Levelling up by levelling down: The economic and political costs of Brexit

Eleonora Alabrese Jacob Edenhofer Thiemo Fetzer

Shizhuo Wang *

July 2, 2024

Abstract

The study uses a synthetic control method to estimate the local economic cost of Brexit. The vast majority of regions in the UK have lost as a result of Brexit. Since losses tend to be concentrated in relatively prosperous regions, Brexit has reduced regional inequalities ("levelling up") while pushing down national output ("levelling down" in the aggregate). Using both aggregate data from local elections and individual-level survey data from the British Election Study, we find that, politically, those areas that experienced Brexit-related output losses saw increases in support for right-wing populist parties, while the electoral fortunes of the Labour party declined.

Keywords: Brexit, Populism, Regional Inequalities, Voter Behaviour, Economic Integration

JEL Classification: F15, H72, J18, R11, D72

*Alabrese is affiliated with the University of Bath, SAFE and QAPEC. Edenhofer is associated with the University of Oxford. Fetzer is affiliated with the University of Warwick, University of Bonn, CEPR, ECONtribute, STICERD, Grantham, CAGE, NIESR, and CESifo. Wang is associated with New York University. Junxi Liu and Ivan Yotzov provided excellent research assistance. We appreciate feedback from seminar audiences at the NIESR event on the economic consequences of Brexit. The authors declare that they have no conflicts of interest. *Email addresses:* ea2143@bath.ac.uk, jacob.edenhofer@some.ox.ac.uk, t.fetzer@warwick.ac.uk, shizhuo.wang@nyu.edu.

"That's Your Bloody GDP, Not Ours."

1 Introduction

The United Kingdom (UK)'s vote to leave the European Union (EU) in 2016 marked a watershed when it became clear that populists could succeed, even in one of the world's oldest democracies. The Leave campaign heavily relied on messaging that, among others, linked immigration and the UK's EU budget contributions to the ailing state of local public services amidst growing spatial inequalities. In doing so, the Leave campaign effectively mobilised the UK's large (Wiedemann, 2024b) and growing regional or spatial inequalities.[1] By contrast, the Remain campaign's core message – that the *aggregate* economic consequences of leaving the EU would be dire – failed to resonate in many places, despite the fact that this warning proved to be largely correct (Born et al., 2019; Hassan et al., 2024a; Steinberg, 2019; Sampson, 2017; Dhingra and Sampson, 2022; Breinlich et al., 2022; Bakker et al., 2023; Grassi, 2024; Novy et al., 2024). The *aggregate* economic effects were shrugged off by many voters, especially those in chronically deprived and long-declining regions in the Midlands and the North of England (Carreras et al., 2019). In fact, even in March 2021, more than 40% of respondents believed that Brexit was the right decision (Smith, 2023). Since then, however, support for Brexit has steadily declined, with only roughly one third of voters supporting Brexit as of May 2024.[2]

In light of these twists and turns of the Brexit saga, this paper examines two questions. First, what is the regional incidence of the costs of Brexit within the UK? Second, what political consequences have the economic costs of Brexit engendered? To estimate the economic costs of Brexit *across regions* and *districts*, we use a synthetic control approach, constructing more than 100 synthetic control es-

[1]Growing spatial inequalities may have been encouraged due to the appeal of agglomerations to allow for more efficient spatial organisation of societies. The underlying literature may have not anticipated the distributional and political economy implications.

[2]See: https://www.statista.com/statistics/987347/brexit-opinion-poll/

timates for each spatial unit. We measure the Brexit-vote-induced output gap as the gap between the synthetic and the actual gross value-added index. We analyse the political consequences of the costs of Brexit by leveraging granular data on local elections and individual-level opinion polling data. Since vote shares in local elections depend critically on turnout dynamics and we cannot capture these due to data limitations, we also rely on the *British Election Study's* (BES) individual-level survey data, which are not susceptible to the turnout critique. In the individual-level panel exercise, where we track the same respondents over time, we can study how individuals who supported populist platforms in the past respond when their regional economies are affected by the economic consequences of their own past electoral choice. By triangulating between these two data sources, we can then shed light on the shifts on both the political preferences of regions and individuals owing to the costs of Brexit.

Our analysis yields four interrelated results. First, the cost of Brexit – in the form of lower trend growth – is large and near universal across all regions and constituent countries of the United Kingdom. We estimate that the output losses due to Brexit range from 5 to 10 percentage points of GDP, relative to a large set of synthetic control estimates. Second, there is notable cross-country and regional heterogeneity in the economic costs of Brexit: our estimates suggest that Northern Ireland has to date not been adversely affected by Brexit. This is not surprising, given that Northern Ireland – unlike the rest of the UK – effectively continues to be part of the EU customs union, as stipulated in the EU-UK Trade and Cooperation Agreement. Yet, even across English regions, the costs are heterogeneous: the vast majority of local authorities – around 70% – have experienced some cost of Brexit. Only about 30% of districts appear to have outperformed their respective synthetic control. The share of areas with output losses is notably higher in Scotland (93%), London (85%), and the South West (83%) – while the region with the highest share of areas with output gains is Northern Ireland (93%).[3]

[3]The reconfiguration of trade routes towards the Island of Ireland from mainland Europe has

These two sets of findings suggest that Brexit may, in fact, contribute to the levelling up of the United Kingdom by levelling down economically relatively more successful regions. Put differently, Brexit has contributed to the equalisation of regional inequality – not by levelling up poorer regions but hitting richer regions more severely. This form of levelling up is rather destructive since it implies levelling up only *in relative terms*, all while making the whole of the UK poorer.

Third, none of the covariates that – taken together or individually – were strong correlates of support for Leave in 2016 (Becker et al., 2016), explain a significant part of the cross-sectional variation in the cost of Brexit to date. The same is true for an area's exposure to the Covid-19 pandemic, as measured by mortality, or increased receipts of transfers from the central government under various "levelling-up" funds aimed at reducing spatial inequality.[4]

Fourth, turning to the political consequences of the economic costs of Brexit, we find that in areas which saw their local economy shrink as a result of Brexit support for right-wing political parties significantly increased after the EU referendum – when the Brexit vote's economic costs started to materialise.[5] We detect this both when using individual-level opinion polling data – when tracking the same individuals over time – and when looking at local election outcomes. For local elections, we further observe that the electoral performance of Labour party candidates in areas that are subject to greater economic costs is notably worse. Finally, we find suggestive evidence that the increase in right-wing support in areas for which the

likely resulted in geographic reallocation of economic activity within Northern Ireland, benefiting local economies in the hinterland, near the Irish border. By contrast, the Northern Irish port through which trade from mainland Europe was shipped via the England "land bridge" sees significant economic damage.

[4]There is, however, a notable exception: areas with higher levels of support for Leave in 2016 appear to experience – relatively speaking – lower economic cost of Brexit to date. This correlation is weak, but has gained in strength since 2017. In an earlier version of this paper, that used regional gross value-added estimates up to 2018, the conditional correlation pointed in the other direction. We believe this change in the correlation structure is attributable to methodological changes in the apportionment of regional GDP (Fetzer and Wang, 2020).

[5]The economic costs started materialising *before* the legal exit, partly because of the uncertainty the Leave vote created. For the economically deleterious effects of uncertainty and electoral surprises, see: Bloom et al. 2019; Baker et al. 2020; Fetzer and Yotzov 2023.

economic costs of Brexit are notable economic is likely driven by Leave voters or those who supported right-wing (populist) parties in the past.

Our results are robust to an array of empirical checks. First, to allay concerns – for example, some emerging market economies may be better reference points of future growth compared to other countries – that the synthetic control estimates are biased by virtue of the idiosyncrasies of the sample of donor pool countries, we consider a broad range of potential donor pool sets. Second, to address concerns about potential overfitting, we carry out a permutation exercise where, in essence, we constrain the donor pool both in size and in its composition. This leaves us confident that our estimates of the costs of Brexit are not confounded. Turning to the substantive political economy analysis, we document that the findings are robust to alternative ways of classifying districts into Brexit-vote Losers; to alternative ways of specifying the cost of Brexit in the estimation; to dropping data pertaining to individual regions; to alternative forms of inference using randomisation inference. In addition, we can visually check for violations of the common trends assumption. This makes us confident that we are identifying meaningful Brexit-cost-induced impacts on the political economy.

This paper is related to several strands of the political economy literature. A vast body of work in economics and political science focuses on the drivers of growing (right-wing) populist support (Guriev and Papaioannou, 2022). Less attention has been devoted, however, to examining the economic and political consequences of populist policymaking, particularly at the sub-national (regional) level. The country-level focus of studies that explore these consequences jars with the literature on the origins of populism strongly pointing to the importance of regional heterogeneity in populist electoral success, with support strongly concentrated in economically and socially left-behind areas (Becker et al., 2016; Rodríguez-Pose, 2018).[6] This paper contributes to filling this gap in the existing literature by pro-

[6]For country-level evidence on the consequences of populism: Funke et al. (2023) provide evidence of the costs of populism drawn from across countries; Born et al. (2019) provides estimates of

viding some of the first evidence on the regional heterogeneity in the economic consequences of populist policymaking.

The paper is also related to a growing strand of literature that studies the origins and consequences of zero-sum politics. Framing economic policy choices – e.g. concerning trade integration, immigration, taxation or public spending – as zero-sum policies – often between natives and immigrants on the right or between the working-class and corrupt financial and political elites on the left – is a hallmark of populist rhetoric (Davidai and Ongis, 2019; Morelli et al., 2021) that has featured heavily in particular during the 2016 Brexit referendum. Much of this work has focused on tracing the origins of zero-sum thinking: Chinoy et al. (2023) suggest they may be traced to ancestral experiences, such as inter-generational upward mobility, the experience of economic hardship, and their exposure to immigration.[7] The Leave side in the EU referendum strongly leaned on narratives revolving around the crowding-out effect of the UK's financial contributions to the EU budget and its openness to EU immigrants in terms of access to public goods at home.[8] Our findings suggest that Brexit – rather than being zero-sum – appears to be negative-sum, shrinking the size of the economic pie as a whole. Yet, if individual voters care more about their or their region's relative welfare, rather than their absolute welfare, they may perceive Brexit nevertheless as a success (Burgoon et al., 2019; Kurer, 2020; Kurer and Van Staalduinen, 2022; Nolan and Weisstanner, 2022): people in long-declining regions may care less about the additional economic harm caused by Brexit, while deriving utility from the fact that other regions, notably London,

the aggregate economic cost of Brexit to date. For the UK, and Brexit specifically, several country-level studies have explored Brexit's impact on food prices (Lyon, 2022), foreign direct investment (Breinlich et al., 2020), currency choice on trade invoicing (Corsetti et al., 2022; Crowley et al., 2024; Garofalo et al., 2024), as well as trade and investment Broadbent et al. (2023); Hassan et al. (2024b); Steinberg (2019), more broadly, and the City of London in particular (Ryan, 2023).

[7] See also Carvalho et al. (2023).

[8] These were particularly salient due to ailing public services, which in turn were the result of large-scale public spending cuts in the first half of the 2010s Fetzer (2020, 2019). This episode of austerity has engendered many negative spatial externalities (Facchetti, 2023; Fetzer et al., 2022): increased housing market pressures, lower fiscal wiggle room for local governments to internalise the externalities of structural economic change, such as increased high-street vacancies (Fetzer et al., 2024), and reduced state effectiveness (Feld and Fetzer, 2023).

suffered more.

Taken together, our results show that policies like Brexit can – despite their considerable aggregate economic costs – help populists shore up support as long as they hit the "places that don't matter" (Rodríguez-Pose, 2018; Rodríguez-Pose et al., 2023) less severely than those that have reaped most of the gains of skill- and urban-biased growth. Indeed, one interpretation of the patterns we observe in the data is that (some) individuals appear to double down on their support for right-wing platforms. This raises several puzzles or questions. On the one hand, it may point to the possibility of an *absence of social learning* or updating. Alternatively, individuals may simply be oblivious to the changing economic circumstances in their community. They may also not be directly affected by the adverse economic effects of populist policies; but they could be indirectly exposed to their adverse and highly visible consequences.[9]

The remainder of this paper is organised as follows. Section 2 presents our approach to quantifying the economic costs of Brexit and discusses the observations to date. Section 3 presents the results of our political economy analysis, where we study data on aggregate local election results and individual-level political preferences. Section 4 situates this work in the wider context of the narratives around Brexit and the rise of populism more broadly. In Section 5, we summarise our contributions and reflect on their broader relevance.

2 Measuring the Regional Economic Cost of Brexit

This section describes how we use the synthetic control method, as introduced by Abadie and Gardeazabal (2003),[10] to estimate the regional economic cost of Brexit to date.

[9]See e.g. Fetzer et al. (2024) for evidence in support of such a mechanism.
[10]See also Abadie et al. 2012, 2010.

2.1 Data on sub national economic activity

UK data To track the evolution of regional economic activity in the UK, we utilise two primary data sources. Firstly, we use experimental high-frequency subnational real GDP data from the Office for National Statistics (ONS) for England and Wales, with separate estimates for Scotland and Northern Ireland. These experimental statistics, not classified as official statistics, cover the UK's four constituent countries on a quarterly basis from 2012Q1 to 2022Q2, accessible through respective government websites.[11]

Secondly, we leverage annual subnational economic data on regional gross value added (GVA) from 2000 to 2021, classified as national statistics. The latest data, released on 25 April 2023, provide real-term GVA estimates for the UK's 382 districts, based on 2016 values, and are available online.[12] This dataset provides information on economic activity by local authorities on a workplace basis, offering a detailed view of the UK's economic landscape over time.

Data for (potential) donor pool For the construction of synthetic control estimates *at the quarterly level* for each of the UK's 12 regions, we rely on quarterly real GDP data, as reported in the quarterly national accounts collected by the *Economist Intelligence Unit* (EIU). For the construction of district-level *annual estimates*, we rely on data from the EIU, the European Statistical Office (Eurostat), and the U.S. Bureau of Economic Analysis (BEA). We leverage both national and subnational data for the annual estimates.[13] At the subnational level, we obtain data for European countries at the *Nomenclature of territorial units for statistics* (NUTS) 2 regional level from

[11]England and Wales data: https://www.ons.gov.uk/economy/grossdomesticproductgdp/datasets/quarterlycountryandregionalgdp; Scottish data: https://www.gov.scot/publications/gdp-quarterly-national-accounts-2022-q4/; Northern Irish data: https://www.nisra.gov.uk/publications/nicei-publication-and-tables-q4-2022, accessed 25.06.2023.

[12]GVA data: https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalandrealregionalgrossvalueaddedbalancedbyindustry, accessed 24.06.2023.

[13]Unfortunately, only very few countries produce high-frequency subnational economic accounts.

Eurostat.[14] This data covers 251 NUTS 2 regions in Europe, including EU member countries, countries in accession talks with the EU, and members of the European Economic Area. Further, we draw on data from US states on real gross domestic product by states from the Bureau of Economic Analysis.[15] This includes data for 50 U.S. states and the District of Columbia.

2.2 Donor Pool Sets

To obtain robust estimates of the regional economic cost of Brexit, we construct synthetic control estimates pertaining to a broad range of deterministic and non-deterministic donor pool sets.

Deterministic donor pools The synthetic control method – while applicable to a single donor pool set, as Born et al. (2019) demonstrate using OECD countries for their construction of the counterfactual non-Brexit UK – is expanded in our approach to include a wide array of possible sets of donor pools. Doing so is intended to allay concerns about potential biases that arise when constructing a synthetic control that mainly employs data pertaining to advanced economies. For quarterly analysis, this involves creating synthetic controls from 7 combinations of three donor pools (EU, OECD, G20), resulting in 84 (12 regions $\times$ 7 combinations) estimates.[16] For annual district-level data, the complexity increases with 31 possible donor pool combinations, leading to 11,842 (382 districts $\times$ 31 combinations) potential synthetic control estimates derived based on different donor pool sets.[17]

[14] The closest comparable data is "Gross value added at basic prices by NUTS regions," which is accessible from `https://ec.europa.eu/eurostat/web/products-datasets/-/nama_10r_3gva`

[15] This data is available at `https://apps.bea.gov/regional/downloadzip.cfm`.

[16] The number of combinations is given by: $\binom{3}{1} + \binom{3}{2} + \binom{3}{3} = 2^3 - 1 = 7$. Put differently, for each donor pool, there is the decisions whether to include it or not (2^3), with the combination of no donor pool being used excluded (hence minus 1), i.e.: the EU, OECD, G20; the pairs EU and OECD, EU and G20, G20 and OECD; and the triplet EU, OECD, and G20.

[17] The number of combinations follows from the observation that there are five donor pool sets: annual aggregate data pertaining to OECD, G20, EU27 countries and subnational data pertaining to the EU27 at the NUTS2 level and state level data from the US, i.e. $\binom{5}{1} + \binom{5}{2} ... + \binom{5}{5} = 2^5 - 1 = 31$ combinations.

Appendix Table A1 provides the full set of combinations used for the district-level analysis. Mechanically, the largest donor pool consists of the superset of all potential donors, the combined set consisting of EU-NUTS2, US-STATES, G20, OECD, and EU. This donor pool consists of 253 spatial units.

Resampling technique In addition to the deterministic donor pool sets, we also leverage a sampling approach. Synthetic control estimation approaches are vulnerable to overfitting, which may introduce bias in the out-of-sample projection. This risk rises with the cardinality (size) of the donor pool set and when the pre-treatment period is relatively short. To mitigate these concerns, we use sampling without replacement to construct a set of 70 synthetic control donor sets $\mathcal{S}_{\text{sim}}$. For each donor pool size, ranging from 10, 15, 20, 25, 30, 35, and 40 potential donors, we draw ten random samples from the most comprehensive donor pool set, consisting of data from the superset of US States, NUTS2 regions, EU27, OECD, and G20 countries.[18]

2.3 Constructing Synthetic Control Estimates

To construct a synthetic control for each potential donor pool, we proceed as follows. We fix a UK region d, and one of the donor pool sets $\mathcal{S}$.

Synthetic control estimation Let x_r be the real output of region r. The latter is either measured annually between 2000 and 2015 (16 data points) or for on a quarterly basis from 2012Q1 to 2016Q2 (18 data points). For the annual data, we consider 2015 the last pre-vote period. For the quarterly data, we consider 2016Q2 the last time period before the Brexit vote, as the EU referendum was held on 23 June 2016.

[18]For the regional quarterly estimate the maximal donor pool size is constrained to the 33 countries that are in the EU27, OECD and G20 and for which quarterly data is available.

Let X_s denote a matrix of the pre-Brexit (pre treatment) real GDP of the units in the donor pool combination $s \in \mathcal{S}$. Thus, X_s has dimensions of $|T_0| \times n(s)$, where $n(s)$ is the number of units in donor pool s and $|T_0|$ represents the number of time periods before the Brexit vote. For annual data, $T_0 = \{2000, \ldots, 2015\}$, and for quarterly data, $T_0 = \{2012Q1, \ldots, 2016Q2\}$. The number of columns in X_s varies, with $n(s) = 18$ if s refers only to G20 countries, and $n(s) = 253$ if s includes all spatial units.

The $n(s) \times 1$ vector of weights $w_s^d \equiv \{w_1^d, \ldots, w_{n(s)}^d\}$, which represent the importance of each unit $\{1, \ldots, n(s)\}$ in the combined donor pool for approximating the UK region r, is selected to minimize the mean squared error (criterion):

$$\hat{w}_s^d = \underset{w_s^d \in R}{\arg\min} \ (x_r - X_s w_s^d)' V (x_r - X_s w_s^d) \tag{2.1}$$

where R is defined as the compact space for which $w_j^d \geq 0$, $j \in \{1, \ldots, n(s)\}$ and $\sum_{j=1}^{n(s)} w_j^d = 1$. The matrix V is symmetric, positive semi-definite, and represents the relative importance of each characteristic in minimizing the mean squared error, following the approach outlined in Abadie and Gardeazabal (2003), Abadie et al. (2010), and Born et al. (2019). We select the matrix V that minimizes the pre-intervention mean squared prediction error using code implementations in Matlab. Each $\hat{w}_s^d$ allows us to construct a counterfactual series $\hat{y}_{d,t}^s$ for each region or district for 2016 to 2021, or for the quarterly period from 2016Q2 up to 2022Q2.

Model selection For the deterministic donor pool, we use model selection techniques to identify the best synthetic control estimate among each of the 31 (7 for regions) distinct synthetic controls estimates for each district (region).[19] We do so by constructing a measure of goodness of fit of the synthetic control series for the

[19]Naturally, one would expect that the "best" series among the set $\mathcal{S}$ may be the product of the most extensive donor pool. This is a mechanic result: a larger donor pool makes it easier to fit pre-treatment outcomes.

period before the Brexit vote:

$$\text{RMSPE}_d^s = \sqrt{\frac{1}{T_0} \sum_{t \in T_0} (x_d^t - X_{t,s}\hat{w}_s^d)^2}$$

The above computes the average squared difference between the actual measure of economic activity and the synthetic control estimate pertaining to donor pool s. We then consider as best the model whose estimates produce the lowest "root mean square projection error" (RMSPE) in the pre-intervention period T_0, i.e. before the Brexit vote took place. The intuition here is that the "best model" is the one that produces a synthetic control estimate that is, on average, very similar to the actual value before the Brexit vote.[20] Appendix Table A2 provides a tabulation of the 31 donor pool sets and the number of districts selected as "the best" model using each of the three goodness-of-fit measures. The table highlights that the "best model" among the 31 candidate models is not unanimously the one based on the most extensive donor pool set.

