Immobility and the Brexit vote

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Abstract

Popular explanations of the Brexit vote have centred on the division between cosmopolitan internationalists who voted Remain, and geographically rooted individuals who voted Leave. In this paper, we conduct the first empirical test of whether residential immobility – the concept underpinning this distinction – was an important variable in the Brexit vote. We find that locally rooted individuals – defined as those living in their county of birth – were 7 percent more likely to support Leave. However, the impact of immobility was filtered by local circumstances: immobility only mattered for respondents in areas experiencing relative economic decline or increases in migrant populations.

Keywords: Brexit; Globalisation; Mobility; Populism

Editorial acknowledgements

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1. Introduction

On 23rd June 2016, the UK electorate voted to leave the European Union. There have been many attempts to explain the Brexit vote, but popular accounts have centred on an apparent division between two economically and culturally distinct groups: locally-oriented, geographically-rooted individuals who voted to Leave, and mobile cosmopolitan internationalists who voted to Remain. This distinction echoes a larger academic debate about the tensions at the heart of populist politics (Inglehart and Norris, 2016); it is also linked to a long tradition of scholarship in sociology, including Merton's (1957) work on local leaders in small-town America, and Tönnies' (1940) classical distinction between *Gemeinschaft and Gesellschaft.* In the context of Brexit, David Goodhart (2016) offers a memorable expression of such ideas, labeling the localists as "Somewheres" and the cosmopolitans as "Anywheres".

The notion of mobility (or the lack thereof) lies at the heart of this distinction. Localist "Somewheres" are defined by being rooted in place, with strong attachments to the specifics of their local area and identities formed through local associations. By contrast, Anywheres are defined partly by their mobility. Such mobility, which typically occurs through attending a residential university and/or obtaining professional work some distance away from their place of birth, contributes to the development of what Goodhart (2016) describes as 'portable "achieved identities"' which are internationally- rather than locally-oriented. Beyond Brexit, mobility plays a similarly important, though largely implicit role in larger academic discussion of the connections between cosmopolitanism, localism, and the populist movements that have recently reshaped politics in the UK, US, and a considerable number of European countries.

The division between mobile and immobile relates to two other common explanations for recent populist votes, both of which suggest that it was partly a reaction to globalisation (e.g. Becker et al., 2017). One common argument is that populism is a response to economic decline. Processes of economic globalisation will have benefited certain cities and regions, with residents and new migrants to these cities benefiting, but other places missing out (McCann, 2016). According to this argument, relative economic decline of themselves or their communities may have led to a populist backlash in the form of the Brexit vote. Supporting this view, Antonucci et al. (2017) find that individuals who perceived themselves to be losers from global economic integration were more likely to vote to leave the EU. A second common argument is that populism is a backlash against immigration. As previously homogenous communities diversified, some residents responded by voting for anti-European parties and, eventually, Brexit (Carozzi, 2016; Becker & Fetzer, 2017). Both explanations – relative economic decline and migration – show populism as a response to globalisation by locally rooted residents who were in some sense 'left behind' by economic or demographic change.

Yet despite the importance placed on mobility in discussion of the Brexit vote, research has not considered how residential mobility – or rather, immobility – influenced the

vote. People migrate for many reasons, but it may have multiple effects on those who do: changing fixed mentalities, opening up new social networks and 'broadening the mind' (Oishi, 2010). In contrast, *immobility* may be both a cause and a consequence of certain norms, beliefs and ways of thinking. The experience of living in one place over time will also shape mentalities. These influences may be changing in the UK which, while more mobile than many other European countries (Bell et al., 2015), has seen long term declines in rates of inter-regional migration (McCann, 2016; Clarke, 2017).

This paper uses the Brexit vote as an opportunity to derive and test hypotheses regarding these connections. Most generally, we consider the role that residential immobility plays in explaining voters' choices in the 2016 EU Referendum. We argue that immobile voters are more likely to have built location-specific social and human capital, and consequently to hold a less pluralistic and more placebound identity. All else being equal, we therefore expect immobile individuals to be more likely to support Leave. However, recognising that there can be either negative or positive selection into immobility, the second hypothesis tested in this paper is that the effect of immobility on voting in the EU Referendum depends upon the extent to which one's local community has been buffeted by globalisation and/or experienced considerable immigration. We identify two ideal types of placebound individuals, each associated with particular patterns of voting behaviour – those that choose to remain fixed in place because things are going well in their locale, and those that feel trapped. Those who select positively into immobility ought to be less likely to support Leave than those who select negatively.

To test these ideas, we use early release data from Understanding Society, the primary longitudinal survey of UK households. In the most recent wave of the survey, individuals were asked the same question that was posed in the EU Referendum: "Should the United Kingdom remain a member of the European Union or leave the European Union?" We use these data to investigate whether, holding constant other factors, respondents living in the same county in which they were born were more likely to support Brexit than respondents who have moved away, as well as whether the effects of immobility on support for Brexit depend on local change in economic performance or inward migration. Controlling for demographic characteristics, educational attainment, psychological values and cognitive ability, we find that those who were living in their county of birth in 2016 are around 7 percent more likely to state that the United Kingdom should leave the European Union. However, we also find that the effect of immobility on Brexit support is modified by recent local change in terms of wage growth and increases in the non-white British population: immobility only matters in places where wages are growing slowly or recent growth in the non-white British population exceeds 2 percentage points.

This paper makes a number of contributions to the literature. Although there is a growing body of research into the determinants of voting patterns in the EU Referendum (for example Becker et al., 2017; Colantone and Stanig, 2016; Antonucci

et al, 2017), no study has yet explored the relationship between Brexit and residential immobility, nor the links between voting, mobility and local circumstances. To the best of our knowledge this avenue of study is also novel in within the larger literature on populist voting. And while academic research has long been preoccupied with the 'migrant', this is not the majority experience in developed countries: our data shows that around 55% of UK residents live in their county of birth. Our results indicate that immobility, and in particular the combination of immobility and certain types of local change created an important set of circumstances which help explain the EU Referendum outcome. By improving our understanding of the complex interplay between individual characteristics, structural conditions and electoral outcomes, we therefore contribute to addressing the relative neglect in the social sciences of those who are 'rooted in place'.

The paper is structured as follows. Section two presents the literature on populism, the cosmopolitan/localist distinction, argues that investigating mobility is a crucial part of this, and develops a set of hypotheses. Section three presents the data and presents descriptive statistics on our key variables. Next, we describe the econometric model we use to test our hypotheses, before presenting basic regression results. Section five extends these results to investigate how individual mobility and local change are related. Section six concludes.

2. Brexit, populism and immobility

The Brexit vote is often described as an expression of populist sentiment (e.g. Wolf, 2017). We can thus situate Brexit in relation to movements responsible for the electoral success of Donald Trump and the resurgence of far-right nationalist political parties in France, the Netherlands, Hungary and other European countries, as well as linking it to older populist manifestations. We can equally consider Brexit in light of more conceptual work on the subject of populism, a topic which has stimulated academic interest since the rise of the Populist Party in the US during the late 19th century.

And yet populism is a highly ambiguous umbrella. It is much a disputed term in academic circles, as well as a highly inclusive one that encompasses political and social movements inspired by both far-left and –right visions of society and governance; it is also a label that is almost never self-applied. Surveying these debates, Mudde and Kaltwasser (2012, p.8) identify a 'minimal' definition, under which society is conceptualised as being "ultimately separated into two homogenous and antagonistic groups, the 'pure people' and 'the corrupt elite', and which argues that politics should be an expression of the volonté générale (general will) of the people." This framing can be applied to movements with diverse political orientations. On the left it describes Hugo Chavez's assertion of a fundamental conflict pitting Venezuela's downtrodden against the austerity-imposing U.S. establishment and national elites. Meanwhile, during the Brexit debates and the 2017 French election, right-of-centre populists called for Britain and France to throw off the yoke of European regulation

and 'unaccountable Brussels bureaucrats' as keys to re-asserting 'lost' national greatness.

In a recent study, Inglehart and Norris (2016) argue that populism as expressed in Brexit and the election of Donald Trump occupies a space orthogonal to left and right distinctions, lying instead at one end of a continuum whose opposing pole is cosmopolitanism, which "refers to the idea that all humans increasingly live and interact within a single global community, not simply within a single polity" (p.7). This distinction harkens back to Merton's (1957) study of influential individuals in small-town America, conducted during the second world war. Merton's cosmopolitans distinguished themselves from 'locals' by the spatial extent of perceived community and social networks; by their weaker commitment to their present narrow geographical location. He also found that cosmopolitans relied on knowledge as a key to influence, while locals valued personal contact above all.

