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Regional Variations in the Brexit Vote: Causes and Potential Consequences

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ABSTRACT

Regional Variations in the Brexit Vote: Causes and Potential Consequences*

There were large regional differentials in the Brexit vote. Most notably, the percentage voting to leave the EU ranged from 38% in Scotland and 40% in London to 59% in the East and West Midlands. Turnout also varied across Britain, from a low of 67% in Scotland to 77% in the South East and South West. Existing empirical studies have tended to focus on the demographic composition of geographical areas to identify the key socio-economic characteristics in explaining spatial and other variations in the leave vote - with age and education found to be important drivers. We use the *British Social Attitudes Survey* to provide a more nuanced picture of regional differences in the Brexit vote by examining in particular the role that national identity and attitudes towards immigration played. In addition to education, we find that national identity exerted a strong influence on the probability voting leave in several English regions, including the East, North East, London and South East. Whereas, over and above this, concerns about immigration had a quantitatively large and highly significant impact in all regions bar London, and the East to a lesser extent. Differences by country of birth are also explored, with national identity and concerns about immigration having a larger impact for the English-born. Our findings are then discussed in the light of changes that have affected regional economies during the process of increased globalisation, austerity, the current Covid-19 crisis and recent UK government announcements to rebalance the economy.

JEL Classification: D72, R11, F60, J61

Keywords: Brexit, regional economies, globalisation, immigration

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1. Introduction

In June 2016, the United Kingdom (UK) held one of only a handful of referendums that has ever taken place under its parliamentary system. Such single-issue voting had only previously been deployed twice before; most recently in the case of the parliamentary voting method in 2011 and before that the initial referendum to join what was then the European Economic Community in 1975. The run-up to the most recent referendum was bitter and polarising from a political perspective, exposing splits in the country across regions, families and friends (Cosslett, 2016). Although the overall outcome of the vote was close in percentage terms, with 52% of the UK electorate who participated voting to leave the European Union (EU) and 48% to remain, leave voters were in the majority in 9 out of Britain's 11 regions.¹ The result therefore exposed deep-running divides across the UK, largely driven by social and economic factors that researchers have sought to explain ever since the vote took place (Arnorsson and Zoega, 2018).

It can be argued that many of the underlying conditions that contributed to the decision to leave had developed over decades but were magnified and highlighted during the period of austerity that was introduced by the Coalition Government following the 2010 General Election. For example, it has been recognised that the UK has one of the most imbalanced economies from a regional viewpoint in Europe and indeed across the industrialised world (Harris *et al.*, 2019; McCann, 2020). Moreover, while not a new phenomenon, regional inequalities have been rising since the 1980s. From a political economy perspective, the period of UK deindustrialisation negatively affected areas with concentrations of traditional manufacturing industries (Beatty and Fothergill, 2018; Tomaney and Pike, 2018). In contrast, the Knowledge Intensive Business Service (KIBS) sectors have grown rapidly in other parts of the UK, especially London and the South East, resulting in very different economic landscapes across the regions.

The way in which the UK embraced globalisation also meant that it benefitted from more open borders and free trade arrangements at the aggregate level, as evidenced by the UK having amongst the most liberal labour and product market arrangements in Europe and the OECD (OECD, 2018). The UK has traditionally attracted above average levels of international capital. The stock of inward Foreign Direct Investment as a share of Gross Domestic Product (GDP) was 15.1% in 1995 compared with an average of 10.8% across developed economies globally. By 2015, these shares had risen to 49.2% and 36.9% respectively (Ascani and Iammarino, 2018). While the overall level of inward investment has been significant, it has been concentrated in the KIBS sectors. Therefore, the higher degree of openness has created winners and losers at the sub-national level, and thus contributing to regional inequalities. Cities and conurbations (especially London) have seen a growth in highly skilled knowledge workers, innovation and inward capital investment, revolving around agglomeration economies as more peripheral regions have seen a decline in the retention of young, educated workers, as well as a loss in core, traditional manufacturing employment and a fall in inward investment (McCann, 2020). Immigration into London and other successful regions have further boosted economic performance because highly skilled migrants, often originating from a wide range of countries from across the globe, are attracted to the multicultural environment and the greater range of jobs, especially in high paying sectors such as banking, finance and insurance. Nathan (2014)

¹ The regions where this did not occur were Scotland and London. We exclude Northern Ireland from our analysis because it does not appear in the survey data that are being examined. Therefore, our paper essentially focuses on the Brexit vote in Great Britain.

discusses a variety of channels through which highly skilled migrants can boost the economic performance of a geographic area, including through entrepreneurship as immigrants tend to be more innovative and seek out new business opportunities. However, the Brexit vote could lead to an outflow of highly skilled UK citizens. In particular, Auer and Tetlow (2019) find that the number of UK citizens has risen since the EU Referendum, with their in-depth interviews with UK citizens in Germany indicating that Brexit was a key driver.

The expansion of the EU into Central and Eastern European led to increased migration flows into the UK from new accession countries - especially Poland - from the mid-2000s (Drinkwater *et al.*, 2009). A significant proportion of these workers found employment in relatively low skilled jobs, such as hospitality and the agricultural sector (McCollum and Findlay, 2011), thereby creating, at least the perception of, downward pressure on wages in the low skilled labour market and greater competition for labour market opportunities. This process was exacerbated by other features of globalisation, since it has combined with new technologies that have facilitated an increased capacity for the outsourcing of labour-intensive operations to lower labour-cost countries - especially China and other parts of Asia, particularly in businesses and sectors where cost competition is the key driver (Greenaway, 2007). These effects, whilst affecting areas right across the UK, were felt most keenly in those regions that were already suffering from economic decline. Taken together, two key issues appear to have emerged. Firstly, regional inequalities matter. Secondly, rising levels of immigration have heightened the tensions between winners and losers as labour market participants see themselves as being replaced by foreign workers either directly or indirectly through offshoring.

Thus, it is evident that by the time the financial crisis occurred, the UK economy was already experiencing increasingly divergent fortunes at the sub-national level. While not the sole cause, the financial crisis and period of austerity and reduction in the role of the state which followed - in part ideologically driven by the government of the time - brought into sharp focus the regional imbalances in the UK (Ballas *et al.*, 2017). This was not unique to the UK as other countries, including the United States, also saw a growth in spatial inequalities thus creating an impetus to question the effects of globalisation. The global experience of a reduction in GDP at national levels has also resulted in a questioning of it being used as a valid measure of economic wellbeing (Stiglitz *et al.*, 2010).

As a consequence of the economic disruption caused by the financial crisis, there has been a notable rise in populist governments (Algan *et al.*, 2017). Trump in the US, the success of Le Pen in France and a pronounced shift to the right of the Conservative Party in the UK, following increased support for the UK Independence Party (UKIP), are all consistent with a broad movement that indicates a breakdown in trust between the electorate and its political leaders. Algan *et al.* (2017) point to two causes which are relevant to this paper. Firstly, what they term a “cultural backlash against progressive values” (p. 310) and secondly, the economic insecurity stemming from technological change.

The above issues have also had a clear influence on the subsequent Brexit withdrawal process, which saw the UK in a state of parliamentary paralysis for almost two years and culminated in the General Election that took place in December 2019 (Cutts *et al.*, 2020). This election effectively became a public verdict on how the UK should finally leave the EU, and so to all intents and purposes acted as a second referendum on Prime Minister Boris Johnson’s pledge to ‘Get Brexit Done’ and that the UK should leave the EU by the end of January 2020. The government’s election campaign was largely based around the implementation of a withdrawal

agreement that had repeatedly struggled to receive the support of the UK Parliament because it had neither managed to satisfy the Euroskeptic arm of the Conservative Party or the (generally) more pro-European stance of the opposition parties. As with the vote to leave, the outcome of the election itself took many political commentators by surprise, especially the margin of victory by the Conservative Party, both with regards to the number and distribution of seats. The results were particularly notable from the perspective of the change in the regional and local voting patterns that had been observed for the previous 80-90 years in which the Labour party had repeatedly won virtually every seat across large swathes of Northern England in consecutive General Elections since the 1930s. This was reversed to a certain extent in 2019 when the Conservative Party recorded successes in constituencies for the first time in generations - especially in the North East, Midlands and Yorkshire & the Humber. Cutts *et al.* (2020) report that more than a half of the seats that the Conservatives gained occurred in these regions. This came on the back of large vote changes away from the Labour party, with a 13% swing against Labour in the North East and a 10% swing in the Yorkshire & the Humber. Not all of this was due to traditional Labour voters switching directly to the Conservative Party, although some did since the government also benefitted from a significant shift in support towards the Brexit party in these areas.

Following its landslide victory, the UK Government pledged to ‘level up’ the UK economy to reduce regional disparities. From a political perspective, this appears to be aimed at maintaining the faith of traditional Labour voters in order to deliver on its pre-Election promises. Schemes such as High Speed 2, electrification of other parts of the rail network and support for the Northern Powerhouse offer some concrete examples of how the government aims to achieve such an outcome, but it is unlikely that such policy interventions alone will be enough to make significant in-roads into regional disparities (Zaranko, 2020). Moreover, focus is often directed towards the Government Office Regions and yet inequalities are substantial and concentrated at more localised levels within these broad regions. The Institute for Fiscal Studies commented that while efforts in the March 2020 budget were designed to give regions a boost through increased levels of capital investment, the levelling up process, however defined, will take considerably longer than a parliamentary term (Johnson, 2020). It is also telling that the approach adopted does not seem to mark any sort of shift from traditional regional policy initiatives, which have typically been relatively unsuccessful in raising overall levels of productivity - especially when cost effectiveness is taken into consideration (Harris and Robinson, 2004; 2005; Moffat, 2014).

The paper is organised as follows. Section 2 contains a review of existing evidence on the main drivers that underlay the outcome that was voted for at the EU referendum before we go on to discuss the data source that is used - the 2016 *British Social Attitudes Survey (BSAS)*. Section 4 outlines the methodological approach that has been adopted and section 5 presents results for the key variables of interest that have been estimated in the regression models. Section 6 contains a discussion of the implications of our findings in the context of regional economies, whilst the final section summarises.

2. Related Literature

The outcome of what has become known as the Brexit vote was a shock that was felt across Europe (Asthama *et al.*, 2016). In its immediate aftermath, political commentators sought to identify the reasons that could explain the surprise result, including differences in voting patterns at the sub-national level. In his early post-Brexit analysis, Curtice (2017) presents evidence based on data from a range of sources that alludes to the importance of national

identity, general European ambivalence and attitudes shaped by high levels of net migration. Jump and Michell (2019) go on to summarise the drivers into five sets of factors: demographic (especially age and education), economic (inequality and austerity), distributional (relating to globalisation), cultural (especially English nationalism and xenophobia) and campaign-specific (including misleading claims and social media). In this section, we review the empirical literature on the factors that have been thought to have influenced the Brexit vote, with particular reference to the regional dimension.

As a precursor, Table 1 contains some key electoral statistics from the Electoral Commission on the EU referendum in relation to the size of the electorate in each region, the percentage who voted and the percentage who voted to leave. It shows that turnout ranged from 62% in Northern Ireland and 67% in Scotland to 77% in the South West and South East. The percentage of leave voters was highest in the West Midlands, where over 59% of voters indicated that they wanted to leave the EU and lowest in Scotland, where only 38% expressed a similar desire. Wales was very close to the UK national averages, both with regards to turnout (71.7% compared to 72.2%) and in its percentage of leave voters (52.5%).

Attempts to explain the Brexit vote have typically been undertaken using three broad types of data. Firstly, examining aggregate data at a particular spatial level in order to explain the Brexit vote in terms of the socio-demographic composition and economic characteristics of spatial areas e.g. such as NUTS2 areas (Arnorsson and Zoega, 2018) and local/unitary authorities (Becker *et al.*, 2017). Secondly, by analysing a range of cross-sectional or longitudinal surveys. These include large-scale regular datasets (Goodwin and Milazzo, 2017; Liberini *et al.* (2019); Kolpinskaya and Fox, 2019), those conducted by polling organisations such as Ashcroft, Ipsos MORI and YouGov immediately after the vote and those collected or commissioned by academics and other organisations (Fox, 2020; Clarke *et al.*, 2017; Kaufmann, 2017). Finally, some studies have combined large-scale surveys and spatial data (Albaresie *et al.*, 2019; Fetzer, 2019). With reference to these studies, our brief review summarises the existing evidence into three sets of factors: regional/spatial, social-demographic and economic characteristics of voters and additional influences.

Regional and Spatial Factors

Several studies have examined the determinants of the leave vote using aggregate data. These include Becker *et al.* (2017), who estimate a series of Ordinary Least Squares (OLS) regressions for the 380 districts in the UK, starting with an initial set of variables capturing exposure to the EU (immigration, trade and structural funds). Subsequent models are then augmented by the inclusion of three groups of factors: austerity (public service provision & fiscal consolidation), demography (including education) and economic structure (industrial distribution, wages and unemployment). Virtually all of the included explanatory variables are found to exert a significant impact on the leave vote at the district level, thus indicating that the leave vote was underpinned by a complex combination of factors. Goodwin and Heath (2016) also examine the impact of demographic and economic influences on both turnout and the leave vote at the district level for the UK.

