the 23rd of June and thus assess whether these groups show a difference in their support for leave. We note that these groups do not concern the same respondents, as the respondents participating in Wave 8 were interviewed only once in 2016 or 2017. This has consequences for exploring the dynamics of support over this period as it means that we cannot assess changes for individual respondents. All we can do is identify changes in the aggregate for different groups in the population. To do this, we will analyse repeated cross-sections of the sample (by quarter of interview), which is an accepted practice provided the cross-sections are representative (UK Data Service 2015: 5). With regards to Understanding Society, the cross-sections by quarter of interview over the 2016 – 2017 period can be made nationally representative by applying the June 23rd pre-post weight (Lynn 2017), which we have consequently done for the subsequent analyses. This also means the cut-off point for the second quarter will be the 23rd of June. Thus, in the analyses below first and second quarter of 2016 represent those interviewed before the referendum, and third and later quarters those surveyed after the referendum. Again, whenever we talk about "growing" or "declining" support for Leave further below, we mean aggregate change, not change for individuals.

Variables

The dependent variable is the based on the question about Britain's membership of the EU (see Table 1).

Table 1. Outcome variable

Should the UK remain a member of the EU?		
	n	**%**
Remain	10,660	53.72
Leave	7,999	40.31
Don't know	1,186	5.98
Total	19,845	100

Regarding the independent variables, we are interested in the links of both observed socio-demographic characteristics and political attitudes and behaviour to opinions on Britain's membership of the EU. To represent the former we included gender, age, education, income, employment status and marital status in the analyses below. Many studies have found these 'usual suspects' to be strongly linked to a preference for leave or remain (Carke and Whittaker 2016; Kaufmann 2016; Swales 2016). Attitudinal and behavioural indicators concern variables tapping voting behaviour (voted at the last general election in 2015; party voted for), support for a particular party, intention to vote at the next GE, interest in politics, political efficacy and political engagement. We also include variables on trust in institutions and national identity. Appendix A gives a complete account of all these variables, including the full wording of the questions on which they are based.

Table 2 provides an overview of the attitudinal variables and shows their response rates. It also includes separate variables for the 'don't know' categories. We consider it important to include these in the analysis aiming to identify groups with particular characteristics (see further below) as undecidedness on the attitudinal indicators may well be related to a preference for leave or remain.

Table 2. Indicators used to define Voter profiles

	Certain answer	% valid cases	Uncertain answer (Don't know/Neither agree nor disagree)	% valid cases
1	Didn't vote last GE	21.2		
2	Doesn't support Party	68.5		
3	No strong support for Party	57.4		
4	Voted Conservative	27.4		
5	Voted labour	26		
6	Voted Lib Dem	7		
7	Voted SNP	4.5		
8	Voted UKIP	6.2		
9	Voted Green Party	2.8		
10	Voted Other	26.2		
11	Intend to vote next GE	77.3		
12	No interest in politics	52.6		
13	Vote is civic duty	78.5	DK vote civic duty	14.6
14	Yes own political influence	18.6	DK own political influence	6.8
15	Political engagement is costly	55.4	DK costs political engagement	35.9
16	Dissatisfied with democracy	51.3	DK satisfied democracy	6.8
17	Not qualified for politics	60	DK if qualified	25.3
18	Not better informed	68.8	DK better informed	33.3
19	Public officials care	30.6	DK public officials care	29.7
20	Have a say in politics	35	DK if have a say in politics	23.7
21	Importance of being British	71.4		

Methods

We start by providing mean levels of support for leave by quarter of interview to describe trends in the outcome of interest. Subsequently, we explore the predictors of the preference for leave with *logistic* regression because of the binary nature of the dependent variable. We do this primarily to assess whether any identified change in support for Leave is genuine. This is important as a robustness check as we rely on repeated cross-sections by quarter, as explained earlier. These quarterly samples could show small differences in socio-demographic composition. If aggregate levels of support are entirely a reflection of these differences, no real change in this support has occurred. To assess whether the predictors became stronger or weaker over time we include interaction terms combining quarter of interview with each of these predictors.

Third, we use latent class analysis (LCA) (Collins & Lanza, 2010; Lazarsfeld, 1959) to identify subgroups in the population based on their political attitudes and behaviours. The first step of

the LCA is the selection of the number of classes, or sub-groups, that best describe the qualitative differences in the conditional distributions of the indicators in the population under analysis. LCA helps identify subgroups whose respective members are internally homogeneous, whilst also maximising the between-group heterogeneity on the basis of the chosen indicators, using as the starting point the responses to a set of categorical questionnaire items (Geiser, 2013). The analyses were conducted in Mplus (Muthén & Muthén, 1998) and Stata v15.

There is a set of model fit statistics that we took into account in order to select the optimal number of latent classes, i.e., the log-likelihood value (LL), the Akaike Information Criterion (AIC), the sample-adjusted Bayesian Information Criterion (s-BIC). For the first index (the LL), the higher the value the better the solution, whilst the opposite is true for the AIC and s-BIC. The other result to consider is the Entropy measure, which is an indicator of the quality of the classification: in this case, values above .800 are desirable (Muthén and Muthén, 2007). Finally, search for the optimal solution is guided by the adjusted Lo-Mendel-Rubin likelihood ratio test (Adjusted LRT) and its p-value, as well for the bootstrapped LRT (BLRT), both of which compare the appropriateness of the last estimated model with k classes with the previous one with k-1 classes (Finch & Bronk, 2011; Nylund, Asparouhov, & Muthén, 2007). The other result to consider is the Entropy measure, which is an indicator of the quality of the classification: in this case, values above .800 are desirable (Muthén & Muthén, 2007).

Once the subgroups in the population are identified by the latent classes, the second step is the characterisation, or description of the classes based on the probability of membership in each class, as well as the conditional item response probability within each class (Collins & Lanza, 2010). The conditional response probability is the probability of a score of 1 (the maximum) on a specific item, given the individual's membership in one of the detected classes.

Lastly, we use multinomial regression to assess how the latent classes that we identified are related to opinions on the UK's membership of the EU. We use this type of analysis as we are also interested in the undecided respondents and the outcome variable thus has three categories (leave, remain and don't know). We run both a model with the latent profiles as the sole explanatory variable (i.e. the baseline model) and a model with the latent profiles and various socio-demographic characteristics as predictors.

We use the weight recommended by the Understanding Society team for all these analyses (i.e. brextotwt). Applying these weights ensures that the proportions in the sample on a given set of characteristics match those in the population to the greatest extent possible.

4. Results

Trends in support for leave

Figures 1-5 display the development of the preference for leave from the first quarter of 2016 to the first quarter of 2017. Support for Brexit appears to have first risen, from 41.7% in the first quarter of 2016 to 46.5% in the last quarter of 2016, and then slightly declined, to 45.8% in first quarter of 2017, across the sample as a whole (Figure 1). Noticeable is the sharp increase from the second to the third quarter, which suggests that the EU referendum itself has had an impact on the preference for leave. Possibly, people adapted their opinions to the new Brexit reality after the referendum. The sample is further likely to have underestimated the preference for leave among the population because the result of the EU referendum, as we all know, was 52% in favour of Brexit. Thus, even with all the proper weights in place the Understanding Society data is still likely to have underrepresented some groups in the population (notably those inclined to vote leave). We feel the reader needs to be made aware of this caveat.

