

**Manuscript version: Author's Accepted Manuscript**

The version presented in WRAP is the author's accepted manuscript and may differ from the published version or Version of Record.

**Persistent WRAP URL:**

<http://wrap.warwick.ac.uk/148193>

**How to cite:**

Please refer to published version for the most recent bibliographic citation information. If a published version is known of, the repository item page linked to above, will contain details on accessing it.

**Copyright and reuse:**

The Warwick Research Archive Portal (WRAP) makes this work by researchers of the University of Warwick available open access under the following conditions.

Copyright © and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable the material made available in WRAP has been checked for eligibility before being made available.

Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

**Publisher's statement:**

Please refer to the repository item page, publisher's statement section, for further information.

For more information, please contact the WRAP Team at: [wrap@warwick.ac.uk](mailto:wrap@warwick.ac.uk).

# **Explaining Ethnic Violence. On the Relevance of Geographic, Social, Economic and Political Factors in Hate Crimes on Refugees**

Ulf Liebe<sup>a,\*</sup> and Nicole Schwitter<sup>a,\*</sup>

<sup>a</sup> Department of Sociology, University of Warwick, Coventry CV4 7AL, UK

\*Corresponding author. Email: [ulf.liebe@warwick.ac.uk](mailto:ulf.liebe@warwick.ac.uk); [nicole.schwitter@warwick.ac.uk](mailto:nicole.schwitter@warwick.ac.uk)

**Abstract:** Many Western societies experience reoccurring patterns of violence against ethnic minorities, immigrants, refugees and other asylum seekers, making it important to better understand which conditions increase (or decrease) the likelihood of hate crimes. In this paper, we test the relevance of different geographic, social, economic, and political conditions for attacks on refugees. To this end, we conduct an event-history analysis for Germany between 2014 and 2017, when Germany experienced a sharp rise and subsequent decline in assaults on refugees with up to 142 personal and miscellaneous (such as assaults and insults) and 11 arson attacks on refugee homes and refugees per week. We analyse these incidents at the district level and derive hypotheses from theoretical considerations on geographic proximity, social similarity, political opportunity structures, competition for resources, opportunities of contact with foreigners, and differences between East and West Germany. Irrespective of the type of attack, the results of Cox regression models support our theoretical reasoning on diffusion processes, geographical proximity, and the contact hypothesis. There is no support for the model-adopter similarity and competition-for-resources hypothesis. The type of violence matters with regard to the importance of political opportunity structures and differences between East and West Germany. Our findings show the importance of differentiating between different types of violence and accounting for context-dependency of ethnic violence for future research.

## **Acknowledgements**

We thank the anonymous reviewers and the editor for their valuable comments and suggestions.

## **Introduction**

### **Recurring Patterns of Ethnic Violence**

Native assaults on ethnic minorities, foreigners, immigrants or refugees are a constant companion of many societies. Several studies document and attempt to explain different forms of ethnic violence (often also called racist violence, xenophobic violence, hate crime, or right-wing extremist violence, see Bjørgo, 2003: 785; Green et al., 2001), which often seem to come in waves following a diffusion process (e.g. Ross, 1992 for Canada; Kaplan, 2007 for USA; Koopmans, 1996 and Ravndal, 2018 for several European countries). With regard to structural causes of right-wing terrorism and violence, Koopmans (1996) offered the first systematic cross-country comparison of eight West European countries between 1988 and 1993. One key finding is that violence tends to be lower in countries where “extreme right and racist parties are strong and vice versa” (Koopmans, 1996: 185). Following this line of work, Ravndal (2018) analysed right-wing terrorism and violence events for 18 West European countries between 1990 and 2015. In line with other studies (e.g. Bjørgo, 1997: 74–75; Koopmans, 1996), he documents a wave-like pattern, substantive cross-country differences in the amount of violence, finds partial support for Koopmans’ (1996) results regarding right-wing party support and further reveals that levels of violence are higher in more polarised countries.