Other studies have used similar data and approaches but sometimes for different spatial units or areas. For example, Jump and Michell (2019) focus on the impact of education on the leave vote at the local/unitary authority level in England and Wales. Whilst in addition to demographic and economic variables, Arnorsson and Zoega (2018) include information on attitudinal variables at the NUTS2 level from the 2011 European Social Survey in relation to

fear of the EU, dislike of neighbours and views towards immigrants. However, as well as these data relating to five years before the EU Referendum, they may also be subject to an ecological fallacy.

Individual and aggregate data have also been combined within some studies. For example, Fetzner (2019) combines data from Understanding Society with mainly economic variables such as welfare benefits at the district level to examine the impact that austerity had on the referendum outcome. His analysis reveals that UKIP was able to gain support in areas containing larger shares of less educated residents and workers with routine occupations following the introduction of welfare reforms in 2010.

To further illustrate the impact of austerity and other (longer term) economic factors at the regional level, Figure 1 presents changes in real gross domestic household income. It reveals that there was positive growth in household incomes from 1997 to 2006 in virtually all regions, however, the highest growth rates over this period were typically observed in London. For example, London ranked first in terms of the growth in real household income in four out of the five years leading up to 2006-7. Although household incomes suffered the most in the capital during the Global Financial Crisis, they rebounded after 2011 so that the growth in household income was highest in this region in each year from 2011-12 to 2014-5, as well as in 2017-18. Moreover, Figure 1 also clearly shows a sharp change in real household income across the regions in the year before the referendum took place, with London one of only three regions to register an increase in household income between 2015 and 2016. These regional patterns are also reflected in Figure 2, which shows levels of Gross Value Added (GVA) per capita relative to London. It indicates a generally steady decline in GVA per head compared to London in all regions since 1997, particularly after 2006.

Socio-Demographic and Economic Characteristics of Voters

A number of empirical studies have used microdata from large scale surveys, such as Understanding Society, including Liberini *et al.* (2019) and Alabrese *et al.* (2019). Although the relevant sample of data contains a relatively large number of respondents (over 13,000) to the question that asked whether the UK should remain a member or leave the EU, only 42% indicated that they thought that UK should leave. This is almost 10 points lower than the percentage of electorate voting leave at the referendum. Nevertheless, based on answers to this question, Alabrese *et al.* (2019) conclude that the probability of voting leave is higher for whites, older people, those with low levels of education, in receipt of benefits, in poor health, who make infrequent use of the internet and smartphones and have low life satisfaction.² Given that they use the same dataset, Liberini *et al.* (2019) report broadly similar findings but also that females were significantly more likely to be in favour of remaining in the EU. Liberini *et al.* (2019) also examine the impact of respondents' feelings about their finances. They find that people who felt that things were very difficult from a financial perspective were around 13 percentage points more likely to be in favour of leaving the EU than people who felt that they were comfortably off.

Studies using other large-scale data sets such as the British Election Study Referendum Panel report similar socio-demographic influences on the Brexit vote, especially in terms of the importance of age and education. These include Goodwin and Milazzo (2017) and Kolpinskaya

² Neither do they report evidence of an ecological fallacy with regards to the aggregate variables that have been included in their regression models.

and Fox (2019). The latter also focuses on the impact that religion might have had on the leave vote, with their results indicating that there was no significant relationship between Catholicism and the remain vote, whereas Anglicans were significantly more likely to be leave voters. Whilst in contrast to Fetzer (2019) and Liberini *et al.* (2019), Goodwin and Milazzo (2017) do not find that economic variables played an important role in explaining the leave vote in their regression models that included a wider set of control variables, as discussed further in the following section.

Additional Influences

Several studies have identified the importance of attitudinal variables - especially in relation to immigration. In particular, Clarke *et al.* (2017), Ford and Goodwin (2017) and Goodwin and Milazzo (2017) highlight the impact that negative views towards various features of immigration had on the leave vote. More specifically, Goodwin and Milazzo (2017) find that, in order of importance, respondents who thought that Brexit would reduce immigration, levels of immigration were getting higher, immigrants burden the welfare state, undermine cultural life and are bad for the economy were far more likely to indicate that they would vote to leave the EU. Similar findings have also been obtained using qualitative data (Leruth and Taylor-Gooby, 2019). Moreover, such evidence points to the persistence of firmly held views that are may be difficult to change (Kaufmann, 2019), especially within particular geographic areas and regions. For example, individuals residing in some locations are typically better able to accept new groups (of migrants) than others, which may be related to more general attitudes towards immigrants.³ This is consistent with contact theory (Allport, 1954) and supporting evidence (Pettigrew and Tropp, 2006). Therefore, findings based on attitudes towards immigration may differ from those obtained in studies that use other measures in an attempt to determine the impact of immigration on the leave vote, for instance the initial concentrations of or growth in immigration in the lead up to the referendum in particular spatial areas, such as in Becker *et al.* (2017).

Kaufmann (2019) examines the relationship between national identity and attitudes towards ethnicity and immigration. He argues that its possible to distinguish between two types of ethnic nationalists: open and closed, with the former group being amenable to changing their views with regards to immigration. Given this, and within the context of the Brexit vote, individuals reporting an English - rather than British or some other - national identity were significantly more likely to be leave voters. Evidence presented by Goodwin and Milazzo (2017) highlights the importance of national identity especially in terms of those identifying as English on the probability of voting leave. They also unsurprisingly obtain a very large negative coefficient for people who indicated that they had a European identity. Fox (2020) presents similar results, as well as finding that Scottish identifiers were significantly less likely to vote leave compared with people identifying themselves as British. Henderson *et al.* (2017) focus specifically on the importance of English national identity by using the Future of England Survey and conclude that Englishness was a key factor in explaining the leave vote.

Given the existing evidence, it is clear that a range of factors contributed to the outcome of the EU referendum. However, there continue to be some unanswered questions, particularly with regards to possible variations at the regional level. To address these, we use microdata from

³ See Crawley *et al.* (2019) for a more detailed discussion on spatial variations, including on the consistent evidence from several sources that people living in London and Scotland display more tolerant views towards different types of migrants e.g. economic migrants, refugees and asylum seekers. As noted earlier, these were the only two regions of Britain where remain voters were in the majority.

the *BSAS* from 2016 to provide a more nuanced understanding of the causes of the Brexit vote, especially in connection to the additional variables discussed above by focusing on concerns about immigration and national identity and the differential impact that these may have at the regional level - over and above the influence of socio-demographic and economic influences. As well as identifying the key factors that affected the leave vote at the regional level, we also examine which variables influenced whether or not individuals voted in the referendum.

3. Data

The *British Social Attitudes Survey (BSAS)* is a well-established survey that has taken place more or less annually since 1983. It has been designed to obtain views and opinions on a broad range of topics from a representative sample of adults aged 18 and over. This is achieved by using a Postcode Address File compiled by the Post Office as a sampling frame. Natcen (2016) provide detailed information on the sampling methods used. As a result, these annual surveys have been extensively used across the social sciences to examine a wide variety of issues including by Chan and Goldthorpe (2007), Grasso *et al.* (2019), Dustmann and Preston (2001), Johnson and Deeming (2016) and Reeves and de Vries (2016). This paper utilises the 2016 survey which asked respondents whether and how they voted in the EU referendum, as well as collecting information on a range of relevant explanatory variables including concerns about immigration.

Northern Ireland does not feature in the subsequent analysis as it is not part of the *BSAS* and an equivalent survey has not been undertaken there since 2004. This should not make much difference given that Northern Ireland made up only 2.7% of the UK electorate that was eligible to vote in the EU referendum. Areas north of the Caledonian canal in Scotland have also been consistently excluded from the survey because of their remoteness (Natcen, 2016). It is possible to apply the population weights within the *BSAS*. These have been constructed to take account of the sampling biases that may be introduced. Weights are especially useful when looking to ‘gross up’ statistics to the national level. However, statistical analyses can be sensitive to weighting and thus their application should be carefully considered, as discussed below.

The two dependent variables that we focus upon are: (i) whether the respondent voted in the EU Referendum (*V*) and (ii) if the respondent voted leave in the referendum (*L*). These variables have been constructed using the questions that were asked of the 2,942 respondents who participated in the *BSAS* in 2016. The precise wording of the questions and the responses to these are presented in Tables A1 and A2 in the Appendix. Table A1 reveals that 78.3% of the sample indicated that they had voted in the referendum, 20.4% that they didn’t vote, 0.7% didn’t want to say whether they voted, 0.2% couldn’t remember and 0.4% didn’t know if they had voted or refused to say. This gives a turnout rate of 79.3% using the unweighted data who had indicated that they had definitely voted in the referendum.⁴ This is around seven percentage points higher than the actual turnout rate reported for Great Britain.⁵ Table A2 shows that there is a slight majority of respondents indicating that they had voted leave (1,139) compared to remain (1,115) amongst the 2,302 respondents who reported that they had voted in the

⁴ If all or most of the individuals who indicated that did not want to say or couldn’t remember whether they had voted did not actually vote in the referendum then this would lower the turnout rate by around a percentage point.

⁵ Fox (2020), referencing Van der Eijk and Franklin (2009), notes that respondents often exaggerate their electoral participation in (political) surveys, when discussing the high proportion of respondents (87%) in the YouGov survey commissioned by WISERD who reported that they had voted in the EU Referendum.

referendum. Of the remaining 48 respondents, 28 indicated that they preferred not to say how they voted, 6 that they could not remember and 14 did not know or refused to answer.⁶

We are unable to precisely identify UK/Irish/Commonwealth citizens i.e. those groups that were eligible to vote in the EU Referendum, given the absence of a question on citizenship in the 2016 survey. However, some information is presented in Table A3 based on responses to the country of birth and nationality questions. This reveals a far lower turnout rate amongst two of the groups: respondents who were born outside the British Isles answering either “European” or “Other”, “None of These” or “Don’t Know” to a question about how they would best describe their nationality. The percentage of respondents in these two groups reporting that they had voted in the referendum was 32.6%, whereas it was 82.5% in the rest of the sample. Of the 59 respondents in these two groups who said that they had voted, 22% were leave voters, compared to an average of 51% amongst the other 7 nationality categories. It may therefore be argued that these two groups could therefore be excluded from the analysis. This would (slightly) increase both the overall turnout rate and leave vote. However, since around a third of respondents in these groups did vote and we can’t be sure about their citizenship, we continue to use the full sample in our analysis and include a dummy variable to identify individuals belonging to these two groups. The 2013 *BSAS* did include a question on British citizenship, which was asked to around a third of the sample. The answers to the question indicated that almost 96.7% of all respondents (based on unweighted data) reported that they were British citizens.⁷

Table 2 presents more detailed information on voting in the referendum using both unweighted and weighted data from the survey for the 11 British regions. These percentages are also compared to the figures from the Electoral Commission.⁸ The table also includes significance levels for the means of voting in the referendum (*V*) and voting leave (*L*) relative to Wales using two tailed tests on the unweighted data. These tests indicate that there are no significant differences compared to any other region in terms of the probability of voting - even at the 10% level. In contrast, the probability of voting leave was significantly lower at the 1% level in both London and Scotland and significantly higher at the 5% level in the West Midlands. There were no other significant differences in the leave vote relative to Wales in any other region - even at the 10% level of significance.

In order to obtain a greater understanding of the fairly large differences in the turnout rates in the *BSAS* and the Electoral Commission for some regions, Table A4 reports the age distribution for the weighted and unweighted samples.⁹ Given there is under-sampling of more marginal groups/transient populations such as migrants and ethnic minority groups in the survey, the data can be weighted. Weighting the sample makes most difference in regions such as London because of its higher concentration of younger residents.

⁶ Again, if all of these respondents were highly concentrated in either the leave or remain categories then this would either increase or reduce the ‘actual’ leave vote in the sample by around a percentage point.

⁷ The question only referred to British citizenship. Therefore, given that the data will also include Irish and Commonwealth citizens, this would further boost the percentage of the sample that was eligible to vote in the referendum.

⁸ There is a high degree of correlation between the regional rankings, especially in relation to the leave vote. In particular, a Spearman Rank correlation coefficient of 0.95 is obtained for the percentage voting to leave between the Electoral Commission data and both weighted and unweighted data from the *BSAS*. The corresponding correlation coefficients for the percentage voting in the referendum are lower: 0.565 using the unweighted data and 0.382 for the weighted data, with only the former being significantly different from zero at the 10% level.

⁹ The difference is most noticeable in Scotland, where over 80% of respondents reported that they had voted in the referendum compared to the official turnout figure of 67%.