Figure 1. The dynamics of support for Britain's departure from the EU (%)
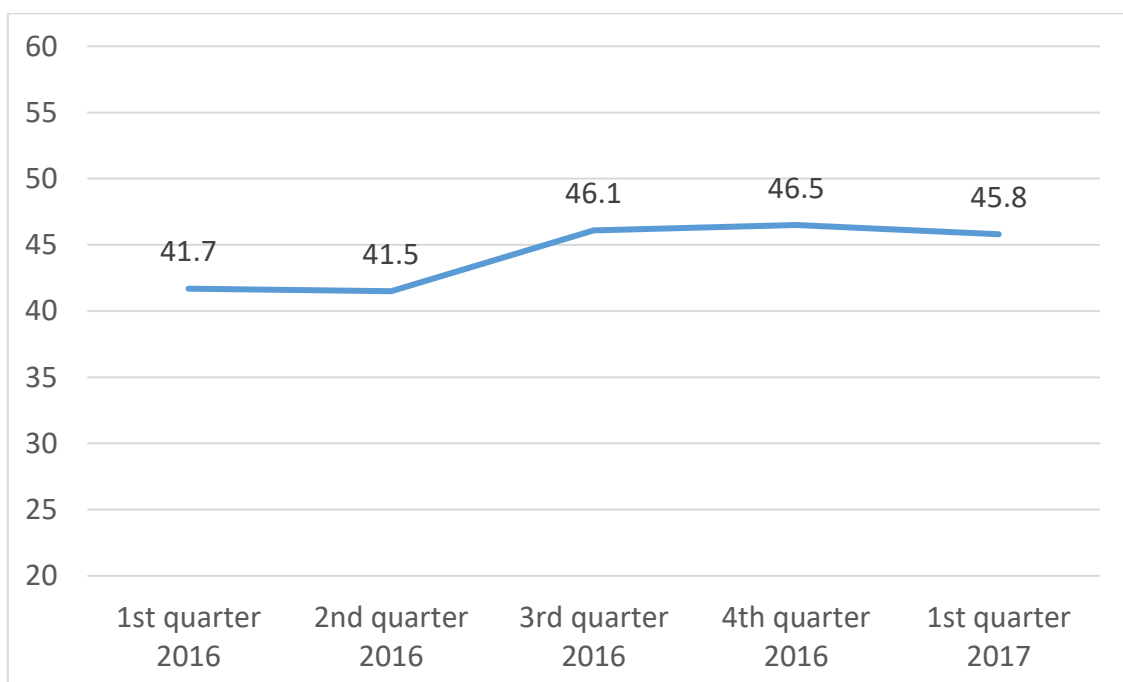
Figures 2-5 show the trends by different subgroups. To begin with age, we see that the common arch-shaped trend (of an initial rise and a subsequent decline) is visible in each age group, except for the youngest group. This group shows a more fluctuating pattern, which is perhaps due to the lower number of respondents in this category. What stands out is the large difference

in *levels* of support for leave between the age groups, with the Millennials showing much less enthusiasm for this idea than the elderly. This is a well-known finding highlighted by previous studies. Much the same observations can be made for different income groups (Figure 3). All income groups, except for the 4th quintile, show a steady rise and then a slight falloff and do so at practically the same rate of increase and decline. Again it is differences in levels rather than trends that catch the eye. This time it is the lower income groups showing much greater support for leave, with support decreasing linearly as income increases.

Figure 2. Trends in support for leave by age group (%)
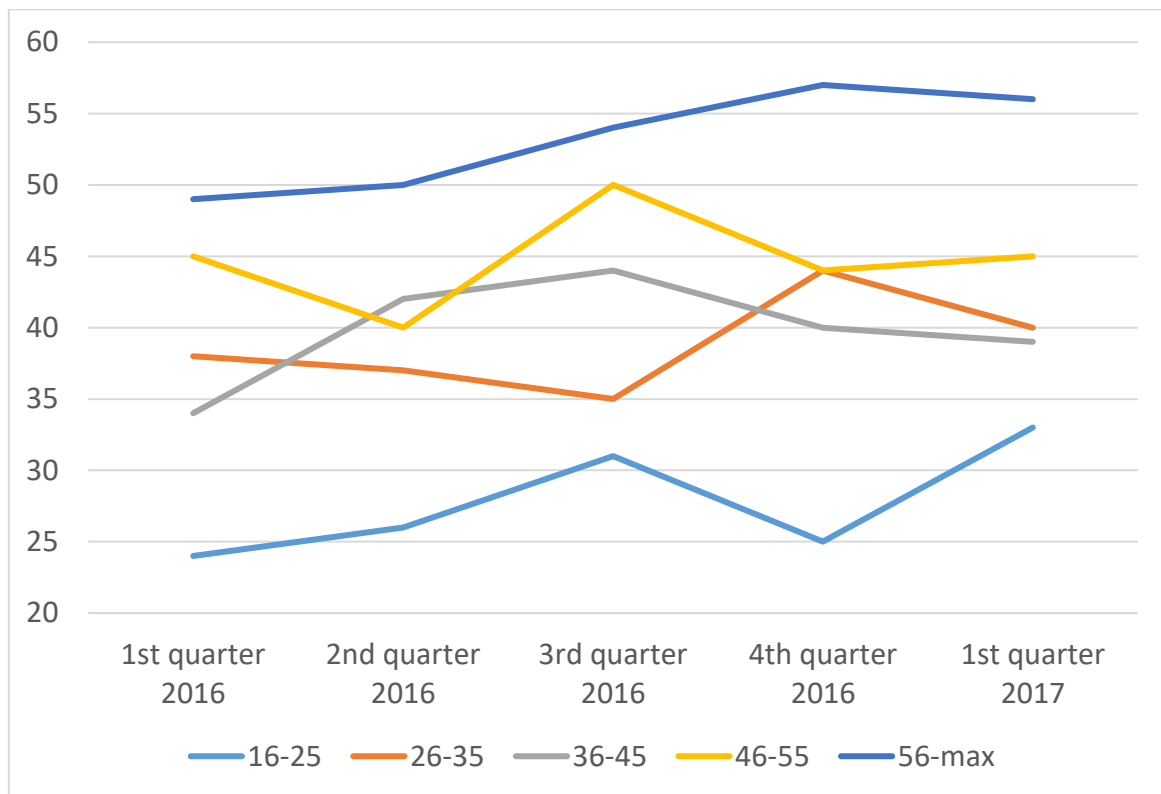
Figure 3. Trends in support for leave by income group (%)
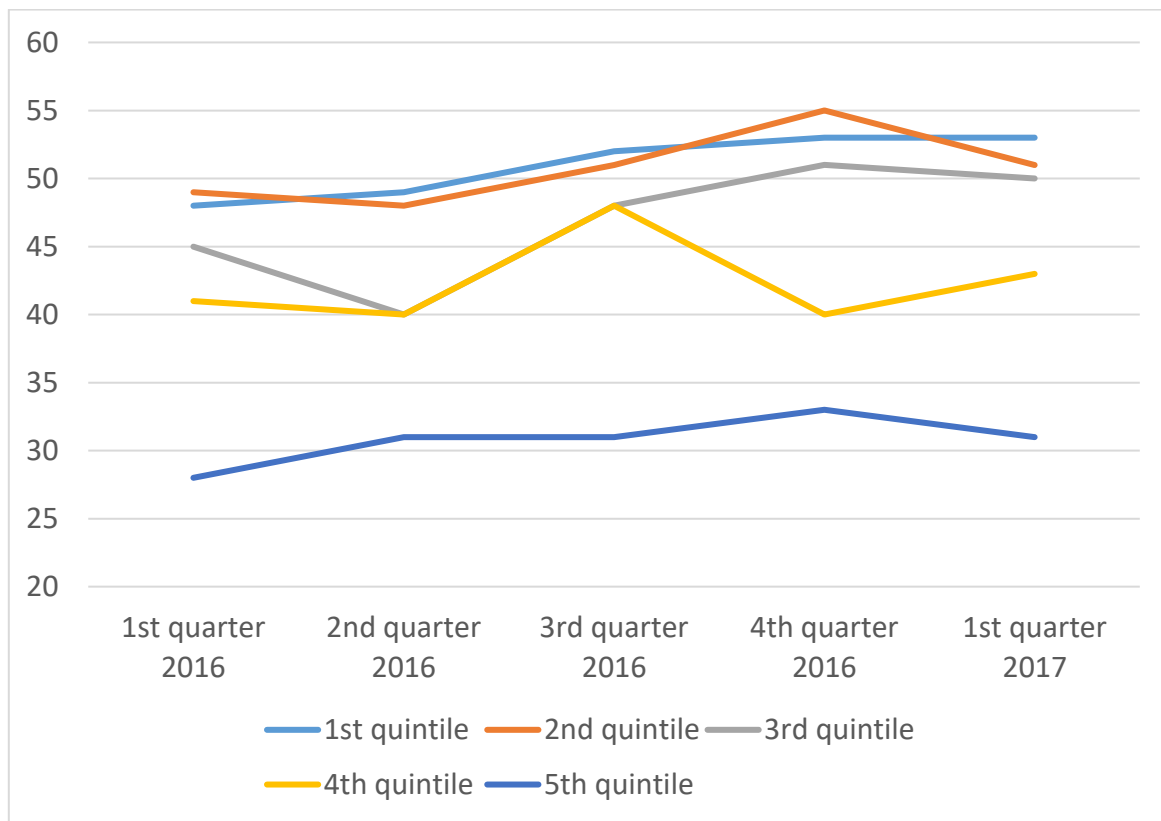
Patterns are a bit different for gender and education. Although men and women show the same arch-shaped trend, they do converge in their support for leave (Figure 4). While men started out with a 4% lead over women in their support for Brexit, towards the end of the time series this had shrunk to just 1%. Women seem to have been particularly responsive to the EU referendum as their preference for Leave rose markedly from 39% to 46% between quarters two and three. With regard to education (as measured by highest qualification obtained), the very pronounced difference in levels of support for leave between those with the lowest (60%) and those with the highest levels of education (24%) is the first thing to be noticed. It is also interesting to observe that these polar opposites are very stable in their support for Brexit throughout 2016. By contrast, the groups with middling education levels show either dramatic fluctuations or a steep rise in the preference for leave. Moreover, opinions on Brexit appear to have become more polarized across education groups as those with GCSEs or A-levels, as the education groups closest to those with the lowest level of education, are approaching the latter in their support for leave, while those with qualifications just under degree level have moved towards the ones with the highest education levels (i.e. degrees).

