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Abstract

We contribute to the recent research on Brexit and public opinion formation by contending that the determinants of the referendum results should be evaluated against the background of wider public security concerns. Terrorism has long been regarded as a top concern by the British public, more than in any other European country. Terrorist attacks on UK soil raised voters' awareness of security issues and their saliency in the context of an EU referendum. We find that locations affected by terrorist violence in their proximity exhibit an increase in the share of pro-Remain votes, particularly for more sensational attacks. Using individual-level data, we show that in the aftermath of terrorist attacks, citizens are more likely to reconsider the security risks involved in leaving the EU.

Keywords: Brexit, Security, Terrorism, Voting, Referendum

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1 Introduction

On 20 February 2016 the UK Prime Minister David Cameron formally announced, under the terms of the European Union Referendum Act 2015, a referendum to decide whether the UK should leave or remain in the European Union (EU). Four months later, following an intense campaign whose contradicting claims are still disputed, 51.9 per cent of British voters chose to support the withdrawal of the United Kingdom from the European Union. The unexpected outcome, which resulted in Cameron's resignation, caught many scholars, pollsters and practitioners by surprise and spurred a growing academic literature on the determinants of the Brexit vote. Socio-economic characteristics enjoy near-consensus support and pro-Leave vote is often explained by financial dissatisfaction, prevalence of national identity, including previous support for UKIP, and social status (see e.g., Becker *et al.* , 2017; Chan *et al.* , 2017; Liberini *et al.* , 2017). Older and less educated individuals were also more likely to be pro-Brexit (Chan *et al.* , 2017; Goodwin & Heath, 2016). Furthermore, economic distress in "left behind" areas of globalization played an important role in the support for the Leave option (Colantone & Stanig, 2018).

Our article contributes to recent research on Brexit and public opinion formation by contending that the determinants of the referendum results should be also evaluated against the background of wider public security concerns. The United Kingdom has a long history of battling episodes of terrorism and political violence within its borders. In 2015 and 2016 only, 29 terrorist incidents were recorded in the country, excluding Northern Ireland. And in 2017, the year after the Brexit vote, emblematic terrorist attacks such as those at Westminster Bridge, Manchester Arena and London Bridge killed a total of 36 people. Not surprisingly, a recent YouGov poll of the public's global concerns show that international terrorism is regarded by UK citizens as the biggest threat, whereas it is usually economic uncertainty the top concern in other European countries.[1] As of yet, however, extant studies have neglected whether and how security concerns have shaped support for Brexit.

Since 9/11, the social and political implications of terrorism have been active areas of academic debate. Terrorist attacks often receive prominent media coverage and public attention and can affect public attitudes and policy outputs (Legewie, 2013; Neumayer *et al.* , 2014; Nussio, 2018). We claim that terrorist attacks on UK soil raised voters' awareness of security issues and their saliency in the context of an EU referendum. Other studies show that terrorism increases voters' turnout and right-wing votes (Balcells & Torrats-Espinosa, 2018; Getmansky & Zeitzoff, 2014; Kibris, 2011; Berrebi & Klor, 2008). We depart from these studies to demonstrate that terrorism does not only affect party preferences, but also public support for broader political and economic issues, such as European integration. At the same time, studies on EU-related referendums show status-quo bias because voters are concerned about drastic economic consequences (Atikcan, 2015), but ignore changes in preferences when voters are cued on potentially drastic public security consequences.

We offer a rigorous empirical analysis that can inform public debates on the impact of security concerns on Brexit and helps shed light on how political attitudes are formed. The main identifying variation in our analysis is the distance from a terrorist event. For the average terrorist incident, we assume that the effect is a function, *inter alia*, of geographic proximity, the physical distance of an individual to the place where the event occurred. Geographic proximity heightens the perception of threat and affects the extent to which an event is covered also by the local media (e.g., Nossek

[1] Available online: https://tinyurl.com/y96pb48x. Similarly, according to Ipsos MORI, in 2018 British people were more concerned about terror attacks than most of their major neighbors (https://tinyurl.com/y2g86t5v).

& Berkowitz, 2006; Koopmans & Vliegenthart, 2010). Physical proximity to attacks amplifies the personal sense of vulnerability (Braithwaite, 2013) as well as the perception of risk in terms of both the probability and the consequence of terrorist events (Fischhoff *et al.* , 2003). Physical proximity is also shown to increase counterfactual thoughts, i.e., individual thinking that "they themselves could have suffered from a disaster if the circumstances had been a bit different" (Zagefka, 2018, p.5).[2] As such, whether acts of terrorism are distant or nearby seems to be crucial for understanding audiences' reactions of fear and their attitudes toward external security threats.

We put forward two competing hypotheses on the impact of terrorism on support for Remain. On the one hand, several studies indicate more support for reactionary nationalist, right-wing and anti-immigration parties after terrorism (Legewie, 2013; Berrebi & Klor, 2008; Davis & Deole, 2017). As terrorism can affect anti-foreigner sentiments and increase concerns about less restrictive immigration policies, we expect weaker support for Remain in locations proximate to terrorist attacks. On the other hand, terrorist attacks may expose national security vulnerabilities and increase awareness of the additional security risks of leaving the EU. Terrorist attacks are found to foster both negative, particularly fear and prejudice, as well as positive emotions such as solidarity and sense of belonging (Vázquez *et al.* , 2008). In a context where terrorism targets other EU countries and media explicitly link terrorism to risks of Brexit, we can expect voters to react to terrorism by holding onto the status quo. Hence, our second competing hypothesis has it that support for Remain is stronger as distance from terrorist attacks decreases. We leverage plausibly exogenous variation in exposure to terrorism and exploit data on 380 local authority districts as well as variation in the voting shares within attacked districts using information at the electoral ward level.

We find support for the hypothesis that terrorism increases the share of votes in favor of the EU (i.e. pro-Remain), and the result is robust to controlling for most of the known socio-economic correlates of the Brexit vote (e.g., Goodwin & Heath, 2016; Chan *et al.* , 2017; Alabrese *et al.* , 2019). The closer is a location from an attack the higher is the percentage of the Remain vote. In our baseline and most conservative estimate, we show that two non-attacked districts – within the same attack cluster – that differ by 45 kms in terms of proximity to the attacked district are expected to differ by 1 percentage point in terms of support for Remain. As such, the effect is of considerable size and has important implications for our understanding of the EU referendum, particularly against the background of the narrowness of its outcome.

We also offer important insights into the mechanisms behind these results. First, we think of terrorism as an event that produces a change in vote by raising saliency of security issues and affecting overall individual attitudes towards the European Union. Yet, a terrorist attack may also contribute to make the EU a more salient issue *per se*, one that is worth voting on. If this is the case, then, terrorism does not only affect attitudes towards the European Union through e.g., nationalist views, but it also increases the odds that those views are ultimately turned into votes. We thus explore whether terrorism contributes to an increase in political participation and voter turnout. We only find weak evidence that proximity to terrorist attacks pushes citizens to ballots, thus suggesting that the higher share of pro-EU voters and turnout are independent. Second, our hypothesized effects on the Brexit vote are likely to be more pronounced for sensationalist events, for example those with large number of victims. We thus further investigate whether the

[2]Geographic distance does not only capture physical proximity though, but also commonalities, trust and cultural ties. Proximate individuals, tied to their neighbors by frequent exchange, travel and contact opportunities, are more likely identify with those attacked in the neighboring areas (Moskalenko *et al.* , 2006).

characteristic of the attack moderates the effect of distance and find that proximity to the attack has a much stronger effect on the support for remaining in the EU when they attracted prominent national media coverage, when the attacks caused casualties or when they involved Muslim or Jihadist perpetrators. Third, to dig deeper into the micro-foundations for our second hypothesis, we use survey data on attitudes towards the European Union and public mood toward terrorism salience. We find that individuals are more likely to report positive attitudes about the EU in the wake of terrorist attacks. In a similar vein, individuals are more likely to perceive higher risks of terrorism if the UK leaves the EU. At the same time, as one would expect, terrorism stimulates emotional public responses, and increases individuals' views of terrorism as the single most important issue facing the country. As such, terrorism seems to displace other important concerns, such as economic conditions or immigration policies. We probe the robustness of our empirical findings with numerous robustness checks including instrumental variable regressions, matching techniques and placebo regressions and, by and large, our results carry over.

2 Theory

In recent years, a growing literature has pointed to the adverse effects of terrorist violence on political trust and attitudes more generally. The main political consequences of terrorism observed across studies are related to a rallying around the flag dynamic, with increased approval of presidents and trust in government (Hetherington & Nelson, 2003). For example, Dinesen & Jæger (2013) find that institutional trust increases after the 2004 Madrid bombings. Getmansky & Zeitzoff (2014) illustrate how the mere threat of terrorism in Israel measured in localities within rockets' range increases right-wing and nationalist votes. Balcells & Torrats-Espinosa (2018) however, do not find any directionality in the voting preferences of Spanish voters after ETA terrorist attacks; terrorism results in a rally-around-the-flag effect that increases turnout and does not change support for the incumbent. Regardless of political preferences, terrorism does reinforce hardline beliefs and may trigger hostility against out-groups, even when the threat is just perceived (Huddy *et al.* , 2005). Indeed, the rally-around-the-flag effect strengthens cohesion within the targeted group while also increasing negative attitudes about out-groups such as immigrants. Feelings of distrust and prejudice about immigrants, particularly Muslim immigrants, are also found in places where inter-group contact is limited (Legewie, 2013). There are a number of reasons behind such negative reactions, including heightened anxieties and increased mortality salience (Anson *et al.* , 2009), which can lead to distancing from strangers in response to a terrorist attack (Burke *et al.* , 2013).

The link between terrorism and migration has become increasingly common in the political discourse within the EU. Despite the lack of evidence to support an objective association between migration and terrorism (Dreher *et al.* , 2017; Bove & Böhmelt, 2016), strict migration policies are often justified as a response to the threat of transnational terrorism that allegedly operates and infiltrates migration flows. The securitization of immigration and the restrictive migration policies have been depicted as counter-terrorism tools (Huysmans, 2006). Within the EU, negative attitudes toward immigrants are also associated with higher levels of euroskepticism because the abolition of borders and free movement of people increase feelings of exposure to security threats and terrorism (McLaren, 2002). The Leave campaign's narrative revolving around the idea of "taking back control" included immigration issues, often framed in relation to generous fiscal transfers. Low-skilled immigrants are often expected to be a burden by increasing fiscal pressure and reducing government spending (Hanson *et al.* , 2007). And the Leave campaign's decision to focus on the

immigration issue helped to drive support for leaving the EU, particularly in communities that had experienced higher rates of ethnic change before the vote (Goodwin & Milazzo, 2017). References to the threat posed by a borderless Europe, however, were also abundant. Leave campaigners highlighted that as an EU member, the UK has lost control over national borders and is powerless against terrorist threats; the mere membership to the EU, they argued, is a sign that welcomes terrorists to Europe.[3]

As such, terrorist attacks can increase support for Brexit through a rally-around-the-flag effect. Terrorist attacks foster nationalist and patriotic feelings by reinforcing in-group social cohesion. As a consequence, voters are expected to be more supportive of the UK allegedly re-gaining independence from the EU. This is consistent with studies showing that more pro-Brexit counties also largely supported UKIP in previous elections (Goodwin & Heath, 2016). Furthermore, feelings of fear and anxiety in the aftermath of terrorism, reinforce in-group cohesion at the expense of out-groups, thus further reducing support for EU and its communitarian policies. As a result, support for Remain decreases. The rally-around-the-flag effect is expected to unfold the closer voters are to terrorist attacks. These arguments lead to the following hypothesis:

H1a: Proximity to terrorism decreases support for Remain

From a psychological perspective, the implications of terrorism and other violent events on individuals are not always primarily negative. In their review of the topic, Vázquez *et al.* (2008, p. 70) conclude that "terrorist attacks - originally planned to weaken society - can sometimes act as catalysts to develop strengths related to human relations, to improve social and community aspects, and even philosophical or spiritual aspects". While terrorist attacks do positively affect national pride and intra-group cohesion, this is not necessarily accompanied by more negative world-views, e.g. trust for other people. More importantly, a sense of community and solidarity are among the most common positive feelings reported after a terrorist attack (Vázquez *et al.* , 2008). Terror management scholars have challenged the conservative shift inherent in the rallying around the flag arguing that the political context in which the attack occurs affects its impact on citizens' attitudes. Furthermore, the political context also influences emotional responses to terrorism. According to Huddy & Feldman (2011), anger leads to reduced risk perception, more aggressive responses and more risk-taking in order to change a situation; conversely, anxiety results in overestimation of threats and careful, systematic information processing, thus a general preference for status quo. In other words, anger, not anxiety, explains the rally-around-the-flag effect after terrorist events (Robbins *et al.* , 2013) and voting choices aimed at blaming and punishing (Petersen, 2010). To some extent, the Leave vote conforms to this blame-and-punish logic dictated by anger; indeed, Alabrese & Fetzer (2018) find that the small margin of victory for Leave is mostly explained by protest voters who voiced their discontent with austerity in the referendum.

Exposure to terrorism increases stress, fear, and anxiety in the population (Huddy *et al.* , 2005; Klandermans *et al.* , 2013), and, in fact, terrorism in Europe seems to have mostly spurred anxiety rather than anger. Rather than a vengeance rhetoric, terrorist attacks in Europe have been followed by calls to "go about normal life" as an act of resistance against terrorism. Browning (2018) connects the popular "Je suis en terrasse" meme to the anxiety-driven need for ontological security in the aftermath of the November 2015 terrorist attack in Paris. Similarly, following the attack in London and the media depiction of a nation still "reeling" from the Manchester attack and "under

[3] http://www.voteleavetakecontrol.org/briefing_safety.html

siege", social media users from the UK were outraged by such coverage and replied by resuming the World War II slogan of "Keep Calm and Carry On". And research in neuropsychology suggests that anxiety and fear result in greater risk aversion and increase in the use of reason, information search and reflective judgement (e.g., Marcus *et al.* , 2000). Accordingly, in the context of the Irish referendum on the "Fiscal Compact" treaty, Garry (2014) shows that anxious and fearful citizens were more likely than angry citizens to learn about the substantive content of the treaty, reflect upon it and vote on the basis of its implications. Angry voters, on the opposite, used the vote to pass judgement on their domestic government. Whereas anger affected support for the 'risky' referendum option, anxiety affected support for the option framed as 'non-risky'. "The great struggle was between fear and anger - and fear won" (Irish Times, 02/06/2012, also cited in Garry (2014)).