Ravndal (2018: 862, brackets added) concludes: “The ongoing migration crisis has been fuelling fear, uncertainty and polarisation in a number of West European countries. A main ambition must be to stop such fears from translating into intolerant and violent behaviour, and thereby risking a new wave of RTV [right-wing terrorism and violence] in this region.” This is the starting point for our own analysis where we do not attempt a cross-country comparison but a more fine-grained analysis of within-country differences in ethnic violence, taking political and other factors into account. While cross-country comparisons can examine the relevance of structural determinants of ethnic violence at the national level (e.g., political structures), the definition of violence as well as recording standards for incidents can vary across countries which can affect the validity of such comparisons (Bjørgo, 2003: 793). A within-country analysis can examine more specific differences in the structural conditions of ethnic violence, e.g. regarding the “social homophily across geographic units” (Braun and Koopmans, 2010: 112) and better accounts for a potential reporting bias if a common standard of reporting incidents is employed across different units. We conduct a district-level analysis of violence against refugees in Germany between 2014 and 2017, a period that falls into the

“migration/refugee crisis”, and aim to understand and explain where incidents of violence against refugees are more likely to happen. Following the cross-country comparisons mentioned above and previous within-country comparisons in Germany (see Koopmans and Olzak, 2004; Braun and Koopmans, 2010; Jäckle and König, 2017, 2018), we ask which geographic, social, economic, and political contexts are more likely to result in ethnic violence. To what extent do spatial proximity, social similarity, political opportunity structures, competition for resources, and opportunities of contact with foreigners play a role for the degree of ethnic violence?

### **Ethnic Violence in the German Context**

In 2015/2016, Europe experienced a large influx of refugees and the decision in the summer of 2015 by the German chancellor Angela Merkel to leave Germany’s border open to shelter refugees was praised around the globe (see e.g. BBC, 2015). Thousands of Germans were literally welcoming refugees at train stations, providing food, clothes, and other necessities and the term “welcome culture” was coined (DW, 2015a). Today, thousands of citizens are still involved in voluntary work to support the integration of refugees into society. At the same time, critical discussions on the accommodation of refugees and other migrants emerged. People started questioning whether Angela Merkel’s decision was a mistake, what the limits of refugee numbers are, and how integration can best be achieved (e.g. DW, 2015b). Critical and negative attitudes towards refugees were not only expressed in discussions in daily life, (social) media, and politics, but also led to violent attacks on refugees and the often newly constructed refugee homes. These violent attacks have not ceased to exist to this date and have also not been the first instance of violent attacks on foreigners in Germany: There are striking similarities between the increase in violent attacks on foreigners in 2015/2016 and the early 1990s. One of the worst attacks in the 1990s took place between 22 August and 26 August 1992 in Rostock where hundreds of right-wing extremists attacked an asylum seekers’ home with stones and Molotov cocktails, and thousands of citizens were applauding as bystanders (see DW, 2017). Between 21 August and 23 August 2015, thirteen years later, violent protests targeted an asylum seekers’ home that was built to accommodate 200 refugees in Heidenau (Independent, 2015). The attacks were led by one to two hundred right-wing extremists, and up to a thousand citizens were supporting the incident as demonstrators or bystanders.

Albeit some striking similarities, these examples strongly differ in many aspects including the social context, the visibility of the public reaction, and the political context. While the public organised “chains of lights” against xenophobic violence all over Germany in the early 1990s (e.g. Los Angeles Times, 1992), counter protests on a national level were less visible in 2015/2016. Further, the populist party “Alternative für Deutschland” (AfD), which was founded 2013 and gained voter shares of up to 24% at the level of federal states in 2017, is closely related to immigration policy. Recent studies (e.g., Arzheimer and Berning, 2019) argue or provide evidence that the AfD is supported by citizens holding negative views on immigration and immigrants, among other things.