Figure 4. Trends in support for leave by gender (%)
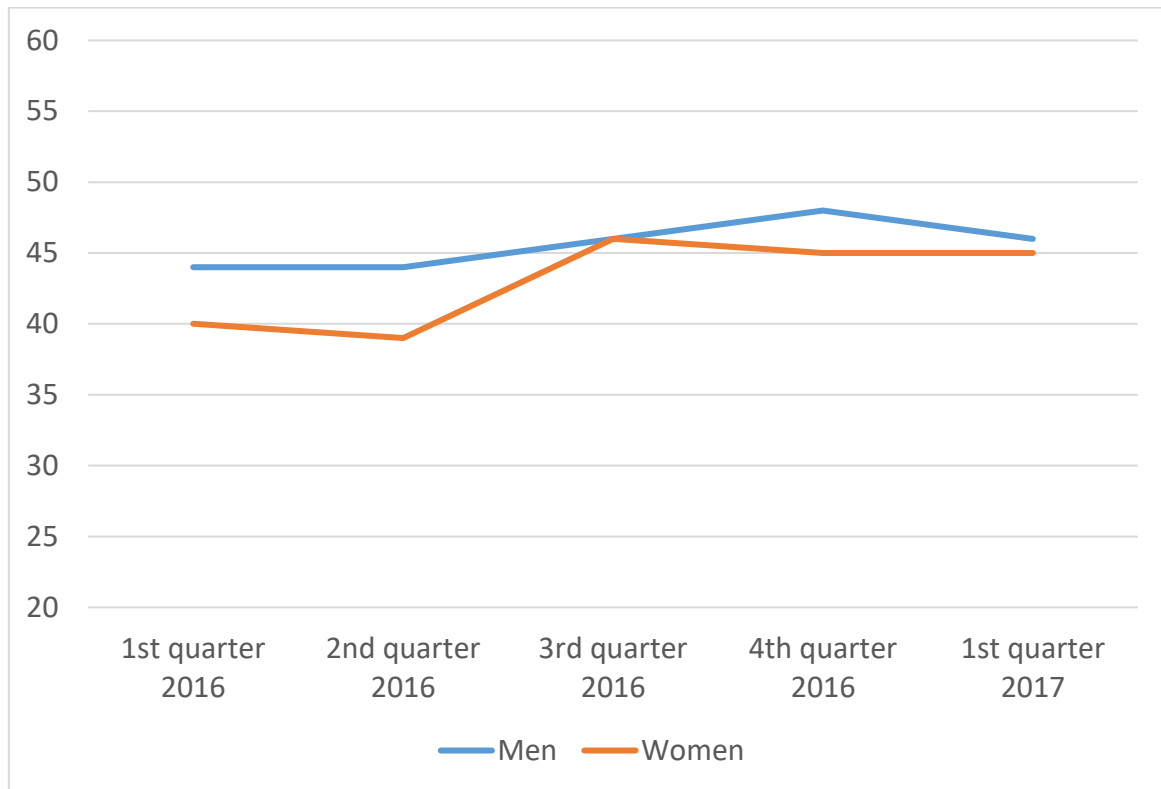
Figure 5. Trends in support for leave by highest qualification obtained (%)
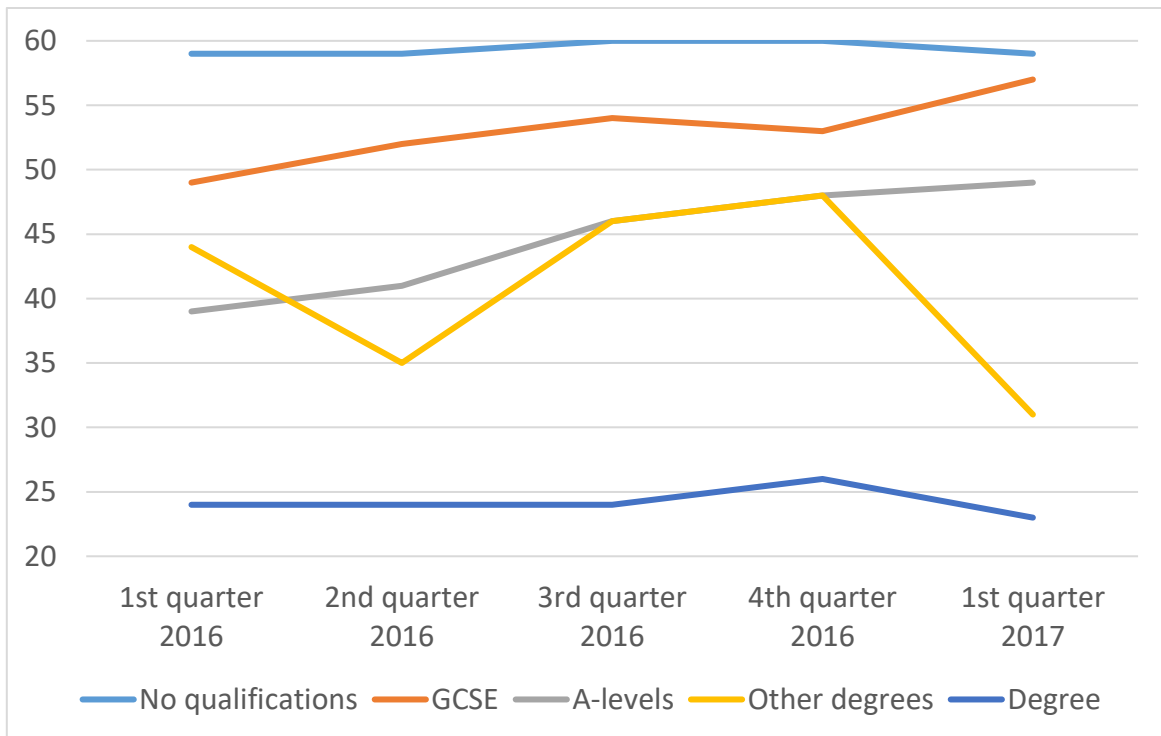
Predictors of the preference for Brexit

Also when controlling for socio-demographic and attitudinal features, support for leaving the EU appears to have risen significantly during 2016 (see Table 3 below). We thus know that this change is genuine and does not reflect differences across time in the social composition of the sample. The coefficients in the table representing the different quarters show the same inverse u-shaped trend over time as was observed above. Compared to individuals responding in the first quarter of 2016, those responding in the second quarter are 1.5 percent more likely to support 'leave' (non-significant difference), and those responding in the third quarter are 3.7 per cent more likely to support 'leave'. The support for 'leave' reaches a peak in the fourth quarter with a 5.6 percent difference, then declines in the first quarter of 2017 (4 percent difference). The trend is probably showing a relationship with the internsification of the 'leave' campaign but we cannot state this with certainty. Assuming that the referendum campaign intensified from the second quarter, the results seem to show that the leave campaign struck a greater cord among the electorate than the Remain campaign.