Early in the Brexit campaign, the Remain camp had three core arguments, that remaining would be better for the economy, security and UK's place in the world. In fact, the Remain camp made the explicit argument that the UK would be more secure inside the EU, because the EU gives effective tools to fight common threats such as terrorism and global warming. A main concern was Britain losing access to EU databases on border crossings and police stops, used to track terrorists, which increased significantly after the spate of terrorist attacks in 2015.[4] David Cameron himself asserted that EU membership made Britain safer, hinted that Brexit might increase the risk of conflict and even said that the so-called Islamic State would be pleased if the UK left the EU.[5] In a similar vein, prominent policymakers such as the former heads of GCHQ, MI5 and MI6, the former director of CIA David Petraeus, the head of Europol, the Defence secretary, Michael Fallon and other leading figures also suggested that leaving would present real risks to security and safety and counter-terrorism efforts.[6] Likewise, think tanks such as Chatman House openly suggested that Brexit would damage existing cooperation with law enforcement and intelligence partners and "impair Britain's ability to tackle terrorism".[7]

And although the Remain camp's message became more focused on economic concerns as the campaign unfolded, using novel survey data Atikcan *et al.* (forthcoming) show that 43% of the Remain supporters cited the UK's ability - as an EU member - to fight more effectively against terrorism to justify their choice. And perhaps more importantly, the media significantly contributed to reinforcing the link between UK public security and the key role of the EU as a security provider. Since the 2004 bombings of commuter trains in Madrid, the number of Jihadist terrorist attacks has increased in Europe, leading to growing concerns about the security of targeted countries. Regardless of their initial attitude towards Europe, terrorism might make voters more concerned with the issue of security and more aware that this is important to them, or make them change their opinion of Europe as a provider of security. Consistent with feelings of anxiety pushing people to re-assess and carefully evaluate information, Goodwin *et al.* (2018) show that pro-EU arguments were more likely to impact the Brexit vote than anti-EU ones. Goodwin *et al.* (2018) are worth

[4] By one estimate, British law enforcement officials consulted the Schengen Information System, 539 million times in 2017. Available online at: https://tinyurl.com/y6kdedyu. Furthermore, the UK can lose access to other well-established data and process systems, such as the European Arrest Warrants and the European Criminal Records Information System (ECRIS), prompting the UK's National Audit Office to warn that "organized criminals and others are likely to be quick to exploit any perceived weaknesses or gaps in the enforcement regime." Available at https://tinyurl.com/y3tke68y

[5] Available online at: https://tinyurl.com/yxkzyhgp, https://tinyurl.com/yxrkcg24

[6] Available online at: https://tinyurl.com/y63t3oww

[7] Available online at: https://tinyurl.com/zlwyjnh

quoting at length here: "[w]ell-rehearsed arguments about the perceived costs, risks and threats from the EU became 'priced in' to the national debate about continued EU membership. Having experienced several decades of Eurosceptic[ism] [....] it is perhaps not surprising that participants in our survey were less strongly influenced by prominent Eurosceptic arguments than hitherto less well-known messages about the benefits of EU membership. In contrast, our results suggest that communicating the claimed benefits and advantages of EU membership to an electorate that had long been noted for its instinctive Euroscepticism might have had a significant impact on the overall vote" (Goodwin *et al.* , 2018, p.12). Therefore, voters' familiarity with Eurosceptic arguments reduced the influence of the latter and in favor of less familiar pro-EU ones, which were more likely to shape voting decisions. Fighting terrorism was one of the less familiar but highly-prominent arguments, particularly for those living nearby targeted areas. Atikcan *et al.* (forthcoming) note that the case of Brexit distances itself from other EU or independence referendums in which highly risky economic consequences of change pushed people to vote in favor of the status quo. We argue that in the aftermath of terrorist attacks, citizens become more aware of the saliency of security and terrorism and reconsider the security risks involved in leaving the EU. As in the case of risky economic consequences generating a pro-status quo bias, terrorism may result in a similar change in preferences toward a seemingly less risky option, namely to Remain. This would also explain why voters do not punish incumbents after terrorist events, rather support them and the status quo "as a way to confront terrorists" (Balcells & Torrats-Espinosa, 2018). Consistent with this discussion we formulate a countervailing hypothesis as follows:

H1b: Proximity to terrorism increases support for Remain

We provide competing arguments about the positive and negative effects of terrorism on the Remain vote, but we remain largely agnostic about the prevalence of a specific one. Terrorism can have two effects that go in opposite directions, and the net effect on the Brexit vote is not obvious. This is something that has to be determined from the data. Yet, we also offer insights into the main mechanisms behind our main results and explore some of the micro-foundations behind our hypotheses. Before turning to the empirical analysis, we provide information on the data and some institutional context of the Brexit vote and background material on terrorism in the UK.

3 Data

Dependent variable: Remain votes

Since the Brexit vote, numerous analyses have been undertaken to understand who voted for Brexit, and we refer the interested reader to Becker *et al.* (2017) for a more comprehensive overview of the cross-sectional variation in the Leave shares across the UK's local authority districts that we can possibly give here. Figure 1 presents a map of the support for the Remain side across local authority districts. As we can see from the map, the highest share of the votes for Remain were registered in Scotland whereas West Midlands had the highest vote share for Leave. Voters were much more likely to vote Remain also in London, where seven out of 10 areas had more than 75% of votes in favor of staying in the European Union. The Leave campaign saw the majority of votes across England and Wales, in large cities such as Sheffield and Birmingham, as well as in the Welsh valleys and in the south and east of England. We use the percentage of votes for Remain at the district level from the Electoral commission, and then complement this information with data at ward level from Rosenbaum (2017).

[Figure 1 about here]

Main explanatory variable: terrorism

Data on terrorism are taken from the Global Terrorism Database. Terrorism is defined as "the premeditated use or threat to use violence by individuals or sub-national groups against noncombatants in order to obtain a political or social objective through the intimidation of a large audience beyond that of the immediate victims" (Enders *et al.* , 2011, p.321). We choose a relatively wide window and consider all terrorist attacks from January 2013 to 23 June 2016. January 2013 is a representative month as David Cameron first mentioned the EU referendum on 23rd January 2013.[8] And since the announcement was made, the public debate increasingly revolved around the issue of the costs and benefits of leaving the EU.[9] At the same time, 2013 saw a sharp increase in the frequency of terrorist attacks in the country (see Figure A.2 in the Online Appendix). And although the effect of terrorism for many citizens in the targeted country can be short-lived, there is ample empirical evidence demonstrating that the burden of terrorism-related disorders is substantial in both the short and the long term (see e.g., Neria *et al.* , 2011). For major attacks, the changes in the political behavior of affected groups is long-lasting, with effects discernible even after 12 years (Hersh, 2013). Moreover, it is likely that the impact of terrorism may increase over time as the cumulative effects of multiple attacks set in. We also run models where we weight our coefficients by time since last episode of terrorism.

In Figure 2 we show a map of terrorist incidents in the UK from January 2013 to the referendum date. There are a total of 43 districts targeted by terrorist violence, not surprisingly, London is the city with most incidents. Yet, attacks are scattered around the country, and even if terrorism *per se* is a rather rare event for the average district, all districts are exposed to neighbors' attacks. The lethality of terrorism in the UK has been declining since the 1970s. According to the Global Terrorism Database,[10] between 1970 and 1984, more than 2,200 people were killed in the UK in terrorist attacks. In the following 15-year period, there were 1,094 terrorism-related deaths and only 126 between 2000 and 2017. Yet, despite a decline in its severity, a string of terrorist attacks has hit the country in recent years. Among the most emblematic attacks before the Brexit vote, there is the assassination of Jo Cox, a member of Parliament who campaigned against a British exit. She was killed on the 16th of June 2016, in daylight after a town hall meeting in West Yorkshire, just one week prior to the Brexit referendum. Her killer was a longtime supporter of a neo-Nazi organization and shouted "Britain first" before stabbing and shooting Ms. Cox. In December 2015 three people were stabbed in east London by an attacker driven by Islamic extremism. In February 2014 the New Irish Republican Army (NIRA) claimed responsibility for a series of parcel bombs sent to army recruitment offices in at least seven cities or towns in England. In May 2013, a British soldier, Lee Rigby, was murdered in an attack in Woolwich by two Islamist extremists. Not surprisingly, after the series of attacks around the country in recent years, the number of terrorism-related arrests in Britain hit a record high, with 441 people held on suspicion of terrorism-related activity as of March 2018.[11] And, as noted above, terrorism is becoming an increasing concern for the British public.

[8] Available online at: https://www.bbc.co.uk/news/uk-politics-21148282
[9] Available online at: https://tinyurl.com/yxnmogdf
[10] Available online at: http://www.start.umd.edu/gtd/
[11] Available online at: https://tinyurl.com/ydgn8coj

[Figure 2 about here]

Control variables

Following the existing literature on the determinants of the Brexit vote,[12] we control for a broad set of variables that may confound the relationship between terrorism and the referendum returns. As in prior studies, we link data from the 2001 and 2011 censuses using changes and growth rates to capture changing trends.[13] In particular, to account for the impact of education attainment on vote choice, we control for the growth in the share of the highly educated population, defined as the share of citizens with an undergraduate degree, professional qualification or equivalent. To capture the important role played by immigration in predicting the referendum outcomes, we include growth rates in the local population shares by three immigration origin groups: the 15 'old' EU member states, the 12 states that joined the EU in 2004 and 2007, and non-EU countries. To address the claim that the Leave campaign resonated particularly well with voters in areas that had experienced prolonged economic downturn (Becker *et al.* , 2017), we control for the change in the share of the population that are employed in the manufacturing sector, and the change in the median hourly pay. We also add to the specification the share of value added in a UK region that can be attributed to consumption and investment demand in the rest of the EU as a proxy for 'globalization' and 'EU trade integration', and the change in the share of Muslim population to capture changing trends in the district's religious diversity. Finally, we include a set of variables that are potentially correlated with terrorism exposure, but may also be relevant for explaining the referendum outcomes (see e.g., Marineau *et al.* , 2018). Specifically, we control for population density, a measure of crime (the logarithm of the district's total number of crimes and offences) and a measure of attack history (a binary indicator coding districts that experienced terrorist attacks between January 1996 and December 2012). Further discussion on the choice of control variables, and a full description of all variables used in the regional-level analysis (together with the corresponding data sources), are provided in Section A.1 of the Online Appendix.

4 Empirical Analysis

4.1 Methodology

To test our hypotheses, we employ data at the local authority district (LAD) level – which comprises 380 spatial units across England, Scotland and Wales. Our estimation strategy exploits the fact that only 11% of these districts were hit by terrorist attacks over the sampled period, and uses the distance of non-attacked districts from their closest attacked district as the identifying source of variation. The idea behind this method is that, by focusing on 'spillover effects' rather than direct exposure effects, we can address self-selectivity concerns (Bratti *et al.* , 2017); that is, unobserved factors – that are not fully captured by our covariates – affecting both the likelihood of a district to experience terrorist attacks and the voting behavior of its residents. Specifically, our empirical

[12] See Langella & Manning (2016); Becker *et al.* (2017); Goodwin & Milazzo (2017); Clarke *et al.* (2017); Liberini *et al.* (2017); Chan *et al.* (2017); Colantone & Stanig (2018); Pickard (2019).

[13] Previous studies have shown that the Brexit results can be explained by both levels of predictor variables (socio-economic characteristics) and changes in these variables over a longer period (see, for instance, Becker *et al.* , 2017). The advantage of using changes or growth rates, rather than levels, is that the variables are less correlated and more distinct from one another, which allows us to limit collinearity concerns.

model takes the following form:

$$\text{`Remain'}_i = \beta_0 + \beta_1 \text{`Distance'}_{ij} + \beta_2 \mathbf{X}_i + \mu_c^j + \varepsilon_i \quad (1)$$

where 'Remain'$_i$ is the Remain vote share in district i (ranging from 24.4% to 78.6%); 'Distance'$_{ij}$ is the centroid-to-centroid distance in kilometers between district i and the closest terrorist-hit district j;[14] $\mathbf{X}_i$ is a vector of district i's covariates; μ_c^j represents fixed effects at the attack cluster level c, with each cluster consisting of all districts with the same closest terrorist-hit district j (43 clusters in total); and, ε_i is an error term, clustered at the same level. Our parameter of interest, β_1, measures the effect of proximity to terrorism on the Remain vote, with a positive value supporting *H1a*, i.e., proximity to terrorism decreases support for Remain, and a negative value supporting *H1b*. Under this setting, the key identification assumption is that the occurrence of a terrorist attack in district j is not correlated with unobserved determinants of the Remain vote in district i, where $i \neq j$.

$\mathbf{X}_i$ includes the control variables described in Section 3. As already mentioned, these variables can serve as potential predictors of the likelihood to experience terrorism or have been identified as significant correlates of the Brexit referendum returns in prior studies. However, to strengthen our identification assumption, we also experiment by adding a wide range of additional observable characteristics at the district i level, as location-specific characteristics are likely to correlate with the frequency of terrorism (Belmonte, 2019). Furthermore, to account for residual heterogeneities related to macro-region idiosyncrasies, we augment Equation (1) with fixed effects at higher tiers of sub-national division: countries and government office regions (GORs).[15] Finally, to address any remaining endogeneity concerns, we report instrumental variable (IV) estimates of Equation (1), where 'Distance'$_{ij}$ is instrumented through 'historical' distance to terrorism.

4.2 Main results

Table 1 shows our main results.[16] Column (1) reports the estimates of Equation (1) based on the baseline working sample of non-attacked districts, and provides strong evidence in favor of *H1b*. In particular, we observe a negative (positive) and highly statistically significant effect of distance (proximity) to terrorism on support for Remain, where a 1-km decrease in distance increases the Remain vote share by 0.022 percentage points. This effect is substantively non-negligible: two non-attacked districts – within the same attack cluster – that differ by 45 kms in terms of proximity to the attacked district are expected to differ by 1 percentage point in terms of support for Remain. In columns (2)-(7), we augment the specification of column (1) with additional district-level controls, which are first introduced separately and then jointly. In line with arguments presented in the relevant literature (Becker *et al.* , 2017; Liberini *et al.* , 2017; Chan *et al.* , 2017), we include the pre-referendum share of UKIP supporters ('UKIP'), the extent of total fiscal cuts over the period 2010-2015 ('Austerity shock'), the growth rate in the share of the population aged 60 or older ('Pensioner share growth'), and the district's total population ('Population'). To capture the impact of social media on political attitudes (Müller & Schwarz, 2018), we also include a binary indicator for districts with high Twitter usage per capita ('Twitter usage'). The effect of

[14] To construct this variable, we used the ArcGIS spatial analysis tool and the Stata command 'geodist'.

[15] England, Scotland and Wales (countries) are divided into 11 GORs.

[16] Due to space limitations, in the Online Appendix, Section A.3, we report the results of the full set of variables included in vector $\mathbf{X}_i$.

distance remains negative, statistically significant, and stable in size across specifications. Some of these controls are plausibly post-treatment (such as the UKIP support) and the inclusion of a large number of covariates can introduce multicollinearity problems (Colantone & Stanig, 2018). However, the low sensitivity of our distance estimates in columns (2)-(7) is quite reassuring as regards to biases arising from the potential omission of unobserved characteristics.

[Table 1 about here]

One potential explanation for the aforementioned results is that terrorism changes the composition of the electorate. If, for instance, proximity to terrorism increases the likelihood that public attitudes are translated into votes, then the positive Remain effects may be driven by higher post-treatment mobilization of the Remain supporters. To examine this possibility, we replace the dependent variable with districts' turnout rate ('Turnout')[17] and run the same regression set-up as in Table 1. The corresponding results, reported in Table 2, indicate that proximity to terrorism does not induce different turnout rates. As one would expect given its salience, being closer to terrorist-hit districts is associated with higher voter mobilization, and therefore the estimate on distance is negative, yet the effect is substantively small and fails to reach statistical significance in all specifications. Controlling for turnout rates in the regressions for 'Remain' has also little impact on the estimates reported in Table 1 (results available in Section A.3 of the Online Appendix).

[Table 2 about here]

To corroborate our identification strategy, we re-estimate our model using IV techniques. Concerns about remaining endogeneity can be mitigated if our chosen instrument is valid, which in turn, relies on two conditions: first, the instrument must be correlated with distance to terrorism; second, it must not be correlated with unobserved factors that may affect the Remain vote. Motivated by earlier studies we instrument distance to recent attacks using 'historical' distance to attacks (see e.g., Wahl, 2017, for a recent application); that is, the geodesic distance of a non-attacked district to the closest district that was hit by terrorism over the period 1970-1979.[18] Since our historical distance measure refers to 30 attacks that occurred about four decades before the referendum, it is expected to influence the Remain vote only indirectly through correlation with distance from future attacks. Table 3 shows the corresponding results. Column (1) reports the estimates for the baseline specification, whereas column (2) shows robustness to introducing additional covariates. The first-stage coefficient on the instrument is positive and statistically significant at the 1% confidence level across all four columns. The F-test of excluded instruments also produces a very high F-statistic, documenting the strength of the instrument.[19] Turning now to the second stage results, we can see that the magnitude of the coefficient on distance is relatively close to the OLS one (reported in Table 1), pointing to the absence of a strong endogeneity bias. Running the same IV regressions for 'Turnout' provides evidence that proximity to terrorism leads to statistically higher turnout rates, even though the effect is again substantively small (columns (3)-(4)).