Braun and Koopmans (2010) studied the diffusion of violent incidents between 1990 and 1995 at the level of districts in Germany. They found among others effects of the extent of media coverage and homophily, i.e. the similarity between districts in terms of share of right-wing parties and immigrants, on the likelihood of incidents. Further, their analyses show that social similarity is more relevant for the spread of xenophobic violence than geographical proximity. Following this line of research, we take a longitudinal perspective and analyse attacks on refugees and refugee homes in Germany between 2014 and 2017, using data on daily incidents at the district level. This setup allows to test classic hypotheses on attitudes towards immigration, for example, regarding labour market competition, contact with immigrants, and model-adopter similarity. It must be stressed that our analysis is on the aggregate level and therefore we are not able to identify micro-level mechanisms explaining violent attacks. However, we still believe that investigating incident rates and their correlates at district level can be insightful.

In a previous study, Jäckle and König (2017) analysed attacks on refugee homes in Germany in 2015 based on data on daily incidents at the district level (see also Jäckle and König, 2019 for a replication). They found effects of the share of right-wing parties as well as the temporal and spatial proximity to districts that had experienced attacks on the probability of additional attacks. They further argue that differences between West Germany and the former state-socialist East Germany can be explained by structural factors such as differences in the share of migrants.

We extend previous research by differentiating types of attacks (arson attacks and personal/miscellaneous attacks) and considering further explanatory factors such as social

similarity between districts. We also differentiate between the newly formed populist AfD and extreme right-wing parties to explore their respective influence on ethnic violence over time.

In the subsequent sections, we present theoretical considerations, describe the data and variables, present our results and discuss our findings in the light of previous research on ethnic violence.

### **Theoretical Considerations**

In the following, we derive several theoretical hypotheses on the diffusions and extent of violent attacks against foreigners. Starting with influential ideas from the diffusion of social phenomena and innovations literature (Rogers, 1995 [1962]; Granovetter, 1978; Hedström, 1994) and keeping in mind that we analyse at the level of districts within a country, a well-known argument is that past behaviour can shape the *diffusion* of social phenomena and that *geographical proximity* can facilitate, due to strong tie networks and contact opportunities, the exchange of ideas and social movement organizations across geographic areas (Strang and Soule, 1998; Nicholls, 2009). At the level of districts, this would imply that the number of previous incidents of ethnic violence positively affects future incidents and that ethnic violence in a specific district has a positive effect on the occurrence of ethnic violence in another district, the closer these districts are located to each other.

However, this proposed positive relationship between spatial proximity and similarity of social processes is not well defined theoretically. It is somewhat unclear what constitutes effects of geographic proximity and hence, there might be hidden factors at work. For example, social homophily (Simmel, [1908] 1971; Lazarsfeld and Merton, 1954) has been suggested to explain effects of geographical proximity (Braun and Koopmans, 2010). In other words: not the geographical proximity per se, but the fact that neighbouring districts have rather similar characteristics explains the positive effect of spatial proximity on the spread of ethnic violence. The micro-mechanism underlying homophily effects is that individuals strive for similarity which then leads to a *similarity* between the *model* of a certain behaviour and the *adopter*. Another line of argumentation is that similar social contexts (e.g. share of immigrants) produce similar behavioural outcomes, and therefore districts which share certain characteristics are more likely to experience the same types of violent incidents. A possible mechanism for this supposition is the emergence of violence condoning norms in similar social contexts (see e.g. Crandall and Stangor, 2005).

*Diffusion Hypothesis:* Previous incidents in the same district increase the likelihood of additional violent attacks on refugees and refugee accommodations.

*Geographical-Proximity Hypothesis:* Geographical proximity to previous incidents increases the likelihood of additional violent attacks on refugees and refugee accommodations.

*Model-Adopter-Similarity Hypothesis:* Districts with similar characteristics are more likely to experience violent incidents compared to districts with dissimilar characteristics.

Social, political and economic factors further explain the prevalence of ethnic violence. Following general theories in the social movement literature, it can be expected that the political opportunity structure influences extraparliamentary protest (Kriesi et al., 1995; Koopmans, 1996). Kriesi et al. (1995) argue that social mobilisation is less likely in more inclusive and consensual political contexts so that the presence of right-wing and populist parties in the political arena will decrease extraparliamentary protest. While Kriesi et al. (1995) and others (Koopmans, 1996; Giugni et al., 2005) compare countries, it can also be argued that within countries ethnic violence is less likely in districts where right-wing and populist attitudes are represented in the political arena.