Merton's observations, and the larger distinction between cosmopolitanism and localism are germane in unpacking Brexit and other recent populist upswells. One way to understand recent populist movements is to view them as a rejection of a cultural and economic order that emerged after the end of Fordism, the oil crisis, and the collapse of the Bretton Woods international system, as well as out of the countercultural revolutions of the 1960s. This regime was marked by the widespread liberalization of rules governing trade and finance, the rise of dominant multinational firms, a twofold increase in the number of global migrants, as well as the introduction of new and highly disruptive technologies. These and other forces created a considerably less locally-bound world, in which the nation state lost the privileged position it held in the era of the Bretton Woods compromise in managing the economy, as well as its singular role in shaping defining identity and culture (Ong, 1999; Rodrik, 2017).

In cultural terms, populist movements assert their relevance as a response to a broken social compact between 'the people' and elites, as the latter have promulgated a vision of society marked by what Inglehart and Norris (2016, p. 3) call the "cultural escalator", whereby values have become increasingly re-centred around a vision of an immigrant-friendly multicultural society that embraces progressive movements aiming to expand environmental protection and promote various forms of human rights (women's; LGBTQ, etc). This suggests cleavages between generations, as well as regularities in terms of individuals' orientation towards political liberalism and immigration that were strongly articulated during the campaign for Brexit.

Economics represents a second key explanation for the rising demand for populist politics. In high wage countries, a confluence of factors generated strong distributional effects that have conferred relative rewards in terms of employment prospects and pay upon workers with higher levels of skill and education. Put simply, the gaps between winners and losers have grown too large. The economic forces expanding these gaps may include shifting comparative advantage in high-wage countries and

consequent Stolper-Samuelson-type distributive effects (Autor et al., 2014; Kemeny et al., 2015); skill-bias in the direction of technological change (Autor et al., 2003); an insufficient supply of educated workers (Goldin and Katz, 2009); slowing productivity growth (Gordon, 2012); low-skill immigration (c.f. Peri and Yasenov, 2016; Borjas, 2015; Nickell and Salaheen, 2015); the unequal effects and recovery from the Great Recession (Crescenzi et al, 2016); the public economics of austerity (Vasilopoulou et al, 2014); and, in certain countries at least, persistent unemployment (Blanchard and Summers, 1987). Populist movements have found fertile ground for arguments blaming globally-oriented cosmopolitan elites for their disregard for those in the national polity whose economic circumstances have been weakened by these trends.

Moreover, as a consequence of the highly spatially-uneven nature of many of these distributional effects, contemporary populism is also 'local' in a specific geographical sense. In many countries, it pits highly-mobile cosmopolitan elites operating in networks of large, high-wage urbanised areas against less-well-educated workers inhabiting smaller, peripheral places. This is not to say that all high-skill workers have sorted into large agglomerations while lower-skill workers are uniformly found in smaller places; nor is it an assertion that all larger cities have done well over this period. Rather, it describes clear patterns of sorting of high-skill workers to high-wage, high-cost, and consequently high-amenity cities since 1980 (Diamond, 2016), which, in the US at least, also tend to offer additional rewards in the form of increased intergenerational mobility (Chetty et al, 2014), suggesting a growing gap between a small number of thriving urban locations and the rest of the economy.

Put another way, a good number of peripheral economic locations continue to suffer what Gunnar Myrdal (1957) described as 'backwash' effects: being on the losing end of agglomeration economies, these places become progressively emptied of capital and skilled jobs. Individuals who remain are less likely to have the resources, ability or desire to move to locations offering greater opportunity. They are also more likely to be locally-oriented in terms of their investments in knowledge and social capital (Gordon, 2017). In short, in the 21st century, Merton's locals and cosmopolitans are increasing (though not exclusively) found in different places. This sorting links cultural and economic factors, as locals and cosmopolitans are increasingly cut off from one another, reinforcing existing tendencies and limiting opportunities for mutual understanding. This account finds considerable anecdotal support, not least in the fact that support for Brexit, Trump, Marine le Pen and others tends to be strongest in less-successful and/or smaller cities, and especially in non-urban areas.

The migration flows described above have important implications for economic geography, but should not be overstated. Compared to the United States, inter-regional migration flows in the UK are relatively small and declining (McCann, 2016; Clarke, 2017). They are also highly selective, with certain groups – particularly university graduates – being most likely to move, and are often associated with other factors such as risk-taking behaviour. In the UK, declining inter-regional migration has been the response to several trends including reduced employment rate differentials (Clarke, 2017). But

migration is a cultural act, which is only partly determined by economic considerations: family and friends form a sort of location-specific human capital (Green, 2017; Gordon, 2017).

In his popular book on the Brexit vote, David Goodhart's (2016) memorably, if controversially, captures these cleavages, distinguishing between 'Anywheres' and 'Somewheres'. Goodhart's 'Anywheres' are educated elites whose identities are not strictly tied to any particular local community, or even Britain, and this group is seen to have dominated politics and culture for decades. These elites are said to have overwhelmingly voted to remain in the European Union. Meanwhile, 'Somewheres' – with strongly place-bound identities and associations – voted to leave the European Union, responding to both their local experience of recent uneven economic development and immigration, as well as the perception that elites in London are out of touch with their values.

A growing number of scholarly studies are using data to understand the Brexit vote, and these tend to be framed by the broader debates around populism that we sketch above. The most rigorous use individual-level data to identify the relationship between voting patterns and individual demographic and psychographic features. Results thus far support the full range of populist narratives, though specific emphases differ. For instance, using pre-referendum British Election Survey (BES) data that recorded individuals' voting intention, Hobolt (2016) finds evidence consistent with both cultural and economic themes. Older, less-educated, and lower-income respondents were more likely to intend to vote for Brexit, as were those who expressed more concern about immigration and multiculturalism. Using the same dataset, Antonucci et al., (2017) find a nonlinear relationship between voting Leave and both education and income, with voters with moderate levels of income and education being more likely to vote for Brexit than those with very low or higher levels. Also using BES, Colantone and Stanig (2016) find a robust positive relationship between regional vulnerability to import competition and the intention to vote for Brexit, a finding that fits with recent evidence linking populism to trade exposure in the United States (Autor et al, 2016). One might go some way towards reconciling these two papers' findings with reference to work on job polarisation that confirms this 'hollowing out' effect in various economies (Goos et al. 2009).

A range of studies examine the role played by international migration in the EU referendum. Colantone and Stanig (2016) conclude that stocks and flows of immigrants in NUTS 3 regions are unrelated to voting intention, a finding that stands in direct contrast to that found by Goodwin and Milazzo (2017), who use more disaggregated parliamentary constituencies. Using the Essex Continuous Monitoring Survey, Clarke et al (2017) show that individual perceptions played an important role in shaping voting patterns. Specifically, individuals' perceptual tradeoffs between immigration and terrorism, and between the economy and global influence were important in shaping voting patterns, as were assessments of individual political leaders in the Leave and Remain campaigns. Using data from the European Social

Survey, Gordon (2017) also uncovers an important role for individual attitudes, in particular those towards immigrants, as well as one's educational and occupational background.

Empirical work on Brexit remains at an early stage, and many important questions remain unanswered. The focus of this paper is on one such unanswered question. To our knowledge, studies of Brexit and of populism more generally have not yet sought to understand how mobility – or the lack thereof – may play a role in shaping populist politics. This is true despite the fact that differences between mobile and immobile populations lie at the centre of theories of social division, linking both economic and cultural drivers of populism; these differences loom especially large in the formulation of the cosmopolitan-localist dichotomy. Indeed, cosmopolitans can only be cosmopolitan because they have reached beyond their local circumstances. In the internet age (and even before), a cosmopolitan identity might in principle be constructed through purely sedentary means, in practice there is every reason to think that, for many, actual residential mobility is involved, and that it strengthens this orientation.

It is easy to think of reasons why the experience of moving might shift political views towards a more cosmopolitan perspective: loosely, it facilitates exposure to new ideas and peoples, puts previous experiences in their wider context, and breaks up familiar references points. Mobility ought to independently influence Brexit support for a few reasons. While individuals who are immobile are more likely to have highly localised social networks, the networks of movers span more than one location (Oishi, 2010). As a consequence, we expect that stayers will have more strongly place-based identities. Movers are also more likely to travel back and forth between these locations, in the process passing through other places that provide a relative wider sense of the country as a whole. And through these networks and interactions across locations, movers are more likely to have had more encounters with different types of people (Gordon, 2017). Such experiences increase the likelihood of being exposed to different ideas. In some ways, the rationale for a mobility effect reflect a particular articulation of the idiom, 'travel broadens the mind,' in which by 'travel' we mean having lived in more than one location.

This suggests that residentially immobility individuals are more likely to support leaving the European Union. Nonetheless, it is hard to develop a causal story from mobility to voting, as mobility is both a cause and a consequence of a host of individual characteristics and political views. Ambition, a tolerance for risk, open-mindedness and other individual features both cause people to move from place to place, but may also be reinforced by the act of moving (Jokela, 2009; Zimmerman and Neyer, 2013). Moreover, since Greenwood (1997) identifies participation in higher education and obtaining employment as two of the most important drivers of internal migration in developed economies, it is plausible that mobility may both enable an improvement in human capital, and simultaneously afford entry into social networks and economic

opportunities that mean individuals are better positioned to succeed in the global economy. This presents a major confounding problem in identifying the causal effects of (im)mobility, one which we can only address partially by including a wide range of potential confounders as covariates.

