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WAS BREXIT TRIGGERED BY THE OLD AND UNHAPPY? OR BY FINANCIAL FEELINGS?

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PUBLIC ECONOMICS

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Was Brexit Triggered by the Old and Unhappy? Or by Financial Feelings?

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Abstract

On 23 June 2016, the United Kingdom voted in favour of 'Brexit'. This paper is an attempt to understand why. It examines the micro-econometric predictors of anti-EU sentiment. The paper provides the first evidence for the idea that a key channel of influence was through a person's feelings about his or her own financial situation. By contrast, the paper finds relatively little regression-equation evidence for the widely discussed idea that Brexit was favoured by the old and the unhappy. The analysis shows that UK citizens' *feelings about their incomes* were a substantially better predictor of pro-Brexit views than their *actual incomes*. This seems an important message for economists, because the subject of economics has typically avoided the study of human feelings in favour of 'objective' data.

Keywords: Referendum, European Union, Brexit, Voting, Happiness, Discontent.

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"The Brexit vote and Donald Trump's surge reflect discontent." Andrew Ross Sorkin, <u>New York Times</u>, 29 February 2016.

"I don't think Brexit would have happened if it hadn't been for the political and economic events of the preceding 10 years. People were disillusioned. They felt badly treated. They felt squeezed." Alistair Darling, former Chancellor of the Exchequer, <u>The Guardian</u>, 13 September 2017

"Why did millions vote to leave? ...the big gap between those over 50 and those below in support for Leave." Ben Chu, <u>The Independent</u>, 26 June 2016

1.Introduction

This paper is an attempt to understand the outcome of the 2016 UK referendum on membership of the European Union. That referendum led to what has become known as Brexit. The contribution of the current study is to provide evidence -- in a way consistent with work in other areas of economics such as Georgiadis and Manning (2013) and Grichnik, Smeja and Welpe (2010) -- that suggests it is necessary to appreciate the influential role played by human 'feelings'. The paper focuses especially upon, and provides new evidence for, the predictive power of people's feelings of discontent about their income. We show that feelings about income can be more important than actual income.

The reasons for Brexit have been widely discussed in the UK media. Those discussions are captured in part by the kinds of quotations, particularly from Alistair Darling and Ben Chu, illustrated above. These quotes (the one from Sorkin, interestingly, predates both Brexit and Trump) are meant only as examples. They are used here as iconic cases of issues that have been debated across the UK about why it was that Brexit occurred. Some newspaper and TV journalists have suggested that the decision to leave the EU was forced on the country by special groups (particularly old voters swamping the views of the young, or discontented citizens swamping the views of others). Early academic writings on the topic also, and rightly, emphasized the concept of a divided nation (Dorling 2016, for example). One purpose of the current paper is to try to probe the exact nature of the divisions.

The principal objective of the paper is to try to gain some understanding of who voted for Brexit and what motivated them. It is not possible to observe the confidential votes cast, on June 23rd 2016, in voting booths across the United Kingdom. What later sections do, instead, is to investigate the patterns in citizens' views in each week in the run-up period between January and June of that year. The recent Understanding Society data set, based on random sampling, makes that feasible. Using information from this source, we examine approximately 8000 citizens' views on whether they felt the UK should leave, or remain within,

the European Union. Some complementary evidence from the earlier British Household Panel Survey is also provided.

2. Prior Research

The paper builds upon a small but growing literature. Important contributions, many of which may be seen eventually as seminal, have been made by scholars such as Shaw, Smith and Scully (2017), Clarke, Goodwin and Whiteley (2017), Becker, Fetzer and Novy (2017), Dorling (2016), Goodwin and Milazzo (2017), Goodwin and Heath (2016), Heath and Goodwin (2017), and Hobolt (2016). We confirm some of these articles' early conclusions, such as the likelihood of highly-educated citizens favouring Remain. Our work also relates to research that has begun to explore scepticism towards European Union values (such as Hobolt and de Vries 2016) and the probable cultural and economic repercussions of Brexit (Ginsburgh, Moreno-Ternero and Weber 2017).

The above-mentioned research is generally consistent with later results in finding a negative effect of education and income on the Leave vote, and strongly significant effects from cultural identity and political preferences. The effect of age is arguably more complex: it enters with a positive sign in a regression including the simple linear coefficient (eg. Goodwin and Heat 2016), but features a significant concavity when the quadratic term is included (eg. Powdthavee et al. 2017). Interestingly, Goodwin and Milazzo (2017), using the British Election Study, find no statistically significant coefficients for age groups above 34 years old. Moreover, Becker et al. (2017), in their work on regionally aggregated data, do not find an unambiguously positive and significant coefficient on a variable for the percentage of the population aged over 60 in a region.

Early empirical studies that try to unpick the reasons for the Brexit vote have pointed to economic forces and immigration-related factors (for example, Clarke, Goodwin and Whiteley, 2017, although interestingly the work of Becker et al. 2017 argues that actual exposure to immigration was not particularly important). Goodwin and Milazzo (2017) used data from the British Election Study (BES) to explore the influence of immigration on Brexit. They found that an increase in the rate of immigration at the local level, and attitudes to perceived immigration control, were key predictors of sympathy for Brexit. Similarly, Hobolt (2016), who analysed campaign and survey data, showed that Brexit was favoured by the less-educated, the poorer and older voters, and those who expressed concerns about immigration

and multi-culturalism. Goodwin and Heath (2016) attributed Brexit more specifically to the 'left behind', as caused by poverty and a general lack of education and opportunities. The authors provided persuasive evidence that Brexit voters were consistently from among the poorest households, with incomes below £20,000 per year, the unemployed, in low-skilled and manual occupations, had worsened financial situations, and tended to have few qualifications. Indeed, Goodwin and Heath suggested that educational inequality might have been the strongest driver behind the Leave vote.[1]

It has also been shown that turnout was higher in Remain areas, and where there were high numbers of young people, of ethnic minorities, and of university graduates (Heath and Goodwin, 2017). However, in contrast to the tenor of some media reports that suggested voting for Brexit was more common in the North of England, Dorling (2016) has pointed out that the absolute numbers of Leave voters was higher in the South.

Shaw, Smith and Scully (2017) tried to understand the referendum's result by documenting the key campaigning messages promoted by each side. They used causal-mapping methods to analyse data from nine televised Brexit debates broadcast in the 4 weeks prior to the referendum. The authors found that the Leave campaign stuck closely to a small set of themes, repeated core values, and avoided topics viewed as important to Remain voters. By contrast, these authors show that the Remain side covered a much broader set of issues, were generally less consistent in their messages, and strayed into the themes propagated by Leave.

By emphasizing the predictive power of human feelings, the current paper builds upon a general literature on the consequences of emotions and subjective wellbeing for voting behaviour. Liberini et al. (2017) demonstrates that greater subjective wellbeing increases the probability of voting for the incumbent party. Along similar lines, but without explicitly using indices of SWB, Achen and Bartels (2004), Healy, Malhotra, and Hyunjung Mo (2010), Wolfers (2009) and Bagues and Esteve-Volart (2016) demonstrate how exogenous events that generate emotional reactions, but are unrelated to government actions, can affect the popular support for politicians. On the other hand, Di Tella and MacCulloch (2005) finds that the happiness of citizens with strong ideological identities can be affected by an electoral success

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[1] 1In a recent experimental study, Paetzel et al. (2014) show that in case of uncertainty about the future, those who are likely to lose from a reform will likely vote in its favor, provided it promises to enhance efficiency. In more general settings, Pecoraro (2017) shows that, under uncertainty with respect to future labour income, voters do not demand redistributive policies (such as those intended by the EU).

per se, rather than by the positive outcomes of valid implemented policies. An introduction to the modern social-science of happiness can be found in sources such as Powdthavee (2010).

By drawing upon the Understanding Society data set, the analysis produces two results that may not currently be widely understood. First, somewhat in support of a version of Sorokin's and Darling's opinions, there is evidence that unhappy feelings contributed to Brexit. Here our results are akin to a finding in new work by Alabrese et al. (2018), which documents a significant, though small, effect from the level of life satisfaction. However, our own analysis suggests that, as a matter of statistical predictors, the key channel of influence on Brexit voting was not through general dissatisfaction with life. It was through a person's feelings about his or her own financial situation. Second, despite what some commentators have believed, on our estimates the Brexit decision was not, in any sharp sense, due to the old. The Understanding Society data set suggests that *ceteris paribus* only the very youngest UK citizens -- particularly those under the age of 25 -- were substantially pro-Remain. Between the end of their 20s and their 70s, people who live in the UK apparently have, after adjustment for other characteristics, rather similar views on the desirability or not of EU membership.

3. Survey Data

The empirical work in the paper is based primarily on data from the UK's Understanding Society data set (UNDSOC). We draw on wave 8 of UNDSOC, which covers interviews[2] conducted from January 2016 to December 2016,[3] and we integrate these data with additional variables taken from previous waves of the UNDSOC and the British Household Panel Survey (BHPS). The Understanding Society is a rich database, designed to be representative of the UK population as a whole, and collects information each year on over 100,000 UK residents. It contains questions on political orientation and participation, voting behavior and intentions, life and financial satisfaction, as well as personal and demographic information on jobs, family status, income, and local authority of residence. Understanding Society builds on its predecessor project, the British Household Panel Survey. Approximately

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[2] From the UNDSOC data documentation: "…Following this, a random interview date in the household is chosen. To compute derived interview dates, cross-wave inconsistencies in recorded interview dates were resolved" , available here https://www.understandingsociety.ac.uk/documentation/mainstage/dataset-documentation/wave/3/datafile/c_indall/variable/c_intdaty_dv. ".

[3] The wave includes interviews conducted from January 2016 to June 2018, but we obtained and early access of the data which included interviews up to December 2017.

6,000 original participants from the BHPS agreed to join UNDSOC, which makes it possible, in certain circumstances, to combine data from the two studies.

We seek to understand the possible role for 'discontent' in the Brexit vote. How can that concept be incorporated into a statistical study of voting? In the later analysis, we rely especially on two questions that are asked of respondents in the Understanding Society survey. An overall life-satisfaction question[4] appears on page 523 of the Understanding Society questionnaire Wave 8 Consultation v02, 2016. It is:

On a scale of 1 to 7 where 1 = 'Completely Dissatisfied' and 7 = 'Completely Satisfied', please tell me the number which you feel best describes how dissatisfied or satisfied you are with the following aspects of your current situation.

Satisfaction with life on a 7 point scale (with the answer % in parentheses)
Completely dissatisfied   (2.2%)
Mostly dissatisfied   (5.1%)
Somewhat dissatisfied   (7.4%)
Neither satisfied nor dissatisfied   (9.7%)
Somewhat satisfied   (17.0%)
Mostly satisfied   (45.5%)
Completely satisfied.   (12.9%)

A question about people's feelings about their financial situation is asked on page 486 of the Understanding Society questionnaire Wave 8 Consultation v02, 2016. The wording is

How well would you say you yourself are managing financially these days? Would you say you are...

Subjective financial situation on a 5 point scale (with the answer % in parentheses)
Living comfortably   (35.0%)
Doing all right   (39.7%)
Just about getting by   (19.0%)

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[4] Such data have been widely used in other settings in quantitative social science (surveyed in Powdthavee 2010, for instance). There have also been a number of attempts to validate life-satisfaction data. Work by Oswald and Wu (2010), for example, provides evidence, using compensating-differentials theory and data on approximately 1 million USA citizens, that there is a match between life-satisfaction scores and objective quality of life.

Finding it quite difficult   (4.7%)

Finding it very difficult   (1.6%)

Both of these are versions of people's feelings – about, respectively, the overall quality of their life and, more specifically, how they feel they are doing in an economic sense.

As a dependent variable in later regression equations, we will approximate Leave/Remain answers from a survey question asked on page 524 of the Understanding Society questionnaire Wave 8 Consultation v02, 2016. The wording of that question is

Should the United Kingdom remain a member of the European Union or leave the European Union?

<u>*Options*</u>

1 Remain a member of the European Union

2 Leave the European Union

For the regression equations, a variety of other variables will be included as independent controls. These are of the type normal in quantitative social science. They will include people's age, gender, ethnic group, marital status, working status, region, trust in the institutions and so on.

Table 1 sets out means and standard deviations for a number of the key variables used. Noticeably, the proportion 'voting' Brexit here, in the week before the referendum, is only 42.5% of those giving a clear answer in the survey. This percentage is unsatisfactorily low (because a narrow majority, just under 52%, in the actual vote favoured Brexit).   However, the statistical-sampling difficulty here is known to be a fairly common one. As is now known about the original polls in the United Kingdom, and the fact that the financial markets and betting bookmakers were not expecting the result of the referendum, many UK voters seem beforehand to have concealed their views and intentions. One possible partial explanation is that a significant number of voters -- 7% in this survey -- declined to answer or said they were undecided. However, that is still not enough to account for the apparent discrepancy. A later section returns to this: it investigates issues of sample composition and the possible reasons behind an under-representation of Brexit supporters in social-science surveys.

The rest of Table 1 provides information about life satisfaction (its mean is 5.22 on a scale from 1 to 7) and feelings of financial difficulty (mean of 1.98 on a scale from 1 to 4). Standard demographic and personal variables are also reported.

Table 2 gives the age distribution of the respondents in the sample. Here we group individuals into 5-year bands, except for those over 70 years of age, who are combined into a single category. Approximately 17% of citizens in this sample are aged above 70. Table 3 gives further information.

4. Main Results

To examine the link between individuals' preferences for Brexit and their characteristics, we estimate regressions of the form:

$$ProBrexit_i = \alpha_i + \beta\ LifeSat_i + \gamma\ FinSit_i + \delta X_i + \varepsilon_i \qquad (1)$$

where $ProBrexit$ is a simple zero/one dummy to represent individuals' views either against or for the European Union. $LifeSat$ is a measure of an individual's level of life satisfaction; $FinSit$ captures the person's feelings about his or her financial situation.

We propose two ways to model life satisfaction and financial feelings -- by using individual dummies and by treating the variables as continuous. The symbol X represents a vector of controls defined in the previous section, and ε_i is an i.i.d. error term. In all regressions we control for a week-of-interview dummy variable and dummy variables for the Local Authority District (LAD) /region of residence. Robust standard errors, which are adjusted for clustering at the household level, are reported. The regression equations in the following tables are thus of an Ordinary Least Squares kind. Although OLS here has technical drawbacks, more complicated kinds of estimators give the same results, so for simplicity we report estimates here in the OLS form.[5] Estimation using probit or logistic regression is available on request.

Table 4 provides the key results. Non-responders to the EU membership question are here omitted (we later provide further information on the non-respondent+undecided individuals).

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[5] Results for the marginal effects of the non-linear estimators are qualitatively and quantitatively similar to those for the coefficients of the linear probability model estimated with the OLS.

Is a low level of life-satisfaction predictive of someone being in favour of Brexit? The regression equations offer relatively little evidence for such a view. The base category for the life-satisfaction variable in the Column 1 regression is 'completely dissatisfied'. That extreme answer is given by 2% of the UK population. Column 1 of Table 4 gives the coefficient estimates on the different life-satisfaction scores (to the best of our knowledge our econometric estimates are the first of their kind). There is little clear pattern; the standard errors on the coefficients are large. Table 4's first column shows, for example, that the coefficient on 'mostly dissatisfied' is barely different from that on 'completely satisfied', at -0.0458 compared to -0.0372. Levels of life satisfaction *per se* here seem to have remarkably little predictive power.

This does not mean that 'feelings' have no predictive role. Table 4 reveals an interesting, and quantitatively powerful, pattern in the variable for respondents' feelings about their finances. Coefficients are reported for 'doing all right', 'just about getting by', 'finding it quite difficult', and 'finding it very difficult'. 'Living comfortably' is the base category. Unlike in the pattern for the life-satisfaction scores, a marked and monotonic incline in the coefficients is found. In the fullest specification, that of column 3 of Table 4, the four coefficients on financial feelings are, respectively, 0.0332, 0.0708, 0.0744, and 0.131. These financial-feelings coefficients can be treated as approximate percentage amounts in a Brexit 'voting' equation. Hence they are substantial in size. For example, UK citizens who feel things are very difficult financially are approximately 13 percentage points more likely (than those who feel their finances are comfortable) to be in favour of leaving the European Union. The pattern is illustrated in the right-hand side of Figure 1.

Table 4 includes a set of dummy variables for age. Was it, as some newspapers reported at the time, the 'old' who forced the UK out of the European Union? On that issue, it is necessary to decide whether the analytical objective is to understand the predictive 'raw' effect of age or the 'regression-corrected' consequence of age. In column 1 of Table 4, the base category is young adults who are aged under 20 years old. Relative to them, the coefficient on the 20-24 age category is 0.0187 with a large standard error. Hence people in their early twenties appear to be slightly more in favour of Brexit than those under 20, but it is not possible to reject the null hypothesis, at 95% confidence, that their views are the same as the very young.