Tables A5 and A6 contain comparisons between the voting data on the EU Referendum in the *BSAS* and surveys reporting the percentage who voted and voted leave in the immediate aftermath of the referendum. More specifically, Table A5 contains turnout percentages for different socio-demographic groups from an Ipsos MORI Poll and the unweighted and weighted data from the *BSAS*. Table A6 reports similar information for a larger number of socio-demographic groups in relation to the percentage of leave voters from Ashcroft and YouGov, as well as the Ipsos MORI, polls.¹⁰

Both tables indicate a fairly high degree of correspondence between the *BSAS* data and the information provided by the polling organisations. In line with differences in the overall turnout rates, the percentage of *BSAS* respondents who reported that they had voted is higher than in the Ipsos MORI poll in virtually all categories. However, the turnout percentages are the same or sometimes lower for some of the younger age groups, whereas much larger gaps emerge for the older age groups. In terms of the leave vote, the percentages for many of the variables are close to each other, especially when using the unweighted data, when they are typically within a couple of percentage points and identical in some cases. There are, however, some exceptions including age, where the *BSAS* data appears to underestimate the leave vote for people in the 35-64 age range as well as amongst graduates to a certain extent. The discrepancies between the *BSAS* and the data from the polling organisations are slightly larger when using the weighted data for the majority of the categories. In addition to this, the application of weights can also add unnecessary complications to empirical models (Gelman, 2007). We therefore only report results using unweighted data in the subsequent analysis.

4. Empirical Methodology

Our initial modelling approach relates to estimating (1) for both V and L . This specification includes a range of socio-demographic and economic variables as explanatory variables in addition to the regional dummy variables using the full sample of data for Britain:

$$Y_i = \alpha + \gamma \mathbf{R}_i + \beta \mathbf{X}_i + U_i \quad (1)$$

where Y_i relates to two binary outcome variables: V_i which takes a value of 1 if the respondent reported that they voted in the EU referendum and 0 if they indicated that they hadn't voted and L_i which takes a value of 1 if respondent was a leave voter and 0 if they voted to remain. Separate sets of models have been estimated for V and L and we follow Liberini *et al.* (2019) by reporting OLS estimates for reasons of simplicity.¹¹ $\mathbf{R}_i$ consists of a set of regional dummies - which are measured relative to Wales, where the leave vote was close to the overall figure for the UK and also in terms of turnout. $\mathbf{X}_i$ contains a standard set of socio-demographic and economic characteristics including gender, age and education.¹² α is the constant, γ and β are the vectors of coefficients to be estimated and U_i is the error term.

No direct controls for household income have been included in $\mathbf{X}_i$. This is because although the *BSAS* does collect information on (banded) household income, the variable is subject to relatively high levels of non-response and missing information, thereby substantially reducing the useable sample if included as an explanatory variable. Instead, controls have been included

¹⁰ Brief details on the nature and sample sizes of these polls have been provided in the notes below the tables.

¹¹ Results from probit and logit models are available from the corresponding author on request.

¹² See Appendix for details of the variables that have been included in $\mathbf{X}$ and how these have been created.

using a question about ‘feelings about present household income’, which was answered by virtually all respondents. Table A7 indicates that it is appropriate to include such a variable as a proxy for actual income given its relationship with the household income bands. For example, over three-quarters of those in the highest income quartile reported that they were living comfortably or very comfortably on their income compared with less than 4% in this income group who indicated that they were struggling or really struggling.¹³ It is worth noting that a relatively high percentage of Londoners report that they were struggling financially with their current household income - since their assessment is also likely to take the higher prices in the capital into account.¹⁴ Therefore, despite this being a subjective question, it could be argued that it is a more useful question in comparison to one that just measures household income. This variable is also similar to that included by Liberini *et al.* (2019) in their regression models.

To provide a more complete perspective on the key drivers of the Brexit vote, we augment (1) to include additional variables in (2):

$$Y_i = \alpha + \gamma R_i + \beta X_i + \delta A_i + U_i \quad (2)$$

where A_i contains the additional variables - specifically concerns about particular issues (such as crime, housing, work and immigration), national identity and the number of flights taken in the last year. The latter variable has been included in an attempt to capture openness (Kaufmann, 2019). δ is the associated set of coefficients.¹⁵

Using the results from (2), and also the mean values of V and L reported in Table A8 for each explanatory variable in X and A , we can establish which of these variables are the most important in influencing the probabilities of voting and how people voted in the referendum. Table A8 provides confirmation of the view that few young people and graduates were leave voters. Whilst in terms of the additional variables, the table reveals that those mentioning a concern about immigration and people who identified as English (grouped with Scottish and Welsh here) were most likely to be leave voters.¹⁶ Older people had the highest turnout rates. Table A6 also contains the percentage of the total number of observations that are accounted for by each of dummy variables that have been included in (2). For example, 8.4% of the sample who indicated whether or not they had voted in referendum were members of ethnic minority groups but this percentage fell to 6.6% for respondents who said that they had actually voted, as a result of the lower turnout amongst this group.

More parsimonious models are then estimated using both V and L as dependent variables in order to identify the main drivers of voting patterns to include in the separate regional models, as shown in (3):

$$Y_i = \alpha + \gamma R_i + \beta^* X_i^* + \delta^* A_i^* + U_i^* \quad (3)$$

¹³ Some other potential covariates have not been included as certain questions have only been asked on some of the 2016 *BSAS* questionnaires. For example, attitudes towards the death penalty, which Kaufmann (2016) argued was an important predictor of the leave vote was not included on all of self-completion questionnaires and thereby reduces the sample size that can be analysed when controls such as these are included in the regression models.

¹⁴ More specifically, people living in London were most likely to report that they were struggling or really struggling on their present incomes despite the higher (average) incomes in the capital.

¹⁵ Again see Appendix for details of how the variables included in A have been constructed.

¹⁶ See Appendix for further details on the definitions of national identity that have been used.

where $\mathbf{X}^*$ and $\mathbf{A}^*$ are the key socio-demographic, economic and additional variables to be included in the separate regional models. Although many of the influences on V and L are expected to be similar, the final set of variables to be included in $\mathbf{X}^*$ and $\mathbf{A}^*$ will be determined by considering the estimates obtained from (3) for V and L . β^* , δ^* and U^* represent the estimated vectors of parameters and error term when the parsimonious set of socio-demographic, economic and additional variables have been included. This empirical approach is in line with that adopted by Paul *et al.* (2020), who find that estimating models with a parsimonious group of indicators such as gender, parental education and income produces predictions that are virtually as accurate as models with a full set of controls.¹⁷

Following the identification of which variables to include in $\mathbf{X}^*$ and $\mathbf{A}^*$, separate regression models are then estimated for each region (r) using (4):

$$Y_{ir} = \alpha + \beta^* \mathbf{X}_{ir}^* + \delta^* \mathbf{A}_{ir}^* + U_{ir}^* \quad (4)$$

Finally, and following on from (3) and (4), we examine differences by country of birth - which will capture both the impact of internal and external migration decisions - by estimating (5):

$$Y_{ie} = \alpha + \gamma \mathbf{R}_{ie} + \beta^* \mathbf{X}_{ie}^* + \delta^* \mathbf{A}_{ie}^* + U_{ie}^* \quad (5)$$

where the e subscript relates to the separate models that are estimated for the English and non-English born.

5. Results

We firstly present our results for each of the three initial specifications (1, 2 and 3) by reporting estimates for the regional dummy variables for the probability of voting in the referendum in Table 3. Note again that the reference region is Wales. These estimates confirm that there was relatively little regional variation in turnout in the EU referendum, especially after controlling for socio-demographic, economic and additional variables. In particular, there are no significant differences between any of the regions and Wales using (1) and (2). It is also worth noting that all of the coefficients attached to the regions reported in Table 3 are positive, which indicates that Wales now appears at the bottom of regional table in terms of turnout after controlling for other explanatory factors. This picture changes slightly in (3) since the differences compared to the East of England, South East and Scotland become significantly different from zero at the 10% level. Table A9 contains the full set of estimates for the third specification and highlights which explanatory factors affected whether respondents voted in the referendum the most. It reveals that age and education exert large effects, with older and more highly educated people far more likely to have voted. National identity is somewhat less important, with only one significant effect at the 5% level and two at the 10% level in relation to the 5 other national identity dummies in comparison to the base category of English/Welsh/Scottish. Concerns about immigration do not play a role in explaining differences in the probability of voting in the referendum since this variable is not significant in (2) - given a p -value of 0.237 - so this variable is amongst those that have been excluded from (3) when V is the dependent variable. Table 3 also indicates a relatively small reduction in goodness of fit between models (2) and (3), given that the R-squared statistics only fall from 0.218 to 0.198.

¹⁷ Their paper focuses on targeted childhood interventions.

Table 4 presents estimates for the regional dummy variables for each of the three specifications with voting leave (L) as the dependent variable. Using (1), which includes controls for a range of socio-demographic and economic characteristics, significant differences remain at the 1% level for Scotland and at the 5% level for the West Midlands. Whilst in contrast to Table 2, the difference in the leave vote between London and Wales is only significant at the 10% level after controlling for socio-demographic and economic variables. There are no other significant regional differences for the probability of voting leave compared to Wales. Using (2), which contains the additional variables, differences relative to Scotland and the West Midlands remain significant at the 1% and 5% levels respectively, whereas the difference with London becomes insignificant. The final column reports little difference in the coefficients and significance levels for the regional dummies despite the more parsimonious model that has been estimated using (3). The only exception is London, where the difference with Wales again becomes significant at the 10% level. This is due to the exclusion of the ethnic minority dummy variable from (3) in comparison to (2). The full set of estimates are reported in Table A10 and are generally consistent with those reported in other studies that use large scale survey data to estimate the probability of voting leave such as Liberini *et al.* (2019) and Kolpinskaya and Fox (2019). In particular, these studies emphasise the importance of education and age.¹⁸ However, in addition to these variables, concerns about immigration appear very important given the magnitude of the coefficient attached to this variable in (3) relative to other variables. This is in line with the findings of Goodwin and Milazzo (2017), who highlight the importance of attitudes towards immigration using several different measures at the national level. All of the dummies capturing national identity, apart from more English/Scottish/Welsh than British, are also significant at the 1% level. Respondents taking at least 3 flights in the last year were significantly less likely to be leave voters than less frequent flyers.

In Table 5 separate regression estimates are presented after estimating equation (4) for each region with V as the dependent variable.¹⁹ The information in this table enables us to establish the extent to which there is regional variation across key socio-demographic factors, especially age and education, in explaining variations in turnout at the regional level. The impact of age on the probability of voting is largest in the North West, East Midlands, the East of England, London and the South East. For education it is greatest in the North West, Yorkshire & the Humber, South East and South West. There are also some significant effects associated with national identity in certain regions – including Yorkshire & the Humber, West Midlands and the East of England – where respondents who identified as English were significantly more likely to have voted in the referendum than other groups, especially those reporting an ‘other’ identity. Respondents in London, the South East and Scotland reporting that they were struggling on their incomes were significantly less likely to have voted in the referendum.

Table 6 reports the analogous information for L across the regions.²⁰ Education is particularly important in explaining the leave vote in several regions since more educated people are significantly more likely to be remain voters. For example, large positive coefficients compared to the base category of graduates are observed in the North, North West, Yorkshire & the Humber, the East, South West and Scotland. The influence of attitudes towards migration can

¹⁸ The marginal effects (at sample means) for this variable are slightly larger: 0.282 from a probit and 0.289 from a logit compared to the coefficient of 0.248 from the OLS model.

¹⁹ Means of the explanatory variables in each region are reported in Table A10.

²⁰ Table A11 contains the means of the additional explanatory variables that have included in the probability of voting leave models estimated for each region. This shows, for example, that concerns about immigration are high in the majority of regions since they are in the range of 30-40%, whereas such concerns were far less prevalent in London and Scotland, which is consistent with evidence and discussion provided in Crawley *et al.* (2019).

again clearly be detected in the table since the concerned about immigration variable is significant at the 1% level in seven out of the 11 regions, at the 5% level in a further two and at the 10% level in another.²¹ London is the only region where this variable is not significantly different from zero. The coefficient for London is also very small (0.07) in comparison to much larger values, typically in the range of 0.2 to 0.3, that are observed in other regions.²² The highest coefficient of 0.44 is in the East Midlands, which is the only significant variable in the model that has been estimated - thus indicating that it was the fundamental factor that mattered in this region. Whilst in the model for the West Midlands, the only significant variable other than concerned about immigration is other qualifications.

National identity also has an important impact in some regions, with significant differences found in the North East, Yorkshire & the Humber, the East, London, South East and the South West. In particular, those identifying as British were significantly less likely to be leave voters than people identifying as English at the 1% level in two regions, at the 5% level in three regions and at the 1% level in one region. There were no significant differences between Welsh and other identifiers in Wales and only one significant difference at the 10% level in Scotland between Scottish and other identifiers. In contrast, there are only two other significant age-related coefficients, where people aged 65 and over in the South East and those aged 30-44 in Yorkshire & the Humber were more likely to be leave voters. This is consistent with the findings of Goodwin and Milazzo (2017) at the national level, after controlling for other influences. Also in common with Goodwin and Milazzo (2017), we do not find that an indication of financial/economic difficulties has an important influence on the leave vote, at least at the regional level after the inclusion of the additional variables. This is because including a single dummy capturing reported struggles with living on present income is not statistically different from zero in any of the regional models. Therefore, the key factors underlying the leave vote at the regional level would appear to have been concerns about immigration, education and national identity.