[Table 3 about here]

[17] Section A.2 in the Online Appendix provides a map with the turnout rates across districts (LADs).

[18] This period corresponds to the first 10 years for which data on terrorism are available in the Global Terrorism Database. Only 8 out of the 43 attacked districts were also attacked during the period 1970-1979.

[19] We have also experimented by estimating the first stage equation and adding the dependent variable of the second stage ('Remain') among the controls. The dependent variable enters the specifications statistically insignificantly and leaves the estimates on the instrument virtually unchanged, suggesting that the first-stage error term is uncorrelated with the Remain vote.

Robustness

In the Online Appendix, we perform various tests to assess the robustness of our key findings. Specifically, we examine the sensitivity of our estimates to controlling for a broad set of additional district-level covariates (Section A.3), to re-constructing the attack distance measure based on a shorter time window or assigning a larger weight to attacks that occurred closer to the referendum date (Section A.4), to excluding regions (Section A.5), and to using alternative clustering of errors (Section A.6). Furthermore, we check whether our results hold when we introduce fixed effects at higher tiers of sub-national division (Section A.7) and when we employ categorical or non-linear measures of distance (Section A.8). In all cases, distance to terrorism has a negative and statistically significant effect on the Remain vote, providing further support for *H1b*. To rule out the possibility of a spurious relationship, we also perform placebo tests where we examine the effects on outcomes that are related to the referendum but should not be affected by distance to terrorism, such as people's perceptions of the economic consequences of Brexit. None of the placebo tests return statistically significant estimates, confirming the validity of our results (Section A.9).

Even though the official referendum results were published at the district (LAD) level, voting data at the level of electoral wards can also be obtained from Rosenbaum (2017). Unfortunately, this dataset covers only 1,261 wards in England (13% of the total number of wards in the UK) and information on a wide range of socio-economic characteristics at such disaggregated level is not available. Exploiting, however, this dataset allows us to test whether our results persist when we focus on variation within attacked districts, and to address concerns regarding ecological fallacy.[20] To this end, we consider 367 wards located in 19 terrorist-hit districts with data on the referendum results, and use differences in distances from attacked wards (within these districts) for identification. We also control for wards' degree of deprivation (composed of deprivation indices covering income, employment, education and skills, health and crime), as well as their population density and size, and add attacked-district fixed effects to capture unobserved characteristics that are shared by geographically close wards. The estimates obtained do not change the inferences drawn from the 'across district' analysis: once again, we find that proximity to terrorism increases the Remain vote. We refer to Section A.10 of the Online Appendix for a full discussion of these results.

4.3 Heterogeneous effects

The media are primarily responsible for providing information to the public in the aftermath of terrorist events (Altheide, 1987). While some attacks are sensationalized and extensively covered, others receive little media attention (Chermak & Gruenewald, 2006), and the amount of reporting can be seen as a reflection of the event's relevance and national importance (Legewie, 2013). Thus, to the extent that media coverage increases public awareness, our results should be stronger for attacks that attracted prominent media attention. To explore this argument, we augment Equation (1) with an interaction term between distance and a measure of media reporting of the attack(s) occurred in the closest terrorist-hit district. Since it is not possible to measure the coverage by all media outlets (newspapers, television, radio and social media platforms), we focus on newspaper reporting for which data can be extracted from LexisNexis: an online service that searches through

[20] It must be stressed that, when it comes to the determinants of the Brexit vote, ecological fallacy is of limited concern. See, for example, Alabrese *et al.* (2019) who show that individual-level regressors give similar results to corresponding aggregate variables at the district (LAD) level.

the text of thousands of news publications. For the purpose of this study, we limit the search results to national newspapers from UK-based sources that include the term 'terrorism' or 'terrorist', the location, and other key words related to each attack, in the month following the attack. We then construct a proxy for 'high' media coverage using the attacks with 10 or more LexisNexis hits (relevant articles),[21] corresponding to nearly half of the attack clusters in our sample (20 out of 43). The first two columns of Table 4 display the results when the interaction between 'Distance' and 'High media coverage' is added to the regressions for the Remain vote (with the non-interactive effect of high media coverage being absorbed by the attack cluster fixed effects). Column (1) reports the baseline estimates, whereas column (2) includes the additional controls of Tables 1 and 2. The evidence obtained confirms that media coverage plays an important role in mediating the effect of distance on the Remain vote: the interaction term enters highly statistically significant and with the appropriate (negative) sign. Substantively, the estimates reveal that the distance-induced Remain effect is at least three times as large when the attacks are extensively covered by media.

Domestic terrorism is often portrayed as a minor threat committed by troubled, mentally ill loners, whereas terrorism motivated by radical interpretation of Islam is framed as a hostile external force (Powell, 2011). There is also suggestion in the literature that people implicitly connect terrorism and Islam (Saleem & Anderson, 2013), and view Muslims as a threat to national security, especially in the United Kingdom (Allouche & Lind, 2010). At the same time, a number of studies have shown that, when people are killed in an attack, the shock value and the fear of terrorism are amplified (see, for example, Zhang *et al.* , 2013). And the British public displays aversion towards civilian casualties, particularly in the presence of strong narratives, visual cues, and identifiability (Johns & Davies, 2019). To examine whether our results change when we focus on attacks with Muslim/Jihadist perpetrators or those that involved deaths, we employ the same framework as in the previous paragraph and introduce interaction terms between distance and indicators capturing the occurrence of these types of attacks in the closest terrorist-hit district (5 cases with Muslim/Jihadist perpetrators and 5 cases with fatal outcomes). The corresponding estimates, reported in columns (4)-(6) of Table 4, confirm that proximity to terrorism has a more pronounced positive effect on the Remain vote when the perpetrators are members of an out-group or an external military movement, and when the attacks involve deaths. It must be stressed that, due to high correlation between media coverage of terrorism, perpetrator identity, and fatal outcomes,[22] one has to be very cautious in prioritizing and uncovering links among different mediating factors. Nevertheless, the analysis in this section clearly indicates that our findings are stronger for attacks that are deemed more relevant than others either due to their media attention-grabbing nature or their 'perceived' potential to be a national security threat.

In columns (7)-(12) of Table 4, we run the same regressions as in columns (1)-(6) using 'Turnout' as the dependent variable. We find no evidence that terrorism induces different turnout rates based on the extent of media coverage, the identity of perpetrators, or the occurrence of fatalities.

[Table 4 about here]

[21] A binary indicator is less sensitive to outliers than a continuous measure and reduces the noise from not considering information from other media outlets.

[22] Kearns *et al.* (2018), for instance, show that attacks by Muslim perpetrators receive, on average, 3.5 more coverage than other attacks, even after controlling for the number of deaths. In our sample, 4 out of the 5 cases with Muslim or Jihadi-inspired perpetrators, and 4 out of 5 cases with fatal outcomes, are also classified as cases with high media coverage. Furthermore, 3 out of the 5 cases with Muslim or Jihadi-inspired perpetrators are also classified as cases with fatal outcomes.

4.4 Direct exposure effects

As already mentioned, an alternative way to answer our research question is to focus on the direct effect of terrorism on the Remain vote for the districts that were hit by terrorist attacks. Based on our results so far, this approach is likely to produce biased estimates due to the existence of spillover effects on the neighbouring districts. We do expect, however, that attacked districts will have a higher (on average) Remain vote share than the rest of the districts when the full sample of districts is taken into account. In Section B of the Online Appendix, we perform an analysis along these lines and use propensity score matching techniques to address the endogeneity problem of the terrorism location choice. Specifically, we estimate the effect of terrorism as the difference in the sample average of the Remain vote between treated observations and a carefully selected group of matched control observations. To do that, we first identify the most prevalent district-level characteristics influencing the probability to experience a terrorist attack. We find that districts with high levels of crime and history of attacks (which also tend to be more populated areas) are more likely to be hit by terrorism. We then match each attacked district with a non-attacked district based on these characteristics. The results confirm that districts that experienced an attack are indeed associated with a stronger Remain vote relative to districts that are similar in terms of terrorism determinants (and thus propensity to be directly exposed to terrorism) but did not experience an attack. If anything, this approach increases our confidence in our main finding: terrorism is associated with increased support for Remain.

5 Individual level analysis

5.1 Data and methodology

To shed light into the micro-foundations underlying the terrorism-induced Remain effects at the regional-level, we use individual-level data from the British Election Study (BES). BES is an internet panel survey with a stratified random probability sample of eligible voters living in England, Scotland, and Wales, and includes questions that are designed to capture the respondents' attitudes on key issues, such as the EU, immigration and the economy. It also includes questions about their socio-demographic attributes, party identification and district of residence. Exploiting information from the survey waves that coincide with terrorist attacks allows us to examine the causal effect of terrorism on people's responses. Our identification strategy relies on the assumption that the timing of attacks is exogenous relative to that of the interviews, and thus individuals interviewed after the attack can be defined as the 'treatment' group whereas those interviewed before the attack can be defined as the 'control' group (Balcells & Torrats-Espinosa, 2018). This setup allows us to examine particularly the short-term, partial equilibrium effects of terrorism on attitudes.

We consider three of the five 'major' terrorist attacks that occurred in 2016 and 2017:[23] the murder of MP Jo Cox (16 June 2016); the Manchester Arena bombing (22 May 2017); the Finsbury Park attack (19 June 2017). The rationale for the choice of these attacks is twofold: first, they all received widespread media coverage and resulted in deaths, which makes them particularly impact-

[23] The two other 'major' attacks are the Westminster Bridge attack (22 March 2017) and the London Bridge attack (3 June 2017). We do not consider the former since its timing did not coincide with the timing of BES waves. We also do not consider the latter since it occurred towards the end of wave 12. Moreover, the Manchester Arena bombing (wave 12) took place 11 days earlier, and thus the individuals interviewed between the two attacks are already defined as 'treated'.

ful and relevant; and second, they overlapped with recent BES waves (8, 12 and 13, respectively) containing comparable information on attitudes and perceptions about the EU.[24] In particular, we infer individuals' pro-EU sentiment from their answer to the following question, which is worded in exactly the same way across the three waves: *"Some people feel that Britain should do all it can to unite fully with the EU. Other people feel that Britain should do all it can to protect its independence from the EU. Where would you place yourself on a 0-10 scale?"* (with higher values indicating more positive attitudes about the EU). Drawing upon the research design of Balcells & Torrats-Espinosa (2018), we then estimate the causal effect of terrorist attacks on EU attitudes using the following model:

$$\text{`Pro-EU'}_{nkw} = \gamma\text{`Post-attack'}_{nkw} + \delta\mathbf{Z}_{nkw} + \lambda_{kw} + u_{nkw} \tag{2}$$

where 'Pro-EU'$_{nkw}$ captures the response to the above question for individual n, living in region k, interviewed in survey wave w; 'Post-attack'$_{nkw}$ is a binary indicator that takes value 1 if the individual was interviewed after the day of the attack, and 0 otherwise;[25] $\mathbf{Z}_{nkw}$ is a vector that includes the following individual-level control variables: gender, age, age squared, level of education (low, medium, high) and the political party for which the interviewee voted in the 2015 general election; λ_{kw} represents region-by-wave fixed effects; and, u_{nkw} is an error term.[26] Our parameter of interest, γ, measures the effect of terrorism on EU attitudes, with a positive value indicating that exposure to terrorism sways the population towards a more pro-EU sentiment.

A possible threat to our identification strategy is that individuals with specific characteristics may respond to the survey at different points in time, and these characteristics may be predictive of the outcome. In Section C.3. of the Online Appendix, we show that there is a strong balance in observed characteristics (included in vector $\mathbf{Z}_{nkw}$) across treatment and control units. The covariate balance acts as evidence that differences in attitudes should be attributed to the effect of the terrorist attack rather than pre-existing differences across sampled groups. To further ensure that our results are not affected by such differences, we report estimates both before and after augmenting the specification with vector $\mathbf{Z}_{nkw}$. Note that the inclusion of region-by-wave fixed effects restricts the pre- and post-attack comparisons to individuals interviewed in the same wave and living in the same region, which can also remove any biases arising from systematic differences in how the different waves were fielded (Balcells & Torrats-Espinosa, 2018). To check the sensitivity of our estimates to the regions considered, we start with the least restrictive specification where regions are captured by GORs and then re-estimate the model using counties[27] and districts as our regional units – with the latter corresponding to our preferred specification.

5.2 Results

Table 5 presents the OLS estimation results of Equation (2). Column (1) refers to a simple specification that regresses our treatment variable on the outcome variable, whereas columns (2) and

[24] In Section C.2 of the Online Appendix, we provide additional information on these attacks, such as the timing of each attack in relation to the survey time window, the district they occurred, the identity of perpetrator(s), and the total number of fatalities and wounded. To show that the individuals in our sample were aware of these attacks, we also provide examples of national newspaper front pages covering the attacks the day after they occurred.

[25] In all three cases, the attack appeared in national newspapers the following day. Dropping individuals who were interviewed on the same day of the attacks leaves our results unchanged.

[26] Section C.1 in the Online Appendix provides an overview of the variables used in the individual-level analysis.

[27] England, Scotland and Wales are divided into 40 counties (NUTS2 regions).

(3) progressively add GOR-by-wave fixed effects and the variables in vector $\mathbf{Z}_{nkw}$. The estimates obtained show that citizens take a more positive stance towards the EU after terrorist attacks: the coefficient on 'Post-attack' is positive and highly statistically significant across the three specifications. In columns (4)-(7), we run the same regression setup as in columns (2)-(3), but we now control for fixed effects at finer administrative levels: counties and districts. The results are little affected by this exercise, both in terms of magnitude and statistical significance. In particular, the estimated coefficient of the treatment variable in columns (2)-(7) suggests that exposure to a new terrorist attack strengthens the pro-EU sentiment by about 0.1 units (1 percentage point on the 0-10 scale).[28]. As discussed in the previous sections, geographic proximity to a terrorist attack is expected to amplify the perception of threat and the personal sense of vulnerability, leading to stronger post-attack reactions. Columns (8)-(10) of Table 5 provide evidence in line with this argument. When we restrict the sample to include individuals living in the counties of the three terrorist attacks, the treatment effect becomes nearly four times as large, even though it is now less precisely estimated due to the smaller sample.[29] This finding also adds further support to the use of 'distance to terrorism' as our key explanatory variable in Section 4.

[Table 5 about here]

Robustness

In the Online Appendix, we present additional analysis and robustness checks. In Section C.4, we re-estimate Equation (2) separately for each attack/wave. In all cases, we find that individuals place themselves closer to the idea of Britain uniting fully with the EU after they are exposed to an attack. However, the results are stronger and statistically more robust for the Manchester Arena bombing which was a highly shocking and sensational event with a large number of casualties (the deadliest attack in the UK since the 2005 London bombings). In Section C.5, we check the sensitivity of our results to using alternative clustering of errors. The estimate on 'Post-attack' appears to be highly statistically significant, regardless of the clustering strategy used. In Section C.6, we perform a placebo test where we examine the treatment effect on citizens' views on whether the UK should keep the nuclear deterrent system. As expected, we find no evidence that exposure to a terrorist attack affects this outcome. Finally, in Section C.7, we explore the treatment effect on citizens' beliefs about the single most important issue facing the country. The analysis reveals that, after an attack, individuals are far more likely to perceive terrorism as the top national problem as opposed to other popular issues such as economy and immigration.

