# Did Austerity Cause Brexit?[*]

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**Abstract**

This paper documents a significant association between the exposure of an individual or area to the UK government's austerity-induced welfare reforms begun in 2010, and the following: the subsequent rise in support for the UK Independence Party, an important correlate of Leave support in the 2016 UK referendum on European Union membership; broader individual-level measures of political dissatisfaction; and direct measures of support for Leave. Leveraging data from all UK electoral contests since 2000, along with detailed, individual-level panel data, the findings suggest that the EU referendum could have resulted in a Remain victory had it not been for austerity.

**Keywords**: POLITICAL ECONOMY, AUSTERITY, GLOBALIZATION, VOTING, EU
**JEL Classification**: H2,H3,H5, P16, D72

## 1 Introduction

Much of the recent rise of populism in the West has been attributed to a political backlash against globalization. A host of papers suggest that the distributional effects of globalization may causally explain the electoral success of populists (Autor et al., 2016; Colantone and Stanig, 2018; Dippel et al., 2015). Other factors,

such as immigration and, in particular, the free movement of labor within the European Union (EU), may have similar distributional effects (Ottaviano and Peri, 2012; Dustmann et al., 2013), such factors feature prominently in populist rhetoric as well. Globalization, by creating winners and losers, puts specific emphasis on the role of the welfare state (Stolper and Samuelson, 1941; Rodrik, 2000; Stiglitz, 2002). While a functioning welfare state can compensate the globalization's losers (Antras et al., 2016), welfare cuts may do the opposite. This paper provides evidence that, at least in the context of the UK, the austerity-induced withdrawal of the welfare state since 2010 is an important driver to understand both how pressures to hold an EU referendum built up, and why the Leave side won.

I proceed in two steps. Using novel data on the universe of all elections held in the UK between 2000 and 2015, I present a set of observations that highlight how the political landscape changed in the UK in the period from 2010 to 2015 immediately prior to the referendum. I focus on the electoral performance of the UK Independence Party (UKIP). UKIP, established in the late 1990s, was prior to 2016, the only main party in the UK with the explicit goal of leaving the EU. Due to the tight correlation between UKIP vote shares and an area's support for Leave (see Becker et al., 2017 and Figure A1), UKIP's evolution is an important window into understanding the buildup of Leave sentiment. Exploiting high-frequency annual election data, I show that the EU referendum was precipitated by a significant expansion in electoral support for UKIP in places with weak socioeconomic fundamentals. For instance, regions with a larger baseline share of residents in "routine jobs" with a larger share of "low-educated" residents, and with higher baseline employment shares in retail and manufacturing all experience an increase in support for UKIP, *yet only after 2010*.

Why did UKIP gain electoral support in these areas after 2010? Working with district-level data, I present evidence suggesting that austerity-induced welfare reforms initiated in late 2010 contributed to the upheavals in the UK's political landscape. The fiscal contraction brought about by the Conservative-led government starting in 2010 was sizable: aggregate real government spending on welfare and social protection decreased by around 16 percent per capita. At the district level - the level at which most administration of welfare spending takes place -

welfare spending per person fell by 23.4 percent in real terms between 2010 and 2015. Across districts, the extent of the cuts was widely variable, ranging from 46.3 percent to 6.2 percent, with the sharpest reductions in the poorest areas (Innes and Tetlow, 2015). Using data from government estimates on the expected intensity of specific welfare cuts across districts, I show that support for UKIP started to grow in areas with significant exposure to specific benefit cuts after these became effective. As a further plausibility check, I use the austerity shock to estimate multiplier effects on local GDP; this yields estimates that compare well with those in the literature (Ilzetzki et al., 2013).

The austerity-induced increase in support for UKIP is not negligible and suggests that the tight 2016 EU referendum could have well resulted in a victory for Remain had it not been for austerity. (Leave won by a margin of 3.8 percentage points) The point estimates suggest that UKIP vote shares increased by between 3.5 to 11.9 percentage points due to austerity. Given the tight link between UKIP vote shares and an area's support for Leave, simple back-of-the-envelope calculations suggest that Leave support in 2016 could have been easily at least 6 percentage points lower. Because, as this paper shows, support for UKIP is likely to understate the overall impact austerity had on Leave sentiment, the results suggest that without austerity, Remain would likely have won the EU referendum.

In the second step, I turn to individual-level data constructing a rich panel using the 40,000 household strong Understanding Society study (USOC), which, in the most recent wave asked the EU referendum question. These data allow me to address many plausible concerns by exploiting within-individual variation in both political preferences as well as exposure to specific benefit cuts. The results suggest that individuals exposed to various welfare reforms experienced distinct, sizable and precisely estimated increases in their tendency to express support for UKIP and, in turn, to support Leave in 2016. Further, they increasingly perceive that their vote does not make a difference, that they do "not have a say in government policy" or that "public officials do not care." Each of these measures is a strong correlate of support of support for Leave over and above what can be accounted for when controlling for respondents' political party preferences. The timing of the effects is consistent with individual reforms becoming effective for the affected

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populations (for example, households living in social housing judged to have a "spare bedroom"). Further, for a set of benefit reforms I can document auxiliary effects directly along relevant margins (for example, households living in social rented housing with a "spare bedroom" avoiding benefit cuts by moving to smaller accommodation). While UKIP gains among those exposed to cuts, support for the Conservative Party that brought about the cuts goes down. This suggests that there are political costs to austerity - a notion for which there is limited evidence in the literature (Arias and Stasavage, 2016; Alesina et al., 2011, 1998).

Lastly, while an in-depth exploration of the underlying economic reasons of why individuals become reliant on the welfare state (and thus, exposed to austerity) goes beyond this paper, I provide some suggestive evidence indicating that shocks and economic trends that contribute to the skill divide in labor markets are likely particularly relevant. I show that, consistent with the literature documenting growing polarization in labor markets (Card and DiNardo, 2002; Lemieux, 2006; Goos et al., 2014), in the past 15 years UK labor incomes diverged along the human-capital divide. Against this backdrop, the UK welfare state was responsive, providing growing transfers to those who, in relative terms, were increasingly left behind. This came to an abrupt halt from 2010, as the welfare reforms started to bite, marking the onset of the populist backlash. While a host of economic mechanisms which may contribute to the growing skill bias in the economy[1], the patterns are very consistent with this paper's central argument, which suggests that austerity was key to *activating these existing grievances*, and to producing the sentiment that ultimately culminated in the Brexit vote.

This paper is related to several strands in the literature. The paper highlights that, at least in the UK context, economic drivers are a non-negligible factor to understand the rise of populism. This lies in contrast with research that traces the origins of the populist wave to a latent cultural drift within Western societies with work such as Fukuyama (2018), Mutz (2018) and Norris and Inglehart (2019) mostly suggesting that economic factors are less relevant. In research similar to

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[1]For example trade integration and offshoring (Autor et al., 2013; Scheve and Slaughter, 2004), structural transformation (Rogerson, 2008; Rodrik, 2016), the rise of automation (Caprettini and Voth, 2015; Graetz and Michaels, 2015), technological change more broadly (Acemoglu, 1998; Autor et al., 2003) or possibly due to migration (Becker and Fetzer, 2018; Dustmann et al., 2013).

that of this paper, Bó et al. (2018) carefully trace the economic origins of the recent rise in the populist Swedish Democrats to policy-induced economic losses exacerbating grievances between labor market "outsiders" and "insiders." They suggest that economic pressures may make people more receptive toward messages emphasizing the fiscal costs of immigration; the effect may be an indirect one, as they suggest that the growth in anti-immigration attitudes appears second order compared to the overall growth of distrust among the economic distressed. Guiso et al. (2018) study the supply- and demand-side of populism. After accounting for turnout, they suggest that economic insecurity is an important driver of demand for populist policies. Also in Sweden, Dehdari (2017) links economic distress to support for right-wing parties, while Algan et al. (2017) document that in areas and among individuals more exposed to economic shocks in the wake of the financial crisis, support for populist parties and distrust in political institutions grew. Trade integration with low-income countries may similarly have contributed to the buildup of economic grievances; these grievances have been suggested as an important causal factor behind the surge in populism (Autor et al., 2016; Colantone and Stanig, 2018; Che et al., 2017; Dippel et al., 2015).[2] While labor market dynamics are important in contributing to the growing reliance on the welfare state, the results presented here are not confounded by labor market shocks; rather, they capture genuine effects due to changes in the UK's welfare system.

Another related literature links the recent rise in populism to various forms of immigration, which typically features strongly in populist rhetoric. While the effects may depend on the underlying type of immigration (e.g. legal or illegal immigration, refugee movements), the literature broadly documents, with a few exceptions, that support for right-wing platforms increases in areas affected by migration (see Mayda et al., 2018 for the US, Dustmann et al., 2018 in Denmark and Halla et al., 2017 in Austria).[3] While anti-immigration rhetoric featured strongly

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[2]This builds on a rich literature studying the distributional effects of globalzation (Revenga, 1992; Autor et al., 2013; Grossman and Rossi-Hansberg, 2008; Scheve and Slaughter, 2001b).

[3]Scheve and Slaughter (2001a); Hainmueller and Hopkins (2014) study preferences over immigration policy in the United States. A rich literature studies the economic effects of migration: Ottaviano and Peri (2012); Dustmann et al. (2013) find immigration to have small negative effects for US and UK native residents with low human capital.

in the 2016 EU referendum campaign, the results presented here suggest that support for UKIP can be associated to an individuals' exposure to welfare reforms producing distinct grievances. By documenting that populist voting in the UK can be linked to exposure to austerity through welfare reforms, this paper relates to a growing literature studying the interactions between political preferences and austerity, or fiscal policy more broadly (Alesina et al., 2011, 1998). A paper closely related to this one is Galofré-Vilà et al. (2017), who link the rise of the Nazi Party in the 1930s to an area's exposure to austerity. Also related is the work of Ponticelli and Voth (2017), who find a positive correlation between austerity and popular unrest more broadly. Arias and Stasavage (2016) find no evidence of a political cost to austerity; their findings are similar to those of Alesina et al. (2011). This paper is able to tackle many plausible identification concerns that arise when working with low-frequency election results data, by turning to rich high-frequency individual level panel data. The paper presents evidence on a range of further margins, which indicate that exposure to welfare reforms produced tangible grievances that contributed to a consequential political effect: Brexit.

Lastly, the paper naturally relates to a growing literature on Brexit. Most of this work is purely cross sectional. By contrast, this paper comprehensively adds a time dimension.[4] Colantone and Stanig (2018), following the seminal paper by Autor et al. (2013), find compelling evidence suggesting that Leave support was distinctly higher in areas of the UK most exposed to import competition from low-income countries. This paper qualifies these findings, suggesting that post-2010 austerity, by cutting transfer payments to globalization's likely losers, is an important factor that can explain the timing of the UK's populist revolt. Further, the paper suggests that the economic origins of exposure to the welfare state (and, hence, to austerity) likely go beyond what can be explained by trade integration alone. Turning to the consequences of Brexit, Born et al. (2018), using a synthetic control approach, estimate a cumulative Brexit-induced output loss of £19.3 billion, accrued between the EU referendum and the end of the 2017 calendar year. Given that the fiscal

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[4]A rich descriptive correlational and purely cross-sectional literature emerged since the Leave vote (see Hobolt, 2016; Goodwin and Heath, 2016; Becker et al., 2017), while (populist) campaigning and social media around the EU referendum are studied in a few papers (Gorodnichenko et al., 2016; Goodwin et al., 2018).

savings of the austerity measures studied in this paper were projected to be around £18.9 billion per year, this suggests that the economic costs of Brexit are likely already higher than the austerity-induced fiscal savings that this paper argues significantly contributed to Brexit. More broadly, Dhingra et al. (2017) discuss the cost (and benefits) of the UK leaving the EU, while Breinlich et al. (2017) document the welfare losses due to inflation following the Brexit-induced drop in the value of the pound.

The rest of the paper proceeds as follows: Section 2, discusses the context and the main data. Section 3 provides motivating evidence. Section 4 studies the impact of austerity at the district level, while Section 5 turns to individual level data. Section 6 concludes.

# 2 Context and data

## 2.1 UK Politics, the EU, and the EU referendum

The UK joined the European Economic Community (EEC), the precursor of the EU in 1973, and held its first "in or out" referendum just two-and-a-half years later following the Labour Party's 1974 pledge to renegotiate the terms of British membership of the EEC, and to consult the public in a referendum on whether Britain should stay in the EEC on the new terms. The referendum on 5 June 1975 asked the electorate: "Do you think that the UK should stay in the European Community (the Common Market)?". The referendum resulted in a decisive victory for remain with a victory margin of 34.5 percent. Since the 1975 Referendum, the EEC has evolved into the central pillar of what became the European Union with the Maastricht Treaty of 1993. Further steps to European integration were formalized through the treaties of Amsterdam in 1997, Nice in 2001, and Lisbon in 2009.

In parallel to the growing institutionalization of the EU, opposition to further integration grew in the UK. The UK opted out of the single currency and the border-free Schengen travel area. After the Maastricht Treaty, the UK Independence Party (UKIP) formed out of the Anti-Federalist League, adopting a wider right-wing platform, making it the only significant party in the UK's political system that, prior to 2016, had the explicit goal of leaving the EU (Lynch

and Whitaker, 2013). UKIP gained traction over time, attracting defectors mainly from the Conservative Party, and developing a footprint in local, European and Westminster elections. Earlier cross-sectional work suggests that UKIP drew its supporters from two pools of voters: 1) more affluent middle-class "strategic defectors" from the Conservatives who identify with UKIP's Euroskeptic platform, and, later, 2) economically struggling, working-class voters with traditional Labour Party backgrounds (see Ford et al., 2012). Because electoral support for UKIP is tightly related with Leave support in 2016, it provides a good proxy variable to pick up broader "Leave sentiment," which, as I will show, encapsulates broader measures of disaffection as well.

UKIP was seen as a threat to the Conservatives leading the party to adopt anti-EU stances: In March 2009, the Conservatives left the centre-right block in the European Parliament to join a group of right-wing parties, while the 2010 Conservative manifesto set out "to bring back key powers over legal rights, criminal justice and social and employment legislation to the UK." In the run-up to the 2015 general election, UK Prime Minister David Cameron pledged to hold an EU referendum by the end of 2017 if the Conservative Party were to win the election. Reports suggest that Cameron never expected to find himself in circumstances necessitating action on his pledge as he, and most polls, predicted another hung parliament and a continuation of the coalition with the pro-EU Liberal Democrats.[5] Yet, electoral gains for UKIP in England and the SNP in Scotland split the opposition votes, resulting in a surprise outright election win for the Conservatives. After a round of negotiations with the EU, the EU referendum was called, with Cameron campaigning for Remain in 2016.

The official Leave campaign and UKIP's own Leave campaign used an aggressive populist campaign that likely would have resonated well in areas most affected by austerity. Throughout, the Leave campaign wrongly claimed that the "UK sends £350 million to the EU every single week".[6] The correct figure is £181

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[5]The Guardian, Cameron did not think EU referendum would happen, https://goo.gl/Vsmgnt, accessed 03.03.2019.

[6]The following inline quotes are from advertisements run by the Vote Leave campaign. These have been made available following a UK Parliamentary investigation in late July 2018 and can be accessed online https://goo.gl/UtX2QG.

million, amounting to 1.2 percent of overall UK government spending.[7] The campaign suggested that the UK's contribution to the EU budget could be used to support the National Health Service (NHS), which faced pressures that the campaign in turn blamed on immigration. The campaign highlighted that "layoffs and hospital closures continue throughout the UK" because "money is running out," stoking fears about whether "your local NHS [could] survive." The campaign suggested that leaving the EU was without risks as the UK would hold all the cards in any subsequent negotiations with the EU. It suggested that the UK could retain the benefits of EU membership without meeting any of its obligations, and it implied that a windfall profit would result from leaving the EU "to spend on OUR PRIORITIES and NOT THEIRS." Similarly, the campaign suggested that immigration is to blame for cuts in the UK health care system as "local hospitals are shutting down across the UK because of pressures from EU immigration policies". The campaign further claimed that "the EU acts overwhelmingly in the interests of big business and against the interests of workers," and suggested that remaining in the EU would erode workers' rights. Lastly, the campaign suggested that UK public money was wasted by supporting luxurious lifestyles of "corrupt" EU bureaucrats; it contended that "EU officials wasted thousands of pounds on elite chauffeur services and prestige cars." It is not inconceivable that this type of campaigning was particularly effective in areas and among people most affected by austerity.[8] After a 10 week campaign period, Leave narrowly won the referendum with 51.9% of the votes on 23. June 2016.

## 2.2 Measuring Leave sentiment

Throughout this paper, the electoral performance or expressions of support for UKIP is a key outcome variable. I next describe both the data on the electoral

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[7]Office of National Statistics, The UK contribution to the EU budget, https://goo.gl/nsVuaD, accessed 03.03.2019.

[8]UKIP's 2015 manifesto was not campaigning on a very distinct anti-austerity platform compared to, for example, Labour. Their manifesto was similar to Labour's by promising to revoke the "bedroom tax" for example; it mainly stood out suggesting that the UK leaving the EU would produce a fiscal windfall to be spend on preserving the NHS. Similar funding pledges for the NHS, albeit not linked to EU membership fees, were included in Labour's manifesto.

performance of UKIP across elections, and the individual-level panel data.[9]

**Election data**   I leverage data from the population of electoral contests between 2000 to 2015, drawing on data from Westminster, European, and local council elections in this time frame, as well as from the 2016 EU referendum. The performances of UKIP across the different types of electoral contests over time are presented in the left panel of Figure 1. Support for UKIP surged significantly after 2010 across all election types, yet, the overall levels of support for UKIP are different, which is due to the different electoral systems and due to the way election results are reported. Westminster elections are conducted using a first-past-the-post (FPTP) electoral system, which results in voters casting their votes strategically, favoring large parties. As a result, UKIP, like most other small parties, has performed quite poorly, with its vote share being well below 10 percent prior to 2010. Yet, in 2015 UKIP came in third, winning 12.6 percent of the popular vote, while still only winning a single seat (which was held by a Conservative Party member who had defected to UKIP), highlighting the distortions introduced by FPTP.[10] Constructing consistent measures of an area's population's political preferences across Westminster elections is difficult due to regular constituency boundary changes. Bearing in mind these caveats, I harmonize the results across elections to the 2001 constituency boundaries using detailed ward-level shapefiles together with 2001 population figures. The resulting data set is a balanced panel of 570 harmonized constituencies in which I measure UKIP's vote share; I assign an area with a zero if UKIP did not field a candidate there.

I also leverage data from the European Parliamentary (EP) Elections held in 2004, 2009, and 2014. These elections report results at the local authority district level. Importantly, they essentially use proportional representation to allocate the British seats in the European Parliament. Not surprisingly, as strategic voting concerns do not weigh in, UKIP has significantly higher vote shares, increasing from 15.6 percent in 2004 to 26.6 percent in 2014. The extent and the spatial distribution

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[9]Summary statistics of the main variables are provided in Appendix Table A1.

[10]A further distortion may be introduced since not all parties field candidates in each constituency. After 2001, this is not a major concern for the analysis as UKIP fielded 496 candidates in 2005, 558 candidates in 2010, and 624 in 2015 across roughly 650 potential seats.

of UKIP support base across EP elections changed significantly between 2004 and 2014, as Figure 2 illustrates. UKIP gains since 2004 are most concentrated in the coastal regions, Wales, and parts of the industrial areas of the Midlands. Panel C presents the spatial distribution of the 2016 EU Leave vote share, for which the official counting areas were also the 380 local authority districts; the map highlights the tight relationship between an areas' support for UKIP and support for the Leave already alluded to earlier. While EP elections use proportional representation, and are thus able to pick up protest voting quite well, EP elections usually have low turnout. Further, EP and Westminster elections happen only infrequently, which may limit the statistical power of analysis exploiting time-varying shocks.

To navigate the issue of the low-frequency nature of EP and Westminster elections, I also make use of local council election data for England and Wales since 2000. Local elections have an appealing feature in that, rather than happening uniformly across the UK every four years such elections may take place in any given year across the UK due to the rotating fashion by which councillors are elected.[11] The left panel of Figure 1 highlights that across local elections, UKIP's vote share hovered between Westminster election performance (as lower bound) and European election performance (as upper bound), ranging from between 5 percent and 12 percent in the 2004-2009 period, and peaking at 22.7 percent in 2013. Yet, the figures are likely downward biased because most local elections are conducted at the local ward level, while election results are collated at the level of the local authority district.[12] This implies that if UKIP does not field candidates in each of the races at the ward level, UKIP's vote shares are mechanically downward biased as wards that were not contested mechanically contribute zero votes.[13]

While each of the different types of election results data has its own advantages and disadvantages, the results focusing on election outcomes are robust across election types. I next detail the individual-level panel data, which allow for sharper empirical designs and finer outcome measurement.

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[11]Terms last for four years, and most councils hold elections by "thirds" with a third of the seats up for election each year, and with no election held one year. See appendix B.1 for more details.

[12]The ward-level boundaries are changing over time; as of 2014, there were 9,456 electoral wards.

[13]Results are robust to restricting to districts in which UKIP almost continuously contested.

**Individual-level panel data** This paper leverages a newly constructed individual-level panel data set, making use of the USOC panel study with approximately 40,000 households contributing across the UK. Participating households are visited, on average, every year. Interviews are carried out face to face in respondents' homes by trained interviewers or through a self-completed online survey. Respondents are coded based on the residence at the district-level and in this paper, I use data from the first eight waves covering the years from 2009 to 2016. Given the gradual data collection, I can construct a quarterly individual-level unbalanced panel.

The survey instruments used across waves are quite harmonized. In particular, each survey wave includes an instrument eliciting respondents' and households' sources of income and employment status. Further, most survey waves include a module to elicit political preferences. Respondents are first asked "whether they see themselves a supporter of a specific political party" or "whether they are closer to a political party compared to another." If neither of these questions is successful in eliciting a response of a party name, the remainder of the respondents are asked which party they would vote for if a general election were held tomorrow. The resulting answers are coded as dummy variable if respondent expresses support for UKIP (or any of the other parties).[14] Panel B of Figure 1 presents the share of respondents expressing support for UKIP over time. The plot highlights that support for UKIP surged from around 2013 onward, and remained distinctly high among individuals directly exposed to any of the three welfare reforms studied in detail in Section 5. In addition to asking questions about political party preferences, survey waves two, three and six included further measures of of broader dissatisfaction or discontent, asking questions of individual's perceived political influence (whether individuals think their vote makes a difference), the extent to which they think that "public officials do not care" or that they have "no say in what government does." I use these measures as further outcome variables capturing broader discontent and anti-establishment sentiment. These sentiments

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[14]Hence, for a significant share of respondents, preferences are elicited without election framing; I further can directly tackle issues concerning prospective turnout as respondents can state that they would not vote or support any party (Bursztyn et al., 2017; Guiso et al., 2018). More details on the data are provided in Appendix B.2.

are strongly associated with Leave preferences and also strongly increase among those exposed to welfare reforms. Further, as I later discuss in detail, the data allow me to study other adjustment margins directly relevant to some of the reforms studied. Lastly, the most recent USOC wave 8 actually asks the EU referendum question, providing an additional, immediately relevant outcome measure, which I will link with the empirical analysis of support for UKIP and the measures of broader discontent.

I next present a range of stylized facts used to motivate the subsequent analysis.

# 3 Where (and when) did UKIP start to grow?

I first present a range of stylized facts, which highlight that UKIP-support distinctly grew in areas with weak socioeconomic fundamentals, but only after 2010.

## 3.1 Empirical specification

Using data from the local, Westminster and EP elections, I estimate the following regression:

$$y_{i,r,t} = \alpha_i + \beta_{r,t} + \sum_{t \neq 2010} \eta_t \times Year_t \times X_{i,baseline} + \epsilon_{i,r,t} \tag{1}$$

where $y_{irt}$ denotes UKIP vote shares in council, Westminster and EP elections. The fixed effect $\alpha_i$ absorbs any time-invariant differences in political preferences or sentiment across districts.[15] Region-by-time fixed effects $\beta_{rt}$ capture non-linear time trends specific to each of the eleven regions across the UK. The main coefficients of interest are the interaction terms between (fixed) baseline socio-economic characteristic $X_{i,baseline}$ and a set of year fixed effects. I plot out the estimated coefficients $\hat{\eta}_t$ over time relative to 2010 as the reference year (2009 for the EP elections) to capture how UKIP differentially gained support over time as a function of $X_{i,baseline}$. Throughout the paper, standard errors are clustered at the district level (constituency level for the Westminster election analysis).[16]

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[15]Local Council election results, similar to EP elections, are reported at the district level; the Westminster election results data is presented at the harmonized 2001 constituency level.

[16]Districts are the main meaningful subnational administrative unit in the UK. Results are robust to computing spatial HAC errors or clustering at a higher level statistical areas.

I focus on four main characteristics $X_{i,baseline}$ that stand out due to their prominence in the cross-sectional analysis of the Leave vote and their relevance to the wider literature: the share of the 2001 resident population with no formal qualifications, the share working in routine jobs, and the working-age resident population shares working in the manufacturing and retail sectors.[17]

## 3.2   Results

I discuss results for the local elections presented in Figure 3 in more detail.[18]

**Human capital**   Panel A of Figure 3 focuses on a baseline proxy measure of area's population's *human capital*. The results suggest that support for UKIP gradually trends up as a function of the share of the resident population with low educational attainment. The correlation between support for UKIP and the measure of low human capital only becomes sharply stronger *after 2010*.