From this point on in the age distribution, however, the results are different than might have been anticipated. The age dummy-variable coefficients are much flatter than some commentators apparently believed. The coefficients run from 0.204 for ages 25-29; 0.222 for

ages 30-34; …0.249 for ages 50-54; and again 0.249 for 70 years and above. Figure 2 illustrates this shape. On the vertical axis is a measure of support for Brexit. It can be seen that by the time people are in their 30s there is steady support for a pro-Brexit position (all relative, it should be emphasized, to the views of the young adult citizens who are under 20 years old in the Understanding Society data set). The natural conclusion from Figure 2 seems to be that support for the Leave side of the EU referendum follows a kind of step function in age-group. It jumps up abruptly, and then runs almost horizontally. This non-linear link between *ceteris paribus* age and Brexit voting is depicted in Figure 2. By contrast, if raw means in the data are examined, Figure 3 shows that the old are much more likely to favour Brexit. The key point, however, is that this is not because of <u>age</u> per se. Figure 3 is the uncorrected graph. In that vein, interesting new work by Eichengreen et al. (2018) explores -- and is more favourable towards belief in -- a Brexit age-gradient. The authors use a long time-series, which allows them to try to distinguish between cohort and other effects in a way not possible with our data set. Eichengreen and his colleagues do not adjust for a large number of other variables, in the way our own work does, so it is not straightforward to compare their results directly with those in the current paper's tables.

In their attitudes to Brexit, the young are highly pro-Europe. However, the word 'young' here does mean very young. Once UK citizens reach their late 20s, they are apparently behaving -- once we control for other variables -- in almost the same way as UK citizens in, for example, their 70s. The data suggest that Brexit was not, in a deep sense, the result of many of the voters being old.

Table 4 allows other hypotheses to be explored. A strong association is found between having high qualifications and favouring Remain. The coefficient on having a degree is, in the full specification, approximately -0.125. Women are more favourable to the EU, by a substantial 8% points. Having dependent children in the household leaves people statistically indifferent to the EU. There is also evidence of an ethnic influence. Those who classify themselves in the survey as Black or Mixed are markedly less likely to vote for Brexit, compared to individuals who classify themselves as White British (who in turns of numbers are around three quarters of those answering the UNDSOC survey). The coefficients, in the columns of Table 4, are an almost identical -0.185 and -0.186, for the two ethnic groups respectively.

Some other attitudinal variables can be included as independent variables. We find small but statistically significant differences among respondents who value the "importance of

being British", among those who are highly trusting of their neighbours, and those people who say they are very interested in politics. The first group is more likely to support Brexit, by approximately 2 percentage points. The second group is rather in favour of remaining in the European Union, by 3 percentage points, and the third group is more likely to support Brexit by another 3 percentage points.

Most other variables fail to have statistically strong effects. In the full specification of Table 4, being 'in work' does enter negatively, with a small coefficient of -0.0291, but the standard error is 0.0175. It might be thought (for example, from the careful analysis of district data by Becker et al. 2017), that unemployment per se would be crucial. Perhaps surprisingly, a dummy variable for being unemployed into the regressions has a small coefficient that is never statistically significantly different from zero. It may be that the Becker et al. (2017) results are consistent with our own and are capturing the important, and natural, connection at the regional level between high levels of unemployment and high levels of financial discontent. We find that being married has no detectable effect on people's views about Brexit. Finally, and perhaps against some commentators' intuitions, living in a rural area has no discernible predictive consequences.

Table 4 includes a number of independent variables whose coefficients are not reported explicitly in the table but are mentioned in the footnotes. These are regional dummies (for the 12 regions) and week-of-interview dummies (for 25 consecutive weeks) from January 2016 to June 2016. The former pattern is depicted in Figure 4; the latter is given in Figure 5. Scotland emerges as the most pro-EU region of Great Britain.

Figure 5 makes clear the upward trend in pro-Brexit attitudes through the year of 2016.

5. Consequences of Objective Income

Overall, our analysis finds that financial feelings are one of the strongest predictors of citizens' views on the desirability of Brexit. A natural supposition is that this is illusory – that it is instead because feelings about income are merely standing in for objective information on income. However, as we now show, that apparently turns out not to be true. In Table 5 we run a kind of statistical 'horse race' between objective income and subjective feelings about finances.

Data on respondents' incomes are unavailable for the latest waves of the Understanding Society Panel. To overcome this limitation, we propose a check that is explained in greater

detail later, where we use income from previous waves to adjust for objective measures of and individual's financial situation. We take historical income data, from the 6th wave of the Understanding Society individual panel questionnaire. Specifically, we use two variables: total monthly personal income (variable *fimnlabgrs_dv*) and total monthly labour income (variable *fimnlabgrs_dv*), both in gross figures and capped at 15,000 GBP. In addition, we collect local authority district (LAD) 2016 wage data from the Office of National Statistics, and construct measures capturing respondents' relative income position compared to that of their "neighbours". The first one, denoted *Relinc*, is calculated as the ratio between a respondent' total income and LAD of residence's median income (expressed in logs), as additional measure we also propose an indicator variable that equals 1 if the individual total monthly labour income exceeds the LAD monthly pay median income. A caveat in this analysis is that we can only use a restricted sample of individuals -- those with observed income.

Table 5 re-estimates the models in column (3) of Table 4, but now controlling also for objective income. Columns (1), (3) and (5) of Table 5 incorporate Life Satisfaction and Subjective Financial Situation as categorical variables, as before, while columns (2), (4) and (6) treat both variables continuously. For the income measure, we use total personal monthly income (columns (1)-(2)), total labour income (columns (3)-(4)) and the relative income indicator (columns (5)-(6)).

The inclusion of objective income does have some effect on the size of the coefficient on subjective financial situation, but it does so only slightly. Its inclusion does not alter the paper's main finding. As shown in the left-hand side of Figure 1, feelings about a person's financial situation emerge as more important, as a predictor of Brexit views, than that person's actual income. The estimated coefficients on relative income (columns (5)-(6)) are typically not significant.

6. Checks

Other results are described in the Appendix. Table A1 provides results for variations of the model reported in column 6 of Table 5, where we experiment with combinations of objective and subjective income measures. A possible concern is that subjective financial situation is not necessarily exogenous. To try somewhat to address this, we re-estimate the baseline model of column 6 of Table 5, and instrument feelings about financial situation with measures of an individual's relative income (measured relative to those people in the local

geographical area). This choice is motivated by a literature in economics, psychology and sociology highlighting the importance of relative income for (financial) satisfaction (which include among others Clark and Oswald (1996), Clark et al. (2008), Senik (2004, 2008), Ferrer-i-Carbonell (2005), Caporale et al. (2009), Knies (2012), and McBride (2001)). The validity of our instrument assumes that the relative income position of a respondent can be based on the respondent's past income level (exogenous because evaluated in the past) and on the median income level from the local authority district where the respondent resides.

Table A1 displays the results for this exercise. In column (1) of Table A1 we replicate column (6) of Table 5 which is our baseline model; columns (2) to (5) experiment with variations of the baseline model by adding additional income controls. Relative income is never significant. The objective measures of income (Total and Labour Monthly incomes) is again not significant both if regressed together with relative income or on its own, but the subjective measure of financial situation is always statistically significant and has the expected sign. Columns (6) to (8) of Table A1 present the results for our IV estimation when subjective financial situation is instrumented with measures of relative income. The Hansen Sargan test reported at the bottom of the table does not reject the instrumenting.

We explore three other possibilities to rule out the case that the relative income affects both perceptions on income and perceptions about institutions.

First, we re-run the pro-Brexit equation excluding respondents who live in London. Second, given that in the UK much of the possible substitution between public and private services is in the education sector, we run our pro-Brexit equation excluding respondents with school-age children. Third, we use an alternative version of the instrument, that also accounts for the variance of income within the LAD. Results are displayed in Table A2.

As a final exercise, displayed in Table A3, we allow for the effect of Life Satisfaction (columns (1) and (3)) and the effect of Subjective Financial Situation (columns (2) and (4)) to vary, according to whether the respondent reports labour income levels higher than the LAD median. In general, we find that individuals who report higher income than the LAD median are less likely to support Brexit. Looking at column (4), the results also suggest that respondents who are finding their financial situation very difficult are more likely to support Brexit, unless they also report higher income than their LAD median, in which case they tend to be in favour of the status quo, and prefer the UK to preserve their EU membership.

6.1 Alternative Samples: Understanding Society post-referendum and BHPS data

The regression-equation analysis in earlier sections chose to exclude people who were interviewed after the 23rd June Referendum took place. That is because at the time of the interview those later individuals already knew, of course, the outcome of the vote. However, it is interesting to wonder whether the answers to the EU membership questions given with the knowledge of the referendum outcome are structurally different from those answers given before the 23rd June 2016. In addition, it is interesting to probe the robustness of our estimates to a model that employs sampling weights. These can, in principle, be used only on the full-waves sample, and therefore require us to include all respondents. Table A4 gives the results of these exercises. All specifications here use sampling weights. Consistently across all specifications, it seems that knowledge of the actual referendum outcome does not greatly affect the spirit of our main results.

It is natural to wonder whether there is something special, and potentially unreliable, about UNDSOC data. As an additional robustness check, therefore, we exploit the fact that in waves 9, 12 and 16[6] of the BHPS survey the respondents were asked questions about their attitude towards the European Union. The wording is not dissimilar to that asked in wave 8 of UNDSOC.

The BHPS questions are: (i) EU-Bad1[7], where respondents had to evaluate on a scale from 1 to 3 if *"UK membership of EU is a good thing (equal to 1), neither a good or a bad (2) and, a bad thing (3)";* (ii) EU-Bad2[8] where respondents are asked whether "*UK benefited from being in EU*", we reverse-coded the variable on scale where *1* is associated with "*no*" and *0* with "*yes*." There are also some interesting and possible relevant variables which are included in the BHPS but not in UNDSOC; these are indicators of risk aversion and of trust, which are both measured on a 1 to 10 scale. A part from these new variables most of the other regressors included in the Pro-Brexit equation from UNDSOC are also available in the BHPS;[9] so we

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[6] These waves refer to interviews which took place in 1999, 2002, 2006.

[7] This variable is based on BHPS-*opeur1*.

[8] This variable is based on BHPS-*opeur2*.

[9] We have excluded the ethnic-origin variables because of the very high frequency of missing values.

can to re-run a standard equation using the BHPS. This allow us to explore whether Brexit was a kind of one-time shock or a signal of a deeper disaffection with the European Union?[10]

Table A5 displays summary statistics, Tables A6 and A7 report the results from the estimation of 'Pro-Brexit regression equations' based on BHPS data. Here EU-Bad1 and EU-Bad2 are, in turn, the dependent variables, and the format of the tables is similar to previous tables. Overall, these BHPS results seem encouragingly in line with previous UNDSOC ones. As with the UNDSOC sample, life satisfaction does not seem entirely robustly predictive of preferences towards the EU, although it works considerably more strongly in BHPS than before. The new variables proxying for risk aversion and trust are significant: more risk-averse individuals and more-trusting people are happier in the EU than those with the opposite attributes. Crucially, the BHPS equations continue to find a strong predictive role for feelings about a person's financial satisfaction.

6.2 On Discrepancies between UNDSOC data and the Brexit vote

A previously mentioned concern is that the sample proportion of the pro-Brexit respondents is less than in the actual Brexit vote. Respondents interviewed for Understanding Society thus seems to under-represent the actual support for Leave.

One possible reason is that Brexit supporters were unwilling to express their political views in the survey (perhaps because of 'social desirability' concerns). Social-image maintenance is known to matter (DellaVigna, List and Malmendier, 2012; DellaVigna et al., 2017). There is evidence that even individuals with strong political views might avoid publicly expressing them if they believe their opinion is not popular in their social environment (Bursztyn et al., 2016). But social norms can change quickly, as a consequence, for example, of an (unanticipated) election result. Bursztyn, Egorov and Fiorin (2017) show that Donald Trump's victory in the 2016 U.S. Presidential election increased individuals' perception of the social acceptability of holding strong anti-immigration (or xenophobic) views and their willingness to publicly express them. *Mutatis mutandis*, we can apply this logic to the Brexit vote, and exploit the data originating from the interviews which took place during the post-referendum period, i.e. from 24th June to 31st December 2016.

Some individuals may have refused to answer the EU membership question merely because their interview took place before the referendum. These individuals, if interviewed

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[10] We are grateful to an anonymous referee for suggesting this route.

after the referendum, may have felt confident enough to reveal their preference against the EU. Over six percent of people interviewed in the pre-referendum sample left blank the answer on the EU. Following the same logic, other individuals might have, instead, answered that they were in favour of remaining in the European Union, only because they were unwilling to reveal their (at the time) 'socially unacceptable' preference.

A second concern is selective participation in the Understanding Society study. One could argue that those who are dissatisfied with the political and societal situation are less likely to participate in a social-science survey. A non-negligible proportion of respondents in the pre-referendum sample (seven percent) declared themselves to be *not decided* about whether the UK should stay in the EU. The number of individuals who declare no opinion regarding EU membership goes down over time. If we compare the before and after Brexit distribution of individuals, the only growing category is that of individuals preferring to leave the EU, and the only shrinking category is that of the individuals who were undecided at the time of the first interview. (Figure A1)

Next, therefore, we exploit the responses of those who were interviewed after the 23rd June -- the assumption being that post-referendum answers are likely to be unconstrained by issues of social acceptability or to be the outcome of informed choices. We estimate our baseline model on the sample of respondents interviewed after the 23rd of June 2016. Then, we use the obtained estimates to predict the Brexit vote for the individuals interviewed before the referendum took place. [11] Re-attributing respondents to the Leave/Remain options gives us a new imputed Brexit vote distribution for the pre-referendum interviewees.

Table A8 gives a transition matrix based on this exercise, which suggests that the respondents who refused to answer were split among the Remain and Leave vote, but 60 per cent of the respondents who were undecided can be allocated to the Leave vote, according to

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[11] This is based on a cut-off rule at the mean of the predicted probability of those who responded "leave". To note that, among those interviewed before the referendum, the mean (median) of the predicted value for those who voted remain is 0.531(0.532), and it is instead 0.652(0.692) for those who voted leave and 0.622(0.654) for those who answered "don't know". So, before setting any threshold, we find that those who selected "don't know" are more similar to the leavers than to the remainers. Looking at the model performance, we find that the percentage of correctly classified cases is equal to 66.11% when the threshold is set to 0.5, equal to 62.55% and 59.96% when set to 0.65 and to 0.7, respectively. However, in all cases the model performs better at predicting the leave votes (the model has high sensitivity and low specificity). Finally, we checked how the percentage of predicted leave/remain votes changes over different threshold levels, and we find that the share of predicted leave vote stays constant at 52.13 for all threshold values equal and smaller than 0.75. Graph visualising this exercise is available upon request.

the post-referendum model. The share of respondents who expressed a preference for Remain and who are allocated to the Leave vote (43.18%) is larger than the share of respondents who expressed a preference for Leave and are instead allocated to the Remain vote (36%).

We perform a further exercise. We re-aggregate the preferences for leaving and remaining on the basis of the transition matrix displayed in Table A8. Figure A2 shows our results, which suggests that accounting for the allocation of the undecided individuals to the leave, based on "estimated" preferences for the EU membership, delivers figures that are quite close to the referendum outcome.

As a final check. We re-estimate our standard equation for the pre-referendum sample, but now replacing the responses on the opinions on EU membership of those who were undecided or did not answer (and who were not included in the baseline regression sample) with the predictions to the same question based on post-referendum sample. Results are displayed in Table A9. From the inspection of the table we can clearly see that the results are in line with the earlier regressions.

Another possibility is that, on June 23rd, many of those UK citizens who favoured the EU simply failed to go to the polls to vote. Perhaps they felt less intense about the issue than the Brexiters. Our data do not allow us to judge the strength of feeling, either for or against the EU, of survey respondents. If the anti-EU individuals had, relatively, much stronger preferences than those who wished for Remain, the people who desired Brexit might have been more inclined to go to the polling stations on referendum day. Abstentions by pro-EU citizens might have been influential.

The UNDSOC question on EU membership is in a sense hypothetical and does not refer to participation to the Brexit referendum. UNDSOC asks about general preferences over EU membership. However, we explore this debate about 'selection' in the participation to the referendum (i.e. those who wanted Remain did not go to the voting booths sufficiently) by looking at respondents' voting records in the past years and we re-estimate Eq. (1) augmented with a new variable *PastVote*. Using this reduced sample, our main previous results hold. The variable *PastVote* is not significantly different from zero, which suggests that voting habits are not distributed differently across Brexiters and non-Brexiters. We cannot be certain, of course,

about whether our measure of voting habits applies to voting in this very special kind of referendum *per se*.[12]

7. Discussion

The analysis has a number of limitations that should be noted.