Risk of terrorism outside the EU

Table 5 demonstrates that exposure to a new terrorist attack increases the positive attitudes towards the EU. One of the arguments put forward in this paper is that, in the aftermath of terrorist attacks, citizens reconsider the risks involved in leaving the EU, particularly in the security domain. To test this argument in a more direct way, we run a final round of analyses and replace the dependent

[28] The results are robust to using ordered probit (OP) estimation rather than OLS. Re-scaling the dependent variable to take 3 or 4 values – based on tercile and quartile splits of the original 0-10 variable – produces, again, a positive and statistically significant effect. The corresponding OP estimates suggest that exposure to a new terrorist attack increases the probability that individuals will express high pro-EU views by 1-2 percentage points.

[29] We do not perform the same analysis for the attacked districts as the sample is extremely small and not balanced in terms of observed characteristics before and after the attacks.

variable with citizens' responses to the following BES question: *"Do you think the risk of terrorism would be higher, lower or about the same if the UK leaves the European Union?"*. The limitation of this question is that it cannot be used for the Manchester Arena bombing (wave 12), as it was included in waves 8 and 13 only. We code the responses *"Higher"* and *"Much higher"* with 1 – and all the other responses with 0 – and estimate a linear probability model using the same regression set-up as in Table 5. We find that, after a terrorist attack, individuals are 1.5 percentage points more likely to report that the risk of terrorism will be higher if the country leaves the EU, and, once again, the results become stronger when we focus on individuals living in the counties of the two terrorist attacks (see Table 6). All in all, our findings confirm that citizens believe that a more effective response to terrorism is at the EU rather than the national level.

[Table 6 about here]

6 Conclusions

We study the consequences of terrorism on the outcome of the Brexit vote. Previous studies have convincingly shown that important characteristics of the population such as education, unemployment, income and social status, as well as issues of sovereignty and immigration, have all played an important role in determining the share of votes for Remain. Yet, despite the crucial role of social and economic concerns, security considerations have largely been absent from these studies. This is all the more remarkable as the United Kingdom has long struggled against terrorism and political violence within its borders, which has made counter-terrorism efforts a key priority for policymakers and a main concern for the public. To investigate the effect of terrorism on the Brexit vote, we combine data on voting shares at the district and ward level and individual-level data on public attitudes, and leverage exogenous variation in exposure to terrorism. Our analysis presents a key finding: terrorism is associated with increased support for remaining in the European Union. This effect is large and important: for example, our lower estimate of the effect of terrorism shows that two non-attacked districts – within the same attack cluster – that differ by 45 kms in terms of proximity to the attacked district are expected to differ by 1 percentage point in terms of support for Remain. The estimated effect is even more important in light of the narrowness of the outcome of the referendum, with Leave winning only by a margin of 3.8 percentage points. We show that this was likely to be driven by an increase in the voters' perception of the benefits of the EU membership and risks to security and safety posed by the UK's departure from the EU. To mitigate concerns about selection bias, we use several strategies including instrumental variables regressions, where we rely on the distance from past terrorist violence as exogenous variation in current attacks; propensity score matching techniques to further address potential unbalance between covariates; placebo tests and other sensitivity analyses. Our key finding remains robust.

Our analysis serves to inform the current ongoing policy debate on the factors affecting the Brexit vote, on public opinion in favor of European unification, and on the short and long-term consequences of terrorism on behavioral and attitudinal consequences. We provide credible empirical evidence of a causal effect of terrorism on the outcome of the EU referendum and show that security concerns have played an important role in the decision to support Remain. At the same time, we show that the negative effects of terrorism go well beyond national elections, and can affect public support for broader political and economic issues, such as European integration. As such, the overall consequences of terrorist attacks for political behavior and electoral outcomes are even

greater than hypothesized by extant studies. This study is a first step in this direction, and the results suggest that whether terrorism may influence other aspects of domestic politics and shape its course deserves greater scrutiny.

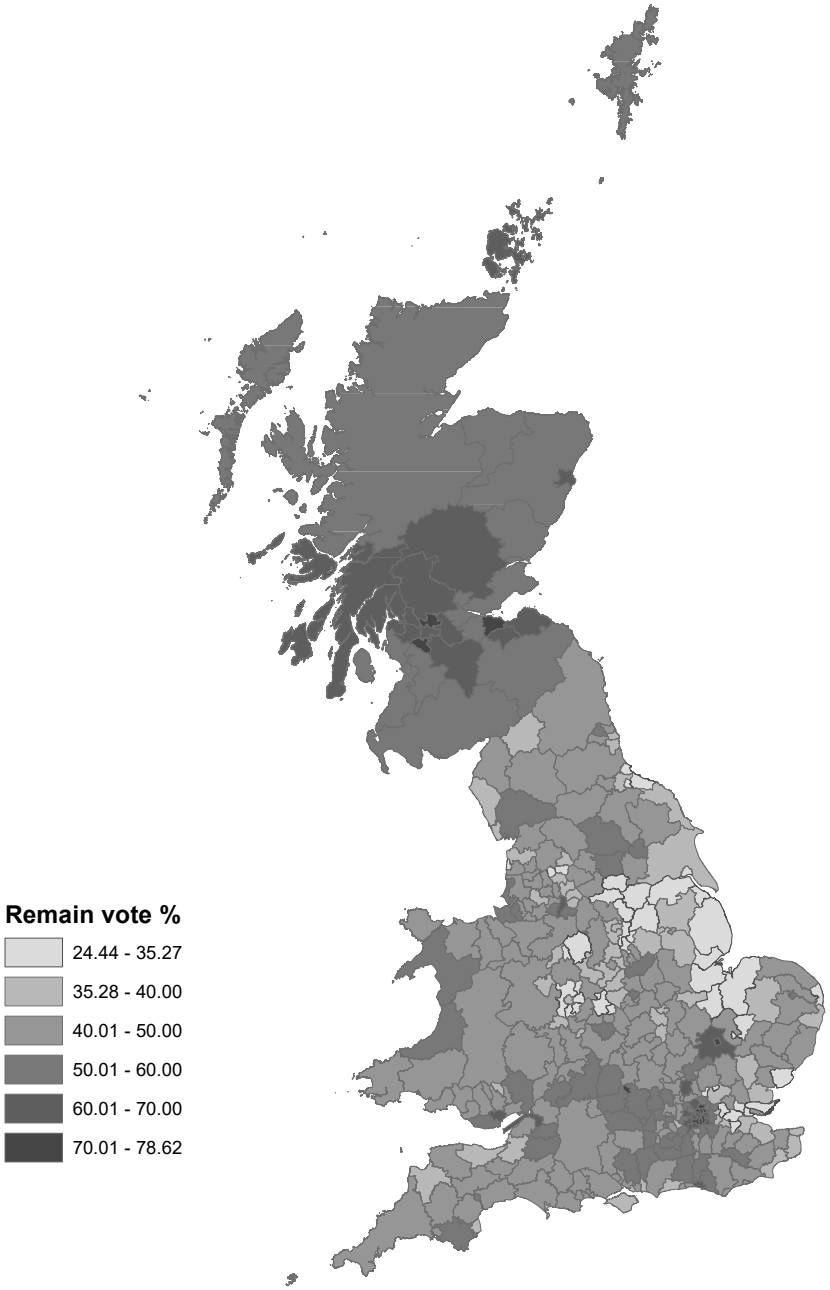

Figure 1: Remain vote share across districts (LADs)

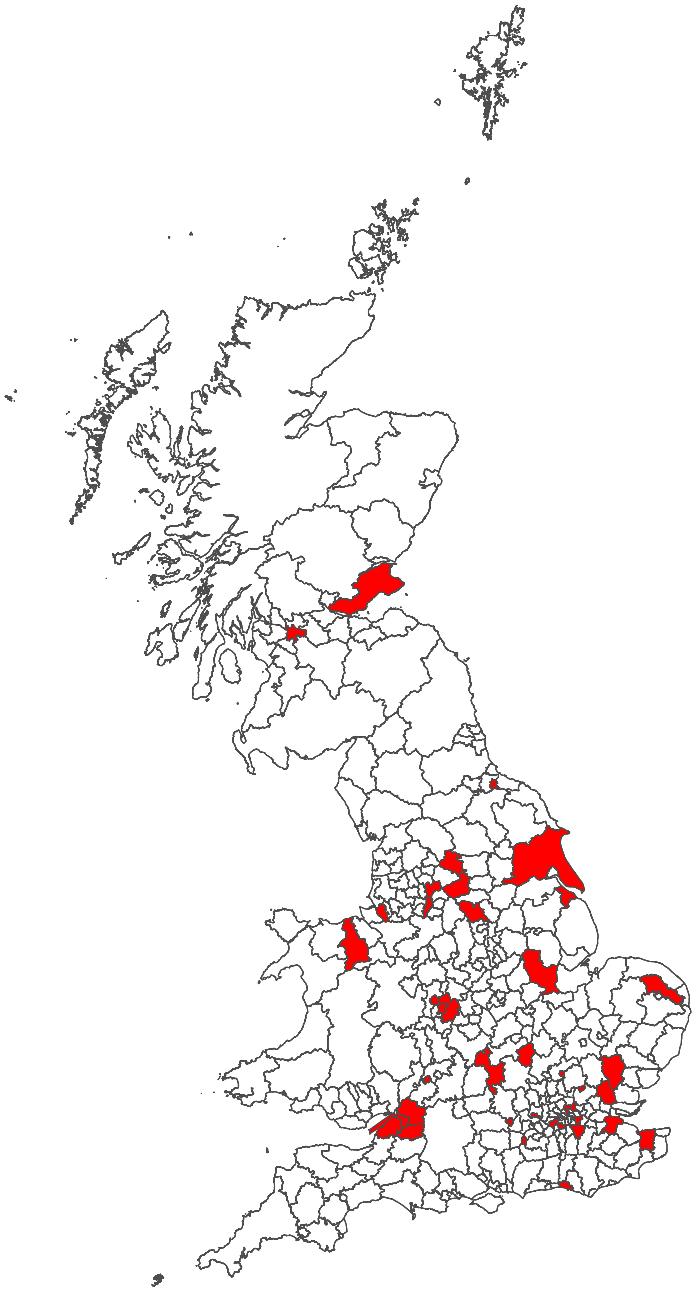

Figure 2: Terrorist-hit districts (LADs)

Notes: Red shades correspond to districts that were hit by terrorist attacks from January 2013 to the referendum date.

Table 1: Terrorism and the Remain vote

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Distance	-0.022**	-0.024*	-0.027**	-0.023**	-0.022**	-0.026**	-0.030**
	(0.045)	(0.051)	(0.011)	(0.036)	(0.045)	(0.025)	(0.011)
UKIP support		-1.996***					-1.484***
		(0.000)					(0.000)
Austerity shock			-3.766***				-3.644***
			(0.000)				(0.000)
Pensioner share growth				0.493			-0.669
				(0.414)			(0.311)
Population					0.885		0.811*
					(0.138)		(0.056)
Twitter usage						2.574***	2.248***
						(0.007)	(0.009)
Vector $\mathbf{X}_i$	✓	✓	✓	✓	✓	✓	✓
Attack cluster FEs	✓	✓	✓	✓	✓	✓	✓
R-squared	0.751	0.769	0.787	0.752	0.754	0.759	0.806
Observations	337	335	336	337	337	337	335

Notes: The dependent variable in all columns is 'Remain'. Standard errors are clustered at the level of the closest terrorist-hit district (attack cluster). p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 2: Terrorism and turnout

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Distance	-0.004	-0.004	-0.003	-0.006	-0.004	-0.004	-0.004
	(0.317)	(0.256)	(0.454)	(0.104)	(0.320)	(0.379)	(0.280)
UKIP support		-0.123					0.120
		(0.310)					(0.228)
Austerity shock			-2.020***				-1.821***
			(0.000)				(0.000)
Pensioner share growth				1.227***			0.576*
				(0.000)			(0.053)
Population					-0.476		-0.405
					(0.117)		(0.107)
Twitter usage						-0.237	-0.061
						(0.532)	(0.851)
Vector $\mathbf{X}_i$	✓	✓	✓	✓	✓	✓	✓
Attack cluster FEs	✓	✓	✓	✓	✓	✓	✓
R-squared	0.835	0.840	0.879	0.856	0.839	0.836	0.892
Observations	337	335	336	337	337	337	335

Notes: The dependent variable in all columns is 'Turnout'. Standard errors are clustered at the level of the closest terrorist-hit district (attack cluster). p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 3: Terrorism, the Remain vote and turnout: IV estimates

	Remain		Turnout	
	(1)	(2)	(3)	(4)
Distance	-0.031**	-0.032***	-0.011**	-0.009***
	(0.012)	(0.000)	(0.021)	(0.001)
UKIP support		-1.484***		0.121
		(0.000)		(0.172)
Austerity shock		-3.645***		-1.823***
		(0.000)		(0.000)
Pensioner share growth		-0.662		0.593**
		(0.259)		(0.024)
Population		0.818**		-0.387*
		(0.029)		(0.068)
Twitter usage		2.269***		-0.009
		(0.002)		(0.975)
First stage				
Distance (1970-1979)	0.925***	0.913***	0.925***	0.913***
	(0.000)	(0.000)	(0.000)	(0.000)
Vector $\mathbf{X}_i$	✓	✓	✓	✓
Attack cluster FEs	✓	✓	✓	✓
Excluded F-stat	152.207	121.945	152.207	121.945
Observations	337	335	337	335

Notes: Standard errors are clustered at the level of the closest terrorist-hit district (attack cluster). p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 4: Terrorism, the Remain vote and turnout: heterogeneous effects

	Remain						Turnout					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Distance	-0.014**	-0.021***	-0.015**	-0.023***	-0.015**	-0.022***	-0.003	-0.005	-0.004	-0.005	-0.004	-0.005
	(0.036)	(0.004)	(0.032)	(0.004)	(0.045)	(0.009)	(0.418)	(0.288)	(0.271)	(0.274)	(0.279)	(0.288)
Distance × High media coverage	-0.047**	-0.045**					-0.005	0.001				
	(0.013)	(0.016)					(0.621)	(0.781)				
Distance × Muslim/Jihadi perpetrators			-0.047***	-0.048***					0.004	0.002		
			(0.002)	(0.001)					(0.459)	(0.635)		
Distance × Fatal outcomes					-0.054***	-0.056***					0.003	0.001
					(0.000)	(0.000)					(0.525)	(0.733)
Vector $\mathbf{X}_i$	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Attack cluster FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Additional controls		✓		✓		✓		✓		✓		✓
R-squared	0.755	0.810	0.755	0.810	0.756	0.811	0.835	0.892	0.835	0.892	0.835	0.892
Observations	337	335	337	335	337	335	337	335	337	335	337	335

Notes: Standard errors are clustered at the level of the closest terrorist-hit district (attack cluster). p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 5: Terrorism and pro-EU sentiment: individual-level analysis

	All respondents							Within attacked counties		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Post attack	0.202***	0.130***	0.093***	0.136***	0.093***	0.126***	0.083**	0.453**	0.373*	0.313*
	(0.000)	(0.000)	(0.006)	(0.000)	(0.006)	(0.001)	(0.015)	(0.033)	(0.082)	(0.074)
GOR-by-wave FEs		✓	✓							
County-by-wave FEs				✓	✓					
District-by-wave FEs						✓	✓		✓	✓
Vector $\mathbf{Z}_{nkw}$			✓		✓		✓			✓
R-squared	0.001	0.035	0.320	0.044	0.322	0.073	0.336	0.003	0.059	0.331
Observations	72,828	72,828	62,529	72,828	62,529	72,828	62,529	1,920	1,920	1,650

Notes: Standard errors are clustered at the district level. p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 6: Perceptions of terrorism outside the EU: individual-level analysis

	All respondents							Within attacked counties		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Post-attack	0.015***	0.015***	0.015**	0.015***	0.015**	0.015**	0.015**	0.059**	0.061**	0.037
	(0.008)	(0.008)	(0.013)	(0.008)	(0.013)	(0.013)	(0.017)	(0.043)	(0.031)	(0.251)
GOR-by-survey FEs		✓	✓							
County-by-survey FEs				✓	✓					
LAD-by-survey FEs						✓	✓		✓	✓
Vector $\mathbf{Z}_{nkw}$			✓		✓		✓			✓
R-squared	0.000	0.004	0.051	0.006	0.052	0.020	0.066	0.002	0.027	0.100
Observations	52,338	52,338	44,537	52,338	44,537	52,338	44,537	1,278	1,278	1,083

Notes: Standard errors are clustered at the district level. p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

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Did terrorism affect the Brexit vote?
APPENDIX

For online publication

A. Region-level analysis: spillover effects

A.1 Motivation and description of control variables

Several recent studies have identified potential determinants of the Brexit vote at both the individual and the region level; see Becker *et al.* (2017), but also Langella & Manning (2016); Goodwin & Milazzo (2017); Clarke *et al.* (2017); Liberini *et al.* (2017); Chan *et al.* (2017); Colantone & Stanig (2018); Pickard (2019). We capture these determinants through our broad set of control variables.