Mobility or internal migration is driven by a complex mix of individual features and locational differences (ibid), with residential movers in the UK changing locations for diverse reasons at a range of different points in their life-cycle (ONS, 2016). On the other hand, we conjecture two ideal types of immobile people: those that select into immobility because the contemporary lived social and economic features in the counties in which they are born are not dissatisfying; and those that are 'stuck' in circumstances that are not satisfying but for whatever reason they are unable or unwilling to move to resolve them. Though locational satisfaction is likely to be driven by individual, idiosyncratic preferences, the review above suggests that locally specific experiences of globalisation and community are likely to act as conditioning forces. This bifurcation suggests the following hypothesis: the effect of immobility on support for Brexit will depend on the local extent of local economic or demographic change.

3. Data

Data is drawn from Understanding Society (also known as the UK Household Longitudinal Study), a household panel survey that has followed individuals from approximately 40,000 households in the United Kingdom since 2009. Where possible, all adult (age 16 or above) members of Understanding Society households are interviewed each year; original sample members are followed if they leave their original household and new (or newly eligible) members of Understanding Society households are also added to the survey. Since Wave 2 (2010), Understanding Society has incorporated continuing participants of the British Household Panel Survey (BHPS), a similar household panel survey of around 8,000 households in the UK which began in 1991 and ran for 18 successive years. In Wave 8, Understanding Society respondents were asked the same question that was posed in the UK referendum on EU membership that took place on 23rd June 2016: 'Should the United Kingdom remain a member of the European Union or leave the European Union?' The answer to this question is our dependent variable.[1]

Owing to the central focus on immobility and Brexit voting preferences, the main independent variable employed in this analysis is whether a respondent was living in the same county in which they were born at the most recent interview. We set out more on how we construct this variable in Appendix A. The binary variable was generated by comparing the county in which respondents were born with the county in which they were living in at Wave 8 or, where data was missing, at Wave 7. Our

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[1] We exclude missing responses. Note that our data is the early-access version of the Understanding Society, made available by the Institute of Social and Economic Research at the University of Essex ahead of the scheduled full release of Wave 8 data in November 2018.

main variable of interest, *immobile*, is 1 where a respondent is living in the county they were born in and 0 when not[2]. A small majority (55%) of our sample live in their county of birth. As we report below, we additionally consider several alternative measures of immobility.

Table 1. Brexit support (%) by mobility

Should the United Kingdom remain a member of the European Union?	*Mobility*: Mobile (lives outside county of birth)	Immobile (lives in county of birth)	Total
Yes	60.0	48.8	53.6
No	40.0	51.2	46.4

Note: N = 6,221. Weights applied.

The bivariate relationship between Brexit support and immobility is given in table 1. For simplicity, we restrict the table to the smallest sample used in our results (that used in table 4), although this affects the results little, and use weights so the results are representative of the UK population. The results show a slight over-statement of support for remaining in the EU: 53 percent support Remain, compared to 48 percent in the actual EU Referendum. They also show a significant difference in Brexit support between the immobile and the mobile. More than half (51 percent) of the immobile support Leave, compared to just 41 percent of the mobile.

4. Research Design

4.1 Model and methodology

Our data is a cross-section, where the dependent variable takes the form of the question posed in the EU referendum. To separate out the impact of immobility from other potentially confounding factors, we begin by estimating a simple probit regression model. This is estimated for each individual 'i' and takes the following form:

$$\text{EU Ref}_i = \alpha + \beta_1 \text{Immobile}_i + \beta'_2 \text{Person}_i + \beta'_3 \text{Place}_i + \beta_4 \text{Immobility*Place}_i + \varepsilon$$

Where, "Immobile" is an indicator for whether the individual lives in their county of birth. "Person" is a vector of individual characteristics such as age, age[2], education, gender, ethnicity, personality and political engagement. "Place" is a vector of local characteristics, of which the two most important are indicators of economic and cultural change. Most importantly here, "Immobility*Place" is the linear interaction term

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[2] It is not possible to identify the age at which those who are not living in the same county in which they were born moved from the Understanding Society data. The 0 (mover) category thus includes respondents who moved as children and respondents who moved as adults, the common denominator being they have lived in more than one county and been exposed to more than one local context since birth, in contrast to immobile respondents.

between individual mobility and our two measures of local change drawn from UK Nomis.

Control variables

To motivate our control variables, we draw on the literature on the determinants of populist voting (see Inglehart and Norris, 2016, or Antonnuci et al., 2017). First, we include a set of variables for the basic demographic characteristics of individuals. Males were generally seen as more likely to support Brexit, so we include a control for gender. Age was also significant, with older voters generally being more likely to support Leave up to a certain point, beyond which older voters were more likely to support Remain. We control both for age and, owing to the differential effect with increasing age, also use a quadratic term. We also include an ethnicity variable to reflect the fact that whites have tended to be more Eurosceptic than members of ethnic minorities. Data on income in the early release data have a large number of missing observations, so instead we include controls for both income satisfaction and life satisfaction.

Educational attainment is seen as a critical determinant of populist views, with those holding lower educational qualifications being more likely to be pro-Brexit. In the present context, education is doubly crucial, since those with higher qualifications are also more likely to be mobile, owing in part to the residential model of higher education in the United Kingdom. We therefore include controls for four major educational categories: below GCSE level; GCSE or equivalent; A-Level or equivalent; and undergraduate degree or higher. To account for the fact that Understanding Society Wave 8 fieldwork spanned the EU referendum vote and that public knowledge of the outcome may have altered responses to the EU membership question posed in Wave 8, we incorporate a binary variable which denotes whether the respondent was interviewed before or after 23rd June 2016. Summary statistics and definitions for these variables are included in table 2.

Table 2. Variable definitions and summary statistics

Variable	Definition	Mean	Std. Dev.	Min	Max
UK should leave the European Union	Answers yes to: "Should the United Kingdom remain a member of the European Union?	0.46	0.50	0	1
Lives in county of birth	Lives in county in which they were born	0.56	0.50	0	1
Local best friend	All named best friends live less than 5 miles away	0.28	0.45	0	1
Local mother	Mother lives < 30 minutes away	0.28	0.45	0	1
Stayer-returner	Has lived outside county in lifetime of survey, but now in county of birth	0.04	0.20	0	1
Verbal ability	Verbal fluency: Count of correct answers (from 49)	23.15	6.32	0	49
Numeric ability	Numeric ability: Count of items answered correctly (from 5)	3.77	1.04	0	5
Agreeableness	Big 5 Personality trait: Agreeableness	5.60	1.02	1	7
Conscientiousness	Big 5 Personality trait: Conscientiousness	5.45	1.08	1	7
Extraversion	Big 5 Personality trait: Extraversion	4.61	1.28	1	7
Neuroticism	Big 5 Personality trait: Neuroticism	3.60	1.41	1	7
Openness	Big 5 Personality trait: Openness	4.63	1.27	1	7
Traditional	Believes the husband should earn, wife should stay at home	0.38	0.48	0	1
Government	don't have a say in what government does	1.20	0.86	0	2
Environmental scepticism	environmental crisis has been exaggerated	1.03	0.79	0	2
officials	public officials don't care	1.27	0.80	0	2
Male	Male gender	0.48	0.50	0	1
White	White ethnicity	0.96	0.19	0	1
Mixed	Mixed ethnicity	0.01	0.09	0	1
Asian	Asian ethnicity	0.02	0.13	0	1
Black	Black ethnicity	0.00	0.07	0	1
Other	"Other" ethnicity	0.00	0.04	0	1
Age	Age	50.25	17.27	20	100
Age Squared	Age squared	2,821	1,808	400	10000
Sampled before referendum	Sampling occurred before the referendum vote (23rd June 2016)	0.42	0.49	0	1
Employed	Employed at time of 2016 interview	0.62	0.49	0	1
Unemployed	Unemployed at time of 2016 interview	0.03	0.17	0	1
Inactive	Inactive at time of 2016 interview	0.06	0.24	0	1
Retired	Retired at time of 2016 interview	0.26	0.44	0	1
Student	Student at time of 2016 interview	0.01	0.12	0	1
No qualifications	Highest qualification: No qualification	0.27	0.44		
GCSE	Highest qualification: GCSE or equivalent	0.27	0.44	0	1
A Level	Highest qualification: A-level	0.11	0.32	0	1
Degree	Highest qualification: Degree or equivalent	0.37	0.48	0	1
Income satisfaction	Self-reported satisfaction with income	4.92	1.57	1	7
Life satisfaction	Self-reported satisfaction with life	5.27	1.41	1	7

Note: 6,221 Observations. Source for all reported variables is Understanding Society, various waves.