Ensemble model In addition to identifying the *best* model, we also construct a simple *ensemble average* across the 31 (7 for regions) synthetic controls for each series for the district-level annual (region-level quarterly) data as follows:

$$\hat{y}_{d,t}^{ENS} = \frac{1}{|\mathcal{S}_s|} \sum_{s \in \mathcal{S}} \hat{y}_{d,t}^s$$

Ensemble methods often outperform individual models as they help average out biases and noise introduced by overfitting (Athey et al., 2019) .

Resampling approach The sampling approach – that holds constant varying donor pool sizes – yields 70 additional synthetic control series for each region d. This ap-

[20] We use two other measures of projection error for model selection: the "average absolute projection error" $\text{AAPE}_d^s = \frac{1}{T_0} \sum_{t \in T_0} |x_d^t - X_{t,s}\hat{w}_d^s|$ and the maximum projection error, defined as $\text{MAPE}_d^s = \max_{t \in T_0} |x_d^t - X_{t,s}\hat{w}_d^s|$.

proach of restricting the donor pool size mechanically reduces concerns related to biases introduced by overfitting, as the donor pool size is ultimately constrained to include at most 40 units. Constraining the donor pool may, however, introduce biases due to the creation of poorly performing synthetic controls. We navigate the bias-variance trade-off that comes with sampling by computing the following ensemble estimate for the resampled donor pool sets of different sizes.

$$\hat{y}_{d,t}^{ENS_{sim}} = \frac{1}{|\mathcal{S}_{\mathrm{s}}|} \sum_{s \in \mathcal{S}_{\mathrm{sim}}} \hat{y}_{d,t}^{s}$$

We next present the main estimates and explain how we construct the main explanatory variables used for the subsequent political economy analysis.

2.4 Characterising the spatial distribution of the cost of Brexit

Country- and region-level estimates We begin by presenting the estimates of the economic cost of Brexit across the constituent countries of the United Kingdom. Figure 1 visualises the evolution of real GDP over time across the constituent countries of the UK: England, Scotland, Wales, and Northern Ireland. The Figure plots the ensemble synthetic control estimate constructed for the relevant country-specific real GDP series. The four panels in Figure 1 suggest that the synthetic real GDP time series tracks actual GDP very well in all four countries in the pre-treatment period, prior to the EU referendum vote. With the exception of Northern Ireland, all other UK countries witness a substantial decrease in real GDP post Brexit, relative to their synthetically constructed counterfactuals. The average annual output loss for the entire UK during the post-Brexit period is around 5 percentage points. For England, the output loss is around 4.5 percentage points, whereas for Scotland it is 5.9 and for Northern Ireland only 1.4 percentage points (see regional gap estimates in Table 1). Recently, the output loss in 2022 became more pronounced in England, -7 percentage points, and Scotland, -8.7 percentage points, while being close to null for Northern Ireland (0.3 percentage points). The fact that Northern

Ireland is the least exposed country is likely due to its unique status, with the EU and UK trade agreement effectively keeping Northern Ireland in a customs union with the European Union.

Figure 2 visualises and Table 1 lists the synthetic control estimates for English regions. For all regions, the synthetic control estimates track the evolution of the actual regional real GDP values prior to the EU referendum vote quite closely, with most English regions experiencing a significant decline in GDP post 2016. Regions, like the East and the West Midlands, saw declines only with some time lag, which may have been due to these regions initially having benefitted from the devaluation of the pound, as suggested by Broadbent et al. (2019). Overall, however, this Figure suggests that, in relative terms, the West Midlands, followed by London, are the region that lost most because of Brexit. In general, there is not a single overall region that can be classified as having gained in economic activity post Brexit, relative to its synthetic counterfactual.

District-level estimates We next turn to the main focus of the analysis in this paper: the estimates of the district-level Brexit cost to date. A more detailed examination at the district level offers a nuanced understanding of the economic impact of Brexit. By averaging all cost estimates for each district from 2016 to 2022, we obtain the distribution shown in Figure 3. Red shades indicate Brexit costs (negative output gap ranging from -40% to 0), while green shades represent Brexit gains (positive output gap from 0 to 40%). The distribution varies significantly across districts, with the majority (73%) facing substantial economic challenges and only a minority (27%) experiencing gains. Despite some areas benefitting from Brexit, they are outnumbered by those facing moderate (30%) and high costs (44%). This asymmetry indicates that, while gains occur in some instances, they are insufficient to offset the widespread and significant costs, reflecting a skewed distribution of economic impacts post-Brexit. To further visualise the local cost distribution, refer to the regional box plots in Figure 4 and the UK map in Figure 6, which uses the same red and green shades to represent Brexit costs and gains across UK local authorities.[21]

Our estimates of the costs of Brexit are based on the assumption that the synthetic control accurately captures the counterfactual economic activity in the absence of the EU referendum outcome. Yet, it could be that the measured local economic activity is itself affected by other post-2016 changes that may be correlated with an area's exposure to the cost of Brexit. For instance, the synthetic control estimate could be downward biased if areas that were more exposed to the cost of Brexit saw increased fiscal transfers after the EU referendum vote.

By way of addressing these concerns, we explore to what extent we can detect patterns in our measure of the Brexit cost that are systematically related to other observable characteristics of the districts. We focus on the average output gap post 2016. Averaging allows us to net out idiosyncratic factors that may have affected the output gap in a specific year. We regress the average post-Brexit-vote output gap estimate on a set of potential confounders, X_d, for each district d:

$$\frac{1}{T}[\sum_{t>T_0} y_{d,t} - \hat{y}^s_{d,t}] = \beta' X_d + \nu_{d,t} \tag{2.2}$$

We consider three sets of variables. First, we consider a vector of around 40 mostly socio-economic characteristics that are taken from Becker et al. (2017).[22] Becker et al. (2017) show that these variables, taken together, do a good job of capturing the cross-sectional variation in support for Leave in 2016. The second set of measures related to levelling-up funding as a type of financial transfer aimed at

[21]The underlying estimates of the regional costs of Brexit are shared on `https://www.brexitcost.org`. The website provides an interactive way to view the estimates for each district and region one-by-one. Appendix Figure A1 provides an illustration. Notably, only one district in Northern Ireland, Mid and East Antrim, is negatively impacted by Brexit, an area where EU trade policies and customs in the Irish Sea were expected to severely affect the economy. The map further highlights the inequalities in the effects of Brexit, with cities, like London and coastal regions, being hit particularly hard.

[22]The four groups capture an areas 1) exposure to the EU with a specific focus on immigration; 2) quality of good access and tenancy status; 3) demography, educational attainment and life satisfaction of the resident population; 4) sector level employment makeup, self-employment and unemployment status.

communities that were perceived to be falling behind economically. Third, we also consider an area's exposure to COVID-19.[23] There are good reasons to believe that, on average, we would not expect to see robust patterns when estimating equation A.1, since the synthetic control approach should have adequately taken into account the independent variation in the observable characteristics of the districts.

We follow Becker et al. (2017) and carry out a similar best subset selection (BSS) exercise. For each group of variables, we identify the best subset of features – including region fixed effects – that best captures within-region variation in the cost of Brexit to date. For brevity, we only present the combined results in Appendix Table A3. Column (1) provides the best model, while column (2) includes all features. Columns (3) to (6) provide the best models pertaining to each variable group. We do not detect any robust association between any of the features that were helpful in decomposing variation in an area's vote share for Leave in 2016 to be associated with higher or lower costs of Brexit since 2016. The goodness of fit of even the most saturated models is quite low, suggesting that the features are hardly relevant in capturing cross-sectional variation in the estimated cost of Brexit.

Appendix Table A4 explores the extent to which levelling-up funding awarded in round 1 or 2 and/or the cumulative number of COVID-19 deaths is/are predictive of the estimated cost of Brexit. None of the measures of post-2016 policy changes and COVID-19 deaths (as a proxy for relevant shocks to the UK economy) seem to matter in that respect.These results are to be expected if our synthetic control is robust. The lack of significant explanatory power pre-2016 Brexit correlates and post-2016 policy changes, as well as the pandemic shock, supports the validity of our synthetic control model in accurately capturing the output gap induced by Brexit.

[23]Sources of data for Levelling-Up Fund Round 1, for Levelling-Up Fund Round 2, and for COVID-19 deaths.

2.5 Binary classification of economic cost of Brexit

For the main empirical analysis, we construct a set of different cross-sectional binary indicators that capture whether a local authority's economy is a Brexit loser relative to its synthetic control.[24] This approach is more conservative in assigning loser/winner status, compared to simply computing the average output gap over the post-2016 period. This less conservative approach would classify 73% of UK districts as Brexit losers (see Figure 3).

We construct three types of binary cross-sectional indicators. The first considers an area a Brexit-vote loser if there is an output gap between the actual and the synthetic control estimate, $y_{d,t} - \hat{y}^{s}_{d,t} < 0$, in *each of the years* after the 2016 Brexit vote. That is:

$$Loser_d^{RMSPE} = \begin{cases} 1 & \text{if } y_{d,t} - \hat{y}^{RMSPE}_{d,t} < 0 \quad \forall t > 2016 \quad \text{(Loser)} \\ 0 & else \end{cases}$$

We use a second, somewhat less stringent definition that we refer to as the *trend* definition. Accordingly, a district is classified as a Brexit loser if it meets two conditions: 1) if the *trend growth* post 2016 is lower compared to the trend growth before 2016; 2) if, on average, it had a negative and significant output gap over the period between 2016 and 2022, that is, if the upper confidence band of $\frac{1}{T}[\sum_{t>T_0} y_{d,t} - \hat{y}^{ENS}_{d,t}] < 0$.

The third definition is a relative one: we classify a district d as a *relative* Brexit loser if its average gap $\frac{1}{T}[\sum_{t>T_0} y_{d,t} - \hat{y}^{ENS}_{d,t}]$ is strictly lower than the output loss of the country, $\frac{1}{T}[\sum_{t>T_0} y_{UK,t} - \hat{y}^{ENS}_{UK,t}]$. We further require that the upper (lower) confidence band of the estimated gap for district d lies below the upper (lower) confidence band for the estimated for the UK as a whole. It goes without saying that our national estimates consistently point to a negative aggregate impact of Brexit on the UK economy – with an average output loss of around 5 percentage

[24] All of our results are robust to using a continuous measure.

points relative to the synthetic control. This implies that the third definition is the most stringent one by far.

Appendix Figure A2 presents the share of districts that are coded as Brexit losers using the above definitions. As indicated, the definition that focuses on the *average* growth performance is the broadest one, with almost 55% of districts classified as economic losers from Brexit. The definition that requires an output loss in each of the years after 2016 classifies around 43% of districts as Brexit losers. The relative definition, on the other hand, is the most conservative one, classifying just around 28% of the districts as losers – districts that experienced output losses that are more severe than those experienced by the country as a whole.[25]

3 The political implications of the economic cost of Brexit

We next turn to exploring the political consequences of the economic cost of Brexit. We do so studying data from both granular local elections as well as individual-level panel data from opinion polls.

3.1 Local election data

We begin by introducing the local election data we leverage.

Data To study the electoral consequences of Brexit, we use two levels of data. At the aggregate level, we examine local election data for wards between 2012 and 2022, sourced from the Andrew Teale Archive and the House of Commons for the 2021 local elections and 2022 local elections. At the individual level, we use the British Election Study (BES), combining waves from 1 to 24, covering the years

[25]The other bars in Appendix Figure A2 highlight the extent to which the different loser definitions are mutually exclusive (or not).

between 2014 and 2023.

All results in the next section are robust to the full set of "loser" definitions. This robustness indicates that our findings are not sensitive to the specific criteria used to classify areas as "losers", whether based on RMSPE, average performance, delta measures, or comparisons to national output losses. This consistency ensures that the observed patterns are not artefacts of particular coding decisions regarding the operationalisation of the dependent variable, but reflect genuine underlying economic and electoral dynamics.

Empirical approach To understand how Brexit has influenced electoral outcomes across different regions and, more broadly, how economic disruptions shape political behaviour and preferences, we estimate versions of the following specification:

$$partyshares_{pwdt} = \beta \cdot (Loser_d \cdot Post_{>2016}) + \gamma_w + \delta_t + \epsilon_{pwdt}$$

where $partyshares_{pwdt}$ represents the share of votes for a particular party p in ward w at time t. $Loser_d$ denotes a dummy variable, indicating whether the ward w is in a local authority d that is classified as a Brexit loser according to any of the above definitions in Section 2.5. $Post_{>2016}$ is an indicator for years after 2016 (post-Brexit).

The coefficient on the interaction term, β, is our theoretical parameter of interest. It captures the differential impact of Brexit on ward-level party vote shares in "loser" areas post 2016. The term γ_w represents ward fixed effects, δ_t represents year fixed effects, and ϵ_{pwdt} is the error term, clustered at the local authority district level. When multiple parties are considered, the specification includes party fixed effects η_p. The figures presented in the results section replace the $Post_{>2016}$ indicator with year dummies to provide event-study results.

Results Table 2 presents the results when estimating different versions of the above specification. Specifically, Table 2 shows the regression results for vote shares of Labour and right-wing parties in local elections, comparing pre- and post-Brexit periods in loser areas. Columns (1) to (3) focus on Labour vote shares. The results indicate a significant and negative impact on Labour support in loser areas post-2016. The coefficients range from -1.8 to -2.2 percentage points, corresponding to between 5 and 6% of the average Labour vote share in local elections (34.9). These estimates are statistically significant at least at the 5% level. This suggests that Labour's vote share decreased, on average, in areas that were adversely affected by Brexit.

Columns (4) to (6) present the results for right-wing party vote shares. We consider the following parties as right-wing parties: the UK Independence Party (UKIP), British National Party (BNP), English Democrats Party (EDP), National Front (NF), Reform UK, and the Christian Party (Chr). Here, the interaction terms are positive and significant, indicating an increase in right-wing electoral support in loser areas post-2016. The coefficients range from 1.3 to 2 percentage points, corresponding to between 8.6 and 13% of the average vote share for right-wing parties in local elections (15.2), with varying levels of statistical significance. This implies that right-wing parties gained support in regions that experienced clear Brexit-related economic costs. The inclusion of year and ward fixed effects controls for confounding factors common to all wards at the same time, as well as time-invariant ward-level factors, providing a robust indication of the electoral shift post-Brexit in areas that appear to be adversely economically affected areas.

Common trends assumption Figure 7 complements Table 2 by visualising the event-study estimates, i.e. the dynamic effects of the economic costs of Brexit on vote shares in local elections over time. It also provides some evidence in support of the underlying common trends assumption – the identifying assumption for difference-in-difference designs. That is, it adds plausibility to the assumption that local election vote shares for the respective (group of) parties would have evolved similarly before and after 2016 in loser and non-loser regions, had Brexit not happened.

Panel A traces out the event-study estimates for Labour vote shares. The negative trend in Labour vote shares in loser areas becomes apparent after 2016, with the exception of 2013, where the coefficient drops sharply. This drop is likely due to welfare cuts taking effect around that time. Post 2016, the coefficient estimates consistently below zero, highlighting that Labour vote shares declined more strongly before and after 2016 in loser regions, compared to those not classified as losers. Panel B displays right-wing vote shares. The graph shows a notable increase in right-wing vote shares in loser areas after 2016. The positive coefficients indicate that right-wing parties benefitted from the economic discontent in these regions following Brexit. Finally, note that we find no (consistent) association between Brexit costs and Conservative vote shares. But we hasten to add that this may reflect turnout dynamics, rather than a genuine null effect of Brexit costs on Conservative party support. However, given the limitations of the data, we cannot further empirically assess this hypothesis.

The trends are robust across different model specifications and persist over time. As shown by the two panels in the event-study plot (Figure 7), the coefficient estimates for Labour vote shares remain negative for all years after 2016, with the average estimate being around -0.03, i.e. Labour lost around 3 percentage points. The post-2016 bit of the coefficient plot for right-wing parties is almost the mirror image of that for Labour, with these parties having gained, on average, approximately 3 percentage points. These results highlight the broader implications of economic disruptions on political behaviour. As areas experienced economic hardships due to Brexit, voter dissatisfaction translated into electoral losses for the mainstream centre left (Labour), while boosting the electoral fortunes of right-wing populist parties.

Robustness Checks We conducted a range of robustness checks.

Our results are robust to alternative binary loser definitions, alternative ways of classifying areas as economic losers of Brexit (see Appendix Table A5). Appendix Table A6 suggests that the increase in right-wing vote shares in local elections is not driven by UKIP, but genuinely due to all far-right (populist) parties having gained support. Appendix Table A7 highlights that the results are not an artefact of the binary coding of loser/winner status. We obtain very similar results when employing a standardised version of the continuous cost-of-Brexit measure, which is the average of the cost-of-Brexit estimates for the period post 2016.

In Appendix Figure A3, we explore non-linearities in the effect by converting the Brexit-cost estimate into quintiles. The Figure captures differences in local election vote shares in Brexit-vote losing areas, ranging from areas with the largest output losses (1st quintile) to areas with Brexit output gains (5th quintile, our excluded category). Panel A documents that vote shares for the Labour party decrease after 2016 in areas with greater Brexit losses. Panel B demonstrates that vote shares are notably higher for right-wing parties in Brexit-losing areas after 2016, with effects especially concentrated in areas that have experienced the largest losses from Brexit. This analysis suggests that right-wing parties gained support in local elections at the expense of the Labour party in areas with the largest Brexit losses.

Appendix Figure A4 shows that we can safely reject the null result of no effect when using randomisation (or permutation) inference, which can address a broad range of concerns around classical inference (e.g. multiple comparisons). Finally, Appendix Figure A5 presents the results of leave-one-out exercise, where we drop data for each region (Panel A) or each district (Panel B) in turn and re-estimate the main specification. We observe that results are robust to alternative regional subsets of the data.

3.2 Individual-level panel evidence

While the analysis based on local election data sheds some preliminary light on the political ramifications of the economic cost of Brexit, it is also subject to considerable limitations. For one, not all parties field candidates in each of the local elections. More importantly, differences in vote shares may be driven (mostly) by differential turnout dynamics. This is because with (varying) turnout differentials across groups, the composition of the electorate changes, which may confound our results. To allay these concerns, we next leverage individual-level survey data from the British Election Study (BES) and perform a very similar set of empirical exercises as above.

Data We restrict our sample to respondents who lived in the same district for all waves in which they participated and were surveyed before and after the referendum. To ensure the reliability of our findings, we conduct the same analysis using an alternative (larger) sample of respondents for which we do not impose the second condition.

Empirical specification To better understand the electoral consequences of the costs of Brexit, we explore individual-level variation using data from the British Election Study (BES), which provides a panel of individuals from 2014 to 2023. Specifically, we estimate versions of the following specification:

$$y_{iwdt} = \beta \cdot (Loser_d \cdot Post_{>2016}) + \gamma_i + \delta_t + \epsilon_{iwdt}$$

where y_{iwdt} represents the outcome variable for individual i in ward w, district d at time t. We are interested in two (binary) variables: voting intentions and (self-reported) turnout. Given that, we estimate the above specification via a linear probability model. The variable $Loser_d$ is a dummy, indicating whether the respondent resides in a local authority d classified as a "loser" area according to any of the definitions described above (see Section 2.5). The term $Post_{>2016}$ denotes an indicator for the post-Brexit period, i.e. years after 2016.

The coefficient on the interaction term, β, is, as before, our theoretical parameter of interest. It captures the differential impact of living in a Brexit loser area on individuals' voting/turnout intentions, comparing the pre- and post-2016 periods. Finally, γ_i and δ_t indicate that we control for individual and year fixed effects, respectively, while ϵ_{iwdt} denotes the error term. The latter is clustered at the local authority district level.

Main results Table 3 contains the estimates for the interaction term in the above specifications for our two dependent variables. Columns (1) to (3) focus on support for Labour, i.e. the self-reported intention to vote for Labour. The results show a small, but mostly statistically insignificant decrease in Labour support post-2016, with coefficients ranging from -0.004 to -0.009. These estimates imply a 1.6 to 3.5% reduction in respondents supporting Labour, suggesting only a modest decline in Labour voting intentions in areas adversely affected by Brexit. Columns (4) to (6) present the results for right-wing party voting intentions, including the UK Independence Party (UKIP), British National Party (BNP), Reform UK, and the Brexit Party. The coefficient estimates are positive and significant, indicating an increase in right-wing support post-2016. The coefficients, which range from 0.012 to 0.014, correspond to a 13.8 to 16% increase in self-reported support for right-wing parties, implying that right-wing parties gained traction among individuals in economically affected regions. The inclusion of wave, local authority district, and individual fixed effects ensures robustness against confounders that are common to all units, but vary over time and those that are local-authority or respondent-specific, but time-invariant.

Common trends Figure 8 visualises the estimates from our event-study analysis (where we replace the post-2016 dummy with year dummies), which allows us to examine the dynamic effects of Brexit on self-reported voting intentions over time. The Figure shows a significant and durable increase in voting intentions for the right in loser areas post-2016, indicating that right-wing parties capitalised on the economic dissatisfaction in these regions. These trends remain robust across various model specifications and highlight that, consistent with what we observed in the aggregate analysis of local elections, right-wing parties gained traction among BES respondents in areas experiencing economic hardships by virtue of Brexit.