Table 3. The determinants of support for leaving the EU, logit model

	Average marginal effect	SE
Quarter of interview		
First quarter 2016 (ref cat)		
Second quarter 2016 (until 23 June)	0.014	0.016
Third quarter 2016 (from 24 June)	0.037*	0.015
Fourth quarter 2016	0.056***	0.017
First quarter 2017	0.039~	0.022
Age	0.001*	0.001
Female	-0.067***	0.011
Marital status		
Single (ref cat)		
Married	0.054**	0.018
Divorced	0.067**	0.023
Widowed	-0.025	0.026
Employment status		
Employed (ref cat)		
Not employed	-0.016	0.026
Retired	0.009	0.017
Looking after family	0.047	0.030
Student	-0.058	0.039
Household income	-0.004**	0.001
Satisfaction with income	-0.014***	0.004
Highest qualification (UKHLS & BHPS)	-0.050***	0.004
Importance of being British	0.027***	0.002
Level of interest in politics	-0.025***	0.007
Qualified to participate in politics	-0.017**	0.006
Do not have a say on what govt does	0.028***	0.006
Satisfaction with democracy in own country	-0.036***	0.007
Public officials do not care	0.039***	0.007
Observations	10896	
Standard errors in parentheses		
~ p<0.10, * p<0.05, ** p<0.01, *** p<0.001		

Note: HH income is measured in units of £500

The regression analysis confirms previous research regarding the negative correlation between socio-economic status and support for leave. More educated individuals, individuals from families with a a higher income and individuals who are more satisfied with their income are less likely to support 'leave'. In detail, moving from no qualification to GCSE or from GCSE

to A level or from A level to a degree on average decreases the likelihood of supporting 'leave' by 5 percent. An increase of the gross monthly income of 500£ decreases the support for 'leave' by 0.4 percent. A higher satisfaction with income is also associated with a lower probability of supporting 'leave'.

Attitudinal factors can be distinguished in british identity, political efficacy and trust in politics. Individuals for whom being British is very important are more likely to support 'leave', as well as those showing little interest in politics, not considering themselves qualified to participate in politics, feeling excluded from politics ("do not have say in what government does"), and being dissatisfied with democracy in one's country. British identity plays a large role in shaping the support for leave, but also the feeling of being excluded from politics and disentchantment with democracy led individuals to take the leave gamble. Even if the leave option is likely to be costly in the long term, many leave supporters seem to be willing to pay the price in order to challenge the status quo.

Figure 6. The interaction of importance of feeling British with quarter of interview
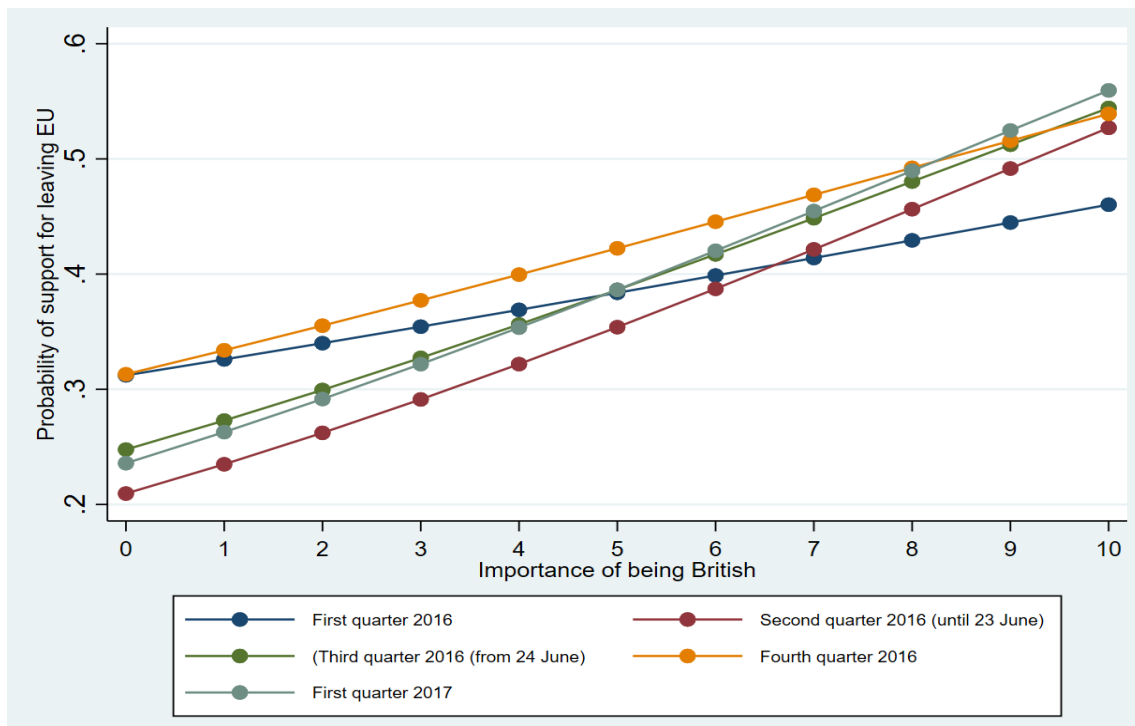
We interacted quarter of interview with the all predictors to analyse whether the effect of these predictors follow a time trend. Britishness turned out to be the only variable whose effect changed as shown by the significant interaction with time (for the complete results of this analysis, see Appendix B further down). Britishness became a more important positive

determinant of support for leave over the course of 2016 (see Figure 6). Possibly, people with a strong British identity were not engaged with the issue yet at the start of 2016 and only became more involved when the leave campaign gathered steam.

Identifying different political profiles of respondents

We provide the results of the latent class analysis in terms of the selection of the appropriate number of classes in Table 4 and Figure 7. The Entropy value is below .800 for every solution, but the graphical representation of the LL, AIC, BIC values would suggest that the optimal solutions are the 3-class and the 4-class. Hence we proceed to describe these solutions, however due to the higher level of detail we decided to retain the four-class solution for the analysis of change in support for the EU Referendum outcomes.

Table 4. Unconditional LCA: statistics for the selection of number of classes

No. of classes	Log-Likelihood	Model's free parameters	AIC	Sample-adjusted BIC	Entropy	Adjusted LRT p-value for K-1 classes
2	-204405.771	59	408929.541	409207.877	0.741	0.0000
3	-200341.4320	89	400860.8650	401280.7270	0.747	0.0000
4	-198083.8980	119	396405.7960	396967.1850	0.738	0.0000
5	-196287.5570	149	392873.1140	393576.0300	0.735	0.0000
6	-194974.0880	179	390306.1760	391150.6180	0.736	0.0000

Figure 7. Unconditional LCA: statistics for the selection of number of classes
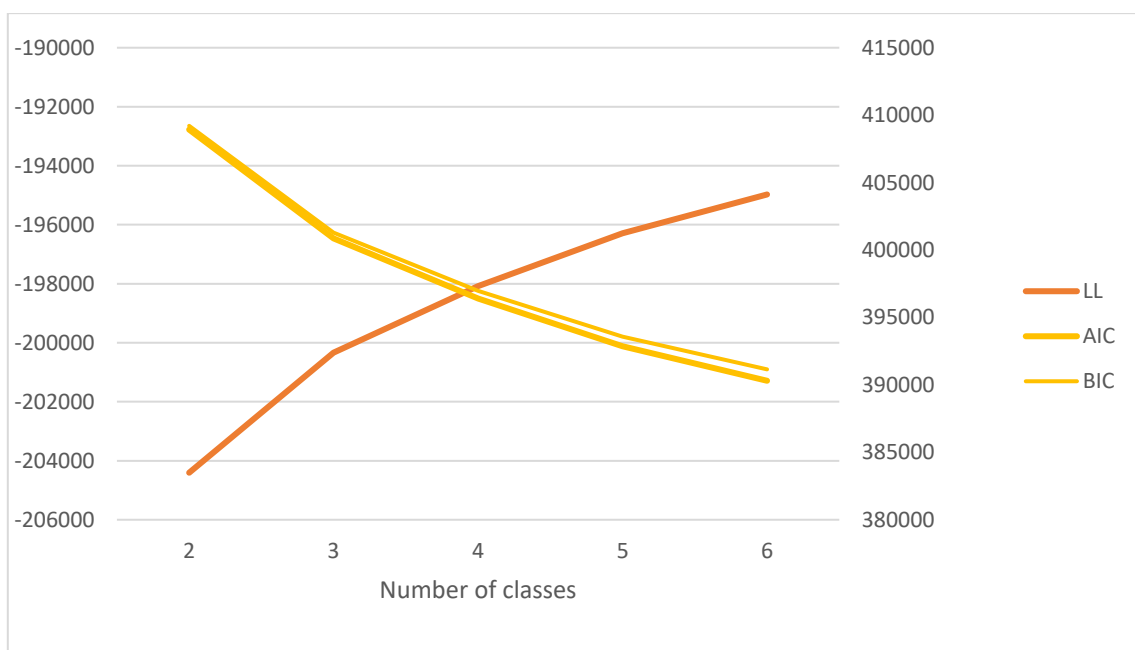
Figures 8 and 9 below report the response probabilities for the 3- and the 4-class solutions, respectively.