First, although the patterns discussed above may help us to understand individuals' voting for Brexit, the analysis is necessarily a study of associations in the data. We are not able to say, with scientific certainty, that variable X caused Brexit. This is particularly relevant when considering the hypothesis that unhappy feelings in the UK helped lead to the Brexit decision. While we have experimented with a number of possible instrumental-variable strategies, this paper presents only instrumented econometric estimates for a subset of the sample for which we have available income data. We can legitimately say that people's financial worries, for instance, are strongly associated with favouring the Leave side of the argument, but we cannot firmly establish that financial worries literally caused people to favour Brexit.

Second, it could perhaps be argued more reasonably that we have probed the causal effects from age, on the grounds that age is exogenous, and thus that it will be orthogonal to other regressors in the equation. However, even here, individuals cannot be forced to take part in the survey; nor can they be compelled to answer particular questions within the survey form. Hence there could, in principle, remain some selection-effect biases even on the age coefficients.

Third, the low overall figure for people who are pro-Brexit in this data set remains a concern to us. Admittedly, it is not necessary statistically to have a random sample to estimate regression equations, so our inferences on the role of financial feelings may be immune to this concern. Moreover, like other analysts, we have to use the data set as it comes to us. Nevertheless, at face value, there must presumably be some kind of inaccuracy in the data collection. Even in week 25 of the year of 2016, we find, in this data set, only 42.5% of the

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[12] Output for this exercise is available upon request.

population saying they definitely want to leave the European Union. There is no easy explanation for this puzzle.

Fourth, and relatedly, it might be that attrition within the sample is leading to difficulties in inference (Danny Dorling raised this interesting point with us), if more 'stable' people are systematically more likely to favour Remain. Again this would be a form of selection bias.

8. Conclusions

The UK's decision to leave the European Union is one of the major political events of modern European history. This paper is an attempt to understand its roots. Our analysis cannot, in a strict scientific sense, establish the causes of Brexit. What it does instead is to document the micro-econometric predictors of Brexit voting.

We have drawn, for this analysis, upon recently released data to try to probe the motivations of UK citizens for voting Leave or Remain in the 2016 UK referendum on membership of the European Union. It is not possible -- for any social scientist -- to know the individual answers given on June 23 within the private voting booths across the United Kingdom. What the paper is able to do, however, is to examine the patterns in citizens' expressed views on the days and weeks running up to the election. The Understanding Society data set, which uses random sampling, and has the advantage that it is not run by a political-polling company, makes that possible. In the present inquiry, the data set provides information on approximately 8000 citizens' views. We also draw on some results using earlier BHPS data.

The paper has presented data on raw averages and also a selection of results from regression equations. The former allows a simple description of survey answers; the latter provides an analytical attempt to hold constant other influences. Neither of these is 'right' or 'wrong', because they measure different things. The paper places more emphasis on the latter method – the one based on regression equations and thus on *ceteris paribus* judgments. We are interested in, for example, how being female or having a university degree, *per se*,

influenced people's views. To do so it is necessary to control for other characteristics of females and of degree holders. [13]

    We have documented a range of statistically significant predictors of anti-EU sentiment. Our analysis does not detect major influences from age or life satisfaction. The paper's main -- and we believe new -- contribution is to point to a strong predictive role for people's feelings about their financial situation. Consider those who, respectively, described their financial situation as *living comfortably*, *doing all right*, *just about getting by*, *finding it quite difficult*, and *finding it very difficult*. The individuals giving lower answers, after adjusting for other influences, were systematically much more likely to favour leaving the EU. Compared to those 'living comfortably', the other categories favoured Brexit in a steadily increasing way by, respectively, the following percentage points: 3%, 7%, 8%, and 13%. One reason this finding may matter in political science, and perhaps more broadly in the practical political world, is that it is not clear that voting in an anti-EU way is capable of solving the problem of how someone feels about their finances.

    Feelings about income are, in our data, a substantially better predictor of Brexit voting than is actual income. This seems an important message for economists. The subject of economics has tended to avoid the study of human feelings in favour of 'objective' data.

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[13] Some researchers have documented 'raw' Brexit-voting patterns but we concentrate on regression-adjusted ones. It is possible, instead, to calculate in the raw data how the average woman voted, or how the average degree-holder voted. But by using a regression-equation method we can adjust for the fact that, for example, women have a higher average age in the population and degree-holders have a lower average age. If we rely only on the raw data then we conflate the effects of age and of other influences.

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FIGURES

Figure 1. Financial Feelings were Approximately Twice as Influential as Actual Income
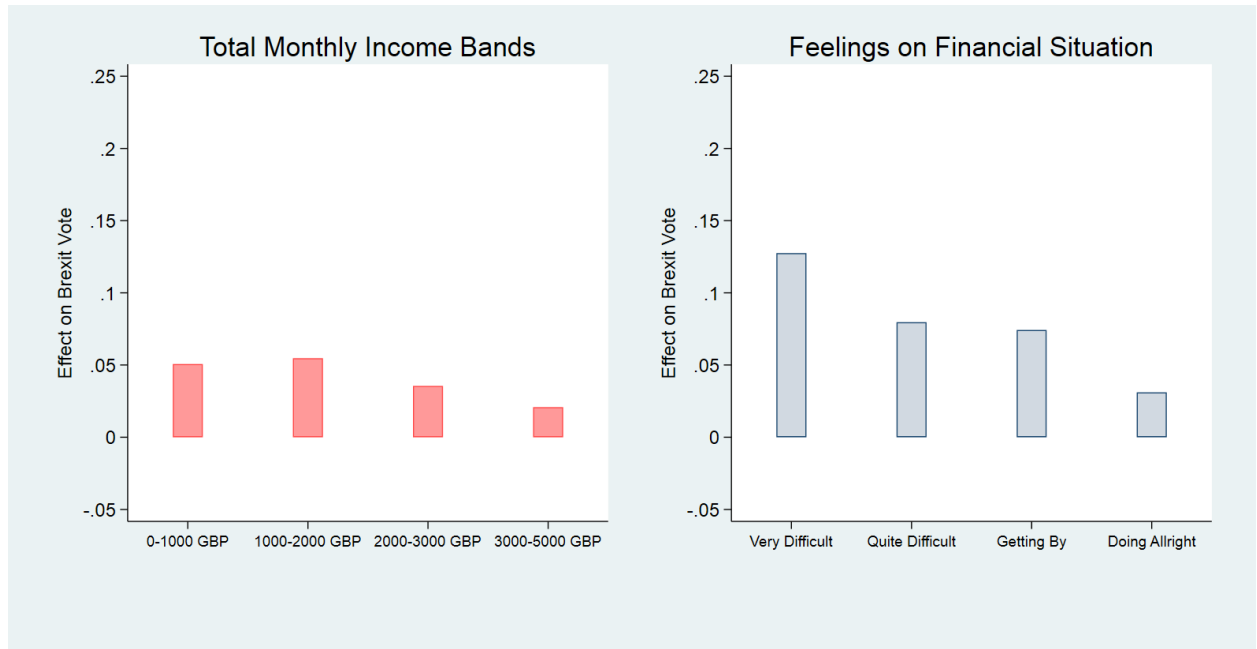
Notes. The vertical axis gives a measure of the probability points of favouring Brexit. The bar charts report the coefficients estimated in regression equations (in Table 5).

Figure 2. The Regression-Corrected Age-Profile of Those Who Wanted to Leave the EU
(as calculated from a Brexit equation: Column 1 of Table 4) *(95% CI shown)*
The vertical axis gives a measure of the probability of favouring Brexit.

Note. 18-19 yrs olds is the baseline
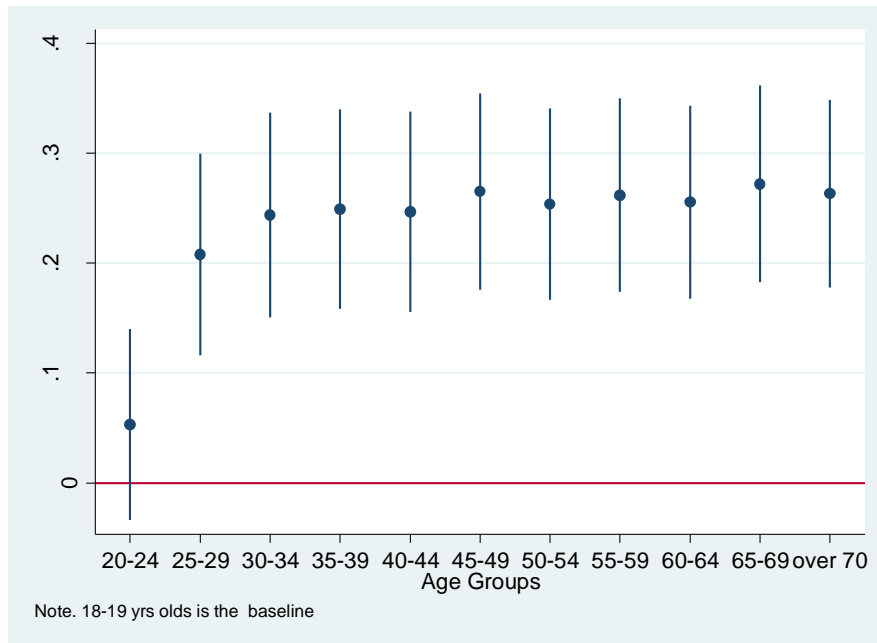
Figure 3. The Uncorrected Age-Profile of Those Who Wanted to Leave the EU *(95% CI shown)*
The vertical axis gives a measure of the probability of favouring Brexit

Note. 18-19 yrs olds is the baseline
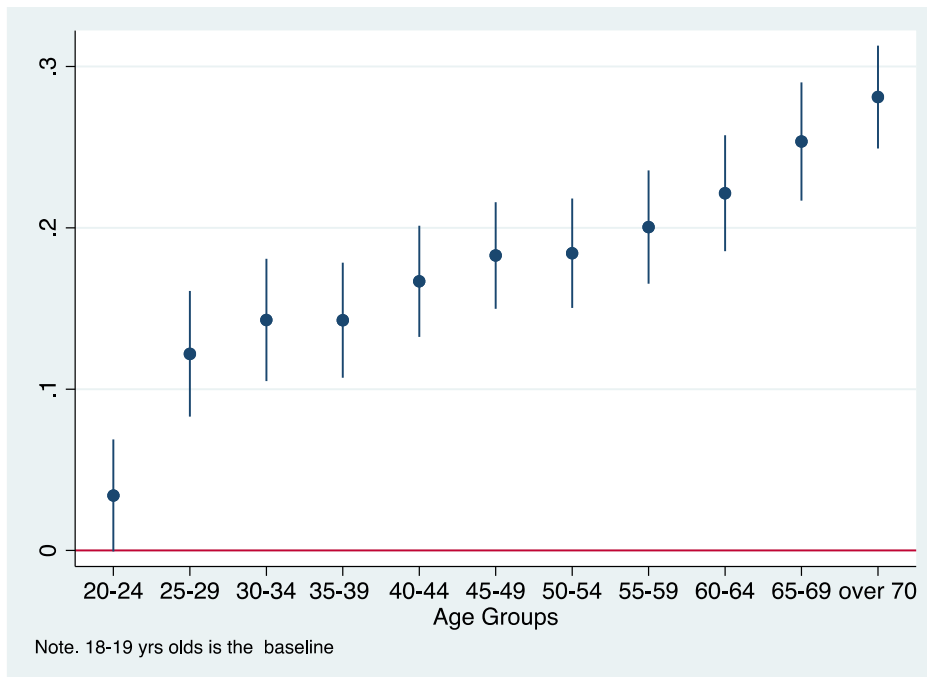
Figure 4. The Regional Distribution of Those Who Wanted to Leave the EU (as calculated from a Brexit equation: Column 2 of Table 4)   *(95% CI shown)*
The vertical axis gives a measure of the probability of favouring Brexit.

Note. London is the baseline
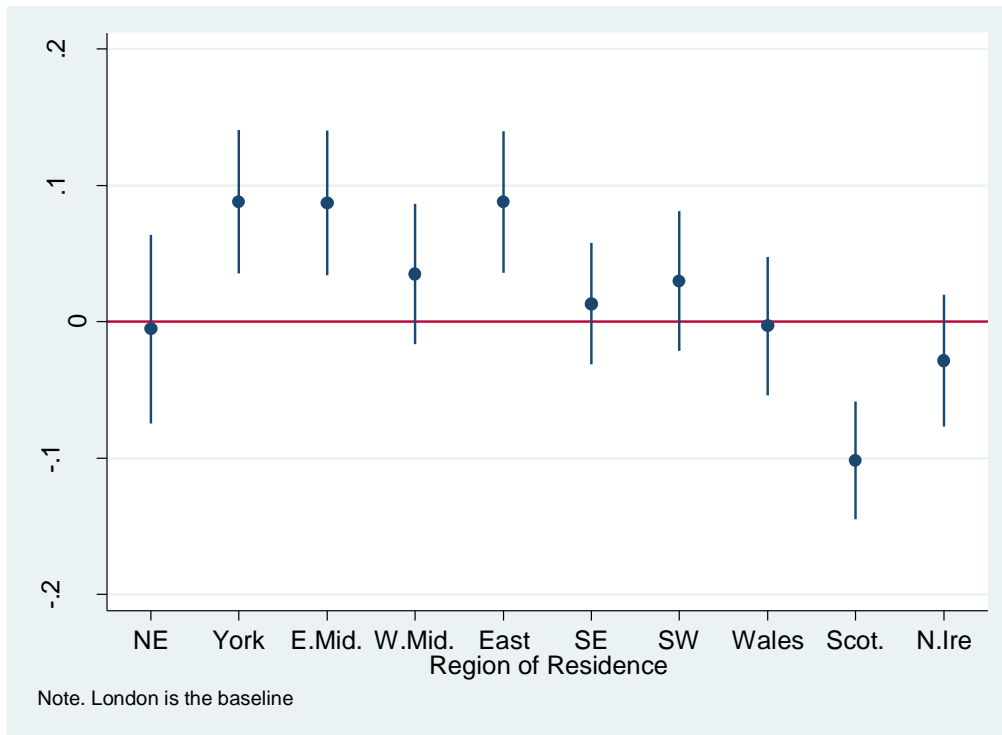
Figure 5. The Percentage Supporting Brexit by Each Week from January 2016 to June 2016.
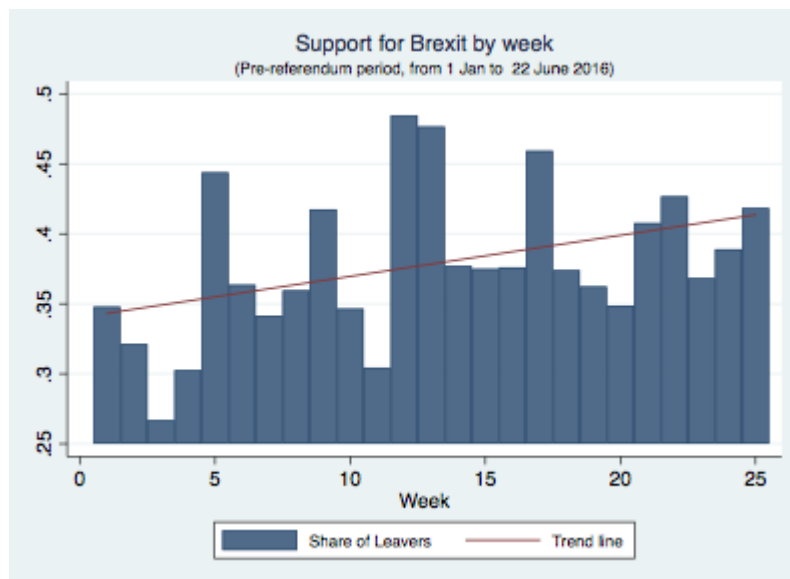
This chart uses the whole sample (weighted). A linear time-trend is fitted.

TABLES

Table 1. Variable Definitions and Descriptive Statistics for the Main Sample (UNDSOC wave 8) *(where R is the survey respondent).* The first three rows are for the available sample, weighted, and not just for the sample used in the eventual regressions.