Robustness Checks As before, we carry out a broad range of robustness checks for our individual-level analysis.

Appendix Table A8 examines the robustness of the main results presented in Table 3 for different definitions of loser areas (as described in Section 2.5). The results remain consistent across all loser definitions – as well as combinations of ward fixed effects and either district fixed effects (Panel A) or individual fixed effects (Panel B). For Labour voting intentions, the coefficient estimates are always negative, albeit not always statistically significant. For right-wing voting intentions, the association is always positive and significant across all loser definitions and fixed-effects combinations.

Appendix Table A9 shows the main result using different sub-samples. The result remain substantively similar (as regards the signs of the coefficients), though the estimates are only significant for the sample that includes respondents living in the same district both before and after Brexit. One reason might be that these respondents could be more exposed to the economic fallout from Brexit in their local area. Furthermore, appendix Table A10 and the corresponding event-study plot in Appendix Figure A9 show that results are not an artefact of the binary coding of the Brexit-vote losing status. Instead, we find very similar results when using a continuous Brexit-cost measure.

Appendix Figure A10 explores the extent to which the effects are monotonic in the intensity of the continuous measure of the cost of Brexit. We do so by breaking the cost measure into quintiles. This Figure captures the differences in party support among BES respondents across areas with varying levels of Brexit-related economic impact. Panel A shows a significant decline in Labour vote shares in areas experiencing the largest Brexit losses (1st quintile). Panel B documents an increase in right-wing vote shares, primarily in the 2nd quintile of Brexit costs, with a positive and insignificant effect for the areas with the largest losses. The excluded category in this analysis is the 5th quintile, representing areas that experienced economic gains post-Brexit. This analysis suggests that the effects of Brexit on voting intentions are non-linear (non-monotonic), with right-wing support increasing most in areas with moderate losses and Labour support decreasing in areas with the largest losses.

In appendix Figure A7, we demonstrate that the results are not driven by any single regions, i.e. they are robust to dropping all data pertaining to each individual region (Panel A) or to each individual local authority (Panel B). In a similar spirit, appendix Figure A6 presents the results of a permutation exercise, which show that, even when using randomisation inference rather than classical inference, we can safely reject the null hypothesis of no effect. Finally, in Appendix Figure A8 we visually present the (non-robust) correlation of Brexit-vote losing status on Labour Party voting intention (Panel A). Further, we document that the effects that we observe on expressed right-wing party support are not masking differences in turnout intentions (Panel B).

Overall, the robustness checks confirm that our main findings are consistent across various definitions of loser areas, continuous measures of Brexit cost, and different sub-samples of respondents. These results are also in line with the aggregate findings from the local elections, reinforcing the validity of our conclusions about the electoral impact of Brexit.

4 Broader Discussion on Narratives Underpinning Populism

In this section, we discuss some of the potential mechanisms that underpin our reduced-form findings and, more broadly, the underlying narratives that shaped the political dynamics in the run-up to the EU referendum. We do so against the backdrop of the reflections on the economic consequences of Brexit that is the focus of the substantive part of this paper.

Why then were populist narratives, focused on immigration (and sovereignty), so successful – both in the years leading up to Brexit and during the EU referendum campaign? Our central argument is that far-right populists, notably UKIP,[26] were able to craft a narrative that pushed the material economic concerns about Brexit into the background by fanning fears about immigration, which was, crucially, enabled by two conditions. First, fears about immigration were fuelled by populists' savvy use of social media, which they used to distort voters' perceptions by hyping up single cases or outliers as representative of the country. Second, the immigration narrative resonated with voters in places, where the (spatial) externalities of austerity – such as high-street vacancies and homelessness – were particularly visible, even if the actual stock or inflow of immigrants was low. We argue that this was because these externalities served as a daily and tangible reminder for voters that, when the going gets rough and budget constraints tighten, it is them who will end up bearing the brunt.

Let us examine these points in turn. By way of background, note that the salience of immigration increased in the years prior to 2016, as did the prevalence of anti-immigration rhetoric. In the early 2000s and 2010s, respectively, the UK saw considerable immigration from Eastern Europe and drastic cuts to public spending in the wake of the Global Financial Crisis. Panel A of Figure 10 highlights that – although the growth in UKIP support is, on average, negatively correlated[27] with

[26]The growth in far-right populist support during the early 2010s – in particular that of the UK Independence Party (UKIP) – was critical in creating the political pressure within the Conservative party to call the a referendum (Bale, 2022).

[27]This correlation may well be spurious if, for instance, immigrants to sort into places that are more cosmopolitan because that facilitates integration. In fact, Pupaza and Wehner (2023) provide evidence that, using a more credible empirical design, the relationship is, in fact, positive. This is also consistent with a fair amount of other research evidence showing that immigration, particularly in the form of short-term contact with refugees or sudden increases in the number of immigrants, tends to be associated with increased electoral support for far-right platforms (Becker et al., 2016; Halla et al., 2017; Dustmann et al., 2019; Edo et al., 2019; Kristīne Vasiļjeva et al., 2019; Dinas et al.,

the growth of Eastern European immigrants – there are notable outliers that could have helped amplify the immigration narrative. The seaside town of Boston (top right in Panel A), for example, saw both very high levels of immigration from Eastern Europe and a particularly sharp increase in electoral support for UKIP between 2009 and 2014. Right-wing politicians might have used such outliers as "evidence" for their anti-immigration rhetoric, with the prominence of these outliers also being driven by the (right-wing) media's disproportionate attention to these outliers[28] – a phenomenon that Besley et al. (2020) dub the media multiplier.

The other factor that received growing attention in popular discourse in the run-up to the EU referendum was (perceived) local economic decline, in general, and austerity, in particular. Panel B in Figure 10 documents that there is a significant positive[29] association between an area's exposure to austerity and the growth in UKIP support. The underlying austerity index we plot on the x-axis combines both the share of an area's population that is exposed to welfare cuts and the extent of local government spending cuts.[30] Inspecting the top right of Panel B shows that the immigration outlier regions, such as Boston, that were used as "evidence" for anti-immigration narrative were also severely hit by local cuts. Blaming the ills on immigrants in these regions was plausible, and the fact that austerity cuts were widespread provided right-wing populists with fertile ground for creating the fear that immigration would worsen the access to and quality of local public services.

This is also reinforced by Panel C in Figure 10. The areas with higher than median accession migrant growth and the lowest early protest vote (bottom-right quadrant of Panel A) – corresponding also to the areas with the lowest austerity

2019; Steinmayr, 2021). Yet, whether these effects are quantitatively meaningful *out of sample*, and whether small average effects mask substantial heterogeneity (e.g. across origin countries), is unclear (Cools et al., 2021).

[28]See also: Stier et al. (2024)

[29]A number of well-identified studies have been published in recent years that document a causal link between exposure to welfare cuts and support for right-wing populists at both the individual and regional level (Fetzer, 2019, 2023; Bansak et al., 2021; Bojar et al., 2022; Baccini and Sattler, 2023; Hübscher et al., 2023; Wiedemann, 2024a; Alesina et al., 2024).

[30]The data used for constructing this index is described in detail in Fetzer (2019), Fetzer (2020), and Feld and Fetzer (2023).

index (top-left quadrant of Panel C) – are now the areas experiencing the highest cost of Brexit. This suggests a complex dynamic, where regions that were previously less impacted by austerity and had, in fact, low UKIP support now face significant economic challenges post-Brexit. Overall, our discussion suggests that far-right populists can exploit regional inequalities and austerity to increase the political relevance of anti-immigration sentiment – either by changing people's attitudes or making worries about immigration more salient – and that doing so can give rise to a lose-lose equilibrium, where some economic equalisation occurs by creating new 'loser' areas that had previously been more resilient to austerity.

5 Conclusion

Our objective in this paper was to make two contributions: to estimate the regional economic cost of Brexit and to examine the political ramifications of the economic costs of Brexit. To that end, we used a conventional synthetic control method to approximate how economic activity would have evolved had Brexit not happened. The key finding is that – while each region and constituent country of the UK lost economically, which is consistent with prior research on the aggregate ramifications – some regions lost more heavily than others, with London and the Midlands being the main losers. In this sense, Brexit has given rise to levelling up by levelling down – it has somewhat reduced regional inequalities by affecting previously relatively prosperous regions more severely than less prosperous ones or those in long-term decline. Based on these estimates, we then showed that, both in local elections and at the individual level, our cost-of-Brexit measure is robustly and positively associated with greater support for right-wing populist parties and lower support for Labour.[31] The economic fallout of Brexit has thus hurt far-right populist parties less than their competitors, with the reverse true for Labour.

While our research opens various avenues for further research, here we wish

[31] We found no consistent and robust effect for support for the Conservatives.

to highlight one in particular, namely a more careful analysis of the mechanism(s) that underpin our reduced-form findings. Specifically, more research is required to examine why the Remain campaign's emphasis of the likely negative aggregate economic consequences fell on deaf ears in relatively poor regions and among large swathes of the electorate. In interpreting our findings, we relied on the following mechanism: voters were convinced that more prosperous regions would be hit harder than left-behind regions in the Midlands and the North – and as a result long-standing regional inequalities would be redressed to some extent. An alternative explanation might be that voters simply did not believe what they saw as estimates produced by technocrats to bolster "Project Fear", as the Leave campaign referred to those who advocated to remain in the EU. To tease out and disentangle mechanisms, our observational data are insufficient, which is why we believe this paper paves the way for experimental work based on solid observational foundations.

The broader relevance of our findings is that the regional distribution of the costs of populist economic policy-making matters not only for welfare-economic assessments, but also for the political ramifications that populist policies, such as Brexit, are likely to engender. Examining the geographic heterogeneity in the economic costs of populism is also critical for understanding when and why populists are able to implement (predictably) negative-sum economic policies, like Brexit. And, when despite doing so, they incur, at least in relative terms, lower electoral costs than mainstream parties. With more populists in power or more likely to gain power in many (advanced industrialised) democracies, it is crucial to understand who bears the cost of their policies and why.

References

Abadie, A., A. Diamond, and J. Hainmueller (2010). Synthetic control methods for comparative case studies: Estimating the effect of california's tobacco control program. *Journal of the American statistical Association 105*(490), 493–505.

Abadie, A., A. Diamond, and J. Hainmueller (2012). Comparative Politics and the Synthetic Control Method. *mimeo*.

Abadie, A. and J. Gardeazabal (2003). The economic costs of conflict: A case study of the Basque Country. *American Economic Review 93*(1), 113–132.

Alesina, A., G. Ciminelli, D. Furceri, and G. Saponaro (2024). Austerity and elections. *Economica*.

Athey, S., M. Bayati, G. Imbens, and Z. Qu (2019). Ensemble Methods for Causal Effects in Panel Data Settings. *AEA Papers and Proceedings 109*, 65–70.

Baccini, L. and T. Sattler (2023). Austerity, economic vulnerability, and populism. *American Journal of Political Science*.

Baker, S. R., R. A. Farrokhnia, S. Meyer, M. Pagel, and C. Yannelis (2020). How Does Household Spending Respond to an Epidemic? Consumption During the 2020 COVID-19 Pandemic. *NBER Workigng Paper 26949*.

Bakker, J. D., N. Datta, R. Davies, and J. De Lyon (2023). Brexit and consumer food prices: 2023 update. *Centre for Economic Performance*.

Bale, T. (2022). Why David Cameron called the 2016 referendum – and why he lost it.

Bansak, K., M. M. Bechtel, and Y. Margalit (2021). Why austerity? the mass politics of a contested policy. *American Political Science Review 115*(2), 486–505.

Becker, S. O., T. Fetzer, et al. (2016). Does migration cause extreme voting. *Center for Competitive Advantage in the Global Economy and The Economic & Social Research Council*, 1–54.

Becker, S. O., T. Fetzer, and D. Novy (2016). Who Voted for Brexit? A Comprehensive District-Level Analysis. CAGE Online Working Paper Series 305, Competitive Advantage in the Global Economy (CAGE).

Becker, S. O., T. Fetzer, and D. Novy (2017). Who voted for Brexit? A comprehensive district-level analysis. *Economic Policy 32*(92), 601–650.

Besley, T., T. Fetzer, and H. Mueller (2020). How Big is the Media Multiplier ? Evidence from Dyadic News Data. *forthcoming, Review of Economics and Statistics*.

Bloom, N., J. Van Reenen, and H. Williams (2019). A Toolkit of Policies to Promote Innovation. *Journal of Economic Perspectives 33*(3), 163–184.

Bojar, A., B. Bremer, H. Kriesi, and C. Wang (2022). The effect of austerity packages on government popularity during the great recession. *British Journal of Political Science 52*(1), 181–199.

Born, B., G. J. Müller, M. Schularick, and P. Sedláček (2019). The costs of economic nationalism: evidence from the brexit experiment. *The Economic Journal 129*(623), 2722–2744.

Breinlich, H., E. Leromain, D. Novy, and T. Sampson (2020). Voting with their money: Brexit and outward investment by UK firms. *European Economic Review 124*, 103400.

Breinlich, H., E. Leromain, D. Novy, and T. Sampson (2022). The brexit vote, inflation and uk living standards. *International Economic Review 63*(1), 63–93.

Broadbent, B., F. Di Pace, T. Drechsel, R. Harrison, and S. Tenreyro (2023). The Brexit Vote, Productivity Growth, and Macroeconomic Adjustments in the U.K. *Review of Economic Studies*.

Broadbent, B., F. DiPace, T. Drechsel, R. Harrison, and S. Tenreyro (2019). The Brexit Vote, Productivity Growth and Macroeconomic Adjustments in the United Kingdom. *CEPR Discussion Papers*.

Burgoon, B., S. Van Noort, M. Rooduijn, and G. Underhill (2019). Positional deprivation and support for radical right and radical left parties. *Economic Policy 34*(97), 49–93.

Carreras, M., Y. I. Carreras, and S. Bowler (2019). Long-Term Economic Distress, Cultural Backlash, and Support for Brexit.

Carvalho, J.-P., A. Bergeron, J. Henrich, N. Nunn, and J. Weigel (2023). Zero-Sum Thinking, the Evolution of Effort-Suppressing Beliefs, and Economic Development. *SSRN Electronic Journal*.

Chinoy, S., N. Nunn, S. Sequeira, and S. Stantcheva (2023). Zero-Sum Thinking and the Roots of U.S. Political Divides. *mimeo*.

Cools, S., H. Finseraas, and O. Rogeberg (2021). Local Immigration and Support for Anti-Immigration Parties: A Meta-Analysis. *American Journal of Political Science 65*(4), 988–1006.

Corsetti, G., M. Crowley, and L. Han (2022). Invoicing and the dynamics of pricing-to-market: Evidence from uk export prices around the brexit referendum. *Journal of International Economics 135*, 103570.

Crowley, M. A., L. Han, and S. Minkyu (2024). The Swift Decline of the British Pound: Evidence from UK Trade-invoicing after the Brexit Vote Meredith. *Janeway Institute Working Papers*.

Davidai, S. and M. Ongis (2019). The politics of zero-sum thinking: The relationship between political ideology and the belief that life is a zero-sum game. *Science Advances 5*(12), 1–10.

Dhingra, S. and T. Sampson (2022). Expecting brexit. *Annual Review of Economics 14*(1), 495–519.

Dinas, E., K. Matakos, D. Xefteris, and D. Hangartner (2019). Waking up the Golden Dawn : Does exposure to the refugee crisis increase support for extreme-right parties? *Political Analysis 27*(2), 244–254.

Dustmann, C., K. Vasiljeva, and A. Piil Damm (2019). Refugee migration and electoral outcomes. *The Review of Economic Studies 86*(5), 2035–2091.

Edo, A., Y. Giesing, J. Öztunc, and P. Poutvaara (2019). Immigration and electoral support for the far-left and the far-right. *European Economic Review 115*, 99–143.

Facchetti, E. (2023). Police Infrastructure, Police Performance , and Crime: Evidence from Austerity Cuts. *mimeo*.

Feld, I. and T. Fetzer (2023). Austerity and Climate (In) Action. *mimeo*.

Fetzer, T. (2019). Did Austerity Cause Brexit? *American Economic Review 109*(11), 3849–3886.

Fetzer, T. (2020). Austerity and Brexit. *Intereconomics 55*(1), 27–33.

Fetzer, T. (2023). Regulatory barriers to climate action: Evidence from Conservation Areas in England. *CAGE Working Paper*.

Fetzer, T., J. Edenhofer, and P. Garg (2024). Local Decline and Populism. *mimeo*, 1–13.

Fetzer, T., S. Sen, and P. C. L. Souza (2022). Housing Insecurity and Homelessness: Evidence from the United Kingdom. *Journal of the European Economic Association*.

Fetzer, T. and S. Wang (2020). Measuring the regional economic cost of brexit: Evidence up to 2019. *CEPR Discussion Paper No. DP15051*.

Fetzer, T. and I. Yotzov (2023). (How) Do electoral surprises drive business cycles? Evidence from a new dataset. *CEPR Discussion Paper DP18306*(1468).

Funke, M., M. Schularick, and C. Trebesch (2023). Populist Leaders and the Economy. *American Economic Review 113*(12), 3249–3288.

Garofalo, M., G. Rosso, and R. Vicquéry (2024). Dominant currency pricing transition. *Bank of England Staff Working Paper No. 1074*.

Grassi, B. (2024). The EU Miracle : When 75 Million Reach High Income. *mimeo*, 1–15.

Guriev, S. and E. Papaioannou (2022). The Political Economy of Populism. *Journal of Economic Literature 60*(3), 753–832.

Halla, M., A. Wagner, and J. Zweimüller (2017). Immigration and Voting for the Extreme Right. *Journal of the European Economic Association*.

Hassan, T. A., S. Hollander, L. V. Lent, and A. Tahoun (2024a). The Global Impact of Brexit Uncertainty. *Journal of Finance 79*(1), 413–458.

Hassan, T. A., S. Hollander, L. V. Lent, and A. Tahoun (2024b). The Global Impact of Brexit Uncertainty. *The Journal of Finance 79*(1), 413–458.

Hübscher, E., T. Sattler, and M. Wagner (2023). Does austerity cause polarization? *British Journal of Political Science 53*(4), 1170–1188.

Kristīne Vasiļjeva, C. Dustmann, K. Vasiljeva, and A. P. Damm (2019). Refugee Migration and Electoral Outcomes. *The Review of Economic Studies 86*(5), 2035–2091.

Kurer, T. (2020). The declining middle: Occupational change, social status, and the populist right. *Comparative Political Studies 53*(10-11), 1798–1835.

Kurer, T. and B. Van Staalduinen (2022). Disappointed expectations: Downward mobility and electoral change. *American Political Science Review 116*(4), 1340–1356.

Lyon, D. B. N. D. R. D. J. D. (2022). Non-tariff barriers and consumer prices: evidence from Brexit. *Center for Economic Performance No. 1888*(18).

Morelli, M., G. Gennaro, and G. Lecce (2021). Mobilization and the strategy of populism theory and evidence from the united states. Technical report, CEPR Discussion Papers.

Nolan, B. and D. Weisstanner (2022). Rising income inequality and the relative decline in subjective social status of the working class. *West european politics 45*(6), 1206–1230.

Novy, D., T. Sampson, and C. Thomas (2024). Brexit and uk trade. *Centre for Economic Performance*.

Pupaza, E. and J. Wehner (2023). From low-cost flights to the ballot box: how eastern european migration shaped far-right voting in london. *The Journal of Politics 85*(4), 1214–1228.

Rodríguez-Pose, A. (2018). The revenge of the places that don't matter (and what to do about it). *Cambridge Journal of Regions, Economy and Society 11*(1), 189–209.

Rodríguez-Pose, A., J. Terrero-Dávila, and N. Lee (2023). Left-behind versus unequal places: interpersonal inequality, economic decline and the rise of populism in the USA and Europe. *Journal of Economic Geography 23*(5), 951–977.

Ryan, J. M. T. (2023). How Brexit Damaged the United Kingdom and the City of London. *Economists' Voice 20*(2), 179–195.

Sampson, T. (2017). Brexit: The economics of international disintegration. *Journal of Economic Perspectives 31*(4), 163–184.

Smith, M. (2023). Most britons say brexit has been 'more of a failure'.

Steinberg, J. B. (2019). Brexit and the macroeconomic impact of trade policy uncertainty. *Journal of International Economics 117*(March 2019), 175–195.

Steinmayr, A. (2021). Contact versus exposure: Refugee presence and voting for the far right. *Review of Economics and Statistics 103*(2), 310–327.