**Routine jobs**   In Panel B of Figure 3, I present results when studying how the degree of correlation between support for UKIP in local elections and the share of an area's working-age population employed in routine jobs as per the Census *socioeconomic status* classification. Prior to 2010, support for UKIP is not statistically associated with the share working in routine jobs. Since 2010, this correlation becomes sharply stronger, which can account for, on average, 7.5 (or 6.7) percentage points of the increase increase in UKIP vote shares in local elections since 2010 (in EP elections between 2009 and 2014).

**Economic structure**   Lastly, panels C and D of Figure 3 zoom in on measures of a district's *local economic structure*, focusing on employment shares in retail and manufacturing sectors. The latter is of particular interest due to the manufacturing sector's exposure to trade integration. The retail sector is represented all across the country, and the sector is, for the bulk of jobs, not directly subject to global trade exposure; at the same time, however, it provides relatively low-quality jobs, and

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[17]Appendix C.1 shows that patterns presented here are robust to alternative fixed effects, different sample cuts and broader or more refined baseline measures. Further, in appendix C.2, I document that the growth of UKIP is mostly at the expense of the Conservative party.

[18]Appendix Figure C1 and Figure C2 highlight that I obtain very similar results studying UKIP's performance in EP and Westminster elections.

is likely indirectly affected by contractions in consumer spending. Areas with larger employment shares in retail and manufacturing saw significant increases in electoral support for UKIP *after 2010*. As we will see, these sectors are disproportionately affected by the contraction in local area incomes due to austerity.

**Discussion** The observation that UKIP, after 2010, starts to thrive distinctly in areas characterized by low educational attainment, and a significant share of the population working in routine jobs or in manufacturing or retail suggests that the underlying causal drivers of the EU referendum may go *beyond* what is currently known. The extent of knowledge on this issue has been limited because most papers thus far have studied the topic using cross-sectional data.[19] A central question is why the structure of support for UKIP only changed so rapidly after 2010. The next sections presents evidence on how austerity is the likely causal factor explaining these trends, starting with aggregate district-level evidence in Section 4 and then moving to evidence from individual-level data in Section 5.

# 4 Austerity as activating factor?

I next present evidence from aggregate data suggesting that austerity measures are likely factors behind the shift toward UKIP.

## 4.1 Aggregate trends in fiscal spending

In the wake of the financial crisis, the Conservative-led coalition government that came to power after the May 2010 General Election brought forward wide-ranging austerity measures to reign in public-sector deficits. The government cut spending across all levels of government. Panel A of Figure 4 suggests that, starting in 2011, spending for welfare and social protection dropped significantly, declining by 16 percent in real terms, falling to levels that had last been seen in the early 2000s. Spending on healthcare, which was spared direct cuts, flatlined. Yet the rapidly aging population added pressures on health care services. Further, spending on education contracted by 19 percent in real terms, while expenses for

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[19] Colantone and Stanig (2018) suggest that import-competition may be an important causal factor that can explain Leave support. In Appendix Figure C8, I partial out non-linear time trends in their main measure along with trends in manufacturing employment. Throughout, the patterns remain intact suggesting that import-competition may only explain a part of the Leave vote.

pensions steadily increased, suggesting a significant shift in the composition of government spending. The Conservative-led government used three methods to cut spending. First, the initial wave taking immediate effect with the announcement of the autumn budget in 2010 cut budgets for day-to-day spending across most Westminster departments.[20] Local government funding fell significantly, putting pressures on local councils to provide services, despite increasing demand due to population growth (Innes and Tetlow, 2015). A second significant component took the form of nominal freezes. From 2011 to 2013, the government froze salaries of public-sector employees earning more than £21,000. Beginning in 2014, it capped public-sector wage growth at 1 percent. Similar freezes were introduced for most welfare benefits, resulting in cuts in real terms, as inflation averaged between 2 and 4 percent throughout this period. In this paper, I focus on the third important component of austerity – the reform of the welfare state – which was set in motion through the Welfare Reform Act 2012.

## 4.2 Exposure of welfare cuts at the district level

I draw on data from Beatty and Fothergill (2013), who, using detailed data on the distribution of claimants across different types of benefits before reforms became effective, provide an estimate of the incidence of the different welfare cuts at the district level. Beatty and Fothergill (2013) consider 10 different measures, which, taken together, were expected to yield fiscal savings of up to £18.9 billion per year by 2015. The estimates of the intensity of exposure of an area to the welfare reforms are "deeply rooted in official statistics" drawing in "data from the Treasury's own estimates of the projected savings, the government's impact assessments, and benefit claimant data."[21] The exposure of an area to specific reforms is measured as the financial loss per working age adult in a district and year. The aggregate figure masks a wide range of variation in the intensity of treatment, which is driven by the heterogeneity in the distribution of benefit claimants across the UK prior to the reforms. This variation is visually presented in Panel B of Figure 4. The overall projected financial loss per working adult varied between £914 in

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[20]The Department for International Development and the Department for Health, which funds the National Health Service (NHS), were spared cuts.

[21]Online Appendix B.3 provides more detailed description of the data.

Blackpool and £177 in the City of London.

The measures with the largest effect were the reform of tax credits, changes to child benefit, and the capping of benefit increases to account for inflation to 1% per year. Tax credits are a means-tested transfer to households to top up low incomes; child benefit is an unconditional benefit paid out to families. The reform of tax credits involved a faster withdrawal of the transfer payment as income grows, in addition to a host of changes to eligibility requirements. This complexity makes identifying the affected group in the population difficult because exposure depends on a rage of characteristics. In the case of child benefit, the main measure was to make the benefit means tested withdrawing child-benefit from better-off households with at least one earner with an annual pre-tax income above £50,000.

According to the estimates from the Department of Works and Pensions, these three measures alone were expected to generate around £10 billion in savings per year by 2015. It is estimated that changes to tax credits and child benefit affected between 4.135 million to 6.980 million households, or roughly between 15-25 percent of the 27.2 million UK households. My paper demonstrates that these specific measures, while having small direct effect on individual households, had sizable indirect effects on the local economy.[22] In the individual-level analysis, I focus on three smaller welfare reforms – the abolishment of council tax benefit, the so-called "bedroom-tax" and the introduction of Personal Independence Payments replacing Disability Living allowance – about which I provide more detail later in Section 5. I first estimate the impact of the overall welfare-reform austerity measures on voting outcomes, incomes, and support for Leave.

## 4.3 Empirical strategy

I perform three related exercises. First, I estimate a difference-in-differences specification to study how support for UKIP distinctly grew after 2010 in areas more exposed to cuts across local, European and Westminster elections. I further explore an event study design similar to specification 1, where I replace the measure $X_{i,baseline}$ with a measure the exposure of district $i$ to welfare reform $j$,

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[22]In total, the paper studies five measures in some detail. The other reforms are indirectly accounted for in the overall austerity impact measure. Appendix Section B.3 explains how data availability guides the focus on these reforms.

Austerity$_{i,j}$. Further, I study a specification allowing me to estimate local multipliers. The pooled difference-in-difference specification takes the following form:

$$y_{i,r,t} = \alpha_i + \beta_{r,t} + \gamma \times \mathbb{1}(\text{Year} > 2010) \times \text{Austerity}_{i,j} + \epsilon_{i,r,t} \qquad (2)$$

The only difference compared to the earlier *event studies* specification 1 is that the treatment periods are pooled together. As we will see when studying the event studies as second exercise, this is likely to underestimate the specific impacts of some benefit cuts that only became effective starting 2013.

For the third exercise, the estimation of local multipliers, I obtained district-level data from the Office of National Statistics (ONS) on local area gross value added by sectors.[23] I also estimate an event study to highlight that contractions in district GDP due to austerity only occur after austerity takes effect. Lastly, I show that exposure to austerity, changes in support for UKIP and higher levels of support for Leave in 2016 in the cross section are tightly linked.

## 4.4 Results

I first discuss the pooled difference-in-difference results, before turning to the event studies and the estimates of the multipliers.

**Pooled difference-in-difference**  The results from estimating specification 2 are presented in Table 1. The rows explore UKIP's electoral performance in local, European and Westminster elections, while the columns explore the different welfare reform *j*-specific measures Austerity$_{i,j}$ taken from Beatty and Fothergill (2013). Column 1 studies the impact of the overall estimated impact of the reforms. The average anticipated financial loss per working-age adult was estimated to be £447.1. Given that the median household disposable income in the UK stands at just around £27,300, this is a non-negligible amount. The point estimates indicate a strong positive relationship between the austerity exposure and UKIP's electoral performance. Computing the full in-sample distribution of point estimates implied by column (1) suggests that UKIP's electoral performance increased, on average, by 6.5, 3.5, 3.8 percentage points across local, European or Westminster elections

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[23]The data are available from the ONS at https://goo.gl/eJgiLf, accessed 15.06.2018.

respectively after 2010.

Columns 2-6 zoom in to a set of specific benefit cuts, in particular, changes to tax credit (TC) and child benefit (CB). For the former, I find sizable effects on support for UKIP, while for the latter the results are more mixed. This is due to the nature of the child benefit cut, which affected relatively well-off households. Other key welfare reforms (which are described in detail in Section 5.2) - abolishing council tax benefit (CTB) and the disability living allowance (DLA), and the "bedroom tax" (BTX) - almost exclusively affected low-income households. For these benefit cuts, I have reasonably sharp timings and eligibility rules that I can trace out in the individual-level data. Across most of these specific reforms, the aggregate election data suggest similar sized effects across Panels A - C.

At the bottom of Table 1, I provide some summary statistics on the size and distribution of the cuts. For example, the bedroom tax explored in column (6) was expected to yield fiscal savings of just £10.81 per working-age adult; yet, the measure was much more concentrated, affecting an estimated 660,000 households. Further, I also provide the correlations between the share of working age households affected by the reforms and the baseline district measures explored in section 3. This highlights non-negligible cross-correlations between an area's exposure to austerity and these measures, indicating that indeed, benefit cuts were particularly concentrated in areas with significant resident shares with low qualifications or significant working-age adult populations working in routine jobs.

**Event studies** The pooled difference-in-difference analysis, by averaging the co-efficient estimates after 2010, may underestimate the effect of austerity. Welfare cut measures, such as freezing of benefits, or changes in inflation indexing, compound over time, while others only become fully effective at a later date. This only affects the local election results, because for Westminster and EP elections, only a single election occurred in the time window between 2010 and 2015 before the referendum. Nevertheless, looking at Westminster and EP elections is still useful in terms of whether support for UKIP in more austerity-exposed areas followed similar trends prior to the time when the reforms took effect.

While the vast majority of benefit cuts were introduced as part of the Wel-

fare Reform Act 2012 and became effective with the start of the financial year in 2013, some measures, such as reforms to tax credits or nominal freezes had already taken effect in 2011. In the event studies presented in Figure 5, I focus on the overall austerity exposure measure in Panel A, as well as three individual policies further detailed in the next section. Throughout, there is no evidence of systematic divergence before 2011 in a fashion that is correlated with exposure to austerity. Markedly, the timing is also quite consistent with the specific measures. The first effects appear in 2012 for the overall austerity measures in Panel A, which is significantly carried by the tax credit reforms taking effect from April 2011. The estimated coefficient for the year 2015 is, not surprisingly, larger compared to the pooled difference-in-difference estimates: the full distribution of implied effect sizes across England and Wales suggests that the main austerity measure can explain an increase in support for UKIP of 11.9 percentage points by 2015.

Panels B - D focus on three reforms further detailed in the next section – the abolishment of council tax benefit, the so-called "bedroom-tax" and the introduction of Personal Independence Payments replacing Disability Living allowance. There is no evidence of diverging pre-trends for any of these reforms. The timing of each of the effects is quite consistent with the times at which various measures (particularly for the abolishing of the council tax benefit) took hold.[24]

**Local multipliers**  I estimate local spending multipliers as a further plausibility check. The average local authority district was expected to lose £447.1 per working-age adult in transfer income, which should result in further indirect contractions of local incomes. I estimate these multiplier effects using data on local-area GDP estimates. The only difference from the main estimating equation is that the dependent variable now is the log value added per working-age adult by sector, while the independent variable is the overall austerity-exposure measure.

The results are presented in Appendix Table A3. The estimates suggest a significant negative relationship between austerity exposure and local GDP: for every

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[24]Appendix Figure A2 presents the same figures for Westminster elections. Appendix Figure A3 looks at EP elections. In Westminster elections there are no evident pre-trends, while for EP, there are a noteworthy trend-changes after 2009. Further, results are robust to linear time trends as evidenced in Appendix Table A2.

pound contraction in transfer income to working-age adults, local-area gross value added contracts by around 2.4 pounds. The multiplier effects are broadly carried by contractions in the distribution and retail sectors, as well as by the manufacturing sector. The magnitude of the multipliers and the distribution across sectors are quite consistent with estimates in the wider literature (Ilzetzki et al., 2013).[25]

**Austerity, UKIP, and Leave support in 2016**   The previous results suggest that austerity, at the aggregate level, is consistently and significantly associated with the steep rise in support for UKIP after individual austerity measures started to take effect. In turn, changes in support for UKIP across elections and the Leave vote are also tightly linked. In column (1) of Appendix Table A4, I highlight that areas exposed to austerity experience higher levels of support for Leave in 2016. Similarly, column (2) suggests that areas that see marked swings to UKIP across the three election types studied see higher levels of support for Leave in 2016. Across election types, the estimated coefficients suggest that a 1 percentage point larger swing to UKIP is associated with a 0.9 to 1.9 percentage point higher level of support for Leave in 2016. Column (3) further highlights that changes in support for UKIP are tightly correlated with the district-level austerity exposure: after controlling for the swing to UKIP, the coefficient on the austerity measure shrinks markedly. This suggests that a lot of the variation that drives the correlation between the austerity measure and the Leave vote share can, in fact, be captured by the change in support for UKIP.

I next turn to use these observations to provide back-of-the-envelope calculations. The estimated effects of austerity and UKIP are sizable and substantially meaningful: *a victory for Remain* in the 2016 EU referendum would have been much more likely, had it not been for austerity. Taking the point estimates from column (2) of Appendix Table A4, which links changes in support for UKIP with leave support in 2016, I can obtain estimates of the potential impact that austerity had on support for leave. For European election, the previous analysis suggests that the austerity-induced increase in support for UKIP of around 3.5 percentage points may have translated into up to $3.5 \times 1.9 = 6.7$ percentage points higher levels of

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[25]Appendix Figure A4 shows that there are no pre-trends in local area gross value added across districts and that the contraction is tightly related with the onset of austerity after 2010.

support for Leave. For local elections, the full distribution of pooled difference-in-difference estimates suggested that the austerity exposure can account for, on average, a 6.5 percentage point increase in support for UKIP. Taking the corresponding point estimate from Appendix Table A4 suggests that leave support could have been at least $6.5 \times 0.9 = 5.9$ percentage points lower. In the event studies for local elections, the analysis suggested that the increase in support for UKIP by 2015 that can be attributed to the main austerity measure is 11.9 percentage points. This would suggest that leave support in 2016 could have been up to $11.9 \times 0.9 = 10.7$ percentage points lower. This implies that even conservative estimates would suggest that Remain would have won the EU referendum had it not been for austerity.

Despite the consistency of results in terms of timing, magnitude, and election types, a range of concerns still make it difficult to interpret the results in a causal fashion. In particular, selection into benefit receipt could be endogenous to an area's exposure to austerity. In addition, austerity may affect political preferences, and contribute to the buildup of Leave sentiment more broadly in ways that do not necessarily operate solely through changes in support for UKIP. Lastly, the observed changes in the election results could also reflect changes in composition of turnout (Guiso et al., 2018). To tackle these concerns, I next turn to an individual-level panel, which will allow me to get cleaner identification by tracking pools of individuals affected by specific welfare reforms over time.

## 5 Turning to individual level evidence

To overcome the issues highlighted when studying aggregate data, I turn to *individual-level panel data* constructed from the USOC study starting in 2009.

### 5.1 Capturing individual exposure to welfare cuts

The main advantage to using individual-level data is that, in addition to providing multiple reasonable outcome measures capturing facets of political preferences, it can be used to construct more refined measures of an individual's exposure to reforms. The USOC survey contains an "Unearned Income and State Benefits module," which asks the respondent questions about their receipt of benefits. This allows the identification of reasonably clean subsets of individuals who

received benefits of certain types and were thus, exposed to reforms.

The substantive concern for causal identification is *selection*. Individuals can be exposed to austerity in three different direct ways. First, individuals who have received benefits prior to the reform, may lose benefits altogether as a result of the reforms. Second, individuals who were not receiving benefits, due to a host of reasons (possibly related to austerity), may start receiving benefits from a now less generous welfare state. Third, individuals who had already and continuously received the same benefit prior to a reforms could see a reduction in the value or quality of the benefit. The main challenge is to distinguish those selection in (or out) of benefits as a result of the reforms vis-a-vis those whose personal situation changes for reasons unrelated to the welfare cuts.

## 5.2 Zooming in on individual benefit reforms

I next discuss three welfare reforms affecting roughly 10 percent of all UK households, for which I can tackle selection concerns rather well.

**Council tax benefit abolishment (CTB)**   Council tax is a tax levied by local councils to pay for some public goods (e.g., waste collection). Up until April 2013, people earning low incomes could be exempted from paying council tax, or they could receive a rebate. The central government financed this benefit, but it was canceled without replacement starting with the new fiscal year in 2013. As a result, an estimated 2.4 million households across the UK were asked to pay the full council tax for the first time starting in April 2013. The extent of council tax varies across the UK from council to council, but is usually at least around £1,000 annually per household. I identify the population of individual households affected by this reform based on whether they consistently received council tax benefit *at all the times* they were surveyed prior to April 2013. This set of individuals was most likely affected by the abolishment of the council tax benefit and it is unlikely that results are conflated by endogenous selection. For the estimating equation to be explored in detail further below, I define a subset of treated individuals as:

$$T_{i,CTB} = \begin{cases} 1 & \text{received council tax benefit prior to April 2013} \\ 0 & \text{else} \end{cases}$$

In addition, the USOC survey instrument consistently asked respondents whether they were "behind with their council tax payments," allowing me to provide evidence on a direct reform impact margin.

**Disability Living Allowance (DLA)**  Established in 1992, the Disability Living Allowance (DLA) was a social security benefit paid to disabled individuals aged under 65 to help cover the cost of a personal care and/or mobility need due to a disability. It was a tax-free, non-means tested and non-contributory benefit with an estimated 3.2 million claimants across the UK by 2012. The Welfare Reform Act of 2012 lead to the replacement of DLA with a new system of benefits called Personal Independence Payments (PIP). PIP could be claimed by working-age claimants, and continues to be non-means tested; but involves regular work-capability assessments carried out by private contractors on behalf of the government.

The transfer to the new system caused significant public outcry. While only a relatively small share of DLA claimants lost their benefit following the reassessment, a change in the quality or conditionality of awards (by requiring regular work capability checks, for example) affected a non-negligible share of the 73 percent of recipients transitioned to PIP.[26] The PIP roll out started from the 28th of October, 2013 existing beneficiaries from DLA were gradually converted to PIP. Unfortunately, I do not know when individuals were converted from DLA to PIP, because these two benefits are lumped together in the benefit-receipt data.

To tackle selection, I focus on the subset of claimants who had a so-called indefinite award of DLA and, prior to the introduction of PIP, were not required to regularly reapply for the benefit. I code these lifetime recipients as treated from the fourth quarter 2013, when the roll-out of PIP started. For the empirical design, this set of affected individuals is identified as follows:

$$
T_{i,DLA} = \begin{cases} 1 & \text{always received either DLA or PIP} \\ 0 & \text{else} \end{cases}
$$

Technically, all DLA recipients with a lifetime award should receive a similar mon-

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[26]Department of Works and Pensions (DWP), "Personal Independence Payment: Official Statistics, October 2017", https://goo.gl/M46Tj6, accessed 23.06.2018.

etary award through PIP. Nonetheless, the process and the requirement for assessment are said to have caused significant grievances.[27]

**Bedroom tax (BTX)**  Housing benefit is a benefit paid to individuals on low income living in social housing, as government-subsidized rental properties are called in the UK. As of April 2013, all current and future working-age tenants renting from a local authority, housing association, or other registered "social landlord" ceased to receive help that had previously been available to defray the costs of a spare room. This provision was also dubbed the "bedroom tax" in the popular press as it implied that a lot of working-age parents, whose children had moved out, found themselves living in accommodation with a spare bedroom. The rules allow one bedroom for each adult couple, for each single person over 16, for each two children of the same sex under 16 and for each two children of either sex under 10. Significant cuts were imposed on housing benefit for individual recipients who were found to have a spare room as per these definitions; financial support to pay rent fell by 14 percent for those found to have one spare bedroom, and by 25 percent for those found to have two or more.

I identify individuals who were most likely affected by the "bedroom tax" as follows. They must *continuously live in social housing* (roughly 16.4 percent of the sample) and, they must have a spare bedroom as per the governments definition the most recent time they were surveyed before April 2013.[28] This defines a simple treatment indicator used in the various difference-in-difference estimations.

$$T_{i,BTX} = \begin{cases} 1 & \text{lives in social housing with excess bedroom(s) prior April 2013} \\ 0 & \text{else} \end{cases}$$

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[27]Anecdotes that generated outrage proliferated in the media. For example, articles reported that wheelchair-bound claimants were asked to attend reassessment appointments in non-accessible facilities, and claimants with trisomy 21 (Down syndrom) were asked when they "caught it." Further, there were concerns about the qualification of the staff of two private firms tasked with conducting the reassessments. The Independent, "Disability benefit assessors failing to meet Government's quality standards," https://goo.gl/uX4yD5, accessed 23.06.2018.

[28]The requirement of living continuously in social housing is a conservative as some households attempting to avoid the bedroom tax may have moved to the private rented sector in anticipation. The spare bedroom indicator is constructed using the information on the household composition and the age distribution of children allowing a near replication of the governments criteria.

The bedroom tax was widely debated and affected more than 660,000 households across the country. To avoid financial losses, the government encouraged households to "move to accommodation which better reflects the size and composition of their household."[29] I can directly measure two impact margins relevant to this benefit cut: the number of bedrooms in the respondent's accommodation after April 2013, and further, whether individuals report to be "behind with their rent."

**Combined treatment**   In addition to using these three groups to define exposure to treatment $T_{i,j}$ with $j \in \{$CTB,DLA,BTX$\}$, I also construct a combined dummy $T_{i,\text{ANY}}$ that takes on a value of one if a respondent household belongs to either of these groups. In total, 10 percent of my USOC sample are affected by either of these three treatments, which is similar compared to the aggregate estimate from Beatty and Fothergill (2013), suggesting that between 2 million to 3 million households (around 10 percent of households) were affected by these three measures. I next discuss the empirical strategy.

## 5.3   Empirical strategy

As before, I present results from pooled difference-in-difference designs as well as event studies.

**Pooled difference-in-difference**   I begin by estimating simple pooled difference-in-differences, across a range of specifications that include different sets of fixed effects. The least demanding specification will be the equivalent to the specifications estimated in the previous sections, controlling for district- and region-specific non-linear time effects, but now exploiting individual-level data. The most demanding specification, with $i$ indexing an individual, takes the following form:

$$y_{i,d,w,t} = \alpha_i + \beta_{d,w,t} + \gamma \times Post_{i,j,t} \times T_{i,j} + \epsilon_{i,d,w,t} \qquad (3)$$

The inclusion of individual-level fixed effects $\alpha_i$ implies that I exploit only *within-individual variation*. The time fixed effects, $\beta_{d,w,t}$, are very demanding because they are specific to each of the 378 districts. They thus absorb any district-specific time-varying shocks affecting outcomes of respondents living in the same districts in a

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[29]DWP Assessment: Under-occupation of social housing, June 2012, https://goo.gl/xFWDqW.

common fashion. This amounts to estimating more than 12,000 coefficients.[30] Importantly, these district-specific time effects also quite richly control for the indirect exposure to austerity that the analysis of the local multipliers suggested.

The main coefficient of interest is $\gamma$, which captures changes in the outcome variables $y_{i,d,w,t}$ after, indicated by $Post_{i,j,t}$, a benefit cut $j$ became effective for the subpopulation indicated by $T_{i,j}$. The main outcome variable studied $y_{i,d,w,t}$ is a dummy variable indicating whether respondents reveal a preference toward UKIP. In addition, I study a range of reform-specific auxiliary outcome measures that are either immediately relevant to the welfare cuts, or capture political perceptions more broadly.

**Event studies** I also estimate a range of event studies for the specific benefit cuts, using less demanding specifications, but fully exploiting the frequency of the survey data that arises due to the staggered data collection for the USOC waves.

The estimation specification is as follows:

$$y_{i,d,r,w,t} = \alpha_d + \beta_{r,w,t} + \sum_{t=2010q1}^{2015q4} \gamma_t \times Time_t \times T_{i,j} + \epsilon_{i,r,w,t} \tag{4}$$

This specification is almost identical to the specification studied when using aggregate data with two differences. The time fixed effects $\beta_{r,w,t}$ are resolved at the quarterly level specific to the survey wave $w$ and region $r$. I estimate a full set of quarter time effects $\gamma_t$, to draw event study plots showing how the outcome variables $y_{i,d,r,w,t}$ evolved over time relative to the timing specific to a reform $j$.

## 5.4 Results

I first discuss the results from the pooled difference-in-difference exercise, before turning to the event studies.