For the 3-class solution we identified the following groups (the labelling is ours):

The non-engaged: 24.9%. These people are characterised by low support for conventional political participation; if they vote at all, they avoid the major parties. Voting in general is not their way to express their political engagement. They are not interested in politics and do not think that voting is a civic duty. Their sense of political efficacy is the lowest of all groups, they are undecided or dissatisfied about democracy, and they do not feel qualified to participate in the political arena. They are also distrusting of public officials, and record the lowest level of Britishness

The highly engaged: 37.5%. This group shows high levels of voting and support for a particular party (mostly one of the major parties). They have a definite intention to vote in the next GE and are highly interested in politics. They also strongly believe that voting is a civic duty, have high levels of political efficacy and believe that political engagement is not costly. They are satisfied with democracy and consider themselves qualified for politics and better informed than the average citizen. They express high levels of trust in public officials and attach great value to their British identity.

The unsure voters: 37.6%. These respondents believe in voting as a civic duty, and tend to vote for the major parties, as well as for UKIP, although they do not support any party strongly. They do not show a high interest in politics, have moderately high levels of political efficacy, but say that they are not better informed about politics than the average citizen. They do not feel qualified to participate in politics, do not trust public officials, and do not think they have a say in politics but think that feeling British is important.

When looking at the 4-class solution, the fourth class seems to originate from the highly engaged and the unsure voters in the 3c solution. The following groups emerge:

The trusting voters: 20.5%. These people tended to vote at the last general election. Although they do not provide particularly strong support for any political party, they are the most likely to have voted for the Tories at the last GE. They think that voting is a civic duty, but are

undecided as to whether political participation is costly. They are satisfied with democracy, but do not know if they are qualified enough for politics. They have relatively high trust in public officials, think that they have a say in politics and consider their British identity to be very important.

The highly engaged and satisfied: 30.3%. This group shows high support for party politics, as they both go to the ballot box and support a political party, mostly one of the major parties. They express a definite intention to vote in the next GE, are highly interested in politics, and strongly believe that voting is a civic duty. They feel they really have a say in government policy and believe that political engagement is not costly. They are satisfied with democracy, consider themselves qualified for politics and better informed than the average citizen. They express high levels of trust in public officials, and assign great importance to their Britishness.

The non-engaged: 24.4%. This group is very similar to the non-engaged group in the three-class solution. They also consider voting not to be a civic duty but appear to be more likely than any other class to say that they are not qualified for politics.

The dissatisfied voters: 21.8%. This group voted for UKIP in the highest numbers and expresses relatively low levels of trust in public officials. They show a very low score on political efficacy.

Figure 8. 3-class solution: response probabilities

3-class solution

Categories (x-axis): Didn't vote last GE, Doesn't support Party, No strong support for Party, Voted Conservative, Voted labour, Voted Lib Dem, Voted SNP, Voted UKIP, Voted Green Party, Voted Other, Intend to vote next GE, No interest in politics, DK vote civic duty, Vote is civic duty, DK own political influence, Yes own political influence, DK costs political engagement, Political engagement is costy, DK satisfied democracy, Dissatisfied with democracy, DK if qualified, Not qualified for politics, DK better informed, Not better informed, DK public officials care, Public officials care, DK if have a say in politics, Have a say in politics, Important being British

Legend: ■ Non-engaged ■ Highly engaged and satisfied ■ Unsure voters

Figure 9. 4-class solution: response probabilities
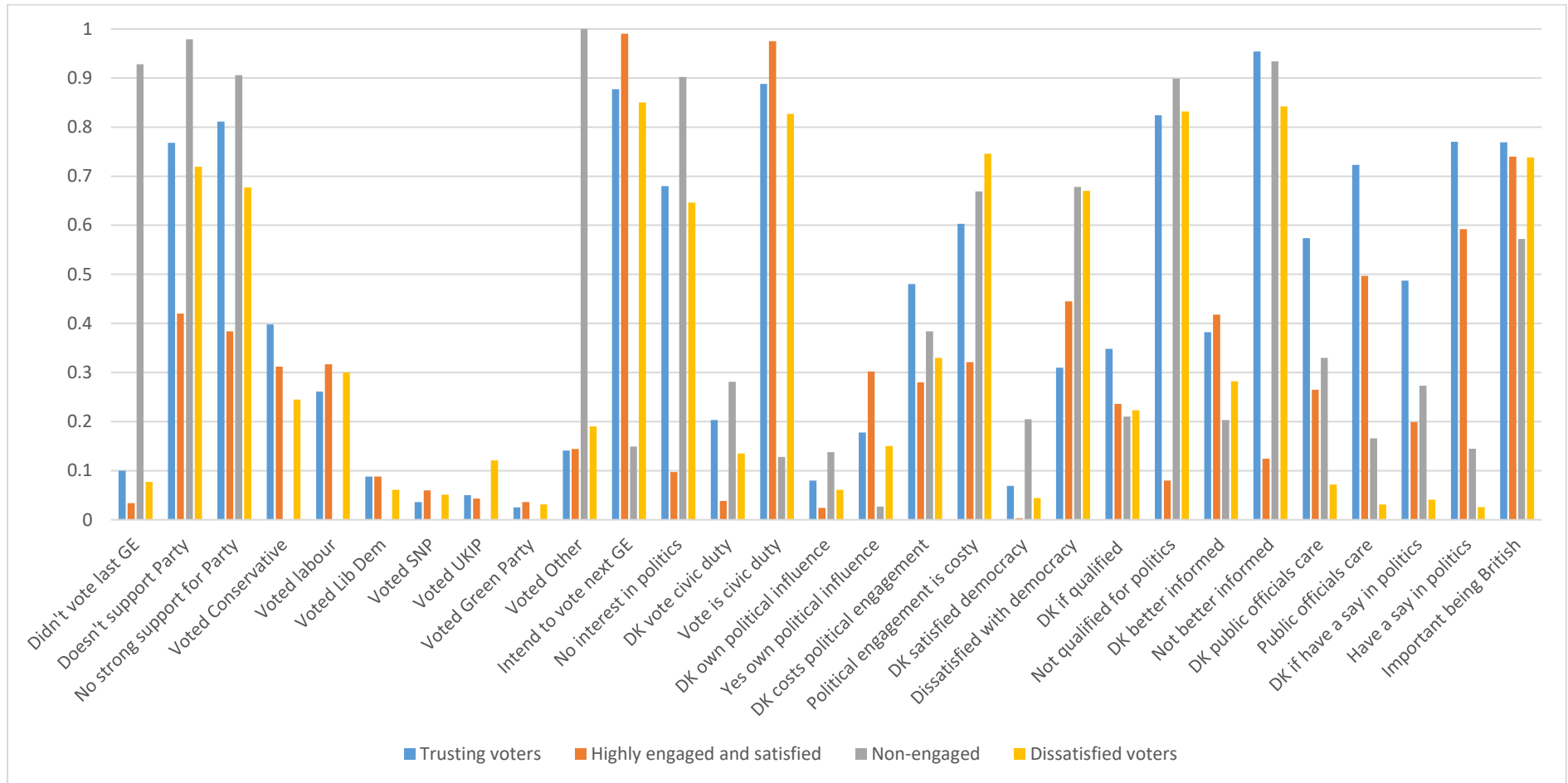
The link between political profiles and support for leave

In the final step we included the profiles generated by the 4-class LCA and a number of socio-demographic variables in a model to explain the disposition toward the UK's membership in the EU. Moreover, as our interest is in the dynamics of support for Leave among the different profiles, we included quarter of interview in the model and introduced an interaction term between the political profiles and quarter of interview.

The results of our baseline model (i.e. with only the political profiles, quarter of interview and the interaction between the two as predictors of the EU referendum outcome) are for simplicity reported as a graph of the adjusted predictions (Figure 10). The same has been done for the full model (i.e. the model including the socio-demographic characteristics) (Figure 11).[1] We only report the results for the first quarters of 2016 and 2017. We did so because we wanted to leave ample time between the pre- and the post-referendum respondents, i.e. enough time for the two periods of data collection to be distinct. The beginning of 2017 showed the first signs of the British economy performing less well than those of the Eurozone countries, while the opposite was the case in the first quarter of 2016.