Given the importance of the concerns about immigration variable for the probability of voting leave in the vast majority of regions, this effect is further investigated in Table 7. This table contains the coefficients and *p*-values associated with this variable from estimating models separately for different sub-groups of the sample in each region. These sub-groups relate to two gender, age, educational and national identity groups. The table reveals that the estimates for each of the sub-groups are broadly in line with those presented in Table 6 in that the variable is virtually always positive – the only exceptions are males and less educated people living in London and typically highly significant, either at the 1% or 5% level.²³ This implies a high degree of homogeneity across socio-demographic groups in the impact of attitudes towards immigration on the leave vote across different regions. However, there are some variations worth noting. These include that the impact of the concerned about immigration variable is relatively more important for more highly educated individuals in the majority of regions and is even significant at the 10% for respondents in London with at least an A Level qualification. This implies that even for the highly educated, concerns about immigration was a key factor in

²¹ This is the East of England, which was one of only two regions - along with Yorkshire & the Humber – where over 40% of respondents reported that they were concerned about immigration.

²² In addition to being insignificant in the regression for Britain as a whole, the concerned about immigration variable only exerts a significant influence on the probability of voting in the referendum in the South West and Wales when it is introduced as an explanatory factor. Its influence is stronger in Wales, with a *p*-value of 0.005 compared to 0.021 in the South West.

²³ This is in spite of a relatively small number of observations in some regions such as the North East (127 in total) and Wales (124 in total) after splitting the samples even further.

accounting for why an individual voted to leave. Welsh national identity appears to suppress this effect given the very small coefficient observed for those respondents identifying as Welsh or more British than Welsh, whereas the concerned about immigration variable is highly significant for individuals not identifying themselves in this way. An insignificant effect is also observed for the equivalent group of Scottish identifiers living in Scotland. In contrast, the estimate for English identifiers is significant at the 5% level or better in 5 out of the 9 English regions and in 7 of them for other identifiers. Whilst national identity appears to have had virtually no influence on the impact of attitudes towards immigration on voting leave in London.

Table 8 reports some regional variations between English and non-English born respondents by firstly presenting the proportion of V and L for these two groups and then using (5) to obtain regression estimates for the 10 other regions relative to Wales. The raw differentials indicate that the English born living in the East of England and South East were significantly more likely to have voted in the referendum than those living in Wales. This continued to be the case for both regions after controlling for the variables in X^* and A^* and is also true for the East Midlands at the 5% level. Whilst a significant difference at the 10% level was observed in 4 other regions, implying that the English born living in Wales had a relatively low turnout rate, especially after controlling for other factors. The non-English born living in Wales were significantly more likely to have voted in the referendum than individuals from the same group living in all regions of England apart from the North East and Yorkshire & the Humber based on the raw data. However, all of these effects became insignificant at the 5% level once other explanatory factors have been included. This suggests that the outcome is more a function of the socio-economic attributes and attitudes of this group rather than whether they were born in England.

With regards to the leave vote, Table 8 reveals few significant regional differences for the English born relative to the living in Wales reference category, with no significant differences at the 5% level amongst the reported regression estimates. The exception is a highly significant effect that is observed for the English born living in Scotland, with only 24% of this group within the sample voting to leave the EU. The non-English born living in London, the South East and Scotland were also significantly more likely to have voted leave than the comparable group living in Wales. However, these effects were only significant at the 10% level after other factors have been controlled for.

Table 9 reports estimates of X^* and A^* for V separately for the English and non-English born using (5), whilst Table 10 contains the equivalent information for L . The main findings from these tables relate to the relative importance that the educational qualifications, concerned about immigration (and crime and education to a lesser extent) and national identity variables have on the probability of voting leave for the English born in comparison to the non-English born. Age has a relatively larger impact on explaining the leave vote for the non-English born, especially given the propensity to vote leave in the 65 and over age group when compared to younger respondents.

6. Policy Discussion

Forecasts before the referendum suggested that Brexit was likely to involve dramatic adjustment costs for the UK and that the economy would be smaller than it would have been had it remained in the EU. Forecasts were complicated by uncertainty over possible trading arrangements after exiting the EU. The Treasury examined three possible alternative scenarios

(ranging from membership of the European Economic Area to following WTO rules) in their estimates of the likely falls in the level of GDP predicted in 2030 with Brexit compared to remaining in the EU. However regional forecasts were not provided and subsequent research on the regional impact of Brexit is still uncertain, again complicated by the fact that trading arrangements still are currently unknown - although the likely outcome appears to be moving towards a harder Brexit where forecasts have predicted larger falls in GDP.

After the referendum, studies have begun to consider the likely regional/sub-national impacts of Brexit within the UK and contrast these with voting patterns. Los *et al.* (2017) argue that economic geography dominated voting patterns in the EU Referendum, the result of which is likely to be large geographical differences in the economic consequences of Brexit. Using input-output tables, they show that the regions that voted to leave will be most affected since these regions are the most reliant on the EU market for their local economic activities. In particular, they report a clear positive correlation between the share of regional GDP that comes from consumption and investment demand in other parts of the EU and the proportion of leave voters. McCrombie and Spreafico (2018) estimate the impact of Brexit using a regional balance of payments constrained growth model and their results indicate that regional economic disparities will widen after Brexit. Dhingra *et al.* (2017) also focus on the impact of possible post-Brexit trade patterns but find that the areas in which the *remain vote was higher* would be the hardest hit, with the effect being stronger under a hard compared to a soft Brexit scenario.²⁴ They suggest that differences compared to Los *et al.* (2017) arise due to that study not modelling the effects of non-tariff barriers which they argue could be particularly costly under a hard Brexit scenario. Dhingra *et al.* (2017) also predict a North-South divide, with nine of the top ten worst affected local authorities being located in the South since these areas 'have high employment shares in Business Activities or Financial Intermediation (or both)'. Clayton and Overman (2017) predict that all local authority areas will be negatively affected but cities are likely to be hit harder than non-urban areas, even though they may recover quicker. Analysing the economic costs of Brexit in terms of movements in GDP since the Referendum, rather than making forecasts, Fetzner and Wang (2020) find that vote leave areas 'experienced significantly lower levels of economic growth relative to their respective synthetic control units', confirming many of the above predictions.

However, speculation about the ultimate impacts of Brexit in the short to medium term have been complicated by the Covid-19 pandemic and its arrival in the UK at the start of 2020. As a result, disentangling these two structural effects is likely to be problematic since some regions may be affected more than others by the Covid-19 crisis. There currently exists a large amount of uncertainty surrounding whether businesses in particular regions can show resilience in the face of this external shock and how they will respond to it (without excessive government assistance). Although the relative longer-term impact on regional economies is unclear at the present time there are some early indications that certain peripheral regions, such as the North West, North East and Yorkshire & the Humber, as well as the West Midlands - which had the highest proportion of leave voters, may be the most vulnerable in the short to medium term. For example, the Norman and Petrie (2020) identify a number of cities in these regions that are predicted to be in the top 10 most impacted areas with the highest pre-crisis levels of unemployment. This is to some extent due to the structure of regional and local economies, and reflected in lowest rates of homeworking in peripheral and leave voting regions. Areas with more highly skilled workers and highly based IT economies, particularly in the Greater

²⁴ The correlation coefficients between the estimated percentage reduction in GVA and percentage voting to remain were -0.39 and -0.24 for hard and soft Brexits respectively.

South East, have initially been able to adopt more effectively to home working whereas in the more peripheral regions this has been less so. Blundell *et al.* (2020) have shown how Covid-19 has hit the most vulnerable hardest and so will impact more on relatively deprived areas. Bell *et al.* (2020) find that the lowest paid have been three times more likely to have been furloughed or lost their jobs when compared to high earners.

The economic impact of Covid-19 is likely to work through a number of transmission channels through which the economy is negatively impacted, Carlsson-Szlezak *et al.* (2020) outline three. The direct impact reduces consumption through social distancing which can also reduce consumer confidence and therefore reduces discretionary spending. The indirect transition works through the financial markets where a fall in household wealth leads to consumption falling further. The third works through supply-side disruptions leading to lay-offs and increasing unemployment. These mechanisms will have different regional implications as well as time period implications partly related to the success of exit strategies. Davenport *et al.* (2020) emphasise the importance of timescales when assessing potential damage to the economy. In the short to medium term the financial consequences of job losses and firm closures may be initially mitigated by government policies. In the medium and longer term the economy will be damaged by lost education, with again potentially different regional implications. Research has shown that children from poorer and disadvantaged backgrounds have been more affected by school closures having fewer resources to support online learning (Green, 2020). The longer run implication for closing regional inequalities are enormous given the role of skills in successful regional development. The importance of putting in place policies to replace lost education and to avoid labour market scarring is therefore of particular relevance.

De Lyon and Dhingra (2020) find that the sectors that have been least affected by the lockdown are those that are most likely to be damaged by leaving the EU. The pandemic has coincided with Brexit and so all sectors of the economy are likely to be severely hit leading to the perfect storm and a rising budget deficit so arguments may be made to limit the response of the governments to mitigate the crisis. The possibility of increased tariff barriers and regulation following Brexit was already leading companies to reconsider long term investment decisions in the UK. The additional depressing economic effects of the pandemic and the need for companies to adjust and rationalise, especially in the case of a hard Brexit, could speed up the progress of restructuring with consequences for unemployment. The plans to level up the economy could also be tested since high rates of unemployment may lead the Government to focus policies more on economic impact rather than need which could be detrimental to peripheral regions. For example, finance set aside for the Shared Prosperity Fund may be directed to other policies as the deficit widens.

In the short run, the fear for many of the less prosperous regions of the UK is that their economies don't have the capacity to deal with the large number of redundancies all at one time - as evidenced by the speed of recovery from earlier recessions. Large scale job losses in particular have been less easily absorbed in these areas in the past. This is because many local labour markets do not benefit from agglomeration economies and a diversified industrial base and have less skilled workforces and a relative scarcity of dynamic growing industries. The inability of these areas to adequately adjust to structure change in the past has played a major role in limiting the growth of output. Unemployment arising from Brexit and structural change and the pandemic by interlocking with social factors may create vicious circles of decline if not checked. Redundancy and resulting unemployment lead not only to a loss of a job and income but also to a breakdown of social relationships, generating poorer health outcomes

including reducing wellbeing. This can lead to the reproduction of unemployment and thereby providing more complex challenges for policies to reverse the initial rise.

In response to the pandemic and to save lives, the UK Government through social distancing policies has deliberately induced an economic slowdown to ‘flatten the curve and save lives’. To support the economy during the downturn it has introduced a raft of policies to support worker and firms not seen in peace time and probably leading to a debt to the highest GDP ratio since the end of World War II. Whilst it has been argued that entering lockdown from a policy perspective was relatively easy, exiting lockdown will be much more problematic and to do so most effectively and efficiently will require a targeted approach, where the consequences for lives and livelihoods are considerable. When examining the policy responses to the 1930s recession, Mitchener and Mason (2010) state one of the most important lessons to be learnt was not to end policies supporting the economy too early.

In addition, the Covid-19 crisis has led to politicians, businesses, academics and organisations at various levels - local, national and global - to call for major changes to the way that the economy should function, especially with regards to the environment and creating sustainable economies. This is also related to an increased focus on environmental considerations more generally to combat climate change (Hepburn *et al.*, 2020). These policy objectives alongside those necessitated by Brexit may prove to be incompatible in some dimensions, such as international trade, but changes to regional industrial policies along the lines of place-based initiatives appear to offer the best opportunities for levelling up (Bailey *et al.*, 2019). Existing evidence from Billing *et al.* (2019) suggests that ‘Brexit response activities’ have so far been *ad hoc* at the regional or often local levels and as a consequence offer no unified policy development. Indeed, Billing *et al.* (2019) point to a disconnect between local activity and any form of central government policy response. They argue that all too often, place-based policies have fallen short of expectations because they “are targeted gestures relying upon trickle-down effects to work their way through the economy and reach intended beneficiaries” (p. 321) and therefore rarely benefit the areas most in need. Moreover, these policies seem to focus on addressing the deficits within areas rather than working with the resources embedded within them. Thus, successful, genuinely place-based policies have remained elusive in the UK.

Finally, something that is likely to connect these two events is a tendency to move away from globalisation. In response to the Brexit vote the government aims to restrict immigration just as people seem to be displaying more positive views towards it. This has been highlighted by Ipsos MORI polling in the period following the EU Referendum.²⁵ This trend is also likely to have been enhanced by the role that key workers, such as in health and social care, have played in the current crisis. However, many of the migrant workers with jobs in sectors such as social care will be unlikely to be able to get visas in the future following the passing of the Immigration Bill in May 2020 since they would need to have annual earnings of at least £25,600 to work in the UK.²⁶ Moreover, the focus of immigration policy in future seems to be on attracting the brightest and best workers from abroad. This will have the effect of restricting the amount of migrant workers employed in routine and semi-routine occupations, although there is a view in some sections of the UK government that such jobs can be filled by currently inactive members of the native-born working age population.

²⁵ See : <https://www.ipsos.com/ipsos-mori/en-uk/britons-are-more-positive-negative-about-immigrations-impact-britain>.

²⁶ There was however a government U-turn on the Immigration Bill with regards to key workers in health and social care (from outside the EU) having to pay fees to access the National Health Service.