**Pooled difference-in-difference** The pooled difference-in-difference results are presented in Table 2. The dependent variable in this table is a dummy indicating whether an individual expressed support for UKIP. Columns 2-4 provide estimates for the three different welfare reforms affecting different subpopulations,

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[30]Such shocks could be austerity-caused closures of libraries or parks. The fixed effects are also specific to each survey-wave to control for survey-specific idiosyncrasies.

while column 1 combines these into a single treatment indicator that is switched on from April 2013. The different Panels A - C employ different sets of fixed effects for the estimation. Panel A controls for district and region by survey-wave by time fixed effects. This empirical design comes closest to the estimations conducted in the previous sections by exploiting district-level variation. This empirical design comes closest to the estimations conducted in the previous sections by exploiting district-level variation. Across the different welfare reforms, the population likely exposed to a reform is significantly more likely to express support for UKIP after these reforms became effective. The point estimates are economically sizable and precisely estimated, indicating that the treated population sees an increase in the propensity to support UKIP by between 2.6 - 5.1 percentage points. In relative terms, the propensity to support UKIP increases by between 53 percent and 108 percent (relative to the mean of the dependent variable which stands at 4.7 percent). While the mean of the dependent variable appears low, suggesting that the effects are driven by a small subpopulation, it should be seen relative to levels of support for other political parties. The Liberal Democrats, the UK's other main party, sees support in the USOC population averaging at just 8.2%; hence, the UKIP figures are not dramatically lower. In the next section, I explore a set of further outcomes to allay concerns about the validity of the outcome measure.

Panel B only exploits within-district variation, controlling for district by survey wave by time fixed effects. This effectively controls for any idiosyncratic and time-varying shocks affecting all residents in a specific districts. Such common shocks could, e.g. be capturing the indirect economic effects of austerity affecting the wider local economy or other local shocks. Throughout, the results remain very similar across the different measures.

In Panel C finally, I only exploit within-individual variation within districts, controlling for individual-level fixed effects in addition to the district and survey specific time fixed effects. Though this comes at the cost of losing some statistical power, the results remain precisely estimated.

**Event studies** I next turn to the event studies for the council tax benefit and the bedroom tax.[31] I begin by studying the abolishment of council tax benefit. The results are presented visually in Figure 6. The left panel presents the average support for UKIP among those individuals who have consistently received council tax benefit at all times prior to its abolishment. The vertical line marks the date from which the council tax benefit was abolished. The propensity to support UKIP is consistently higher, on average, after the benefit was abolished which most likely affected this subpopulation. Panel B highlights that this subpopulation is indeed affected by the benefit cut; the share of individuals in the treated subpopulation stating that they are behind with their council tax payments rises sharply and in a very timely fashion. In Appendix Figure A5, I further highlight how, for this population, a marked and timely significant drop occurs in benefit income and gross income, while labor income remains unaffected.

Next, I turn to study the effects of the bedroom tax, which affected households on low incomes living in social housing. The results are presented in Figure 7. The left panel presents the effects on support for UKIP among the group of individuals affected by the bedroom tax. While the pattern is noisier, there is a consistent increase in support for UKIP among this subpopulation. The central panel explores an economic margin directly relevant to those individuals who, likely, saw a cut to their housing benefit payment: they are significantly more likely to be in arrears with their rent, suggesting that the cut to housing benefit due to the spare bedroom increased rent arrears. Lastly, the right panel studies the number of bedrooms as an outcome variable, which is immediately relevant as the "bedroom tax" could be avoided if households moved to smaller accommodation. The pattern is quite consistent, suggesting that households started to move to smaller accommodation; while moving costs may not be negligible, this suggests that some households may have been able to avoid some of the direct economic grievances.

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[31]The analysis of the disability living allowance reform is relegated to the Appendix Figure A6. The subpopulation that most likely was exposed to the reform sees a timely increase in support for UKIP. While the DLA-to-PIP conversion did not generate direct economic grievances, in particular for this subpopulation of lifetime DLA claimants, among this set of respondents there is a significantly higher increase in perception that "government officials do not care", which in turn, is also strongly linked to support UKIP and Leave (see Appendix Tables A10 and A11).

Together, these results provide further evidence in support of the underlying common trends assumption inherent to the previously presented difference-in-difference estimates. I next discuss a few additional robustness checks before studying broader measures of political dissatisfaction.

**Accounting for other shocks**  While the event studies suggest that there are no diverging pre-trends, some concerns may remain that the observed effects on support for UKIP (and the auxiliary outcomes explored in the next section) could be masking other unobserved and concurrent shocks. A host of these concerns can be addressed by saturating the main estimation model with additional controls as is done in Appendix Table A5, where column (1) replicates the corresponding column (1) in Table 2 for reference. Columns (2) - (4) explore the implications of controlling for region-by-qualification-group or region-by-economic-activity status specific time effects. The former accounts for unobservable region and skill-group specific (labor market) shocks, while the latter accounts for the potential exposure to multiple concurrent policy shocks. (The economic activity status distinguishes between 11 different categories, such as being employed, retired, self-employed, a student, in a family care role, or being unemployed.)

Columns (5) and (6) further aim to account for a potentially (long-delayed) political response to the 2009 Recession. To address this issue, I construct an identifier for each distinct economic activity status sequence that appears in the whole USOC panel. I then allow each such unique group that is identified by a distinct economic activity status history to have a different set of time effects.[32] This adds to the estimation a further 18,000 unique estimable controls in the most demanding specification and renders many observations perfectly collinear. Yet, the observation that exposure to either of the three reforms increases the propensity to support for UKIP remains broadly intact.

**Refinement of the control group**  A second refinement of the analysis may consist of restricting the control group. Naturally, this will have implications for the

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[32]This would allow a separate non-linear time trend in political attitudes for certain cohorts. For example, this would separate groups of individuals who were unemployed throughout the period of study from those who were, say, unemployed in 2009 and then become and remained employed again from 2010 onward.

statistical power especially when estimation the more saturated models. I consider two such refinements. First, an ad hoc refinement that restricts the control group to those who at some point in time, have received the respective benefit or could have received it. An alternative approach to refine the control group uses propensity-score matching to construct matched pairs. For each reform, I construct matched pairs, with the matching based on: gender, age, dummy variables for the different economic-activity status, the housing-tenure status indicators, a set of features capturing the educational attainment across the five categories included in the UK census, along with the log value of pre-treatment monthly benefit income. This variable implies that matching will compare individuals with similar amounts of benefit income that differ only with respect to the specific benefit that is undergoing reform and is the subject of study. I impose a caliper of 0.01 to focus on good matches based on the baseline observables.The results from this exercise are added as Appendix Table A6, replicating the main results Table 2, but adding the estimates that are obtained restricting the control groups. The analysis highlights that the results are robust. Unsurprisingly, statistical power is lost when moving from the less demanding specifications to the most demanding specifications, which absorb both individual-level and demanding district-level time effects, especially for the Disability Living Allowance reform and the bedroom tax. This loss of power is not a substantive concern as, for example, the specification on the matched panel in column (5) of Panel C, in excess of 18,000 parameters are estimated on a sample of just over 60,000 observations.

## 5.5 Broader outcome measures

Expressing political support for UKIP may only be one specific outcome measure, but the political responses to austerity could be broader.

**Support and like or dislike for other parties**   I first present results capturing shifts in expressions of support for other political parties. These are presented in Table 3. Overall, the results suggest that UKIP was a much stronger beneficiary of the support lost by the Conservatives (see Panel A) than other parties, such as Labour, which also were also not in government. Support for Labour and the Liberal Democrats increases weakly among those affected by either of the three

welfare reforms. There is also a weak reduction in those reporting that they would not vote for any party if there was an election tomorrow in Panel D. This would be indicative of a potential increase in turnout that has been suggested to be an important factor in driving populist support (see Guiso et al., 2018). The analysis presented in Appendix Table A7 suggests that those who become UKIP supporters are mostly original supporters of the Conservatives, Labour and a few other parties but only marginally from among those who initially reported that they support no party/would not vote. The welfare-reform induced gains for Labour are mostly drawn from this pool of people.

In Appendix Table A8, I present results drawing on measures of the intensity of like or dislikes of the three historic main political parties (the Conservatives, Labour and the Liberal Democrats) on a 10 point Likert scale. The results suggest that, respondents affected by the combined *any welfare reform* measure are much more likely to express a scores indicating strong dislike for the Conservative party.

**Perception of politics more broadly**     In Table 4, I present evidence for three additional survey questions, asking whether individuals perceive that "Public officials do not care", that they "Don't have a say in what government does" and that "your vote is unlikely to make a difference". Each of these auxiliary measures see a significant increase among individuals exposed to welfare reforms. Appendix Table A9 further highlights that the effects of exposure to welfare reforms on these auxiliary outcomes go beyond what can be accounted for by an individuals' political preferences. As we will see, these auxiliary outcomes are also correlates for Leave support, even after accounting for an individuals' political party preference.[33]

The perception of having no political voice is something that was prominently leveraged in the EU referendum campaign, with voters being suggested that voting against EU membership is a vote against the status quo (Ford and Goodwin, 2017). The observed additional effects are consistent with the idea that austerity contributed to a feeling of disenfranchisement or disconnect from the established political parties and institutions, and encouraged voters to support more extreme policy positions or engage in protest voting (Myatt, 2017). Unfortunately, despite

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[33] Appendix Table A10 further highlights that the effects on these auxiliary outcomes are broadly carried across the three distinct reforms studied.

the interesting observation of a weak increase in turnout intentions among the affected population, as I do not observe actual turnout for the 2016 EU referendum to let this observation bear on the data. Nevertheless, as I will show in the next section, exposure to welfare reforms – as per the above definitions – not only increased propensity to support UKIP and increased perceived marginalization – but is further, strongly linked to expressions of support for Leave.

## 5.6  Welfare reform exposure and support for Leave

The most recent USOC survey wave asked the EU referendum question in which 43 percent expressed support for Leave. Not surprisingly, UKIP supporters stand out with 87 percent supporting Leave as suggested by Appendix Figure A7. I next study the impact of welfare reforms on support for UKIP and Leave jointly.

**Empirical approach**   I set up a two-equation system to study whether exposure to welfare reforms and support for UKIP and Leave in 2016 can be linked. To do so, I construct for each individual $i$, a measure of whether an individual "switched to UKIP" before or after a reform $j$ became effective. This implies collapsing the data from an unbalanced panel used in the main difference-in-difference specification 3 into a two-period panel.[34]  The two period panel can then simply be first-differenced to obtain an individual-level cross-section:

$$\Delta UKIP_{i,d} = \beta_d + \gamma_j \times T_{i,j} + \nu_{i,d} \tag{5}$$

The first-differencing implies that time-invariant individual-level characteristics are accounted for. A second equation studies support for Leave in the cross section and would constitute the second equation in the system:

$$Leave_{i,d} = \xi_d + X_i'\beta + \phi_j \times T_{i,j} + \epsilon_{i,d} \tag{6}$$

Conceivably, the vector of additional controls $X_i$ should include a set of factors that would be captured by the individual-level fixed effects implicit in the first-

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[34]Collapsing the data into a two period panel has the added benefit of being a common ad-hoc approach to solve the inference problems in contexts with serial correlation highlighted in DiD settings by Bertrand et al. (2004).

difference estimator. As an ad hoc approach, I saturate equation 6 with a consecutively more demanding vector of controls. The system consisting of equations 5 and 6 can then be estimated using a seemingly unrelated regression, which accounts for a potential cross-correlation between $\epsilon_{i,d}$ and $\nu_{i,d}$ and allows me to test whether $\phi = \gamma$. This null hypothesis is expected to be rejected against the alternative of $\gamma < \phi$ as the previous sections suggested that the welfare reforms were affecting factors contributing to Leave sentiment beyond what is captured by UKIP.

**Results** The results are presented in Table 5. Moving across the columns, iteratively more demanding sets of control variables are added. Column (1) only include district fixed effects. In column (2), I add qualification group and age fixed effects. Column (3) adds economic activity status group effects (such as being employed, unemployed, a full-time student, retired...). Column (4) adds gross-household-income-decile fixed effects. Column (5) controls for a set of dummy variables capturing whether individuals reported any of 17 different health conditions. Column (6) focuses on the subset of individuals in employment controlling for socioeconomic status and sector of employment.

The results suggest that the estimated propensity to support Leave is at least 6.8 percentage points higher among individuals exposed to either of the three welfare reforms. Throughout, the null hypothesis of $\phi = \gamma$ is rejected against the alternative of $\gamma < \phi$. This is not surprising, as Appendix Table A11 shows that the additional outcomes explored in Table 4 and the event studies are also strong correlates of Leave over and above what can be accounted for by controlling for the expressed political preferences. Support for UKIP thus likely understates the extent to which exposure to the welfare reforms contributed to the builtup of Leave sentiment, which is consistent with the observation in Section 4.[35]

## 5.7 Welfare cuts in the broader economic context

The above analysis suggests that austerity and the implied welfare reforms are important to understanding the changes in the UK's political landscape in the run up to the EU referendum. Yet, the underlying economic reasons for why

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[35]Appendix Table A12 further highlights that the results are robust to focusing on the sample of matched pairs.

individuals become exposed to welfare reforms (by virtue of becoming reliant on the welfare state) are much broader. To shed some more light on this and to connect with the broader literature, I study how income from benefits and labor have evolved over a longer period, with a focus on the human-capital divide.

**Estimating robust trends**   To do so, I combine data from the USOC study from 2009 with its much smaller precursor, the British Household Panel study (BHPS), to study an individual-level panel from 2001. I estimate the following specification:

$$y_{i,d,r,w,t} = \alpha_i + \beta_{d,w,t} + \sum_{t=2001}^{2015} \gamma_t \times Time_t \times X_{i,t} + \epsilon_{i,r,w,t} \tag{7}$$

Here, the dependent variable $y_{i,d,r,w,t}$ measures individual $i$'s monthly labor income, benefits income and gross income over time. The specification controls for individual respondent fixed effects $\alpha_i$, while also controlling for district by survey wave and year fixed effects. The coefficients of interests are the point estimates on $\gamma_t$, capturing the extent to which an individual $i$'s educational attainment $X_{i,t}$ correlates with the evolution of incomes over time.

**Results**   The results are visually presented in Figure 8. Panel A presents the trends for respondents with no formal qualifications. The figures suggest that throughout the last 15 years, monthly labor incomes for this group of individuals have, in relative terms, declined. The central figure presents the evolution of monthly benefit income, which has stayed flat for the early years in the 2000s, but started expanding in 2005. This suggests that, at least in part, the relative secular decline in labor incomes was cushioned by an expansion of benefit payments to individuals with low human capital. This trend in benefit growth came to an abrupt halt in 2011 as austerity took effect. The last column presents gross income, which includes income from both labor and benefits. For most of the early 2000s gross income for individuals with low educational attainment declines in relative terms, yet, as benefit income expands, this trend flattens out. As austerity started to take effect, in 2014, marked relative declines in gross income occur.

Panel B studies the trends pertaining to respondents who have completed at least an undergraduate university degree. Labor income for this group of individ-

uals has trended up significantly over time in an uninterrupted fashion; the same is true for gross income, shown in the right column. Not surprisingly, benefit income for this group contracts mostly throughout the 15 years.

**Discussion** There are three main observations. First, labor income for individuals at the lower end of the skill divide declined significantly over time, while labor income for those at the top end of the human capital divide increased markedly in relative terms. This is consistent with the literature documenting growing labor market polarization (Card and DiNardo, 2002; Lemieux, 2006; Goos et al., 2014). Second, though the welfare state had been responsive, evening out these growing inequalities for those with low skills, this growth in benefit incomes came to an abrupt halt as the Conservative-led coalition government's austerity measures took effect. As this paper demonstrates, these measures significantly contributed to the buildup of Leave sentiment (even after controlling for region- and skill-group-specific labor market shocks). Third, gross income inequality across the skills divide is likely to have increased substantially since 2010 due to austerity.

The observations are relevant in the context of the existing research studying the causal drivers behind the rise in populism. A lot of work has focused on the role of trade-induced manufacturing sector decline (see Autor et al., 2016; Colantone and Stanig, 2018; Dippel et al., 2015). Yet, this can only account for a part of the story, at least in the context of the UK. In Appendix Figure A8, I show that the patterns presented in Figure 8 are robust to excluding individuals who have ever worked in manufacturing, agriculture, or mining. Since these sectors are most vulnerable to economic pressures due to trade, the fact that the overall trends in income (from labor and benefits) and gross incomes along the human-capital divide remain intact suggests that the secular decline in labor incomes for those with low human capital can not be explained by trade integration alone. Other factors beyond trade integration that are likely to feature among additional explanations of the trends documented here are: structural transformation (Rogerson, 2008; Rodrik, 2016), the rise of automation (Caprettini and Voth, 2015; Graetz and Michaels, 2015), skill-biased technological change more broadly (Acemoglu, 1998; Autor et al., 2003), the rise of the gig economy, or, possibly, some forms of

migration (Becker and Fetzer, 2018; Dustmann et al., 2013).

Importantly, the results suggest that an *active welfare state* can help mitigate the growing skill bias in labor markets (to which trade integration has likely contributed). In the context of the UK, the results suggest that cuts to the welfare state since 2010 likely activated already existing grievances and resentment.

# 6 Conclusion

The UK's 2016 vote to leave the European Union is a watershed moment. It marks an end to a 70-year-long process of continued economic and political integration in Europe. Understanding the causes for why the UK's electorate voted to leave the EU is of utmost importance – not only for the UK as it redefines its relationship with Europe – but for many other European countries that see a growth in support for political parties campaigning on anti-EU political platforms.

This paper presents evidence suggesting that austerity policies from late 2010 onward are key to understanding "Brexit." The welfare reforms are a strong driving factor behind the growing support for the populist UKIP party in the wake of the EU referendum, contributed to the development of broader anti-establishment preferences and are strongly associated with higher levels of support for Leave. The results suggest that the EU referendum either may not have taken place, or, as back-of-the-envelope calculations suggests, could have resulted in a victory for Remain, had it not been for austerity.

While exposure to austerity-induced welfare reforms is a key activating factor contributing to the buildup of leave sentiment, and to support for populist parties, the underlying economics causes of the growing reliance and exposure of (especially low-skilled) individuals on the welfare state are of key relevance to the broader public and political debate. This paper provides some suggestive auxiliary evidence indicating that factors contributing to the growing skill-divide in labor markets are likely to go beyond trade-integration alone, which is a key driver explored in an important growing literature.

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Figure 1: UKIP support across elections or across individuals over time

*Panel A*: Across elections



*Panel B*: Individual level
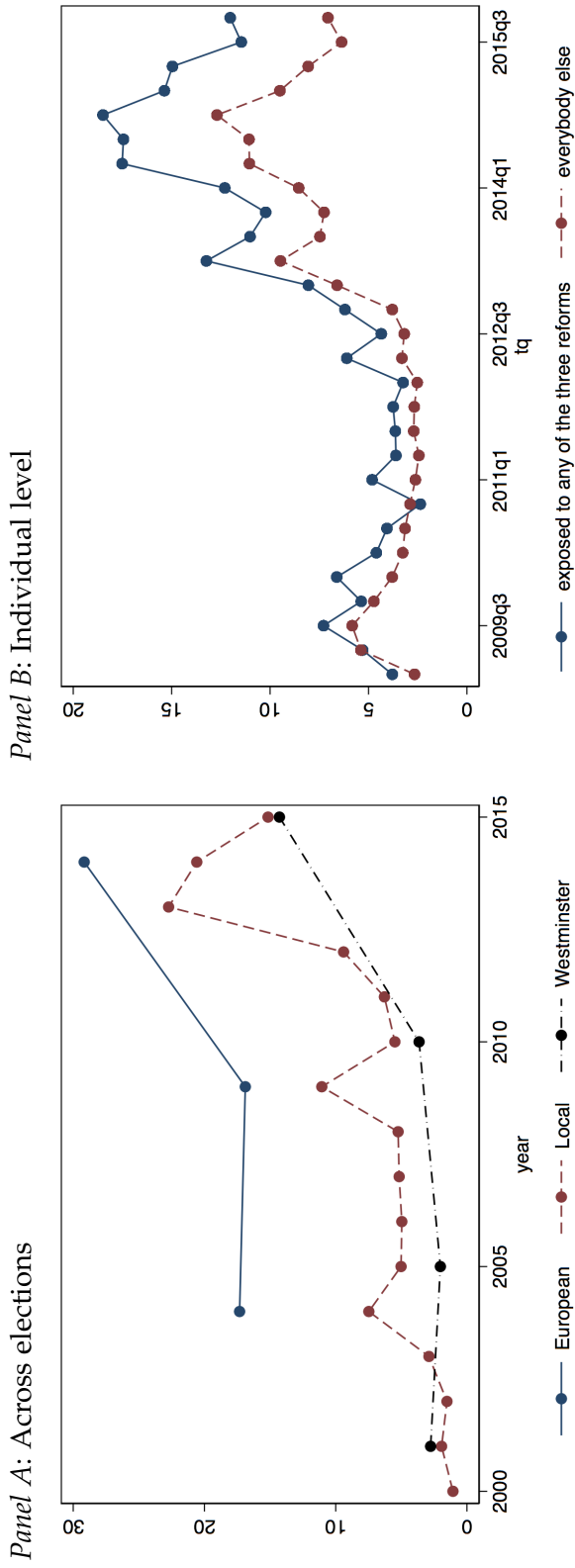


**Notes:** The left panel presents the average UKIP vote share across the European, Westminster and Local elections since 2000. The right figure includes the share of respondents in the USOC data that state that they are a supporter of UKIP compared to other parties or, among those stating they would vote, express that they would vote for UKIP if there was an election tomorrow. This follows the way the USOC instrument elicits political party preferences which is detailed in Appendix Figure B1.

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Figure 2: UKIP vote share in the EP elections in 2004, 2014 and the Leave share in the 2016 EU referendum

Panel A: UKIP vote in 2004

Panel B: UKIP Vote in 2014
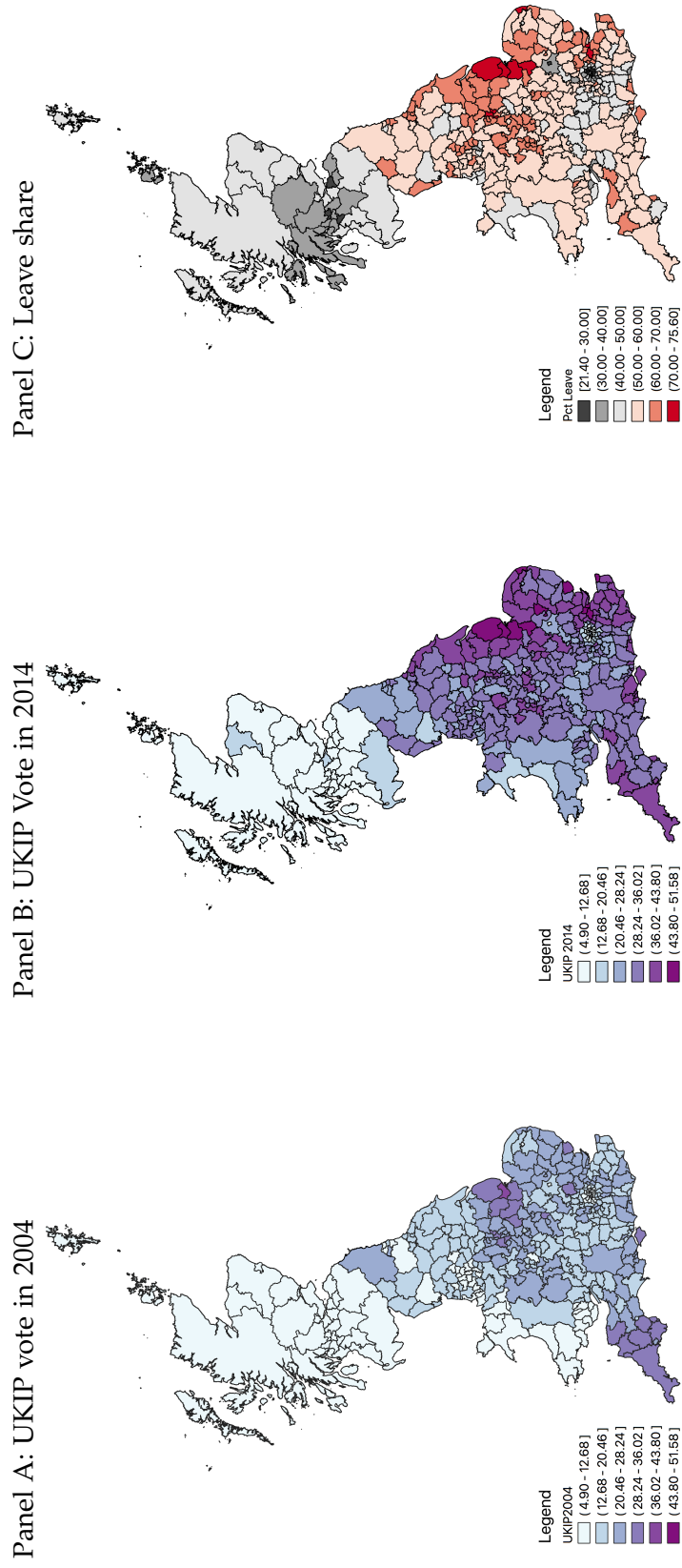
Panel C: Leave share



**Notes:** This map displays the UKIP vote share in the European Parliamentary elections in 2004 and 2014 in Panel A and B, and the share of the electorate that voted leave in the 2016 EU referendum across local authority districts in Panel C.