*Political-Opportunity-Structure Hypothesis:* The higher the share of right-wing and populist parties, the less likely are violent attacks on refugees and refugee accommodations.

The literature discusses labour-market competition (Myers, 1997; Scheve and Slaughter, 2001) as a reason for negative attitudes towards immigration. The basic assumption holds that foreigners and national citizens compete for the same jobs, thus creating social tensions. In the context of the present paper, it is important to note that tensions can already occur from perceptions of labour-market competition, even if they lack an actual empirical basis as refugees were very restricted from entering the German labour market before August 2016 (see Schmieder, 2016). Further, previous research suggests context-specific and rather small labour market effects of immigration on natives' employment and wage levels (Longhi et al., 2010; Foged and Peri, 2016). Nevertheless, perceived labour-market competition leads to the baseline hypothesis that ethnic violence is more likely in contexts with higher unemployment or economic deprivation. However, it is also argued that labour-market competition or economic

threat related to immigration is not a universal phenomenon but varies across economic sectors as studies show that low-skilled citizens express stronger negative attitudes towards immigration than high-skilled citizens (Scheve and Slaughter, 2001; Mayda, 2006; Hainmueller and Hopkins, 2014 for a critical account). Yet, this might be not an effect of skill level or education per se; rather, it could just reflect the empirical fact that low-skilled natives are more exposed to low-skilled migrants than high-skilled natives to high-skilled migrants (Diehl et al., 2018).

Assuming that migrants and national citizens are more likely, if at all, to compete for jobs in low-skilled sectors, the effect of unemployment on ethnic violence should be smaller in contexts with better overall economic conditions. Given better conditions, it can be assumed that there is less economic pressure on the low-skilled sector and individuals perceive unemployment as a temporary phenomenon and hence less competition with immigrants. Contrary, in contexts with poor economic conditions and, hence, higher economic pressure, individuals are more likely to struggle with unemployment as a long-term phenomenon, making them more likely to perceive immigrants as an economic threat.

*Competition-for-Resources Hypothesis:*

- a) The higher the unemployment rate in a district, the more likely are violent attacks on refugees and refugee accommodations.
- b) The effect of the unemployment rate on violent attacks on refugees and refugee accommodations is smaller in districts with overall better economic conditions.

Albeit not uncontested, the contact hypothesis (Allport, 1954; Dixon et al., 2005; Pettigrew and Tropp, 2006; Wagner et al., 2003) is a classic and often empirically supported argument stating that actual contact with foreigners decreases prejudices and stereotypes. It is assumed that by experiencing contact with foreigners, individuals must adapt their perceptions which conflict with what they actually observe to reduce cognitive dissonance. At the aggregated level, districts with higher shares of foreigners create more opportunities for contact between national citizens and foreigners which should weaken negative attitudes towards refugees and other migrants and decrease the likelihood of violent incidents. Yet, the application of this might depend on the economic context (Burns and Gimpel, 2000; Schneider, 2008). The process of reducing cognitive dissonance and prejudice is more likely to occur in contexts with good economic conditions, given that competition for resources between foreigners and natives is



lower and contact to foreigners might be perceived as positive. Contrary, in contexts with poor economic conditions, e.g. captured by high unemployment, contacts with foreigners might be perceived as less positive which weakens stereotype-decreasing processes (see Barlow et al., 2012 for effects of negative contacts).

*Opportunity-of-Contact Hypothesis:*

- a) The higher the share of foreigners in a district, the less likely are violent attacks on refugees and refugee accommodations.
- b) The effect of the share of foreigners on violent attacks on refugees and refugee accommodations is smaller in districts with a high unemployment rate.