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[1] The full results of these models (as tables with regression coefficients) can be obtained from the authors upon request.

Figure 10. Adjusted predictions for the baseline model with latent profiles, quarter of interview and their interaction (DK = Don't know)
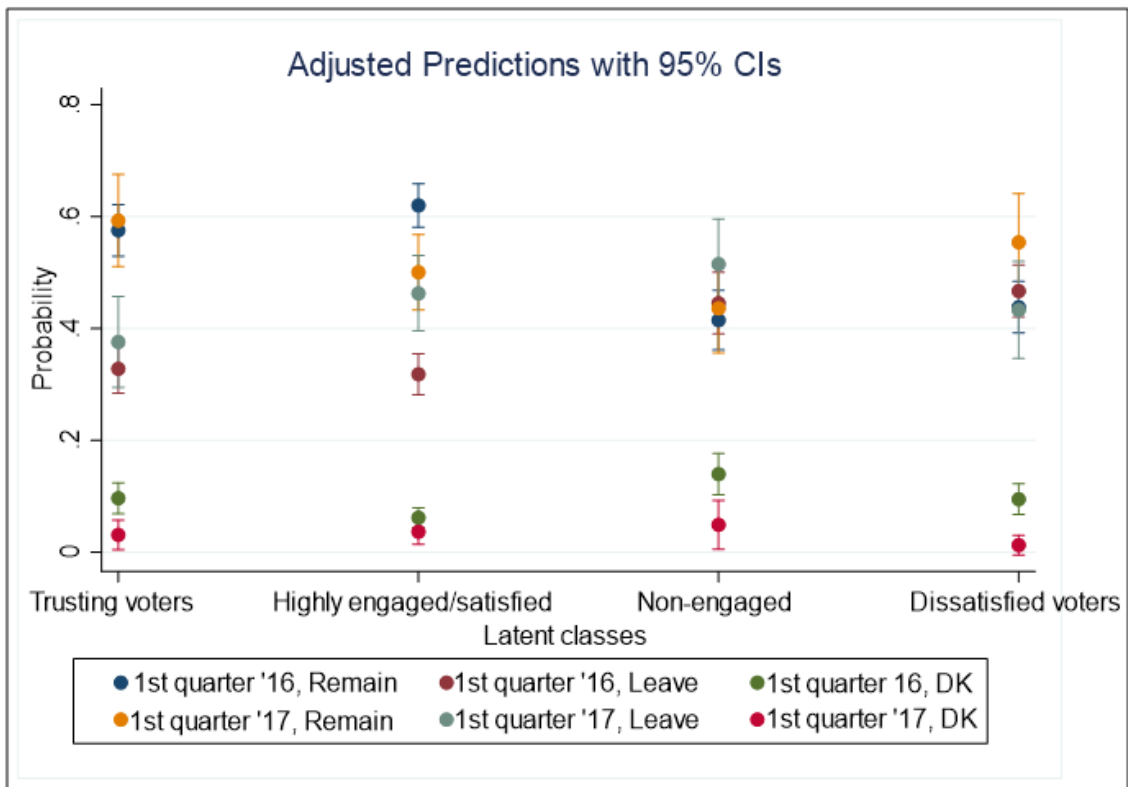
Figure 11. Predictive margins for the final model with latent profiles, quarter of interview and their interaction (DK = Don't know)
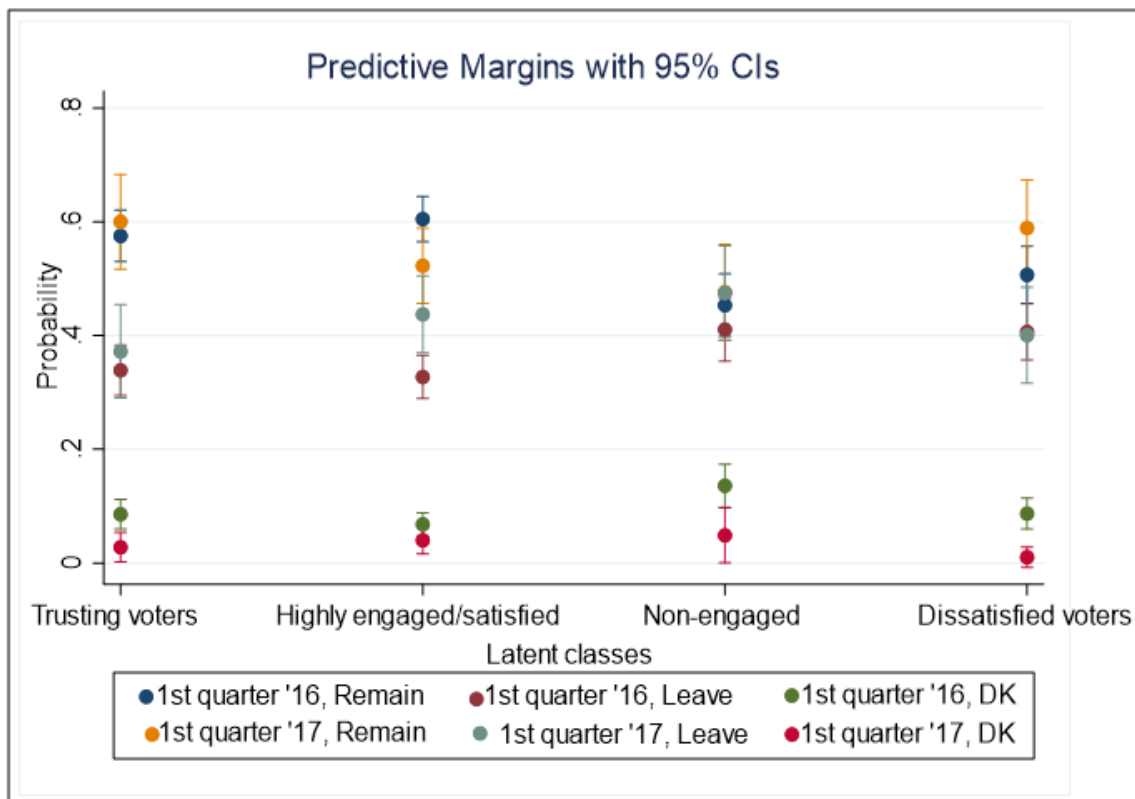
Figure 10 shows that the only type of voter profile that records a significant increase in support for Leave from the 1st quarter in 2016 to the 1st quarter in 2017 is the highly engaged and satisfied group. This group also has the highest level of political efficacy and forms the main support base for the two major parties. Possibly, the engaged character of this group meant that it has been more susceptible to messages from the Leave campaign and to the response of the mainstream political parties after the referendum result than the other profiles. In other words, this group may have been more inclined to adjust their views on UK's membership of the EU to the changing political realities than other groups. Perhaps they were more influenced by the ambiguous messages from the two major parties regarding issues such as freedom of movement and welfare distribution and were therefore more prone to change their views than voters with other profiles. Yet, this is not more than a conjecture. Panel data combining repeated items on Britain's membership of the EU with questions tapping motivations for changing preferences could provide more definitive answers. We also remind the reader that whenever we draw conclusions about changes we refer to changes in the aggregate, not changes within individuals. Figure 11 confirms the results obtained for the baseline model. However we notice here that the addition of the socio-demographic variables reduce the rate of change in support for Leave between the 1st quarter 2016 and the 1st quarter 2017 for the Highly engaged voters, confirming the importance of socio-demographic characteristics for the EU membership outcome. Support for leave amongst this group remains significantly higher in the first quarter of 2017 by comparison to the first quarter of 2016. Thus this group remains the only group showing a significant increase in support for Brexit.

We further see that the number of undecided people (i.e. the don't knows) has gone down significantly for three of the four profiles between early 2016 and early 2017. Probably, this declining share of ambivalent voters is due to the growing salience of the issue of Britain's membership of the EU over the course of 2016. In a context where not a day goes by that this issue is not discussed in the media it is likely that people become engaged with the topic and make up their minds about it.

Interestingly, the only group not showing a significant decline in the number undecided voters is the highly engaged group. As this group did show a marked increase in support for leave, quite a few people backing remain in this group must have switched preferences.