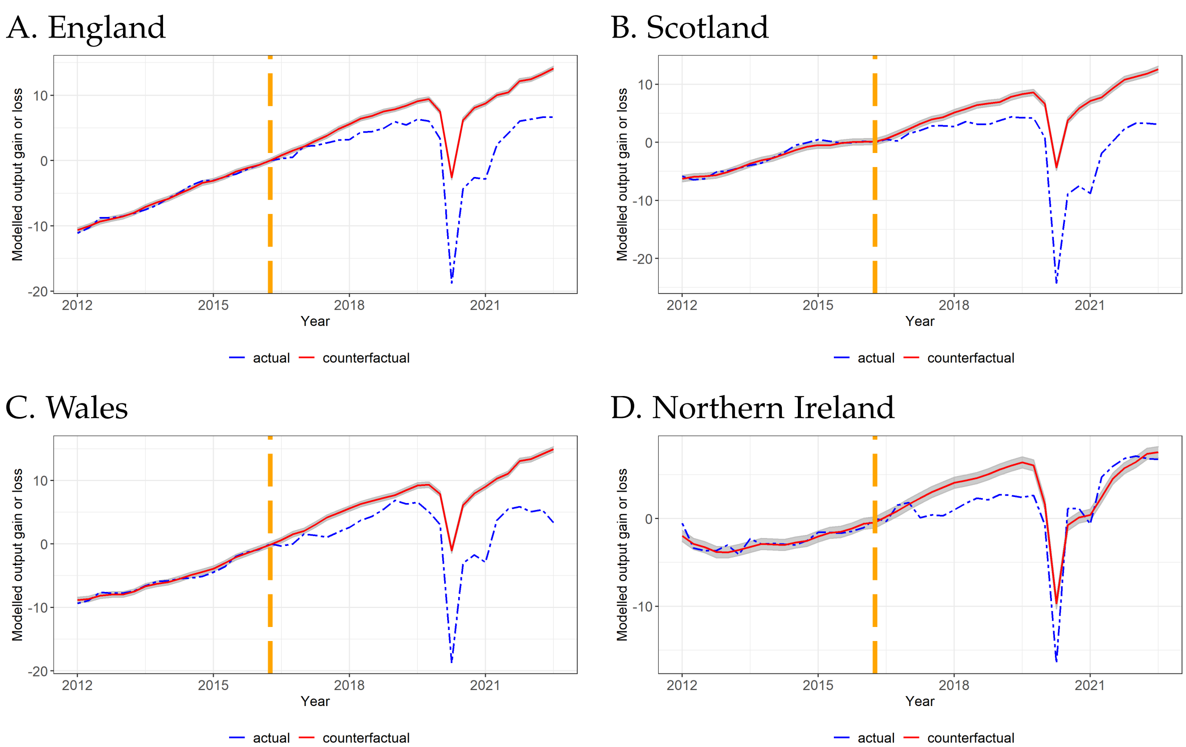
Stier, S., C. Froio, and J. Ho (2024). Mainstreaming the populist radical right? online news exposure and voting behavior in the 2019 european parliament election. *European Political Science Review 16*(1), 1–17.

Wiedemann, A. (2024a). The electoral consequences of household indebtedness under austerity. *American Journal of Political Science 68*(2), 354–371.

Wiedemann, A. (2024b). Redistributive politics under spatial inequality. *The Journal of Politics 86*(3), 1013–1030.

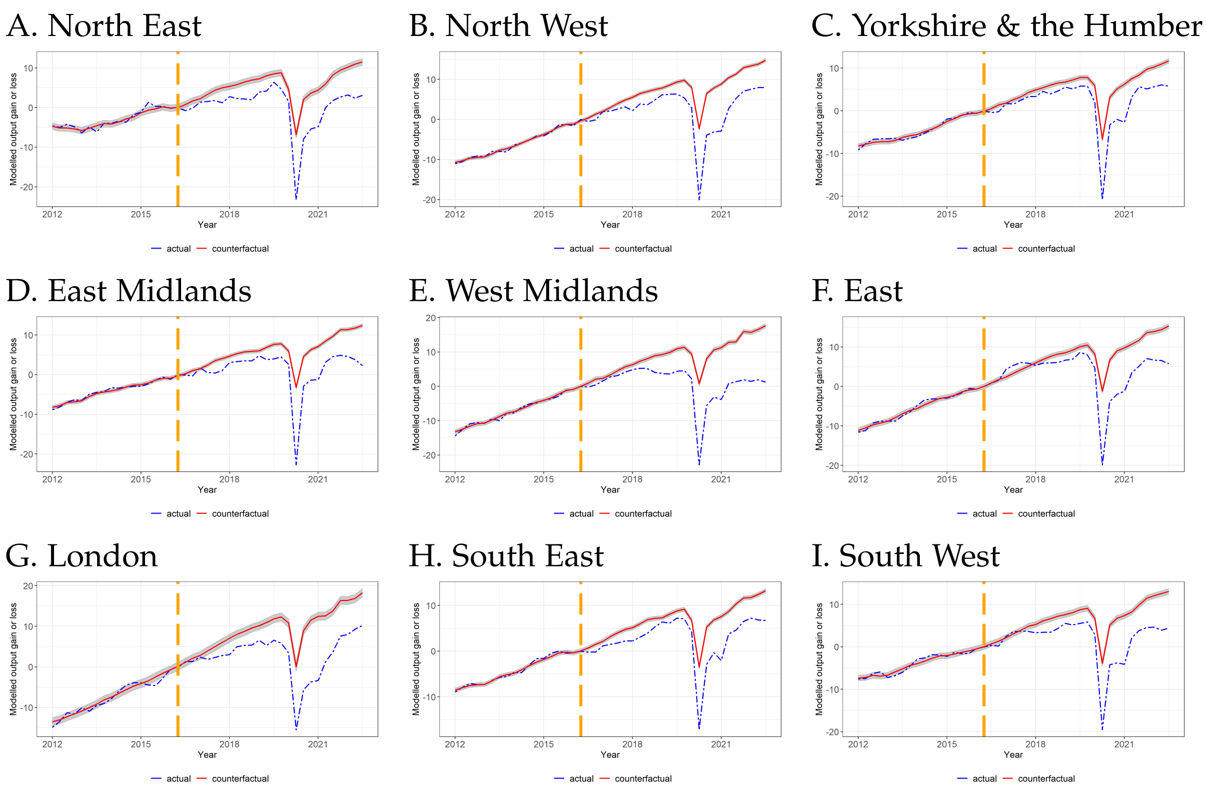
Figures

Figure 1: Ensemble estimate of the impact of Brexit-vote on UK constituent countries real GDP



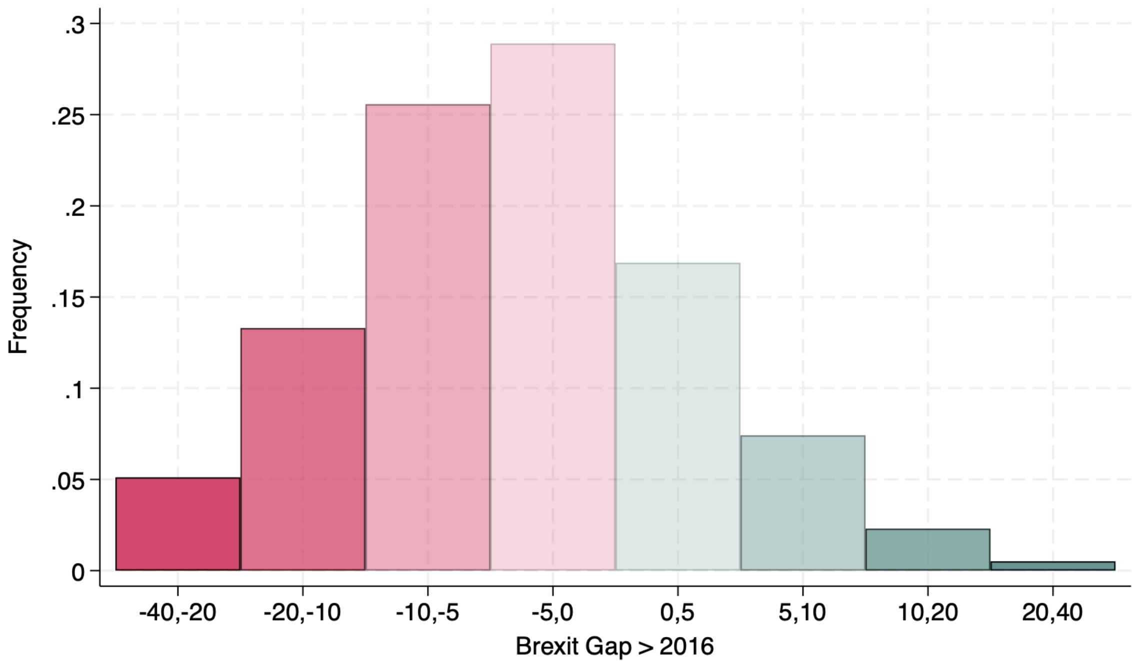
Note: This Figure plots the synthetic control value of the deviation of real GDP, relative to 2015, from the UK's actual GDP over time. The figure highlights notable heterogeneity. On average, the economic cost for Brexit is lowest for Northern Ireland which, as the only member of the United Kingdom de-facto remains in a Customs Union with the European Union. Scotland and Wales, by 2022, experience notably higher economic cost of Brexit (-8.7 and -8.3 percentage points) compared to England (-6.5 percentage points).

Figure 2: Quarterly Region-Level Synthetic Control Estimates Across English Regions



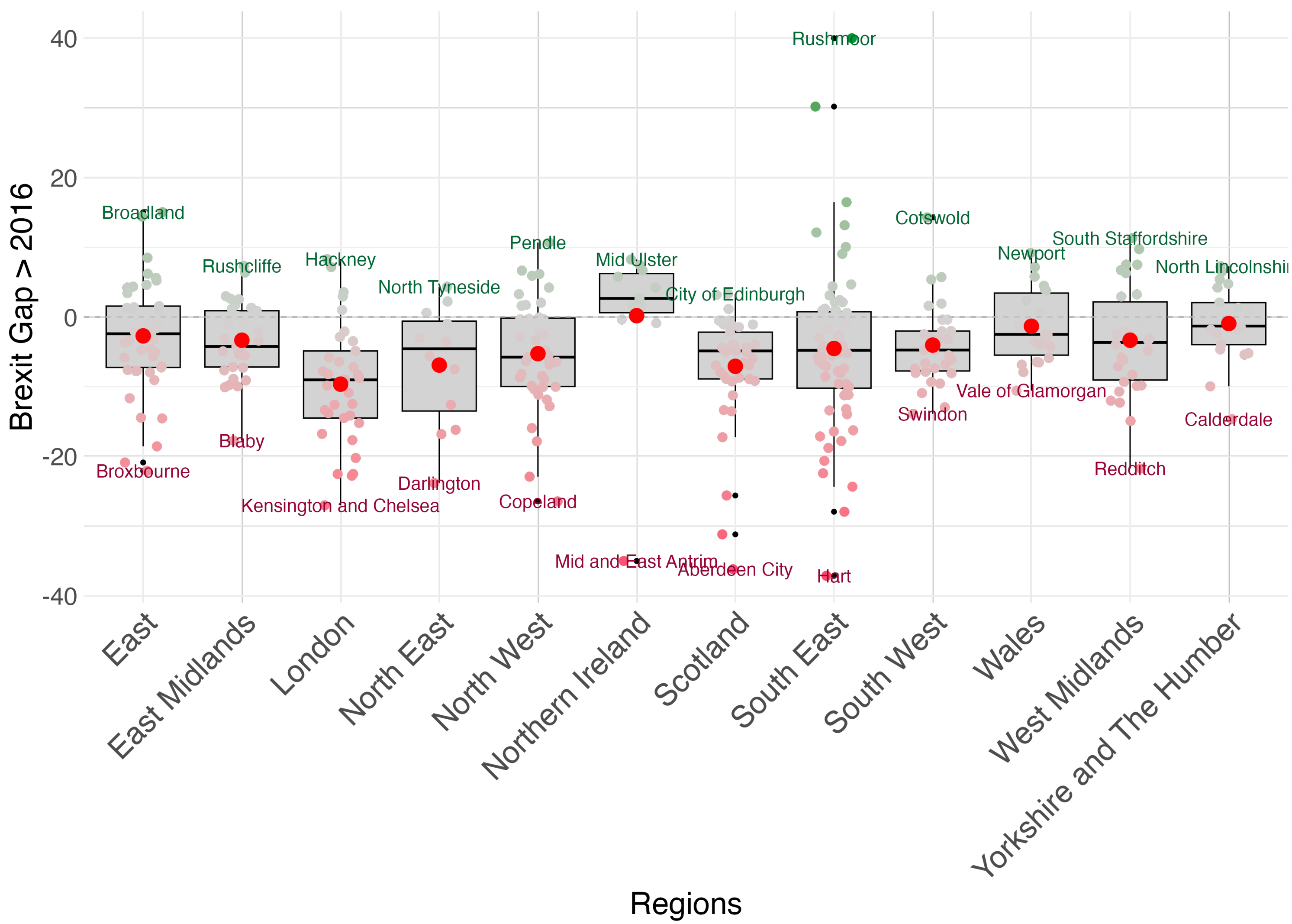
Note: This Figure plots the synthetic control value of the deviation of real quarterly GDP relative to 2016 Q2 for each of the nine English NUTS1 regions. The dotted line indicates the regions' actual real GDP growth relative to 2016Q2, while the red line indicates the ensemble synthetic control estimate. We observe marked heterogeneity, with output in London appearing to be settling on a lower level, but trend growth recovering relative to the synthetic control. Other regions, such as the North East, the East, and the Midlands see not only a negative output gap, but also notably lower trend growth. Output levels appear to have flat-lined in the North East, Northwest and Yorkshire.

Figure 3: Empirical distribution of the average Brexit cost across districts



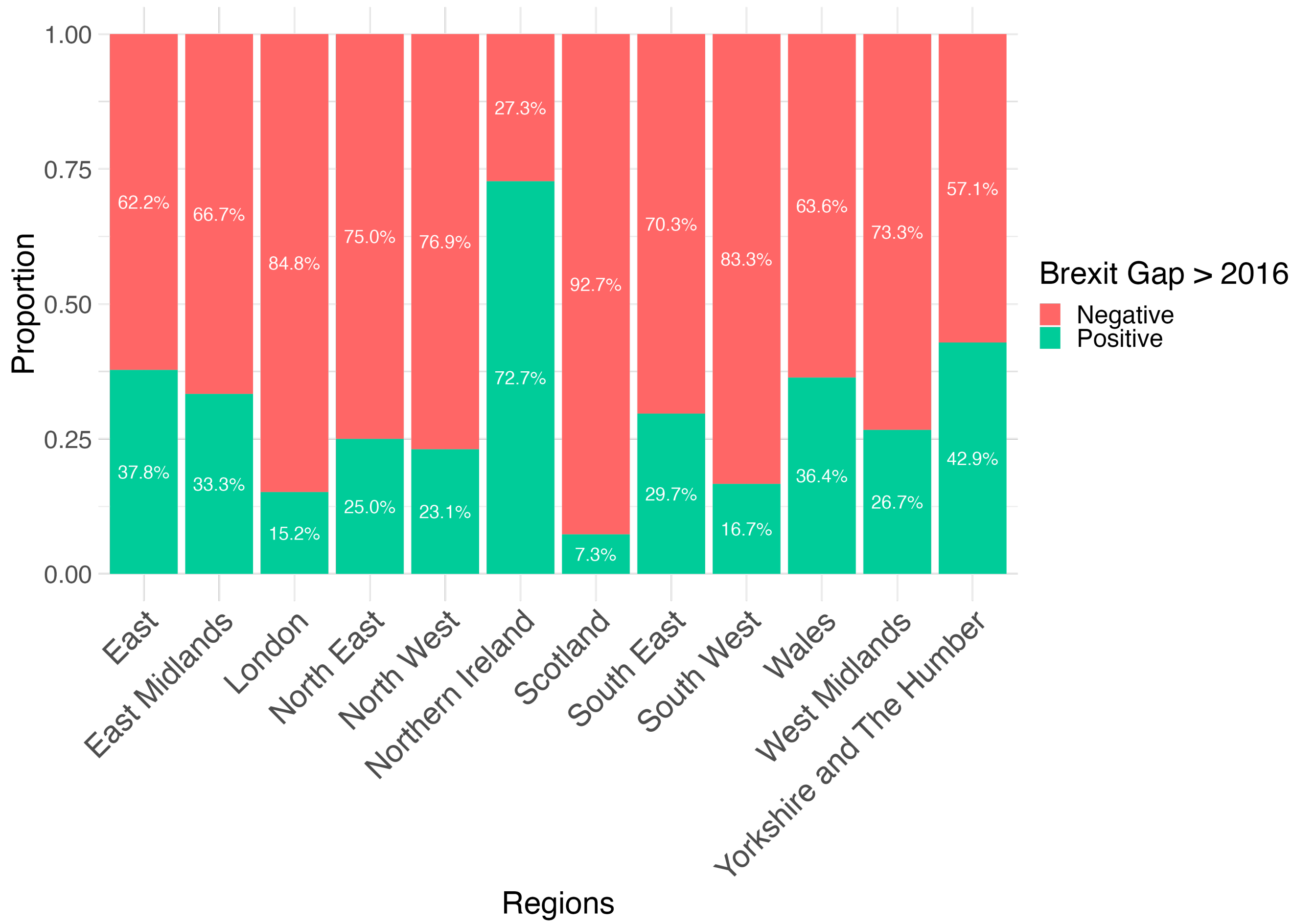
Note: The Figure shows a histogram displaying the relative frequency of district-level Brexit-related economic losses or gains. The district-level estimates represent the unweighted post-2016 averages, measuring the average gap between the actually reported value and the ensemble synthetic control estimate for each district from 2016 to 2021. For reference, the UK as a whole, experiences an average annual output loss of around 5 percentage points. The distribution of costs and gains varies significantly across districts. A total of 73% of districts experience a tangible cost of Brexit vis-à-vis their synthetic control. Only 27% of districts experience a positive output gap vis-à-vis their respective synthetic control. This highlights that the vast majority of local authorities are economic losers from Brexit.

Figure 4: Distribution of Brexit Costs and Gains across Districts within Regions.



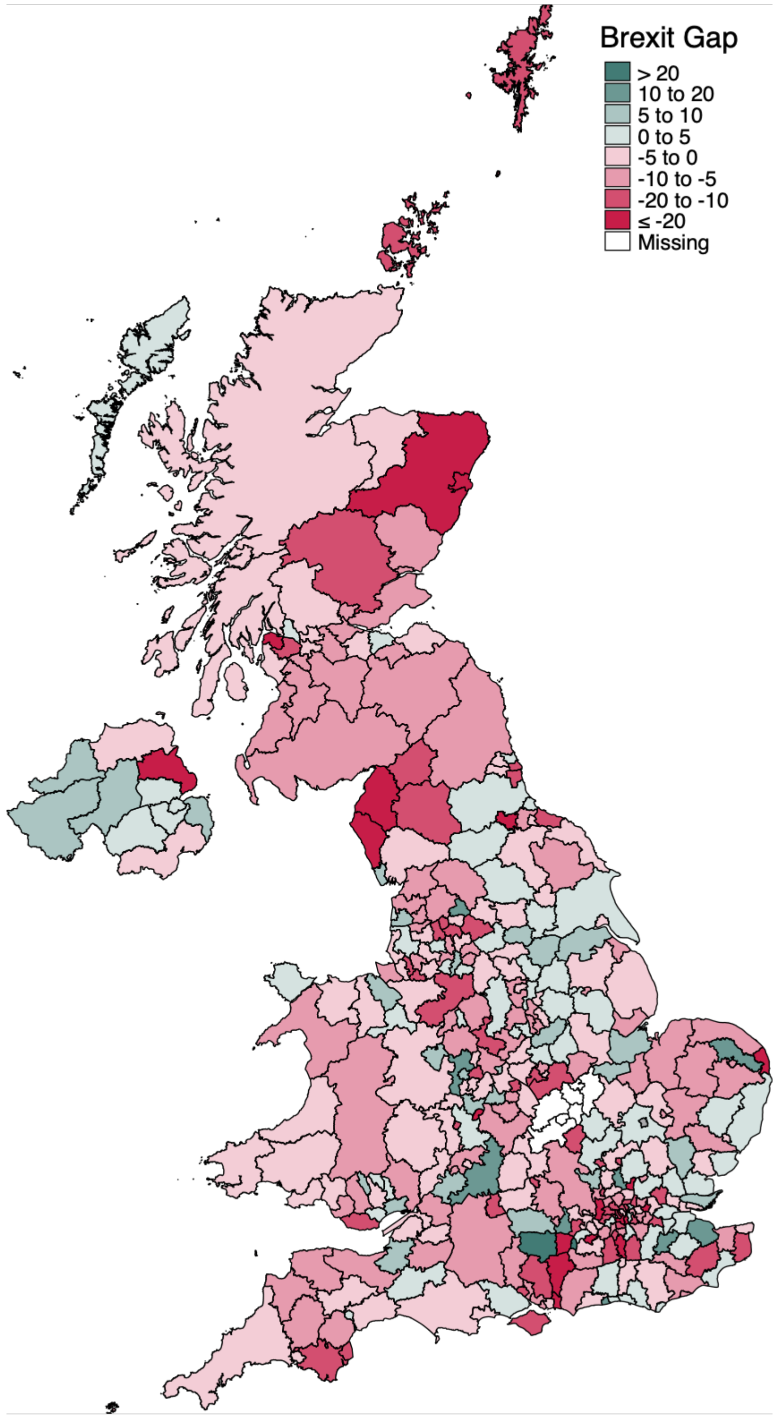
Note: The Figure shows the composition and dispersion of the district-level estimates for Brexit-related costs or benefits, with boxplots representing the estimates obtained from the ensemble synthetic control for a given region. The district-level estimates represent the unweighted post-2016 average gap between the actual- and the synthetic control estimate for each district. Negative values, shaded in red, indicate that an area is a Brexit vote loser. The large red dot indicates the average within region, while the district names correspond to districts with minimum and maximum Brexit gap within each region.