There is widespread regional and cultural variation in Germany and many argue that due to its state-socialist past, individuals grown up in or with parents from East Germany have different political and social attitudes compared to those in West Germany (e.g., Adler and Brayfield, 1996; Alesina and Fuchs-Schündeln, 2007; Neundorf, 2009; Brosig-Koch et al., 2011). Further, previous research has found that individuals from East Germany are generally more hostile towards foreigners than those from West Germany (Krueger and Pischke, 1997; Decker et al., 2014). Also, it is possible that the presence of corresponding violence condoning norms differs between East and West Germany (see e.g. Crandall and Stangor, 2005; Küpper et al., 2019); compared with West Germany the higher presence of populist and right-wing parties in the political arena might increase the perceived legitimacy of violence towards refugees in East Germany. This would lead to different effects of political opportunity structures in East and West Germany. However, it has been argued theoretically and shown empirically (Wagner et al., 2003; Jäckle and König, 2017) that differences between East and West Germany vanish if both parts of Germany faced the same social, economic, and political conditions. In other words: controlling for structural conditions, similar likelihoods of ethnic violence are expected.

*East-West-Divide Hypothesis:*

- a) The likelihood of violent attacks on refugees and refugee accommodations is greater in East Germany than in West Germany.
- b) Controlling for social, economic and political context factors, the likelihood of violent attacks on refugees and refugee accommodations is not greater in East Germany than in West Germany.

We test these theoretical hypotheses in the following sections.

## **Data and dependent variables**

Data on cases of violence against refugees is collected by the Amadeu Antonio Foundation and the association PRO ASYL in their chronicle of hostile incidents against refugees since 2014 (Amadeu Antonio Stiftung, 2015, 2018). The chronicle offers a more detailed source of data to the public than governmental databases such as the Federal Criminal Police Office and incidents are collected through an extensive surveys of various sources, including but not limited to news reports, press releases by the police and parliamentary interpellations. Comparisons with official data also show significant more attacks against refugees listed in the chronicles as official sources do not seem to report all of the incidents and employ a strong downward bias according to the Foundation (Amadeu Antonio Stiftung, 2016).

To create the dataset of anti-refugee violence in Germany used in the following analysis, we web scraped the information from the online chronicles on 21<sup>st</sup> October 2017, including all entries that were collected by the foundation up to this date, and manually re-checked double and false entries. Assaults are geocoded using the GoogleMaps and OpenStreetMap API. For each event, we determined the district identification number (Kreisschlüssel). This standardised identifier is used in official statistics, allowing to merge official district data with the event data.

The chronicle documents four different types of hostile attacks against refugees: 1) arson attacks on refugee housing, 2) demonstrations against refugees, 3) personal injuries, 4) miscellaneous attacks on housing and refugees (such as shots, graffiti or insults and other attacks lacking detailed information). In our subsequent analysis, we focus on categories 1, 3 and 4. Arson attacks on refugee housing (category 1) are analysed separately because they constitute a very severe form of violent attack, putting a group of refugees at risk. Compared with other incidents, arson attacks are more strategic and involve more planning as well as preparation; they are similar to the right-wing terrorist attacks in Northern Europe in the 1990s and can be classified as heavy violence (Koopmans, 1996: 192). A second analysis is run on incidents on all other kinds of violent attacks towards refugees (categories 3 and 4, which are also more ambiguous than category 1). Demonstrations will not be analysed as firstly, they do not refer to actual attacks on refugees, and secondly, the method of data collection on demonstrations by the Amadeu Antonio Foundation has changed substantially throughout the years.

Our event dataset contains each recorded event with the date on and district in which it occurred. We start our analysis on 1 January 2014 and end on 18 October 2017 with the last event recorded in the chronicles by the time we have run the data collection (1378 days). Our level of analysis are the 401 German administrative districts (Kreise)<sup>1</sup>. This leads to 552,578 units of observation in the overall analysis. All in all, we observe 315 arson attacks and 5470 personal/ miscellaneous attacks.

### **Independent Variables**

For the independent variables, additional information from the district level was collected. Unless otherwise stated, data are obtained from the platforms of the federal statistical office and the respective statistical offices from the states. Where time-varying data is available, it has been used. In the following, the construction of the variables is described (see Table 1 for a descriptive overview with summary statistics).