5. Discussion

A key finding of this paper is that support for UK's departure from the EU is not stable. From the first quarter of 2016 to that of 2017 the preference for leave first increased and then declined. This trend was also visible among subgroups of the population, such as young and old, rich and poor, and men and women, notwithstanding the sometimes marked differences in levels of support for leave between these groups. The common trends among the subgroups suggest that no one was immune to the wider the socio-political context. All people, whatever their socio-demographic profile, seem to have been influenced regarding their preference for leave or remain by the political events of 2016 and their coverage by the media. The only exception to this pattern are the very poorly and very highly educated, as the opinions of these groups were remarkably stable. Since these groups also showed such a pronounced preference for either remain (the highly educated) or leave (the poorly educated), it would appear that the more decided a particular group is in its views on Brexit the less likely it is to change its views in response to external events and circumstances. This finding chimes with other research showing that groups with firm beliefs or extreme views are unaffected by educational experiences or facts challenging their points of view (Gaine 2000; Preston et al 2005; Nyhan and Reifler 2010).

Yet, these two groups with their pronounced views on Brexit should not distract us from the finding that the views of the vast majority of people were malleable. Indeed, regression analysis showed that the increase in support for leave over the aforementioned period was *significant* controlling for a range of socio-demographic and attitudinal variables. In other words, this growth was genuine and did not reflect changes in the social composition of the sample collected over this period. This analysis also revealed that national identity (as measured with a question on the importance of being British) became a more important predictor of the preference for leave during 2016. In view of the changeable nature of the views on Brexit, one could indeed question the wisdom of basing such an important decision as leaving the EU on a single poll. 'The will of the people' might be more accurately captured by holding the referendum multiple times over the course of several years and by averaging the result of these plebiscites.

Our research further identified four groups of respondents with distinct political profiles. We labelled these groups 'the trusting voters', 'the highly engaged and satisfied', 'the non-

engaged' and 'the dissatisfied voters'. Interestingly, the only group showing a significant rise in the preference for leave was the highly engaged and satisfied, who also happen to be the largest of the four. In terms of the perspectives on voter volatility discussed in the review of the literature, this finding unequivocally supports the theory that changing political positions are a feature of the engaged, informed and well-educated citizen responding rationally to the changing socio-political context. They are also quite compatible with the aforementioned valence theory of Butler and Stokes' (1969), which holds that voters change their party of choice if they feel the government is falling short of delivering on objectives for which there is broad popular support. They do so because valence theory assumes voters to be informed and willing to invest time in monitoring and evaluating the government. As it is primarily the engaged and satisfied who display the greatest flexibility, a group moreover that is larger than any other group, one could quite plausibly predict that many people are likely to change their opinion back to remain if they are confronted with circumstances suggesting that Brexit brings more costs than benefits.

What caused these dynamics in support for leave? Our findings provisionally suggest that changing positions of the mainstream political parties and positive economic developments are the prime drivers. After the referendum Labour and the Conservatives, who officially supported remain in the run-up to the poll, quickly embraced the result of the referendum and stated they would lead the UK out of the EU in an orderly manner. The highly engaged and satisfied, who also happen to form the backbone of these parties, may well have responded to this changing position and the new political reality post-referendum by bringing their views in line with their parties' standpoints. Their increasing inclination towards leave may have been further propped up by the sound performance of the economy in the second half of 2016, as this gave the impression that Britain would not be affected by the departure from the EU in terms of economic prosperity. Our results do *not* suggest that radical voices on the fringes of the political spectrum and expressed through the social media are responsible for the change, because the group showing rising support for leave is unlikely to have been susceptible to such voices.

Yet, these provisional conclusions are mere conjectures. As noted before, the data only allow us to make statements about changes in the aggregate for different groups, not about changing preferences for individual respondents, let alone draw firm conclusions about motivations for changing preferences.

We have to end on a rather disconcerting note. We found clear evidence of growing polarization among the electorate regarding views on Britain's membership of the EU as the percentage of undecided people ('don't knows') contracted in all four political groups. This polarization appeared to happen along social lines as we found people with lower than average levels of education to be increasingly drawn towards the leave side while those with higher than average levels of education displayed a growing preference for remain. It may well be the case that the continued salience of the issue in the media has pushed people to make up their minds about Britain's membership of the EU and/or cling ever more tenaciously to their existing preference. It may take years before the divisions generated by the Brexit process can heal.

6. Literature

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Appendix 1: A List of variables used in the analysis

Label used in the text	Original variable's response categories
Should UK remain member of EU, w8	Leave EU, Remain in EU (Don't know/refusal = missing)
Should UK remain member of EU, w8	Leave EU, Remain in EU, Don't know (Refusal=missing)
Age and sex, w8	
Quarter of interview, w8	
Highest qualification, w8	Other/No qualification, GCSE, A-level, Other degree, Degree
Satisfaction with income, w8	from Completely dissatisfied (1) To Completely Satisfied (7)
Level of interest in politics, w7	from Very (4) to Not at all (1)
Gross household income	w6 personal data using w8 household structure (in 500£ increments)
Economic Status, w8	Employed, Not employed, Retired, Looking after family, Student
Marital status, w8	Single, Married, Divorced, Widowed
Importance of being British, w6	from Not at all important (0) to Extremely important (10)
Qualified to participate in politics, w6	from Strongly agree (5) to Strongly disagree (1)
Public officials do not care, w6	from Strongly agree (5) to Strongly disagree (1)
Do not have a say on what govt does, w6	from Strongly agree (5) to Strongly disagree (1)
Satisfaction with democracy in own country, w6	Very satisfied (4) to Very dissatisfied (1)
Importance of being British, w6, for LCA	Low = 0 to 5; High = 6 to 10
Strength of Party support, w6, for LCA	Very and Fairly = 1 to 2; Not very = 3
Interest in politics, w6, for LCA	Very and some = 1 to 2; Little and None = 3 to 4
Political efficacy, w6, for LCA	Low = 2 to 3; High = 4; Missing = 1
Don't know Political efficacy, w6, for LCA	Known political efficacy = 2 to 4; Does not know = 1
Voting is a civic duty, w6, for LCA	Disagree = 4 to 5; Agree = 1 to 2; Missing = 3
Don't know if voting is a civic duty, w6, LCA	Knows if voting is civic duty = 1, 2, 4, 5; Does not know = 3
Costs of political engagement, w6, LCA	Costly = 1 to 2; Not costly = 4 to 5; Missing =3
Don't know costs of political engagement	Knows costs = 1, 2, 4, 5; Does not know = 3
Intention to vote at next GE, w6, for LCA	Low = 0 to 5; High = 6 to 10
Satisfaction with democracy, w6, for LCA	Satisfied = 1 to 2; Dissatisfied = 3 to 4
Don't know if satisfied with democracy, LCA	Known satisfaction = 1 to 4; Does not know = 5
Feels qualified for politics w6, for LCA	Agree = 1 to 2; Disagree = 3 to 4
Don't know if qualified for politics w6, for LCA	Known = 1 to 4; Does not know = 5
Feels better informed in politics than average w6, for LCA	Agree = 1 to 2; Disagree = 3 to 4
Don't know if better informed than average w6, for LCA	Known = 1 to 4; Does not know = 5
Feels that public officials care w6, for LCA	Agree = 1 to 2; Disagree = 3 to 4
Don't know if public officials care w6, for LCA	Known = 1 to 4; Does not know = 5
Feels that has a say in politics w6, for LCA	Agree = 1 to 2; Disagree = 3 to 4
Don't know if has a say in politics w6, for LCA	Known = 1 to 4; Does not know = 5

Appendix 2: Determinants of the preference for leaving the EU (main effects and interactions)