Figure 5: Proportion of Brexit Costs and Gains across Districts within Regions.



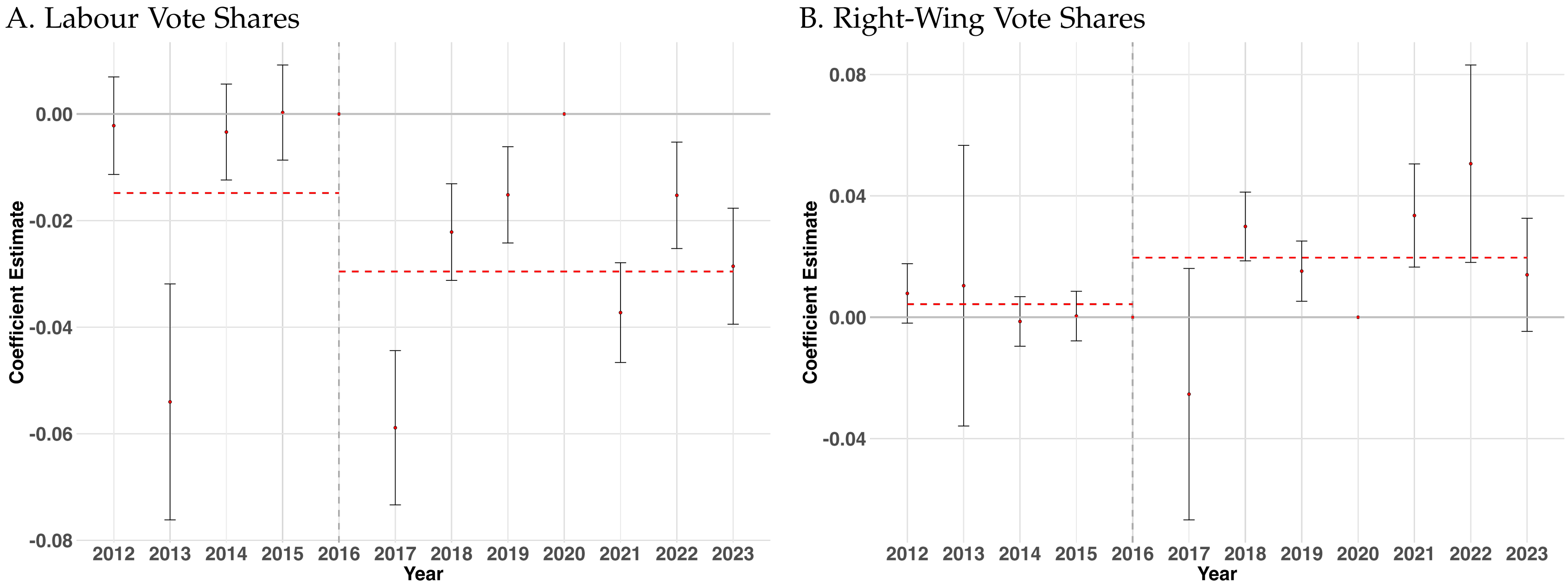
Note: The Figure shows the composition of the district-level Brexit cost or gain estimates obtained from the ensemble synthetic control estimates across districts within a region. The district-level represent the unweighted post 2016 average gap between the actual- and the synthetic control estimate for each district. Values in red indicate the proportion of areas with Brexit output losses, while values in green represent the share of areas with output gains. The share of areas with output losses is notably higher in Scotland (93%), London (85%), and South West (83%), while the region with the highest share of areas with output gains is Northern Ireland (93%).

Figure 6: Map of Brexit Costs and Gains Across Districts.



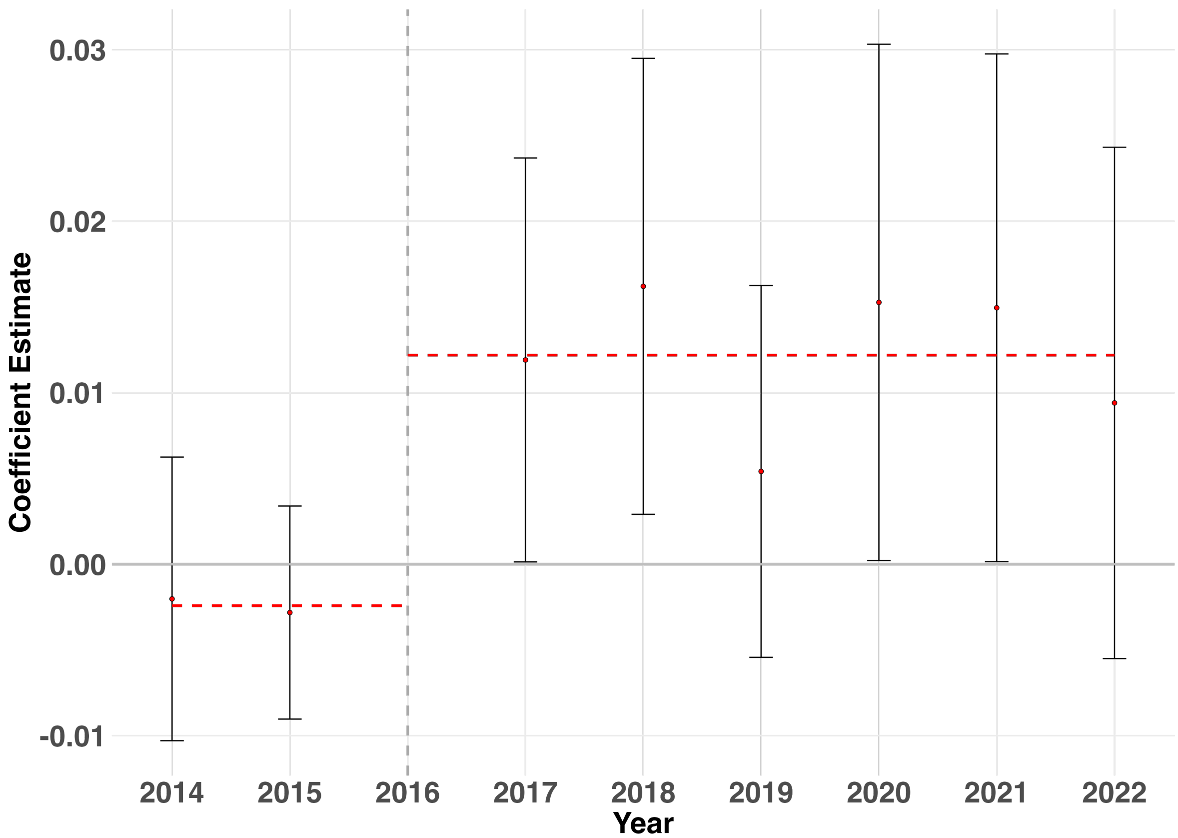
Note: The Figure maps district-level Brexit gaps across the UK. Red shades represent costs (-40 to 0) and green shades represent gains (0 to 40). The distribution of costs and gains varies significantly across districts, with 73% experiencing significant economic challenges and only 27% seeing gains.

Figure 7: Vote Patterns in Loser Areas from Aggregate Local Elections Data



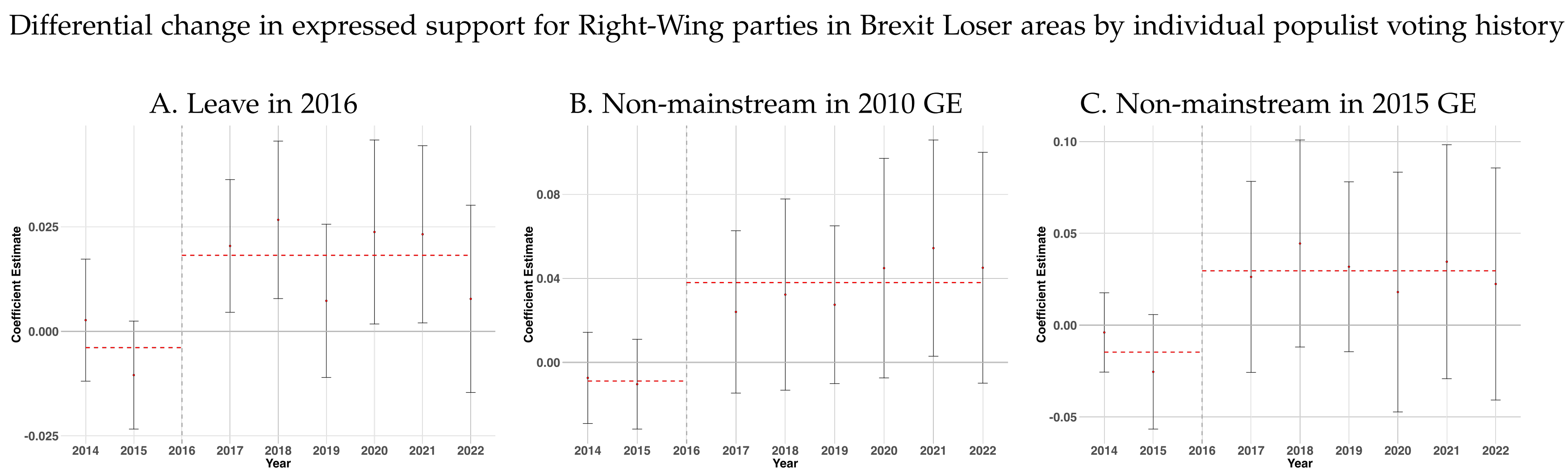
Note: The Figure captures the differences in party vote shares across wards in local elections in local authority districts that have lost economically as a result of the 2016 EU referendum vote. Panel A documents that the vote share for the Labour party decreases in Brexit-vote losing areas after the EU referendum. Panel B documents that vote shares are notably higher for right-wing parties in Brexit-losing areas after 2016. The analysis suggests that right-wing parties gained support in local elections at the expense of the Labour party in Brexit-loser areas. Right-wing parties in Panel B are the UK Independence Party (UKIP), British National Party (BNP), English Democrats Party (EDP), National Front (NF), Reform UK and the Christian Party (Chr). All regressions are estimated using two-way fixed effects models, controlling ward and year fixed effects in Panel A, and ward, year, and party fixed effects in Panel B. The omitted year is 2016. No local elections were held in 2020 due to the pandemic.

Figure 8: Increases in right-wing party support among British Election Study respondents in areas negatively economically impacted by Brexit



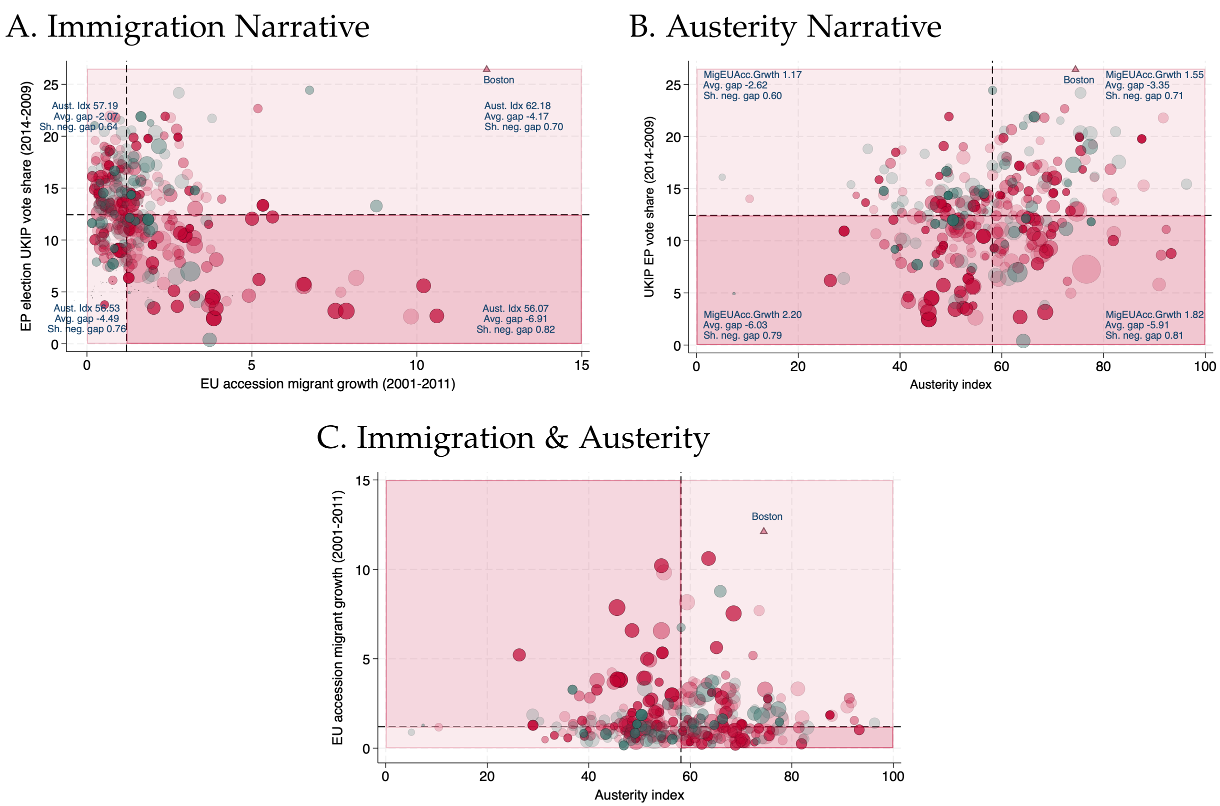
Note: The Figure presents results from a regression analysis, documenting that right-wing party support among BES survey respondents is notably higher in areas that are negatively economically impacted by Brexit. To measure Brexit cost, we use the preferred binary coding that classifies areas as Brexit-vote losers if their synthetic control estimate is below the actual recorded measure in each of the years after 2016. Appendix Figure A9 presents similar results using the continuous measure of the Brexit cost estimate. Appendix Table 9 presents pooled results showing that results are robust to alternative Loser definitions. Appendix Figure A10 highlights that the results are driven by areas that experience the highest Brexit cost. We use the best synthetic control that has been identified using the RMSPE selection criterion. Right-wing parties considered are the UK Independence Party (UKIP), British National Party (BNP), Reform UK and the Brexit Party respectively. Regressions are estimated using two-way fixed effects models controlling for individual-level fixed effects as well as time fixed effects. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level.

Figure 9: Heterogeneity in differential change in right-wing party support in Brexit Loser areas by *individual* historical voting patterns among BES survey participants



Note: The Figure captures the differential increase in right-wing party support among BES survey respondents in Brexit-vote losing areas by individual past populist or non-mainstream party electoral support. Panel A documents that, among Leave voters, support for right-wing parties disproportionately increases in Brexit-vote losing areas after the EU referendum. Panels B and C show that individuals, who have expressed proclivity to support non-mainstream parties (not Labour, Conservatives or Liberal Democrats) in previous general elections, are considerably more likely to express support for right-wing parties in Brexit-losing areas after 2016. Right-wing parties considered are: the UK Independence Party (UKIP), British National Party (BNP), Reform UK and the Brexit Party respectively. All regressions are estimated using two-way fixed effects models, controlling for individual-level fixed effects, as well as non-linear time trends for whether an individual is residing in a Brexit vote losing area and in the individual-level heterogeneity that is explored. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level. Standard errors clustered at district level.

Figure 10: Immigration Narrative Uses Outliers Masking Austerity Relationship to UKIP Vote



Note: The figures depict the Brexit gap in different colors, with red shades indicating costs (-40, -20); (-20, -10); (-10, -5); (-5, 0) and green shades indicating gains (0, 5); (5, 10); (10, 20); (20, 40). The y-axis represents the difference in UKIP vote share between the 2009 and 2014 European Parliamentary Elections. In Panel A, the x-axis represents the percentage growth of migrants from EU accession countries between 2001 and 2011. In Panel B, the x-axis represents the austerity index, which is a standardised principal component analysis of benefit cuts and cuts to local council expenditure.

Tables

Table 1: Regional Output Gap Post Brexit

		"Best Syntetic Control"			Ensemble	
ITL1	Region	$MAPE_s$	$RAPE_s$	$RMSPE_s$	$\hat{y}^{ENS}$	$\hat{y}_d^{ENS_{sim}}$
A: Average post 2016						
UK	*United Kingdom*	-5.20	-5.20	-5.20	-5.12	-5.05
TLB	England	-5.72	-5.72	-5.72	-4.56	-4.57
TLC	North East	-5.93	-5.46	-6.41	-5.09	-5.13
TLD	North West	-7.00	-5.86	-7.00	-4.74	-4.65
TLE	Yorkshire and The Humber	-5.08	-5.08	-5.08	-3.33	-3.42
TLF	East Midlands	-6.97	-6.97	-6.97	-4.50	-4.46
TLG	West Midlands	-7.64	-8.03	-8.03	-7.67	-7.61
TLH	East	-4.13	-4.63	-4.52	-4.10	-4.11
TLI	London	-7.45	-5.93	-6.57	-6.43	-6.40
TLJ	South East	-4.62	-4.18	-4.62	-3.88	-3.88
TLK	South West	-5.44	-5.66	-5.44	-4.57	-4.54
TLL	Wales	-6.03	-6.12	-6.12	-5.06	-5.05
TLM	Scotland	-6.52	-6.66	-6.52	-5.91	-5.88
TLN	Northern Ireland	-1.72	-1.72	-1.72	-1.35	-1.43
B: Average 2022						
UK	*United Kingdom*	-8.30	-8.30	-8.30	-7.88	-8.08
TLB	England	-8.11	-8.11	-8.11	-6.51	-6.58
TLC	North East	-8.52	-7.46	-9.77	-7.48	-7.52
TLD	North West	-9.58	-7.98	-9.58	-6.07	-5.94
TLE	Yorkshire and The Humber	-7.28	-7.28	-7.28	-4.53	-4.70
TLF	East Midlands	-11.80	-11.80	-11.80	-7.30	-7.21
TLG	West Midlands	-14.27	-15.14	-15.14	-14.17	-14.08
TLH	East	-7.11	-8.32	-8.15	-7.53	-7.58
TLI	London	-10.39	-7.93	-9.20	-8.58	-8.52
TLJ	South East	-6.46	-5.28	-6.46	-5.50	-5.50
TLK	South West	-9.17	-9.61	-9.17	-7.51	-7.50
TLL	Wales	-10.68	-10.64	-10.64	-8.28	-8.26
TLM	Scotland	-9.74	-10.03	-9.74	-8.74	-8.71
TLN	Northern Ireland	-0.53	-0.53	-0.53	0.37	0.23

Note: The Table presents region-level estimates of the cost of Brexit, expressed as the difference in growth rates relative to 2016Q2 between the actual UK region and the synthetic control estimate. The data capture the average difference in the respective years indicated in the column head. The preferred estimate is the ensemble average across the whole set of synthetic control estimates. We further provide the ensemble estimate, which is constructed using 70 synthetic control estimates (based on different samples), along with the estimates that are obtained by picking the best series among the set of synthetic control according to the best pre-treatment fit.