Variables	Definition	Mean*	Std. Dev
Pro-BREXIT	Proportion of Rs who think UK should leave the EU (sample interviewed in the week before the referendum, n=339). Weighted.	0.425	0.495
Pro-BREXIT	Proportion of Rs undecided+refuse-to-answer-to-the-EU-question (sample interviewed in the week before the referendum, n=339). Weighted.	0.070	0.184
Pro-BREXIT	If R believes the UK should leave the EU and 0 otherwise (wave 8 UNDSOC, January-June). Total n = 8764. Weighted.	0.384	0.486
Overall life satisfaction	Overall satisfaction with life: "completely dissatisfied" =1 , "mostly dissatisfied"=2, "somewhat dissatisfied"=3, "neither satisfied nor dissatisfied=4, "somewhat satisfied"=5, "mostly satisfied"=6, "completely satisfied" =7 (wave 8 UNDSOC)	5.22	1.455
Subjective financial situation:	(Current) subjective financial situation: "living comfortably"=1"doing all right"=2, "just about getting by"=3, "finding it quite difficult=4, "finding it very difficult"=5 (wave 8 UNDSOC)	1.982	0.934
University degree	=1 if R has a university degree and 0 otherwise (wave 8 UNDSOC)	0.380	0.485
Children	=1 if R has children and 0 otherwise (wave 8 UNDSOC)	0.153	0.360
White Brits	=1 if R 's ethnic origin is white British and 0 otherwise (wave 8 UNDSOC)	0.763	0.424
Working	=1 if R is in paid occupation and 0 otherwise (wave 8 UNDSOC)	0.033	0.493
Married	=1 if R is married and 0 otherwise (wave 8 UNDSOC)	0.556	0.496
Rural	=1 if R lives in a rural area and 0 otherwise (wave 8 UNDSOC)	0.279	0.448
Female	= if R is female and 0 otherwise (wave 8 UNDSOC)	0.551	0.497

Unemployed	= if R is unemployed and zero otherwise (wave 8 UNDSOC)	0.279	0.180
Ethnicity: White	We code the variable *racel_dv* into individual 0/1 dummies. (wave 6 UNDSOC)	0.916	0.277
Ethnicity: Asian	We code the variable *racel_dv* into individual 0/1 dummies. (wave 6 UNDSOC)	0.047	0.213
Ethnicity: Black	We code the variable *racel_dv* into individual 0/1 dummies. (wave 6 UNDSOC)	0.020	0.140
Ethnicity: Mixed	We code the variable *racel_dv* into individual 0/1 dummies. (wave 6 UNDSOC)	0.011	0.108
Ethnicity: Other	We code the variable *racel_dv* into individual 0/1 dummies. (wave 6 UNDSOC)	0.004	0.063
Importance of Bring British	Variable coded: "Not at all important" =0 to "Extremely Important"=10	7.065	3.030
Trust in Neighbours	Variable coded from 1(very low) to 5 (very high)	3.770	0.786
Interest in Politics	Political Interest: 1(none) to 4 (very high)	2.713	0.882
Total Monthly Income	Total monthly overall income (from wave 6) n= 6,879	1964.027	1818.144
Labour Monthly Income	Total monthly labour income (from wave 6) n=4,305	2193.471	1970.079

*Observations used in the actual regressions = 7,091, from Understanding Society Panel Survey, Wave H.

Respondents aged 18 and above interviewed between 5th January 2016 and 22 June 2016.

The regression equations given later in the paper use unweighted data (as is conventional with such equations).

Hence inferences from them should not be affected by data weights released subsequently.

Table 2. Distribution of the Respondents' Ages *(for the sample used in regression equations)* 5-year intervals.

Intervals	Freq.	Percent	Cum.
18-19 years old*	108	1.34	1.34
20-24 years old	469	5.84	7.18
25-29 years old	455	5.66	12.84
30-34 years old	512	6.37	19.21
35-39 years old	658	8.19	27.40
40-44 years old	720	8.96	36.36
45-49 years old	804	10.00	46.37
50-54 years old	823	10.24	56.61
55-59 years old	743	9.25	65.85
60-64 years old	678	8.44	74.29
65-69 years old	682	8.49	82.78
70 years or older	1,384	17.22	100.00
Total	8,036	100.00	

Note: *Only respondents 18 years old or above are included in the regression sample; therefore those aged 15 to 17 are excluded here. UNDSOC data.

Table 3. Distribution of Responses on the EU Membership Question

Should UK remain a member of the EU?	Freq.	Percent	Cum.
Missing	226	2.57	2.57
Refusal	139	1.58	4.16
Don't know	625	7.12	11.28
Remain a member of the European Union	4,632	52.77	64.05
Leave the European Union	3,155	35.95	100.00
Total	8,777	100.00	

Note. Subsample of respondents aged 18 and above interviewed between 5th January 2016 and 22 June 2016. UNDSOC data.

Table 4. Pro-Brexit Regression Equations. OLS Cross-Sectional Estimates with Banded Life-Satisfaction and Financial-Feelings Dummy Variables.

	Pro-Brexit		
	(1)	(2)	(3)
Satisfaction with life: [a]			
Mostly dissatisfied	-0.0458		-0.0455
	(0.0464)		(0.0462)
Somewhat dissatisfied	-0.0447		-0.0493
	(0.0443)		(0.0441)
Neither satisfied nor dissatisfied	0.00763		0.00796
	(0.0434)		(0.0432)
Somewhat satisfied	-0.0508		-0.0449
	(0.0413)		(0.0413)
Mostly satisfied	-0.0773*		-0.0606
	(0.0400)		(0.0400)
Completely satisfied	-0.0372		-0.0145
	(0.0422)		(0.0422)
Subjective financial situation: [b]			
Doing all right		0.0332**	0.0332**
		(0.0137)	(0.0138)
Just about getting by		0.0748***	0.0708***
		(0.0177)	(0.0181)
Finding it quite difficult		0.0810***	0.0744**
		(0.0297)	(0.0303)
Finding it very difficult		0.143***	0.131**
		(0.0501)	(0.0512)
Age Group: [c]			
20-24 yrs old	0.0187	0.0200	0.0156
	(0.0478)	(0.0485)	(0.0480)
25-29 yrs old	0.204***	0.201***	0.196***
	(0.0502)	(0.0508)	(0.0504)
30-34 yrs old	0.222***	0.218***	0.213***
	(0.0501)	(0.0508)	(0.0504)
35-39 yrs old	0.241***	0.235***	0.233***
	(0.0485)	(0.0490)	(0.0486)
40-44 yrs old	0.236***	0.226***	0.223***
	(0.0491)	(0.0497)	(0.0492)
45-49 yrs old	0.250***	0.242***	0.237***
	(0.0472)	(0.0477)	(0.0474)
50-54 yrs old	0.249***	0.241***	0.236***
	(0.0464)	(0.0470)	(0.0466)
55-59 yrs old	0.255***	0.251***	0.247***
	(0.0467)	(0.0472)	(0.0469)
60-64 yrs old	0.254***	0.252***	0.248***

		(1)	(2)	(3)
		(0.0468)	(0.0474)	(0.0470)
	65-69 yrs old	0.265***	0.266***	0.263***
		(0.0473)	(0.0479)	(0.0474)
	Over 70 yrs old	0.249***	0.252***	0.249***
		(0.0455)	(0.0461)	(0.0456)
University Degree		-0.131***	-0.127***	-0.125***
	=1 if R has a university degree	(0.0129)	(0.0130)	(0.0130)
Female		-0.0793***	-0.0781***	-0.0779***
	=1 if R is female	(0.0114)	(0.0114)	(0.0114)
Children		0.0104	0.00361	0.00481
	=1 if R has children	(0.0182)	(0.0183)	(0.0182)
Ethnicity [d]				
	Asian	-0.0370	-0.0389	-0.0414
		(0.0311)	(0.0314)	(0.0312)
	Black	-0.168***	-0.184***	-0.185***
		(0.0369)	(0.0378)	(0.0375)
	Mixed	-0.178***	-0.186***	-0.186***
		(0.0414)	(0.0419)	(0.0416)
	Other	-0.117	-0.130	-0.128
		(0.0799)	(0.0809)	(0.0804)
Importance of Bring British		0.0201***	0.0205***	0.0204***
	(0-low to 10-very high)	(0.00201)	(0.00201)	(0.00201)
Trust in your Neighbours		-0.0342***	-0.0313***	-0.0311***
	(1-very low to 5-very High)	(0.00805)	(0.00809)	(0.00810)
Interest in Politics		0.0293***	0.0295***	0.0279***
	(1-very low to 4-very High)	(0.00723)	(0.00722)	(0.00723)
Unemployed		-0.0204	-0.0273	-0.0325
	=1 if R is unemployed	(0.0356)	(0.0356)	(0.0356)
Working		-0.0339*	-0.0335*	-0.0291*
	= 1 if R is working full time	(0.0174)	(0.0174)	(0.0175)
Married		-0.0119	-0.00815	-0.00719
	=if R is married	(0.0136)	(0.0136)	(0.0137)
Rural		0.00336	0.00364	0.00418
	=1 if R lives in a rural area	(0.0152)	(0.0152)	(0.0151)
Observations		7,091	7,091	7,091
R-squared		0.093	0.094	0.096

Robust standard errors, clustered by household, in parentheses: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

(a) Overall satisfaction with life: coded from completely dissatisfied (1) to completely satisfied (7). Completely dissatisfied is the base category.

(b) Subjective financial situation: from living comfortably (1) to finding it very difficult (5). Living comfortably is the base category.

(c) Age group: 5-year intervals, base category is 18-19 years old.

(d) Base category is white.

(e) Regional dummies included in all regressions: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South East, South West, Wales, Scotland, Northern Ireland.

Table 5. Pro-Brexit Regression Equations. OLS Cross-Sectional Estimates with Banded Life-Satisfaction, Financial-Feelings, and Income.

	Pro-Brexit					
	(1)	(2)	(3)	(4)	(5)	(6)
	Personal Income		Labour Income		Relative Income	
Satisfaction with life: [a]						
Mostly dissatisfied	-0.0467		-0.00103		-0.0556	
	(0.0478)		(0.0710)		(0.0843)	
Somewhat dissatisfied	-0.0509		0.0104		-0.0664	
	(0.0457)		(0.0692)		(0.0838)	
Neither satisfied nor dissatisfied	0.00446		0.0431		-0.00733	
	(0.0446)		(0.0680)		(0.0812)	
Somewhat satisfied	-0.0479		0.00800		-0.0265	
	(0.0427)		(0.0660)		(0.0790)	
Mostly satisfied	-0.0620		-0.0396		-0.102	
	(0.0414)		(0.0644)		(0.0770)	
Completely satisfied	-0.0182		0.0165		-0.0600	
	(0.0436)		(0.0671)		(0.0803)	
Satisfaction with life: [b]		-0.00379		-0.00999*		-0.0135*
		(0.00431)		(0.00560)		(0.00710)
Subjective financial situation: [c]						
Doing all right	0.0322**		0.0163		-0.0114	
	(0.0141)		(0.0169)		(0.0214)	
Just about getting by	0.0690***		0.0444*		0.0315	
	(0.0184)		(0.0228)		(0.0287)	
Finding it quite difficult	0.0722**		0.0333		-0.0215	
	(0.0310)		(0.0411)		(0.0528)	
Finding it very difficult	0.129**		0.217***		0.215***	
	(0.0515)		(0.0641)		(0.0790)	
Subjective financial situation: [d]		0.0311***		0.0271***		0.0189*
		(0.00723)		(0.00897)		(0.0114)
ln (Total Monthly Income)	-0.0129**	-0.0136***				
	(0.00516)	(0.00513)				
ln (Labour Monthly Income)			-0.0155*	-0.0162*		
			(0.00889)	(0.00887)		
Relinc (wrt LAD Median Income)					-0.0186	-0.0202*

					(0.0120)	(0.0120)
Age Group: [e]						
20-24 yrs old	0.0189	0.0273	0.00409	0.0113	-0.0331	-0.0232
	(0.0636)	(0.0645)	(0.0780)	(0.0796)	(0.104)	(0.106)
25-29 yrs old	0.210***	0.218***	0.184**	0.191**	0.138	0.147
	(0.0660)	(0.0668)	(0.0795)	(0.0809)	(0.106)	(0.108)
30-34 yrs old	0.231***	0.239***	0.219***	0.227***	0.207**	0.216**
	(0.0666)	(0.0675)	(0.0791)	(0.0807)	(0.105)	(0.107)
35-39 yrs old	0.251***	0.256***	0.217***	0.221***	0.213**	0.217**
	(0.0652)	(0.0661)	(0.0787)	(0.0805)	(0.105)	(0.107)
40-44 yrs old	0.245***	0.251***	0.233***	0.237***	0.269**	0.274**
	(0.0660)	(0.0669)	(0.0788)	(0.0805)	(0.106)	(0.108)
45-49 yrs old	0.255***	0.262***	0.248***	0.255***	0.221**	0.229**
	(0.0639)	(0.0647)	(0.0771)	(0.0787)	(0.103)	(0.105)
50-54 yrs old	0.259***	0.267***	0.233***	0.240***	0.262**	0.272***
	(0.0637)	(0.0646)	(0.0767)	(0.0784)	(0.103)	(0.105)
55-59 yrs old	0.264***	0.270***	0.245***	0.250***	0.201**	0.208**
	(0.0638)	(0.0646)	(0.0764)	(0.0781)	(0.102)	(0.104)
60-64 yrs old	0.269***	0.277***	0.235***	0.243***	0.213**	0.223**
	(0.0640)	(0.0649)	(0.0775)	(0.0790)	(0.104)	(0.106)
65-69 yrs old	0.285***	0.294***	0.254***	0.260***	0.280**	0.289**
	(0.0643)	(0.0652)	(0.0817)	(0.0834)	(0.111)	(0.113)
Over 70 yrs old	0.270***	0.279***	0.248***	0.257***	0.217*	0.230**
	(0.0632)	(0.0640)	(0.0853)	(0.0867)	(0.114)	(0.115)
University Degree *=1 if R has a university degree*	-0.123***	-0.125***	-0.121***	-0.123***	-0.102***	-0.104***
	(0.0133)	(0.0132)	(0.0159)	(0.0159)	(0.0201)	(0.0202)
Female *=1 if R is female*	-0.0846***	-0.0851***	-0.0903***	-0.0912***	-0.0788***	-0.0795***
	(0.0118)	(0.0118)	(0.0159)	(0.0159)	(0.0201)	(0.0201)
Children *=1 if R has children*	0.00266	0.00230	-0.00493	-0.00636	-0.0208	-0.0235
	(0.0185)	(0.0186)	(0.0216)	(0.0216)	(0.0278)	(0.0279)
Ethnicity: [f]						
Asian	-0.0259	-0.0249	0.0564	0.0601	0.0358	0.0386
	(0.0323)	(0.0325)	(0.0395)	(0.0396)	(0.0453)	(0.0452)
Black	-0.172***	-0.171***	-0.175***	-0.172***	-0.166***	-0.167***
	(0.0387)	(0.0391)	(0.0455)	(0.0454)	(0.0527)	(0.0523)
Mixed	-0.175***	-0.176***	-0.181***	-0.185***	-0.185***	-0.193***
	(0.0448)	(0.0451)	(0.0503)	(0.0503)	(0.0578)	(0.0578)
Other	-0.124	-0.126	-0.101	-0.0978	-0.105	-0.105
	(0.0799)	(0.0807)	(0.110)	(0.108)	(0.114)	(0.111)
Importance of Bring British *(0-low to 10-very high)*	0.0206***	0.0208***	0.0223***	0.0224***	0.0205***	0.0204***
	(0.00205)	(0.00205)	(0.00239)	(0.00239)	(0.00302)	(0.00304)
Trust in your Neighbours	-0.0300***	-0.0297***	-0.0318***	-0.0318***	-0.0536***	-0.0544***

	(1)	(2)	(3)	(4)	(5)	(6)
(1-very low to 5-very High)	(0.00827)	(0.00827)	(0.0100)	(0.0101)	(0.0124)	(0.0125)
Interest in Politics	0.0281***	0.0296***	0.0395***	0.0411***	0.0583***	0.0599***
(1-very low to 4-very High)	(0.00732)	(0.00732)	(0.00896)	(0.00896)	(0.0112)	(0.0113)
Unemployed	-0.0534	-0.0475	-0.0796	-0.0720	-0.0326	-0.0222
=1 if R is unemployed	(0.0383)	(0.0380)	(0.0605)	(0.0603)	(0.0738)	(0.0753)
Working	-0.0158	-0.0181	-0.0176	-0.0194	-0.0104	-0.0103
= 1 if R is working full time	(0.0185)	(0.0184)	(0.0302)	(0.0301)	(0.0408)	(0.0408)
Married	-0.00961	-0.00987	-0.0243	-0.0253	-0.0433**	-0.0431**
=if R is married	(0.0138)	(0.0138)	(0.0172)	(0.0172)	(0.0218)	(0.0219)
Rural	0.00726	0.00685	0.00706	0.00656	-0.00101	-0.00309
=1 if R lives in a rural area	(0.0153)	(0.0153)	(0.0186)	(0.0185)	(0.0265)	(0.0264)
Observations	6,885	6,885	4,305	4,305	2,629	2,629
R-squared	0.095	0.093	0.110	0.106	0.129	0.122
Week FE	yes	yes	yes	yes	yes	yes
Region/LAD FE	region	region	region	region	region	region

Robust standard errors, clustered by household, in parentheses: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

(a) Overall satisfaction with life: coded from completely dissatisfied (1) to completely satisfied (7). Completely dissatisfied is the base category in columns (1), (3) and (5).