4.2 Basic results

Table 3 summarises the results of our basic regression model. This shows that people living in their county of birth are more likely to be pro-Brexit and that this relationship holds when we control for basic personal characteristics (age, ethnicity) and broader personal characteristics (education, labour force status and both income and life satisfaction). Figure 1 considers the average marginal effects. This shows that, on average, the immobile were 10 percent more likely to have pro-Brexit beliefs, after controlling for basic individual characteristics. While this is not the most important variable in our model (the average marginal effect for having a degree is a 20% decrease in probabilities), it is relatively robust across specifications and consistently statistically significant.

Table 3. Impact of immobility on Brexit support, probit regression results
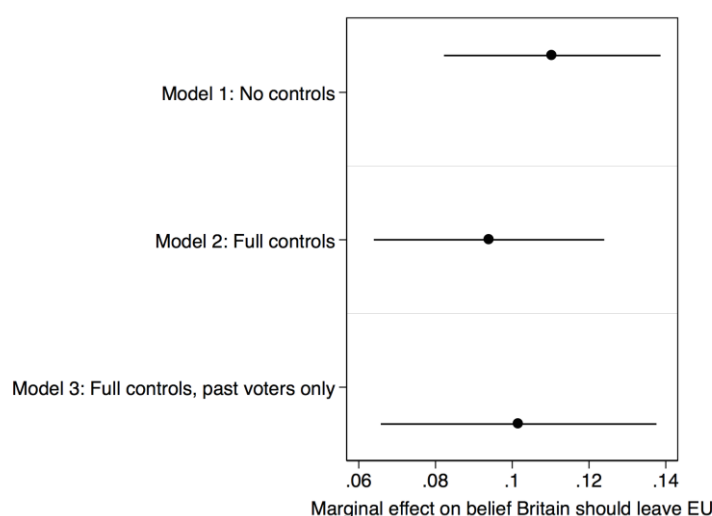
	(1)	(2)	(3)
	Dependent variable:		
	Believes UK should leave the European Union		
Lives in county of birth	0.279***	0.236***	0.324***
	(0.0367)	(0.0387)	(0.0536)
Sample	Full	Full	Only those who voted in 2016
Controls	No	Yes	Yes
Observations	6,221	6,221	3,457

Note: Estimated as probit regression results with robust standard errors. Weights applied. Controls used in columns 2 and 3: Gender, 5 Ethnic Categories, Age, Age^2, whether sampled before Brexit, labour force status (employed, retired, student, unemployed, inactive), education, life satisfaction, income satisfaction and Government Office Region. Note that regression coefficients without restricting sample to those used in all regressions are very similar: for column 1, beta=0.231026, (n = 10,014), for column 3, beta = 0.2284 (n = 7,290)

Our control variables also provide some insights into the demographics of the Brexit vote. Ethnically white people were more likely to favour Brexit, as were older people although the effect declines. Most likely reflecting a combination of increasingly close polls in the run-up to the vote and sample response bias, those sampled before the vote were less likely to be pro-Brexit than those afterwards. In addition, those with higher income satisfaction were less likely to be pro-Brexit; those with higher life satisfaction more likely. Education was a strong predictor of Brexit support. That the immobility effect holds when controlling for educational attainment is particularly noteworthy given the established association between higher educational attainment

and mobility in the United Kingdom (Green, 2017). The implication of table 3 is that among respondents with the same levels of educational attainment (for example those with no or low qualifications), those who were living in their county of birth were more likely to be pro-Brexit than those who have moved at some point in their life. In other words, immobility appears to shape voting preferences over and above the effect of educational attainment.

Figure 1. Average marginal effects (with 95% confidence intervals) of impact of living in county of birth on Brexit beliefs

Note: Each model presents the average marginal effect of the impact of immobility (defined as living in county of birth) on belief that Britain should leave the European Union. Models specified as in table 3, with controls for Gender, 5 Ethnic Categories, Age, Age[2], whether sampled before Brexit, labour force status (employed, retired, student, unemployed, inactive), education, life satisfaction, income satisfaction and Government Office Region.

4.3 Testing other explanations: Psychology, values, social networks and mobility

There are several obvious channels through which immobility might be associated with populist voting. Other literature has suggested that factors such as individual values or personal psychology may influence voting intentions (see Kaufman, 2016, for example). These will be highly inter-related with mobility with causality running both ways. For example, more psychologically open individuals might be more likely to move; but movement will make individuals more psychologically open. In table 4 we incorporate a series of potentially confounding variables into our model, taken from earlier waves of Understanding Society, to test whether these affect the impact of immobility on pro-Brexit beliefs. While we cannot be perfectly confident in arguing that results indicate an independent causal role for immobility in shaping Brexit support,

controlling for these factors helps isolate the distinct effect of mobility, independent of its impact on these.[3]

Table 4. Immobility and Brexit support – alternative explanations, 2016

Area	Variable	(1)	(2)	(3)	(4)
		Dependent variable: Believes UK should leave the European Union			
Immobility	Lives in county of birth	0.244***	0.260***	0.216***	0.207***
		(0.0408)	(0.0407)	(0.0411)	(0.0417)
Cognitive test	Verbal ability	-0.00830**			-0.00437
		(0.00324)			(0.00333)
	Numeric ability	-0.0928***			-0.0701***
		(0.0220)			(0.0228)
Psychology	Agreeableness		-0.0823***		-0.0679***
			(0.0205)		(0.0210)
	Conscientiousness		0.0521***		0.0437**
			(0.0199)		(0.0205)
	Extraversion		0.0329**		0.0222
			(0.0155)		(0.0158)
	Neuroticism		-0.0126		-0.0123
			(0.0147)		(0.0152)
	Openness		-0.0837***		-0.0573***
			(0.0159)		(0.0165)
Values / beliefs	Husband should earn, wife should stay at home			0.164***	0.152***
				(0.0405)	(0.0407)
	Don't have a say in what government does			0.140***	0.127***
				(0.0282)	(0.0286)
	Environmental crisis has been exaggerated			0.264***	0.251***
				(0.0252)	(0.0254)
	Public officials don't care			0.144***	0.137***
				(0.0304)	(0.0305)
	Constant	-0.299	-0.0829	-1.625***	-0.952***
		(0.244)	(0.286)	(0.245)	(0.312)
	Controls	Yes	Yes	Yes	Yes
	Observations	6,221	6,221	6,221	6,221
	Pseudo R2	0.0881	0.0912	0.123	0.130

Estimated as a probit regression with robust standard errors. Unreported controls are for gender, age, age^2, ethnicity, if interviewed before Referendum, education, labour force status and region. Robust standard errors in parentheses. Marginal effect for "Lives in county of birth" is 0.07 in column 4.
*** p<0.01, ** p<0.05, * p<0.1

A first concern is that there may be some unobserved factor related to cognitive ability which survives even once we include educational controls (for example, some

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[3] We do attempt to show a causal effect using an instrumental variable (IV) approach based on birth order, following the intuition that first born children are likely to move further from home. Unfortunately, while our results suggest a positive relationship between immobility and Brexit, the instrument is weak.

significant difference between GCSE grades or the quality of degree level qualifications). We address this by introducing two indicators for cognitive testing taken from an earlier wave of the data: one of which controls for numeric ability and another for verbal recollection. These are a scale where a higher positive value indicates a higher number of correct answers in a cognitive test (note the two variables have different scales). These are introduced in model 1, but including these variables does not seem to influence the basic result, and our variable for immobility remains statistically significant with a similar coefficient.

Psychological factors are a second potential explanation. These have been seen as important in explaining populist votes such as Brexit (Obschonka et al., 2017; Garretsen et al., 2017). Moreover, migration decisions are partly explained by individual psychology (Rentfrow et al., 2008). To account for this, we use indicators of the established "Big Five" indicators of personality traits (see Barrick and Mount, 1991). These are: Conscientiousness – associated with hard work, organisation and task completion; Extraversion – being outgoing, sociable and assertive; Openness – capturing originality, creativity and open to new ideas; Agreeableness – which captures kindness and trust, and; Neuroticism – if the individual is worried and tense. Each of these is a scale between 1 – 7, with a set of sub-questions are used to establish an overall indicator. These are introduced in model 2. They show that psychological factors did matter for Brexit beliefs - Conscientiousness and Extraversion are positively related to being pro-Brexit, while Openness and Agreeableness are negatively so. These individual level findings are very similar to the local authority level study of Garretsen et al. (2017). However, our coefficient for immobility changes little even once we control for psychology.

Finally, the argument has been made repeatedly that values mattered in the Brexit vote. For example, Kaufmann (2016) argues that differences in values were the main dividing line between remain and leave voters. To rule this out, model 3 includes four indicators which reflect individual values or belief. These are the extent to which people believe four statements related to gender differences in the home, their power to influence government, scepticism about climate change and the intentions of public officials. While they show clear evidence that values matter, with all four beliefs positively and statistically significantly related to pro-Brexit views, immobility seems to matter even with these controls.