Figure 3: Non-parametric effect of educational qualification, socio-economic status, and sectoral employment of the resident population as of 2001 on support for UKIP over time

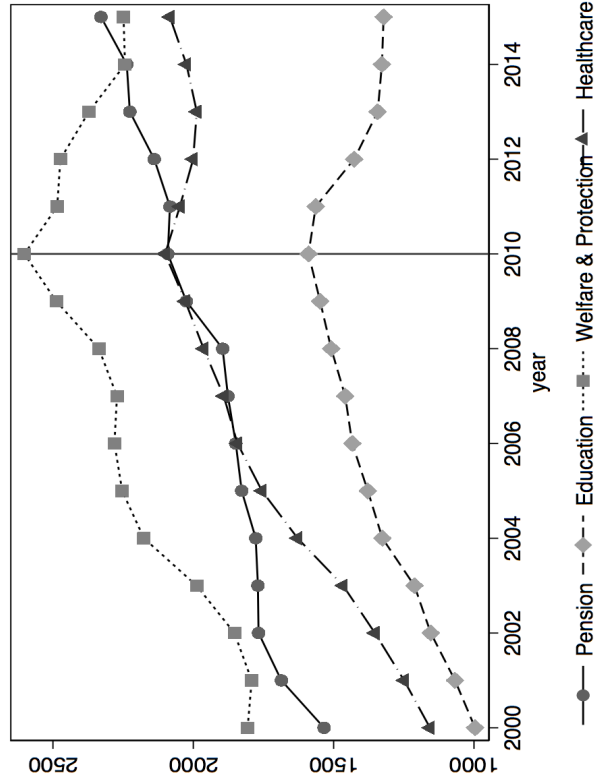Panel A: No qualifications
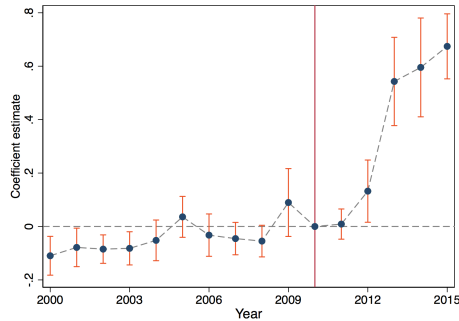
Panel B: Routine jobs
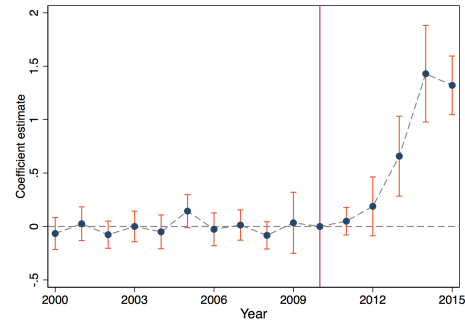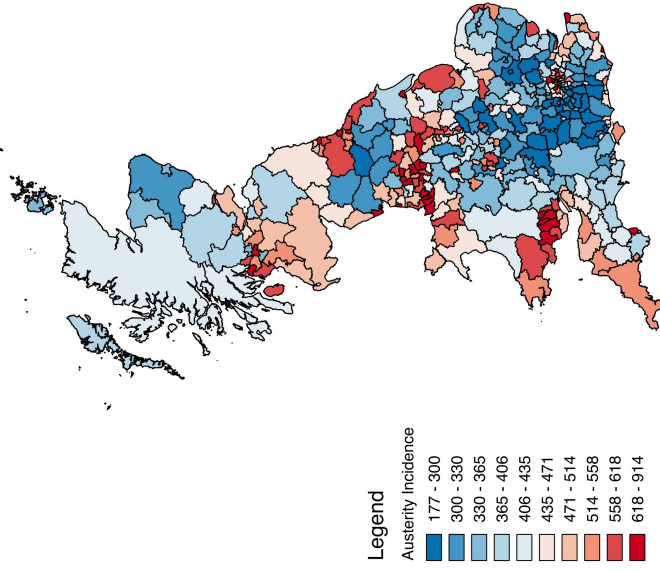
Panel C: Retail
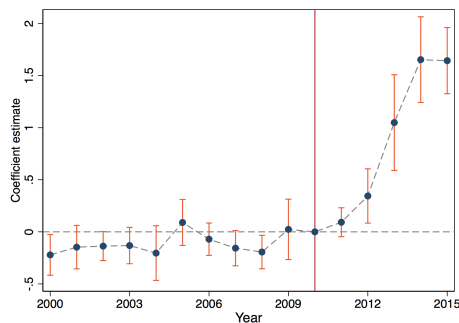
Panel D: Manufacturing
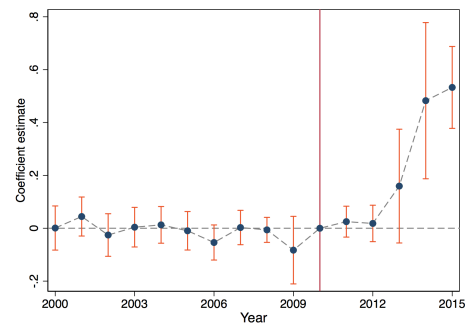


**Notes:** The dependent variable is the percentage of votes for UKIP in local council elections. Panel A uses the share of the resident population with no formal qualifications as of 2001 with mean 0.28 (0.06 sd). Panel B uses the share of the resident population in Routine jobs as per the National Socio-Economic Classification of Occupations as of 2001 with mean 0.1 (0.03 sd). Panel C uses the share of the resident working age population employed in the Retail sector with mean 0.17 (0.02 sd), while panel D uses the share of the resident working age population employed in Manufacturing with mean 0.15 (0.05 sd). The graph plots point estimates of the interaction between these cross sectional measures and a set of year fixed effects. All regression include local authority district fixed effects and NUTS1 region by year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure 4: Goverment spending per capita and distribution of austerity shock across local authority districts in the UK

*Panel A*: Composition of government spending



*Panel B*: Spatial variation in austerity shock



Legend
Austerity Incidence

177 - 300
300 - 330
330 - 365
365 - 406
406 - 435
435 - 471
471 - 514
514 - 558
558 - 618
618 - 914

Pension — ◆ — Education ····■···· Welfare & Protection ▲ Healthcare

**Notes:** The left panel A plots real aggregate spending per capita in £ using data from HMRC for the years between 2000-2015. Aggregate totals are divided by total population from the National Office of Statistics and the annual CPI with 2015 being the base year. The four series account for, on average, 68% of government spending over the sample period. Panel B displays the spatial distribution of the austerity shock across local authority areas. The size of the shock is measured as the expected loss in benefit income in pounds per working age individual and year from Beatty and Fothergill (2013).

Figure 5: Non-parametric effect of austerity on support for UKIP overall and by individual measures.
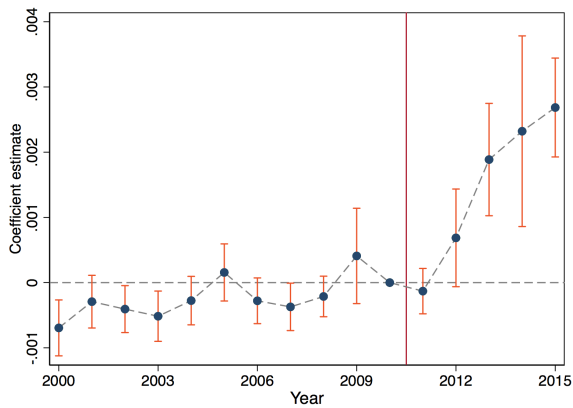
Panel A: Overall austerity shock
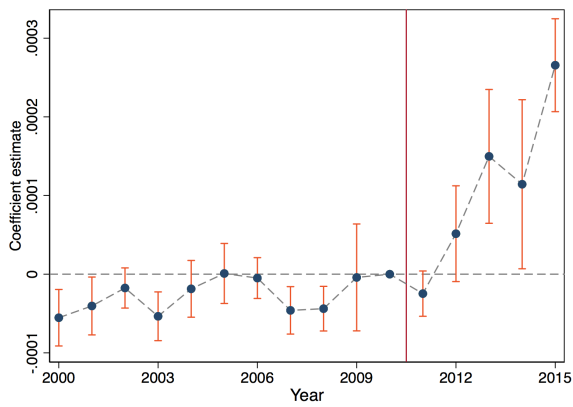
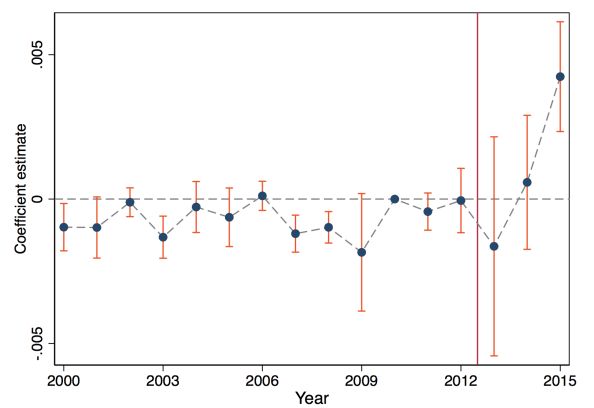Panel B: Council Tax Benefit
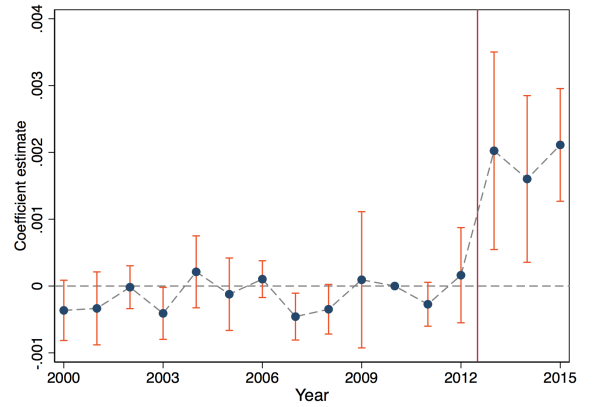


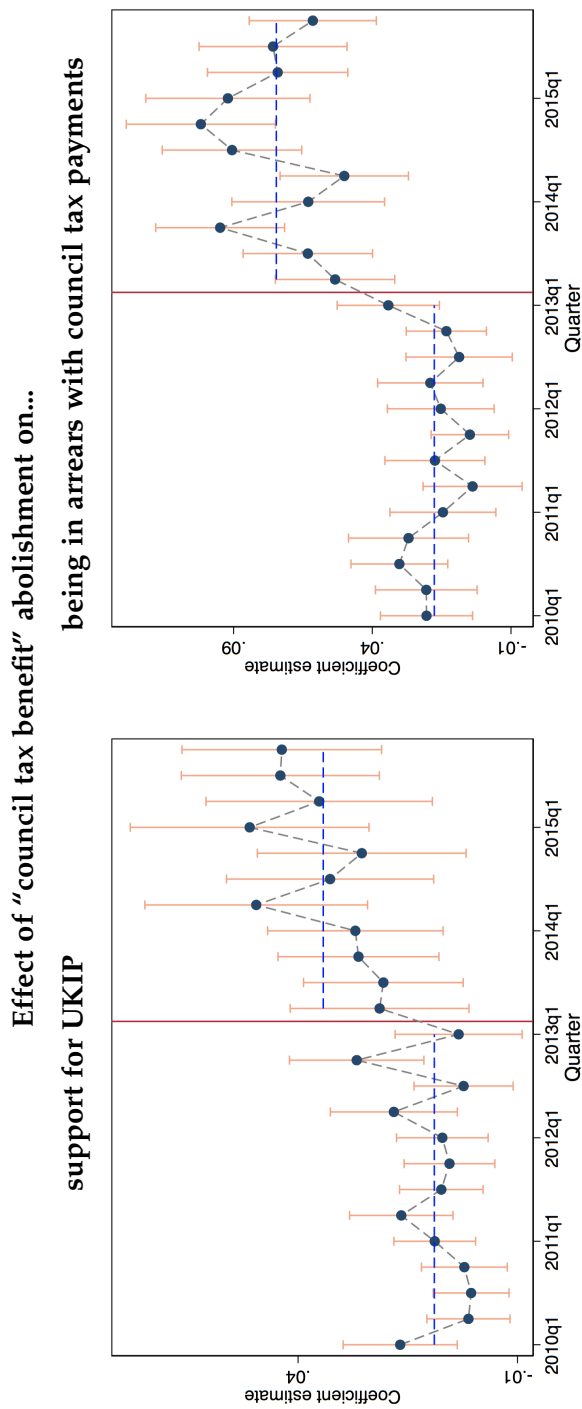Panel C: Disability Living Allowance
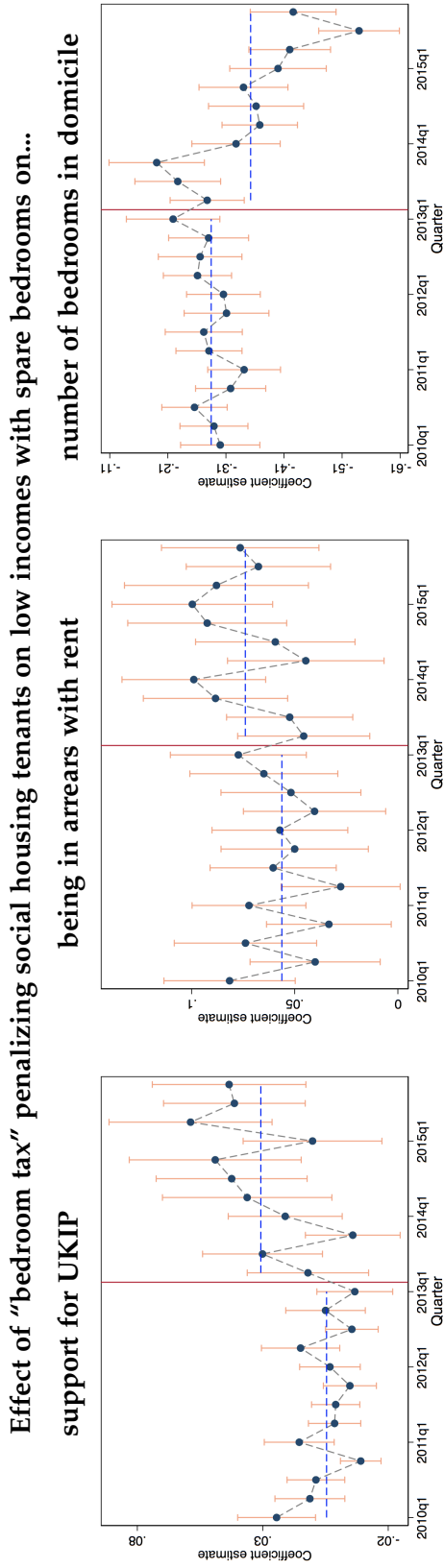
Panel D: Bedroom Tax



**Notes:** The dependent variable is the percentage of votes for UKIP in English and Welsh local council elections from 2000-2015. The graph plots point estimates of the interaction between these simulated incidence of the austerity measures and a set of year fixed effects. All regression include local authority district fixed effects and NUTS1 region by year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

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Figure 6: Impact of abolishment of national council tax benefit system effective April 2013 on support for UKIP and being behind on council tax payments
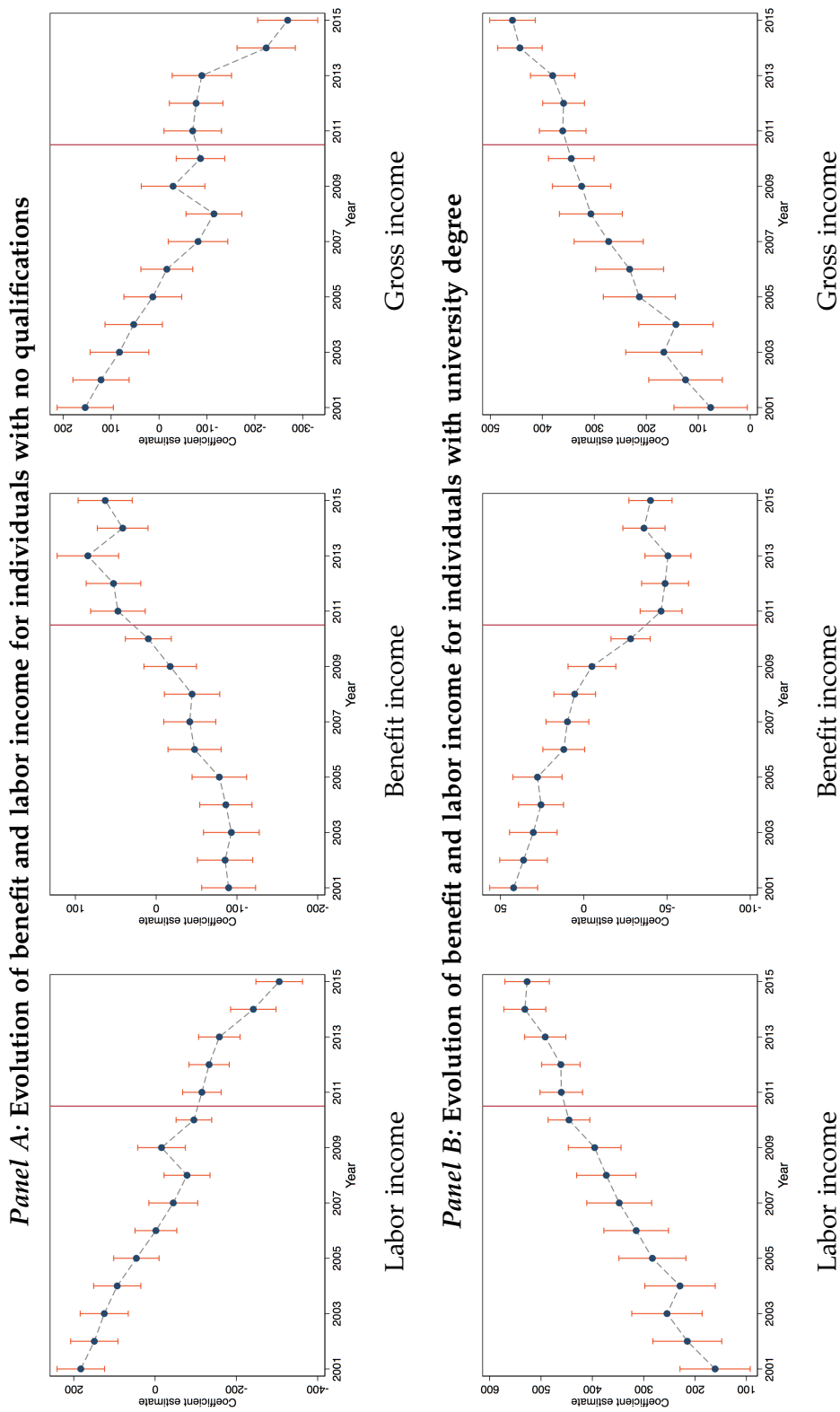
## Effect of "council tax benefit" abolishment on...



**Notes:** Figure plots event studies studying the impact of the abolishment of council tax benefit on previous recipients. The dependent variable in the left panel is a dummy variable indicating whether the respondent revealed a political preference in support of UKIP. The dependent panel in the right hand side is an indicator variable indicating whether the respondent is behind with his or her council tax payments. The regressions control for council by survey wave by time fixed effects. The graph plots point estimates of the interaction between an indicator variable indicating whether the individual respondents received council tax benefit at each point in time in the three years prior to the reform in which they were observed in the sample interacted with an indicator for the survey quarter. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure 7: Impact of "bedroom tax" effective April 2013

Effect of "bedroom tax" penalizing social housing tenants on low incomes with spare bedrooms on... support for UKIP, being in arrears with rent, number of bedrooms in domicile



**Notes:** Figure plots event studies studying the impact of the bedroom tax penalizing households receiving housing benefit living in social housing and are judged to have a spare bedroom. The dependent variable in the left panel is a dummy variable indicating whether the respondent revealed a political preference in support of UKIP. The dependent panel in the center column is an indicator whether respondents state that they are in arrears with their rent, while the outcome variable in the right panel is the number of bedrooms in the dwelling that a respondent lives in. The regressions control for council by survey wave by time fixed effects. The graph plots point estimates of the interaction between an indicator variable indicating whether the individual respondents are living in social housing at each point in time observed in the data and are judged to have an extra bedroom at the most recent time they were surveyed relative to the reform becoming effective in April 2013. Standard errors are clustered at the district level with 90% confidence bands indicated.

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Figure 8: Non-parametric estimates capturing the evolution of labor and benefit income *within-individuals* over time for respondents with low- and high levels of educational attainment



*Panel A*: Evolution of benefit and labor income for individuals with no qualifications

*Panel B*: Evolution of benefit and labor income for individuals with university degree

**Notes:** The dependent variable is the monthly gross labor income on the left, and the monthly benefit income on the right. The population is restricted to the sample of BHPS and USOC respondents that are not retired. The BHPS survey waves 11-18 start in 2001 and end in 2009, while the larger USOC survey starts in 2009 and includes some, but not all of the former BHPS respondents. The graph plots point estimates of the interaction between the qualification status of respondents (having no qualifications in top row, versus having a university degree in bottom row) on monthly labor or benefit income. All regression include individual respondent fixed effects and local authority by survey wave by time fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

Table 1: The Impact of different austerity measures on support for UKIP across Local, European and Westminster elections

| Dependent variable: UKIP vote share in... | (1) Overall | (2) TC | (3) CB | (4) CTB | (5) DLA | (6) BTX |
|---|---|---|---|---|---|---|
| *Panel A: Local elections* | | | | | | |
| $\mathbb{1}$(Year>2010) $\times$ Austerity | 0.014 | 0.081 | 0.036 | 0.128 | 0.166 | 0.162 |
| | (0.003) | (0.013) | (0.044) | (0.036) | (0.031) | (0.086) |
| Avg effect | 6.460 | 7.116 | 2.587 | .9208 | 6.084 | 1.747 |
| SD | 1.747 | 1.903 | .3405 | .9960 | 2.028 | .9033 |
| Mean of DV | 4.49 | 4.49 | 4.49 | 4.49 | 4.49 | 4.49 |
| Local authority districts | 345 | 346 | 346 | 346 | 346 | 346 |
| Observations | 3260 | 3263 | 3263 | 3263 | 3263 | 3263 |
| | | | | | | |
| *Panel B: European elections* | | | | | | |
| $\mathbb{1}$(Year>2010) $\times$ Austerity | 0.008 | 0.049 | 0.054 | 0.060 | 0.128 | 0.001 |
| | (0.002) | (0.009) | (0.028) | (0.028) | (0.018) | (0.047) |
| Avg effect | 3.692 | 4.297 | 3.893 | .4322 | 4.672 | .0086 |
| SD | .9988 | 1.149 | .5125 | .4676 | 1.557 | .0044 |
| Mean of DV | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 |
| Local authority districts | 378 | 379 | 379 | 379 | 379 | 379 |
| Observations | 1134 | 1137 | 1137 | 1137 | 1137 | 1137 |
| | | | | | | |
| *Panel C: Westminster elections* | | | | | | |
| $\mathbb{1}$(Year>2010) $\times$ Austerity | 0.008 | 0.076 | -0.025 | 0.043 | 0.178 | 0.064 |
| | (0.002) | (0.009) | (0.025) | (0.030) | (0.021) | (0.041) |
| Avg effect | 3.978 | 7.00 | -1.810 | .397 | 6.664 | .764 |
| SD | .984 | 1.72 | .226 | .354 | 2.062 | .374 |
| Mean of DV | 6.03 | 6.03 | 6.03 | 6.03 | 6.03 | 6.03 |
| Harmonized Constituencies | 566 | 566 | 566 | 566 | 566 | 566 |
| Observations | 2047 | 2047 | 2047 | 2047 | 2047 | 2047 |
| | | | | | | |
| Avg Loss per working age adult | 447.1 | 87.97 | 71.52 | 7.21 | 36.57 | 10.81 |
| Affected HH. in 1000s | | 4507 | 7601 | 2436 | 499 | 660 |
| *Correlation with...* | | | | | | |
|   No qualification share | | .75 | .17 | .51 | .77 | .58 |
|   Routine job share | | .6 | .12 | .27 | .62 | .43 |
|   Retail sector share | | .35 | .28 | .02 | .21 | .08 |
|   Manufacturing sector share | | .3 | .11 | -.03 | .37 | .24 |

Notes: Table reports results from a panel OLS regressions with the dependent variable being UKIP's vote share in English and Welsh Local Elections from 2000 to 2015 in Panel A, European Elections in Panel B and Westminster Elections in Panel C. The regressions control for local authority district fixed effects in Panels A and B, and harmonized constituency level in panel C as well as region by year fixed effects throughout. Standard errors clustered at the Local Government Authority District Level in Panel A and B and at the Harmonized Constituency level in Panel C, with standard errors presented in parentheses.