Logit models of determinants of support for leaving EU (log odds)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Should UK remain member of EU	Should UK remain member of EU	Should UK remain member of EU	Should UK remain member of EU	Should UK remain member of EU	Should UK remain member of EU	Should UK remain member of EU	Should UK remain member of EU	Should UK remain member of EU
Should UK leave the EU									
Ref.: First quarter 2016									
Second quarter 2016	0.134	0.204	-0.070	-0.056	-0.557**	0.060	-0.024	-0.121	0.022
	(0.261)	(0.169)	(0.264)	(0.210)	(0.213)	(0.208)	(0.252)	(0.224)	(0.280)
Third quarter 2016	0.170	0.187	-0.252	0.355~	-0.322	0.006	0.030	0.194	0.446~
	(0.254)	(0.165)	(0.253)	(0.205)	(0.207)	(0.204)	(0.246)	(0.215)	(0.263)
Fourth quarter 2016	0.091	0.271	-0.362	0.069	-0.031	0.222	0.573*	0.181	0.854**
	(0.275)	(0.177)	(0.272)	(0.223)	(0.221)	(0.221)	(0.250)	(0.236)	(0.287)
First quarter 2017	0.173	0.289	0.265	0.402	-0.377	0.429	0.366	0.636*	0.374
	(0.351)	(0.235)	(0.375)	(0.294)	(0.303)	(0.302)	(0.361)	(0.323)	(0.373)
Age	0.005	0.006*	0.006*	0.006*	0.006*	0.006*	0.006*	0.006*	0.006*
	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Female	-0.318***	-0.318***	-0.320***	-0.320***	-0.316***	-0.320***	-0.317***	-0.318***	-0.315***
	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)
Ref.: Single									
Married	0.256**	0.255**	0.255**	0.253**	0.253**	0.255**	0.255**	0.256**	0.253**
	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)
Divorced	0.316**	0.315**	0.316**	0.317**	0.316**	0.317**	0.320**	0.318**	0.317**
	(0.109)	(0.108)	(0.109)	(0.109)	(0.108)	(0.108)	(0.109)	(0.108)	(0.108)
Widowed	-0.125	-0.121	-0.126	-0.125	-0.121	-0.119	-0.116	-0.118	-0.121

	(0.125)	(0.125)	(0.125)	(0.125)	(0.125)	(0.125)	(0.125)	(0.125)	(0.125)
Ref.: Employed									
Not employed	-0.076	-0.077	-0.079	-0.082	-0.088	-0.080	-0.076	-0.076	-0.085
	(0.121)	(0.122)	(0.121)	(0.121)	(0.120)	(0.122)	(0.121)	(0.122)	(0.122)
Retired	0.038	0.040	0.033	0.038	0.047	0.039	0.042	0.042	0.035
	(0.078)	(0.078)	(0.078)	(0.078)	(0.078)	(0.079)	(0.078)	(0.079)	(0.079)
Looking after family	0.221	0.220	0.216	0.217	0.217	0.216	0.216	0.224	0.213
	(0.138)	(0.138)	(0.138)	(0.138)	(0.138)	(0.138)	(0.138)	(0.137)	(0.137)
Student	-0.285	-0.278	-0.274	-0.275	-0.268	-0.277	-0.279	-0.276	-0.271
	(0.187)	(0.187)	(0.188)	(0.187)	(0.188)	(0.187)	(0.188)	(0.187)	(0.187)
Household income	-0.017**	-0.017**	-0.017**	-0.017**	-0.017**	-0.017**	-0.017**	-0.017**	-0.017**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Satisfaction with income	-0.068***	-0.068***	-0.126**	-0.067***	-0.068***	-0.068***	-0.067***	-0.068***	-0.068***
	(0.017)	(0.017)	(0.039)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Highest qualification (UKHLS & BHPS)	-0.235***	-0.220***	-0.236***	-0.235***	-0.235***	-0.235***	-0.235***	-0.235***	-0.235***
	(0.019)	(0.040)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Importance of being British	0.126***	0.126***	0.127***	0.127***	0.072***	0.126***	0.126***	0.126***	0.126***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.020)	(0.009)	(0.009)	(0.009)	(0.009)
Level of interest in politics	-0.118***	-0.117***	-0.117***	-0.121*	-0.119***	-0.117***	-0.117***	-0.118***	-0.117***
	(0.032)	(0.032)	(0.032)	(0.061)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
Qualified to participate in politics	-0.081**	-0.081**	-0.083**	-0.082**	-0.080**	-0.096~	-0.082**	-0.080**	-0.081**
	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.054)	(0.027)	(0.027)	(0.027)
Do not have a say on what govt does	0.130***	0.131***	0.129***	0.131***	0.128***	0.130***	0.136*	0.132***	0.129***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.057)	(0.031)	(0.031)
Satisfaction with democracy in own country	-0.168***	-0.168***	-0.168***	-0.169***	-0.167***	-0.168***	-0.167***	-0.180**	-0.167***
	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.070)	(0.032)
Public officials do not care	0.184***	0.184***	0.184***	0.182***	0.184***	0.184***	0.182***	0.185***	0.244***

	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.063)
Ref.: First quarter 2016 # Age									
Second quarter 2016 # Age	-0.001								
	(0.004)								
Third quarter 2016 # Age	-0.000								
	(0.004)								
Fourth quarter 2016 # Age	0.003								
	(0.005)								
First quarter 2017 # Age	0.000								
	(0.006)								
Ref.: First quarter 2016 # Highest qualification (UKHLS & BHPS)									
Second quarter 2016 # Highest qualification (UKHLS & BHPS)		-0.041							
		(0.051)							
Third quarter 2016 # Highest qualification (UKHLS & BHPS)		-0.006							
		(0.049)							
Fourth quarter 2016 # Highest qualification (UKHLS & BHPS)		-0.003							
		(0.053)							
First quarter 2017 # Highest qualification (UKHLS & BHPS)		-0.036							
		(0.071)							
Ref. : First quarter 2016 # Satisfaction with income									
Second quarter 2016 # Satisfaction with income			0.032						
			(0.050)						

Third quarter 2016 # Satisfaction with income			0.087~							
			(0.048)							
Fourth quarter 2016 # Satisfaction with income			0.129*							
			(0.052)							
First quarter 2017 # Satisfaction with income			-0.015							
			(0.072)							
Ref.: First quarter 2016 # Level of interest in politics										
Second quarter 2016 # Level of interest in politics				0.056						
				(0.080)						
Third quarter 2016 # Level of interest in politics				-0.078						
				(0.078)						
Fourth quarter 2016 # Level of interest in politics				0.080						
				(0.084)						
First quarter 2017 # Level of interest in politics				-0.095						
				(0.112)						
Ref.: First quarter 2016 # Importance of being British										
Second quarter 2016 # Importance of being British					0.087**					
					(0.027)					
Third quarter 2016 # Importance of being British					0.067**					
					(0.026)					

Fourth quarter 2016 # Importance of being British					0.040				
					(0.028)				
First quarter 2017 # Importance of being British					0.077*				
					(0.038)				
Ref.: First quarter 2016 # Qualified to participate in politics									
Second quarter 2016 # Qualified to participate in politics						0.008			
						(0.068)			
Third quarter 2016 # Qualified to participate in politics						0.058			
						(0.066)			
Fourth quarter 2016 # Qualified to participate in politics						0.015			
						(0.071)			
First quarter 2017 # Qualified to participate in politics						-0.083			
						(0.097)			
Ref.: First quarter 2016 # Do not have a say on what govt does									
Second quarter 2016 # Do not have a say on what govt does						0.032			
						(0.072)			
Third quarter 2016 # Do not have a say on what govt does						0.041			
						(0.070)			
Fourth quarter 2016 # Do not have a say on what govt does						-0.094			
						(0.072)			

First quarter 2017 # Do not have a say on what govt does							-0.054		
							(0.103)		
Ref.: First quarter 2016 # Satisfaction with democracy in own country									
Second quarter 2016 # Satisfaction with democracy in own country								0.085	
								(0.090)	
Third quarter 2016 # Satisfaction with democracy in own country								-0.011	
								(0.087)	
Fourth quarter 2016 # Satisfaction with democracy in own country								0.036	
								(0.096)	
First quarter 2017 # Satisfaction with democracy in own country								-0.193	
								(0.131)	
Ref.: First quarter 2016 # Public officials do not care									
Second quarter 2016 # Public officials do not care									0.018
									(0.079)
Third quarter 2016 # Public officials do not care									-0.081
									(0.075)
Fourth quarter 2016 # Public officials do not care									-0.175*
									(0.082)

First quarter 2017 # Public officials do not care									-0.055
									(0.107)
Constant	-0.232	-0.306	0.026	-0.250	0.142	-0.209	-0.271	-0.237	-0.468
	(0.304)	(0.274)	(0.307)	(0.282)	(0.285)	(0.285)	(0.301)	(0.290)	(0.309)
Observations	10896	10896	10896	10896	10896	10896	10896	10896	10896
Standard errors in parentheses									
~ p<0.10, * p<0.05, ** p<0.01, *** p<0.001									

For more information, please contact
ioe.llakescentre@ucl.ac.uk
LLAKES Centre
UCL Institute of Education
University College London
20 Bedford Way
London WC1H 0AL
UK