Our first set of variables reflects elements of the two primary narratives set out by Chan *et al.* (2017): the revolt of the economically 'left-behinds' and the resurgence of English nationalism. As in prior studies, we primarily use district-level data from the 2001 and 2011 censuses, and employ changes and growth rates between these two census years to capture changing trends over time. One of the most robust determinants is educational attainment. More educated individuals may find it easier to realize the opportunities that result from EU membership, and thus districts that experience a larger growth of highly educated individuals are more likely to support remain (Becker *et al.*, 2017). Another important predictor is immigration, a central topic throughout the referendum campaign (Goodwin & Heath, 2016; Becker *et al.*, 2017; Colantone & Stanig, 2018). On the Leave side, they argued that immigration needed to be controlled and reduced, whilst making links to migrants using up public services that would otherwise go to UK citizens; for example, the National Health Service (NHS). The Remain side, however, argued that migrants are net contributors to the UK economy and provide cultural enrichment and diversity. To capture these arguments, we include growth rates in the local population shares by three origin groups: the 15 'old' EU member states, the 12 states that joined the EU in 2004 and 2007, and non-EU countries. It has also been argued that the Leave campaign resonated well in the old industrial heartlands of the UK where the manufacturing sector is concentrated, which appealed particularly to the notion of returning jobs that have been outsourced or made redundant by technological progress. On the other hand, car manufacturers, for example, warned that not having good access to the EU single market after Brexit would make their plants uncompetitive, leading to lost work and possible closure.[1] We account for these claims through the change in the share of the population that are employed in the manufacturing sector. To further capture the general economic conditions, we include the change in median wages between 2005 and 2015 (Bell & Machin, 2016; Becker *et al.*, 2017). Another key topic on the campaign trail was related to the impact of globalization and EU trade integration. To proxy for this, we include the share of value added in a UK county that can be attributed to consumption and investment demand in the rest of the EU (Los *et al.*, 2017). Finally, to capture changing trends in religious diversity, we control for the change in the share of Muslim population.

Our second set of control variables includes three variables that are correlated with terrorism but may also be relevant for explaining the referendum returns. First, we include a measure of past

[1] https://tinyurl.com/j4hewh8

exposure to terrorist attacks (attack history); namely, a binary indicator coding districts that experienced terrorist attacks between January 1996 and December 2012. Second, we include the total number of crimes and offenses by Police Force Area in England and Wales, and district in Scotland, as a measure of the district's crime level. This captures the fact that terrorists may use criminal gangs to facilitate their attack or target areas which are highly exposed to crime, and, at the same time, these characteristics may affect voting behavior. Third, we include the district's population density, since attacks occur more frequently in densely populated areas (Brodeur, 2018), which were also typically in favor of Remain. Full description of these variables, and the corresponding data sources, are provided in Table A1 below.

Our control variables are all pre-treatment and relatively distinct from one another, which allows us to limit collinearity concerns. However, given the long list of other potential determinants, we perform checks with supplementary controls (see Section 4.2 and Table A2). For comparability purposes, we standardize our continuous right-hand-side variables to have a mean of 0 and a standard deviation of 1.

Table A1: Variable definitions and data sources for region-level analysis

Name	Definition	Source
District level		
Dependent variables		
Remain	Remain vote share in the 2016 EU referendum	Electoral Commission
Turnout	Turnout rate in the 2016 EU referendum	Electoral Commission
Main explanatory variable		
Distance	Centroid-to-centroid distance to closest terrorism-hit district in kilometers (January 2013 to referendum date)	Own calculation from GTD
Control variables		
Attack history	=1 if a district has a history of being attacked (Jan 1996 to Dec 2012), 0 otherwise	Own calculation from GTD
Qual. level 4+ share growth	Growth in the share of highly educated population, defined as citizens with level 4+ qualifications (undergraduate degree, professional qualification or equivalent) (2001-2011)	Census - Becker *et al.* (2017)
Manufacturing employment share change	Change in the share of the population that are employed in the manufacturing sector (2001-2011)	Census - Becker *et al.* (2017)
EU accession migrant growth	Change in the number of migrants from the 12 EU accession states (2001-2011) relative to the local resident population in 2011	Census - Becker *et al.* (2017)
EU 15 migrant growth	Change in the number of migrants from the 'old' EU member states (2001-2011) relative to the local resident population in 2011	Census - Becker *et al.* (2017)
Migrants from elsewhere growth	Change in the number of migrants from non-EU countries (2001-2011) relative to the local resident population in 2011	Census - Becker *et al.* (2017)
Median hourly pay change	Median hourly pay change (2005-2015)	Census - Becker *et al.* (2017)
Muslim population change	Growth in the share of Muslim population (2001-2011)	Census
Population density	Total population in 2011 / Area (hectares)	Census
Total crimes and offences	Logarithm of total crimes and offences by Police Force Areas (2012/13-2013/14)	ONS
Total economy EU dependence	Share of value added in a UK region that can be attributed to consumption and investment demand in the rest of the EU (2010)	Los *et al.* (2017) - Becker *et al.* (2017)
UKIP support	Share of UKIP supporters calculated by matching BES responses to the local authority districts, and excluding districts with less than 10 respondents	BES wave 8
Austerity shock	Total fiscal cuts, defined as financial loss per working age adult per year (2010-2015)	Innes & Tetlow (2015) - Becker *et al.* (2017)
Pensioner share growth	Growth in the share of population aged 60 or over (2001-2011)	Census - Becker *et al.* (2017)
Population	Total population / 1000	Census - Becker *et al.* (2017)
Twitter usage	=1 if district is above the 75th percentile of Twitter usage per capita, 0 otherwise	Own calculation from Follow the Hashtag (2016)
High media coverage	=1 for attacks that received 10 or more LexisNexis hits, 0 otherwise	LexisNexis
Muslim/Jihadi perpetrators	=1 for attacks with Muslim or Jihadi-inspired perpetrators, 0 otherwise	GTD
Fatal outcomes	=1 for attacks with fatal outcomes, 0 otherwise	GTD
UKIP support (2014 EP election)	UKIP vote share in the 2014 European Parliament elections	Electoral Commission
1975 Leave share	Leave vote share in the 1975 EU referendum by county	Becker *et al.* (2017)
Unemployment rate	Unemployment rate (2015)	LFS - Becker *et al.* (2017)
No qual. share growth	Growth in the share of population with no qualifications (2001-2011)	Census - Becker *et al.* (2017)
EU structural funds	EU structural funds per capita (2013)	Becker *et al.* (2017)
Rural	=1 if a district is defined as "Countryside living" or "Town & country living", 0 otherwise	Census
Ward level		
All variables		
Remain	Remain vote share in the 2016 EU referendum	Rosenbaum (2017)
IMD: average rank	Average rank of the Lower Layer Super Output Area (LSOA) index of multiple deprivation (IMD) within a ward; inverse scaling, higher values means more deprived (2015)	ONS
Population density	Total population (2016) / Area (hectares)	Own calculation
Population	Total population (2016)	ONS
Other variables		
Withdrawal deal support (2018)	Percentage of support for the withdrawal deal	Survation
Invalid votes (2016)	Percentage of invalid votes in the 2016 EU referendum	Electoral Commission
Economy worse?	Share of individuals who believe the economy will be worse after Brexit	BES wave 8
Personal finances worse?	Share of individuals who believe their personal finances will be worse after Brexit	BES wave 8

Notes: ONS refers to the Office for National Statistics. GTD refers to the Global Terrorism Database. LFS refers to the Labour Force Survey.

A.2 Additional figures

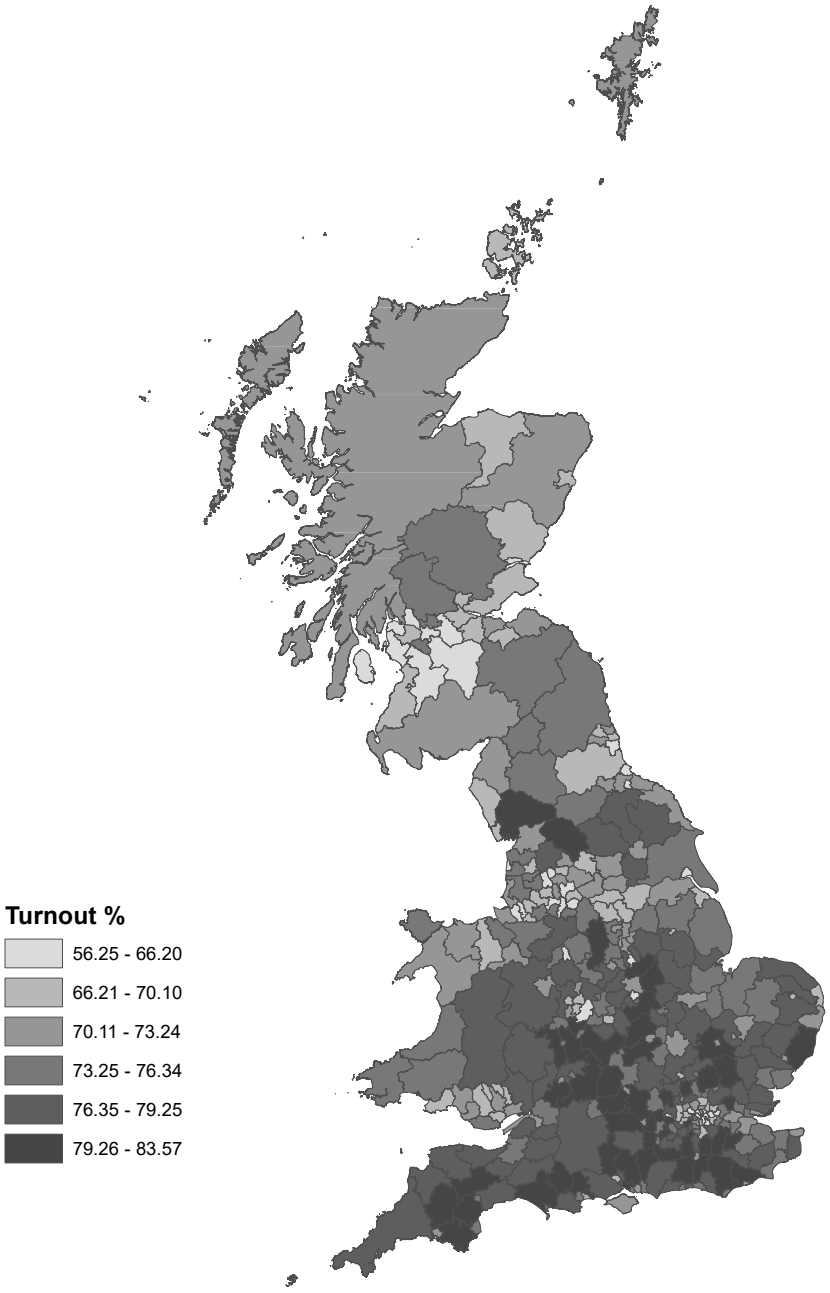

Figure A1: Turnout rate across districts (LADs)

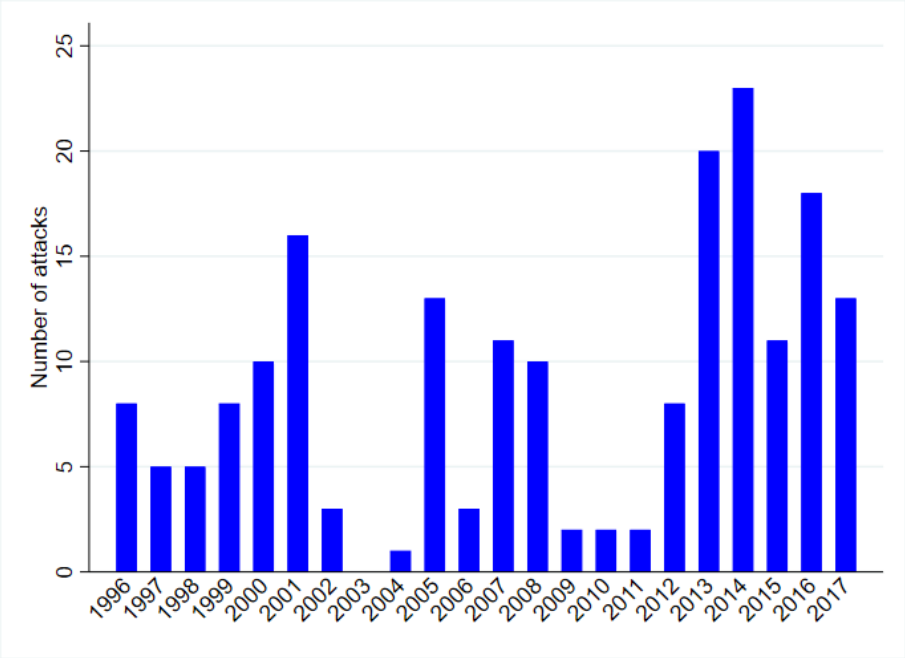

Figure A2: Frequency of terrorist attacks in England, Scotland and Wales from 1996 to 2017

A.3 Extra control variables

In Table A2, we check the sensitivity of our results to including additional regressors. Column (1) reports estimates of the baseline specification, where we control for the variables discussed in Section A.1 (vector $\mathbf{X}_i$). The sign and significance of the estimated coefficients are generally consistent with what has been established in the existing Brexit literature (Becker *et al.*, 2017; Colantone & Stanig, 2018). Column (2) adds the UKIP vote share in the 2014 European Parliament elections, obtained from the Electoral Commission. We do not include this variable throughout our analysis due to high correlation with the Remain vote share (Becker *et al.*, 2017). This is reflected in the value of the R-squared in columns (1) and (2) which jumps from 0.751 to 0.922. Moreover, the European Parliament elections took place during the attack sample period, and thus this variable is, to some extent, post-treatment. Furthermore, it does not portray an accurate representation of the UKIP support, since the turnout rate at the European Parliament elections was only 35.6% and UKIP was the largest party with 26.6% of the national vote. The next six columns include the following variables: the Leave vote share of the 1975 EU referendum (column (3)), the district-level unemployment rate (column (4)), the growth in the population share of citizens with no qualifications (column (5)), the amount of EU structural funds received by each county (column (6)), a binary indicator coding rural districts (column (7)), and the district's turnout rate at the 2016 EU referendum (column (8)). Finally, in column (9), we include all aforementioned variables together. Throughout this exercise, 'Distance' remains negative and statistically significant at conventional levels.