Table 2: The Impact of different austerity measures on support for UKIP: exploiting individual level data

| Dependent variable: support UKIP | (1) Any | (2) CTB | (3) DLA | (3) BTX |
|---|---|---|---|---|
| *Panel A:* | | | | |
| Post × Benefit cut | 0.028 | 0.026 | 0.051 | 0.027 |
| | (0.004) | (0.005) | (0.013) | (0.006) |
| Mean of DV | .0472 | .0472 | .0472 | .0469 |
| Local election districts | 379 | 379 | 379 | 379 |
| Observations | 252642 | 252642 | 252642 | 245352 |
| District FE & Region x Wave x Time FE | x | x | x | x |
| | | | | |
| *Panel B:* | | | | |
| Post × Benefit cut | 0.026 | 0.025 | 0.043 | 0.026 |
| | (0.005) | (0.005) | (0.013) | (0.006) |
| Mean of DV | .0472 | .0472 | .0472 | .0469 |
| Local election districts | 379 | 379 | 379 | 379 |
| Observations | 252642 | 252642 | 252642 | 245352 |
| District x Wave x Time FE | x | x | x | x |
| | | | | |
| *Panel C:* | | | | |
| Post × Benefit cut | 0.019 | 0.019 | 0.030 | 0.016 |
| | (0.005) | (0.006) | (0.015) | (0.006) |
| Mean of DV | .0472 | .0472 | .0472 | .0469 |
| Local election districts | 379 | 379 | 379 | 379 |
| Observations | 252642 | 252642 | 252642 | 245352 |
| Individual FE & District x Wave x Time FE | x | x | x | x |

Notes: Table reports results from a panel OLS. The dependent variable is a dummy variable taking the value 1 in case a respondent expresses support for UKIP. The columns indicate the different welfare reforms we study. Panel A controls for district by Region x Wave x Time fixed effects, thus exploiting between district and between individual variation. Panel B controls for District x Wave x Time Fixed effects, thus only exploiting between individual variation within a district. Panel C controls for Respondent fixed effects and District x Wave x Time Fixed Effects, exploiting only within-individual- and within district variation. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

Table 3: The Impact of different austerity measures on support for other parties: Exploiting individual level data

|  | (1) Any | (2) CTB | (3) DLA | (4) BTX |
|---|---|---|---|---|
| *Panel A:* Support for Conservatives | | | | |
| Post × Benefit cut | -0.023 | -0.019 | -0.022 | -0.027 |
|  | (0.005) | (0.005) | (0.011) | (0.006) |
| Mean of DV | .259 | .259 | .259 | .261 |
| Local election districts | 379 | 379 | 379 | 379 |
| Observations | 252642 | 252642 | 252642 | 245352 |
| *Panel B:* Support for Labour | | | | |
| Post × Benefit cut | 0.014 | 0.017 | -0.004 | 0.011 |
|  | (0.005) | (0.007) | (0.016) | (0.008) |
| Mean of DV | .351 | .351 | .351 | .348 |
| Local election districts | 379 | 379 | 379 | 379 |
| Observations | 252642 | 252642 | 252642 | 245352 |
| *Panel C:* Support for Liberal Democrats | | | | |
| Post × Benefit cut | 0.008 | 0.004 | -0.003 | 0.013 |
|  | (0.003) | (0.004) | (0.010) | (0.005) |
| Mean of DV | .0815 | .0815 | .0815 | .0828 |
| Local election districts | 379 | 379 | 379 | 379 |
| Observations | 252642 | 252642 | 252642 | 245352 |
| *Panel D:* Support for No party | | | | |
| Post × Benefit cut | -0.010 | -0.015 | 0.009 | -0.006 |
|  | (0.006) | (0.007) | (0.013) | (0.008) |
| Mean of DV | .193 | .193 | .193 | .193 |
| Local election districts | 379 | 379 | 379 | 379 |
| Observations | 252642 | 252642 | 252642 | 245352 |
| Individual FE | x | x | x | x |
| District x Wave x Time FE | x | x | x | x |

Notes: Table reports results from a panel OLS regressions. The dependent variable is a dummy indicating individual USOC respondent's support for the Conservatives (panel A), the Labour party (panel B) and the Liberal Democratic party (panel C). The regressions include various different levels of fixed effects indicated at the bottom of the table. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

Table 4: Wider measures of perceptions of disenfranchisement and turnout: included only in some waves of the USOC study

|  | (1) | (2) | (3) |
|---|---|---|---|
| *Panel A:* Public officials dont care |  |  |  |
| Post × Benefit cut | 0.078 | 0.073 | 0.051 |
|  | (0.020) | (0.021) | (0.040) |
| Mean of DV | 3.37 | 3.37 | 3.37 |
| Local election districts | 378 | 378 | 378 |
| Observations | 75547 | 75547 | 75547 |
| *Panel B:* Don't have say in what govt does |  |  |  |
| Post × Benefit cut | 0.096 | 0.093 | 0.068 |
|  | (0.020) | (0.021) | (0.041) |
| Mean of DV | 3.34 | 3.34 | 3.34 |
| Local election districts | 378 | 378 | 378 |
| Observations | 75897 | 75897 | 75897 |
| *Panel C:* Your vote is unlikely to make a difference |  |  |  |
| Post × Benefit cut | 0.020 | 0.021 | 0.020 |
|  | (0.011) | (0.011) | (0.022) |
| Mean of DV | .563 | .563 | .563 |
| Local election districts | 378 | 378 | 378 |
| Observations | 74948 | 74948 | 74948 |
| District FE | x |  |  |
| Region x Wave x Time FE | x |  |  |
| District x Wave x Time FE |  | x | x |
| Individual FE |  |  | x |

Notes: Table reports results from a panel OLS regressions. The dependent variable in Panel A and B is a score on a 5 point likert scale (strongly disagree - strongly agree). In Panel C it is a dummy variable equal to 1 if respondents indicate that they think it is unlikely that their vote makes a difference. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

Table 5: Support for Leave among individuals exposed to any of the three welfare reform measures studied

|  | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Leave* | | | | | | |
| Benefit cut $\phi$ | 0.182 | 0.091 | 0.082 | 0.068 | 0.072 | 0.104 |
|  | (0.012) | (0.011) | (0.011) | (0.011) | (0.013) | (0.022) |
| *Switch to UKIP* | | | | | | |
| Benefit cut $\gamma$ | 0.029 | 0.029 | 0.029 | 0.029 | 0.029 | 0.023 |
|  | (0.006) | (0.006) | (0.006) | (0.006) | (0.007) | (0.011) |
| | | | | | | |
| $\phi = \gamma$ p-value | 0 | 0 | 0 | 0 | .001 | 0 |
| Local election districts | 375 | 375 | 375 | 375 | 375 | 373 |
| Observations | 30364 | 29750 | 29725 | 29367 | 22643 | 12770 |
| District FE | x | x | x | x | x | x |
| Qualifications & Age FE | | x | x | x | x | x |
| Economic Activity Status FE | | | x | x | x | x |
| Income Decile FE | | | | x | x | x |
| Health conditions | | | | | x | x |
| Socio-economic status & Employment Sector FE | | | | | | x |

Notes: Table reports reports seemingly unrelated regression results on the system consisting of equations 5 and 6 studying individuals supporting leave and switching to UKIP jointly. The sample gets successively smaller as more control variables get added that are not available across the full sample. In case a variable is not reported on in the wave asking the referendum question I use the value recorded in the most recent time this variable was observed for an individual to maximize the sample size. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

# Online Appendix
# "Did Austerity Cause Brexit?"

Thiemo Fetzer

June 6, 2019

This appendix is subdivided into three sections. Section A presents further robustness checks and additional results as figures or tables that were omitted from the main paper due to space constraints. These results are directly referred to in the main text and discussed in the main body or in footnotes. Section B presents further descriptions of the underlying data as well as additional background materials. The relevant sections are referred to in the main text. Section C presents a set of auxiliary results only indirectly referred to in the main text, they are discussed in detail in this appendix section.

## A Further Robustness Checks and Additional Results

Figure A1: UKIP Election Result in 2014 EP elections and EU referendum vote leave.

Figure A2: Non-parametric effect of austerity on support for UKIP overall and by individual measures studying *Westminster elections*.



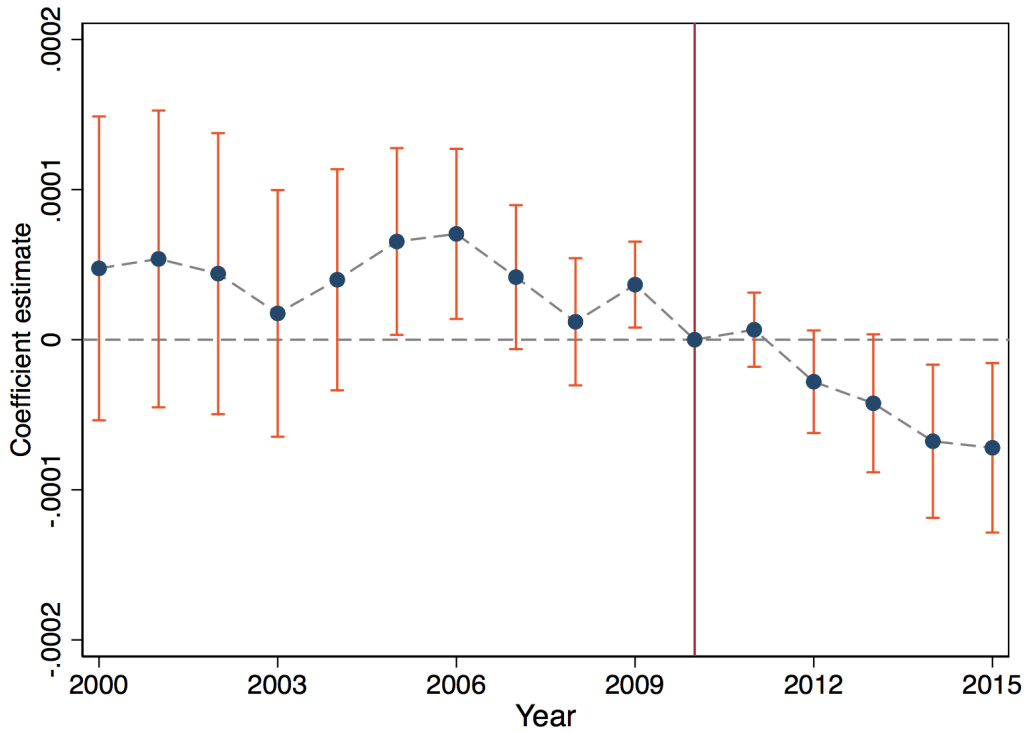Panel A: Overall austerity shock

Panel B: Council Tax Benefit

Panel C: Disability living allow.

Panel D: Bedroom Tax

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Figure A3: Non-parametric effect of austerity on support for UKIP overall and by individual measures studying *European elections.*



Panel A: Overall austerity shock

Panel B: Council Tax Benefit

Panel C: Disability living allow.

Panel D: Bedroom Tax

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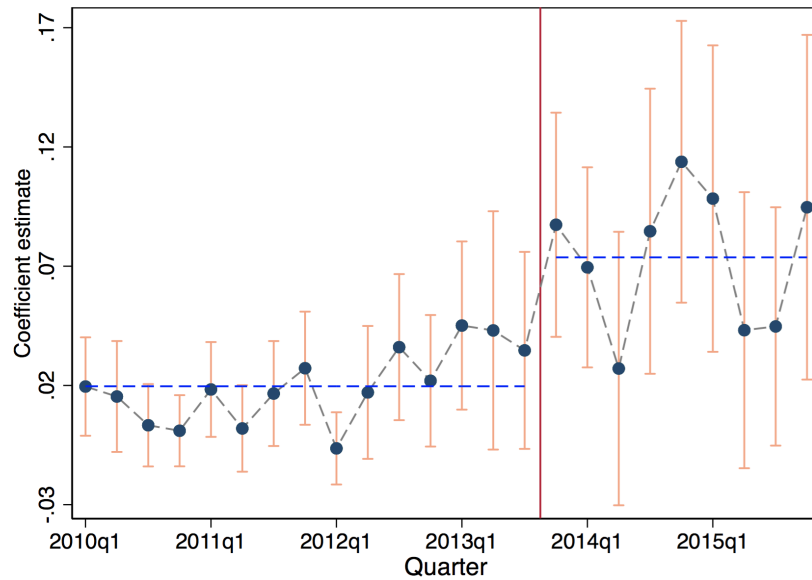Figure A4: Effect of Austerity on Local Area Gross Value Added per capita



**Notes:** The dependent variable is the log value of the gross value added per working age adult in a local authority area between 2000 to 2015. The graph plots point estimates of the interaction between the overall simulated local authority area austerity incidence and a set of year fixed effects. All regression include local authority district fixed effects and NUTS1 region by year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure A5: Evolution of labor, benefit and gross income for individuals affected by the council tax benefit abolishment
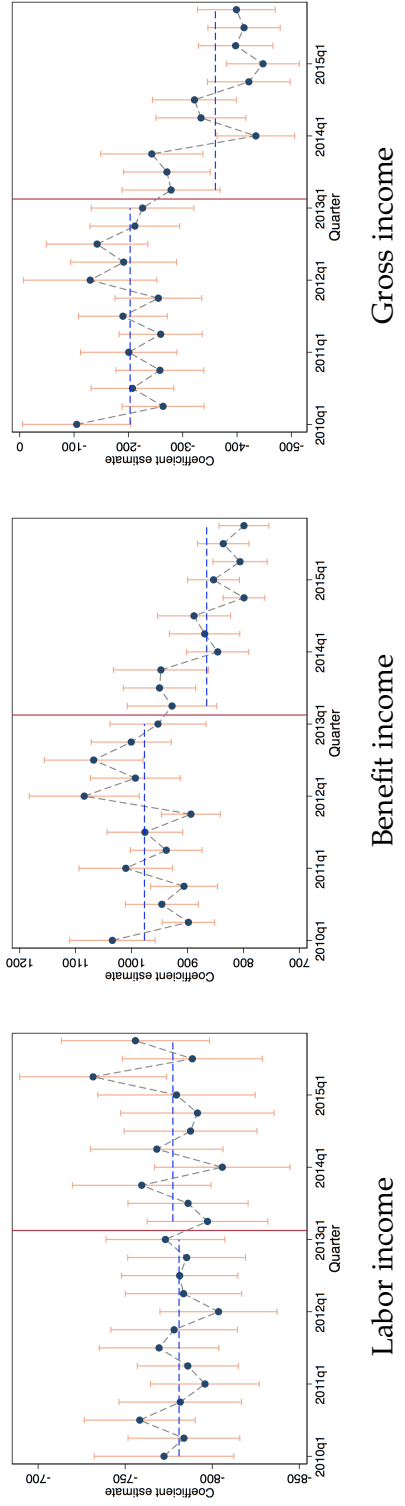


**Notes:** The dependent variable is the monthly labor income on the left, the monthly social benefit income in the center and gross income in the right. Estimated coefficients capture interaction between whether an individual has always received council tax benefit. The vertical line indicates the time from which council tax benefit was abolished and those previously claiming benefits were send a council tax demand letter. Regressions absorb local authority and region by time effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure A6: Impact of "disability living allowance" conversion starting October 28 2013 on support for UKIP
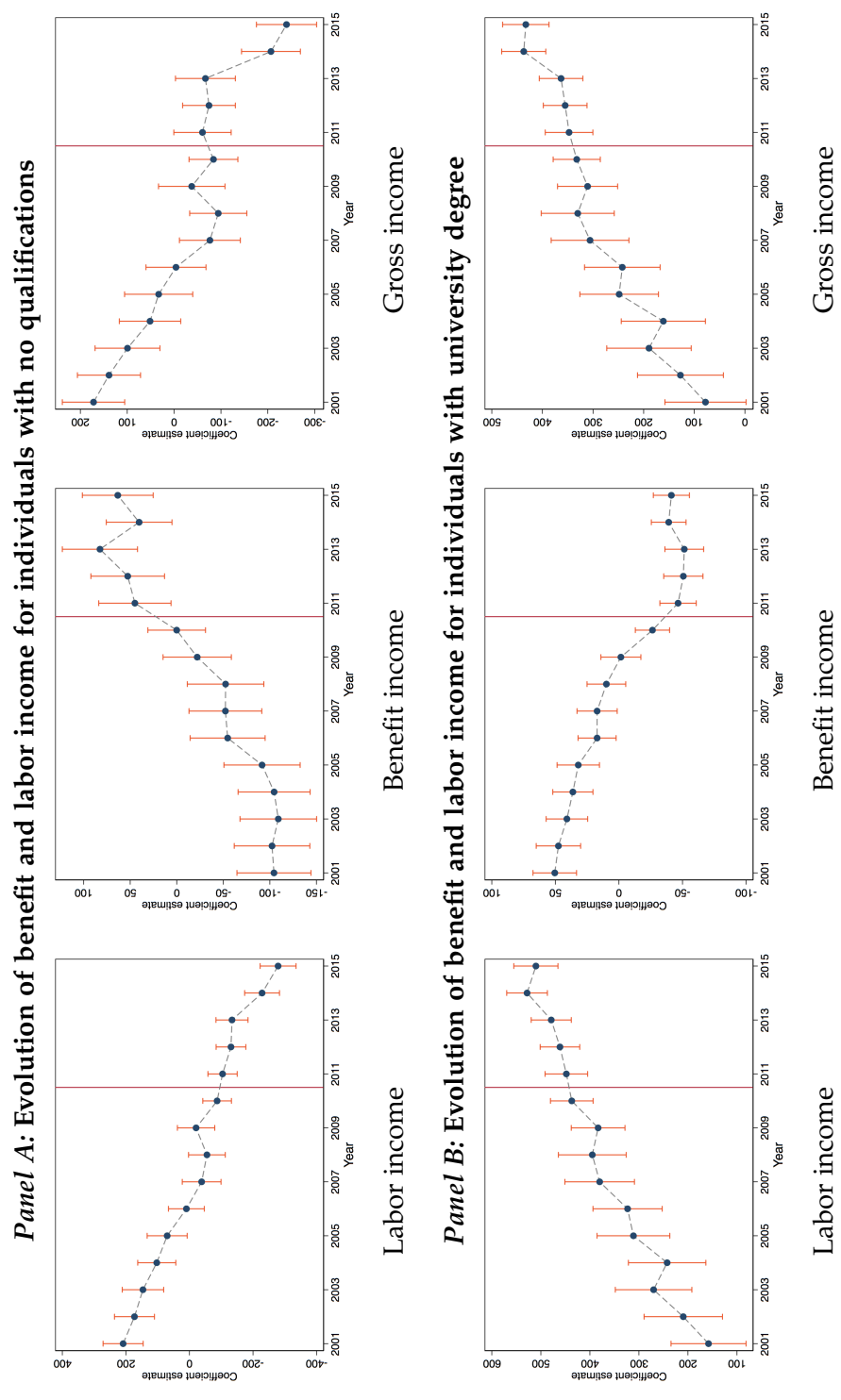


**Notes:** Figure plots event studies studying the impact of the abolishment of council tax benefit on previous recipients. The dependent variable in the left panel is a dummy variable indicating whether the respondent revealed a political preference in support of UKIP. The dependent panel in the right hand side is an indicator variable indicating whether the respondent is behind with his or her council tax payments. The regressions control for counil by survey wave by time fixed effects. The graph plots point estimates of the interaction between an indicator variable indicating whether the individual respondents received council tax benefit at each point in time in the three years prior to the reform in which they were observed in the sample interacted with an indicator for the survey quarter. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure A7: Support for Leave in EU referendum by respondent's political party preference
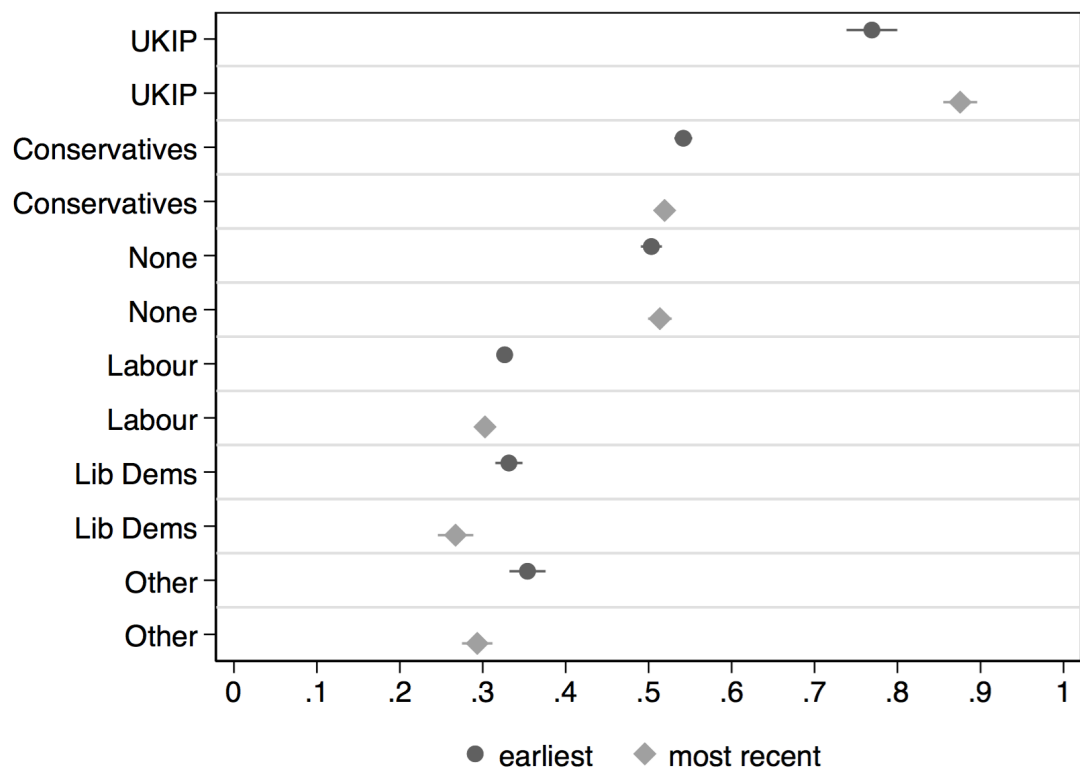


**Notes:** The plot presents sample averages of Leave support in Wave 8 of the USOC survey by the respondents expressed political support for UKIP, the Conservatives, Labour or the Liberal Democrats at the earliest instance and the latest instance.

Figure A8: Excluding individuals ever having worked in manufacturing, mining or agriculture: Non-parametric estimates capturing the evolution of labor and benefit income *within-individuals* over time for respondents with low- and high levels of human capital



*Panel A*: **Evolution of benefit and labor income for individuals with no qualifications**



*Panel B*: **Evolution of benefit and labor income for individuals with university degree**

Table A1: Summary statistics of main variables used

*Panel A:* District level

| | Fstats Mean | SD | N |
|---|---|---|---|
| Local election % for UKIP | 4.454 | 7.571 | 3290.000 |
| EL % UKIP | 21.118 | 9.397 | 1140.000 |
| % with No qual (2001) | 0.286 | 0.062 | 346.000 |
| % working in Routine occ (2001) | 0.102 | 0.030 | 346.000 |
| % working in Retail (2001) | 0.169 | 0.021 | 346.000 |
| % working in Manuf (2001) | 0.154 | 0.054 | 346.000 |
| Total Austerity Impact | 447.122 | 121.110 | 378.000 |
| Tax Credit Cuts | 87.971 | 23.563 | 379.000 |
| Child Benefit Cut | 71.517 | 9.425 | 379.000 |
| Council Tax Benefit Cut | 7.211 | 7.810 | 379.000 |
| Disability Living Allowance | 36.570 | 12.204 | 379.000 |
| Bedroom Tax | 10.813 | 5.597 | 379.000 |

*Panel B:* Individual level

| | Mean | SD | N |
|---|---|---|---|
| $T_{i,CTB}$ | 0.064 | 0.244 | 348188 |
| $T_{i,DLA}$ | 0.018 | 0.135 | 348188 |
| $T_{i,BTX}$ | 0.057 | 0.232 | 325769 |
| support UKIP | 0.047 | 0.212 | 252642 |
| support Conservatives | 0.259 | 0.438 | 252642 |
| support Labour | 0.351 | 0.477 | 252642 |
| support Lib-Dems | 0.082 | 0.274 | 252642 |
| support Neither party | 0.193 | 0.395 | 252642 |
| Like/Dislike Conservatives | 3.530 | 2.620 | 75078 |
| Like/Dislike Labour | 4.093 | 2.636 | 75194 |
| Like/Dislike LibDems | 3.067 | 2.282 | 73784 |
| Public officals dont care | 3.367 | 0.977 | 75547 |
| No say in what govt does | 3.338 | 1.045 | 75897 |
| Vote doesnt make diff | 3.294 | 3.215 | 74948 |

Table A2: Robustness of the Impact of different austerity measures on support for UKIP across Local, European and Westminster elections: Adding district specific linear time trends

| Dependent variable: UKIP vote share in... | (1) Overall | (2) TC | (3) CB | (4) CTB | (5) DLA | (6) BTX |
|---|---|---|---|---|---|---|
| *Panel A:* Local | | | | | | |
| $\mathbb{1}$(Year>2010) $\times$ Austerity | 0.005 | 0.038 | 0.096 | 0.049 | 0.054 | 0.055 |
| | (0.002) | (0.012) | (0.039) | (0.034) | (0.028) | (0.070) |
| Mean of DV | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Local authority districts | 341 | 342 | 342 | 342 | 342 | 342 |
| Observations | 3216 | 3219 | 3219 | 3219 | 3219 | 3219 |
| | | | | | | |
| *Panel B:* European | | | | | | |
| $\mathbb{1}$(Year>2010) $\times$ Austerity | 0.003 | 0.031 | 0.018 | 0.023 | 0.070 | -0.055 |
| | (0.003) | (0.014) | (0.036) | (0.038) | (0.027) | (0.058) |
| Mean of DV | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 |
| Local authority districts | 374 | 375 | 375 | 375 | 375 | 375 |
| Observations | 1122 | 1125 | 1125 | 1125 | 1125 | 1125 |
| | | | | | | |
| *Panel C:* Westminster | | | | | | |
| $\mathbb{1}$(Year>2010) $\times$ Austerity | 0.010 | 0.081 | -0.016 | 0.073 | 0.164 | 0.118 |
| | (0.002) | (0.010) | (0.031) | (0.035) | (0.024) | (0.051) |
| Avg effect | 4.573 | 7.535 | -1.133 | .662 | 6.1364 | 1.413 |
| SD | 1.131 | 1.847 | .141 | .591 | 1.899 | .691 |
| Mean of DV | 6.03 | 6.03 | 6.03 | 6.03 | 6.03 | 6.03 |
| Harmonized Constituencies | 566 | 566 | 566 | 566 | 566 | 566 |
| Observations | 2047 | 2047 | 2047 | 2047 | 2047 | 2047 |
| | | | | | | |
| Avg Loss per working age adult | 447.1 | 87.97 | 71.52 | 7.21 | 36.57 | 10.81 |
| Affected HH. in 1000s | | 4507 | 7601 | 2436 | 499 | 660 |
| *Correlation with...* | | | | | | |
| No qualification share | | .75 | .17 | .51 | .77 | .58 |
| Routine job share | | .6 | .12 | .27 | .62 | .43 |
| Retail sector share | | .35 | .28 | .02 | .21 | .08 |
| Manufacturing sector share | | .3 | .11 | -.03 | .37 | .24 |