7. Conclusions

The aim of this paper has been to identify the key factors in explaining the EU Referendum vote at the regional level and the potential consequences of the decision to leave on the regions themselves. Based on our holistic analysis, it is clear that concerns about immigration was a fundamental factor in determining the decision to leave since it typically emerges as the main influence and is significant at the 5% level or better in all regions apart from London and the East of England. Moreover, in the latter region the variable is only significantly from zero at the 10% level and had the second highest percentage of respondents reporting concerns about immigration. Moreover, such concerns were either the only or one of few significant variables in some of the regions. National identity and education are also significant determinants of the leave vote in several regions but age in itself is typically not a significant factor once other influences have been controlled for. In contrast, age and education are the most notable factors in explaining differences in voting turnout in the majority of the regions.

Given the geographical differences in voting patterns then plans to level up the UK economy is likely to remain an important feature of the current government's economic policy. Moreover, the commitment to leave the EU by the end of 2020, without any extension to the transitional period, has recently been re-affirmed.²⁷ However, given the economic difficulties and uncertainties that the UK is likely to face following the current COVID-19 crisis then this will almost certainly have quite a considerable impact on the government's ability to achieve such an objective. As a result, then rather than a 'levelling up' process occurring then it may be more the case of 'levelling down', where London's relative advantage that has been based to a large extent on attracting highly skilled workers - who have increasingly arrived from overseas - over the other regions is eroded as it becomes less attractive compared to other cities and areas (The Economist, 2020). This particularly relates to the relatively high costs of living in London and surrounding areas, especially in terms of housing.

²⁷ See for example <https://www.bbc.co.uk/news/business-51851150>.

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Table 1**Electoral Statistics for the 2016 EU Referendum by Region of the UK**

	Electorate	% Voting	Voters	% Leave
North East	1,934,341	69.3	1,340,698	58.0
North West	5,241,568	70.0	3,665,945	53.7
Yorkshire and The Humber	3,877,780	70.7	2,739,235	57.7
East Midlands	3,384,299	74.2	2,508,515	58.8
West Midlands	4,116,572	72.0	2,962,862	59.3
East of England	4,398,796	75.7	3,328,983	56.5
London	5,424,768	69.7	3,776,751	40.1
South East	6,465,404	76.8	4,959,683	51.8
South West	4,138,134	76.7	3,172,730	52.6
Wales	2,270,272	71.7	1,626,919	52.5
Scotland	3,987,112	67.2	2,679,513	38.0
Northern Ireland	1,260,955	62.7	790,149	44.2
United Kingdom	46,500,001	72.2	33,551,983	51.9

Source: Electoral Commission.

Table 2

Percentage Voting and Voting Leave in the EU Referendum in Regions of Great Britain

	Official Statistics			Unweighted <i>BSAS</i>			Weighted <i>BSAS</i>		
	% Electorate	% Voted	% Leave	% Sample	% Voted	% Leave	% Sample	% Voted	% Leave
North East	4.3	69.3	58.0	5.8	77.5	59.4	4.3	76.5	58.4
North West	11.6	70.0	53.7	13.0	77.5	49.5	11.4	74.9	47.7
Yorkshire & The Humber	8.6	70.7	57.7	8.3	79.3	58.1	8.5	78.9	54.9
East Midlands	7.5	74.2	58.8	7.1	79.0	58.3	7.4	76.6	58.2
West Midlands	9.1	72.0	59.3	8.0	78.4	65.6**	9.0	75.3	65.6
East of England	9.7	75.7	56.5	10.4	83.4	55.2	9.6	80.1	54.2
London	12.0	69.7	40.1	9.0	71.8	27.9***	13.2	70.9	29.1
South East	14.3	76.8	51.8	13.7	82.6	48.0	14.2	81.8	43.3
South West	9.1	76.7	52.6	10.6	80.3	51.9	8.8	78.3	50.5
Wales	5.0	71.7	52.5	5.6	77.8	52.4	4.9	77.7	50.7
Scotland	8.8	67.2	38.0	8.5	82.3	35.2***	8.7	81.6	31.0
Great Britain	100.0	72.5	52.1	100.0	79.3	50.5	100.0	77.4	47.8

Sources: Electoral Commission and 2016 *British Social Attitudes Survey*.

Notes: *** and ** indicate significance at the 1% and 5% levels respectively for differences between the means of V and L (relative to Wales) using two-tailed tests. Significance levels have only been reported for the unweighted sample of *BSAS* data.

Table 3

Estimates of the Regional Effects on the Probability of Voting in the EU Referendum

	(1)		(2)		(3)	
	Coef.	<i>p</i> -value	Coef.	<i>p</i> -value	Coef.	<i>p</i> -value
North East	0.022	0.624	0.021	0.647	0.018	0.685
North West	0.033	0.392	0.032	0.413	0.038	0.323
Yorkshire and The Humber	0.009	0.831	0.013	0.752	0.019	0.643
East Midlands	0.027	0.516	0.028	0.504	0.034	0.401
West Midlands	0.027	0.502	0.023	0.566	0.031	0.438
East of England	0.058	0.127	0.053	0.162	0.069	0.070
London	0.038	0.379	0.039	0.367	0.051	0.229
South East	0.055	0.135	0.056	0.130	0.062	0.091
South West	0.018	0.646	0.017	0.654	0.031	0.420
Scotland	0.060	0.133	0.066	0.103	0.072	0.071
R-Squared	0.206		0.218		0.198	
N	2845		2841		2846	

Note: *p*-values calculated using robust standard errors.

Table 4**Estimates of the Regional Effects on the Probability of Voting Leave**

	(1)		(2)		(3)	
	Coef.	<i>p</i> -value	Coef.	<i>p</i> -value	Coef.	<i>p</i> -value
North East	0.055	0.381	0.066	0.277	0.047	0.443
North West	-0.017	0.753	-0.015	0.774	-0.042	0.428
Yorkshire & The Humber	0.090	0.115	0.044	0.423	0.025	0.645
East Midlands	0.062	0.306	0.042	0.464	0.030	0.596
West Midlands	0.114	0.047	0.112	0.047	0.097	0.084
East of England	0.041	0.450	0.018	0.731	-0.004	0.940
London	-0.104	0.072	-0.061	0.283	-0.106	0.056
South East	0.027	0.611	0.041	0.430	0.010	0.843
South West	0.030	0.577	0.021	0.695	0.008	0.885
Scotland	-0.156	0.006	-0.135	0.017	-0.155	0.006
R-Squared	0.179		0.262		0.239	
N	2217		2216		2241	

Note: *p*-values calculated using robust standard errors.

Table 5

Estimated Coefficients for the Probability of Voting in the EU Referendum in Regions of Britain

	North	NW	Y&H	EM	WM	East	London	SE	SW	Wales	Scotl.
Age 30-44	-0.085	0.166***	0.004	0.153	-0.004	0.172	0.165*	0.054	-0.032	0.023	-0.083
Age 45-64	0.153*	0.257***	0.161*	0.361***	0.114	0.311***	0.302***	0.249***	0.155*	0.177	0.053
Age 65+	0.219	0.348***	0.251***	0.357***	0.280***	0.381***	0.348***	0.250***	0.159*	0.260**	0.077
Married	0.029	0.086**	0.097*	0.059	0.042	0.017	-0.010	0.010	0.014	0.049	-0.016
No long term health problem	-0.011	0.030	0.017	0.109**	0.105*	0.052	0.014	0.080*	-0.010	0.068	0.014
Born in the UK	-0.124	0.284***	0.003	0.401***	0.164	0.248**	0.132***	0.228***	0.266***	-0.081	0.397**
Lives in a rural area	0.035	0.195**	-0.053	0.001	0.030	-0.010	—	0.045	0.035	-0.010	0.103**
Other Higher Education/A Levels	0.111	-0.120**	-0.166**	-0.006	-0.067	-0.011	-0.025	-0.055	-0.068	-0.130	-0.037
Other qualifications	-0.065	-0.172***	-0.172***	-0.056	-0.092	-0.079	-0.080	-0.129***	-0.146**	-0.003	-0.053
No qualifications	-0.210	-0.231***	-0.258***	-0.157*	-0.256***	-0.195***	-0.144***	-0.209***	-0.268***	-0.235**	-0.093
Struggling or really struggling on present income	-0.014	-0.042	-0.104	0.028	0.051	-0.010	-0.202***	-0.138**	-0.136	-0.065	-0.246**
Other Concerns or Worries	0.236**	0.123	0.223***	0.111	0.089	0.142**	0.275***	0.000	-0.025	0.157	0.164
Concerned about mental health	-0.004	-0.024	-0.057	-0.122	-0.155*	-0.021	-0.038	-0.057	0.023	-0.104	0.011
More Eng./Scot./Wel. than British	-0.154	0.041	-0.178*	0.062	-0.059	-0.031	-0.152	-0.038	-0.021	0.118	-0.141*
Equally Eng./Scot./Wel. and British	-0.098	0.083	-0.118*	-0.036	-0.080	-0.070	-0.134	-0.035	-0.036	-0.088	0.070
More British than Eng./Scot./Wel.	-0.066	0.015	-0.037	0.064	0.160	-0.058	-0.077	-0.045	0.012	-0.052	-0.058
British	-0.169	0.117	-0.050	0.154**	0.091	-0.026	-0.006	-0.028	0.079	0.080	0.027
Other Identity or None of these	-0.397*	0.053	-0.493***	-0.094	-0.481***	-0.310***	-0.206***	-0.222***	-0.123	-0.272	0.033
R-Squared	0.181	0.191	0.192	0.295	0.330	0.248	0.222	0.262	0.232	0.158	0.193
N	166	371	234	202	227	298	258	387	303	157	246

Notes: ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively using robust standard errors. The model that has been estimated for London does not include a rural dummy because there are no respondents in this category.

Table 6

Estimated Coefficients for the Probability of Voting Leave in Regions of Britain

	North	NW	Y&H	EM	WM	East	London	SE	SW	Wales	Scotl.
Age 30-44	0.098	0.071	0.255**	0.093	-0.186	0.015	0.039	0.104	0.126	-0.012	-0.017
Age 45-64	-0.028	0.112	0.109	0.122	0.005	0.127	-0.102	0.132	0.135	0.259	0.054
Age 65+	-0.091	0.094	0.177	0.133	-0.008	0.147	0.070	0.281***	0.087	0.234	-0.022
No long term health problem	-0.074	-0.049	-0.194***	0.033	-0.007	-0.013	-0.024	-0.041	-0.146**	0.031	-0.108
Other Higher Education/A Levels	0.312**	0.248***	0.243**	0.076	0.088	0.259***	0.073	0.142**	0.280***	-0.002	0.240***
Other qualifications	0.313**	0.253***	0.271***	0.074	0.150***	0.419***	0.219**	0.199**	0.323***	0.171	0.291***
No qualifications	0.295**	0.419***	0.267**	0.177	0.285	0.482***	0.217	0.148	0.406***	-0.169	0.312***
Struggling or really struggling on present income	0.151	0.007	-0.083	-0.016	0.100	0.072	0.106	0.007	0.074	0.196	0.149
Concerned about immigration	0.333***	0.284***	0.307***	0.435***	0.311***	0.113*	0.068	0.276***	0.206***	0.229**	0.230**
Concerned about crime	-0.229	0.034	0.110	-0.097	-0.024	0.125*	0.123	0.139**	0.044	-0.055	0.065
Concerned about education	-0.013	0.019	-0.175*	-0.193	0.167	-0.089	-0.020	-0.147***	-0.191***	-0.062	-0.069
Concerned about housing	0.189	0.063	0.031	0.020	0.041	-0.017	0.066	0.119*	0.044	-0.102	-0.027
More Eng./Scot./Wel. than British	-0.147	-0.072	0.083	0.041	0.106	-0.251**	-0.074	-0.121	-0.080	0.234*	0.136
Equally Eng./Scot./Wel. and British	-0.215**	0.015	-0.115	-0.132	0.144	-0.193**	-0.263**	-0.191***	-0.095	0.183	0.013
More British than Eng./Scot./Wel.	-0.397*	0.037	-0.114	-0.106	-0.027	-0.149	-0.498***	-0.414***	-0.242**	-0.100	0.091
British	-0.240*	-0.057	-0.253**	-0.160	-0.088	-0.288***	-0.293**	-0.326***	-0.200**	0.030	-0.015
Other Identity or None of these	-0.423**	-0.034	-0.019	-0.010	-0.238	-0.452***	-0.438***	-0.316***	-0.055	0.108	0.025
3+ flights in the last year	-0.283**	-0.072	0.002	-0.125	-0.098	0.093	0.004	-0.095*	-0.150	-0.224	0.024
R-Squared	0.316	0.223	0.379	0.298	0.267	0.318	0.281	0.324	0.274	0.188	0.174
N	127	289	185	156	180	246	175	323	241	124	195

Notes: ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively using robust standard errors.