Table 2: Loser Areas Vote Patterns in Local Elections

	Labour			Right Wing		
	(1)	(2)	(3)	(4)	(5)	(6)
Loser (RMSPE) * Post 2016	-1.772**	-2.038***	-2.229***	1.409*	1.325**	1.989***
	(0.889)	(0.622)	(0.674)	(0.812)	(0.646)	(0.742)
Year FE	X	X	X	X	X	X
LAD FE		X			X	
Ward FE			X			X
DV mean	34.86	34.86	34.86	15.18	15.18	15.18
Adj. R2	0.0711	0.537	0.872	0.265	0.544	0.682
N	30104	30104	25804	11180	11166	8178
N LAD	358	358	353	348	334	277

Note: The coefficient estimates come from a two-way fixed effects regression models for local election vote shares at the ward level. Columns (1) to (3) examine Labour vote shares, while columns (4) to (6) focus on vote shares for right-wing parties in districts that experienced Brexit-related costs after 2016, the year of the Brexit Referendum. We find that Loser areas see higher support for right-wing fringe parties, resulting in losses for the Labour party. The right-wing parties considered in this analysis of local elections (Panel B) are: the UK Independence Party (UKIP), British National Party (BNP), English Democrats Party (EDP), National Front (NF), Reform UK and the Christian Party (Chr). Standard errors clustered at district level. The significance levels are as follows: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

Table 3: Loser Areas Vote Patters in British Election Study

	Stable location observed pre & post 2016					
	Labour			**Right Wing**		
	(1)	(2)	(3)	(4)	(5)	(6)
Loser (RMSPE) * Post 2016	-0.007	-0.009*	-0.004	0.014**	0.013**	0.012*
	(0.005)	(0.005)	(0.005)	(0.007)	(0.006)	(0.006)
Wave FE	X	X	X	X	X	X
LAD FE		X			X	
Individual FE			X			X
DV mean	0.258	0.258	0.258	0.0868	0.0868	0.0868
Adj. R2	0.0112	0.0558	0.644	0.0357	0.0571	0.471
N	413325	413325	413323	413325	413325	413323
N LAD	362	362	362	362	362	362

Note: The coefficient estimates come from a two-way fixed effects regression models, analysing voting intentions among British Election Study (BES) respondents. Columns (1) to (3) examine support for Labour, while columns (4) to (6) study support for right-wing parties in districts that experienced Brexit-related costs after 2016. We find support for right-wing fringe parties increases among respondents in loser areas, resulting in moderate disengagement with the Labour party. The right-wing parties considered in this analysis are: the UK Independence Party (UKIP), the British National Party (BNP), Reform UK and the Brexit Party respectively. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level. The significance levels are as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 4: Heterogeneity in Right-wing Party Support Changes in Brexit Loser Areas by Individual Historical Voting Patterns among BES Survey Participants

	Stable location observed pre & post '16					
	Right Wing					
	(1)	(2)	(3)	(4)	(5)	(6)
Loser * Post '16	-0.000	-0.000	-0.000	0.001	-0.008**	-0.006**
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Loser * Post '16 * Leave '16	0.021**	0.020**			0.012*	0.013*
	(0.009)	(0.008)			(0.007)	(0.007)
Loser * Post '16 * No-Mainstream '10 or '15			0.044	0.036	0.040	0.032
			(0.027)	(0.025)	(0.024)	(0.022)
Wave FE	X	X	X	X	X	X
LAD FE	X		X		X	
Individual FE		X		X		X
DV mean	0.0868	0.0868	0.0868	0.0868	0.0868	0.0868
Adj. R2	0.158	0.487	0.184	0.499	0.258	0.512
N	389647	389646	367622	367621	356272	356271
N LAD	362	362	362	362	362	362

Note: The coefficient estimates capture the differential increase in right-wing party support among BES survey respondents in Brexit-losing areas by individuals' past populist or non-mainstream party electoral support. Columns (1)-(2) document differential support among Leave voters, with columns (3)-(4) showing differential support among non-mainstream parties (not Labour, Conservatives or Liberal Democrats) in previous general elections. Columns (5)-(6) add Leave voters and non-mainstream parties supporter differential together. The right-wing parties considered are: the UK Independence Party (UKIP), the British National Party (BNP), Reform UK and the Brexit Party respectively. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level. The significance levels are as follows: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

Online Appendix

Levelling up by levelling down: The economic and political costs of Brexit

Alabrese Eleonora, Jacob Edenhofer, Thiemo Fetzer and Shizhuo Wang

July 2, 2024

A Exploring variation in Brexit-cost estimates

Our estimates of the cost of Brexit are based on the assumption that the synthetic control method accurately captures the counterfactual economic activity in the absence of the EU referendum outcome. It could be, however, that the measured local economic activity itself is affected by other post-2016 changes that may be correlated with an area's exposure to the cost of Brexit. For instance, the synthetic control estimate could be downward biased if areas that were more exposed to the cost of Brexit saw increased fiscal transfers after the EU referendum vote.

We explore the extent to which we can detect patterns in our measure of the Brexit cost that are systematically related to other observable characteristics of the districts. We focus on the average output gap post 2016. Averaging washes out idiosyncratic factors that may have affected the output gap in a specific year. We regress the average post-Brexit-vote output gap estimate on a set of potential confounders X_d for each district d:

$$\frac{1}{T}[\sum_{t>T_0} y_{d,t} - \hat{y}^s_{d,t}] = \beta' X_d + \nu_{d,t} \tag{A.1}$$

We consider three sets of variables. First, we consider a vector of around 40 mostly socio-economic characteristics that are taken from Becker et al. (2017).[1] Becker et al. (2017) showed that these variables, taken together, do a good job in capturing the cross-sectional variation in support for Leave in 2016. The second set of measures pertains to levelling-up funding as a type of financial transfer aimed at communities that were perceived to be falling behind economically. Third, we also consider an area's exposure to COVID-19 mortality.[2] There are good reasons to believe that, on average, we would not expect to see robust patterns when estimating equation A.1. After all, the synthetic control approach should have adequately taken into account the independent variation in the observable characteristics of the districts.

We follow Becker et al. (2017) in carrying out a similar best subset selection (BSS) exercise. For each group of variables, we identify the subset of features – including region fixed effects – that best captures within-region variation in the cost of Brexit to date. For brevity, we only present the combined results in Table A3. Column (1) provides the estimates from the "best" model, while column (2) includes all features. Columns (3) to (6) provide the best models for each variable group. We do not detect any robust association between any of the features that were helpful in decomposing variation in an area's Leave vote share for Leave to be associated with higher or lower costs of Brexit since 2016. The goodness of fit of even the most saturated models is quite low, suggesting that the features are hardly relevant in capturing cross-sectional variation in the estimated cost of Brexit. Table A4 explores the extent to which levelling-up funding awarded in round 1, or 2, or the cumulative number of COVID-19 deaths are predictive of the estimated costs of Brexit. None of these variables seems to matter significantly.

Finally, we run the same best sub-sample selection exercise on the additional

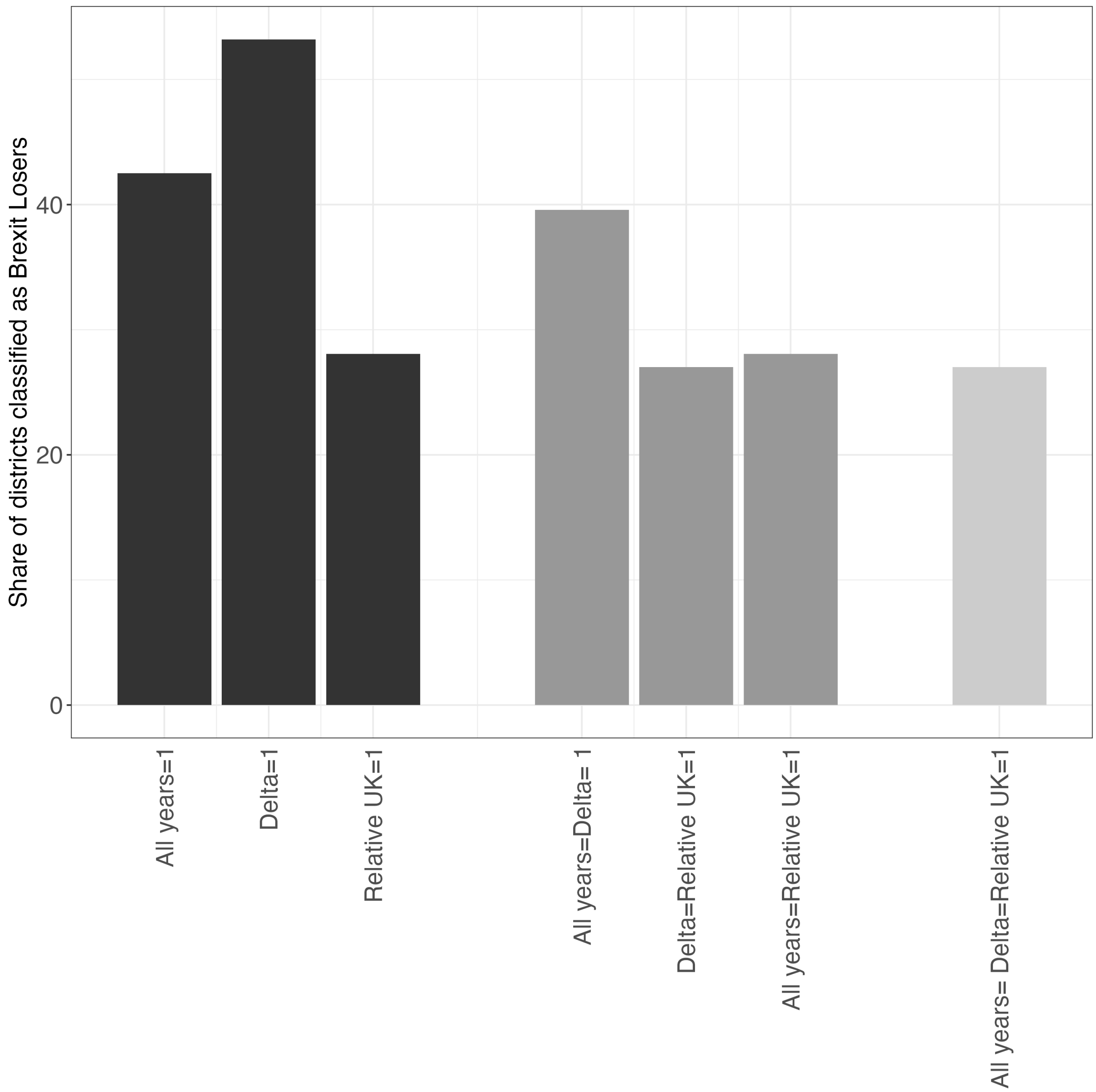
[1]The four groups capture an area's 1) exposure to the EU, with a specific focus on immigration; 2) quality of access to public goods and tenancy status; 3) demography, educational attainment, and life satisfaction of the resident population; 4) sector-level employment makeup, self-employment and unemployment status.

[2]Sources of data for Levelling-Up Fund Round 1, for Levelling-Up Fund Round 2, and for COVID-19 deaths.

group of variables representing post-Brexit changes that could potentially affect our counterfactual analysis, as shown in Appendix Table A4. We find that measures of post-2016 policy changes and COVID-19 deaths (as a proxy for relevant shocks to the UK economy) also do not explain the output losses. These results are to be expected if our synthetic control is robust. The lack of significant explanatory power from both pre-2016 Brexit correlates and post-2016 policy changes and pandemic shock supports the validity of our synthetic control model in accurately capturing the output gap induced by Brexit.

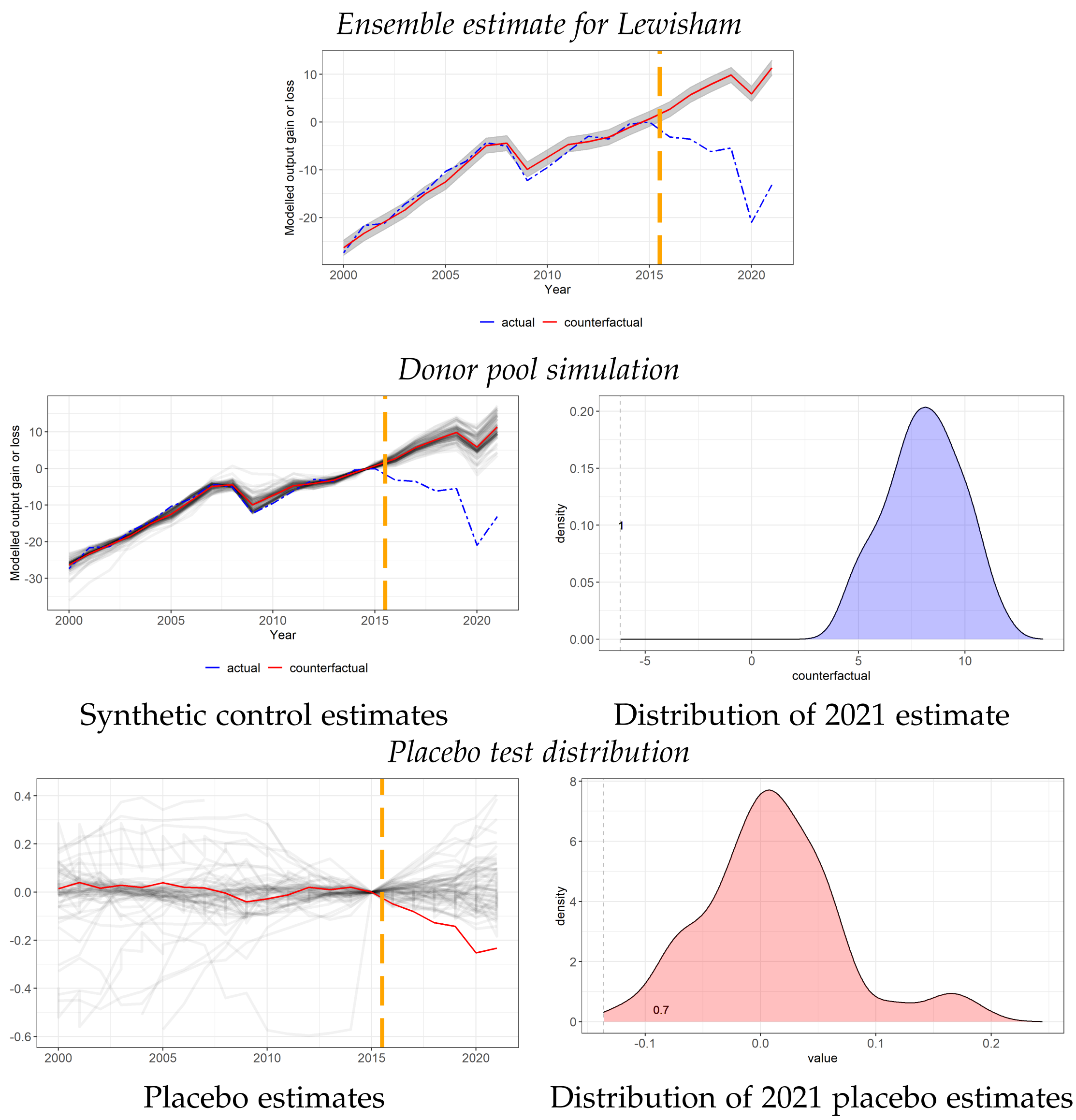
B Appendix Figures

Figure A2: Differences in Binary Coding of Brexit-vote Loser Status



Note: The Figure presents differences in the binary Brexit-vote Loser status for each of the three different Brexit-vote Loser status classifications described in Section 2.5. The vertical axis represents the share of districts that would be classified as Brexit-vote Losers according to each of the different definitions.

Figure A1: District-specific Brexit-vote Information Card: the Case of Lewisham

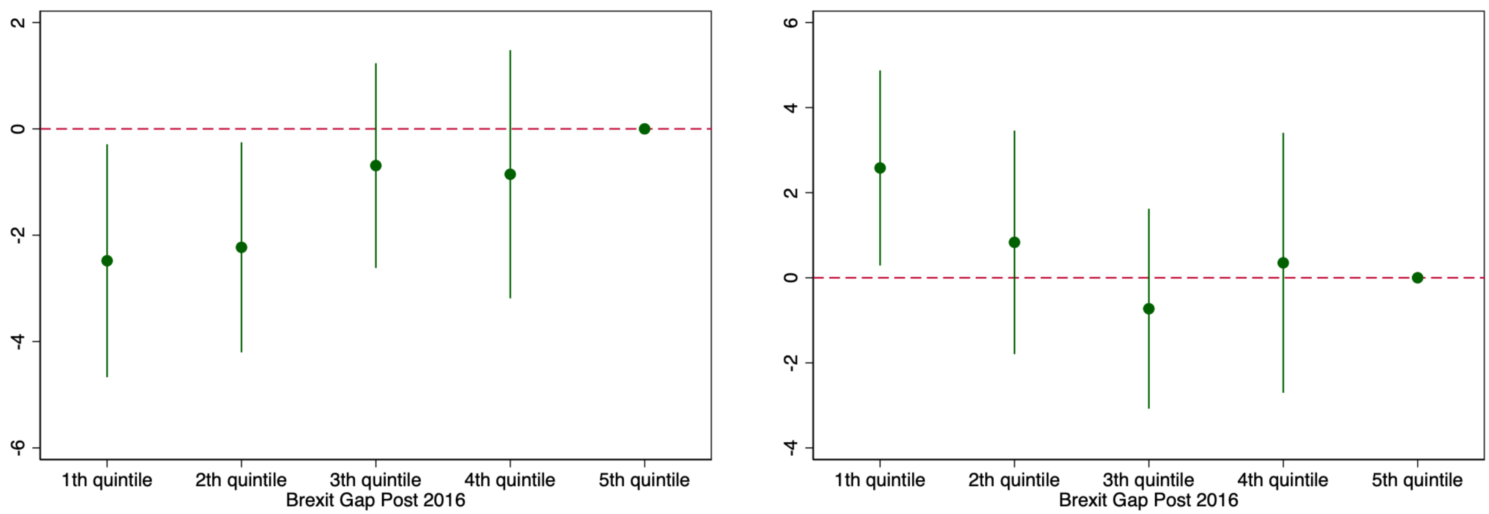


Notes: The Figures plot sample information provided on https://www.brexitcost.org. The top panel presents the ensemble synthetic control estimate (solid) of real gross value added (relative to 2015) and the actual series (dashed). The "donor pool simulation" presents the full distribution of all synthetic control estimates constructed through the permutation test whereby synthetic control estimates are constructed using 70 donor pools of different sizes that are randomly selected. The right figure presents the kernel density estimate of the distribution of the actual gap between the ensemble estimate and the actual line in 2021 vis-à-vis the distribution of that measure for all other synthetic control estimates. The bottom row presents results from a placebo test whereby synthetic control estimates are constructed for each of the 138 donors that ever make it into the donor pool vis-à-vis the estimate of the Brexit-output gap for the actual district. The right panel presents again the empirical distribution of the 2021 gap vis-à-vis the placebo "Brexit" measures.

Figure A3: Vote Patterns in Loser Areas from Aggregate Local Elections Data by Quintiles of Brexit Cost

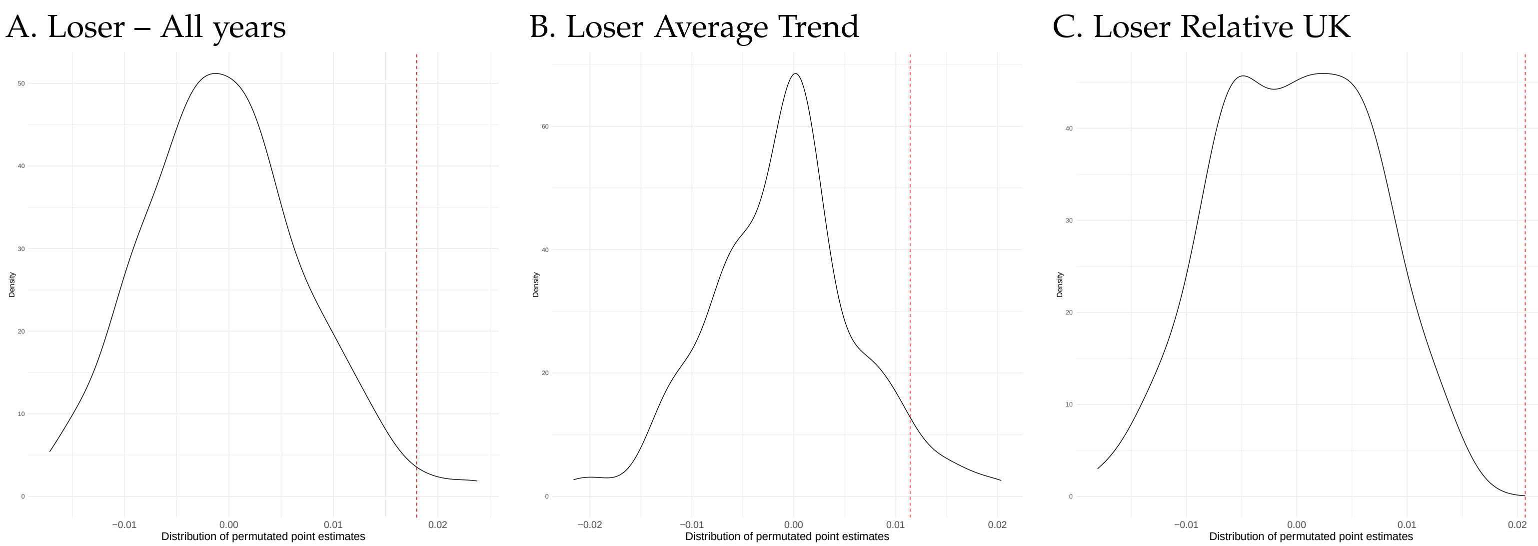
A. Labour Vote Shares

B. Right-Wing Vote Shares



Note: The Figure captures the differences in party vote shares in local elections in Brexit-vote losing areas. Quintiles of Brexit cost range from areas with largest output losses (1st quintile) to areas with Brexit gains (5th quintiles, our excluded category). Panel A documents that vote share for the Labour party decreases after 2016 in areas that have experienced greater Brexit-related losses. Panel B shows that vote shares are notably higher for right-wing parties in Brexit-losing areas after 2016, with effects specifically concentrated in areas experiencing the largest losses from Brexit. We find that especially areas at the extreme of the Brexit cost distribution tend to vote more for right-wing fringe parties, while the Labour party loses in areas most impacted by Brexit. Right-wing parties in Panel B are: the UK Independence Party (UKIP), British National Party (BNP), English Democrats Party (EDP), National Front (NF), Reform UK, and the Christian Party (Chr). All regressions are estimated using two-way fixed effects models, controlling ward and year fixed effects in Panel A, and ward, year, and party fixed effects in Panel B.