(b) Overall satisfaction with life, continuous.

(c) Subjective financial situation: from living comfortably (1) to finding it very difficult (5). Living comfortably is the base category in columns (1), (3) and (5).

(d) Subjective financial situation, continuous.

(e) Age group: 5-year intervals, base category is 18-19 years old.

(f) Ethnicity group: base category is white.

(g)Regional dummies included in all regressions: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South East, South West, Wales, Scotland, Northern Ireland

Table A1. Pro-Brexit Regression Equations (OLS and IV Cross- Sectional Estimates with Life-Satisfaction, Financial- Feelings and Income Measures)

	Pro-Brexit							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Satisfaction with life: [a]	-0.0130*	-0.0129*	-0.0130*	-0.0129*	-0.0130*	0.00829	0.0155	0.00754
	(0.00667)	(0.00666)	(0.00667)	(0.00667)	(0.00667)	(0.0132)	(0.0195)	(0.0131)
Subjective financial situation: [b]	0.0194*	0.0183*	0.0195*	0.0193*	0.0183*	0.138**	0.179*	0.134**
	(0.0107)	(0.0107)	(0.0107)	(0.0107)	(0.0107)	(0.0624)	(0.103)	(0.0622)
Relative Income (to LAD Median income)	-0.0159	-0.00777	-0.0240	0.101	0.110			
	(0.0101)	(0.0123)	(0.0197)	(0.145)	(0.145)			
ln (Total Monthly Income)			0.0112		0.0188		0.0112	
			(0.0229)		(0.0236)		(0.0207)	
ln (Labour Monthly Income)				-0.117	-0.131			
				(0.145)	(0.145)			
Individ. Income > LAD Median Income		-0.0269			-0.0302			
		(0.0238)			(0.0243)			
Age Group: [c]								
20-24 yrs old	-0.0236	-0.0318	-0.0277	-0.0245	-0.0406	-0.0445	-0.0581	-0.0442
	(0.0974)	(0.0969)	(0.0979)	(0.0975)	(0.0976)	(0.103)	(0.111)	(0.103)
25-29 yrs old	0.158	0.148	0.152	0.156	0.133	0.109	0.0814	0.110
	(0.0991)	(0.0990)	(0.100)	(0.0991)	(0.100)	(0.104)	(0.122)	(0.104)
30-34 yrs old	0.200**	0.192*	0.192*	0.198**	0.177*	0.141	0.109	0.142
	(0.0986)	(0.0982)	(0.100)	(0.0987)	(0.100)	(0.104)	(0.126)	(0.104)
35-39 yrs old	0.206**	0.200**	0.198**	0.204**	0.184*	0.149	0.116	0.150
	(0.0987)	(0.0982)	(0.101)	(0.0988)	(0.100)	(0.103)	(0.125)	(0.103)
40-44 yrs old	0.245**	0.239**	0.237**	0.244**	0.222**	0.171	0.132	0.172*
	(0.0987)	(0.0983)	(0.101)	(0.0988)	(0.101)	(0.105)	(0.133)	(0.104)
45-49 yrs old	0.227**	0.221**	0.219**	0.225**	0.205**	0.160	0.124	0.162
	(0.0964)	(0.0960)	(0.0983)	(0.0965)	(0.0982)	(0.102)	(0.128)	(0.101)
50-54 yrs old	0.241**	0.235**	0.233**	0.241**	0.219**	0.179*	0.144	0.180*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.0961)	(0.0957)	(0.0982)	(0.0962)	(0.0980)	(0.101)	(0.126)	(0.100)
55-59 yrs old	0.193**	0.186**	0.185*	0.191**	0.169*	0.147	0.118	0.148
	(0.0953)	(0.0948)	(0.0970)	(0.0954)	(0.0969)	(0.0997)	(0.118)	(0.0994)
60-64 yrs old	0.198**	0.189*	0.190*	0.197**	0.172*	0.158	0.131	0.158
	(0.0975)	(0.0971)	(0.0996)	(0.0976)	(0.0996)	(0.102)	(0.119)	(0.102)
65-69 yrs old	0.248**	0.238**	0.237**	0.247**	0.216**	0.225**	0.202*	0.225**
	(0.105)	(0.104)	(0.108)	(0.105)	(0.109)	(0.110)	(0.123)	(0.110)
Over 70 yrs old	0.243**	0.237**	0.227**	0.242**	0.207*	0.241**	0.222*	0.241**
	(0.108)	(0.108)	(0.114)	(0.108)	(0.114)	(0.115)	(0.124)	(0.115)
University Degree	-0.0937***	-0.0904***	-0.0946***	-0.0930***	-0.0908***	-0.0801***	-0.0774***	-0.0808***
=1 if R has a university degree	(0.0189)	(0.0191)	(0.0190)	(0.0189)	(0.0191)	(0.0211)	(0.0223)	(0.0211)
Female	-0.0863***	-0.0888***	-0.0855***	-0.0865***	-0.0881***	-0.0752***	-0.0698***	-0.0754***
=1 if R is female	(0.0188)	(0.0189)	(0.0189)	(0.0188)	(0.0190)	(0.0190)	(0.0219)	(0.0190)
Children	-0.0130	-0.0146	-0.0149	-0.0131	-0.0183	-0.0294	-0.0364	-0.0287
=1 if R has children	(0.0256)	(0.0257)	(0.0259)	(0.0256)	(0.0261)	(0.0280)	(0.0316)	(0.0280)
Ethnicity: [d]								
Asian	0.0376	0.0367	0.0385	0.0335	0.0336	0.0323	0.0320	0.0326
	(0.0445)	(0.0444)	(0.0445)	(0.0451)	(0.0451)	(0.0456)	(0.0466)	(0.0455)
Black	-0.191***	-0.191***	-0.190***	-0.195***	-0.195***	-0.220***	-0.229***	-0.219***
	(0.0567)	(0.0568)	(0.0567)	(0.0570)	(0.0571)	(0.0595)	(0.0637)	(0.0594)
Mixed	-0.0987	-0.0966	-0.0977	-0.0996	-0.0956	-0.124	-0.131	-0.123
	(0.114)	(0.113)	(0.114)	(0.114)	(0.113)	(0.118)	(0.122)	(0.118)
Other	-0.162***	-0.164***	-0.162***	-0.166***	-0.167***	-0.219***	-0.238***	-0.217***
	(0.0519)	(0.0519)	(0.0519)	(0.0523)	(0.0523)	(0.0628)	(0.0745)	(0.0625)
Importance of Bring British	0.0228***	0.0229***	0.0227***	0.0228***	0.0228***	0.0236***	0.0238***	0.0236***
(0-low to 10-very high)	(0.00277)	(0.00277)	(0.00277)	(0.00277)	(0.00277)	(0.00284)	(0.00293)	(0.00283)
Trust in your Neighbours	-0.0458***	-0.0455***	-0.0458***	-0.0456***	-0.0452***	-0.0350***	-0.0312**	-0.0353***
(1-very low to 5-very High)	(0.0118)	(0.0118)	(0.0118)	(0.0118)	(0.0118)	(0.0135)	(0.0157)	(0.0135)
Interest in Politics	0.0489***	0.0481***	0.0492***	0.0488***	0.0484***	0.0439***	0.0426***	0.0441***
(1-very low to 4-very High)	(0.0107)	(0.0107)	(0.0107)	(0.0107)	(0.0107)	(0.0112)	(0.0117)	(0.0112)
Unemployed	-0.0608	-0.0633	-0.0603	-0.0603	-0.0621	-0.133	-0.158	-0.130

	=1 if R is unemployed	(0.0722)	(0.0722)	(0.0723)	(0.0722)	(0.0723)	(0.0846)	(0.0983)	(0.0843)
Working		-0.0236	-0.0261	-0.0223	-0.0235	-0.0241	-0.0239	-0.0239	-0.0241
	= 1 if R is working full time	(0.0381)	(0.0381)	(0.0382)	(0.0381)	(0.0382)	(0.0389)	(0.0397)	(0.0389)
Married		-0.0454**	-0.0449**	-0.0444**	-0.0448**	-0.0424**	-0.0322	-0.0271	-0.0328
	=if R is married	(0.0206)	(0.0206)	(0.0207)	(0.0206)	(0.0207)	(0.0222)	(0.0244)	(0.0221)
Rural		0.0172	0.0177	0.0169	0.0184	0.0186	0.0157	0.0149	0.0158
	=1 if R lives in a rural area	(0.0236)	(0.0236)	(0.0236)	(0.0237)	(0.0237)	(0.0238)	(0.0243)	(0.0238)
Observations		2,986	2,986	2,986	2,986	2,986	2,986	2,986	2,986
R-squared		0.111	0.112	0.112	0.112	0.112	0.070	0.035	0.072
week FE		yes	yes	yes	yes	yes	yes	yes	yes
region/lad FE		region	region	region	region	region	region	region as instrument	region as instrument
Income		no	no	yes	yes	yes	no	only	only
Method							IV	IV	IV
Hansen Sargan test (p-values) [f]							0.9906	0.5397	0.6967

First Stage Instruments:

	Relative Income (to LAD Median income)						-0.0637***	-0.0430	-0.0430
							(0.0246)	(0.0456)	(0.0454)
	Individ. Income > LAD Median Income						-0.2266***	-0.2213***	-0.2213***
							(0.0246)	(0.0432)	(0.0432)
	ln (Total Monthly Income)								-0.0306
									(0.0504)

Robust standard errors, clustered by household, in parentheses: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.
(a) Overall satisfaction with life, continuous, from completely dissatisfied (1) to completely satisfied (7).
(b) Subjective financial situation, continuous: from living comfortably (1) to finding it very difficult (5) Age group: 5-year intervals, base category is 18-19 years old.
(c) Regional dummies: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South East, South West, Wales, Scotland, Northern Ireland.
(d) Instruments for Subjective financial situation are Relinc and dummy equal to one if R income is above the median LAD income and zero otherwise.
(e) Instruments for Subjective financial situation are Relinc and dummy equal to one if R income is above the median LAD income and zero otherwise and respondent total income (in logs).
(f) The Sargan-Hansen test is a test of over-identifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. Under the null, the test statistic is distributed as chi-squared in the number of (L-K) over-identifying restrictions. A rejection casts doubt on the validity of the instruments.

Table A2. Robustness checks (Tests on the Correlation between Relative Income and Evaluation of LAD)

	Pro-Brexit					
	Excl. London		Excl. Children		LAD Income Variance	
	(1)	(2)	(3)	(4)	(5)	(6)
Satisfaction with life: [a]						
Mostly dissatisfied	-0.0361	-0.0387	-0.0604	-0.0636	-0.0611	-0.0658
	(0.0488)	(0.0499)	(0.0497)	(0.0512)	(0.0564)	(0.0592)
Somewhat dissatisfied	-0.0327	-0.0345	-0.0599	-0.0661	-0.0811	-0.0895
	(0.0466)	(0.0478)	(0.0474)	(0.0488)	(0.0540)	(0.0567)
Neither satisfied nor dissatisfied	0.0274	0.0222	-0.00584	-0.0119	-0.0296	-0.0349
	(0.0458)	(0.0467)	(0.0463)	(0.0476)	(0.0530)	(0.0553)
Somewhat satisfied	-0.0227	-0.0284	-0.0527	-0.0573	-0.0490	-0.0543
	(0.0436)	(0.0446)	(0.0442)	(0.0455)	(0.0502)	(0.0526)
Mostly satisfied	-0.0359	-0.0394	-0.0547	-0.0586	-0.0920*	-0.0953*
	(0.0423)	(0.0433)	(0.0428)	(0.0441)	(0.0487)	(0.0511)
Completely satisfied	0.00562	-0.000138	-0.0202	-0.0276	-0.0306	-0.0352
	(0.0445)	(0.0455)	(0.0450)	(0.0463)	(0.0517)	(0.0541)
Subjective financial situation: [b]						
Doing all right	0.0372**	0.0364**	0.0353**	0.0344**	0.0180	0.0194
	(0.0144)	(0.0147)	(0.0150)	(0.0152)	(0.0177)	(0.0180)
Just about getting by	0.0802***	0.0767***	0.0572***	0.0550***	0.0502**	0.0487**
	(0.0190)	(0.0193)	(0.0197)	(0.0202)	(0.0231)	(0.0235)
Finding it quite difficult	0.0896***	0.0868***	0.0889***	0.0874**	0.0406	0.0338
	(0.0323)	(0.0331)	(0.0341)	(0.0349)	(0.0389)	(0.0396)
Finding it very difficult	0.180***	0.177***	0.121**	0.114*	0.138**	0.130**
	(0.0539)	(0.0542)	(0.0589)	(0.0591)	(0.0638)	(0.0656)
In (Total Monthly Income)		-0.0154***		-0.0175***		-0.00623
		(0.00539)		(0.00568)		(0.00654)
SD (LAD Income)					-0.0116	-0.0177
					(0.0315)	(0.0318)
Age Group: [c]						
20-24 yrs old	0.0186	0.0281	0.0224	0.0295	0.00298	-0.0216
	(0.0506)	(0.0654)	(0.0491)	(0.0655)	(0.0612)	(0.0814)
25-29 yrs old	0.208***	0.226***	0.190***	0.212***	0.176***	0.159*
	(0.0532)	(0.0679)	(0.0527)	(0.0689)	(0.0649)	(0.0848)
30-34 yrs old	0.215***	0.235***	0.224***	0.246***	0.215***	0.199**
	(0.0530)	(0.0684)	(0.0538)	(0.0701)	(0.0651)	(0.0859)
35-39 yrs old	0.236***	0.257***	0.236***	0.264***	0.227***	0.215**
	(0.0511)	(0.0668)	(0.0524)	(0.0693)	(0.0637)	(0.0851)
40-44 yrs old	0.229***	0.253***	0.243***	0.273***	0.253***	0.244***
	(0.0518)	(0.0676)	(0.0519)	(0.0690)	(0.0646)	(0.0860)
45-49 yrs old	0.246***	0.266***	0.233***	0.257***	0.222***	0.210**
	(0.0496)	(0.0653)	(0.0495)	(0.0665)	(0.0614)	(0.0823)
50-54 yrs old	0.238***	0.262***	0.246***	0.277***	0.268***	0.263***

	(1)	(2)	(3)	(4)	(5)	(6)
	(0.0489)	(0.0651)	(0.0480)	(0.0658)	(0.0605)	(0.0824)
55-59 yrs old	0.251***	0.271***	0.246***	0.270***	0.229***	0.215***
	(0.0493)	(0.0653)	(0.0477)	(0.0654)	(0.0612)	(0.0827)
60-64 yrs old	0.248***	0.271***	0.255***	0.282***	0.239***	0.235***
	(0.0493)	(0.0655)	(0.0477)	(0.0656)	(0.0620)	(0.0832)
65-69 yrs old	0.255***	0.283***	0.267***	0.298***	0.270***	0.260***
	(0.0497)	(0.0657)	(0.0480)	(0.0657)	(0.0623)	(0.0835)
Over 70 yrs old	0.244***	0.271***	0.256***	0.284***	0.261***	0.252***
	(0.0479)	(0.0646)	(0.0462)	(0.0647)	(0.0596)	(0.0818)
University Degree	-0.133***	-0.129***	-0.133***	-0.128***	-0.103***	-0.107***
=1 if R has a university degree	(0.0136)	(0.0138)	(0.0143)	(0.0146)	(0.0167)	(0.0170)
Female	-0.0764***	-0.0854***	-0.0739***	-0.0822***	-0.0830***	-0.0872***
=1 if R is female	(0.0119)	(0.0123)	(0.0117)	(0.0121)	(0.0147)	(0.0152)
Children	-0.00340	-0.00396			0.00712	0.00472
=1 if R has children	(0.0191)	(0.0194)			(0.0232)	(0.0237)
Ethnicity [d]						
Asian	-0.0315	-0.0233	-0.0516	-0.0425	-0.0622*	-0.0414
	(0.0359)	(0.0372)	(0.0354)	(0.0366)	(0.0356)	(0.0365)
Black	-0.155***	-0.146**	-0.190***	-0.182***	-0.188***	-0.176***
	(0.0552)	(0.0588)	(0.0459)	(0.0501)	(0.0482)	(0.0521)
Mixed	-0.113	-0.113	-0.113	-0.111	-0.0851	-0.0790
	(0.109)	(0.109)	(0.106)	(0.106)	(0.0890)	(0.0881)
Other	-0.176***	-0.167***	-0.209***	-0.196***	-0.179***	-0.162***
	(0.0515)	(0.0524)	(0.0428)	(0.0442)	(0.0419)	(0.0434)
Importance of Bring British	0.0198***	0.0202***	0.0200***	0.0206***	0.0169***	0.0174***
(0-low to 10-very high)	(0.00212)	(0.00215)	(0.00223)	(0.00227)	(0.00261)	(0.00266)
Trust in your Neighbours	-0.0280***	-0.0263***	-0.0269***	-0.0255***	-0.0463***	-0.0456***
(1-very low to 5-very High)	(0.00851)	(0.00866)	(0.00902)	(0.00922)	(0.0103)	(0.0106)
Interest in Politics	0.0232***	0.0231***	0.0287***	0.0284***	0.0456***	0.0472***
(1-very low to 4-very High)	(0.00752)	(0.00761)	(0.00783)	(0.00794)	(0.00916)	(0.00927)
Unemployed	-0.0370	-0.0402	-0.0394	-0.0587	0.000625	-0.0214
=1 if R is unemployed	(0.0378)	(0.0410)	(0.0390)	(0.0426)	(0.0437)	(0.0461)
Working	-0.0291	-0.0122	-0.0206	-0.00653	-0.0282	-0.0162
= 1 if R is working full time	(0.0182)	(0.0191)	(0.0196)	(0.0208)	(0.0224)	(0.0239)
Married	-0.00532	-0.00793	-0.000735	-0.00316	-0.0200	-0.0252
=if R is married	(0.0142)	(0.0144)	(0.0147)	(0.0149)	(0.0177)	(0.0179)
Rural	0.00401	0.00688	0.00496	0.00753	-0.00622	0.000198
=1 if R lives in a rural area	(0.0152)	(0.0154)	(0.0164)	(0.0166)	(0.0223)	(0.0227)
Observations	6,534	6,359	5,951	5,776	4,293	4,150
R-squared	0.094	0.094	0.097	0.097	0.099	0.098

Robust standard errors, clustered by household, in parentheses: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.
(a)Overall satisfaction with life: coded from completely dissatisfied (1) to completely satisfied (7). Completely dissatisfied is the base category.
(b)Subjective financial situation: from living comfortably (1) to finding it very difficult (5). Living comfortably is the base category.
(c) Age group: 5-year intervals, base category is 18-19 years old.
(d) White is the base category.
(e)Regional dummies: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South East, South West, Wales, Scotland, Northern Ireland.