Notes: Table reports results from a panel OLS regressions with local authority area and region by year fixed effects. The dependent variable is UKIP's vote share in the Local Elections from 2000 to 2015. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

Table A3: The Impact of different austerity on local area gross value added by sector with spending multiplier estimates

| Sector | (1) Overall | (2) Retail & Distr. | (3) Public admin | (4) Manuf. | (5) Business Serv. | (6) Construction | (7) Financial Serv. |
|---|---|---|---|---|---|---|---|
| 𝟙(Year>2010) × Total Austerity Impact | -0.078 | -0.114 | 0.037 | -0.367 | -0.103 | -0.076 | -0.007 |
| | (0.039) | (0.040) | (0.039) | (0.105) | (0.076) | (0.087) | (0.139) |
| Sector GVA | 30.89 | 4.28 | 3.82 | 2.44 | 4.33 | 1.44 | 7.89 |
| Implied multiplier effect | -2.4 | -.49 | .14 | -.9 | -.45 | -.11 | -.05 |
| | (1.21) | (.17) | (.15) | (.26) | (.33) | (.12) | (1.1) |
| Local election districts | 378 | 378 | 378 | 378 | 378 | 378 | 378 |
| Observations | 6048 | 6048 | 6048 | 6048 | 6048 | 6048 | 6048 |

Notes: Table reports results from a panel OLS regressions with local authority area and region by year fixed effects. The dependent variable is the log value of the sector specific gross value added measured in £ 1000 per working age adult in a local authority area between 2000 to 2015. The multiplier effect is the size of the contraction in gross value added due to a one pound contraction transfer-income due to the austerity-induced welfare reforms studied in Section 4. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

Table A4: Austerity, UKIP and support for Leave in 2016: Exploring changes in UKIP support across Local, European and Westminster elections

| Dependent variable: Leave vote share in 2016 | (1) | (2) | (3) |
|---|---|---|---|
| *Panel A:* Local Elections | | | |
| Austerity | 0.029 | | 0.016 |
| | (0.004) | | (0.004) |
| $\Delta UKIP$ | | 0.912 | 0.824 |
| | | (0.070) | (0.080) |
| Mean of DV | 54.6 | 54.6 | 54.6 |
| Observations | 322 | 322 | 322 |
| | | | |
| *Panel B:* European Elections | | | |
| Austerity | 0.028 | | 0.016 |
| | (0.004) | | (0.003) |
| $\Delta UKIP$ | | 1.868 | 1.754 |
| | | (0.090) | (0.099) |
| Mean of DV | 53.2 | 53.2 | 53.2 |
| Observations | 378 | 378 | 378 |
| | | | |
| *Panel C:* Westminster elections | | | |
| Austerity | 0.021 | | 0.002 |
| | (0.004) | | (0.003) |
| $\Delta UKIP$ | | 1.704 | 1.691 |
| | | (0.089) | (0.093) |
| Mean of DV | 53.8 | 53.8 | 53.8 |
| Observations | 528 | 528 | 528 |

Notes: The dependent variable throughout is a measure of Leave support measured at the district level in Panel A and B, at the constituency level using the estimates constructed by Hanretty (2017) in Panel C. Austerity refers to the main austerity shock measure used in Section 4. Δ UKIP in Panel A measures the change in support for UKIP between the 2009 and 2014 EP elections, the change in support for UKIP between the 2009-2012 and 2013-2015 time windows in local elections in Panel B. In Panel C, it measures the change in support for UKIP between 2010 and 2015 Westminster elections. All regressions control for region fixed effects. Standard errors clustered at the Local Government Authority District Level in Panel A and B and at the Harmonized Constituency level in Panel C, are presented in parentheses.

Table A5: Robustness to accounting for non-linear time varying shocks affecting individuals with different characteristics

| | | Controlling for shocks specific to | | | | |
| | | Qualification & Ec. activity | | | Life histories | |
| *Dependent variable:* support for UKIP | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Panel A:* | | | | | | |
| Post x Benefit cut | 0.028 | 0.018 | 0.021 | 0.014 | 0.022 | 0.013 |
| | (0.004) | (0.005) | (0.005) | (0.005) | (0.007) | (0.007) |
| Mean of DV | | | | | | |
| Observations | 252639 | 251186 | 252313 | 250857 | 164794 | 163356 |
| District FE & Region x Wave x Time FE | x | x | x | x | x | x |
| *Panel B:* | | | | | | |
| Post x Benefit cut | 0.026 | 0.018 | 0.019 | 0.014 | 0.021 | 0.015 |
| | (0.005) | (0.005) | (0.005) | (0.005) | (0.008) | (0.008) |
| Mean of DV | | | | | | |
| Observations | 251080 | 249605 | 250734 | 249285 | 162449 | 160958 |
| District x Wave x Time FE | x | x | x | x | x | x |
| *Panel C:* | | | | | | |
| Post x Benefit cut | 0.019 | 0.012 | 0.013 | 0.009 | 0.019 | 0.013 |
| | (0.005) | (0.005) | (0.005) | (0.005) | (0.008) | (0.009) |
| Mean of DV | | | | | | |
| Observations | 234192 | 233390 | 233783 | 233016 | 145569 | 144573 |
| Individual FE & District x Wave x Time FE | x | x | x | x | x | x |
| Region x Qualifications x Wave x Time FE | | x | | x | | x |
| Region x Economic Activity x Wave x Time FE | | | x | x | | x |
| Economic Activity History x Time FE | | | | | x | x |

Notes: Table reports results from a panel OLS. The dependent variable is a dummy variable taking the value 1 in case a respondent expresses support for UKIP. Panel A controls for district by NUTS 1 Region x Wave x Time fixed effects, thus exploiting between district and between individual variation. Panel B controls for District x Wave x Time Fixed effects, thus only exploiting between individual variation within a district. Panel C controls for Respondent fixed effects and District x Wave x Time Fixed Effects, exploiting only within-individual- and within district variation. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

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Table A6: Robustness of impact of different austerity measures on support for UKIP studying alternative control groups: exploiting individual-level data

| Dependent variable: support for UKIP | Whole sample | | | | Matched sample | | | | Narrower control group | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) Any | (2) CTB | (3) DLA | (4) BTX | (5) Any | (6) CTB | (7) DLA | (8) BTX | (9) Any | (10) CTB | (11) DLA | (12) BTX |
| *Panel A:* | | | | | | | | | | | | |
| Post × Benefit cut | 0.028 | 0.026 | 0.051 | 0.027 | 0.016 | 0.017 | 0.035 | 0.023 | 0.019 | 0.016 | 0.043 | 0.020 |
| | (0.004) | (0.005) | (0.013) | (0.006) | (0.007) | (0.008) | (0.016) | (0.009) | (0.005) | (0.006) | (0.017) | (0.007) |
| Mean of DV | .0472 | .0472 | .0472 | .0469 | .0519 | .055 | .0642 | .053 | .0551 | .0564 | .0703 | .0517 |
| Local election districts | 379 | 379 | 379 | 379 | 374 | 372 | 363 | 368 | 374 | 374 | 365 | 374 |
| Observations | 252642 | 252642 | 252642 | 245352 | 62035 | 34592 | 11325 | 29582 | 87198 | 60554 | 15899 | 49405 |
| District FE | × | × | × | × | × | × | × | × | × | × | × | × |
| Region x Wave x Time FE | × | × | × | × | × | × | × | × | × | × | × | × |
| *Panel B:* | | | | | | | | | | | | |
| Post × Benefit cut | 0.026 | 0.025 | 0.043 | 0.026 | 0.017 | 0.021 | 0.028 | 0.023 | 0.021 | 0.017 | 0.044 | 0.023 |
| | (0.005) | (0.005) | (0.013) | (0.006) | (0.007) | (0.010) | (0.029) | (0.013) | (0.005) | (0.006) | (0.024) | (0.008) |
| Mean of DV | .0472 | .0472 | .0472 | .0469 | .0519 | .055 | .0642 | .053 | .0551 | .0564 | .0703 | .0517 |
| Local election districts | 379 | 379 | 379 | 379 | 374 | 372 | 363 | 368 | 374 | 374 | 365 | 374 |
| Observations | 252642 | 252642 | 252642 | 245352 | 62035 | 34592 | 11325 | 29582 | 87198 | 60554 | 15899 | 49405 |
| District x Wave x Time FE | × | × | × | × | × | × | × | × | × | × | × | × |
| *Panel C:* | | | | | | | | | | | | |
| Post × Benefit cut | 0.019 | 0.019 | 0.030 | 0.016 | 0.008 | 0.018 | 0.036 | 0.007 | 0.012 | 0.011 | 0.032 | 0.012 |
| | (0.005) | (0.006) | (0.015) | (0.006) | (0.008) | (0.011) | (0.032) | (0.013) | (0.006) | (0.007) | (0.024) | (0.008) |
| Mean of DV | .0472 | .0472 | .0472 | .0469 | .0519 | .055 | .0642 | .053 | .0551 | .0564 | .0703 | .0517 |
| Local election districts | 379 | 379 | 379 | 379 | 374 | 372 | 363 | 368 | 374 | 374 | 365 | 374 |
| Observations | 252642 | 252642 | 252642 | 245352 | 62035 | 34592 | 11325 | 29582 | 87198 | 60554 | 15899 | 49405 |
| Individual FE | × | × | × | × | × | × | × | × | × | × | × | × |
| District x Wave x Time FE | × | × | × | × | × | × | × | × | × | × | × | × |

Table A7: Effect of austerity on political preferences: Studying the original political preferences of supporters of different political parties

|  | (1) UKIP | (2) Conservatives | (3) Labour | (4) Lib Dems | (5) No party |
|---|---|---|---|---|---|
| *Initial party preference...* |  |  |  |  |  |
| Conservatives $\times$ Post $\times$ Any | 0.049 | -0.078 | 0.026 | 0.007 | 0.002 |
|  | (0.013) | (0.017) | (0.012) | (0.006) | (0.011) |
| Labour $\times$ Post $\times$ Any | 0.042 | -0.012 | -0.018 | -0.006 | 0.008 |
|  | (0.018) | (0.011) | (0.018) | (0.009) | (0.017) |
| Lib Dems $\times$ Post $\times$ Any | 0.012 | -0.023 | 0.017 | 0.001 | -0.007 |
|  | (0.036) | (0.020) | (0.022) | (0.010) | (0.029) |
| None $\times$ Post $\times$ Any | 0.010 | -0.029 | 0.019 | -0.001 | 0.004 |
|  | (0.005) | (0.005) | (0.009) | (0.003) | (0.007) |
| Other $\times$ Post $\times$ Any | 0.050 | -0.065 | 0.004 | 0.003 | 0.015 |
|  | (0.016) | (0.013) | (0.019) | (0.019) | (0.017) |
| UKIP $\times$ Post $\times$ Any | 0.005 | -0.040 | 0.012 | -0.006 | 0.040 |
|  | (0.008) | (0.007) | (0.011) | (0.004) | (0.013) |
| Mean of DV | .0479 | .263 | .351 | .0818 | .187 |
| Local authority districts | 374 | 374 | 374 | 374 | 374 |
| Observations | 227029 | 227029 | 227029 | 227029 | 227029 |
| Individual FE | x | x | x | x | x |
| District x Region x Time FE | x | x | x | x | x |

Notes: Table reports results from a panel OLS. The dependent variable is a dummy variable taking the value 1 in case a respondent expresses support for the party provided in the column head (either stating they are a supporter, feel close or would vote for the party if there was a general election tomorrow). The underlying regression interacts the individual level exposure to welfare reforms studied in Table 2 with a baseline measure of an individual's stated political party preference recorded the first time the respondents contribute to the USOC study. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

Table A8: Effect of exposure to welfare cuts on like/ or dislike of the established political parties: included only in Wave 2, 3 and 6 in USOC study

|  | (1) | (2) | (3) |
|---|---|---|---|
| *Panel A:* Like or dislike Conservatives |  |  |  |
| Post × Benefit cut | -0.196 | -0.243 | -0.192 |
|  | (0.052) | (0.057) | (0.097) |
| Mean of DV | 3.53 | 3.53 | 3.53 |
| Local election districts | 378 | 378 | 378 |
| Observations | 75078 | 75078 | 75078 |
| *Panel B:* Like or dislike Labour |  |  |  |
| Post × Benefit cut | -0.038 | -0.050 | -0.027 |
|  | (0.056) | (0.060) | (0.097) |
| Mean of DV | 4.09 | 4.09 | 4.09 |
| Local election districts | 378 | 378 | 378 |
| Observations | 75194 | 75194 | 75194 |
| *Panel C:* Like or dislike Liberal Democrats |  |  |  |
| Post × Benefit cut | 0.063 | 0.004 | 0.008 |
|  | (0.047) | (0.050) | (0.094) |
| Mean of DV | 3.07 | 3.07 | 3.07 |
| Local election districts | 378 | 378 | 378 |
| Observations | 73784 | 73784 | 73784 |
| District FE | × |  |  |
| Region x Wave x Time FE | × |  |  |
| District x Wave x Time FE |  | × | × |
| Individual FE |  |  | × |

Notes: Table reports results from a OLS regressions. The dependent variable capture the extent to which respondents like or dislike one of the three main political parties. They are measured on a 10 point Likert scale ranging from strong dislike to strongly like. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

Table A9: Effects of benefit cut exposure on wider measures of perceptions of disenfranchisement *controlling for individual level political party preferences*

|  | (1) | (2) | (3) |
|---|---|---|---|
| *Panel A:* Public officials dont care | | | |
| Post × Benefit cut | 0.056 | 0.068 | 0.047 |
|  | (0.022) | (0.023) | (0.046) |
| Mean of DV | 3.37 | 3.37 | 3.37 |
| Local election districts | 374 | 374 | 374 |
| Observations | 66001 | 66001 | 66001 |
| *Panel B:* Don't have say in what govt does | | | |
| Post × Benefit cut | 0.071 | 0.080 | 0.060 |
|  | (0.022) | (0.024) | (0.048) |
| Mean of DV | 3.33 | 3.33 | 3.33 |
| Local election districts | 374 | 374 | 374 |
| Observations | 66237 | 66237 | 66237 |
| *Panel C:* Your vote is unlikely to make a difference | | | |
| Post × Benefit cut | 0.006 | 0.009 | 0.014 |
|  | (0.011) | (0.012) | (0.026) |
| Mean of DV | .553 | .553 | .553 |
| Local election districts | 374 | 374 | 374 |
| Observations | 66659 | 66659 | 66659 |
| | | | |
| Individual level political party preference | x | x | x |
| District FE | x | | |
| Region x Wave x Time FE | x | | |
| District x Wave x Time FE | | x | x |
| Individual FE | | | x |

Notes: Table reports results from a panel OLS regressions. The individual level political party preference controls for time-varying individual level political party preference for Labour, the Conservatives, the Liberal Democrats, UKIP or No Party. The dependent variable in Panel A and B is a score on a 5 point likert scale (strongly disagree - strongly agree). In Panel C it is a dummy variable equal to 1 if respondents indicate that they think it is unlikely that their vote makes a difference. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

Table A10: Wider measures of perceptions of disenfranchisement and turnout: robustness included only in some waves of the USOC study

| | Any reform | | | CTB | | | DLA | | | BTX | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| *Panel A*: Public officials dont care | | | | | | | | | | | | |
| Post × Benefit cut | 0.078 | 0.073 | 0.051 | 0.054 | 0.054 | 0.034 | 0.091 | 0.089 | 0.154 | 0.077 | 0.069 | 0.039 |
| | (0.020) | (0.021) | (0.040) | (0.024) | (0.025) | (0.049) | (0.051) | (0.052) | (0.089) | (0.030) | (0.032) | (0.060) |
| Mean of DV | 3.37 | 3.37 | 3.37 | 3.37 | 3.37 | 3.37 | 3.37 | 3.37 | 3.37 | 3.37 | 3.37 | 3.37 |
| Local election districts | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 |
| Observations | 75547 | 75547 | 75547 | 75547 | 75547 | 75547 | 75547 | 75547 | 75547 | 73357 | 73357 | 73357 |
| *Panel B*: Don't have say in what govt does | | | | | | | | | | | | |
| Post × Benefit cut | 0.096 | 0.093 | 0.068 | 0.083 | 0.071 | 0.057 | 0.066 | 0.054 | 0.083 | 0.084 | 0.083 | 0.041 |
| | (0.020) | (0.021) | (0.041) | (0.023) | (0.025) | (0.047) | (0.053) | (0.054) | (0.097) | (0.031) | (0.033) | (0.061) |
| Mean of DV | 3.34 | 3.34 | 3.34 | 3.34 | 3.34 | 3.34 | 3.34 | 3.34 | 3.34 | 3.34 | 3.34 | 3.34 |
| Local election districts | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 |
| Observations | 75897 | 75897 | 75897 | 75897 | 75897 | 75897 | 75897 | 75897 | 75897 | 73665 | 73665 | 73665 |
| *Panel C*: Your vote is unlikely to make a difference | | | | | | | | | | | | |
| Post × Benefit cut | 0.020 | 0.021 | 0.020 | 0.018 | 0.016 | 0.022 | 0.026 | 0.036 | 0.065 | 0.010 | 0.006 | -0.013 |
| | (0.011) | (0.011) | (0.022) | (0.013) | (0.014) | (0.027) | (0.025) | (0.026) | (0.050) | (0.016) | (0.016) | (0.027) |
| Mean of DV | .563 | .563 | .563 | .563 | .563 | .563 | .563 | .563 | .563 | .562 | .562 | .562 |
| Local election districts | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 |
| Observations | 74948 | 74948 | 74948 | 74948 | 74948 | 74948 | 74948 | 74948 | 74948 | 73309 | 73309 | 73309 |
| *Panel D*: Likelihood to vote in next election | | | | | | | | | | | | |
| Post × Benefit cut | 0.138 | 0.120 | 0.102 | 0.226 | 0.219 | 0.136 | 0.434 | 0.421 | -0.008 | -0.032 | -0.066 | 0.079 |
| | (0.076) | (0.079) | (0.118) | (0.095) | (0.099) | (0.138) | (0.186) | (0.192) | (0.246) | (0.102) | (0.107) | (0.175) |
| Mean of DV | 7.54 | 7.54 | 7.54 | 7.54 | 7.54 | 7.54 | 7.54 | 7.54 | 7.54 | 7.56 | 7.56 | 7.56 |
| Local election districts | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 |
| Observations | 78174 | 78174 | 78174 | 78174 | 78174 | 78174 | 78174 | 78174 | 78174 | 76397 | 76397 | 76397 |
| District FE | x | | | x | | | x | | | x | | |
| Region x Wave x Time FE | x | | | x | | | x | | | x | | |
| District x Wave x Time FE | | x | x | | x | x | | x | x | | x | x |
| Individual FE | | | x | | | x | | | x | | | x |

Notes: Columns (1) - (3) replicate main Table 4. Columns (4) - (6) focus on the individuals affected by council tax benefit reform. Columns (7) - (9) focus on the sample exposed to the disability living allowance reform, while columns (10)-(12) focus on the sample of individuals likely exposed to the bedroom tax. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

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Table A11: Alternative broader outcome measures and support for Leave across different control variables: Controlling for political party preferences

| Dependent variable: Leave support | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Public officials don't care | 0.040 | 0.028 | 0.027 | 0.025 | 0.026 | 0.021 |
| | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) | (0.006) |
| Don't have a say in what government does | 0.033 | 0.023 | 0.023 | 0.022 | 0.022 | 0.024 |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.005) | (0.006) |
| My vote doesnt matter | 0.006 | 0.013 | 0.013 | 0.013 | 0.013 | 0.006 |
| | (0.007) | (0.007) | (0.007) | (0.007) | (0.008) | (0.010) |
| Behind with council tax | 0.069 | 0.066 | 0.060 | 0.051 | 0.061 | 0.036 |
| | (0.017) | (0.017) | (0.017) | (0.017) | (0.019) | (0.025) |
| Behind with rent | 0.021 | 0.015 | 0.012 | 0.001 | 0.008 | -0.005 |
| | (0.016) | (0.016) | (0.016) | (0.016) | (0.019) | (0.022) |
| | | | | | | |
| $\phi = \gamma$ p-value | | | | | | |
| Local election districts | 373 | 373 | 373 | 373 | 372 | 372 |
| Observations | 18422 | 18388 | 18370 | 18169 | 13737 | 9327 |
| Political party preferences | x | x | x | x | x | x |
| District FE | x | x | x | x | x | x |
| Qualifications & Age FE | | x | x | x | x | x |
| Economic Activity Status FE | | | x | x | x | x |
| Income Decile FE | | | | x | x | x |
| Health conditions | | | | | x | x |
| Socio-economic status & Employment Sector FE | | | | | | x |

Notes: Table reports results from a cross-sectional OLS regressions. The dependent variable is a dummy indicating whether respondents stated that they support Leaving the EU. The sample gets successively smaller as more control variables get added that are not available across the full sample. In case a variable is not reported on in a specific wave, the most recent time a control variable is observed for an individual in the panel is used. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

Table A12: Robustness to using control group individuals refined using matching

| Dependent variable: Leave support | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Any Reform | 0.070 | 0.066 | 0.055 | 0.055 | 0.057 | 0.088 | 0.092 | 0.085 |
|  | (0.020) | (0.019) | (0.019) | (0.019) | (0.020) | (0.031) | (0.031) | (0.036) |
| Mean of DV | .556 | .556 | .556 | .556 | .558 | .52 | .522 | .516 |
| Local authority districts | 355 | 355 | 355 | 355 | 354 | 255 | 254 | 224 |
| Observations | 5394 | 5394 | 5391 | 5387 | 5337 | 1715 | 1695 | 1328 |
| District FE | x | x | x | x | x | x | x | x |
| Qualifications FE |  | x | x | x | x | x | x | x |
| Age FE |  |  | x | x | x | x | x | x |
| Employment Status FE |  |  |  | x | x | x | x | x |
| Income Decile FE |  |  |  |  | x | x | x | x |
| Industry of Employment FE |  |  |  |  |  | x | x | x |
| Socio-economic status group FE |  |  |  |  |  |  | x | x |
| Health conditions |  |  |  |  |  |  |  | x |

Notes: Table reports results from a cross-sectional OLS regressions. The dependent variable is a dummy indicating whether respondents stated that they support Leaving the EU. The sample is restricted based on individuals that are good matches among the set of individuals not exposed to either of the three benefit reforms studied in detail. Matches are constructed with replacement with matching on gender, age, indicator variables capturing whether an individual is employed, working in family care roles, retired, self-employed, a student or unemployed, together with the tenancy status indicator of whether an individual lives in rented accommodation, owns the property outright or with a mortgage, together with a set of features capturing the educational attainment across the five categories included in the UK census, along with the log value of pre-treatment monthly benefit income. A caliper of 0.01 is imposed to retain good quality matched pairs. The sample gets successively smaller as more control variables get added that are not available across the full sample. In case a variable is not reported on in a specific wave, the most recent time a control variable is observed for an individual in the panel is used. Standard errors clustered at the Local Government Authority District Level are presented in parentheses.

# B  Data Description and Additional Background Material

## B.1  Council elections

The data for district elections in Great Britain is taken from The Elections Centre. It contains comprehensive data on local government elections since 1973. Since 1999, there have been several changes in local government structure, and these have been accounted for in constructing the panel.

The current local government structure includes both two-tier and single-tier components. In England, there are 27 upper-tier county councils with 201 lower-tier district councils. Additionally, there are 32 London Boroughs, the City of London, 36 metropolitan boroughs (or districts), and 55 unitary authorities (UA), all of which operate on a single-tier basis. Since 1994, there are 22 unitary authorities in Wales and 32 unitary authorities in Scotland. While most responsibilities are split between counties and districts in two-tier authorities, single-tier authorities must provide all the services . In constructing the sample, this paper includes all election results at the district council and single-tier authority level between 2000 and 2015.

Elections are organized by subdivisions of local authorities called electoral wards or electoral divisions. Each ward is represented by one or more elected councillors. Although in all cases councillors serve 4 year terms, there are three distinct systems of elections. First, elections may happen every four years for all councillors. Second, elections may happen for a third of the councillors every year, with no election in the fourth year. In this case, the fourth year is used for county council elections. Third, half of the councillors may be elected every two years . In terms of voting system, England and Wales use First Past the Post, while the Single Transferable Vote system is used in Scotland and Northern Ireland. In the analysis, a system of elections every four years starting in 2000 is treated separately from a system with elections every four years starting in 2000. Thus, all additional variation is taken into account with "election wave" fixed effects, which control for differences between authorities with different elections structures and sequences.