*Diffusion*: To measure a possible contagion effect based on temporal closeness, spatial proximity and social similarity, we construct several time-varying diffusion indicators. These indicators refer to previous events of either type as it can be assumed that both, stronger forms of violence, such as physical attacks, can be followed by smaller attacks, such as racist graffities and hate speech, as well as that small acts of aggression and violence can inspire stronger forms (Allport, 1954: 14-15).

To measure *general diffusion*, we construct a variable counting the number of previous violent events that took place in each district (cumulative number of attacks in the same district). Number of previous attacks ranges from 0 to 346 (there were up to 21 arson attacks and up to 326 personal and miscellaneous attacks per district).

*Geographical Proximity* in kilometres was calculated using the great-circle distance method (haversine formula). The constructed variable is based on the distance between the district centre (polygon centroid) of a given district and the geodetic coordinate of the district centre from the closest district with an incident in the previous week, based on their longitude and latitude. Geodetic data was obtained from the geodata centre. We take the logarithm of the distance variable since we expect the relationship not to be linear but fade disproportionately with rising distance, and we inverse the measure for better interpretation.

*Model Adaptor Similarity:* To test the hypothesis on model adaptor similarity, we construct several time-varying similarity indices: *similarity in the voter share of the AfD*, *similarity in the voter share of other right-wing parties*, *similarity in unemployment rate*, *similarity in foreigner share* and *similarity in urbanisation*. The similarity measure is defined as an inverse dissimilarity, namely  $\frac{1}{(|s_i - s_a| + 1)}$ , with  $s_i$  being the given district and  $s_a$  being the most similar district (in respect to the specific comparison variable) that has experienced an event in the previous week and ranges from 0 (least similar) to 1 (most similar). Ordinal variables have been transformed into normalised ranks to calculate a similarity measure. The different similarity measures correlate significantly, positively and moderately with each other, with the lowest correlation of 0.30 being between similarity in urbanisation and right-wing similarity and highest correlation being 0.54 between similarity in foreigner share and similarity in unemployment rate.

*Political Opportunity Structure:* To assess the effect of right-wing parties on violence against refugees, we account for the voter share these parties obtained at the last election for district councils. District council elections are held every 5-6 years in each district separately; the date of the last election thus varies between districts (2013-2016). Since there is no federal dataset on district council elections results, we web scraped the Wikipedia sites of each district as these usually display this information. Where data was missing or not detailed enough for our purposes, we manually checked the election results on the district's or state's website. We differentiate between the voter share obtained by the newly formed AfD and the sum of the voter shares obtained by other right-wing parties (Die Rechte, Nationaldemokratische Partei Deutschlands, Die Republikaner, pro NRW and other local "pro" parties). We construct interaction effects between these variables and East Germany to account for a possible context-dependency of channelling effects.

*Competition for Resources:* *Unemployment* is measured as the district's unemployment rate in each month (time-varying). The data stem from the federal employment agency and are mean centred for the analysis. To take the overall financial situation of a district into account, we also control for the mean centred log of the gross domestic product per capita (GDP).

*Opportunity of Contact:* Foreigner share is measured as the districts' foreigner share in percent and is mean centred in the analysis (time-varying).

Finally, we employ several control variables which are expected to influence the prevalence of violence. We control for the degree of urbanisation, as individuals living in urban and rural areas are suggested to differ in attitudes towards foreigners (Dirksmeier, 2014; Semyonov et al., 2004). We differentiate four degrees of urbanisation according to data from the federal institute for building, urban and spatial research: large cities, urban districts, rural districts with densely populated areas and sparsely populated rural districts.

We also aim to control for the influx of refugees and the number of refugee homes as these directly influence the opportunity for ethnic violence. To control for this, we rely on an unofficial dataset created by means of anonymised, open collaboration. In 2015, a publicly available map was created on GoogleMaps and has subsequently been updated and dis- and reappearing since as discussions arose whether it violates Google's terms of service. It contained the exact addresses of refugees' homes. It has been generated by anonymous users under questionable intentions, presumably right-wing extremists. We acknowledge that this measure might be biased as it might be confounded with right-wing extremist activity, and does also not guarantee completeness; however, due to a lack of an official source for the number of refugees or refugee homes on the district level in Germany, we consider it a proxy (see the supplementary material for a validation using the Königsteiner Key).