Table A2: Terrorism and the Remain vote: extra control variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Distance	-0.022**	-0.021**	-0.021*	-0.023*	-0.019*	-0.038***	-0.019*	-0.020*	-0.026**
	(0.045)	(0.030)	(0.056)	(0.063)	(0.069)	(0.004)	(0.082)	(0.068)	(0.012)
UKIP support (2014 EP election)		-10.004***							-9.299***
		(0.000)							(0.000)
1975 Leave share			-0.096						-0.326
			(0.868)						(0.525)
Unemployment rate				-1.192**					-0.475**
				(0.035)					(0.034)
No qual. share growth					4.042***				1.434***
					(0.000)				(0.001)
EU structural funds						0.752			0.517
						(0.220)			(0.215)
Rural							-1.103		-0.479
							(0.345)		(0.441)
Turnout								0.469***	0.234
								(0.009)	(0.110)
Attack history	1.118	1.021**	1.105	1.048	0.347	1.165	1.172	0.837	0.641
	(0.205)	(0.044)	(0.221)	(0.263)	(0.768)	(0.169)	(0.154)	(0.394)	(0.185)
Qual. level 4+ share growth	3.107***	1.446***	3.099***	2.776***	4.310***	3.210***	3.143***	2.310***	1.525***
	(0.001)	(0.006)	(0.001)	(0.002)	(0.000)	(0.002)	(0.001)	(0.009)	(0.001)
Manufacturing employment share change	1.488**	1.245***	1.474**	1.223**	0.300	1.861***	1.633***	0.932*	0.595**
	(0.011)	(0.000)	(0.011)	(0.032)	(0.587)	(0.001)	(0.005)	(0.094)	(0.018)
EU accession migrant growth	-2.070**	-0.979***	-2.077**	-2.077**	-2.265***	-1.065	-2.187**	-1.869*	-1.056***
	(0.029)	(0.000)	(0.027)	(0.021)	(0.005)	(0.244)	(0.031)	(0.059)	(0.001)
EU 15 migrant growth	2.930	1.765***	2.929	2.661	2.396	3.139	3.055	2.615	1.353**
	(0.142)	(0.002)	(0.142)	(0.202)	(0.166)	(0.105)	(0.136)	(0.174)	(0.012)
Migrants from elsewhere growth	1.212	-1.672**	1.217	1.414	0.811	0.476	1.118	1.936	-1.285*
	(0.397)	(0.019)	(0.394)	(0.327)	(0.541)	(0.727)	(0.422)	(0.179)	(0.077)
Median hourly pay change	-0.692**	-0.205	-0.689**	-0.530	-0.395	-0.549	-0.683**	-0.528	0.178
	(0.032)	(0.425)	(0.033)	(0.156)	(0.241)	(0.118)	(0.030)	(0.116)	(0.519)
Muslim population change	0.462	-0.400	0.466	0.431	0.409	0.376	0.497	0.542	-0.334
	(0.448)	(0.126)	(0.444)	(0.470)	(0.470)	(0.527)	(0.414)	(0.359)	(0.179)
Population density	2.377**	0.178	2.382**	2.675**	3.096***	2.179*	2.150*	3.449***	1.302**
	(0.036)	(0.742)	(0.035)	(0.034)	(0.007)	(0.064)	(0.072)	(0.005)	(0.034)
Total crimes and offences	-0.247	-0.354	-0.220	-0.111	-0.393	-0.239	-0.123	-0.377	-0.129
	(0.768)	(0.529)	(0.802)	(0.911)	(0.602)	(0.746)	(0.885)	(0.634)	(0.816)
Total economy EU dependence	-0.838	-0.177	-0.868	-0.988	-1.284	-0.748	-0.711	-1.166	-0.293
	(0.368)	(0.645)	(0.361)	(0.251)	(0.144)	(0.430)	(0.463)	(0.226)	(0.496)
Attack cluster FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	0.751	0.922	0.751	0.754	0.789	0.757	0.753	0.760	0.930
Observations	337	337	337	334	337	327	337	337	325

Notes: The dependent variable in all columns is 'Remain'. Standard errors are clustered at the level of the closest terrorist-hit district (attack cluster). p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

A.4 Sensitivity to time period

In Table A3, we test the robustness of our results to re-constructing the attack distance measure based on a shorter time window or assigning a larger weight to attacks that occurred closer to the referendum date. We start by excluding the attacks that occurred in 2013. Column (1) shows the estimates based on the baseline working sample of non-attacked districts; column (2) includes Government Office Regions (GOR) fixed effects to soak up any residual heterogeneities that are not captured by our attack cluster fixed effects (since the attack clusters now include a larger number of districts); and column (3) introduces the extra controls from our main analysis. We then proceed by running the same regression setup after excluding the attacks that occurred in 2013 and 2014; that is, we only use the attacks that occurred from January 2015 to the referendum date to calculate our distance measure (columns (4)-(6)). Finally, we re-estimate our baseline specification using weighted regressions, where the weight assigned to each attack cluster is proportional to the time since the most recent attack in that cluster (with more recent attacks receiving a larger weight). We do this first by year and then by quarter (columns (7)-(8)). Our findings persist regardless of the period used or the weight assigned to each attack cluster, and, perhaps more importantly, the magnitudes of the coefficients are similar across specifications.[2]

Table A3: Terrorism and the Remain vote: sensitivity to time period

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Distance	-0.026**	-0.027**	-0.037***	-0.014	-0.018*	-0.027**	-0.023*	-0.022**
	(0.015)	(0.015)	(0.002)	(0.152)	(0.069)	(0.047)	(0.050)	(0.036)
Vector $\mathbf{X}_i$	✓	✓	✓	✓	✓	✓	✓	✓
Attack cluster FEs	✓	✓	✓	✓	✓	✓	✓	✓
GOR FEs		✓	✓		✓	✓		
Extra controls			✓			✓		
Years excluded	2013	2013	2013	2013 & 2014	2013 & 2014	2013 & 2014		
# of attacked districts	30	30	30	16	16	16	43	43
Weight							Year	Quarter
R-squared	0.737	0.749	0.816	0.685	0.698	0.777	0.779	0.787
Observations	350	350	348	364	364	362	337	337

Notes: The dependent variable in all columns is 'Remain'. Standard errors are clustered at the level of the closest terrorist-hit district (attack cluster). p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

A.5 Region exclusion

In this section, we examine the robustness of our results to excluding regions based on geographical boundaries, attack clusters or outliers in the data. First, we drop one GOR at a time, as well as the districts that are not part of the UK mainland (islands), and re-estimate our baseline OLS and IV specifications. We show this exercise graphically in Figure A3, with the OLS results represented on the left panel and the IV results on the right panel. The red vertical line at value -0.022 indicates the magnitude of our baseline estimate of 'Distance' based on the full sample of districts. Each point represents the point estimate of 'Distance' when we remove the districts contained in the region corresponding to the legend below. Thin whiskers from the point estimate are the 95% confidence intervals and fat whiskers are the 90% intervals. The coefficient remains negative throughout, with the effect becoming much stronger when we remove the islands, and statistically less robust when we remove Scotland (even though the coefficient appears to be larger in the IV regressions). Second, we drop attack clusters one by one. The results are depicted in Figure A4.

[2]The results in this table are robust to using the IV approach, where we instrument contemporary distance with historical (1970-1979) distance to attacks.

In every case, our 'Distance' estimate remains negative and statistically significant. As a third and final check, we drop districts that are outliers in terms of their Remain vote. We cut the sample at the top and bottom of the vote share distribution. Our results are reported in Table A4. Once again, we can see that the estimate on 'Distance' remains statistically significant at conventional levels, even if we go as far as excluding the top and bottom 10th percentiles.[3]

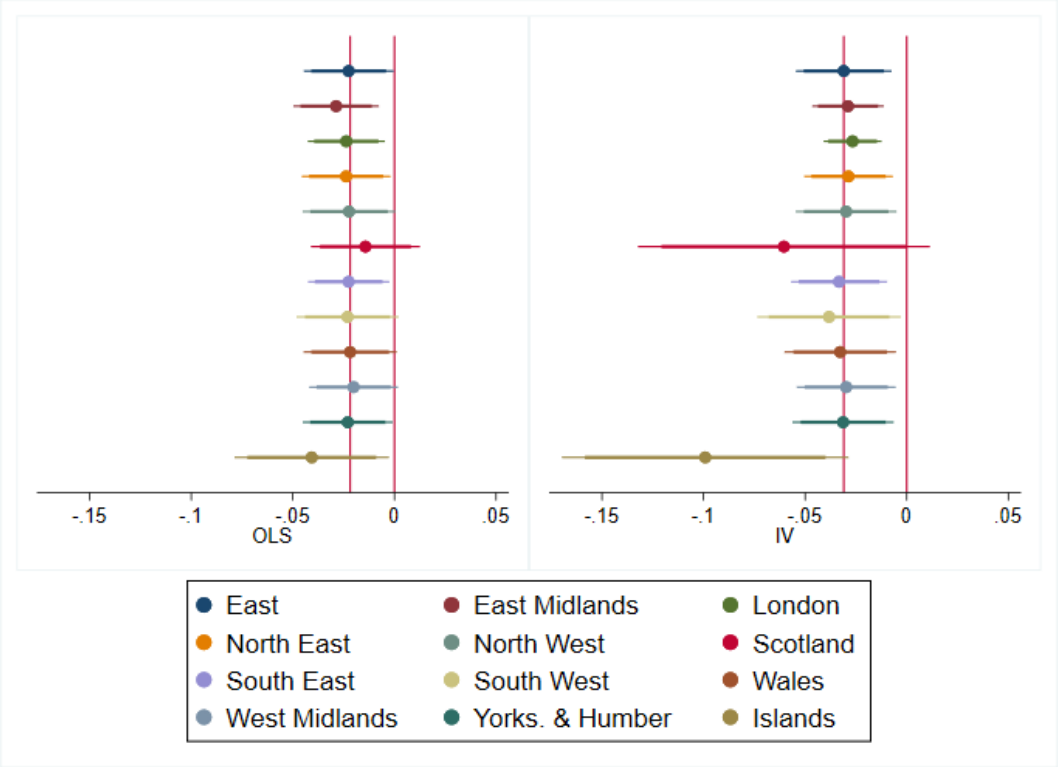

Figure A3: GOR and island exclusion

Notes: Fat and thin whiskers indicate confidence intervals at the 90% and 95% levels, respectively.

Table A4: Terrorism and the Remain vote: excluding districts based on vote shares

	(1)	(2)	(3)
Distance	-0.024**	-0.020*	-0.018*
	(0.028)	(0.057)	(0.072)
Vector $\mathbf{X}_i$	✓	✓	✓
Attack cluster FEs	✓	✓	✓
Percentiles excluded	1 & 99	5 & 95	10 & 90
R-squared	0.736	0.722	0.651
Observations	330	305	273

Notes: The dependent variable in all columns is 'Remain'. Standard errors are clustered at the level of the closest terrorist-hit district (attack cluster). p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

[3] Results from Table A4 and Figure A4 are robust to using the IV approach.

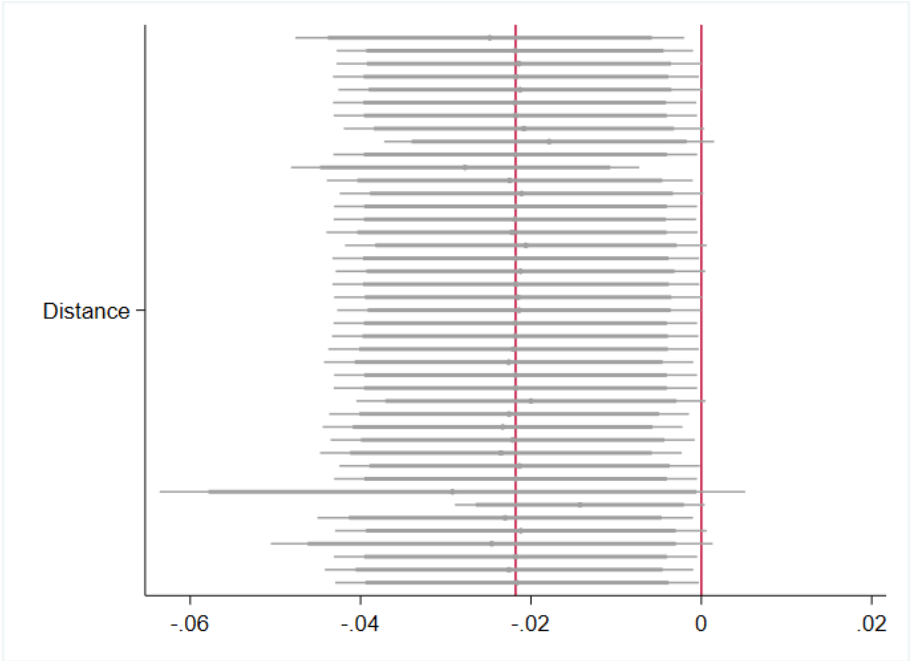

Figure A4: Attack cluster exclusion

Notes: Fat and thin whiskers indicate confidence intervals at the 90% and 95% levels, respectively.

A.6 Alternative clustering of errors

Throughout our main analysis, we have clustered the standard errors at the attack cluster level; that is, the level at which the treatment is assigned. In Figure A5, we check the sensitivity of our results to using alternative clustering of errors. The estimate on 'Distance' remains statistically significant, regardless of the clustering method used.

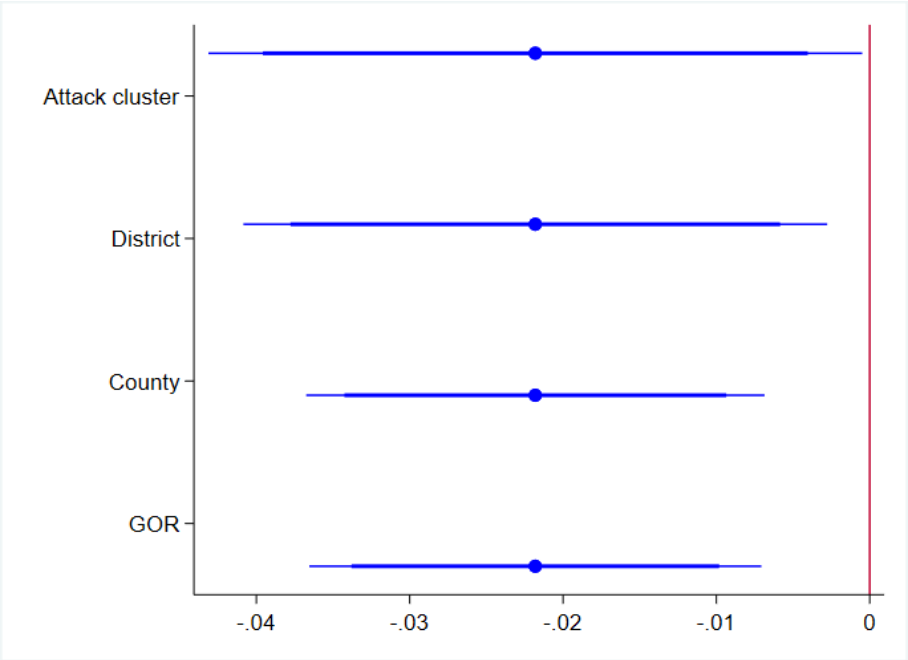

Figure A5: Alternative clustering of errors

Notes: Fat and thin whiskers indicate confidence intervals at the 90% and 95% levels, respectively.

A.7 Additional geography fixed effects

Fixed effects at the level of the closest terrorist-hit district (attack cluster) account for other unobservable characteristics that are shared by geographically close districts. Yet, to allay concerns about residual heterogeneities related to macro-region idiosyncrasies, we augment our baseline model with fixed effects at higher tiers of sub-national division: GORs and countries. The results are presented in Table A5, both before and after the inclusion of attack cluster fixed effects. Across all specifications, the estimate on 'Distance' retains its size and statistical significance.