Finally, in model 4 we include variables for psychology, cognitive ability, beliefs / values together. The headline remains similar: regardless of controls used, the variable for immobility is positive and statistically significant. To quantify this effect, we compute the average marginal effect. This shows that even when controlling for many of the potential mechanisms through which living in county of birth might influence support for Brexit, it is still associated with a 7 percent higher probability of support for Brexit.

5. Local circumstances, mobility and Brexit

Our second research question is the extent to which local change – either in terms of increased migration or relative economic decline – was felt differently by the immobile and shaped their voting preferences. As Gordon (2017) argues, recent populist votes can be understood partly as geographical phenomenon, in two senses. Firstly, because of concentrations of individuals in certain places which have led to the 'map' of populist votes. But secondly, because certain areas have experienced change and this may have presented certain groups with a loss of ability to control their local environment. Two explanations – the cultural view of populist votes as a response to changing communities, and the economic view of populism as a threat to the economic positions of many in declining areas – are linked at a local level. The immobile are, by definition, more tied to their local area and thus more exposed to external change, so local change may have influenced them more than other groups, with the Brexit vote being a way of protesting against changes to their local environment.

Table 5. Probit regressions between local change interacted with mobility and Brexit support

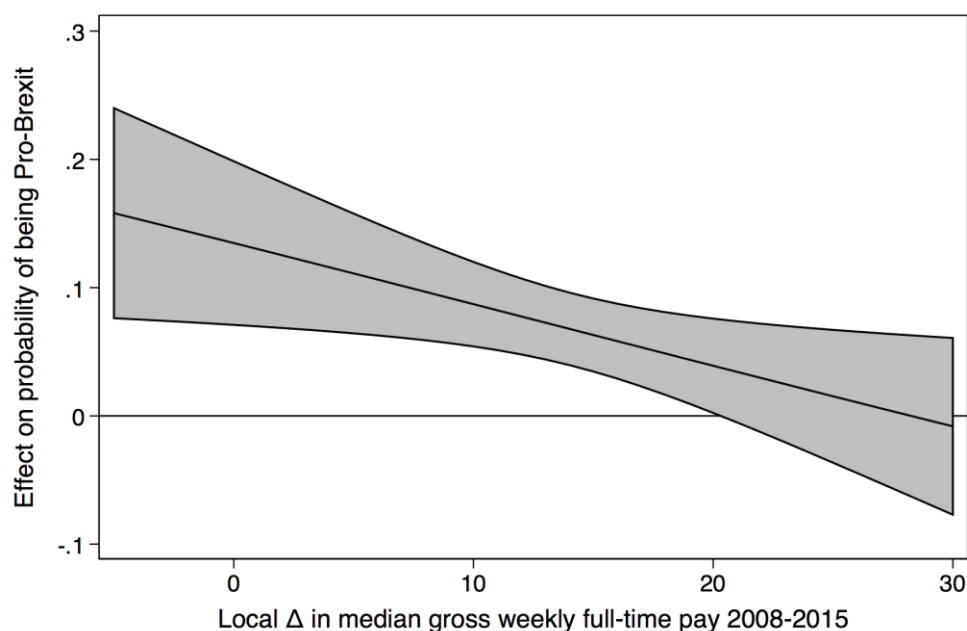|	(1)	(2)	(3)	(4)
	Dependent variable: Believes UK should leave the European Union			
Log local gross weekly full time pay, 2015	0.315***	0.320***		
	(0.0661)	(0.0660)		
Immobile: Lives in county of birth	0.199***	0.387***	0.175***	0.0514
	(0.0415)	(0.0939)	(0.0411)	(0.0713)
Percent Δ in gross weekly full time pay, 2008 – 2015	-0.00951**	-0.00281		
	(0.00373)	(0.00475)		
Immobile * Percent Δ in local gross weekly full time pay, 2008 - 2015		-0.0137**		
		(0.00596)		
Percent Not White British			-0.000399	-0.000496
			(0.00321)	(0.00323)
Percentage Point Δ Not White-British, 2005 - 2015			0.0194*	0.00557
			(0.0111)	(0.0130)
Immobile * Percentage Point Δ Not White-British, 2005 - 2015				0.0237**
				(0.0120)
Controls	Yes	Yes	Yes	Yes
Observations	5,684	5,684	5,684	5,684

Estimated as probit regressions with robust standard errors. Excludes Northern Ireland. Unreported controls are for gender, age, age2, ethnicity, if interviewed before Referendum, education and labour force status.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

To test these ideas, in table 5 we interact the immobility variable with two indicators of recent local change drawn from UK Nomis: percentage growth in average gross weekly wages between 2008 and 2015 and percentage point change in the share of non-white British people in the local area, 2005 - 2015. We adapt the model used in table 4, column 5 slightly. Because subsequent change is likely to be affected by initial levels, we now include variables for either the average wage of the county of residence or the initial proportion of non-white British residents. We also exclude the regional dummies, as these are highly collinear with the other local indicators, and residents of Northern Ireland are excluded as no sub-national data is available there.

Figure 2. Impact of immobility on Brexit beliefs at different levels of economic change, predictive marginal effect
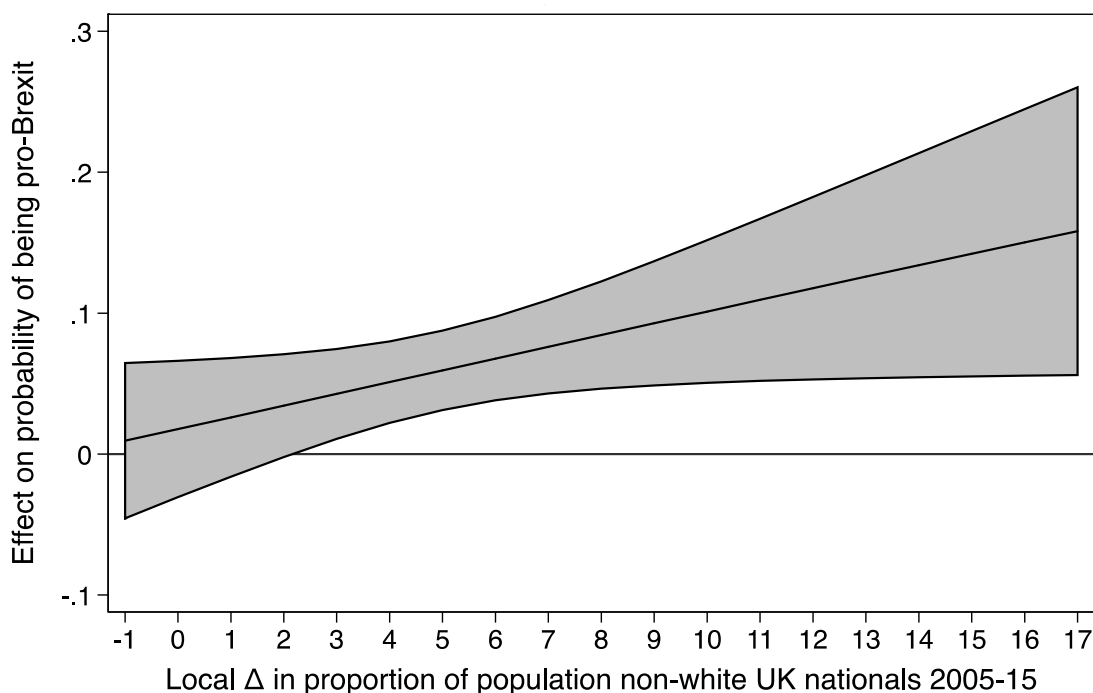

Note: Each model presents the predicted marginal effect of the impact of immobility (defined as living in county of birth) at different levels of local changes in wages on belief that Britain should leave the European Union. 95% Confidence intervals given by shaded area. Models specified as in table 5, with controls for Gender, 5 Ethnic Categories, Age, Age^2, whether sampled before Brexit, labour force status (employed, retired, student, unemployed, inactive), education, life satisfaction, income satisfaction, cognitive testing, the Big 5 personality traits and values.

Models 1 and 2 show the results for changing pay levels; models 3 and 4 for changing demographics. We do not include both sets of variables together because of collinearity. We note that, perhaps surprisingly, places with a higher average income tended to see more people support Brexit, although the effect is small and note that we control for individual satisfaction with their own income. More to the point, change

in pay also matters, with percentage change in gross weekly full time pay between 2008 and 2015 negatively related to Brexit support. People in places experiencing relative economic decline were more likely to support Brexit and vice versa. Model 2 shows an important caveat to this result: local pay change *only* matters amongst those who are immobile. We develop this line of analysis in figure 2, which graphically presents the impact of immobility on probability of being pro-Brexit at different levels of local pay. The central line gives the predicted marginal effect, with the shaded area illustrating the 95% confidence intervals. This shows that the effect of immobility on pro-Brexit views is higher when local pay increases have been lower. But where the local economy has been performing better the impact of immobility declines and below a certain point is not significantly different from zero.