The main change in the structure of local government since 2000 was the introduction of nine new unitary authorities in England in 2009. These changes are summarized in the table below. In the first five county councils, the lower tier district councils were abolished, and all functions were undertaken by the new unitary authority of the same name. In Bedfordshire, Mid- and South Bedfordshire merged to form the Central Bedfordshire UA. Bedford attained UA status, having previously been a district. In Cheshire, the unitary authority of Cheshire West and Chester was formed from the districts of Ellesmere Port and Neston, Vale Royal, and Chester. The districts of Macclesfield, Congleton and Crewe and Nantwich merged to form Cheshire East. In order to compare the regions before and after these reforms, district-level results were merged into the current UA boundaries between 2000 and 2008. There is no concern of overlap, as no district council was split to form the new unitary authorities.

Table B1: Changes to district councils since 2000

| County Council (before 2009) | District Councils | New Unitary Authority (After 2009) |
|---|---|---|
| | (Before 2009) | |
| Cornwall | Caradon | Cornwall |
| | Carrick | |
| | Kerrier | |
| | North Cornwall | |
| | Penwith | |
| | Restormel | |
| Durham | Cheshire-le-Street | Durham |
| | City of Durham | |
| | Derwentside | |
| | Easington | |
| | Sedgefield | |
| | Teeside | |
| | Wear Valley | |
| Northumberland | Alnwick | Northumberland |
| | Berwick-upon-Tweed | |
| | Blyth Valley | |
| | Castle Morpeth | |
| | Tynedale | |
| | Wansbeck | |
| Shropshire | Bridgnorth | Shropshire |
| | North Shropshire | |
| | Oswestry | |
| | Shrewsbury and Atcham | |
| | South Shropshire | |
| Wiltshire | Kennet | Wiltshire |
| | North Wiltshire | |
| | Salisbury | |
| | West Wiltshire | |
| Bedfordshire | Mid Bedfordshire | Bedford |
| | South Bedfordshire | Central Bedfordshire |
| Cheshire | Chester | Cheshire West and Chester |
| | Congleton | Cheshire East |
| | Crewe and Nantwich | |
| | Ellesmere Port and Neston | |
| | Macclesfield | |
| | Vale Royal | |

## B.2 Political preferences elicited through the USOC survey

I take advantage of the USOC politics module that is included in Waves 1-7 of the USOC panel study. Wave 8 of the study includes the EU referendum question, but, unfortunately, does not include the politics module.

The key value added of working with individual level panel data lies in the fact that I can fully zoom in on changes in political preferences within an individual. The instrument used for each USOC survey round contains a Politics module that elicits political preferences through a sequence of questions. These are presented in Figure B1. The enumerator asks the respondents first, whether an individual is a supporter of a political party. If the respondent says yes, they enquire which is the political party.

In case respondents said that they are not a supporter of a specific party, the enumerator asks whether the respondent sees him- or herself closer to one party or another. If that is the case, the enumerator asks, which political party that is.

Only if a respondent is neither a supporter of a political party or feeling closer to one party over another one, the enumerator asks, which party would the respondent vote for in case there was an election.

In the face-to-face interviews, respondents are not directly prompted with party names from a menu, but rather respondents are asked to provide the party name, which the enumerator ticks on the survey questionnaire or, alternatively, details. In waves 1-3, the conversion of the survey questionnaires (containing the detailed party names) to digital files, did not separately code UKIP, but rather, included a broad category "Other" – the other main parties, in particular, Labour, Conservatives, Liberal Democrats, Greens, Plaid Cymru, Scottish Nationalists as well as Sinn Fein for Northern Ireland are always consistently coded.

Conversations with the UK Data Service handling the USOC data confirms that most of the Other-coded responses prior to wave 3 were supporters of UKIP or the British Nationalist Party (BNP). From Wave 4 onwards, UKIP is separately coded and the pool of respondents in the maintained "Other" category collapses once UKIP is separately coded. To be consistent throughout, I include the Other category into the count of UKIP supporters from Wave 4 onwards as well, which

likely adds some noise to the dependent variable.

This narrow module is complemented with a more detailed *Political engagement* module in wave 2, 3 and 6. The political engagement module includes six further survey questions explored in this paper.

- "Public officials don't care" – respondents are asked to (strongly) disagree or (strongly) agree with this statement on a 5 point Likert scale.

- "I don't have a say in what the government does" – respondents are asked to (strongly) disagree or (strongly) agree with this statement on a 5 point Likert scale.

- Perceived political influence – respondents are asked "On a scale from 0 to 10, where 0 means very unlikely and 10 means very likely, how likely is it that your vote will make a difference in terms of which party wins the election in this constituency at the next general election?" – in this paper I code respondents reporting are score weakly lower than 3 as perceiving that their vote is unlikely to make a difference.

- Party likes- and dislikes – respondents are asked for each of the three main parties (Conservative/Labour/ Liberal Democrats) "On a scale from 0 to 10, where 0 means strongly dislike and 10 means strongly like, how do you feel about the ... Party ?"

Figure B1: Schematic of USOC survey instrument eliciting political party preferences

**Vote 1**
Do you think of yourself as a
supporter of any one political
party?

**Yes**
32.29%

**No**
67.21%

**Vote 4**
Which one?

**Vote 2**
Do you think of yourself as a little closer
to one political party than to the others?

**Yes**
28.7%

**No**
71.28%

**Vote 4**
Which one?

**Vote 3**
If there were to be a general election
tomorrow, which political party do you
think you would be most likely to support?

**Other parties**
55.01%

**None**
44.99%

**Overall number of respondents by bin**

| | | | | |
|---|---|---|---|---|
| **%** | 35.84% | 21.54% | 23.44% | 19.17% |
| **N** | 91,327 | 54,875 | 59,698 | 48,819 |

**Notes:** Schematic presenting the structure of the USOC survey instrument eliciting political party preferences of individual respondent.

## B.3 Simulated welfare-reform impact measures and reforms studied

The simulated impact of the welfare reform measures leverages data constructed by Beatty and Fothergill (2013). They study seven actual reforms that were implemented, mostly through the 2012 Welfare Reform Act, many of which became effective starting in early 2013.

- Housing Benefit - Local Housing Allowance - Changes to the rules governing assistance with the cost of housing for low-income households in the private rented sector. The new rules apply to rent levels, 'excess' payments, property size, age limits for sole occupancy, and indexation for inflation.

- Housing Benefit - Under-occupation - New rules governing the size of properties for which payments are made to working age claimants in the social rented sector (widely known as the 'bedroom tax')

- Non-dependant deductions - Increases in the deductions from Housing Benefit, Council Tax Benefit and other income-based benefits to reflect the contribution that non-dependant household members are expected to make towards the household's housing costs

- Household benefit cap - New ceiling on total payments per household, applying to the sum of a wide range of benefits for working age claimants

- Council Tax Benefit - Reductions in entitlement of working age claimants arising from 10 per cent reduction in total payments to local authorities

- Disability Living Allowance - Replacement of DLA by Personal Independence Payments (PIP), including more stringent and frequent medical tests, as the basis for financial support to help offset the additional costs faced by individuals with disabilities

- Incapacity benefits - Replacement of Incapacity Benefit and related benefits by Employment and Support Allowance (ESA), with more stringent medical

tests, greater conditionality and time- limiting of non-means tested entitlement for all but the most severely ill or disabled

- Child Benefit - Three-year freeze, and withdrawal of benefit from households including a higher earner

- Tax Credits - Reductions in payment rates and eligibility for Child Tax Credit and Working Families Tax Credit, paid to lower and middle income households

- 1 per cent up-rating - Reduction in annual up-rating of value of most working-age benefits

**Impact measures**   For each of these reforms, the UK government has estimated impact estimates at the aggregate level. The main source of this information that Beatty and Fothergill (2013) use is reports from HM Treasury estimating overall financial saving arising from each element of the reforms. These were published in the official Budget's or the Chancellor of the Exchequer's Autumn Statement. Additional data sources used are Impact Assessment that government departments, such as, for example, the Department for Works and Pensions, has produced.

Beatty and Fothergill (2013) use these impact assessment to produce local authority level specific estimates of the likely impact. This combines three the official published ex-ante expected financial saving to the UK Exchequer, the distribution of benefit claimants between local authorities, and the extent to which claimants in each local authority are likely to be affected by the reforms.

For the latter, benefit claimant numbers and expenditure by local authority (incorporating demographic information such as family status and age) is incorporated. These data come from the Department of Works and Pensions and HM Revenues and Customs (the UK tax authorities).

**Reforms focused on**   The paper studies in some detail the "Housing Benefit - Under-occupation", "Council Tax Benefit" , "Disability Living Allowance" , "Child Benefit" and "Tax Credits" changes. It also studies the overall implied austerity impact measure that is constructed combining all these ten measures. The choice

of the reforms that are studied with more detail is driven by the availability of data and the ability to be able to capture specific reforms in the individual level data.

The reforms not covered directly are mostly not included due to the difficulty to identify treated subpopulations in the individual level data. Specifically, for the reforms to the Local Housing Allowance, this essentially cut benefits to households living in the private rented sector receiving housing benefits. This involved a change to the way that the maximum amount eligible for housing benefit support is computed. Prior to 2013, housing benefit claimants could get support covering rent up to the median rent in the local authority district; this reference rent was dropped to the 30th percentile.

A second reform was the Household benefit cap, which introduced a cap on the maximum benefit income a household could receive. The initial cap was set at GBP 26,000 (which coincides roughly with the average household income across the UK) resulting in only a handful of households in the sample period being affected in the individual level sample. Since fall 2016, the benefit cap was lowered by 23% to 20,000. The third benefit reform not explicitly discussed was a reform to Incapacity benefits – the Employment Support Allowance, which was another disability benefit reform. This was a reform that was already introduced by the outgoing labor government in late 2008 already and reinforced by the Coalition government introducing similar work capability assessments as for DLA/PIP, more conditionality and more time-limits.

# C  Auxiliary Results

## C.1  Robustness of trend changes in UKIP support

In this appendix, I present a range of robustness checks to highlight that the trends presented in Section 3 are robust.

**Similar trends for EP and Westminster elections**  While the trends presented in the main paper focus on the local elections, due to the high frequency of election results data for local elections, the trend patterns are very similar when studying EP or Westminster elections. Appendix Figure C1 shows that the marked change in the correlation structure between UKIP support and measures of poor economic fundamentals of 2001 constituency boundaries harmonized constituencies are very similar, with UKIP support picking up markedly in areas with high shares of the local population with No Qualifications, working in Routine jobs or high shares of Retail- and Manufacturing sector employment. The same patterns appear when studying EP elections as evidenced in Figure C2. While, on average, UKIP vote shares in Local and Westminster elections are mechanically lower (as not all seats are contested), UKIPs performance in EP elections 2004, 2009 and 2014 stands out consistently realizing more than 15.6% of the vote.

**Functional form**  The set of fixed effects included in the main specification is quite demanding. The results are very similar if I control fo more or less demanding time-fixed effects. In particular, Appendix Figures C10 show the estimated coefficients, when controlling for election-wave by region and year fixed effects. This set of fixed effects is particularly suitable as it de-facto zooms in on districts that are on similar rotation schedules for the elections of councillors. Similarly, Appendix Figure C11) presents results using simple year fixed effects; throughout, the results patterns are very similar.

**Sample balance**  UKIP does not field candidates in each of the local council elections. In the overall panel, UKIP is coded has having zero percentage of votes in case it does not field candidates. The results are however, robust to focusing on a much more balanced panel, including only districts in which UKIP fielded

candidates in at least 50% of the elections. These results are presented in Figure C9, the trends remain very similar. This, taken together with the similar trends we document for the EP (where candidates are fielded throughout the UK as they are selected based on the party's performance in regional lists) and Westminster elections renders me confident that the results are not masking selection effects.

**Broader baseline categories or measures**   The presentation of trends in Section 3 is condensed to a small set of baseline characteristics $X_{i,baseline}$. In this section, I show that the results are robust to a much richer set of baseline characteristics. In particular, Appendix Figure C5 shows a richer set of plots for six distinct qualification groups; the increase in support for UKIP is driven by areas that have a relatively low skill composition of the local resident population, while the reverse is true for areas with a resident population with higher degrees.

Appendix Figure C6 shows a richer set of plots for the eight distinct socio-economic status groups that the UK census bureau distinguishes. The Census bureau categorizes individual occupations and job titles into these socio-economic status groups, following the Goldthorpe classification system from sociology.

Appendix Figure C7 presents a broader set of sectors, suggesting that no trend patterns emerge for areas that have a sizable Health Care or Hotel & Accommodation sector. Similar positive effects on UKIP are found for the Transportation and Construction sectors, while the opposite direction shows up for Education and Real Estate.

In particular, I use refined baseline measures focusing on the qualification profile of the UK-born resident population (as opposed to including foreign borns). This exercise serves to zoom in on the likely electorate, which is mostly drawn from the UK-born resident population, despite EU citizens being entitled to vote in local elections. These results are presented in Appendix Figure C12 and provide very similar patterns.

## C.2   Where do UKIP voters come from?

The EU referendum was announced in early 2013 by the Conservative Prime Minister David Cameron, on condition of winning a majority in the 2015 election. This suggests that UKIP was particularly perceived as a threat to the Conservative

party.

Yet, the previous literature suggests that UKIP also attracted supporters from the Labour party. Similarly, it could be that UKIP was particularly successful in mobilizing voters that previously did not turn out to vote in elections.

I investigate these in turn.

**Empirical specification**   I build on our previous analysis that documents that UKIP's electoral ascent post 2010 is driven by places with weak economic fundamentals. I now ask whether these fundamentals, after 2010, explain distinct moves away from other parties by estimating the following specification

$$y_{irt} = \alpha_i + \beta_{rt} + \gamma \times \text{Post 2010} \times \text{X}_{i,baseline} + \epsilon_{irt} \tag{8}$$

The only difference to the previous specification is that now, we explore a range of dependent variables $y_{irt}$. In addition to the UKIP vote shares, we present results pertaining to turnout, the Conservative-, Labour- and Liberal Democrat party vote shares. Furthermore, due to space constraints, we present not the full sequence of non-parametric effects, but rather, focus on a pooled average post 2010 coefficient estimate $\gamma$ to be presented in table form.

I perform the analysis at the level of local council elections, European Parliamentary elections as well as Westminster elections.

**Results**   The results pertaining to the study of local elections are presented in Table C1. The results suggest that UKIP's growth that is captured by the weak baseline socio-economic characteristics comes mostly at the expense of Conservative party vote shares as indicated by the negative coefficients in column (3) across most proxy measures for weak-socio economic fundamentals, with the exception of the share of residents working in retail.

There is no statistically discernible effect on turnout, suggesting that places with weak socio-economic fundamentals post 2010 saw no differential voter mobilization from which UKIP could have benefited. If anything, the point estimates are negative throughout.

This analysis suggests that the Conservative party, in local elections, was losing

non-negligible numbers of voters to UKIP. This is not surprising, as Conservative councillors defected to UKIP quite regularly (Webb and Bale, 2014).

I obtain very similar results when studying the performance of UKIP and the other parties in the European Parliamentary election of 2014 (relative to the earlier rounds) and the 2015 Westminster election (relative to the 2001, 2005 and 2010 elections). These results are presented in Appendix Tables C2 and C3.

**On the timing**  Since the EU referendum was already *announced* in January 2013, it becomes interesting to see whether the link between weak socio-economic fundamentals and UKIP votes is already present in the data prior to the announcement, in particular up to the 2012 local council elections that were held in May 2012.

I restrict the analysis to the two local election rounds in 2011 and 2012 and present the results in Table C4. The pattern is similar, but also suggests some distinct differences. We find the same positive link between weak socio-economic fundamentals and UKIP votes after 2010. It is statistically significant for two of the four indicators of weak socio-economic fundamentals: for the share of the resident population with low qualification and for the prevalence of retail employment.

There are some differences in the effects on other parties: while the Conservative party appears to be contracting in such areas, the Labour party, along with UKIP actually stands to gain. This suggests that prior to the EU referendum announcement, in local elections, a growing support for UKIP is associated with a worse performance for the Conservatives and a better performance for Labour in areas with weak fundamentals, suggesting that the perceived threat of UKIP, increasing the risk of a shift towards Labour may have been particularly strongly perceived in the run up to the January 2013 announcement.

Figure C1: Non-parametric effect of educational qualification, socio-economic status, and sectoral employment of the resident population as of 2001 on support for UKIP *in Westminster Parliamentary elections* from 2001 - 2015 over time

Panel A: No qualifications

Panel B: Routine jobs

Panel C: Retail

Panel D: Manufacturing
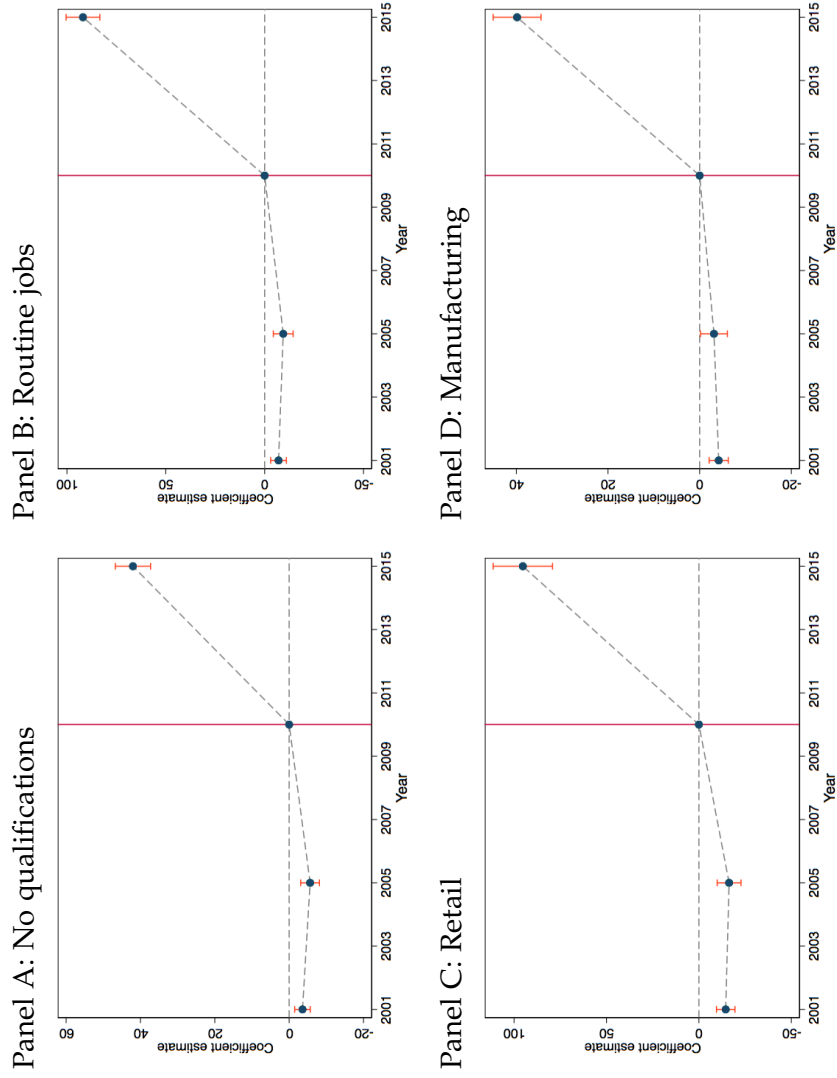


**Notes:** The dependent variable is the percentage of votes for UKIP in Westminster elections at the harmonized 2010 constituency level. Panel A uses the share of the resident population with no formal qualifications as of 2001. Panel B uses the share of the resident population in Routine jobs as per the National Socio-Economic Classification of Occupations as of 2001. Panel C uses the share of the resident working age population employed in the Retail sector, while panel D uses the share of the resident working age population employed in Manufacturing. The graph plots point estimates of the interaction between these cross sectional measures and a set of year fixed effects. All regression include local authority district fixed effects and election wave by NUTS1 region by year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

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Figure C2: Non-parametric effect of educational qualification, socio-economic status, and sectoral employment of the resident population as of 2001 on support for UKIP *in European Parliamentary elections* over time



Panel A: No qualifications

Panel B: Routine jobs

Panel C: Retail

Panel D: Manufacturing

Figure C3: Non-parametric effect of educational qualification of the resident population in 2001 on support for UKIP over time

Panel A: Other qualifications    Panel B: No Qualification    Panel C: Level 1

Panel D: Level 2    Panel E: Level 3    Panel F: Level 4 plus
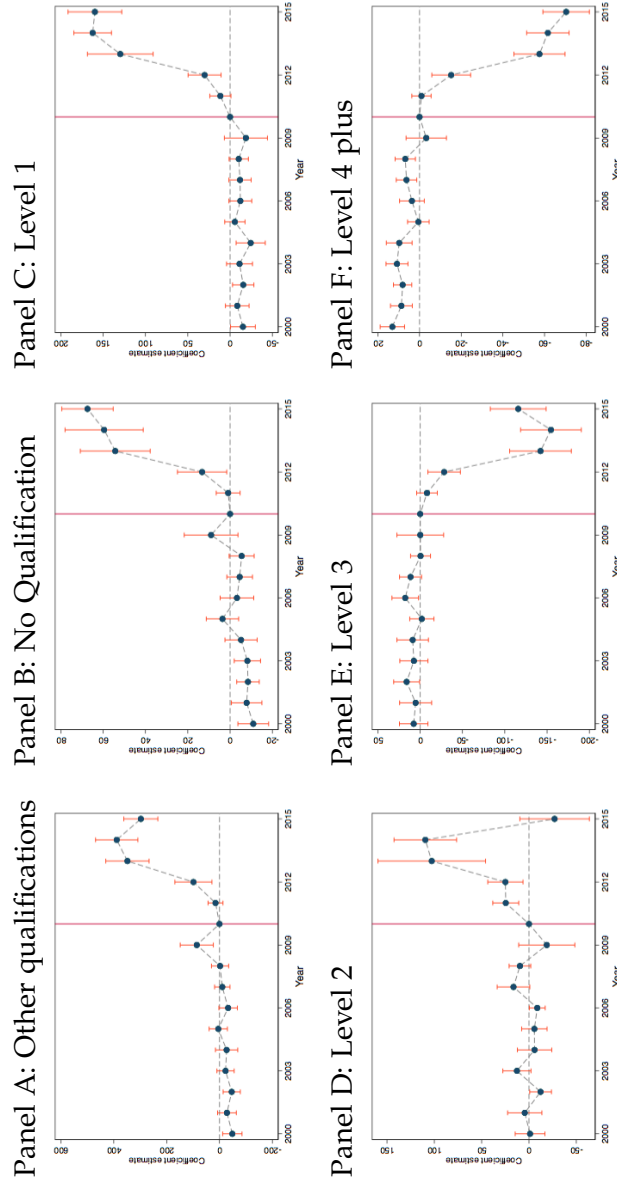
**Notes:** The variable is the respective share of the resident population in a local authority district that has obtained the educational qualifications following the UK classification system, whereby No qualifications means no formal qualification or school leaving certificate, Level 1 stands for having between 1-4 General Certificate of Secondary Education (GCSE) qualifications, Level 2 stands for 5 GCSEs, Level 3 means having 2 or more A-levels (university qualifying), while level 4 or above captures having a university degree. Other qualifications includes apprenticeships and foreign qualification below a university degree. The graph plots point estimates of the interaction between these cross sectional measures and a set of year fixed effects. All regression include local authority district fixed effects and NUTS1 region by year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure C4: Non-parametric effect of socio-economic employment status of the resident population in 2001 on support for UKIP over time



Panel A: Long term unemployed  Panel B : Routine job  Panel C: Semi-routine  Panel D: Lower supervisory

Panel E: Student  Panel F: Lower management  Panel G: Higher professional  Panel H: Higher management

**Notes:** The variable is the respective share of the resident population in a district that is in either socio-economic status classification as of 2001. The graph plots point estimates of the interaction between these cross sectional measures and a set of year fixed effects. All regression include local authority district fixed effects and NUTS1 region by year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

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Figure C5: Non-parametric effect of educational qualification of the resident population in 2001 on support for UKIP over time



Panel A: Other qualifications     Panel B: No Qualification     Panel C: Level 1

Panel D: Level 2     Panel E: Level 3     Panel F: Level 4 plus

Figure C6: Non-parametric effect of socio-economic employment status of the resident population in 2001 on support for UKIP over time



Panel A: Long term unemployed    Panel B : Routine job    Panel C: Semi-routine    Panel D: Lower supervisory

Panel E: Student    Panel F: Lower management    Panel G: Higher professional    Panel H: Higher management

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Figure C7: Non-parametric effect of the industry employment structure in 2001 on support for UKIP over time