A.8 Alternative distance measures

In Table A6, we experiment with alternative measures of distance. In column (1), we employ a categorical variable based on quintile splits of distance within each attack cluster, where category 1 is closest to an attack and category 5 is the furthest away. In column (2), we use the logarithm of distance, whereas, in column (3), we add to the specification the squared value of distance. The

Table A5: Terrorism and the Remain vote: additional geography fixed-effects

	(1)	(2)	(3)	(4)
Distance	-0.027***	-0.022**	-0.026**	-0.021*
	(0.009)	(0.028)	(0.022)	(0.056)
Vector $\mathbf{X_i}$	✓	✓	✓	✓
GOR FEs	✓		✓	
Country FEs		✓		✓
Attack cluster FEs			✓	✓
R-squared	0.657	0.644	0.766	0.752
Observations	337	337	337	337

Notes: The dependent variable in all columns is 'Remain'. Standard errors are clustered at the level of the closest terrorist-hit district (attack cluster). *p*-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

results do not change the inferences drawn from earlier findings, and there is no robust evidence of quadratic effects – the estimated coefficient on the squared term is weakly statistically significant and extremely small in magnitude.

Table A6: Terrorism and the Remain vote: alternative measures of distance

	(1)	(2)	(3)
Distance category (quintile splits)	-0.593*		
	(0.094)		
Ln(1+Distance)		-1.788*	
		(0.056)	
Distance			-0.054**
			(0.045)
Distance squared			0.000*
			(0.069)
Vector $\mathbf{X_i}$	✓	✓	✓
Attack cluster FEs	✓	✓	✓
R-squared	0.751	0.754	0.754
Observations	337	337	337

Notes: The dependent variable in all columns is 'Remain'. Standard errors are clustered at the level of the closest terrorist-hit district (attack cluster). *p*-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

A.9 Placebo tests

Our results show that proximity to terrorism affects the Remain vote share. To rule out the possibility that this is a spurious relationship, we perform placebo tests where we examine the effects on outcomes that are related to the referendum but should not be affected by distance to terrorism. First, we exploit the results from the 2018 Survation poll on EU matters. Specifically, we use the support for the UK's withdrawal deal in its form at the time of survey (November to December 2018). Second, we use the percentage of invalid votes in the 2016 EU referendum. Third, we employ two measures capturing people's perceptions of the economic consequences of Brexit. To construct

these measures, we rely on British Election Study (BES) data for 2016 (wave 8, pre-referendum) and consider individual-level responses to the following question: *"Do you think the following [The general economic situation in the UK / Your personal financial situation] would be better, worse or about the same if the UK leaves the European Union?"*. We match individuals to their local authority district and compute the share of respondents who answered *"Worse"* and *"Much worse"* to the above question. As in Becker *et al.* (2017), we only keep districts with at least ten respondents. The results from these tests are shown in Table A7. Across all four columns, the estimated coefficient on 'Distance' is very close to 0 and fails to reach statistical significance (as expected).

Table A7: Terrorism and placebo outcomes

	Withdrawal deal support (2018) (1)	Invalid votes (2016) (2)	Economy worse? (3)	Personal finances worse? (4)
Distance	0.005	0.000	-0.003	0.014
	(0.169)	(0.308)	(0.829)	(0.479)
Vector $\mathbf{X_i}$	✓	✓	✓	✓
Attack cluster FEs	✓	✓	✓	✓
R-squared	0.673	0.597	0.461	0.302
Observations	337	337	335	335

Notes: Standard errors are clustered at the level of the closest terrorist-hit district (attack cluster). *p*-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

A.10 Within attacked district analysis

Leave and remain votes in the EU referendum at the electoral ward level were made available by Rosenbaum (2017) following a series of Freedom of Information requests to local authorities. This dataset covers 1,261 spatial units in England (13% of the total number of wards in the UK). Exploiting information at such disaggregated level allows us to examine whether our results persist when we focus on variation within attacked districts. To do so, we consider 367 wards located in 19 terrorist-hit districts with voting data, and use differences in distances from attacked wards (within these districts) for identification. A turnout variable cannot be derived as we do not have information on the size of the electorate in each ward. Following Becker *et al.* (2017), we match the ward-level vote shares to cross-sectional data from the 2015 English Index of Multiple Deprivations. This index ranks 32,000 Lower Layer Super Output Areas (LSOAs) in England according to their degree of deprivation across five output areas: income, employment, education and skills, health and crime. We create an average rank of all LSOAs contained within a ward and invert the rank so that higher values represent more deprived wards. We then augment the empirical model of Becker *et al.* (2017) with our 'Distance' variable, which now captures the distance from the attacked ward within the ward's district.[4] Specifically, our empirical model takes the following form:

$$\text{'Remain'}_s = \theta_0 + \theta_1 \text{'Distance'}_{sr} + \theta_2 \text{'IMD'}_s + \phi_i^r + \varepsilon_s$$

where 'Remain'$_s$ is the Remain vote share in ward s (ranging from 17.5% to 85.6%); 'Distance'$_{sr}$ is the centroid-to-centroid distance in kilometers between ward s and the attacked ward r within the same district i; 'IMD'$_s$ is our standardised index of multiple deprivations; ϕ_i^r represents district fixed effects; and, ε_s is an error term, clustered at the same level. As in our main analysis, we focus on non-attacked wards to address self-selectivity concerns.[5]

The results are presented in Table A8. Column (1) reports the estimates of the above model; columns (2) and (3) add population density and total population, respectively; and column (4) includes all three variables together. Our catch-all measure of deprivation is negatively associated with the Remain vote, as in Becker *et al.* (2017), whereas population density and total population exert a positive effect on the support for Remain (as expected). Turning now to our variable of interest, 'Distance', we can see that it enters the specification with a negative sign and appears to be statistically significant across all specifications. This is consistent with the findings in our 'across-district' analysis: proximity to terrorism increases the Remain vote. The estimated coefficient in the most restrictive specification (column (4)) suggests that a 1-km decrease in distance increases the Remain vote share by 0.68 percentage points, which is a sizable and important effect (recall that Leave won with a margin of 3.8 percentage points).

[4] In some cases, the closest attack is outside the ward's district.

[5] In Bristol, there are 6 attacked wards. We use the distance to the ward that the majority of other wards within that district are closest to. Results are qualitatively the same when we remove Bristol from our sample.

Table A8: Within attacked district analysis

	(1)	(2)	(3)	(4)
Distance	-1.180***	-0.687*	-1.072**	-0.679*
	(0.007)	(0.052)	(0.024)	(0.072)
IMD: average rank	-3.577***	-4.672***	-5.230***	-5.796***
	(0.000)	(0.000)	(0.000)	(0.000)
Population density		5.574***		4.703***
		(0.002)		(0.007)
Population			6.378***	4.998**
			(0.005)	(0.032)
District FEs	✓	✓	✓	✓
R-squared	0.702	0.742	0.733	0.760
Observations	367	367	367	367

Notes: The dependent variable in all columns is 'Remain'. Standard errors are clustered at the district level. p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

B. Region-level analysis: direct exposure effects

So far we have studied the spillover effects of terrorism on Remain based on a 'closest attack district' fixed effects strategy. In this section, we consider an alternative approach that allows us to focus on the direct effect of terrorism for the districts that were hit by terrorist attacks. To do that, we compare the average Remain vote share between attacked and non-attacked districts and employ propensity matching techniques to address the endogeneity problem of the terrorism location choice. More precisely, we implement a nearest neighbor matching procedure, where each attacked district is matched (with replacement) with a non-attacked district based on a set of observable traits that determine the probability of experiencing an attack.

Table B1 reports the results from a linear probability model, where the dependent variable is a binary indicator coding the districts that were hit by attacks from January 2013 to the referendum date. Column (1) regresses the dependent variable on the variables included in vector $\mathbf{X}_i$, whereas column (2) adds country fixed effects. In line with previous studies (see, for instance, Brodeur, 2018), we find that the most prevalent district-level characteristics influencing the probability of experiencing an attack are crime and past exposure (attack history). However, once we augment the model specification with the set of additional controls discussed in Section 4.2, we can see that population size enters the regressions highly statistically significant and absorbs the impact of the two aforementioned variables (columns (3) and (4)). This implies that terrorist attacks occur more frequently in highly populated areas, and that these areas are also associated with high levels of crime and previous exposure to terrorism.

The average treatment effects resulting from the matching procedure are displayed in Table B2. In column (1), our matching covariates are all the variables included in columns (1) and (2) of Table B1. We also add country fixed effects to restrict the matched control observations to come from the same country as the treated observations. The limitation of this specification is that the inclusion of too many (insignificant) variables saturates the matching equation, which, in turn, inflates the variance of the estimated probabilities. Thus, in order to 'optimise' the bias-variance trade-off, we proceed by focusing on the statistically significant determinants of terrorism. Column (2) of Table B2 finds matches using attack history and crime, and again includes country fixed effects, whereas column (3) finds matches using population size and country fixed effects. The evidence obtained suggests that direct exposure to terrorism increases the Remain vote. The average treatment effect is positive and statistically significant in our preferred specifications (columns (2)-(3)), and only marginally insignificant in column (1). Overall, the results indicate that districts that experienced an attack are associated with a stronger Remain vote relative to districts that are similar in terms of terrorism determinants (and thus propensity to be directly exposed to terrorism) but did not experience an attack.

To confirm the validity of our results, we perform t-tests of the balancing property; that is, we test the significance of differences between treated (attacked) and non-treated matched districts for each variable entering the propensity score estimation in each of the three specifications considered above. The results are shown in Table B3. In all cases, we fail to reject the balancing hypothesis (our covariates are strongly balanced after matching), confirming that our matching procedure has been successful in grouping together homogeneous districts.

Table B1: Probability of experiencing terrorist attacks

	(1)	(2)	(3)	(4)
Attack history	0.151**	0.152**	0.079	0.079
	(0.017)	(0.016)	(0.153)	(0.151)
Qual. level 4+ share growth	-0.026	-0.023	-0.031	-0.030
	(0.179)	(0.254)	(0.203)	(0.224)
Manufacturing employment share change	-0.003	-0.005	-0.012	-0.011
	(0.867)	(0.795)	(0.510)	(0.559)
EU accession migrant growth	0.005	0.006	0.015	0.015
	(0.857)	(0.821)	(0.578)	(0.565)
EU 15 migrant growth	-0.033	-0.031	-0.027	-0.028
	(0.298)	(0.341)	(0.399)	(0.397)
Migrants from elsewhere growth	0.054	0.053	0.030	0.029
	(0.172)	(0.186)	(0.467)	(0.475)
Median hourly pay change	0.019	0.016	0.026*	0.026*
	(0.130)	(0.204)	(0.053)	(0.057)
Muslim population change	0.005	0.003	-0.010	-0.010
	(0.815)	(0.895)	(0.574)	(0.579)
Population density	0.016	0.014	0.004	0.007
	(0.725)	(0.756)	(0.930)	(0.885)
Total crimes and offences	0.049**	0.063**	0.041	0.045
	(0.037)	(0.039)	(0.123)	(0.152)
Total economy EU dependence	0.013	0.022	0.022	0.029
	(0.506)	(0.398)	(0.278)	(0.261)
UKIP support			-0.010	-0.008
			(0.558)	(0.656)
Austerity shock			-0.031	-0.033
			(0.268)	(0.250)
Pensioner share growth			-0.022	-0.022
			(0.422)	(0.431)
Population			0.079***	0.079***
			(0.001)	(0.001)
Twitter usage			0.021	0.021
			(0.573)	(0.580)
Country FEs		✓		✓
R-squared	0.110	0.113	0.159	0.159
Observations	380	380	378	378

Notes: The dependent variable in all columns is a binary variable taking value 1 if a district was hit by terrorist attacks between January 2013 and the referendum date. p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table B2: Propensity score matching

	(1)	(2)	(3)
Average treatment effect	3.812	2.920**	4.902*
	(0.106)	(0.031)	(0.052)
Observations	380	380	380

Notes: The dependent variable in all columns is 'Remain'. p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table B3: Balancing tests for matched samples

		Mean		t-test	
Column in Table B2	Matching covariate	Treated	Control	$\|t\|$	$p > \|t\|$
(1)	Attack history	0.256	0.233	0.250	0.805
	Qual. level 4+ share growth	-0.260	-0.531	1.350	0.180
	Manufacturing employment share change	-0.105	-0.269	0.740	0.463
	EU accession migrant growth	0.430	0.467	0.130	0.900
	EU 15 migrant growth	0.299	0.247	0.210	0.837
	Migrants from elsewhere growth	0.674	0.709	0.120	0.907
	Median hourly pay change	0.002	-0.049	0.300	0.761
	Muslim population change	0.482	0.304	0.810	0.420
	Population density	0.540	0.483	0.230	0.820
	Total crimes and offences	0.610	0.614	0.020	0.986
	Total economy EU dependence	-0.045	-0.267	1.080	0.282
	England	0.930	0.884	0.740	0.464
	Scotland	0.047	0.023	0.580	0.562
(2)	Attack history	0.256	0.256	0.000	1.000
	Total crimes and offences	0.610	0.656	0.250	0.803
	England	0.930	0.953	0.460	0.650
	Scotland	0.047	0.000	1.430	0.156
(3)	Population	0.953	0.881	0.220	0.825
	England	0.930	0.953	0.460	0.650
	Scotland	0.047	0.047	0.580	1.000
	Observations	380			

C. Individual-level analysis

C.1 Variable definitions

Table C1 describes all the variables used in the individual-level analysis and provides the corresponding data sources.

Table C1: Variable definitions and data sources for individual-level analysis

Name	**Definition**	**Source**
Dependent variable		
Pro-EU	Where an individual places themselves on a 0-10 scale, where 0 is *"Protect our independence"* and 10 is *"Unite fully with the European Union"*	BES waves 8, 12 and 13
Main explanatory variable		
Post-attack	=1 if individual was interviewed after the day of the attack, 0 otherwise	Own calculation from BES waves 8, 12 and 13
Control variables		
Male	=1 if individual is male, 0 otherwise	BES waves 8, 12 and 13
Age	Age of individual	BES waves 8, 12 and 13
Age squared	Age of individual squared	BES waves 8, 12 and 13
Education (low)	=1 if individual's highest qualification is below GCSE, 0 otherwise	BES waves 8, 12 and 13
Education (medium)	=1 if individual has GCSE or A-level as highest qualification, 0 otherwise	BES waves 8, 12 and 13
Education (high)	=1 if individual has undergraduate or postgraduate degree as highest qualification, 0 otherwise	BES waves 8, 12 and 13
Conservative	=1 if individual voted for the Conservative party in the 2015 general election, 0 otherwise	BES waves 8, 12 and 13
Labour	=1 if individual voted for the Labour party in the 2015 general election, 0 otherwise	BES waves 8, 12 and 13
Liberal Democrat	=1 if individual voted for the Liberal Democrat party in the 2015 general election, 0 otherwise	BES waves 8, 12 and 13
SNP	=1 if individual voted for the SNP in the 2015 general election, 0 otherwise	BES waves 8, 12 and 13
Plaid Cymru	=1 if individual voted for Plaid Cymru in the 2015 general election, 0 otherwise	BES waves 8, 12 and 13
UKIP	=1 if individual voted for UKIP in the 2015 general election, 0 otherwise	BES waves 8, 12 and 13
Green	=1 if individual voted for the Green party in the 2015 general election, 0 otherwise	BES waves 8, 12 and 13
Other party	=1 if individual voted for an other party in the 2015 general election, 0 otherwise	BES waves 8, 12 and 13
Other variables		
Terrorism higher?	=1 if individual believes that the threat of terrorism is "Higher" or "Much higher" outside the EU, 0 otherwise ("Lower", "Much lower" and "About the same")	BES waves 8 and 13
Keep nuclear weapons?	=1 if individual believes UK should keep nuclear weapons, 0 otherwise	BES wave 12
Terrorism	=1 if "terrorism" is the most important issue facing the country, 0 otherwise	BES waves 8, 12 and 13
Immigration	=1 if "immigration" is the most important issue facing the country, 0 otherwise	BES waves 8, 12 and 13
Health	=1 if "health" is the most important issue facing the country, 0 otherwise	BES waves 8, 12 and 13
Economy	=1 if "the economy" is the most important issue facing the country, 0 otherwise	BES waves 8, 12 and 13
Inequality	=1 if "inequality" is the most important issue facing the country, 0 otherwise	BES waves 8, 12 and 13
Europe	=1 if "Europe" is the most important issue facing the country, 0 otherwise	BES waves 8, 12 and 13
Negativity	=1 if "negativity" is the most important issue facing the country, 0 otherwise	BES waves 8, 12 and 13
Fight terror vs civil liberty	Where an individual places themselves on a 0-10 scale, where *"Protect civil liberties"* and 10 is *"Fight terrorism"*	BES wave 12

Notes: BES refers to the British Election Study.