Figure 3. Impact of immobility on Brexit beliefs at different levels of demographic change, predictive marginal effect

Note: Each model presents the predicted marginal effect of the impact of immobility (defined as living in county of birth) at different levels of local changes in non-White population on belief that Britain should leave the European Union. 95% Confidence intervals given by shaded area. Models specified as in table 5, with controls for Gender, 5 Ethnic Categories, Age, Age², whether sampled before Brexit, labour force status (employed, retired, student, unemployed, inactive), education, life satisfaction, income satisfaction, cognitive testing, the Big 5 personality traits and values.

Models 3 and 4 in Table 5 consider changes in demographic composition. Our indicator here - the proportion who do not consider themselves white British - is

intended to capture *both* inward migration and ethnic change. We note first of all that the proportion who are not white British in a local area is unrelated to support for Brexit. Change in the share of the population who are not white-British may matter, but the effect is only statistically significant at the 1% level. However, once this is interacted with immobility the effect becomes clearer. As with the results for changes in local wages, it is *the combination* of both immobility and either economic or demographic change which seems to matter. We illustrate this graphically in figure 3. This shows an almost opposite effect than for wages: the effect of immobility on Brexit increases as local non-white British share increase. The differences between the voting preferences of the mobile and immobile are, in contrast, negligible where there has been little local change.

Sensitivity Checks

One concern with our results is that our indicator of immobility may not fully capture the underlying concept of interest. As discussed above, we define immobile respondents as those who were living in the same county in which they were born in 2016; and mobile respondents as those who were not. This indicator has a number of merits, as it is directly about the individual's experience and can be consistently applied across time. There are two potential limitations to this definition. First, we cannot conclusively establish from the data that immobile respondents have *always* lived in their county of birth. However, we can check whether immobile respondents have ever lived elsewhere during the period in which they have participated in Understanding Society, or its predecessor, the British Household Panel Survey. To test if this influences our results, we generate a dummy variable which identifies immobile respondents who left and then returned. Table 6 gives the results of models using this variable, both without (model 1) and with (model 2) our core indicator of immobility. It makes little difference to the results, suggesting that our main results are driven by longer-term processes of immobility rather than short-term moves.

As a further robustness test, we also identify alternative measures of immobility in our data. The first is derived from a question which asks each individual about the location of up to 3 best friends. Our variable is 1 if all named best friends live within 5 miles of the respondent, and 0 otherwise. We assume that immobile individuals will have made friends locally, and through homophily their friends will also be less likely to move away. A second, related variable is the distance from the respondent's mother: this is 1 if the respondents mother lives within 15 minutes journey time, and 0 otherwise. This is only available for a smaller group of respondents and those whose mother is still alive. But we assume that locally rooted people live close to their parents, and so this variable should be a good alternative indicator (although it cannot account for maternal moves). In models 3 and 4 of Table 6, we include measures of the proximity of one's best friends, and one's mother, respectively, in each case without our primary

immobility indicator. On their own, both these alternative measures are positively and significantly related to support for Brexit. Yet when included alongside our county of birth indicator neither is statistically significant. We take this as evidence that immobility does matter, even if defined in other ways, but also that we have identified the best variable to capture it.

6. Conclusions

The UK electorate voted to leave the European Union on 23rd June 2016. This vote was one of a series of populist votes which have been seen as a reaction to the divergent fortunes of people and places under processes of globalisation. Implicit within this 'divergent fortunes' narrative is a division between mobile and the immobile citizens: mobility has long been seen as important by sociologists, political scientists and geographers but no research has hitherto explored whether residential immobility was an important variable in the Brexit vote. This paper addresses this gap using early access data from Understanding Society, and also explores whether the effects of immobility on support for Brexit are contingent on local change in economic performance or inward migration.

Our results show a consistent effect: immobile people – proxied as those living in their county of birth – are around 7% more likely to be in favour of Brexit, even when controlling for individual, cultural, or psychological factors which might be associated with immobility. However, our results are only partly about immobility per se. Instead, our analysis suggests that the effect of immobility on individual support for Brexit is filtered by local circumstances: immobility only matters for respondents living in places experiencing relative economic decline or those where there have been substantial recent increases in non-white British migration. Had more of the British electorate moved away from the place they were born in; had the places in which the immobile have stayed in fared better economically under processes of globalisation; or had these places remained more stable in terms of demographic composition, then the EU Referendum outcome may have been different.

The policy implications of our results are nuanced. The obvious implication of our work is that declining rates of geographical mobility may have helped explain the Brexit vote. It is clear that many groups in the UK are currently unable to move, as they are "shut out" of some of the most important areas of opportunity by high house prices (Luce 2017:14). Given widening geographical divergence in the UK (McCann, 2016), facilitating access to growing cities and regions for those who want to move is one potential policy implication. Yet spatial mobility cannot be the whole solution: many people do not want to move, and an economic development policy which relies solely on spatial mobility into advantaged areas ignores the benefits of stable community, people's social networks and attachment to place. Indeed, our second finding – that people living in areas experiencing relative economic decline or demographic change – were more likely to support Brexit, hints at the need to spread opportunity more

widely across the UK. There are a number of suggested ways of doing this. For example, Iammarino et al (2017) argue for the use of place-sensitive development policies, while Martin et al. (2016) argue for radical decentralisation of power. Whether either of these proposals are sufficient, in addition to supporting individuals in moving to areas of opportunity, efforts need to be made to ensure the opportunities are spread more widely.

It is important also to caveat our results: immobility was just one factor in the vote, others, such as educational attainment, were more important, and we are unable to fully tease out the complex linkages between mobility, individual psychology and values and populist voting. But we believe our work highlights two fruitful areas of future research. Firstly, while we have begun to investigate the relationships between mobility, values and populism, more work in this area would help better understand recent reactions to globalisation. Secondly, we argue for a renewed focus on those who are immobile. The literature on economic geography has (including the authors' own work), perhaps been skewed to study of those who are mobile. This ignores the majority of the population and their circumstances. The current backlash against globalisation, in the form of Brexit and the Trump vote, justifies an even greater focus on the local.
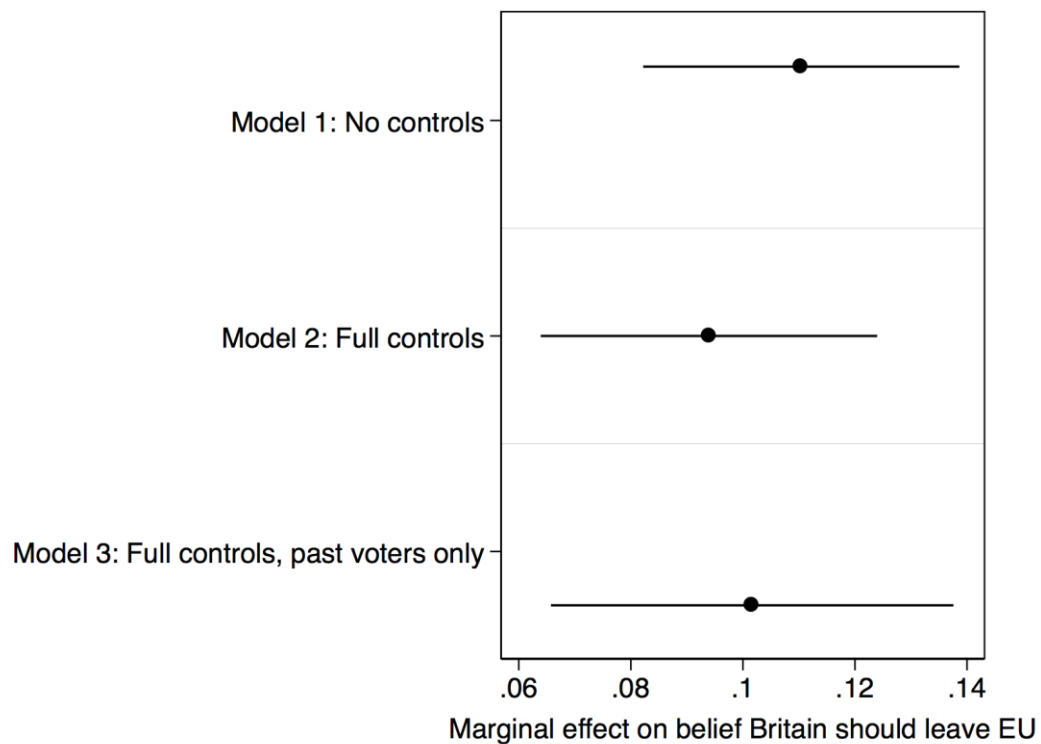
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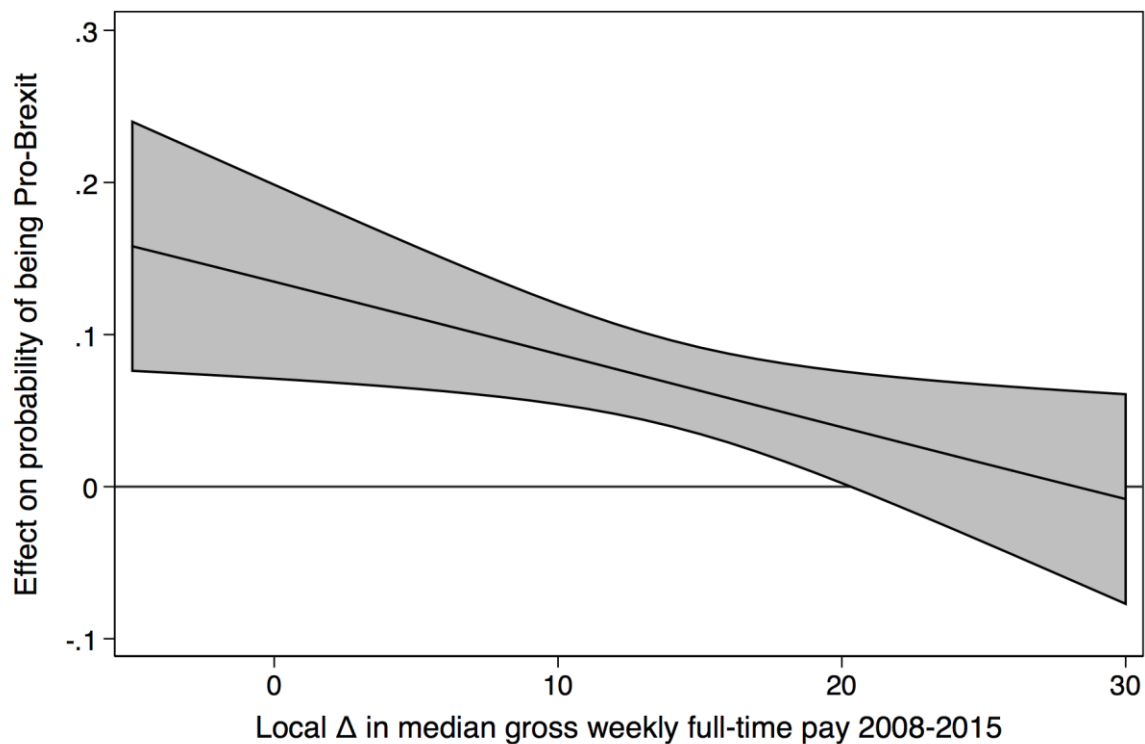
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Figure 1. Average marginal effects (with 95% confidence intervals) of impact of living in county of birth on Brexit beliefs