Table 7

Estimates of Concerned About Immigration on the Probability of Voting Leave in Regions of Britain

		North	NW	Y&H	EM	WM	East	London	SE	SW	Wales	Scotl.	N (Total)
All	Coef.	0.333	0.284	0.307	0.435	0.310	0.113	0.068	0.276	0.206	0.229	0.230	2,241
	<i>p</i> -value	0.000	0.000	0.000	0.000	0.000	0.070	0.520	0.000	0.002	0.023	0.019	
Male	Coef.	0.168	0.315	0.326	0.562	0.317	0.229	-0.054	0.262	0.136	0.172	0.232	999
	<i>p</i> -value	0.349	0.000	0.008	0.000	0.005	0.032	0.728	0.002	0.235	0.283	0.088	
Female	Coef.	0.405	0.272	0.286	0.348	0.243	0.025	0.146	0.281	0.237	0.250	0.216	1,242
	<i>p</i> -value	0.001	0.006	0.006	0.000	0.018	0.759	0.329	0.000	0.010	0.136	0.202	
Aged Under 55	Coef.	0.623	0.334	0.186	0.394	0.260	0.053	0.228	0.143	0.194	0.263	0.316	1,088
	<i>p</i> -value	0.000	0.002	0.116	0.027	0.071	0.587	0.211	0.106	0.069	0.146	0.006	
Aged 55 and over	Coef.	0.316	0.226	0.403	0.575	0.325	0.160	-0.071	0.366	0.246	0.326	0.217	1,153
	<i>p</i> -value	0.006	0.011	0.000	0.000	0.000	0.080	0.595	0.000	0.007	0.007	0.143	
Below A Level	Coef.	0.228	0.210	0.251	0.538	0.125	0.101	-0.135	0.170	0.094	0.252	0.083	1,021
	<i>p</i> -value	0.081	0.019	0.014	0.000	0.130	0.292	0.415	0.080	0.337	0.107	0.552	
A Level and above	Coef.	0.614	0.321	0.464	0.437	0.594	0.137	0.250	0.359	0.282	0.308	0.518	1,220
	<i>p</i> -value	0.000	0.003	0.000	0.001	0.000	0.113	0.080	0.000	0.002	0.033	0.000	
Not Home Country National ID	Coef.	0.397	0.269	0.327	0.531	0.263	0.130	0.002	0.280	0.180	0.398	0.231	1,583
	<i>p</i> -value	0.000	0.001	0.000	0.000	0.001	0.098	0.988	0.000	0.032	0.002	0.061	
Home Country National ID	Coef.	0.161	0.316	0.242	0.350	0.514	0.095	0.039	0.262	0.273	0.004	0.236	658
	<i>p</i> -value	0.266	0.010	0.123	0.007	0.000	0.397	0.825	0.014	0.019	0.980	0.158	

Note: Age, qualifications and national identity dummies have been removed from the bottom three sets of regressions, respectively.

Table 8

Regional Estimates of Voting in the EU Referendum for the English and Non-English Born

	Voted in the EU Referendum						Voted Leave					
	English Born			Non-English Born			English Born			Non-English Born		
	Mean	Coef.	p-value	Mean	Coef.	p-value	Mean	Coef.	p-value	Mean	Coef.	p-value
North East	0.781	0.093	0.148	0.727	-0.007	0.955	0.605	0.000	0.998	0.375	-0.006	0.199
North West	0.794	0.110	0.068	0.640***	-0.034	0.674	0.504	-0.092	0.246	0.419	-0.018	0.105
Yorkshire & the Humber	0.802	0.102	0.098	0.647	-0.142	0.223	0.586	-0.015	0.854	0.455	-0.056	0.132
East Midlands	0.844	0.120	0.049	0.517***	-0.145	0.144	0.596	-0.019	0.822	0.467	0.032	0.142
West Midlands	0.816	0.113	0.062	0.539***	-0.160	0.075	0.663*	0.052	0.522	0.571	0.034	0.139
East of England	0.870**	0.155	0.009	0.595**	-0.115	0.181	0.571	-0.045	0.567	0.364	-0.091	0.121
London	0.815	0.102	0.109	0.596***	-0.079	0.240	0.290***	-0.147	0.072	0.246***	-0.122	0.095
South East	0.871**	0.147	0.013	0.667**	-0.090	0.169	0.513	-0.022	0.774	0.345***	-0.068	0.094
South West	0.843	0.116	0.052	0.604**	-0.117	0.123	0.547	-0.032	0.683	0.345	-0.073	0.111
Wales	0.759	—	—	0.798	—	—	0.523	—	—	0.519	—	—
Scotland	0.913	0.158	0.055	0.816	0.037	0.431	0.238**	-0.245	0.029	0.368**	-0.124	0.069
R-Squared	0.133			0.246			0.259			0.147		
N	2113			733			1738			502		

Notes: ***, ** and * indicate significance at the 1% and 5% levels respectively using two-tailed tests, with regards to the differences between the means of V and L , relative to Wales, which is the reference region in the regression models. p -values calculated using robust standard errors

Table 9

Estimates for the Probability of Voting in the Referendum for the English and Non-English Born

	English Born			Non-English Born		
	Mean	Coef.	p-value	Mean	Coef.	p-value
Age 30-44	0.217	0.051	0.148	0.306	0.094	0.077
Age 45-64	0.352	0.212	0.000	0.306	0.254	0.000
Age 65+	0.310	0.272	0.000	0.244	0.315	0.000
Married	0.640	0.038	0.023	0.693	0.019	0.589
No long term health problem	0.545	0.054	0.001	0.574	-0.039	0.239
Lives in a rural area	0.214	0.027	0.118	0.162	0.039	0.293
Other Higher Education/A Levels	0.285	-0.047	0.022	0.265	-0.040	0.337
Other qualifications	0.290	-0.100	0.000	0.255	-0.099	0.020
No qualifications	0.203	-0.210	0.000	0.201	-0.180	0.000
Struggling or really struggling on present income	0.141	-0.073	0.009	0.173	-0.145	0.003
Other Concerns or Worries	0.033	0.070	0.016	0.044	0.206	0.003
Concerned about mental health	0.155	-0.053	0.033	0.150	-0.023	0.625
More English/Scottish/Welsh than British	0.123	-0.058	0.045	0.131	-0.010	0.858
Equally English/Scottish/Welsh and British	0.487	-0.049	0.025	0.224	0.055	0.251
More British than English/Scottish/Welsh	0.083	-0.001	0.967	0.049	0.058	0.504
British	0.114	0.016	0.569	0.149	0.153	0.011
Other National Identity or None of these	0.033	-0.095	0.074	0.293	-0.201	0.001
N	2116			731		

Note: *p*-values calculated using robust standard errors.

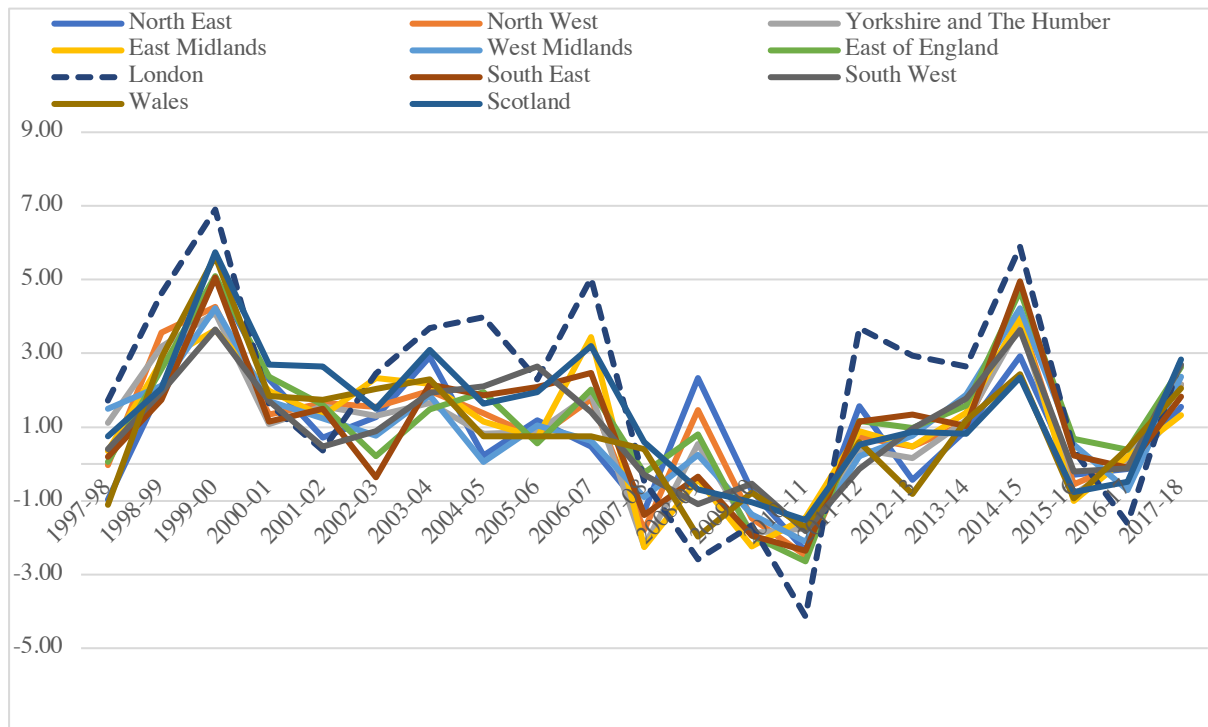
Table 10

Estimates of the Probability of Voting Leave for the English and Non-English Born

	English Born			Non-English Born		
	Mean	Coef.	p-value	Mean	Coef.	p-value
Age 30-44	0.197	0.039	0.337	0.243	0.075	0.339
Age 45-64	0.373	0.083	0.027	0.351	0.084	0.262
Age 65+	0.333	0.099	0.015	0.299	0.145	0.083
No long term health problem	0.657	-0.042	0.069	0.669	-0.094	0.066
Other Higher Education/A Levels	0.295	0.191	0.000	0.285	0.134	0.013
Other qualifications	0.283	0.253	0.000	0.247	0.199	0.001
No qualifications	0.181	0.314	0.000	0.179	0.125	0.090
Struggling or really struggling on present income	0.114	0.066	0.060	0.127	0.038	0.596
Concerned about immigration	0.373	0.258	0.000	0.251	0.193	0.000
Concerned about crime	0.235	0.055	0.033	0.215	0.034	0.541
Concerned about education	0.175	-0.074	0.008	0.175	-0.074	0.189
Concerned about housing	0.146	0.056	0.077	0.147	0.003	0.968
More English/Scottish/Welsh than British	0.120	-0.050	0.198	0.147	0.061	0.444
Equally English/Scottish/Welsh and British	0.471	-0.107	0.000	0.265	-0.010	0.891
More British than English/Scottish/Welsh	0.089	-0.207	0.000	0.058	-0.105	0.334
British	0.124	-0.183	0.000	0.183	-0.055	0.520
Other National Identity or None of these	0.028	-0.150	0.030	0.185	-0.068	0.422
3+ flights in the last year	0.179	-0.089	0.002	0.219	-0.045	0.388
N	1737			502		

Figure 1

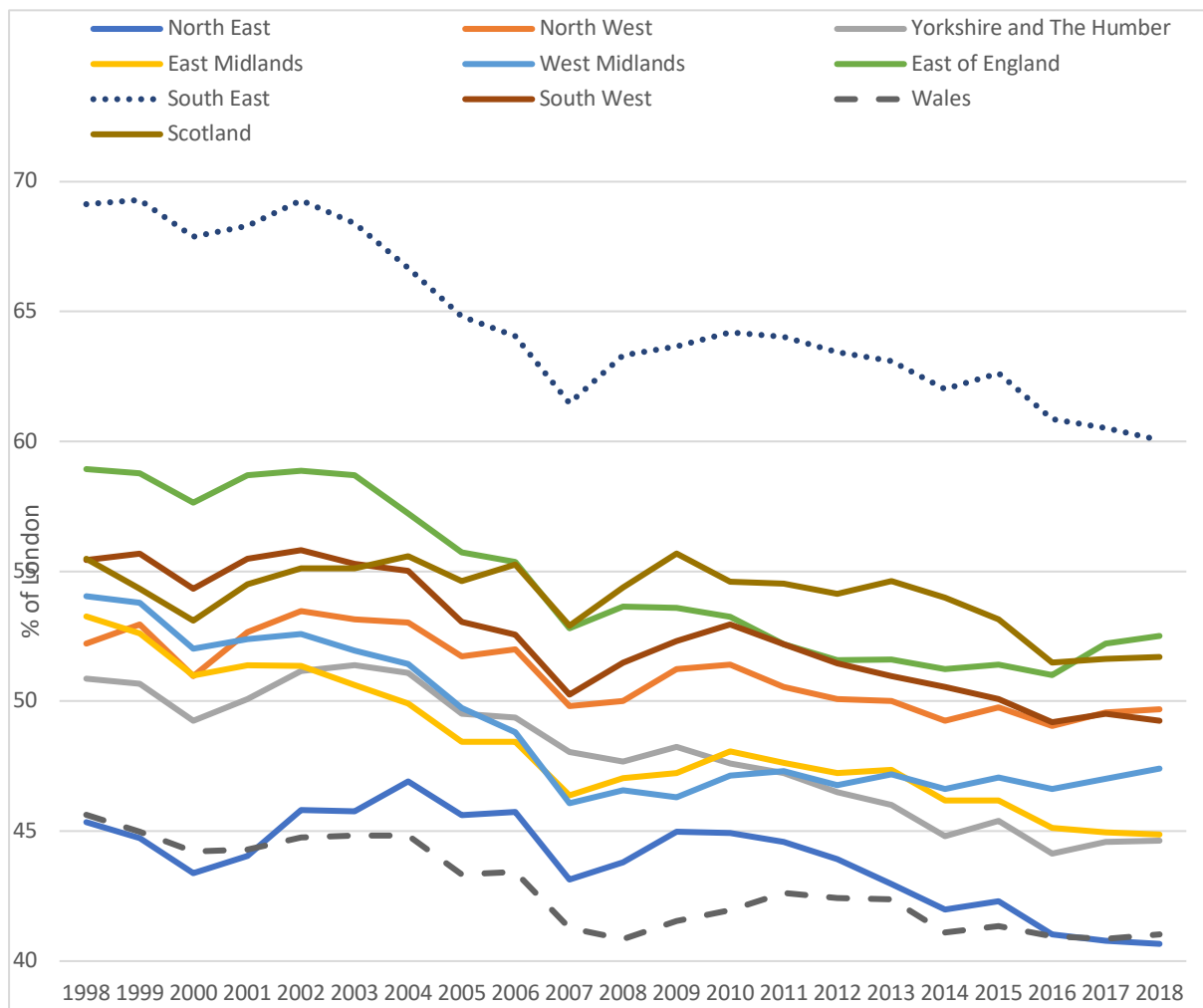
**Annual Percentage Change in Real Gross Domestic Household Income by Region:
1997/8-2017/8**



Source: Office for National Statistics (ONS)

Figure 2

Gross Value Added per capita in Regions of Britain Relative to London: 1998-2018



Source: ONS

Appendix

Dependent Variables

The questions in the 2016 *BSAS* that have been used to construct V and L are:

1. Did you manage to vote in the referendum about the European Union?

The responses to which are reported in Table A1.