	Pro-Brexit			
	(1)	(2)	(3)	(4)
Satisfaction with Life (cont.)[a]	-0.0123	-0.0090		
	(0.00846)	(0.00677)		
Satisfaction with Life: [b]			-0.116	-0.0254
Mostly Dissatisfied			(0.109)	(0.0859)
Satisfaction with Life:			-0.0726	-0.0137
Somewhat Dissatisfied			(0.107)	(0.0841)
Satisfaction with Life:			-0.0254	0.0288
Neither Satisfied nor Dissatisfied			(0.105)	(0.0821)
Satisfaction with Life:			-0.0838	0.0116
Somewhat Satisfied			(0.102)	(0.0800)
Satisfaction with Life:			-0.133	-0.0576
Mostly Satisfied			(0.0999)	(0.0781)
Satisfaction with Life:			-0.0802	0.0003
Completetly Satisfied			(0.104)	(0.0812)
Subjective Financial Situation (cont.) [c]	0.0191*	0.0195		
	(0.0108)	(0.0132)		
Subjective Financial Situation: [d]			-0.0092	-0.0290
Doing all right			(0.0203)	(0.0276)
Subjective Financial Situation:			0.0297	0.0009
Just about getting by			(0.0275)	(0.0338)
Subjective Financial Situation:			-0.0283	-0.0314
Finding it quite difficult			(0.0476)	(0.0568)
Subjective Financial Situation:			0.231***	0.296***
Finding it very difficult			(0.0739)	(0.0807)
Wealthier than LAD Median	-0.0850	-0.0337	-0.304**	-0.0645*
	(0.0731)	(0.0454)	(0.147)	(0.0347)
Wealthier than LAD Median x	0.0095			
Satisfaction with Life (cont.)	(0.0128)			
Wealthier than LAD Median x			0.317*	
Mostly Dissatisfied with Life			(0.169)	
Wealthier than LAD Median x			0.212	
Somewhat Dissatisfied with Life			(0.162)	
Wealthier than LAD Median x			0.191	
Neither Satisfied nor Dissatisfied with Life			(0.158)	
Wealthier than LAD Median x			0.324**	
Somewhat Satisfied with Life			(0.153)	
Wealthier than LAD Median x			0.268*	
Mostly Satisfied with Life			(0.149)	
Wealthier than LAD Median x			0.289*	
Completetly Satisfied with Life			(0.154)	
Wealthier than LAD Median x		-0.0005		
Subjective Financial Situation		(0.0202)		
Wealthier than LAD Median x				0.0441
Financially Doing all right				(0.0394)
Wealthier than LAD Median x				0.0794

Financially Just about getting by				(0.0543)
Wealthier than LAD Median x				-0.0129
Financially Finding it quite difficult				(0.0942)
Wealthier than LAD Median x				-0.447***
Financially Finding it very difficult				(0.145)
ln (Labour Monthly Income)	-0.00670	-0.00672	-0.00570	-0.00465
	(0.0126)	(0.0127)	(0.0129)	(0.0129)
Observations	3,107	3,107	3,107	3,107
R-squared	0.074	0.074	0.083	0.084
week FE	Yes	Yes	Yes	Yes
region/lad FE [e]	Region	Region	Region	Region
Full controls [f]	Yes	Yes	Yes	Yes

Robust standard errors, clustered by household, in parentheses: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.
continuous.
(a)Overall satisfaction with life, continuous, from completely dissatisfied (1) to completely satisfied (7).
(b) Overall satisfaction with life: coded from completely dissatisfied (1) to completely satisfied (7). Completely dissatisfied is the base category in columns (1), (3) and (5).
(c) Subjective financial situation, continuous: from living comfortably (1) to finding it very difficult (5)
(d) Subjective financial situation: from living comfortably (1) to finding it very difficult (5). Living comfortably is the base category in columns (1), (3) and (5).
(e)Regional dummies: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South East, South West, Wales, Scotland, Northern Ireland.
(f) Full controls include: Ethnicity, University Degree, Importance of Being British, Female, Children, Trust in Neighbour, Unemployed, Married, Rural, Age group.

Table A4. Robustness checks. Pro-Brexit Regressions Before and After Referendum Day (UNDSOC wave 8)

	Pro-Brexit			
	Before Referendum[+]		After Referendum[++]	
	(1)	(2)	(3)	(4)
Satisfaction with life: [a]				
Mostly dissatisfied	-0.0455	-0.0467	-0.149***	-0.159***
	-0.0462	-0.0478	-0.0505	-0.0508
Somewhat dissatisfied	-0.0493	-0.0509	-0.0965**	-0.105**
	-0.0441	-0.0457	-0.048	-0.0482
Neither satisfied nor dissatisfied	0.00796	0.00446	-0.0817*	-0.0952**
	-0.0432	-0.0446	-0.0468	-0.0471
Somewhat satisfied	-0.0449	-0.0479	-0.130***	-0.145***
	-0.0413	-0.0427	-0.0454	-0.0457
Mostly satisfied	-0.0606	-0.062	-0.101**	-0.117***
	-0.04	-0.0414	-0.0445	-0.0447
Completely satisfied	-0.0145	-0.0182	-0.0803*	-0.0962**
	-0.0422	-0.0436	-0.0473	-0.0476
Subjective financial situation: [b]				
Doing all right	0.0332**	0.0322**	0.0549***	0.0528***
	-0.0138	-0.0141	-0.0147	-0.0148
Just about getting by	0.0708***	0.0690***	0.0524***	0.0518***
	-0.0181	-0.0184	-0.0184	-0.0186
Finding it quite difficult	0.0744**	0.0722**	0.0598*	0.0482
	-0.0303	-0.031	-0.0324	-0.0327
Finding it very difficult	0.131**	0.129**	0.142***	0.153***
	-0.0512	-0.0515	-0.0471	-0.048
Age Group: [c]				
20-24 yrs old	0.0156	0.0189	0.0615	0.0773
	-0.048	-0.0636	-0.0569	-0.0665
25-29 yrs old	0.196***	0.210***	0.132**	0.149**
	-0.0504	-0.066	-0.0577	-0.0682
30-34 yrs old	0.213***	0.231***	0.211***	0.232***
	-0.0504	-0.0666	-0.0573	-0.0681
35-39 yrs old	0.233***	0.251***	0.204***	0.225***
	-0.0486	-0.0652	-0.0576	-0.0683
40-44 yrs old	0.223***	0.245***	0.229***	0.251***
	-0.0492	-0.066	-0.0565	-0.0677
45-49 yrs old	0.237***	0.255***	0.260***	0.282***
	-0.0474	-0.0639	-0.0561	-0.0668
50-54 yrs old	0.236***	0.259***	0.261***	0.278***
	-0.0466	-0.0637	-0.0562	-0.0673
55-59 yrs old	0.247***	0.264***	0.249***	0.269***
	-0.0469	-0.0638	-0.0565	-0.0677
60-64 yrs old	0.248***	0.269***	0.280***	0.306***
	-0.047	-0.064	-0.0565	-0.0681
65-69 yrs old	0.263***	0.285***	0.268***	0.298***
	-0.0474	-0.0643	-0.0572	-0.0688

Over 70 yrs old	0.249***	0.270***	0.302***	0.332***
	-0.0456	-0.0632	-0.0558	-0.068
University Degree	-0.125***	-0.123***	-0.160***	-0.157***
=1 if R has a university degree	-0.013	-0.0133	-0.0134	-0.0137
Female	-0.0779***	-0.0846***	-0.0673***	-0.0695***
=1 if R is female	-0.0114	-0.0118	-0.0113	-0.0118
Children	0.00481	0.00266	0.0325*	0.0358*
	-0.0182	-0.0185	-0.0184	-0.0186
Ethnicity [d]				
Asian	-0.0414	-0.0259	-0.157***	-0.155***
	-0.0312	-0.0323	-0.0334	-0.0339
Black	-0.186***	-0.175***	-0.183***	-0.188***
	-0.0416	-0.0448	-0.039	-0.0387
Mixed	-0.128	-0.124	-0.0695	-0.0643
	-0.0804	-0.0799	-0.0967	-0.0969
Other	-0.185***	-0.172***	-0.233***	-0.211***
	-0.0375	-0.0387	-0.0438	-0.0453
Importance of Bring British	0.0204***	0.0206***	0.0255***	0.0261***
(0-low to 10-very high)	-0.00201	-0.00205	-0.00203	-0.00204
Trust in your Neighbours	-0.0311***	-0.0300***	-0.0335***	-0.0347***
(1-very low to 5-very High)	-0.0081	-0.00827	-0.00824	-0.00838
Interest in Politics	0.0279***	0.0281***	0.0568***	0.0558***
(1-very low to 4-very High)	-0.00723	-0.00732	-0.00738	-0.00747
Unemployed	-0.0325	-0.0534	0.0397	0.0241
=1 if R is unemployed	-0.0356	-0.0383	-0.0397	-0.0418
Working	-0.0291*	-0.0158	-0.0231	-0.0122
= 1 if R is working full time	-0.0175	-0.0185	-0.018	-0.0191
Married	-0.00719	-0.00961	-0.00575	-0.00663
=if R is married	-0.0137	-0.0138	-0.014	-0.0141
Rural	0.00418	0.00726	0.00412	0.00586
=1 if R lives in a rural area	-0.0151	-0.0153	-0.0156	-0.0157
ln (Total Monthly Income)		-0.0129**		-0.00778
		-0.00516		-0.00526
Observations	7,091	6,885	6,680	6,506
R-squared	0.096	0.095	0.143	0.144

Robust standard errors, clustered by households, in parentheses: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

(+) Includes interviews taking place between first week in January 2016 and 22nd June 2016, (++) Includes interviews taking place between 24th June 2016 and last week in December 2016. (a) Overall satisfaction with life: coded from completely dissatisfied (1) to completely satisfied (7). Completely dissatisfied is the base category; (b) Subjective financial situation: from living comfortably (1) to finding it very difficult (5). Living comfortably is the base category; (c) Age group: 5-year intervals, base category is 18-19 years old. (d) Ethnicity groups: base category is white; (e) Regional dummies: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South East, South West, Wales, Scotland, Northern Ireland.

Table A5. Variable Definitions and Descriptive Statistics for the BHPS Sample *(where R is the survey respondent)*

Variables	Definition	Mean*	Std. Dev
EU-Bad1	We coded the variable opeur1 UK membership of EU =1 a good thing, 2=neither a good or a bad thing, 3=a bad thing. (Waves 9 (1999), 12 (2002), 16 (2006) from BHPS)	1.830	0.815
EU-Bad2	We coded the variable opeur2 UK benefited from being in EU . = 1 if R replied no ``and 0 if replied yes.	0 .507	0.499
Subjective financial situation:	(Current) subjective financial situation: "doing all right"=1, "just about getting by"=2, "finding it quite difficult=3, "finding it very difficult"=4	2.011	0.930
age	R age	47.825	16.450
Satisfaction with life	Overall satisfaction with life: "completely dissatisfied" =1 , "mostly dissatisfied"=2, "somewhat dissatisfied"=3, "neither satisfied nor dissatisfied=4, "somewhat satisfied"=5, "mostly satisfied"=6, "completely satisfied" =7	5.266	1.220
Interest in Politics**	Level of interest in politics: " not at all interested"=1 to "very interested" =4	2.325	0.887
Yearly Family Income		16278.85	14199.77
Married	=1 if R is married	0.608	0.488
Divorced	=1 if R is divorced	0.104	0.305
Widow	=1 if R is widow	0.0624	0.241
Children	Number of R's children	0.526	0.918
Self-employed	=1 if R is self-employed and 0 otherwise	0.081	0.273
Employed	= 1 if R in employment and 0 otherwise	0.540	0.498
Unemployed	= if R is unemployed and zero otherwise and 0 otherwise	0.023	0.150
Retired	=1 if R is retired and 0 otherwise	0.204	0.403
University degree	=1 if R has a university degree and 0 otherwise	0.1632	0.369
Female	= if R is female and 0 otherwise	1.506	0.499
Risk***	Generally takes risks : "Generally does not take risks"=1 to "Ready to take risks"=10,	5.406	2.141
Trust** *	Generally risks in trusting strangers: "Don't trust strangers"=1 to "Ready to trust strangers"=10	4.204	2.103

*Observations = 15,754, from British Household Panel Surveys waves 9, 12, 16. **Variables available only for wave 18 have been used to integrate data for waves 16,12, and 9. *** Variables available only for waves 16 and 12.

Table A6. Robustness checks. Opinion on EU membership Using the BHPS sample (waves 9, 12 and 16).