Note: Each model presents the average marginal effect of the impact of immobility (defined as living in county of birth) on belief that Britain should leave the European Union. Models specified as in table 3, with controls for Gender, 5 Ethnic Categories, Age, Age^2, whether sampled before Brexit, labour force status (employed, retired, student, unemployed, inactive), education, life satisfaction, income satisfaction and Government Office Region.

Figure 2. Impact of immobility on Brexit beliefs at different levels of economic change, predictive marginal effect

Note: Each model presents the predicted marginal effect of the impact of immobility (defined as living in county of birth) at different levels of local changes in wages on belief that Britain should leave the European Union. 95% Confidence intervals given by shaded area. Models specified as in table 5, with controls for Gender, 5 Ethnic Categories, Age, Age^2, whether sampled before Brexit, labour force status (employed, retired, student, unemployed, inactive), education, life satisfaction, income satisfaction, cognitive testing, the Big 5 personality traits and values.

Figure 3. Impact of immobility on Brexit beliefs at different levels of demographic change, predictive marginal effect
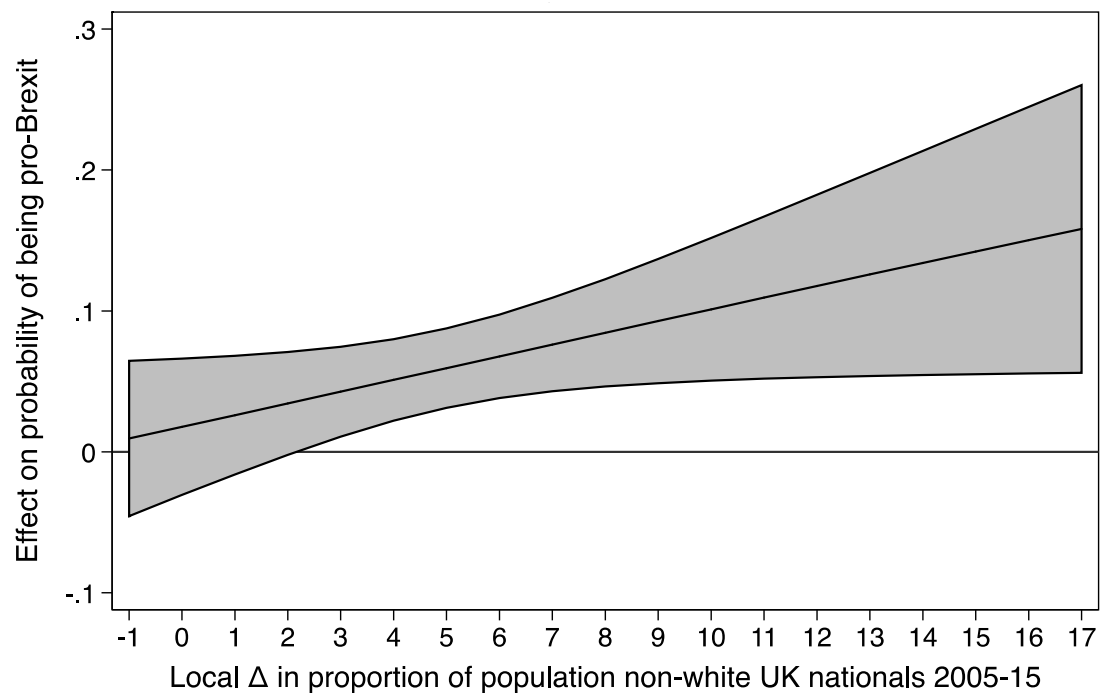

Note: Each model presents the predicted marginal effect of the impact of immobility (defined as living in county of birth) at different levels of local changes in non-White population on belief that Britain should leave the European Union. 95% Confidence intervals given by shaded area. Models specified as in table 5, with controls for Gender, 5 Ethnic Categories, Age, Age^2, whether sampled before Brexit, labour force status (employed, retired, student, unemployed, inactive), education, life satisfaction, income satisfaction, cognitive testing, the Big 5 personality traits and values.

Table 1. Brexit support (%) by mobility

Should the United Kingdom remain a member of the European Union?	*Mobility*: Mobile (lives outside county of birth)	Immobile (lives in county of birth)	Total
Yes	60.0	48.8	53.6
No	40.0	51.2	46.4

Note: N = 6,221. Weights applied.

Table 2. Variable definitions and summary statistics

Variable	Definition	Mean	Std. Dev.	Min	Max
UK should leave the European Union	Answers yes to: "Should the United Kingdom remain a member of the European Union?	0.46	0.50	0	1
Lives in county of birth	Lives in county in which they were born	0.56	0.50	0	1
Local best friend	All named best friends live less than 5 miles away	0.28	0.45	0	1
Local mother	Mother lives < 30 minutes away	0.28	0.45	0	1
Stayer-returner	Has lived outside county in lifetime of survey, but now in county of birth	0.04	0.20	0	1
Verbal ability	Verbal fluency: Count of correct answers (from 49)	23.15	6.32	0	49
Numeric ability	Numeric ability: Count of items answered correctly (from 5)	3.77	1.04	0	5
Agreeableness	Big 5 Personality trait: Agreeableness	5.60	1.02	1	7
Conscientiousness	Big 5 Personality trait: Conscientiousness	5.45	1.08	1	7
Extraversion	Big 5 Personality trait: Extraversion	4.61	1.28	1	7
Neuroticism	Big 5 Personality trait: Neuroticism	3.60	1.41	1	7
Openness	Big 5 Personality trait: Openness	4.63	1.27	1	7
Traditional	Believes the husband should earn, wife should stay at home	0.38	0.48	0	1
Government	don't have a say in what government does	1.20	0.86	0	2
Environmental scepticism	environmental crisis has been exaggerated	1.03	0.79	0	2
officials	public officials don't care	1.27	0.80	0	2
Male	Male gender	0.48	0.50	0	1
White	White ethnicity	0.96	0.19	0	1
Mixed	Mixed ethnicity	0.01	0.09	0	1
Asian	Asian ethnicity	0.02	0.13	0	1
Black	Black ethnicity	0.00	0.07	0	1
Other	"Other" ethnicity	0.00	0.04	0	1
Age	Age	50.25	17.27	20	100
Age Squared	Age squared	2,821	1,808	400	10000
Sampled before referendum	Sampling occurred before the referendum vote (23rd June 2016)	0.42	0.49	0	1
Employed	Employed at time of 2016 interview	0.62	0.49	0	1
Unemployed	Unemployed at time of 2016 interview	0.03	0.17	0	1
Inactive	Inactive at time of 2016 interview	0.06	0.24	0	1
Retired	Retired at time of 2016 interview	0.26	0.44	0	1
Student	Student at time of 2016 interview	0.01	0.12	0	1
No qualifications	Highest qualification: No qualification	0.27	0.44		
GCSE	Highest qualification: GCSE or equivalent	0.27	0.44	0	1
A Level	Highest qualification: A-level	0.11	0.32	0	1
Degree	Highest qualification: Degree or equivalent	0.37	0.48	0	1
Income satisfaction	Self-reported satisfaction with income	4.92	1.57	1	7
Life satisfaction	Self-reported satisfaction with life	5.27	1.41	1	7

Note: 6,221 Observations. Source for all reported variables is Understanding Society, various waves.