Table A1

Responses to Question on Whether Voted in the EU Referendum

	Frequency	Percentage
Yes	2,302	78.3
No	600	20.4
Prefer not to say	21	0.7
Don't remember	6	0.2
Don't Know/Refusal	13	0.4
All Respondents	2,942	100.0

2. Did you vote to remain a member of the EU or to leave the EU?

The responses to the above question are shown in Table A2.

Table A2

Responses to Question on How Voted in the EU Referendum

	Frequency	Percentage
Item not applicable	640	21.8
Remain a member of the European Union	1,115	37.9
Leave the European Union	1,139	38.7
Prefer not to say	28	1.0
Don't remember	6	0.2
Don't Know/Refusal	14	0.5
All Respondents	2,942	100.0

Explanatory Variables

Socio-Demographic and Economic Variables (X)

The following socio-demographic variables have been included in (1) and (2):

Gender (dummy), Age (4 categories), Married (dummy), Children in Household (dummy), Country of Birth (UK born dummy), UK citizenship group (high/low dummy), Health problem

(3 categories), Religion (5 categories), Rural (dummy), Education (4 categories), Economic Activity (7 categories) and Feelings Regarding Current Household Income (5 categories).

See Table A8 for the means of each group voting in the EU Referendum, the percentage voting leave and the reference group used in the regression analysis.

Additional Explanatory Variables (A)

National Identity

A single categorical variable has been constructed using the national identity questions that were asked in England, Scotland and Wales. The questions asked in the three countries were:

“Some people think of themselves first as British. Others may think of themselves first as English/Scottish/Welsh. Which best describes how you see yourself?”

- (i) English/Scottish/Welsh not British
- (ii) English/Scottish/Welsh more than British
- (iii) Equally English/Scottish/Welsh and British
- (iv) British more than English/Scottish/Welsh
- (v) British not English/Scottish/Welsh
- (vi) Other description
- (vii) None of these

An English identity is used in the nine English regions but is replaced by Scottish when the question is asked in Scotland and by Welsh when asked in Wales.

Given that a relatively small number of respondents (43) reported the none of these option, this was then combined with the Other description category.

Causes of Concern or Worry

A series of dummy variables have been created from the below question that asked respondents to identify which issues were currently of most concern to them:

“I’m now going to ask you some questions about current concerns or worries. Here is a list of things that some people may be concerned or worried about. Which, if any, of these would you say you are concerned or worried about at the moment?”

- (i) Your physical health
- (ii) Your mental health
- (iii) Housing or your home
- (iv) Work or finding a job
- (v) Money or debt
- (vi) Your family or partner
- (vii) Your friend(s)
- (viii) Caring for your family, or another person
- (ix) Education (for yourself or your family)
- (x) Immigration
- (xi) Crime in your local area

(xii) Something else (WRITE IN)

From the responses provided to the question given the options presented, an additional dummy variable for “No concerns or worries” was also created.

A follow up question was then asked to respondents (consisting of around 70% of the sample) on which issue they were most concerned or worried about. Information derived from answers to this question has not been included in the regression analysis mainly because of the impact that it would have on the useable sample size. However, in terms of the responses, the most important issues according to respondents were ‘Your Physical Health’ (16.7%), ‘Money or debt’ (14.5%) and ‘Immigration’ (12.7%), where the numbers in parentheses relate to the weighted percentage of respondents stating that they were most concerned about a particular issue.

Air Travel

A categorical variable was created from the responses to the following question: **“How many trips did you make by plane during the last 12 months? Please count the outward and return flight and any transfers as one trip”**.

This variable consists of the following categories:

- i) No flights
- ii) 1 flight
- iii) 2 flights
- iv) 3+ flights

Table A3**Responses to Questions on Whether and How Voted in the EU Referendum by Nationality**

	Whether Voted		How Voted		Indicating concern about immigration
	% Voting	N	% Voting Leave	N	
British	83.5	1,282	46.0	1,053	30.8
English	80.7	965	66.5	764	43.4
Scottish	86.3	197	38.0	163	21.4
Welsh	80.4	112	51.1	88	31.3
Irish (including Northern Irish)	85.4	41	38.2	34	19.5
European - Born in British Isles	93.2	59	0.0	54	10.2
European - Born Outside British Isles	20.9	43	22.2	9	25.0
Other - Born in British Isles	71.2	59	35.9	39	30.0
Other - Born Outside British Isles	36.1	144	22.0	50	18.7
Full Sample	79.3	2,902	50.5	2,254	33.0

Table A4**Age Distribution of Respondents in the Sample**

	Weighted %	Unweighted %	Difference
Aged 18-23	10.4	5.0	5.3
Aged 24-28	7.7	5.9	1.8
Aged 29-33	9.1	7.8	1.3
Aged 34-38	8.4	8.4	0.0
Aged 39-43	8.0	7.9	0.1
Aged 44-48	8.3	8.1	0.2
Aged 49-53	9.2	8.7	0.5
Aged 54-58	8.3	9.0	-0.7
Aged 59-63	7.5	8.9	-1.5
Aged 64-68	6.9	8.7	-1.7
Aged 69-73	6.7	8.0	-1.3
Aged 74-79	4.9	6.7	-1.8
Aged 80-89	4.4	6.4	-2.0
Aged 90 and over	0.4	0.7	-0.3
N	2934.9	2942	-7.1

Table A5

Comparison of Turnout Percentages for Socio-Demographic and Economic Variables

	Ipsos MORI	BSAS (Unweighted)	BSAS (Weighted)
Male	74	81	78
Female	71	78	77
Aged 18-24	64	64	66
Aged 25-34	68	62	63
Aged 35-44	71	71	70
Aged 45-54	73	82	82
Aged 55-64	78	89	88
Aged 65-74	80	90	90
Aged 75 and over	70	86	87
White	74	81	79
Ethnic Minority	57	63	61
Home Owner	79	90	89
Mortgage Holder	75	86	84
Social renter	61	63	61
Private renter	65	62	60
No qualifications	71	71	68
Other qualifications	71	80	78
Degree or higher	78	85	83
All	72	79	77

Notes:

The Ipsos MORI Poll was based on surveying 7,816 adults aged 18 and over in Great Britain, of whom 5,955 were classed as ‘voters’ - see below - and were interviewed by telephone during the campaign. All those who were ‘absolutely certain to vote’ or who said they had already voted, and said they were registered, were classified as voters. The proportions of remain voters, leave voters and non-voters were then weighted to the actual referendum results by region, according to Electoral Commission figures. The data were also weighted to the population profile of Great Britain.

Table A6: Comparison of the Percentage of Leave Voters by Socio-Demographic and Economic Variable

	Ipsos MORI	BSAS (Unweighted)	BSAS (Weighted)	Ashcroft	YouGov
Male	55	53	49	52	53
Female	49	49	46	52	51
Aged 18-24	25	30	28	27	29
Aged 25-34	40	39	37	38	—
Aged 35-44	45	38	37	48	—
Aged 45-54	56	48	47	56	—
Aged 55-64	61	55	55	57	—
Aged 65-75	66	63	63	—	—
Aged 75 and over	63	63	64	—	—
Aged 25-49	—	40	39	—	46
Aged 50-64	—	53	52	—	60
Aged 65 and over	—	63	63	60	64
No qualifications	70	71	72	—	—
Other qualifications	56	56	53	—	—
Degree or higher	32	24	22	43	32
GCSE or less	—	67	67	—	70
A Level	—	47	41	—	50
Higher Education (below degree)	—	54	53	—	52
Non-Graduate	—	60	57	—	59
White	54	52	49	53	—
Black	—	24	26	27	—
Asian	—	36	37	33	—
Ethnic Minority	31	34	34	—	—
Home owner	58	56	54	54	—
Mortgage holder	46	40	40	46	—
Social renter	63	67	65	66	—
Private renter	44	39	34	45	—
Full-time employed	47	42	42	—	—
Part-time employed	47	46	44	—	—
Unemployed	60	54	50	—	—
Not working - looking after home	64	52	50	—	—
Student	20	17	16	19	—
Retired	64	61	62	—	—
Other	61	71	69	—	—
Christian	—	55	52	58	—
All	52	51	48	52	52

Notes: See notes to previous table for details of the Ipsos MORI Poll. The Ashcroft poll surveyed 12,369 people on the day of the referendum after they had voted. Results from the YouGov Poll are based on interviews that took place with 5, 455 adults on June 23rd and 24th 2016.

Table A7**Cross-Tabulation of Feelings about Current Income and Household Income Band**

Feelings about present household income	Household Income Band (£'s per month)				N
	% Less than 1,200	% 1,201 - 2,200	% 2,201 - 3,700	% 3,701 or more	
Living really comfortably on present income	13.7	19.9	18.1	48.4	272
Living comfortably on present income	13.7	23.0	25.7	37.6	920
Neither comfortable nor struggling on present income	24.9	30.9	25.2	19.0	691
Struggling on present income	47.7	31.8	13.4	7.2	267
Really struggling on present income	52.5	29.5	13.1	4.9	61
N	491	582	503	635	2,211

Note: The question on household income was either not answered by or not applicable to more than 600 respondents, thereby reducing the usable sample.

Table A8

Means of Explanatory Variables and Mean Values of *V* and *L*

	Voted in Referendum		Voted Leave	
	Mean	% of N	Mean	% of N
Male*	0.807	0.439	0.528	0.446
Female	0.784	0.561	0.492	0.554
Age 18-29*	0.616	0.128	0.351	0.100
Age 30-44	0.688	0.240	0.382	0.208
Age 45-64	0.856	0.340	0.516	0.368
Age 65+	0.887	0.292	0.628	0.324
Married	0.823	0.552	0.507	0.573
Unmarried*	0.758	0.448	0.509	0.427
Children in Household	0.738	0.323	0.468	0.297
No Children in Household*	0.821	0.677	0.525	0.703
White*	0.809	0.916	0.520	0.934
Ethnic Minority	0.634	0.084	0.342	0.066
Born in the UK	0.830	0.889	0.523	0.931
Born outside the UK*	0.505	0.111	0.342	0.069
Low UK citizenship group*	0.329	0.065	0.220	0.027
High UK citizenship group	0.826	0.935	0.516	0.973
No health problem	0.654	0.800	0.461	0.660
Non-limiting health problem	0.152	0.870	0.553	0.166
Limiting health problem*	0.194	0.714	0.642	0.174
Church of England/Anglican	0.895	0.180	0.599	0.205
Catholic	0.705	0.088	0.446	0.079
Other Christian	0.815	0.177	0.537	0.181
Other Religion	0.684	0.047	0.315	0.041
No Religion*	0.776	0.508	0.485	0.495
Lives in a rural area	0.867	0.201	0.491	0.219
Lives in a non-rural area*	0.776	0.799	0.568	0.781
Degree*	0.845	0.236	0.237	0.250
Other Higher Ed./A Levels	0.825	0.280	0.500	0.293
Other qualifications	0.781	0.282	0.633	0.275
No qualifications	0.710	0.202	0.704	0.181
Employed	0.790	0.517	0.436	0.516
Unemployed	0.584	0.048	0.551	0.036
Student	0.775	0.025	0.167	0.024
Permanently Sick/Disabled	0.596	0.040	0.779	0.031
Retired	0.886	0.302	0.613	0.335
Looking after the home	0.669	0.068	0.523	0.058
Other Inactive	0.864	0.008	0.444	0.008

Living really comfortably on present income*	0.859	0.122	0.473	0.132
Living comfortably on present income	0.839	0.414	0.486	0.439
Neither comfortable nor struggling on present income	0.789	0.314	0.522	0.312
Struggling on present income	0.639	0.122	0.610	0.096
Really struggling on present income	0.603	0.027	0.522	0.021
Concerned about immigration	0.826	0.334	0.740	0.346
Concerned about crime	0.785	0.236	0.630	0.231
Concerned about education	0.786	0.177	0.423	0.175
Concerned about work	0.695	0.158	0.375	0.138
Concerned about caring	0.811	0.264	0.482	0.267
Concerns about family	0.815	0.241	0.490	0.249
Concerned about friends	0.851	0.073	0.434	0.078
Concerned about physical health	0.799	0.345	0.527	0.346
Concerned about mental health	0.794	0.154	0.516	0.139
Concerned about housing	0.710	0.165	0.515	0.146
Concerned about money or debt	0.736	0.280	0.475	0.256
Other concerns	0.913	0.036	0.362	0.041
No concerns mentioned	0.798	0.141	0.456	0.142
English/Scottish/Welsh not British*	0.841	0.160	0.676	0.168
More English/Scottish/Welsh than British	0.800	0.125	0.577	0.127
Equally English/Scottish/Welsh and British	0.808	0.419	0.514	0.425
More British than English/Scottish/Welsh	0.858	0.074	0.374	0.081
British	0.874	0.122	0.381	0.136
Other National Identity or None of these	0.514	0.100	0.329	0.063
No flights abroad in the last year*	0.768	0.480	0.601	0.464
1 flight in the last year	0.822	0.193	0.500	0.199
2 flights in the last year	0.799	0.148	0.420	0.150
3+ flights in the last year	0.830	0.178	0.356	0.187
N	2841		2216	

Note: * indicates the reference categories used in (1) and (2).