Opinion on EU (EU-Bad1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)[d]	(8)[d]
Subjective financial situation: [a]								
Doing all right	0.0469**	0.0429**	0.0661***	0.0657***	0.0695***	0.0642***	0.0478***	0.0504***
	(0.0188)	(0.0190)	(0.0197)	(0.0199)	(0.0235)	(0.0236)	(0.0128)	(0.0130)
Just about getting by	0.0896***	0.0856***	0.103***	0.101***	0.117***	0.105***	0.0724***	0.0760***
	(0.0230)	(0.0234)	(0.0236)	(0.0239)	(0.0266)	(0.0270)	(0.0156)	(0.0159)
Finding it quite difficult	0.115***	0.100**	0.0871**	0.0838*	0.0956**	0.0942**	0.0777***	0.0776***
	(0.0424)	(0.0431)	(0.0429)	(0.0434)	(0.0447)	(0.0456)	(0.0277)	(0.0281)
Finding it very difficult	0.179***	0.192***	0.112*	0.108*	0.158**	0.137*	0.0910**	0.104**
	(0.0619)	(0.0621)	(0.0633)	(0.0647)	(0.0731)	(0.0754)	(0.0410)	(0.0422)
Age Group: [b]								
20-24 yrs old	0.223***	0.230***	0.173***	0.168***	0.105*	0.142**	0.201***	0.179***
	(0.0523)	(0.0564)	(0.0517)	(0.0559)	(0.0580)	(0.0599)	(0.0356)	(0.0383)
25-29 yrs old	0.289***	0.308***	0.224***	0.217***	0.143**	0.192***	0.261***	0.241***
	(0.0525)	(0.0566)	(0.0507)	(0.0548)	(0.0580)	(0.0603)	(0.0363)	(0.0392)
30-34 yrs old	0.294***	0.313***	0.251***	0.246***	0.0479	0.105*	0.286***	0.265***
	(0.0540)	(0.0579)	(0.0525)	(0.0566)	(0.0593)	(0.0618)	(0.0376)	(0.0405)
35-39 yrs old	0.284***	0.302***	0.250***	0.247***	0.121**	0.178***	0.276***	0.256***
	(0.0542)	(0.0583)	(0.0530)	(0.0572)	(0.0617)	(0.0640)	(0.0382)	(0.0410)
40-44 yrs old	0.332***	0.353***	0.253***	0.246***	0.0613	0.116*	0.318***	0.297***
	(0.0540)	(0.0581)	(0.0536)	(0.0577)	(0.0637)	(0.0660)	(0.0381)	(0.0411)
45-49 yrs old	0.322***	0.349***	0.259***	0.251***	0.140**	0.201***	0.328***	0.308***
	(0.0537)	(0.0577)	(0.0553)	(0.0593)	(0.0637)	(0.0662)	(0.0389)	(0.0419)
50-54 yrs old	0.351***	0.371***	0.339***	0.327***	0.183***	0.226***	0.379***	0.356***
	(0.0559)	(0.0597)	(0.0549)	(0.0594)	(0.0640)	(0.0662)	(0.0393)	(0.0421)
55-59 yrs old	0.429***	0.445***	0.390***	0.379***	0.177***	0.227***	0.429***	0.406***
	(0.0572)	(0.0611)	(0.0575)	(0.0616)	(0.0675)	(0.0699)	(0.0398)	(0.0427)
60-64 yrs old	0.485***	0.520***	0.398***	0.399***	0.190***	0.228***	0.465***	0.452***
	(0.0605)	(0.0645)	(0.0618)	(0.0655)	(0.0727)	(0.0751)	(0.0421)	(0.0449)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
65-69 yrs old	0.473***	0.511***	0.461***	0.454***	0.382***	0.431***	0.509***	0.491***
	(0.0659)	(0.0699)	(0.0703)	(0.0741)	(0.0781)	(0.0807)	(0.0465)	(0.0495)
Over 70 yrs old	0.584***	0.622***	0.609***	0.599***	0.354***	0.399***	0.607***	0.589***
	(0.0664)	(0.0705)	(0.0697)	(0.0735)	(0.0795)	(0.0822)	(0.0477)	(0.0507)
Satisfaction with life: (c)								
Mostly dissatisfied	-0.0146	-0.00301	-0.0716	-0.0670	-0.0575	-0.0573	-0.0337	-0.0272
	(0.0945)	(0.0946)	(0.0879)	(0.0887)	(0.110)	(0.113)	(0.0605)	(0.0619)
Somewhat dissatisfied	-0.0342	-0.0271	-0.0840	-0.0835	-0.133	-0.125	-0.0498	-0.0439
	(0.0841)	(0.0841)	(0.0761)	(0.0760)	(0.0986)	(0.102)	(0.0535)	(0.0546)
Neither satisfied nor dissatisfied	-0.0374	-0.0307	-0.0755	-0.0826	-0.125	-0.122	-0.0559	-0.0562
	(0.0815)	(0.0816)	(0.0723)	(0.0722)	(0.0950)	(0.0980)	(0.0516)	(0.0525)
Somewhat satisfied	-0.0728	-0.0666	-0.152**	-0.152**	-0.203**	-0.199**	-0.0973*	-0.0938*
	(0.0807)	(0.0807)	(0.0714)	(0.0714)	(0.0942)	(0.0973)	(0.0513)	(0.0522)
Mostly satisfied	-0.124	-0.113	-0.159**	-0.163**	-0.151	-0.145	-0.132**	-0.127**
	(0.0810)	(0.0810)	(0.0712)	(0.0711)	(0.0943)	(0.0974)	(0.0513)	(0.0523)
Completely satisfied	-0.0548	-0.0551	-0.0838	-0.0806	-0.0701	-0.0637	-0.0935*	-0.0896*
	(0.0828)	(0.0828)	(0.0728)	(0.0730)	(0.0963)	(0.0994)	(0.0526)	(0.0535)
Married	0.0375	0.0376	0.0265	0.0256	0.0362	0.0356	0.0174	0.0172
=if R is married	(0.0249)	(0.0249)	(0.0249)	(0.0248)	(0.0304)	(0.0304)	(0.0188)	(0.0188)
Divorced	0.0428	0.0496	0.0645**	0.0718**	0.0927**	0.0969**	0.0440*	0.0476*
=if R is divorced	(0.0322)	(0.0322)	(0.0325)	(0.0325)	(0.0391)	(0.0391)	(0.0246)	(0.0246)
Widow	0.0292	0.0395	-0.0197	-0.00721	0.0891*	0.0979*	-0.00150	0.00451
=if R is a widow(er)	(0.0424)	(0.0425)	(0.0450)	(0.0451)	(0.0530)	(0.0529)	(0.0333)	(0.0333)
Number of Children	-0.00261	0.000757	-0.00697	-0.00347	0.0198	0.0209*	-0.00183	-0.000241
	(0.0108)	(0.0108)	(0.0106)	(0.0106)	(0.0124)	(0.0124)	(0.00761)	(0.00763)
Employment								
=if R is self employed	0.0181	0.0163	0.0416	0.0626*	-0.000493	0.0327	0.0352	0.0329
	(0.0334)	(0.0346)	(0.0344)	(0.0352)	(0.0383)	(0.0394)	(0.0239)	(0.0247)
=if R is in paid employmebnt	0.0187	0.0371	0.00876	0.0421	0.0355	0.0966***	0.0183	0.0180
	(0.0231)	(0.0264)	(0.0232)	(0.0263)	(0.0254)	(0.0292)	(0.0163)	(0.0188)
= if R is unemployed	-0.00475	-0.00242	0.0725	0.0936*	0.0305	0.0512	0.0514	0.0522
	(0.0497)	(0.0512)	(0.0514)	(0.0534)	(0.0596)	(0.0623)	(0.0351)	(0.0364)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
=if R is retired	-0.0536	-0.0650	-0.00437	0.0140	-0.0551	-0.0284	-0.00523	-0.00819
	(0.0391)	(0.0406)	(0.0435)	(0.0443)	(0.0472)	(0.0485)	(0.0282)	(0.0291)
University Degree	-0.368***	-0.359***	-0.344***	-0.341***	-0.430***	-0.415***	-0.336***	-0.339***
=1 if R has a university degree	(0.0222)	(0.0228)	(0.0219)	(0.0223)	(0.0246)	(0.0250)	(0.0178)	(0.0182)
Female	0.00806	-0.00112	0.0434***	0.0355**	0.0643***	0.0374**	0.0305**	0.0298**
=1 if R is female	(0.0148)	(0.0156)	(0.0155)	(0.0162)	(0.0177)	(0.0189)	(0.0133)	(0.0137)
Risk	0.00859*	0.00896**	0.00866*	0.00880*	0.00138	0.00141	0.00988***	0.0102***
if R takes risks (1-does not to 10-yes she does)	(0.00440)	(0.00443)	(0.00463)	(0.00468)	(0.00533)	(0.00536)	(0.00368)	(0.00371)
Trust	-0.0333***	-0.0324***	-0.0317***	-0.0315***	-0.0298***	-0.0293***	-0.0333***	-0.0332***
if R trust strangers (1-does not to 10-yes she does)	(0.00427)	(0.00433)	(0.00454)	(0.00459)	(0.00516)	(0.00521)	(0.00355)	(0.00359)
Interest in Politics	-0.0746***	-0.0741***	-0.114***	-0.113***			-0.0768***	-0.0776***
(1-very low to 4-very High)	(0.00932)	(0.00944)	(0.01000)	(0.0101)			(0.00701)	(0.00709)
log of Family monthly income		-0.0270***		-0.0168*		-0.0498***		-0.000846
		(0.00957)		(0.00879)		(0.0108)		(0.00664)
Observations	9,852	9,623	8,506	8,352	6,776	6,667	18,358	17,975
R-squared	0.105	0.105	0.123	0.123	0.095	0.099		
region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BHPS Wave	Wave 16	Wave 16	Wave 12	Wave12	Wave 9	Wave 19	Waves 16, 12, 9	Waves 16, 12, 9

Robust standard errors, clustered by household, in parentheses: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively. Dependent variable: Is EU good thing good=1, neither=2, bad =3(a) Subjective financial situation: from   Living comfortably is the base category (1) to finding it very difficult (5).   Living comfortably is the base category. (b) Age group: 5-year intervals, base category is 18-19 years old. ; (c) Overall satisfaction with life: coded from completely dissatisfied (1) to completely satisfied (7). Completely dissatisfied is the base category. (d) Random Effect model; (g) Regional dummies: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South East, South West, Wales, Scotland, Northern Ireland.

Table A7. Robustness Checks. Alternative Measure of Opinion on EU membership Using the BHPS (waves 16, 12 and 9).

UK benefit from EU	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Subjective financial situation: [a]								
Doing all right	0.0209	0.0170	0.0362***	0.0347**	0.0425***	0.0353**	0.0249***	0.0245***
	(0.0127)	(0.0129)	(0.0137)	(0.0138)	(0.0163)	(0.0164)	(0.00892)	(0.00901)
Just about getting by	0.0693***	0.0673***	0.0514***	0.0484***	0.0742***	0.0627***	0.0521***	0.0524***
	(0.0152)	(0.0156)	(0.0166)	(0.0168)	(0.0186)	(0.0188)	(0.0108)	(0.0109)
Finding it quite difficult	0.0581**	0.0502*	0.0564*	0.0508*	0.0633*	0.0563*	0.0588***	0.0555***
	(0.0285)	(0.0291)	(0.0303)	(0.0307)	(0.0324)	(0.0330)	(0.0194)	(0.0198)
Finding it very difficult	0.125***	0.134***	0.0851*	0.0765	0.125***	0.124***	0.0654**	0.0733**
	(0.0405)	(0.0410)	(0.0461)	(0.0472)	(0.0468)	(0.0476)	(0.0304)	(0.0311)
Age Group: [b]								
20-24 yrs old	0.152***	0.173***	0.128***	0.129***	0.215***	0.247***	0.146***	0.148***
	(0.0407)	(0.0434)	(0.0438)	(0.0473)	(0.0499)	(0.0525)	(0.0293)	(0.0314)
25-29 yrs old	0.215***	0.243***	0.252***	0.254***	0.252***	0.289***	0.243***	0.247***
	(0.0409)	(0.0433)	(0.0434)	(0.0468)	(0.0494)	(0.0519)	(0.0296)	(0.0317)
30-34 yrs old	0.221***	0.246***	0.235***	0.236***	0.197***	0.239***	0.227***	0.229***
	(0.0413)	(0.0435)	(0.0438)	(0.0472)	(0.0499)	(0.0528)	(0.0299)	(0.0320)
35-39 yrs old	0.207***	0.233***	0.206***	0.206***	0.253***	0.295***	0.211***	0.212***
	(0.0413)	(0.0437)	(0.0439)	(0.0474)	(0.0510)	(0.0538)	(0.0302)	(0.0323)
40-44 yrs old	0.223***	0.249***	0.215***	0.215***	0.201***	0.243***	0.233***	0.235***
	(0.0409)	(0.0432)	(0.0439)	(0.0474)	(0.0514)	(0.0543)	(0.0300)	(0.0322)
45-49 yrs old	0.220***	0.247***	0.232***	0.228***	0.213***	0.259***	0.245***	0.245***
	(0.0414)	(0.0437)	(0.0450)	(0.0482)	(0.0518)	(0.0546)	(0.0304)	(0.0325)
50-54 yrs old	0.225***	0.254***	0.253***	0.252***	0.261***	0.292***	0.256***	0.260***
	(0.0420)	(0.0445)	(0.0442)	(0.0478)	(0.0511)	(0.0541)	(0.0303)	(0.0324)
55-59 yrs old	0.274***	0.299***	0.270***	0.267***	0.253***	0.289***	0.286***	0.288***
	(0.0420)	(0.0443)	(0.0456)	(0.0490)	(0.0526)	(0.0552)	(0.0305)	(0.0326)
60-64 yrs old	0.289***	0.324***	0.289***	0.295***	0.253***	0.284***	0.301***	0.309***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.0439)	(0.0462)	(0.0476)	(0.0507)	(0.0557)	(0.0585)	(0.0318)	(0.0339)
65-69 yrs old	0.291***	0.327***	0.305***	0.312***	0.348***	0.384***	0.310***	0.318***
	(0.0468)	(0.0492)	(0.0522)	(0.0554)	(0.0578)	(0.0607)	(0.0342)	(0.0363)
Over 70 yrs old	0.381***	0.417***	0.400***	0.406***	0.322***	0.357***	0.381***	0.389***
	(0.0472)	(0.0496)	(0.0510)	(0.0543)	(0.0589)	(0.0618)	(0.0347)	(0.0368)
Satisfaction with life: [c]								
Mostly dissatisfied	-0.0754	-0.0679	-0.0534	-0.0533	0.0356	0.0391	-0.0286	-0.0254
	(0.0599)	(0.0601)	(0.0639)	(0.0651)	(0.0706)	(0.0717)	(0.0432)	(0.0442)
Somewhat dissatisfied	-0.0593	-0.0532	0.0199	0.0147	-0.0405	-0.0385	-0.00109	-0.000920
	(0.0529)	(0.0531)	(0.0544)	(0.0551)	(0.0603)	(0.0613)	(0.0369)	(0.0377)
Neither satisfied nor dissatisfied	-0.0680	-0.0579	-0.0220	-0.0302	-0.0506	-0.0514	-0.0226	-0.0212
	(0.0507)	(0.0509)	(0.0514)	(0.0521)	(0.0578)	(0.0588)	(0.0358)	(0.0365)
Somewhat satisfied	-0.0895*	-0.0814	-0.0566	-0.0593	-0.0882	-0.0846	-0.0438	-0.0416
	(0.0502)	(0.0505)	(0.0508)	(0.0514)	(0.0573)	(0.0582)	(0.0352)	(0.0359)
Mostly satisfied	-0.125**	-0.118**	-0.0706	-0.0765	-0.0862	-0.0825	-0.0705**	-0.0698*
	(0.0506)	(0.0508)	(0.0508)	(0.0515)	(0.0573)	(0.0582)	(0.0353)	(0.0360)
Completely satisfied	-0.0748	-0.0674	-0.0295	-0.0355	-0.0453	-0.0425	-0.0352	-0.0342
	(0.0519)	(0.0522)	(0.0522)	(0.0530)	(0.0589)	(0.0599)	(0.0362)	(0.0370)
Married		0.0375	0.0376	0.0265	0.0256	0.0362	0.0356	0.0174	0.0172
=if R is married	(0.0249)	(0.0249)	(0.0249)	(0.0248)	(0.0304)	(0.0304)	(0.0188)	(0.0188)
Divorced	0.0428	0.0496	0.0645**	0.0718**	0.0927**	0.0969**	0.0440*	0.0476*
=if R is divorced	(0.0322)	(0.0322)	(0.0325)	(0.0325)	(0.0391)	(0.0391)	(0.0246)	(0.0246)
Widow	0.0292	0.0395	-0.0197	-0.00721	0.0891*	0.0979*	-0.00150	0.00451
=if R is a widow(er)	(0.0424)	(0.0425)	(0.0450)	(0.0451)	(0.0530)	(0.0529)	(0.0333)	(0.0333)
Number of Children	-0.00261	0.000757	-0.00697	-0.00347	0.0198	0.0209*	-0.00183	-0.000241
	(0.0108)	(0.0108)	(0.0106)	(0.0106)	(0.0124)	(0.0124)	(0.00761)	(0.00763)
Employment								
=if R is self employed	0.00358	-0.00352	0.00602	0.0189	-0.0494*	-0.0308	0.0190	0.0180
	(0.0233)	(0.0242)	(0.0254)	(0.0262)	(0.0280)	(0.0289)	(0.0171)	(0.0176)
=if R is in paid employment	0.0280*	0.0308*	0.00388	0.0285	0.00287	0.0361*	0.0240**	0.0261*
	(0.0163)	(0.0186)	(0.0173)	(0.0197)	(0.0193)	(0.0219)	(0.0120)	(0.0134)
= if R is unemployed	-0.00539	-0.0130	0.0288	0.0392	0.0652	0.0698	0.0225	0.0246

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.0360)	(0.0372)	(0.0412)	(0.0428)	(0.0458)	(0.0471)	(0.0261)	(0.0269)
=if R is retired	-0.0411	-0.0552**	-0.0190	-0.0127	-0.0443	-0.0329	-0.00770	-0.0129
	(0.0259)	(0.0268)	(0.0280)	(0.0286)	(0.0310)	(0.0321)	(0.0191)	(0.0195)
University Degree	-0.214***	-0.210***	-0.237***	-0.230***	-0.290***	-0.282***	-0.217***	-0.215***
=1 if R has a university degree	(0.0148)	(0.0152)	(0.0151)	(0.0154)	(0.0168)	(0.0170)	(0.0120)	(0.0123)
Female	0.0273***	0.0237**	0.0507***	0.0422***	0.0782***	0.0597***	0.0427***	0.0414***
=1 if R is female	(0.0101)	(0.0106)	(0.0112)	(0.0117)	(0.0124)	(0.0134)	(0.00911)	(0.00937)
Risk	0.00961***	0.0102***	0.00483	0.00472	0.00486	0.00531	0.00755***	0.00780***
if R takes risks (1-does not to 10-yes she does)	(0.00291)	(0.00294)	(0.00319)	(0.00321)	(0.00362)	(0.00366)	(0.00243)	(0.00244)
Trust	-0.0236***	-0.0234***	-0.0220***	-0.0221***	-0.0217***	-0.0208***	-0.0237***	-0.0239***
if R trust strangers (1-does not to 10-yes she does)	(0.00290)	(0.00294)	(0.00316)	(0.00318)	(0.00357)	(0.00362)	(0.00240)	(0.00242)
Interest in Politics	-0.0756***	-0.0751***	-0.0802***	-0.0802***			-0.0635***	-0.0642***
(1-very low to 4-very High)	(0.00619)	(0.00625)	(0.00678)	(0.00685)			(0.00479)	(0.00484)
log of Family monthly income		-0.0124**		-0.0156**		-0.0294***		-0.00420
		(0.00630)		(0.00618)		(0.00765)		(0.00422)
Observations	8,495	8,301	7,259	7,139	5,688	5,585	15,754	15,440
R-squared	0.115	0.115	0.123	0.122	0.108	0.110		
region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BHPS Wave	Wave 16	Wave 16	Wave 12	Wave12	Wave 9	Wave 9	Waves 16, 12, 9	Waves 16, 12, 9

Robust standard errors, clustered by household, in parentheses: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively. Dependent variable: Did the UK benefit from being in the EU. yes=0, no=1. (a) Subjective financial situation: from   Living comfortably is the base category (1) to finding it very difficult (4).   Living comfortably is the base category. (b) Age group: 5-year intervals, base category is 18-19 years old. ; (c) Overall satisfaction with life: coded from completely dissatisfied (1) to completely satisfied (7). Completely dissatisfied is the base category, Columns 7 and 8 use a Random Effects model. (g) Regional dummies: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South East, South West, Wales, Scotland, Northern Ireland.