Lastly, we control for the population size and the male share in the population as it is well established that both, the volume of crime is related to the population size and that men generally commit more crimes (Nolan III, 2004; Collier, 1998). Also, a recent study by Dancygier et al. (2019) found that hate crimes towards refugees in Germany are related to mating markets; in particular crimes are more likely in areas with excess males, where native men perceive male refugees as a "threat in the competition for female partners".

Table 1 approx. here

## Statistical Model

We employ Cox event history models, focusing on the duration of time between violent events in each of the individual districts. This allows us to exploit all available information on the exact dates of violent events.

The Cox model (Cox, 1972, 1975; Cox and Oakes, 1984) proves to be a popular regression model for the analysis of survival data making fewer assumptions than parametric methods and offers greater flexibility: It is not necessary to assume a particular survival distribution for the data. In the basic proportional hazards model, the hazard is assumed to be

$$\lambda(t) = \lambda_0(t) * \exp(\beta_1 x_1 + \dots + \beta_k x_k).$$

The survival models aim to estimate the coefficients  $\beta_1, \dots, \beta_k$ . The Cox model does not directly estimate the baseline hazard  $\lambda_0(t)$ .

The Cox model is a proportional hazard model and therefore assumes that variables included in the model shift the baseline hazard ( $\lambda_0(t)$ ) multiplicatively and that these shifts are constant over time. We tested the proportional hazard assumptions by means of Schoenfeld residuals tests. The tests indicated a violation of the assumption for several of the variables in our models. To relax the assumptions, we allowed the effects to change with time. We therefore incorporated interaction terms between the covariates and time in the models (Mills, 2010: 154-155). We checked if the slope of the time effect significantly differs from zero for all variables simultaneously and used backward elimination to achieve the final models (Kleinbaum and Klein, 2010, Chapter 4).

Our regressions assume the following relationship after introducing variables that vary continuously with time:

$$\lambda(t) = \lambda_0(t) * \exp \{ \beta_1 x_1 + \dots + \beta_k x_k + g(t)(\gamma_1 z_1 + \dots + \gamma_m z_m) \}$$

Where  $z_1, \dots, z_m$  are time-varying covariates of the form  $z_i(t) = z_i g(t)$  which is a function of the current time.

Since the basic proportional hazards model only considers the time until the first occurring event but we are dealing with recurring event data, we follow the counting process approach of Andersen and Gill (1982). The Andersen-Gill model assumes that the instantaneous risk to experience an event at time  $t$  remains the same irrespective of past events. In contrast to the basic model, a district remains in the risk-set after experiencing an event. In the Andersen-Gill model for ordered failure events, the covariance matrix of the estimators is adjusted to account for the additional correlation of failure times within districts.

To account for unobserved heterogeneity and possible event dependence, we employ shared gamma frailty with districts as groups. Frailty enhances conventional regression models by incorporating random effects; it is an unobserved random proportionality factor, modifying the hazard functions of a subject (Austin, 2017; Mills, 2010: 15, 165-166).<sup>2</sup>

## **Results**

### **Spread of violence over time and space**

Figure 1 plots the number of arson and personal/miscellaneous attacks on refugees over the observation period in our dataset. We observe a general increase of xenophobic attacks over time since 2014 and a decrease of attacks in 2017 compared with 2016<sup>3</sup>. The strongest influx of refugees was witnessed over the course of 2015 and 2016, particularly in the second half of 2015. Notable attacks against refugees that received remarkable media attention have happened in August 2015 (attacks in Heidenau) and September 2016 (attacks in Bautzen). Another notable date is the 2015–16 New Year's Eve celebrations during which there were mass sexual assaults perpetrated by men of North African and Arab appearance in a number of German cities, particularly in Cologne (DW, 2016; see also Frey, 2020). These attacks have sparked criticism on the asylum policy and strengthened negative feelings towards refugees.