Table 3. Impact of immobility on Brexit support, probit regression results

	(1)	(2)	(3)
	Dependent variable:		
	Believes UK should leave the European Union		
Lives in county of birth	0.279***	0.236***	0.324***
	(0.0367)	(0.0387)	(0.0536)
Sample	Full	Full	Only those who voted in 2016
Controls	No	Yes	Yes
Observations	6,221	6,221	3,457

Note: Estimated as probit regression results with robust standard errors. Weights applied. Controls used in columns 2 and 3: Gender, 5 Ethnic Categories, Age, Age^2, whether sampled before Brexit, labour force status (employed, retired, student, unemployed, inactive), education, life satisfaction, income satisfaction and Government Office Region. Note that regression coefficients without restricting sample to those used in all regressions are very similar: for column 1, beta=0.231026, (n = 10,014), for column 3, beta = 0.2284 (n = 7,290)

Table 4. Immobility and Brexit support – alternative explanations, 2016

		(1)	(2)	(3)	(4)
		Dependent variable: Believes UK should leave the European Union			
Area	Variable				
Immobility	Lives in county of birth	0.244***	0.260***	0.216***	0.207***
		(0.0408)	(0.0407)	(0.0411)	(0.0417)
Cognitive test	Verbal ability	-0.00830**			-0.00437
		(0.00324)			(0.00333)
	Numeric ability	-0.0928***			-0.0701***
		(0.0220)			(0.0228)
Psychology	Agreeableness		-0.0823***		-0.0679***
			(0.0205)		(0.0210)
	Conscientiousness		0.0521***		0.0437**
			(0.0199)		(0.0205)
	Extraversion		0.0329**		0.0222
			(0.0155)		(0.0158)
	Neuroticism		-0.0126		-0.0123
			(0.0147)		(0.0152)
	Openness		-0.0837***		-0.0573***
			(0.0159)		(0.0165)
Values / beliefs	Husband should earn, wife should stay at home			0.164***	0.152***
				(0.0405)	(0.0407)
	Don't have a say in what government does			0.140***	0.127***
				(0.0282)	(0.0286)
	Environmental crisis has been exaggerated			0.264***	0.251***
				(0.0252)	(0.0254)
	Public officials don't care			0.144***	0.137***
				(0.0304)	(0.0305)
	Constant	-0.299	-0.0829	-1.625***	-0.952***
		(0.244)	(0.286)	(0.245)	(0.312)
	Controls	Yes	Yes	Yes	Yes
	Observations	6,221	6,221	6,221	6,221
	Pseudo R2	0.0881	0.0912	0.123	0.130

Estimated as a probit regression with robust standard errors. Unreported controls are for gender, age, age^2, ethnicity, if interviewed before Referendum, education, labour force status and region. Robust standard errors in parentheses. Marginal effect for "Lives in county of birth" is 0.07 in column 4.
*** p<0.01, ** p<0.05, * p<0.1

Table 5. Probit regressions between local change interacted with mobility and Brexit support

	(1)	(2)	(3)	(4)
		Dependent variable: Believes UK should leave the European Union		
Log local gross weekly full time pay, 2015	0.315***	0.320***		
	(0.0661)	(0.0660)		
Immobile: Lives in county of birth	0.199***	0.387***	0.175***	0.0514
	(0.0415)	(0.0939)	(0.0411)	(0.0713)
Percent Δ in gross weekly full time pay, 2008 – 2015	-0.00951**	-0.00281		
	(0.00373)	(0.00475)		
Immobile * Percent Δ in local gross weekly full time pay, 2008 - 2015		-0.0137**		
		(0.00596)		
Percent Not White British			-0.000399	-0.000496
			(0.00321)	(0.00323)
Percentage Point Δ Not White-British, 2005 - 2015			0.0194*	0.00557
			(0.0111)	(0.0130)
Immobile * Percentage Point Δ Not White-British, 2005 - 2015				0.0237**
				(0.0120)
Controls	Yes	Yes	Yes	Yes
Observations	5,684	5,684	5,684	5,684

Estimated as probit regressions with robust standard errors. Excludes Northern Ireland. Unreported controls are for gender, age, age2, ethnicity, if interviewed before Referendum, education and labour force status.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6. Sensitivity tests: Alternative indicators of immobility, probit regression results

	(1)	(2)	(3)	(4)	(5)
			Dependent variable:		
			Believes UK should leave the European Union		
Stayer-returner	0.00592	-0.0285			
	(0.0418)	(0.0418)			
Best friend < 5 miles away			0.0340*		0.0405
			(0.0174)		(0.0254)
Mother < 15 minutes away				0.0680***	0.0350
				(0.0229)	(0.0240)
Lives in county of birth		0.0840***			0.106***
		(0.0166)			(0.0239)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	6,221	6,221	6,221	2,945	2,945

Note: Average marginal effects presented. Estimated as probit regression results with robust standard errors. Weights applied. Controls used in columns 2 and 3: Gender, 5 Ethnic Categories, Age, Age^2, whether sampled before Brexit, labour force status (employed, retired, student, unemployed, inactive), education, life satisfaction, income satisfaction and Government Office Region.

Appendix A: Variable construction

The main independent variable employed in the analysis presented here describes whether a respondent was living in the same county in which they were born at the most recent interview. Deriving this binary *stayer* variable naturally relies on identifying where Understanding Society respondents were born, where they were living most recently and whether these two locations are the same or different.

Data on the county of birth of Understanding Society respondents is drawn from two different sources, reflecting the incorporation of British Household Panel Survey (BHPS) into Understanding Society from 2010 onwards and the use of different geographies and coding systems for recording the county of birth of old BHPS sample members and new Understanding Society sample members.

For BHPS respondents county of birth is reported in *plbornd* - district of birth[4]. The coding framework for *plbornd* includes some very antiquated geographies (for example Middlesex in England; Ogwr in Wales; Cunninghame in Scotland) which are matched to the contemporary boundaries of counties or unitary authorities via a look-up table created specifically for this analysis, which draws on Wikipedia and other sources of information about historic local government boundary changes.

For Understanding Society respondents, county of birth is reported in *plbornc* – county of birth. The coding framework for *plbornc* is entirely different to the coding framework for the BHPS *plbornd* variable but it too includes antiquated geographies (for example Avon in England; Cardiganshire in Wales; Kirkcudbrightshire in Scotland). The places of birth as reported by Understanding Society respondents are matched to contemporary local government boundaries via a separate look-up table created for this analysis, which again draws on Wikipedia and other sources of information about local government boundary change following a similar protocol to the BHPS matching process. In general, *plbornc* geographies in Understanding Society data are greater in scale than BHPS *plbornd* geographies so BHPS geographies are aggregated up to the lowest common denominator offered by the Understanding Society coding framework.

Respondents' current place of residence is identified by locating individuals in households and households in contemporary local authority area (pre-2015 local government boundaries) using Understanding Society SN 6666 geocodes. Geocodes are provided for local authority districts / unitary authorities. Since local authority districts represent a lower tier of governance than local authority counties, data on local authority district of residence in Wave 8 (or Wave 7, where such data are missing)

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[4] BHPS respondents who agreed to continue participating in Understanding Society, the successor to the BHPS, have not been re-interviewed about where they were born.

are aggregated up to local authority county of residence via publically available look-up tables.

Generating the stayer variable involves comparing whether respondents are still living in the same county in which they were born. This is not as straightforward as it may sound, for a number of reasons. For example, from the documentation available it is not possible to ascertain whether respondents identified the exact place in which they were born (most commonly, a place containing a large hospital with a maternity ward) or whether they tended to name the place in which their parents were living at the time of their birth. It is also impossible to determine exactly what geography respondents who said they were born in historic counties such as Lincolnshire were referring to, since the old county of Lincolnshire has been split into three contemporary unitary authorities: Lincolnshire; North Lincolnshire and North East Lincolnshire.

To mitigate the impact of such geographical quirks, we take a comparatively 'generous' approach to geographical matching. To illustrate, a respondent who was born in Lincolnshire is coded as a stayer if they were living in either Lincolnshire; North Lincolnshire or North East Lincolnshire unitary authorities in the last wave of Understanding Society. They are coded as a leaver if they now live in any other unitary authority in the United Kingdom.