C.2 Information on the attacks

In this section, we provide information on the attacks considered in our individual-level analysis: murder of MP Jo Cox (attack #1); Manchester Arena bombing (attack #2); Finsbury Park attack (attack #3). Table C2 reports the date they occurred, the district where they took place, the identity of perpetrator(s), the total number of fatalities and wounded, the BES wave they coincided with, and the timing of each attack in relation to the wave time window. It also provides a link to a BBC article that contains further details on each attack.

Table C2: Information on sampled attacks and corresponding BES waves

Attack	Date	District location	Perpetrator(s) identity	Total fatalities/wounded	BES wave	Days before attack	Days after attack
#1	16th June 2016	Kirklees	Neo-Nazi extremist	1/1	8	42	6
	https://www.bbc.co.uk/news/uk-england-36550304						
#2	22nd May 2017	Manchester	ISIL	23/119	12	11	18
	https://www.bbc.co.uk/news/uk-england-manchester-40008389						
#3	19th June 2017	Islington	Far-right extremist	1/12	13	11	4
	https://www.bbc.co.uk/news/uk-40323769						

Notes: Information on the identity of perpetrator(s) and the number of fatalities and wounded is taken from the Global Terrorism Database. ISIL refers to the Islamic State of Iraq and the Levant.

Our research design assumes that, regardless of where each attack occurred, individuals from all over the UK were potentially exposed to them through media coverage. The three attacks under consideration were, indeed, extensively covered by all national media outlets (newspapers, television, radio, social media platforms), and thus we can safely assume that the individuals in our sample were aware of them in their aftermath. In fact, every major national newspaper covered these attack on their front page the day after they occurred, and stories appeared on front pages many days afterwards. In Figure C1, we provide examples of national newspaper front pages covering the attacks the next day. The fact that they all involved deaths is also an indication of their shock value and amount of reporting.

(a) Attack #1

(b) Attack #2

(c) Attack #3

Figure C1: Newspaper front pages from the day after the attacks

C.3 Covariate balance

Table C3 shows descriptive statistics for the individual-level control variables included in vector $\mathbf{Z}_{nkw}$; namely, gender, age, age squared, level of education (low, medium, high) and the political party for which the interviewee voted in the 2015 general election. For each variable, we report the mean for those interviewed before the attack (control group) and those interviewed after the attack (treatment group) and compute the difference in means across the two groups. We also perform t-tests for differences in means and report the corresponding p-values.

In columns (1)-(4), we have the full sample of respondents across all three waves. The t-test results show a strong balance across the two groups for nearly all the pre-treatment attributes. The only characteristic that shows a statistically significant difference across treatment and control units is the low education variable. We do not, however, consider this problematic for our research design as the magnitude of the difference is very small. Because the t-tests for the three indicators of education attainment are not independent of each other, we also perform F-tests of joint significance. To do so, we regress the treatment variable ('Post-attack') on the three education variables and add district-by-wave fixed effects. This F-test returns a p-value of 0.092. In columns (5)-(8), we have the sample of respondents who reside within the counties that were hit by the three attacks. None of the p-values are smaller than 0.05, which indicates a strong balance across the two groups along all pre-treatment attributes. The only variable that appears to be statistically different at the 10% confidence level is the Liberal Democrat vote. However, the F-test of joint significance for the full set of party identification variables yields a p-value of 0.580. To make sure that our results are not affected by these minor differences, we report estimates both before and after including our controls. It must be noted that, while the inclusion of controls addresses potential biases from sample imbalances, it comes with the disadvantage that it reduces the power of our tests due to the smaller sample size.

Table C3: Covariate balance across control and treated units

	All respondents				Respondents within attacked counties			
	Pre-attack mean (1)	Post-attack mean (2)	Difference in means (3)	p-value (4)	Pre-attack mean (5)	Post-attack mean (6)	Difference in means (7)	p-value (8)
Male	0.51	0.50	0.00	0.74	0.49	0.51	-0.02	0.62
Age	55.05	55.07	-0.02	0.90	52.60	53.40	-0.80	0.41
Age squared	3257.37	3267.61	-10.24	0.53	3008.57	3093.81	-85.24	0.38
Education (low)	0.11	0.11	0.01	0.03	0.11	0.10	0.00	0.87
Education (medium)	0.39	0.40	-0.00	0.42	0.39	0.38	0.00	0.94
Education (high)	0.49	0.50	-0.00	0.58	0.51	0.51	-0.01	0.86
Conservative	0.34	0.34	0.00	0.44	0.33	0.30	0.03	0.23
Labour	0.31	0.31	0.00	0.71	0.43	0.41	0.02	0.62
Liberal Democrat	0.09	0.08	0.00	0.30	0.06	0.09	-0.03	0.05
SNP	0.06	0.07	-0.00	0.10	0.00	0.00	0.00	0.62
Plaid Cymru	0.01	0.01	-0.00	0.45				
UKIP	0.13	0.13	-0.00	0.56	0.11	0.13	-0.02	0.34
Green	0.05	0.05	-0.00	0.57	0.05	0.06	-0.01	0.66
Other party	0.01	0.01	-0.00	0.79	0.01	0.01	0.01	0.45
Observations	50,988	11,541	62,529		1,320	330	1,650	

C.4 Results for individual attacks

In Figure C2, we show the results when we estimate our model (Equation (2)) for each attack/wave separately. We report the estimates of the treatment variable ('Post-attack') for three different specifications: (i) when we regress our outcome variable ('Pro-EU') on the treatment variable alone; (ii) when we add district-by-wave fixed effects; (iii) when we add both district-by-wave fixed effects and the control variables in vector $\mathbf{Z}_{nkw}$. We persistently find a positive effect, suggesting that individuals place themselves closer to the idea of Britain uniting fully with the EU after they are exposed to an attack. As expected, the results are particularly strong and statistically robust for the Manchester Arena bombing (attack #2) which was a highly shocking and sensational event with a large number of casualties (the deadliest attack in the UK since the 2005 London bombings). Front page stories were written about this attack every day up until the London Bridge attack on the 3rd June 2017 (11 days later). Not surprisingly, the estimates appear to be smaller and statistically weaker for the murder of MP Jo Cox (attack #1), which occurred one week before the referendum. Even though this attack received very high media attention the first couple of days after it occurred, its media cycle was relatively short as newspapers and other outlets quickly returned to covering other referendum-related topics (which may have also affected the outcome variable). For example, the attack's last story on the front page of national newspapers was just 3 days after the first reports (ThePaperBoy, 2019). Turning now to the Finsbury Park attack (attack #3), we can observe a strong positive effect on the pro-EU sentiment, which, however, is quite sensitive to the specification used. This is likely an issue of statistical power because the treatment group for this particular attack/wave is quite small – less than 7% of individuals (1,565) were interviewed after the attack – and it becomes even smaller when we add the control variables.

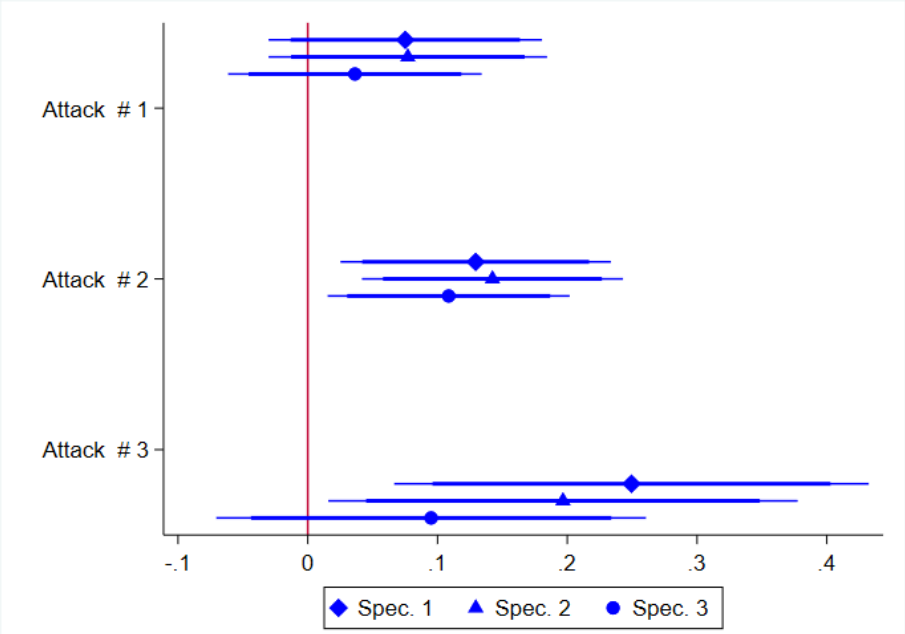

Figure C2: Terrorism and pro-EU sentiment: single attacks

Notes: Specification 1 includes the treatment variable only. Specification 2 includes the treatment variable and district-by-wave FEs. Specification 3 includes the treatment variable, district-by-wave FEs and vector $\mathbf{Z}_{nkw}$. Fat and thin whiskers indicate confidence intervals at the 90% and 95% levels, respectively.

C.5 Alternative clustering of errors

In this section, we test the sensitivity of our results to using alterative clustering of errors. Figure C3 shows how the confidence intervals of the baseline estimate change when the errors are clustered at the level reported on the y-axis. Note that district size corresponds to a set of binary variables based on the quintiles of the district's population, and that clustering at this level accounts for potential over-sampling of larger districts within GORs (Balcells & Torrats-Espinosa, 2018). It is reassuring that regardless of the clustering strategy used, our estimate is highly statistically significant.

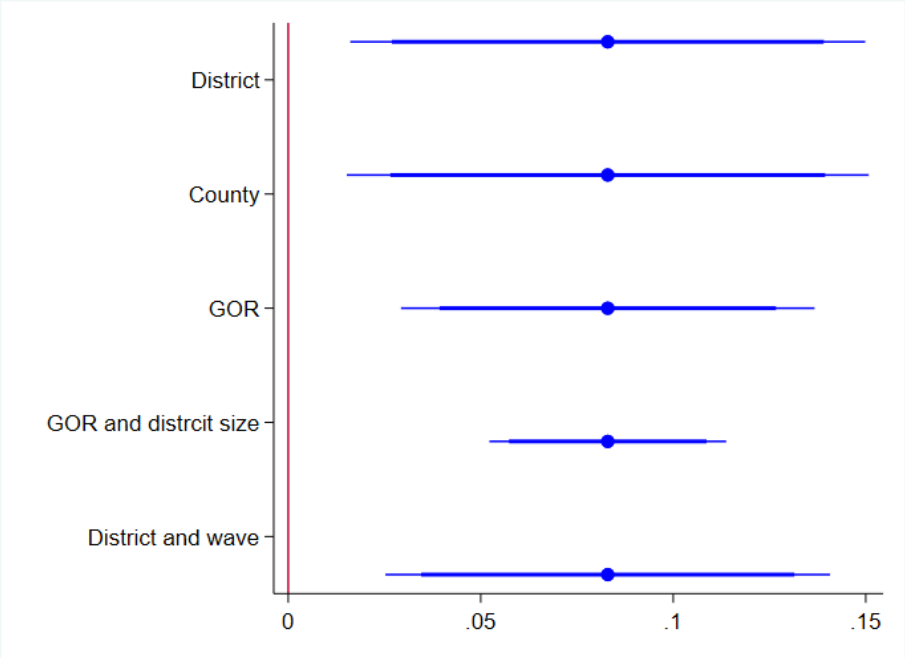

Figure C3: Alternative clustering of errors

Notes:. Fat and thin whiskers indicate confidence intervals at the 90% and 95% levels, respectively.

C.6 Placebo test

In this section, we perform a placebo test using people's positions on whether the UK should keep the nuclear deterrent system, known as Trident. We exploit responses to the question *"Britain should keep its submarines with nuclear weapons"*, which was included in wave 12 only. We code the responses *"Agree"* and *"Strongly agree"* with 1, and all the other responses with 0, and estimate a linear probability model (LPM). We believe that this is a useful placebo test because a nuclear deterrent is not a suitable tool to prevent, or deter, terrorist attacks. The LPM results are shown in C4. As expected, our treatment variable has no (economic or statistically) significant effect on this outcome.

Table C4: Placebo test

	(1)	(2)	(3)
Post-attack	-0.006	-0.009	-0.004
	(0.443)	(0.214)	(0.510)
District-by-wave FEs		✓[a]	✓[a]
Vector $\mathbf{Z}_{nkw}$			✓
R-squared	0.000	0.059	0.264
Observations	19,585	19,585	16,915

Notes: ✓[a] indicates district FEs (this question was included in one wave only). p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

C.7 The most important issues facing the country

In this section, we explore the treatment effect on citizens' beliefs about the single most important issue facing the country. We consider 'terrorism' and the six other most popular issues: 'immigration', 'health', 'economy', 'inequality', 'Europe', and 'negativity'. We construct a binary indicator for each one of these issues coding respondents who believe that the corresponding issue is the most important national problem. Columns (1)-(7) of Table C5 show the LPM estimates of the treatment effect on the seven outcome variables. The results indicate that, after a terrorist attack, individuals are 9.3 percentage points more likely to report terrorism as the top national problem. At the same time, we can observe that exposure to terrorism sways public opinion away from all the other issues. Interestingly, after an attack, people seem to perceive 'Europe' as a less important 'problem'.

We also consider an alternative outcome variable, capturing answers to the following question: *"Some people feel that, in order to fight terrorism, we have to accept infringements on privacy and civil liberties, others feel that privacy and civil liberties are to be protected at all cost. Where would you place yourself and the political parties on this scale? [0-10]"*. This question was included in wave 13 only. The variable is re-coded so that higher values represent a greater desire to fight terror and lower values represent a greater desire to protect civil liberties (value 10 corresponds to *"Fight terrorism"* and value 0 corresponds to *"Protect civil liberties"*). The results are displayed in column (8) of Table C5. We find that, after a terrorist attack, individuals are, on average, 0.171 points higher up the scale; that is, they are more willing to give up some liberty to fight terrorism. Taken together, these last rounds of estimates suggest that terrorism displaces attention from other key concerns such as the state of the economy or immigration policies, and increases the perception of insecurity. At the same time, however, terrorism also increases the likelihood that respondents see Remain as a rather safer choice, given the potential security risks of giving up the EU membership.

Table C5: The most important issues facing the country

	Terrorism (1)	Immigration (2)	Health (3)	Economy (4)	Inequality (5)	Europe (6)	Negativity (7)	Fight terror vs civil liberty (8)
Post-attack	0.093***	-0.007*	-0.016***	-0.006**	-0.005**	-0.050***	-0.015***	0.171**
	(0.000)	(0.097)	(0.000)	(0.046)	(0.038)	(0.000)	(0.000)	(0.028)
District-by-wave FEs	✓	✓	✓	✓	✓	✓	✓	✓[a]
Vector $\mathbf{Z}_{nkw}$	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	0.076	0.179	0.061	0.042	0.061	0.049	0.067	0.214
Observations	59,743	59,743	59,743	59,743	59,743	59,743	59,743	18,006

Notes: ✓[a] indicates district FEs (this question was included in one wave only). p-values are reported in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

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