Panel A: Education
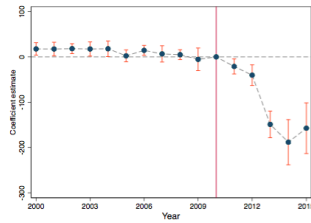
Panel B: Real Estate
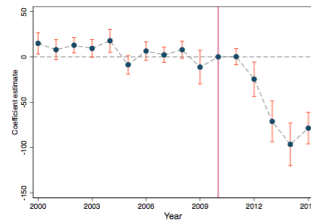
Panel C: Retail
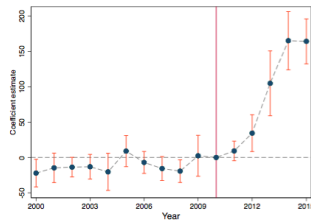
Panel D: Transport
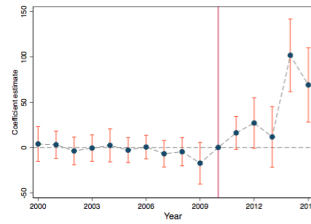
Panel E: Construction
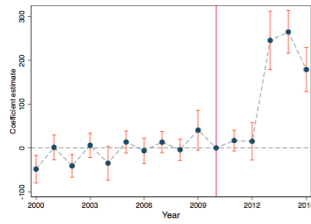
Panel F: Manufacturing
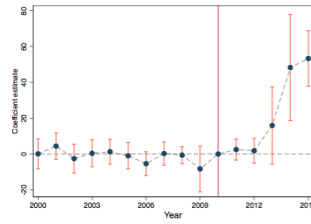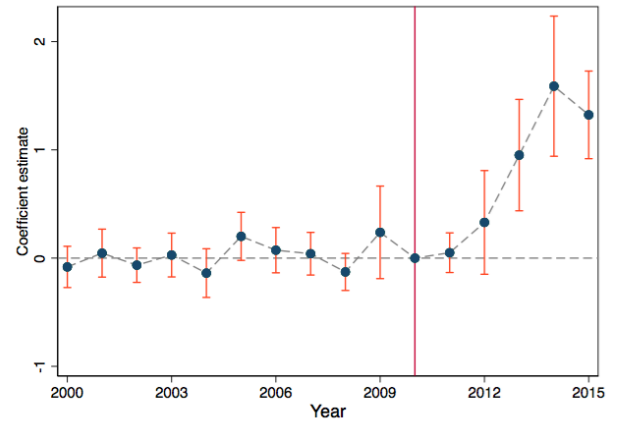
Panel G: Hotel & Accommodation
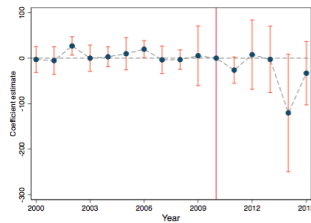
Panel H: Health care
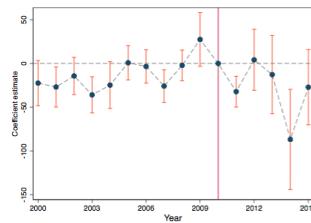


**Notes:** The dependent variable is the percentage of votes for UKIP in local council elections. The independent variables are the respective shares of the resident working age population in a district that is working in any of the different sectors as of 2001 interacted with a set of year fixed effects. All regression include local authority district fixed effects and NUTS1 region by year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure C8: Non-linear time trend in support for UKIP *after partialing out non-linear trend in baseline manufacturing sector prevalence and import-shock*
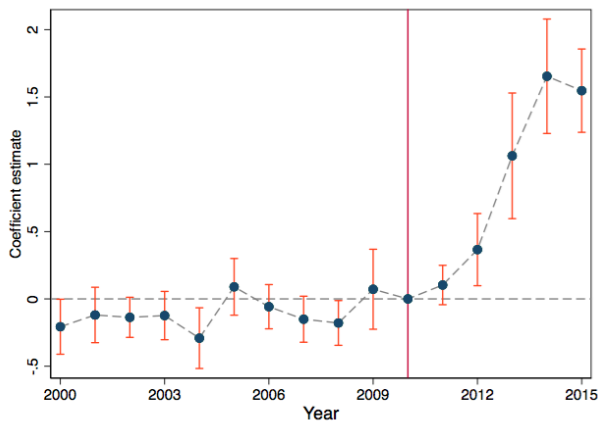
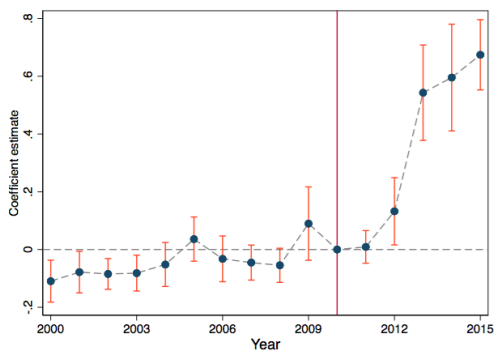Panel A: No qualifications
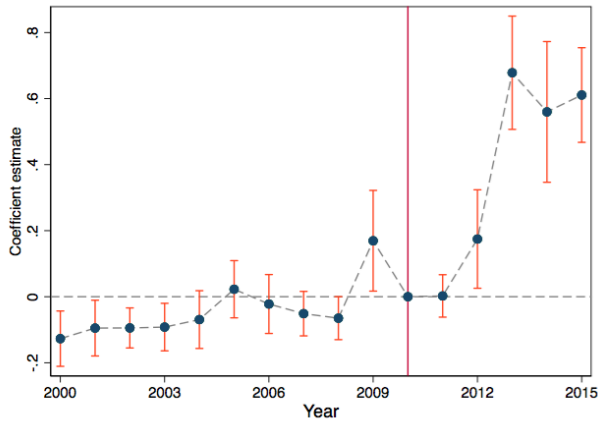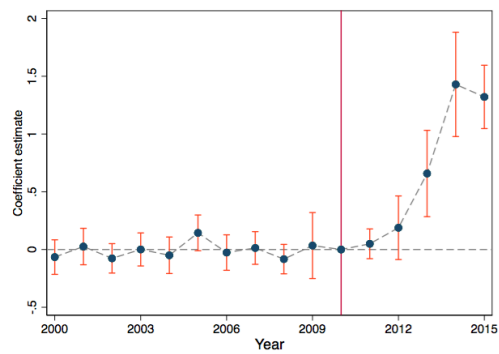


Panel B: Routine jobs



Panel C: Retail



**Notes:** The dependent variable is the percentage of votes for UKIP in local council elections. Panel A uses the share of the resident UK born population with no formal qualifications as of 2001. Panel B uses the share of the UK born resident population in Routine jobs as per the National Socio-Economic Classification of Occupations as of 2001. The graph plots point estimates of the interaction between these two cross sectional measures and a set of year fixed effects. All regression include local authority district fixed effects and NUTS1 region by year fixed effects, in addition to year effects interacted with the baseline size of the manufacturing sector in terms of employment as of 2001 as well as the Colantone and Stanig (2018) import competition measure. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure C9: Robustness to balanced sample of elections – Non-parametric effect of educational qualification, socio-economic status, and sectoral employment of the resident population as of 2001 on support for UKIP over time
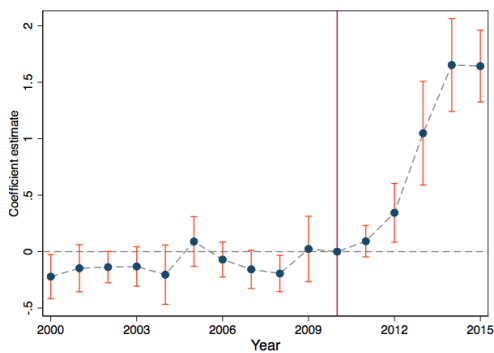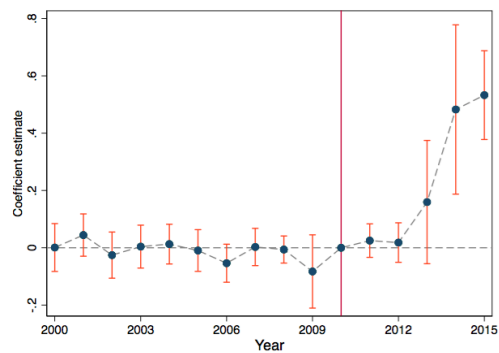
Panel A: No qualifications



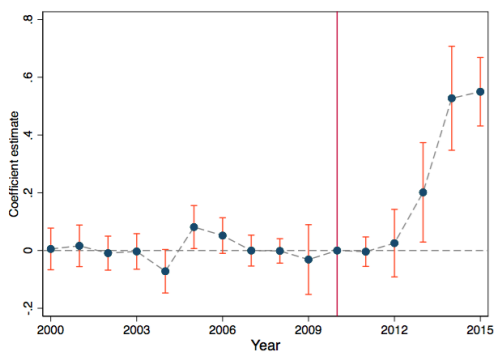Panel B: Routine jobs



Panel C: Retail
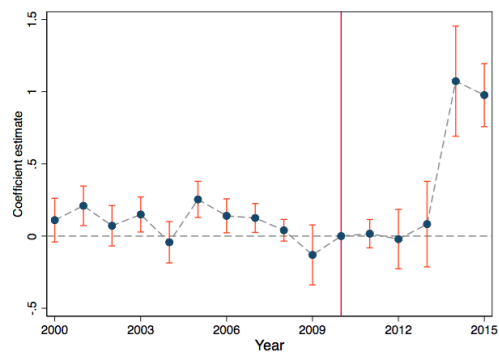


Panel D: Manufacturing



**Notes:** The dependent variable is the percentage of votes for UKIP in local council elections. The sample is restricted to only include elections where UKIP ran across districts in which UKIP contested at least 50% of the races. Panel A uses the share of the resident population with no formal qualifications as of 2001. Panel B uses the share of the resident population in Routine jobs as per the National Socio-Economic Classification of Occupations as of 2001. Panel C uses the share of the resident working age population employed in the Retail sector, while panel D uses the share of the resident working age population employed in Manufacturing. The graph plots point estimates of the interaction between these cross sectional measures and a set of year fixed effects. All regression include local authority district fixed effects and election wave by NUTS1 region by year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure C10: Robustness to controlling for more demanding time effects: Election wave by Region by Year – Non-parametric effect of educational qualification, socio-economic status, and sectoral employment of the resident population as of 2001 on support for UKIP over time

Panel A: No qualifications

Panel B: Routine jobs



Panel C: Retail

Panel D: Manufacturing



**Notes:** The dependent variable is the percentage of votes for UKIP in local council elections. Panel A uses the share of the resident population with no formal qualifications as of 2001. Panel B uses the share of the resident population in Routine jobs as per the National Socio-Economic Classification of Occupations as of 2001. Panel C uses the share of the resident working age population employed in the Retail sector, while panel D uses the share of the resident working age population employed in Manufacturing. The graph plots point estimates of the interaction between these cross sectional measures and a set of year fixed effects. All regression include local authority district fixed effects and election wave by NUTS1 region by year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure C11: Robustness to controlling for less demanding time effects: Year FE – Non-parametric effect of educational qualification, socio-economic status, and sectoral employment of the resident population as of 2001 on support for UKIP over time
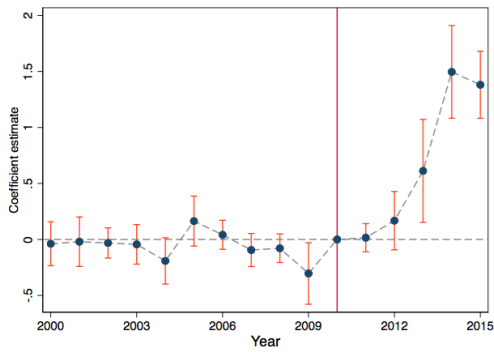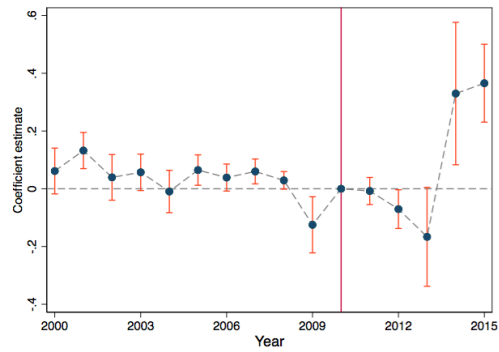
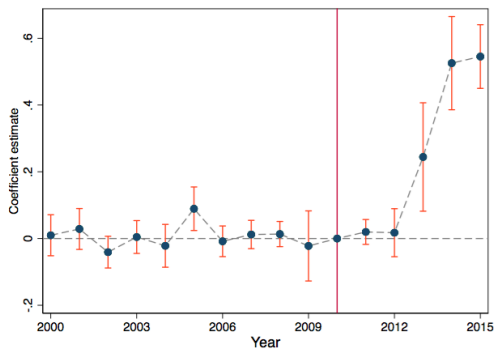Panel A: No qualifications



Panel B: Routine jobs



Panel C: Retail

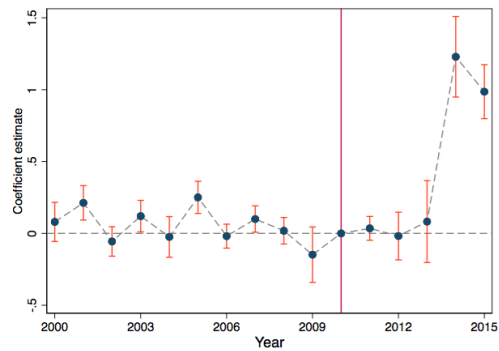

Panel D: Manufacturing



**Notes:** The dependent variable is the percentage of votes for UKIP in local council elections. Panel A uses the share of the resident population with no formal qualifications as of 2001. Panel B uses the share of the resident population in Routine jobs as per the National Socio-Economic Classification of Occupations as of 2001. Panel C uses the share of the resident working age population employed in the Retail sector, while panel D uses the share of the resident working age population employed in Manufacturing. The graph plots point estimates of the interaction between these cross sectional measures and a set of year fixed effects. All regression include local authority district fixed effects and year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

Figure C12: Robustness to measurement of baseline characteristics - Focusing on UK born population shares – Non-parametric effect of educational qualification, socio-economic status, and sectoral employment of the resident population as of 2001 on support for UKIP over time
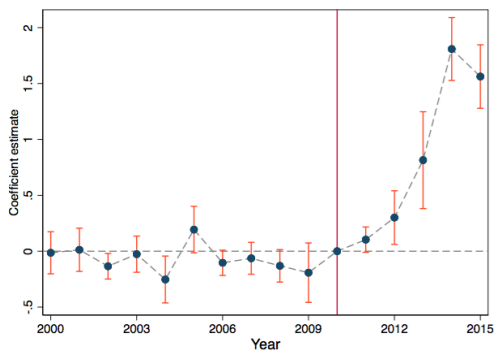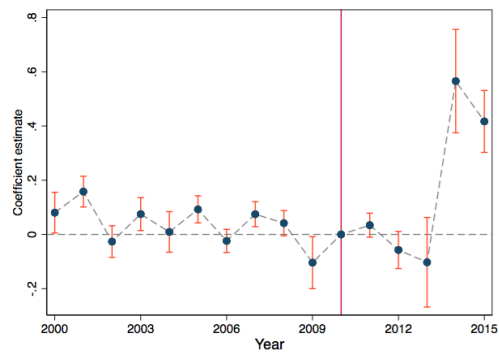
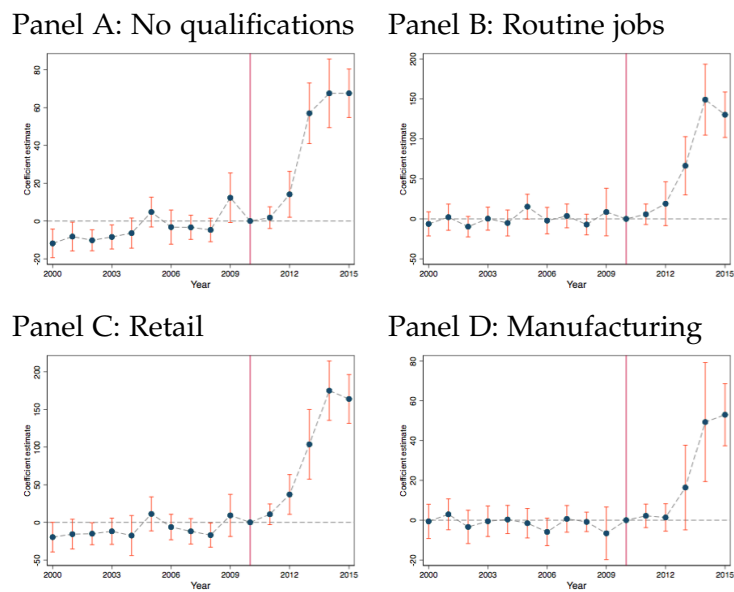Panel A: No qualifications      Panel B: Routine jobs



Panel C: Retail      Panel D: Manufacturing



**Notes:** The dependent variable is the percentage of votes for UKIP in local council elections. Panel A uses the share of the UK born resident population with no formal qualifications as of 2001. Panel B uses the share of the UK born resident population in Routine jobs as per the National Socio-Economic Classification of Occupations as of 2001. Panel C uses the share of the UK born resident working age population employed in the Retail sector, while panel D uses the share of the UK born resident working age population employed in Manufacturing. The graph plots point estimates of the interaction between these cross sectional measures and a set of year fixed effects. All regression include local authority district fixed effects and NUTS1 region by year fixed effects. Standard errors are clustered at the district level with 90% confidence bands indicated.

Table C1: Where do UKIP voters post 2010 come from? Studying local elections

| | | | Other parties | | |
| | UKIP (1) | Turnout (2) | Con (3) | Lab (4) | LD (5) |
|---|---|---|---|---|---|
| *Panel A:* No qualifications | | | | | |
| Post 2010 x Pop. share with No qualifications (2001) | 42.746 | -2.326 | -25.067 | -0.226 | -3.668 |
| | (5.257) | (4.373) | (5.432) | (6.508) | (6.392) |
| Local election districts | 345 | 345 | 345 | 345 | 345 |
| Observations | 3259 | 3258 | 3259 | 3259 | 3259 |
| | | | | | |
| *Panel B:* Routine jobs | | | | | |
| Post 2010 x Working age Pop share working in Routine occupations (2001) | 70.572 | -8.372 | -37.275 | -15.666 | 19.746 |
| | (11.375) | (8.452) | (11.182) | (12.075) | (13.700) |
| Local election districts | 345 | 345 | 345 | 345 | 345 |
| Observations | 3259 | 3258 | 3259 | 3259 | 3259 |
| | | | | | |
| *Panel C:* Retail | | | | | |
| Post 2010 x Working age Pop share working in Retail (2001) | 109.098 | -3.445 | -41.989 | -36.801 | 25.956 |
| | (13.794) | (8.552) | (11.774) | (16.580) | (16.126) |
| Local election districts | 345 | 345 | 345 | 345 | 345 |
| Observations | 3259 | 3258 | 3259 | 3259 | 3259 |
| | | | | | |
| *Panel D:* Manufacturing | | | | | |
| Post 2010 x Working age Pop share working in Manufacturing (2001) | 24.164 | -7.087 | -7.246 | -2.400 | 18.796 |
| | (6.398) | (5.710) | (7.592) | (8.012) | (9.786) |
| Local election districts | 345 | 345 | 345 | 345 | 345 |
| Observations | 3259 | 3258 | 3259 | 3259 | 3259 |

*Notes*: All regressions control for local authority district and NUTS1 region by time fixed effects. Standard errors are adjusted clustering at the local authority district level with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C2: Where do UKIP voters post 2010 come from? Studying European Parliamentary elections

| | | | Other parties | | |
| --- | --- | --- | --- | --- | --- |
| | UKIP<br>(1) | Turnout<br>(2) | Con<br>(3) | Lab<br>(4) | LD<br>(5) |
| *Panel A:* No qualifications | | | | | |
| Post 2010 x Pop. share with No qualifications (2001) | 0.363 | 0.167 | -0.166 | 0.180 | 0.000 |
| | (0.041) | (0.032) | (0.025) | (0.048) | (0.023) |
| Mean of DV | .224 | .369 | .282 | .191 | .116 |
| Local election districts | 346 | 346 | 346 | 346 | 346 |
| Observations | 1038 | 1038 | 1038 | 1038 | 1038 |
| | | | | | |
| *Panel B:* Routine jobs | | | | | |
| Post 2010 x Working age Pop share working in Routine occupations (2001) | 0.731 | 0.294 | -0.255 | 0.213 | 0.050 |
| | (0.078) | (0.062) | (0.051) | (0.083) | (0.043) |
| Mean of DV | .224 | .369 | .282 | .191 | .116 |
| Local election districts | 346 | 346 | 346 | 346 | 346 |
| Observations | 1038 | 1038 | 1038 | 1038 | 1038 |
| | | | | | |
| *Panel C:* Retail | | | | | |
| Post 2010 x Working age Pop share working in Retail (2001) | 0.779 | 0.268 | -0.322 | 0.067 | 0.079 |
| | (0.116) | (0.095) | (0.064) | (0.131) | (0.061) |
| Mean of DV | .224 | .369 | .282 | .191 | .116 |
| Local election districts | 346 | 346 | 346 | 346 | 346 |
| Observations | 1038 | 1038 | 1038 | 1038 | 1038 |
| | | | | | |
| *Panel D:* Manufacturing | | | | | |
| Post 2010 x Working age Pop share working in Manufacturing (2001) | 0.295 | 0.019 | -0.020 | 0.067 | 0.019 |
| | (0.044) | (0.046) | (0.029) | (0.055) | (0.035) |
| Mean of DV | .224 | .369 | .282 | .191 | .116 |
| Local election districts | 346 | 346 | 346 | 346 | 346 |
| Observations | 1038 | 1038 | 1038 | 1038 | 1038 |

*Notes*: All regressions control for state by time fixed effects and local government area (LGA) fixed effects. Standard errors are adjusted for two way clustering by time and LGA with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C3: Where do UKIP voters post 2010 come from? Studying Westminster Parliamentary elections

| | | | Other parties | | |
|---|---|---|---|---|---|
| | UKIP (1) | Turnout (2) | Con (3) | Lab (4) | LD (5) |
| *Panel A:* No qualifications | | | | | |
| Post 2010 x Pop. share with no qualifications | 44.816 | -5.424 | -28.815 | -8.743 | 15.998 |
| | (3.006) | (2.129) | (2.974) | (4.069) | (3.295) |
| Mean of DV | 6.03 | 62.9 | 35.9 | 35.8 | 18.1 |
| Harmonized constituencies | 566 | 573 | 573 | 573 | 573 |
| Observations | 2047 | 2285 | 2283 | 2283 | 2283 |
| | | | | | |
| *Panel B:* Routine jobs | | | | | |
| Post 2010 x Working age pop. share working in routine occupations | 96.878 | -29.340 | -27.619 | -58.484 | 26.620 |
| | (5.396) | (3.607) | (6.600) | (7.960) | (6.591) |
| Mean of DV | 6.03 | 62.9 | 35.9 | 35.8 | 18.1 |
| Harmonized constituencies | 566 | 573 | 573 | 573 | 573 |
| Observations | 2047 | 2285 | 2283 | 2283 | 2283 |
| | | | | | |
| *Panel C:* Retail | | | | | |
| Post 2010 x Working age pop. share working in Retail | 105.018 | -35.603 | -15.902 | -81.719 | 23.520 |
| | (10.381) | (4.952) | (8.871) | (11.848) | (9.592) |
| Mean of DV | 6.03 | 62.9 | 35.9 | 35.8 | 18.1 |
| Harmonized constituencies | 566 | 573 | 573 | 573 | 573 |
| Observations | 2047 | 2285 | 2283 | 2283 | 2283 |
| | | | | | |
| *Panel D:* Manufacturing | | | | | |
| Post 2010 x Working age pop. share working in Manufacturing | 42.112 | -20.545 | -1.271 | -36.274 | 15.915 |
| | (3.323) | (2.020) | (3.965) | (4.718) | (3.723) |
| Mean of DV | 6.03 | 62.9 | 35.9 | 35.8 | 18.1 |
| Harmonized constituencies | 566 | 573 | 573 | 573 | 573 |
| Observations | 2047 | 2285 | 2283 | 2283 | 2283 |

*Notes*: All regressions control for state by time fixed effects and local government area (LGA) fixed effects. Standard errors are adjusted for two way clustering by time and LGA with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C4: Where do UKIP voters post 2010 come from? Studying local elections *prior to 2013*

| | | | Other parties | | |
| --- | --- | --- | --- | --- | --- |
| | UKIP (1) | Turnout (2) | Con (3) | Lab (4) | LD (5) |
| *Panel A:* No qualifications | | | | | |
| Post 2010 x Pop. share with No qualifications (2001) | 9.630 | -6.431 | -21.595 | 23.928 | -6.244 |
| | (3.802) | (4.616) | (6.029) | (7.328) | (6.646) |
| Local election districts | 345 | 345 | 345 | 345 | 345 |
| Observations | 2612 | 2612 | 2612 | 2612 | 2612 |
| | | | | | |
| *Panel B:* Routine jobs | | | | | |
| Post 2010 x Working age Pop share working in Routine occupations (2001) | 9.723 | -15.657 | -30.527 | 35.622 | 9.399 |
| | (7.610) | (8.801) | (12.041) | (13.635) | (13.934) |
| Local election districts | 345 | 345 | 345 | 345 | 345 |
| Observations | 2612 | 2612 | 2612 | 2612 | 2612 |
| | | | | | |
| *Panel C:* Retail | | | | | |
| Post 2010 x Working age Pop share working in Retail (2001) | 30.152 | -10.296 | -17.581 | 11.671 | 17.527 |
| | (10.990) | (8.616) | (12.753) | (20.722) | (16.993) |
| Local election districts | 345 | 345 | 345 | 345 | 345 |
| Observations | 2612 | 2612 | 2612 | 2612 | 2612 |
| | | | | | |
| *Panel D:* Manufacturing | | | | | |
| Post 2010 x Working age Pop share working in Manufacturing (2001) | 2.378 | -4.348 | 0.212 | 17.115 | 12.985 |
| | (3.454) | (5.329) | (7.044) | (8.480) | (9.530) |
| Local election districts | 345 | 345 | 345 | 345 | 345 |
| Observations | 2612 | 2612 | 2612 | 2612 | 2612 |

*Notes*: All regressions control for local authority district and NUTS1 region by time fixed effects. Standard errors are adjusted clustering at the local authority district level with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.