Table A9

Full Set of Estimates for the Probability of Voting in the EU Referendum

	(1)		(2)		(3)	
	Coef.	<i>p</i> -value	Coef.	<i>p</i> -value	Coef.	<i>p</i> -value
Female	-0.008	0.593	-0.007	0.651	—	—
Age 30-44	0.095	0.002	0.089	0.005	0.062	0.032
Age 45-64	0.230	0.000	0.220	0.000	0.208	0.000
Age 65+	0.265	0.000	0.260	0.000	0.264	0.000
Married	0.040	0.009	0.036	0.018	0.034	0.020
Children in Household	-0.026	0.151	-0.029	0.134	—	—
Ethnic Minority	0.001	0.977	-0.009	0.816	—	—
Born in the UK	0.105	0.013	0.102	0.015	0.081	0.035
Low UK citizenship group	-0.348	0.000	-0.307	0.000	—	—
No health problem	0.072	0.001	0.073	0.001	0.042	0.005
Non-limiting health problem	0.079	0.001	0.076	0.002	^	^
Church of England/Anglican	0.058	0.001	0.057	0.001	—	—
Catholic	-0.003	0.907	0.000	0.996	—	—
Other Christian	0.045	0.017	0.044	0.021	—	—
Other Religion	0.073	0.119	0.073	0.120	—	—
Lives in a rural area	0.027	0.093	0.025	0.123	0.032	0.041
Other Higher Ed./A Levels	-0.052	0.005	-0.052	0.006	-0.053	0.004
Other qualifications	-0.095	0.000	-0.091	0.000	-0.100	0.000
No qualifications	-0.187	0.000	-0.179	0.000	-0.200	0.000
Unemployed	-0.102	0.016	-0.085	0.048	—	—
Student	0.158	0.000	0.167	0.000	—	—
Permanently Sick/Disabled	-0.105	0.030	-0.082	0.089	—	—
Retired	-0.011	0.609	-0.015	0.478	—	—
Looking after the home	-0.030	0.399	-0.014	0.698	—	—
Other Inactive	0.084	0.193	0.108	0.099	—	—
Living comfortably on present income	-0.002	0.922	0.002	0.902	^	^
Neither comfortable nor struggling on present income	-0.008	0.713	-0.004	0.852	^	^
Struggling on present income	-0.073	0.017	-0.062	0.059	-0.087	0.000
Really struggling on present income	-0.047	0.403	-0.044	0.453		
Concerned about immigration	—	—	0.020	0.227	—	—
Concerned about crime	—	—	0.005	0.792	—	—
Concerned about education	—	—	0.019	0.319	—	—
Concerned about work	—	—	-0.021	0.366	—	—
Concerned about caring	—	—	0.005	0.727	—	—
Concerns about family	—	—	0.001	0.965	—	—
Concerned about friends	—	—	0.033	0.201	—	—
Concerned about physical health	—	—	0.028	0.095	—	—

Concerned about mental health	—	—	-0.048	0.035	-0.049	0.025
Concerned about housing	—	—	0.003	0.873	—	—
Concerned about money or debt			0.015	0.448		
Other concerns	—	—	0.100	0.001	0.099	0.000
No concerns mentioned	—	—	0.016	0.504	—	—
More English/Scottish/Welsh than British	—	—	-0.053	0.037	-0.049	0.057
Equally English/Scottish/Welsh and British	—	—	-0.039	0.051	-0.033	0.095
More British than English/Scottish/Welsh	—	—	-0.004	0.896	-0.002	0.947
British	—	—	0.027	0.279	0.037	0.137
Other National Identity or None of these	—	—	-0.088	0.018	-0.086	0.019
1 flight abroad in the last year	—	—	0.035	0.064	—	—
2 flights abroad in the last year	—	—	0.013	0.536	—	—
3+ flights abroad in the last year	—	—	0.024	0.234	—	—
N	2,845		2,841		2,846	

Notes:

Estimates for the regional dummy variables and values for R-Squared are reported in Table 3, whilst estimate for the constant is not reported in the table.

^ indicates that the variable becomes part of the default category in Model (3).

Table A10

Full Set of Estimates for the Probability of Voting Leave

	(1)		(2)		(3)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value
Female	-0.037	0.070	-0.031	0.121	—	—
Age 30-44	-0.019	0.653	-0.015	0.725	0.042	0.247
Age 45-64	0.045	0.239	0.034	0.373	0.082	0.014
Age 65+	0.093	0.076	0.063	0.213	0.105	0.004
Married	0.041	0.057	0.031	0.135	—	—
Children in Household	0.034	0.182	0.028	0.262	—	—
Ethnic Minority	-0.013	0.802	-0.009	0.864	—	—
Born in the UK	0.076	0.154	0.057	0.264	—	—
Low UK citizenship group	-0.053	0.469	-0.023	0.768	—	—
No long term health problem	-0.039	0.204	-0.051	0.094	-0.053	0.011
Non-limiting health problem	0.003	0.941	-0.006	0.860	^	^
Church of England/Anglican	0.022	0.425	-0.001	0.958	—	—
Catholic	-0.043	0.262	-0.049	0.190	—	—
Other Christian	0.023	0.416	0.025	0.347	—	—
Other Religion	-0.028	0.658	-0.042	0.491	—	—
Lives in a rural area	0.039	0.118	0.025	0.296	—	—
Other Higher Education/A Levels	0.234	0.000	0.169	0.000	0.177	0.000
Other qualifications	0.342	0.000	0.231	0.000	0.241	0.000
No qualifications	0.372	0.000	0.252	0.000	0.276	0.000
Unemployed	0.080	0.142	0.086	0.116	—	—
Student	-0.189	0.003	-0.129	0.037	—	—
Permanently Sick/Disabled	0.178	0.003	0.174	0.004	—	—
Retired	0.017	0.669	0.016	0.656	—	—
Looking after the home	0.031	0.506	0.059	0.191	—	—
Other Inactive	-0.012	0.912	0.013	0.901	—	—
Living comfortably on present income	-0.021	0.495	-0.024	0.415	^	^
Neither comfortable nor struggling on present income	0.031	0.350	0.023	0.498	^	^
Struggling on present income	0.096	0.033	0.089	0.056	0.058	0.068
Really struggling on present income	-0.043	0.561	-0.051	0.502	—	—
Concerned about immigration	—	—	0.258	0.000	0.248	0.000
Concerned about crime	—	—	0.067	0.004	0.051	0.029
Concerned about education	—	—	-0.062	0.018	-0.074	0.003
Concerned about work	—	—	-0.035	0.260	—	—
Concerned about caring	—	—	-0.025	0.265	—	—
Concerns about family	—	—	-0.012	0.619	—	—
Concerned about friends	—	—	-0.055	0.141	—	—
Concerned about physical health	—	—	-0.035	0.132	—	—

Concerned about mental health	—	—	0.000	0.992	—	—
Concerned about housing	—	—	0.060	0.042	0.047	0.098
Concerned about money or debt			-0.027	0.281		
Other concerns	—	—	-0.007	0.873	—	—
No concerns mentioned	—	—	0.051	0.133	—	—
More English/Scottish/Welsh than British	—	—	-0.016	0.649	-0.026	0.455
Equally English/Scottish/Welsh and British	—	—	-0.082	0.003	-0.089	0.001
More British than English/Scottish/Welsh	—	—	-0.178	0.000	-0.196	0.000
British	—	—	-0.148	0.000	-0.171	0.000
Other National Identity or None of these	—	—	-0.129	0.007	-0.158	0.000
1 flight abroad in the last year	—	—	-0.004	0.867	^	^
2 flights abroad in the last year	—	—	-0.037	0.204	^	^
3+ flights abroad in the last year	—	—	-0.086	0.002	-0.077	0.002
N	2,217		2,216		2,241	

Notes:

Estimates for the regional dummy variables and values for R-Squared are reported in Table 4 whilst the estimate for the constant is not reported in the table.

^ indicates that the variable becomes part of the default category in Model (3).

Table A11
Means of X* and A* by Region

	North	NW	Y&H	EM	WM	East	London	SE	SW	Wales	Scotl.
Age 18-29	0.148	0.136	0.131	0.101	0.116	0.099	0.178	0.116	0.112	0.109	0.147
Age 30-44	0.189	0.249	0.230	0.216	0.211	0.273	0.320	0.242	0.240	0.170	0.230
Age 45-64	0.349	0.315	0.328	0.317	0.306	0.352	0.323	0.401	0.329	0.370	0.349
Age 65+	0.314	0.299	0.311	0.365	0.366	0.276	0.178	0.242	0.319	0.352	0.274
Married	0.503	0.538	0.539	0.534	0.562	0.553	0.504	0.575	0.588	0.533	0.583
No long term health problem	0.651	0.574	0.600	0.654	0.670	0.648	0.751	0.688	0.711	0.630	0.615
Born in the UK	0.970	0.913	0.947	0.889	0.918	0.918	0.608	0.860	0.904	0.957	0.937
Lives in a rural area	0.163	0.101	0.151	0.341	0.217	0.257	0.000	0.243	0.248	0.438	0.175
Degree	0.130	0.182	0.250	0.213	0.167	0.193	0.440	0.298	0.231	0.238	0.215
Other Higher Education/A Levels	0.284	0.282	0.258	0.237	0.249	0.319	0.213	0.315	0.330	0.220	0.291
Other qualifications	0.278	0.313	0.279	0.280	0.266	0.322	0.213	0.253	0.288	0.287	0.307
No qualifications	0.308	0.224	0.213	0.271	0.318	0.166	0.134	0.135	0.151	0.256	0.187
Struggling or really struggling on present income	0.143	0.179	0.135	0.146	0.180	0.105	0.225	0.138	0.144	0.139	0.104
Concerned with mental health	0.101	0.160	0.171	0.159	0.150	0.145	0.174	0.145	0.160	0.121	0.206
Other concerns	0.024	0.055	0.016	0.024	0.030	0.046	0.048	0.030	0.048	0.018	0.040
English/Scottish/Welsh	0.136	0.135	0.147	0.245	0.146	0.197	0.094	0.110	0.147	0.182	0.282
More Eng./Scot./Wel. than British	0.083	0.113	0.122	0.106	0.112	0.095	0.086	0.115	0.125	0.182	0.246
Equally Eng./Scot./Wel. and British	0.562	0.515	0.518	0.404	0.451	0.457	0.252	0.421	0.342	0.273	0.329
More British than Eng./Scot./Wel.	0.077	0.077	0.061	0.082	0.064	0.086	0.090	0.093	0.089	0.067	0.024
British	0.112	0.079	0.102	0.087	0.163	0.092	0.218	0.135	0.150	0.200	0.048
Other Identity or None of these	0.030	0.082	0.049	0.077	0.064	0.072	0.259	0.125	0.147	0.097	0.071
Concerned with immigration	0.343	0.336	0.416	0.361	0.369	0.411	0.200	0.318	0.381	0.285	0.194
Concerned with crime	0.225	0.281	0.331	0.255	0.245	0.270	0.237	0.183	0.173	0.164	0.210
Concerned with education	0.148	0.150	0.192	0.135	0.180	0.188	0.193	0.198	0.218	0.115	0.183
Concerned with housing	0.107	0.160	0.143	0.120	0.167	0.164	0.285	0.190	0.157	0.103	0.155
3+ flights abroad in the last year	0.166	0.205	0.127	0.139	0.107	0.155	0.298	0.215	0.137	0.121	0.226

Note: Means for the final five variables have been taken from models using *L* as the dependent variable, whilst others relate to whole sample, when *V* is used.