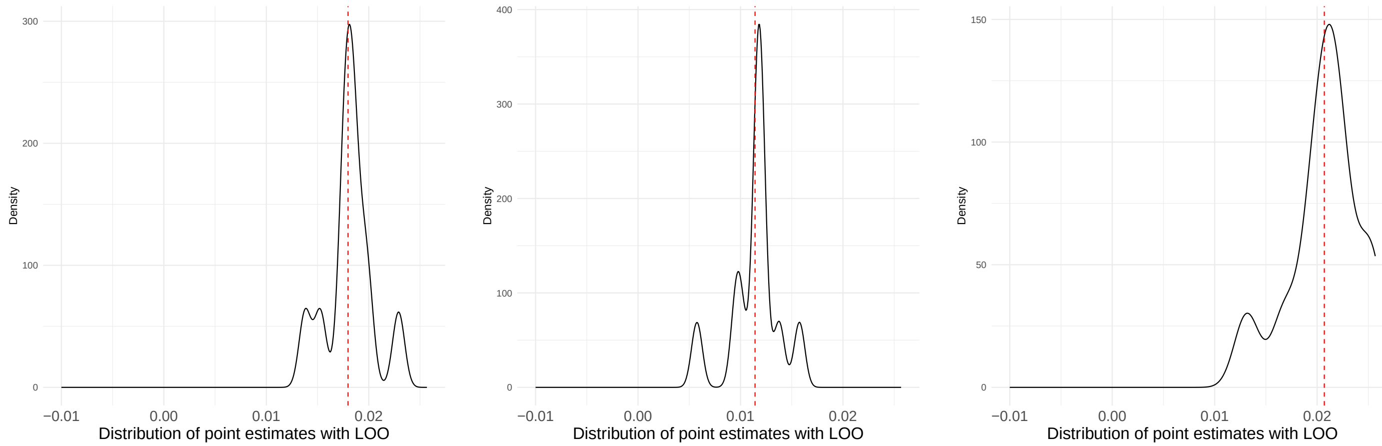
Figure A4: Randomisation inference on the Brexit-vote loser binary definitions for the Ward-Level Right-Wing Party vote share results



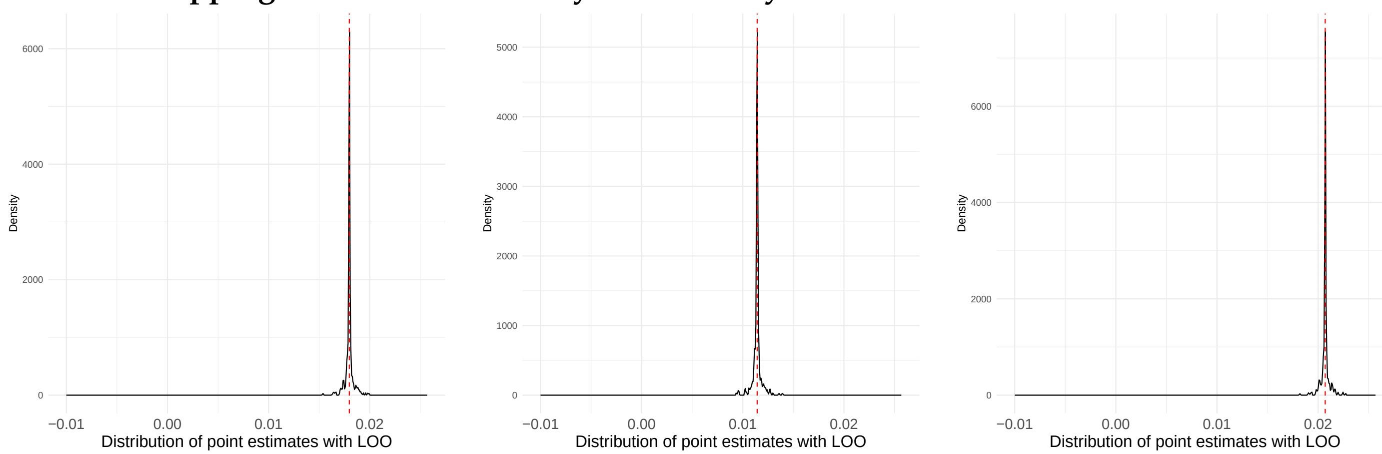
Note: The Figure presents the empirical distribution of point estimates obtained from the main specification in column (6) of Table 2, where we have permuted Brexit loser status. To do so, for each of the main binary Brexit-vote economic loser definitions, we randomly re-assign the loser status 100 times and then re-estimate the main specification. The point estimate that can be obtained with the true loser status is indicated as a vertical dashed line. We note that the empirical distribution of the placebo assignments is centered around zero, while the point estimate obtained with the actual loser status is a clear outlier. All regressions are estimated using two-way fixed effects models, controlling for ward level fixed effects, year fixed effects and party fixed effects. Standard errors clustered at district level.

Figure A5: Robustness of findings to dropping observations in turn – Ward Level Right-Wing party results

Panel A: **Dropping all data pertaining to each of the 12 regions in turn**



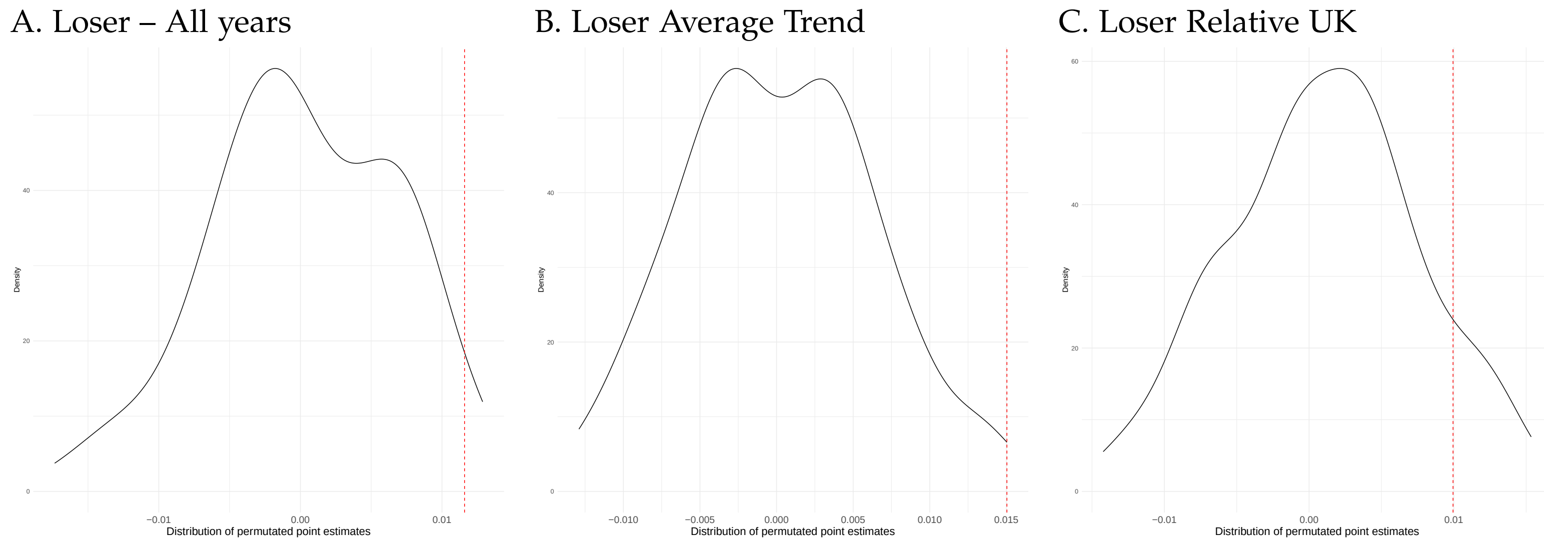
Panel B: **Dropping each Local Authority individually**



Loser – All years | Loser Average Trend | Loser Relative UK

Note: The Figure presents the empirical distribution of point estimates obtained from the main specification in column (6) of Table 2, but dropping all data pertaining to each region one-by-one (Panel A) or when dropping each local authority district one-by-one (Panel B). All regressions are estimated using two-way fixed effects models, controlling for ward level fixed effects, year fixed effects and party fixed effects. Standard errors clustered at district level. Standard errors clustered at district level.

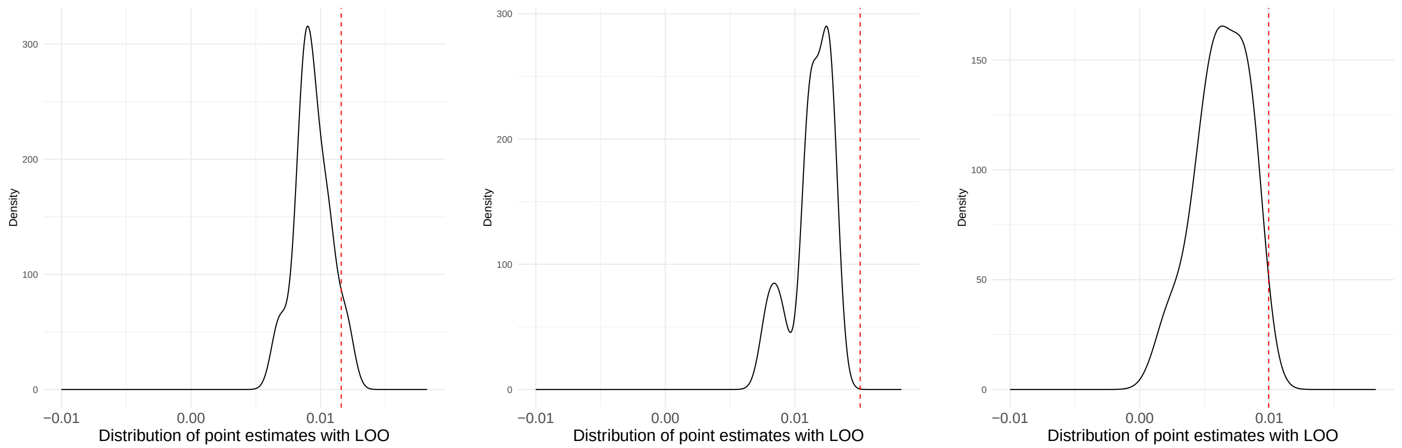
Figure A6: Randomisation inference on the Brexit-vote loser binary definitions for the British Election Study results



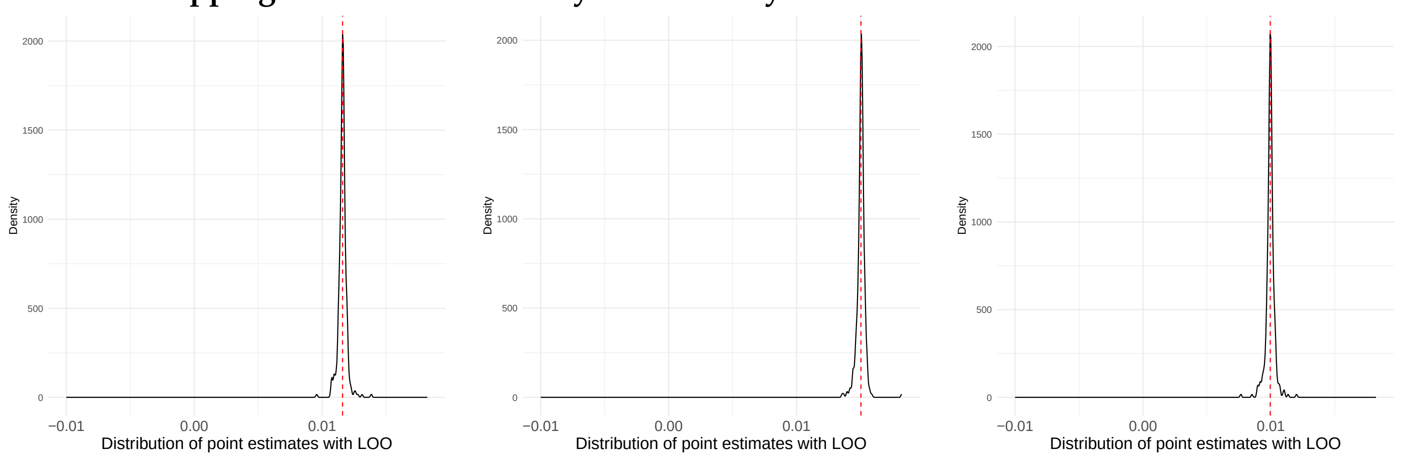
Note: The Figure presents the empirical distribution of point estimates obtained from the main specification in column (6) of Table 3 where we have permuted the Loser status. To do so, for each of the main binary Brexit-vote economic loser definitions, we randomly re-assign the Loser status 100 times and then re-estimate the main specification. The point estimate that can be obtained with the true Loser status is indicated as a vertical dashed line. We note that the empirical distribution of the placebo assignments is centered around zero, while the point estimate obtained with the actual Loser status is a clear outlier. All regressions are estimated using two-way fixed effects models, controlling for individual level fixed effects as well as time fixed effects. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level.

Figure A7: Robustness of findings to dropping observations in turn – British Election Study results

Panel A: Dropping all data pertaining to each of the 12 regions in turn



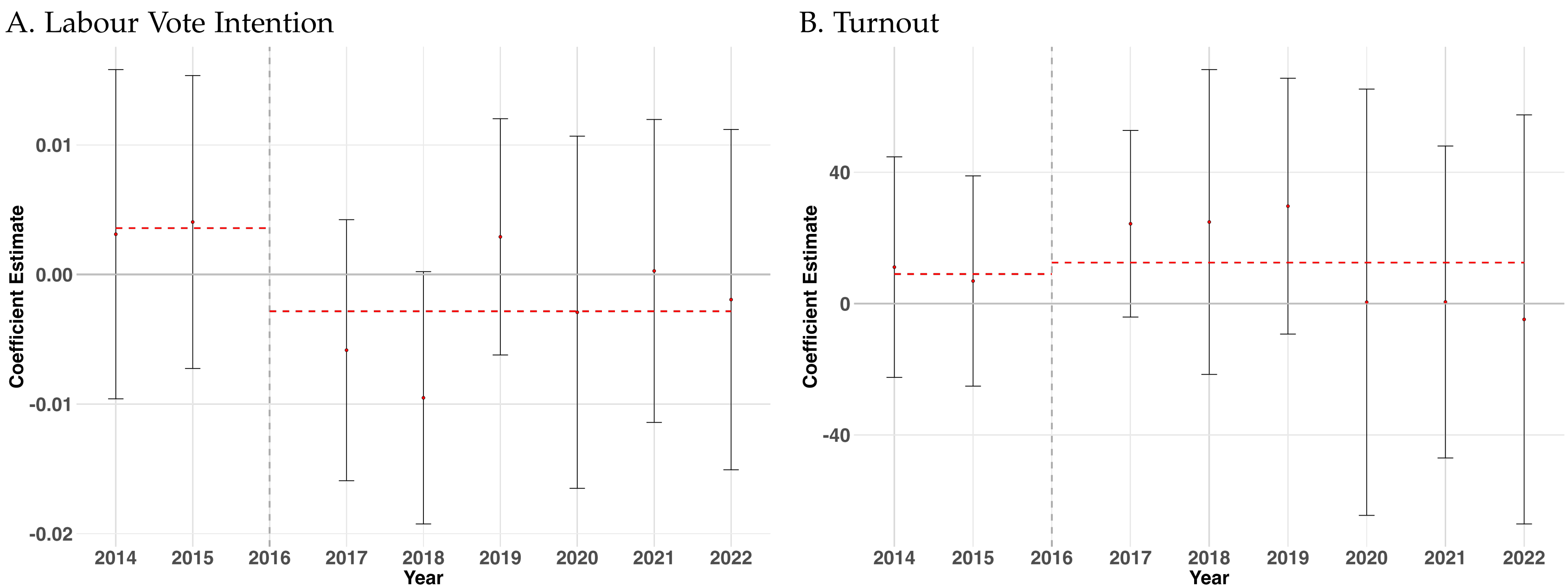
Panel B: Dropping each Local Authority individually



Loser – All years	Loser Average Trend	Loser Relative UK

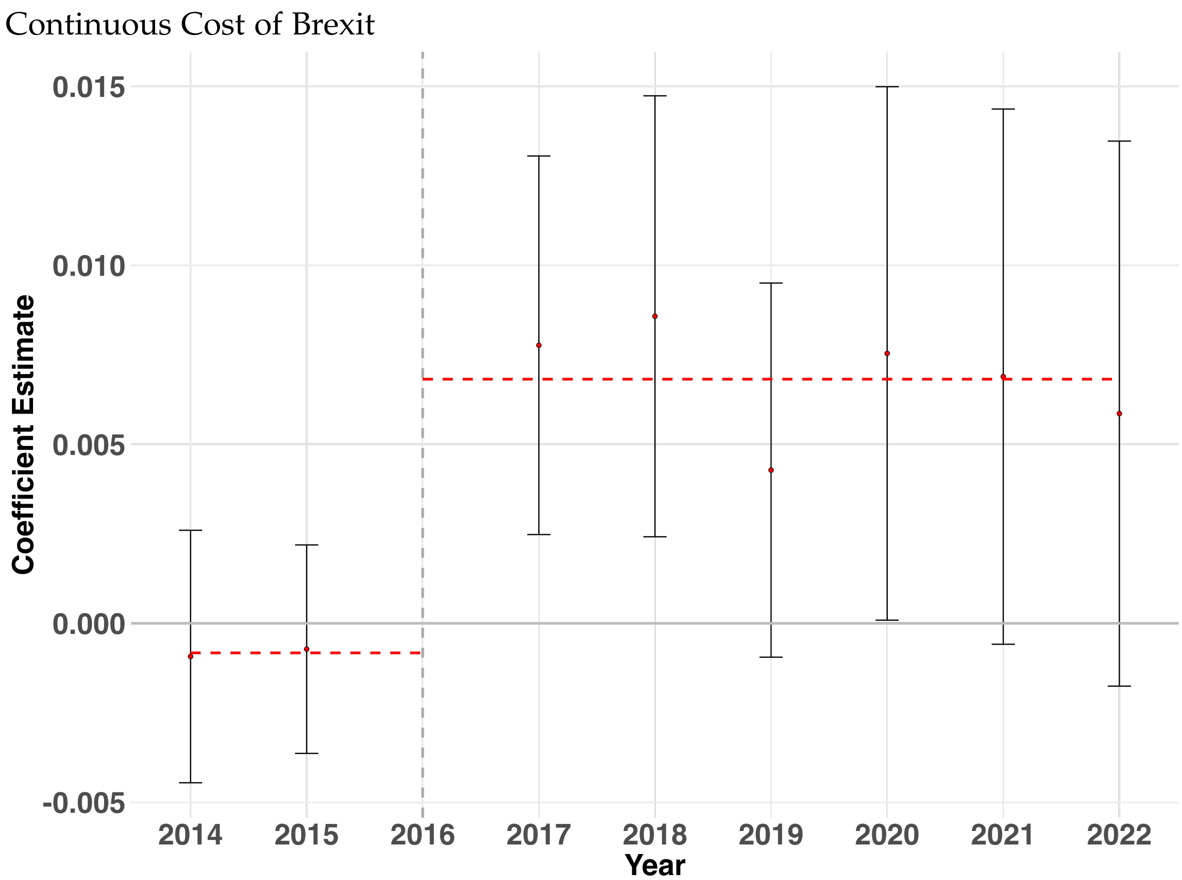
Note: The Figure presents distribution of point estimates obtained when estimating the main specification in column (6) of Table 3 but dropping all data pertaining to each region one-by-one (Panel A) or when dropping each local authority district one-by-one (Panel B). The results suggest that the point estimate for the iterative region-level dropping may be notably smaller, but remains positive. Indeed, the biggest attenuation is observed when dropping the whole of Scotland. This attenuation is less pronounced and heterogeneous across the different Loser definitions. All regressions are estimated using two-way fixed effects models, controlling for individual-level fixed effects as well as time fixed effects. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level.

Figure A8: Non-robust or no effect of Brexit cost on Labour party support or turnout intentions as measured in the British Election Study



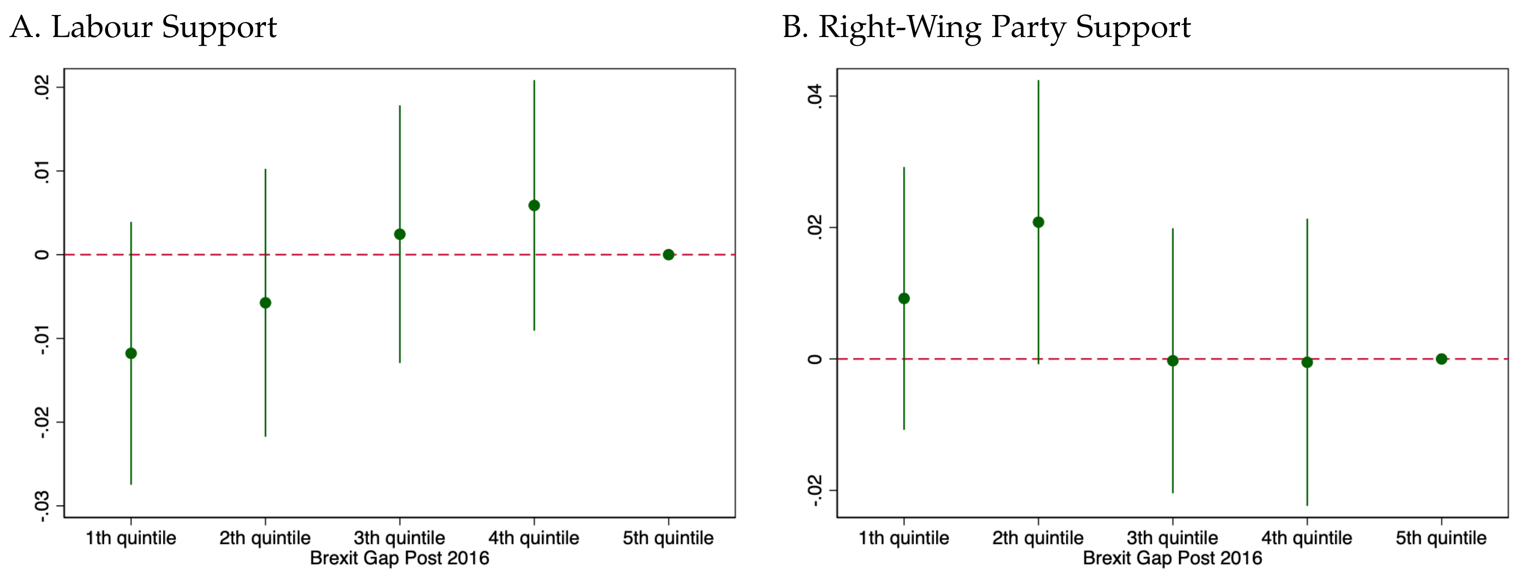
Note: The Figure captures the changes in Labour party support or turnout intentions in Brexit-vote losing areas since the 2016 EU referendum across individuals over time. Panel A documents that support for the Labour party does not systematically decrease in Brexit-vote losing areas after the EU referendum, while Panel B documents that individuals' self-reported turnout intention does not change in Brexit-vote losing areas after 2016. All regressions are estimated using two-way fixed effects models, controlling for individual-level fixed effects as well as time fixed effects. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level.