Table A8: Transition Matrix: Reallocation of Preferences over Leave and Remain Based on Post-Referendum Sample Estimation.

Predicted Brexit Vote, based on Post-Referendum Estimates

	Remain	Leave
Refusal	50.35	49.65
Undecided	40.25	59.75
Remain	56.82	43.18
Leave	35.89	64.11

Notes. The table displays the reallocation of remain and leave preferences divided across Rs' replies to the EU membership question for the pre-referendum sample based on post-referendum sample estimations. Calculations are based upon a threshold set equal to the mean of the predicted Leave Vote for those who replied "leave" to the EU membership question (0.65).

Table A9. Re-estimation of Pro-Brexit Equation Using Pre-Referendum Sample. [Preferences towards EU for those who were "undecided" or "refused to answer" to the EU membership question have been allocated using prediction from post referendum sample.]

	Pro-Brexit			
	(1)	(2)	(3)	(4)
Satisfaction with life: [a]				
Mostly dissatisfied	-0.154***		-0.168***	
	(0.0511)		(0.0513)	
Somewhat dissatisfied	-0.105**		-0.117**	
	(0.0484)		(0.0486)	
Neither satisfied nor dissatisfied	-0.0820*		-0.0991**	
	(0.0472)		(0.0474)	
Somewhat satisfied	-0.135***		-0.155***	
	(0.0459)		(0.0462)	
Mostly satisfied	-0.105**		-0.126***	
	(0.0450)		(0.0451)	
Completely satisfied	-0.0801*		-0.0997**	
	(0.0479)		(0.0481)	
Satisfaction with life: [b]		0.00133		-0.000736
		(0.00464)		(0.00470)
Subjective financial situation: [c]				
Doing all right	0.0605***		0.0577***	
	(0.0147)		(0.0149)	
Just about getting by	0.0591***		0.0567***	
	(0.0184)		(0.0186)	
Finding it quite difficult	0.0746**		0.0598*	
	(0.0323)		(0.0326)	
Finding it very difficult	0.146***		0.146***	
	(0.0465)		(0.0477)	
Subjective financial situation: [d]		0.0300***		0.0280***
		(0.00731)		(0.00741)
ln (Total Monthly Income)			-0.00921*	-0.00949*
			(0.00531)	(0.00535)
Age Group: [e]				
20-24 yrs old	0.0730	0.0713	0.0839	0.0839
	(0.0577)	(0.0584)	(0.0680)	(0.0691)
25-29 yrs old	0.138**	0.140**	0.153**	0.157**
	(0.0587)	(0.0593)	(0.0700)	(0.0710)
30-34 yrs old	0.224***	0.221***	0.244***	0.244***
	(0.0582)	(0.0589)	(0.0699)	(0.0710)

35-39 yrs old		0.220***	0.218***	0.240***	0.240***
		(0.0584)	(0.0591)	(0.0701)	(0.0711)
40-44 yrs old		0.245***	0.244***	0.267***	0.268***
		(0.0572)	(0.0579)	(0.0693)	(0.0704)
45-49 yrs old		0.273***	0.272***	0.295***	0.297***
		(0.0569)	(0.0575)	(0.0686)	(0.0696)
50-54 yrs old		0.277***	0.274***	0.294***	0.293***
		(0.0569)	(0.0574)	(0.0690)	(0.0700)
55-59 yrs old		0.266***	0.264***	0.287***	0.287***
		(0.0574)	(0.0580)	(0.0695)	(0.0705)
60-64 yrs old		0.295***	0.292***	0.319***	0.317***
		(0.0573)	(0.0579)	(0.0698)	(0.0708)
65-69 yrs old		0.286***	0.285***	0.317***	0.317***
		(0.0582)	(0.0587)	(0.0706)	(0.0716)
Over 70 yrs old		0.329***	0.325***	0.356***	0.354***
		(0.0568)	(0.0573)	(0.0699)	(0.0709)
University Degree		-0.166***	-0.169***	-0.162***	-0.164***
=1 if R has a university degree		(0.0135)	(0.0135)	(0.0138)	(0.0138)
Female		-0.0681***	-0.0677***	-0.0717***	-0.0715***
=1 if R is female		(0.0113)	(0.0113)	(0.0118)	(0.0118)
Children		0.0355*	0.0335*	0.0391**	0.0371**
=1 if R has children		(0.0183)	(0.0183)	(0.0185)	(0.0185)
Ethnicity: [f]					
Asian		-0.163***	-0.161***	-0.160***	-0.158***
		(0.0337)	(0.0338)	(0.0343)	(0.0346)
Black		-0.186***	-0.182***	-0.189***	-0.184***
		(0.0402)	(0.0408)	(0.0398)	(0.0406)
Mixed		-0.0252	-0.0265	-0.0187	-0.0204
		(0.0974)	(0.0991)	(0.0976)	(0.0995)
Other		-0.224***	-0.227***	-0.207***	-0.211***
		(0.0455)	(0.0458)	(0.0472)	(0.0475)
Importance of Bring British		0.0254***	0.0253***	0.0259***	0.0259***
(0-low to 10-very high)		(0.00205)	(0.00205)	(0.00206)	(0.00206)
Trust in your Neighbours		-0.0367***	-0.0365***	-0.0374***	-0.0371***
(1-very low to 5-very High)		(0.00823)	(0.00824)	(0.00838)	(0.00840)
Interest in Politics		0.0685***	0.0699***	0.0676***	0.0691***
(1-very low to 4-very High)		(0.00740)	(0.00737)	(0.00750)	(0.00747)
Unemployed		0.0407	0.0324	0.0244	0.0171
=1 if R is unemployed		(0.0397)	(0.0402)	(0.0417)	(0.0423)
Working		-0.0307*	-0.0347*	-0.0183	-0.0228
= 1 if R is working full time		(0.0179)	(0.0179)	(0.0191)	(0.0190)
Married		-0.0101	-0.00879	-0.0123	-0.0108
=if R is married		(0.0140)	(0.0140)	(0.0141)	(0.0141)
Rural		-0.00312	-0.00270	-0.000495	0.000119

=1 if R lives in a rural area	(0.0156)	(0.0156)	(0.0157)	(0.0157)
Observations	6,584	6,584	6,417	6,417
R-squared	0.160	0.157	0.159	0.156

Robust standard errors, clustered by household, in parentheses: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

(a) Overall satisfaction with life: coded from completely dissatisfied (1) to completely satisfied (7). Completely dissatisfied is the base category in columns (1), (3) and (5).

(b) Overall satisfaction with life, continuous.

(c) Subjective financial situation: from doing all right (1) to finding it very difficult (4). Doing all right is the base category in columns (1), (3) an (5).

(d) Subjective financial situation, continuous

(e) Age group: 5-year intervals, base category is 18-19 years old. (f) Ethnicity group: base category is white.

Figure A1. The Share Undecided and Those Who Did Not Answer to the Question on EU Membership Across 2016.
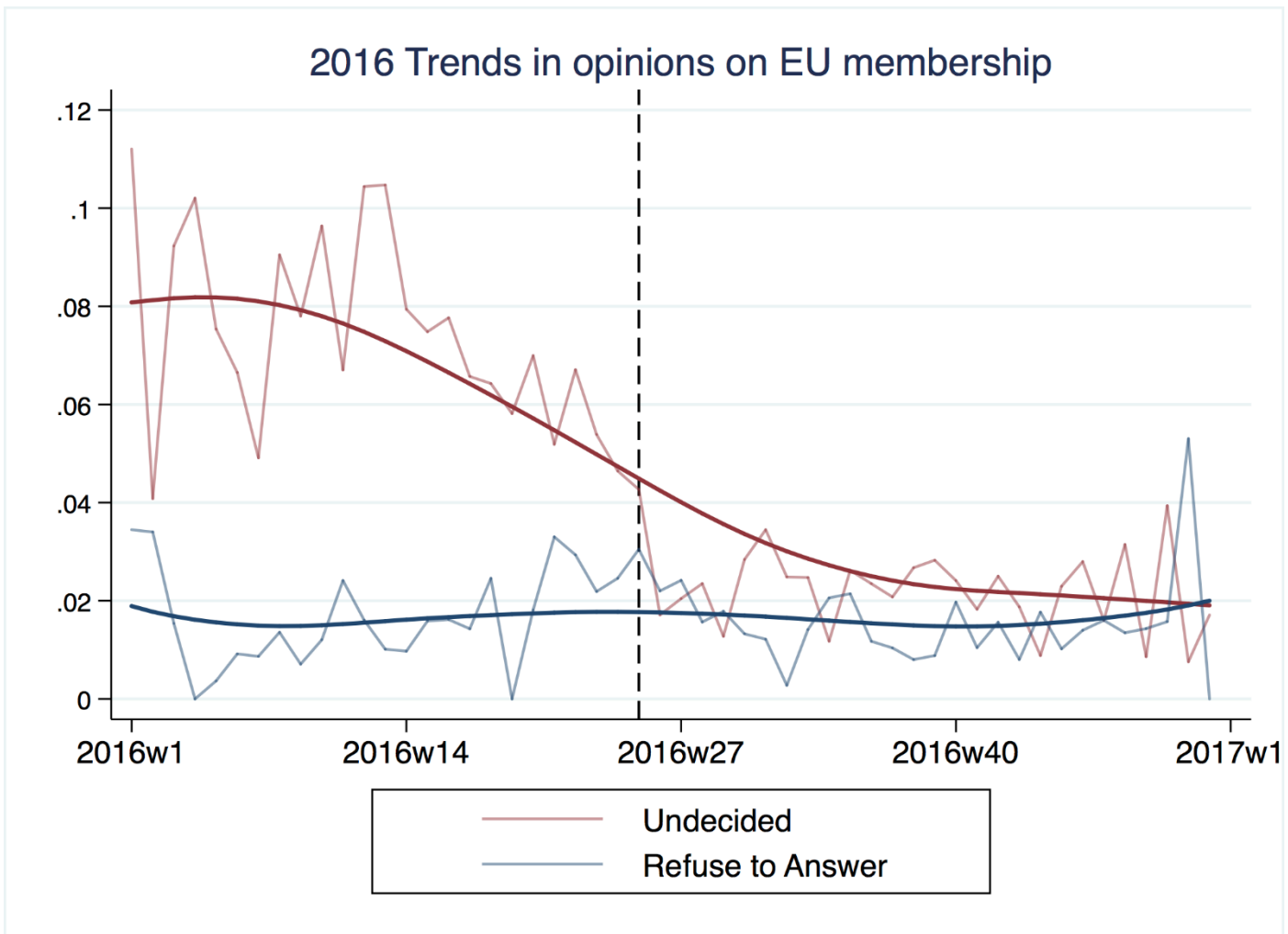
Notes. The figure plots the share of those respondents who were undecided or did not want to express an opinion on EU membership by week of the interview; the first interview took place during the first week of January 2016 and the last during the last week of December 2016. The dotted vertical line indicates the referendum day. The lighter red and blue lines connect the weekly average proportion of undecided and those who did not answer, the darker red and blue lines fit the smoothed values of a kernel-weighted local polynomial regression of EU membership preferences on week of the interview.

Figure A2. Attribution to Remain /Leave Preferences Based on Vote Forecast on Post-Referendum Sample.
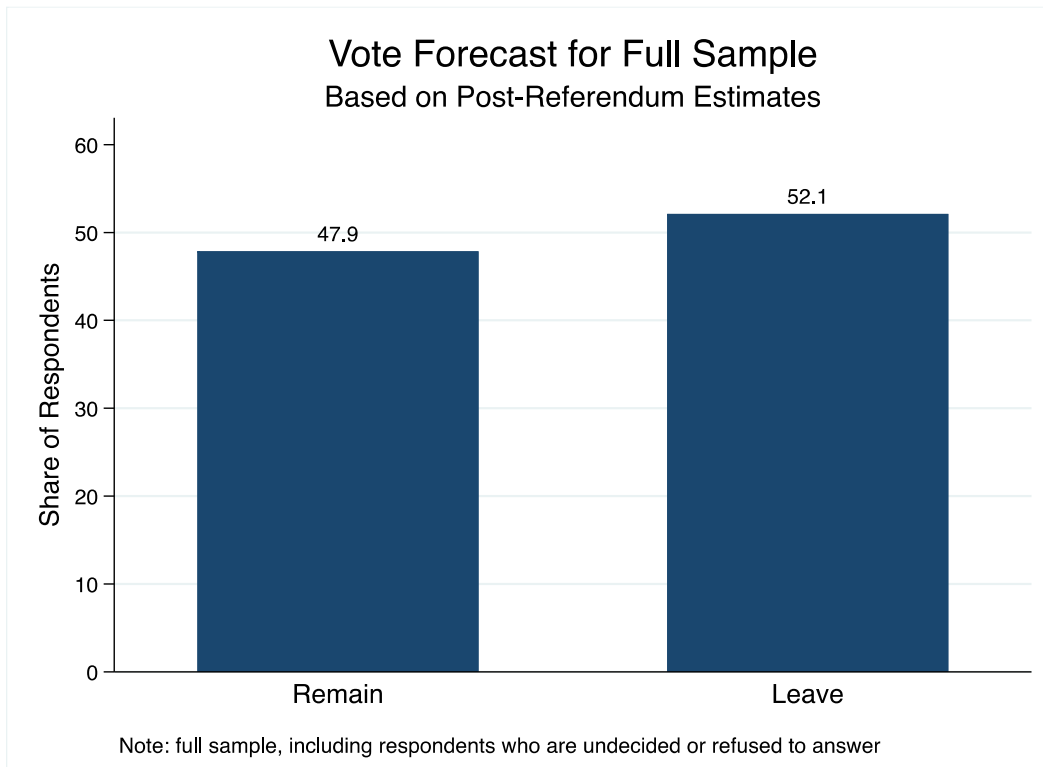
Notes. The bar charts display the predicted share of preferences over EU membership for the sample of respondents interviewed between 1st January 2016 and 31 December 2016. Predictions are generated by probit estimations of Equation (1) on the sample of respondents interviewed between 24th June and 31 December 2016. The threshold for the allocation of preferences over leave /remain has been set equal to the average predicted probability of Leavers (0.65). The transition matrix reported in Table A7 shows how Leavers and Remainers have been re-allocated according to the above rule. The bar charts result from the sum across groups of Leavers/Remainers.