Figure A9: Robustness to using continuous Brexit-cost Measure: Impact of Brexit vote costs on support for Right-Wing Platforms in British Election Study



Note: The Figure captures the right-wing party support among BES survey respondents in Brexit-vote impacted areas. It documents that individuals are notably more likely to express support for right-wing parties in areas experiencing greater costs of Brexit. The Brexit cost here is measured as the continuous output loss in %, relative to the synthetic control. The analysis suggests that right-wing parties gained support in areas more strongly impacted by Brexit. Right-wing parties considered are: the UK Independence Party (UKIP), British National Party (BNP), Reform UK and the Brexit Party respectively. Regressions are estimated using two-way fixed effects models, controlling for and individual level fixed effects as well as time fixed effects. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level.

Figure A10: Vote Patterns in Loser Areas from British Election Study Respondents by Quintiles of Brexit Cost



Note: The Figure captures the different party support among BES survey respondents in Brexit-vote losing areas. Quintiles of Brexit cost range from areas experiencing the largest output losses (1st quintile) to areas with Brexit output gains (5th quintiles, our excluded category). Panel A documents that the non-significant impact on Labour party support in Brexit-vote losing areas after the EU referendum is concentrated among areas with the largest Brexit cost. Panel B documents that individuals are notably more likely to express support for right-wing parties in Brexit losing areas after 2016, specifically in those areas experiencing substantial Brexit losses. Overall, we find that, especially in the areas most impacted by Brexit, respondents tend to increase their support for right-wing fringe parties. Right-wing parties in Panel B are: the UK Independence Party (UKIP), British National Party (BNP), Reform UK and the Brexit Party respectively. All regressions are estimated using two-way fixed effects models, controlling for district and time fixed effects. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level.

C Appendix Tables

Table A1: Total Sets of Combinations of Donor Pools

Pool 1	Size 1	Pool 2	Size 2	Pool 3	Size 3
EU-NUTS2	175	EU-NUTS2 US-STATES	226	EU-NUTS2 US-STATES G20	241
US-STATES	51	EU-NUTS2 G20	191	EU-NUTS2 US-STATES OECD	242
G20	18	EU-NUTS2 OECD	192	EU-NUTS2 US-STATES EU	233
OECD	33	EU-NUTS2 EU	182	EU-NUTS2 G20 OECD	200
EU	27	US-STATES G20	68	EU-NUTS2 G20 EU	197
		US-STATES OECD	83	EU-NUTS2 OECD EU	195
		US-STATES EU	78	US-STATES G20 OECD	91
		G20 OECD	41	US-STATES G20 EU	92
		G20 EU	42	US-STATES OECD EU	90
		OECD EU	40	G20 OECD EU	48

Pool 4	Size 4	Pool 5	Size 5
EU-NUTS2 US-STATES G20 OECD	250	EU-NUTS2 US-STATES G20 OECD EU	253
EU-NUTS2 US-STATES G20 EU	247		
EU-NUTS2 US-STATES OECD EU	245		
EU-NUTS2 G20 OECD EU	203		
US-STATES G20 OECD EU	98		

Notes: The Table presents full set of potential combinations of donor pools drawn from the set of five potential donor sets. Cells coloured light blue include donor pools only constructed using subnational data. Cells coloured light red include only country-level donors; non-coloured cells capture a donor pool set comprised of a mix of country-level and subnational data. The counts indicated in the columns with the respective sizes represent the maximum number of spatial units included in the respective donor pool.

Table A2: District-Level "best model" Selected from the Set of 31 Synthetic Controls Constructed for Each District

	Donor pool		implied by "best synthetic control"		
Donor pool set	Type	Size	$RMSPE_s$	$AAPE_s$	$MAPE_s$
NUTS2	Subnational only	1	2	1	3
US States	Subnational only	1	0	0	0
G20	Country only	1	1	5	29
OECD	Country only	1	10	10	14
EU	Country only	1	6	0	20
NUTS2, US States	Subnational only	2	0	0	0
NUTS2, G20	Mixed	2	38	40	39
NUTS2, OECD	Mixed	2	24	41	18
NUTS2, EU	Mixed	2	23	22	40
US States, G20	Mixed	2	0	0	0
US States, OECD	Mixed	2	1	0	2
US States, EU	Mixed	2	0	0	0
G20, OECD	Country only	2	17	8	16
G20, EU	Country only	2	12	11	24
OECD, EU	Country only	2	13	12	15
NUTS2, US States, G20	Mixed	3	0	0	0
NUTS2, US States, OECD	Mixed	3	5	7	4
NUTS2, US States, EU	Mixed	3	0	0	0
NUTS2, G20, OECD	Mixed	3	38	41	20
NUTS2, G20, EU	Mixed	3	53	51	39
NUTS2, OECD, EU	Mixed	3	51	50	33
US States, G20, OECD	Mixed	3	2	0	3
US States, G20, EU	Mixed	3	0	0	0
US States, OECD, EU	Mixed	3	0	0	2
G20, OECD, EU	Country only	3	12	16	18
NUTS2, US States, G20, OECD	Mixed	4	9	6	5
NUTS2, US States, G20, EU	Mixed	4	0	0	0
NUTS2, US States, OECD, EU	Mixed	4	2	3	2
NUTS2, G20, OECD, EU	Mixed	4	50	38	24
US States, G20, OECD, EU	Mixed	4	0	3	1
NUTS2, US States, G20, OECD, EU	Mixed	5	5	9	3

Notes: The Table presents the number of districts whose "best fit" has been determined according to equations (20)-(20) from the set of 31 synthetic control candidates tabulated against the respective donor pools.

Table A3: Average across Output Loss Estimates post 2016 not Explained by Potential Confounders

	Avg. Brexit Gap post 2016					
	Combined		Different Best Subsets			
	(1)	(2)	(3)	(4)	(5)	(6)
Initial migrants from elsewhere resident share (2001)	-0.720	-0.157	-0.857			
	(0.793)	(0.954)	(0.726)			
Share of residents commuting to London (2011)		1.084		-0.175		
		(1.223)		(1.101)		
Council rented share growth (2001-2011)	0.901	1.016*		0.863		
	(0.576)	(0.591)		(0.579)		
Share of res. pop. qualification 4+ (2001)		-0.605			-0.652	
		(0.918)			(0.647)	
Share of res. pop. qualification 4+ growth (2001-2011)		0.477			0.396	
		(0.649)			(0.545)	
Retail employment share (2001)		0.302				0.154
		(0.777)				(0.661)
Manufacturing employment share (2001)	0.209	0.385				0.139
	(0.639)	(0.754)				(0.649)
Finance employment share change (2001-2011)	-0.380	-1.208*				-0.500
	(0.723)	(0.680)				(0.706)
Observations	351	347	351	347	351	351
R2	.0939	.121	.08	.0935	.0813	.0808

Notes: The Table reports results from OLS regressions, including region fixed effects. The dependent variable is the standardised cost of Brexit, the average of all our alternative measures from 2 between 2016 and 2022 in a local authority area. Correlates correspond to the different variable groupings from (Becker et al., 2017), include socio-economic characteristics of the local authorities, such as population composition in terms of education, age, and employment, as well as sector composition and labour conditions. Empirical models are selected using best subset selection on the set of predictors using the AIC information criterion. Column (1) shows best subset across all groups of variables, Column (2) is the full specification based on best subsets. For comparison, columns (3) through (6) display the optimal specifications within each group. We find that correlates of Brexit from before 2016 do not explain the output losses, which is expected if our synthetic control is robust. The lack of significant explanatory power of correlates supports the validity of our synthetic control model in accurately capturing the output gap induced by Brexit. Robust standard errors are presented in parentheses, asterisks indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A4: Average across Output Loss Estimates post 2016 not Explained by Alternative Policy changes and COVID-19 Deaths

	Avg. Brexit Gap post 2016		
	(1)	(2)	(3)
Ln occurred covid deaths 2020-22	0.460	0.515	0.639
	(0.394)	(0.379)	(0.407)
Ln bid value R1 leveling up		0.378	0.500
		(0.512)	(0.518)
R2 leveling up category			-0.521
			(0.589)
Best Subset	X		
Observations	351	323	323
R2	.0797	.0736	.0759

Notes: The Table reports results from OLS regressions, including region fixed effects. The dependent variable is the standardised cost of Brexit, the average of all our alternative measures from Section 2 between 2016 and 2022 in a local authority area. Correlates correspond to Levelling-Up Funds (Rounds 1 and 2) and COVID-19 deaths at the district level. Empirical models are selected using best subset selection on the set of predictors using the AIC information criterion. Best subset marked by "X". We find measures of post 2016 policy changes and COVID-19 deaths (as a proxy for relevant shocks to the UK economy) do not explain the output losses, ensuring that alternative post 2016 changes are not affecting our synthetic counterfactual. Robust standard errors are presented in parentheses, asterisks indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A5: Local Election Results Robust to Different Loser Definitions

	Labour			Right Wing		
	(1) Loser RMSPE	(2) Loser Delta	(3) Loser Worse	(4) Loser RMSPE	(5) Loser Delta	(6) Loser Worse
Loser * Post 2016	-2.229***	-1.781**	-1.824***	1.865***	1.076	1.984***
	(0.674)	(0.692)	(0.696)	(0.696)	(0.753)	(0.701)
Year & Ward FE	X	X	X	X	X	X
Party FE				X	X	X
Adj. R2	0.872	0.871	0.871	0.750	0.748	0.750
N	25804	25804	25804	8178	8178	8178
N LAD	353	353	353	277	277	277

Note: The coefficient estimates come from a two-way fixed effects regression analysis for local election vote shares at the ward level, using different *Loser* areas indicators, as described in Section 2.5. Columns (1) to (3) examine Labour vote shares, while columns (4) to (6) focus on vote shares for right-wing parties in districts that experienced Brexit-related costs after 2016, the year of the Brexit Referendum. We find that, no matter the loser indicator used, loser areas tend to vote more for right-wing fringe parties, resulting in losses for the Labour party. The right-wing parties considered in this analysis of local elections (Panel B) are: the UK Independence Party (UKIP), British National Party (BNP), English Democrats Party (EDP), National Front (NF), Reform UK and the Christian Party (Chr). The significance levels are as follows: *p<0.1; **p<0.05; ***p<0.01.

Table A6: Right-wing Result in Local Elections are Not Exclusive to UKIP

	UKIP		
	(1)	(2)	(3)
Loser (RMSPE) * Post 2016	1.244	0.860	1.570**
	(0.829)	(0.667)	(0.761)
Year FE	X	X	X
LAD FE		X	
Ward FE			X
Adj. R2	0.230	0.570	0.777
N	9915	9900	7083
N LAD	343	328	255

Note: The coefficient estimates come from a two-way fixed effects regression analysis for local election vote shares at the ward level. Columns examine UKIP vote shares in districts that experienced Brexit-related costs after 2016. The analysis suggests that UKIP gained support in Brexit-loser areas, although not significant across specifications. This suggests that UKIP is not the party driving results for the right-wing shift observed in the main analysis (see Table 2). The significance levels are as follows: *p<0.1; **p<0.05; ***p<0.01.

Table A7: Robustness of Brexit-cost impact on Voter Patterns in Local Election using the Continuous Measure of Brexit Cost Estimate

	Labour			Right Wing		
	(1)	(2)	(3)	(4)	(5)	(6)
Brexit Cost * Post 2016	-0.347	-0.771**	-0.938***	0.654*	0.614**	0.859***
	(0.410)	(0.301)	(0.315)	(0.389)	(0.286)	(0.311)
Year FE	X	X	X	X	X	X
LAD FE		X			X	
Ward FE			X			X
Adj. R2	0.0705	0.536	0.872	0.266	0.544	0.682
N	30104	30104	25804	11180	11166	8178
N LAD	358	358	353	348	334	277

Note: The coefficient estimates come from a two-way fixed effects regression analysis for local election vote shares at the ward level. The main explanatory variable is the standardised cost of Brexit, the average of all our alternative measures from Section 2 between 2016 and 2022. Columns (1) to (3) examine Labour vote shares, while columns (4) to (6) focus on vote shares for right-wing parties in districts that experienced Brexit-related costs after 2016. We find that areas with greater Brexit output losses tend to see higher support for right-wing fringe parties, resulting in losses for the Labour party. The right-wing parties considered in (Panel B) are: the UK Independence Party (UKIP), British National Party (BNP), English Democrats Party (EDP), National Front (NF), Reform UK and the Christian Party (Chr). The significance levels are as follows: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

Table A8: Robustness of Brexit-cost Impact on BES Respondents Vote Preferences to using Different Binary Brexit-vote Loser Definitions

Stable location, observed pre- & post- 2016

Panel A: Local Authority District FE

	Labour			**Right Wing**		
	(1) Loser RMSPE	(2) Loser Delta	(3) Loser Worse	(4) Loser RMSPE	(5) Loser Delta	(6) Loser Worse
Loser * Post 2016	-0.009*	-0.007	-0.009*	0.013**	0.015**	0.012*
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
Wave & LAD FE	X	X	X	X	X	X
Adj. R2	0.0558	0.0558	0.0558	0.0571	0.0571	0.0570
N	413325	413325	413325	413325	413325	413325
N LAD	362	362	362	362	362	362

Panel B: Individual FE

	Labour			**Right Wing**		
	(1) Loser RMSPE	(2) Loser Delta	(3) Loser Worse	(4) Loser RMSPE	(5) Loser Delta	(6) Loser Worse
Loser * Post 2016	-0.004	-0.007	-0.006	0.012*	0.014**	0.011*
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
Wave & Individual FE	X	X	X	X	X	X
Adj. R2	0.644	0.644	0.644	0.471	0.471	0.471
N	413323	413323	413323	413323	413323	413323
N LAD	362	362	362	362	362	362

Note: The coefficient estimates come from a two-way fixed effects regression analysis for voting intentions among British Election Study (BES) respondents, using different *Loser* areas indicators, as described in Section 2.5. Columns (1) to (3) examine support for Labour, while columns (4) to (6) study support for right-wing parties in districts that experienced Brexit-related costs after 2016. The analysis suggests that, irrespective of the loser indicator used, respondents in loser areas tend to increase their support for right-wing fringe parties, resulting in moderate disengagement with the Labour party. The right-wing parties considered are: the UK Independence Party (UKIP), the British National Party (BNP), Reform UK and the Brexit Party respectively. The estimating sample in Panel A focuses on the set of individuals who lived in the same district in all waves in which they participated. The estimating sample in Panel B imposes the additional condition that there must be at least one observation before and after 2016. Standard errors clustered at district level. The significance levels are as follows: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

Table A9: Robustness of Brexit-cost Impact on BES Respondents Vote Preferences to Using Different Sub-samples

	Stable location observed pre & post 2016			
	Labour		**Right Wing**	
	(1) Stable	(2) Stable pre/post	(3) Stable	(4) Stable pre/post
Loser (RMSPE) * Post 2016	-0.004	-0.009*	0.011	0.013**
	(0.005)	(0.005)	(0.006)	(0.006)
Wave & LAD FE	X	X	X	X
Adj. R2	0.0548	0.0558	0.0583	0.0571
N	631306	413325	631306	413325
N LAD	363	362	363	362

Note: The coefficient estimates come from a two-way fixed effects regression analysis of voting intentions among British Election Study (BES) respondents. Columns (1) to (2) examine support for Labour, while columns (3) to (4) study support for right-wing parties in districts that experienced Brexit-related costs after 2016. The estimating sample focuses on the set of individuals who lived in the same district whenever they were surveyed in odd columns (1 and 3), with also at least one observation before and after 2016 in even columns (2 and 4). The analysis confirms that respondents in loser areas tend to increase their support for right-wing fringe parties, resulting in moderate disengagement with the Labour party. The association is, however, only significant among respondents who (stably) lived in the same district before and after the 2016 Referendum (Columns 2 and 4). The right-wing parties considered are: the UK Independence Party (UKIP), the British National Party (BNP) and Reform UK and the Brexit Party respectively. Standard errors clustered at district level. The significance levels are as follows: *$p<0.1$; **$p<0.05$; ***$p<0.01$.

Table A10: Robustness of Brexit-cost Impact BES Respondents Vote Preferences to Using Continuous Measure of Brexit Cost Estimate

	Stable location observed pre & post 2016					
	Labour			**Right Wing**		
	(1)	(2)	(3)	(4)	(5)	(6)
Brexit Cost * Post 2016	-0.004*	-0.006***	-0.005**	0.008***	0.007***	0.007**
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Wave FE	X	X	X	X	X	X
LAD FE		X			X	
Individual FE			X			X
DV mean	0.258	0.258	0.258	0.0868	0.0868	0.0868
Adj. R2	0.0113	0.0558	0.644	0.0360	0.0571	0.471
N	413325	413325	413323	413325	413325	413323
N LAD	362	362	362	362	362	362

Notes: The coefficient estimates come from a two-way fixed effects regression analysis of voting intentions among British Election Study (BES) respondents. The main explanatory variable is the standardised cost of Brexit, the average of all our alternative measures from Section 2 between 2016 and 2022. Columns (1) to (3) examine support for Labour, while columns (4) to (6) study support for right-wing parties in districts that experienced Brexit-related costs after 2016. We find that in areas with greater Brexit output losses respondents increase their support for right-wing fringe parties, resulting in some disengagement with the Labour party. The right-wing parties considered are: the UK Independence Party (UKIP), the British National Party (BNP) and Reform UK and the Brexit Party, respectively. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level. The significance levels are as follows: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

Table A11: Heterogeneity in right-wing party support changes in Brexit Loser areas by individual characteristics

	Stable location observed pre & post 2016			
	Right Wing			
	(1)	(2)	(3)	(4)
Age finished Education:				
15 or under * Loser * Post '16	0.028**			
	(0.013)			
16 * Loser * Post '16	0.015*			
	(0.008)			
17-18 * Loser * Post '16	0.008			
	(0.008)			
19 * Loser * Post '16	0.007			
	(0.014)			
20+ * Loser * Post '16	0.006			
	(0.005)			
Full time student * Loser * Post '16	-0.001			
	(0.016)			
Can't remember * Loser * Post '16	-0.019			
	(0.038)			
Social Grade:				
A * Loser * Post '16		0.012*		
		(0.007)		
B * Loser * Post '16		0.014*		
		(0.007)		
C1 * Loser * Post '16		0.007		
		(0.007)		
C2 * Loser * Post '16		0.011		
		(0.009)		
D * Loser * Post '16		0.019*		
		(0.010)		
E * Loser * Post '16		0.019**		
		(0.009)		
Unknown * Loser * Post '16		-0.003		
		(0.019)		
Income (x):				
$x < 20K$ * Loser * Post '16			0.005	
			(0.008)	
$20K \leq x < 40K$ * Loser * Post '16			0.014*	
			(0.007)	
$40K \leq x < 50K$ * Loser * Post '16			0.022**	
			(0.009)	
$50K \leq x < 100K$ * Loser * Post '16			0.018**	
			(0.008)	
$x > 100K$ * Loser * Post '16			0.011	
			(0.014)	
Daily newspaper read most often:				
None * Loser * Post '16				0.021***
				(0.006)
Individual FE	X	X	X	X
DV mean	0.258	0.258	0.258	0.258
Adj. R2	0.454	0.452	0.463	0.452
N	412980	413322	309460	413323
N LAD	362	362	362	362

Notes: The coefficient estimates capture the differential increase in right-wing party support among BES survey respondents in Brexit-vote losing areas by individual characteristics. Column (1) looks at education, column (2) at social grade, column (3) at household gross income, and column (4) at news diet. The analysis suggests that, in loser areas, right-wing parties gained support especially among people with little education, of the lowest and highest social grade, with middle income, and with no newspaper diet. The right-wing parties considered in this analysis of BES respondents are: the UK Independence Party (UKIP), the British National Party (BNP), Reform UK and the Brexit Party, respectively. All regressions are fully saturated and include individual fixed effects. The estimating sample focuses on the set of individuals who lived in a district in each wave when they were surveyed, with at least one observation before and after 2016. Standard errors clustered at district level. The significance levels are as follows: *p<0.1; **p<0.05; ***p<0.01.