Figure 1: Number of violent attacks over time

Figure 1 approx. here

The diffusion of violent attacks (sum of personal/miscellaneous and arson attacks) over time and space are shown in Figure 2. We observe that attacks against refugees have started to take place in East Germany and in some districts in the urban area of the Ruhr region in 2014. Over the years, violence has spread all over Germany and further centres of high violence developed

(such as around Stuttgart and Munich) but prevalence of attacks stayed especially high in East Germany.

Figure 2: Geographic distribution of attacks against refugees over time

Figure 2 approx. here

Note: The shade of red reflects the rate of attacks (number of attacks divided by population size in 100,000) in a certain district with a darker red representing districts with more violent attacks (8 categories:  $0 \leq 1 \leq 2 \leq 3.5 \leq 5 \leq 10 \leq 30 \leq 50 <$ ).

### **Cox Model on Personal/Miscellaneous and Arson Attacks**

The results of the Cox models for personal/miscellaneous attacks and arson attacks, respectively, are presented in Table A1 (see appendix). In the following, we evaluate our theoretical hypotheses based on these models and illustrate main results with the accompanying hazard rate plots, which refer to the models including the interaction effects (Models 2) in Table A1 unless stated otherwise. While loosening the proportional hazard assumption required us to include interaction effects between time and the predictor variables, the hazard plots cannot account for this, and we hold time constant at the mean for illustrative purposes.

*Diffusion:* For both personal/miscellaneous and arson attacks, the cumulative number of previous attacks in the same district has positive and significant effects on the hazard rate (see also Figure 3). An additional attack increases the hazard rate by approximately one percentage point for personal/miscellaneous attacks and three and a half percentage points for arson attacks (see Table A1).

Figure 3: Effect of number of previous attacks

Figure 3 approx. here

Note: Comparison of 1st and 99th percentile, other variables hold at the mean.

*Geographical-Proximity Hypothesis:* In line with theoretical considerations, geographical proximity to previous incidents has a positive and statistically significant effect on the likelihood of additional personal/miscellaneous and arson attacks (see Figure 4).



Figure 4: Effect of geographical proximity

Figure 4 approx. here

Note: Comparison of 1st and 99th percentile, other variables hold at the mean.

*Model-Adopter-Similarity Hypothesis:* Figure 5 provides hazard plots for the effect of similarity in right-wing voter share (see Table A1 for all similarity measures). The Cox models for personal/miscellaneous and arson attacks do not support the hypothesis that the model and adopter of ethnic violence have common characteristics. While for personal/miscellaneous attacks all variables except for similarity regarding AfD voter share – similarity in share of foreigners, urbanisation, unemployment rate, right-wing voter share – indicate a positive effect in line with our theoretical considerations, all effects are statistically insignificant (except the one for unemployment rate which is significant at 10-percent level). For arson attacks, we find a positive and significant effect of similarity in urbanisation and right-wing voter share at the 10-percent level. While similarity in AfD voter share has, as expected, a positive effect, similarity in unemployment and foreigner share have negative effects (all effects are insignificant). In an alternative model we created an additive index of the different similarity measures and find a positive but insignificant effect on the likelihood of personal/miscellaneous and arson attacks (see Table S2 in the supplementary material).

Figure 5: Effect of similarity in right-wing voter share

Figure 5 approx. here

Note: Comparison of 1st and 99th percentile, other variables hold at the mean.

*Political-Opportunity-Structure Hypothesis:* We expect that ethnic violence is less likely if right-wing and populist parties are represented in the political arena. Figure 6 provides some evidence for this theoretical reasoning in the case of personal/miscellaneous attacks but none for arson attacks. For the former, a larger voter share for the AfD results in an increased hazard rate (comparing the blue versus the green line). An increase in voter share for the AfD of one unit results in a decrease of the violence hazard of two percentage points for West Germany (see Table A1). This effect is significant at the 1-percent level. For East Germany (interaction effect between AfD voter share and variable “East Germany”), the AfD effect is positive, large and significant at the 1-percent level; this positive effect can also be seen when comparing the yellow and red lines in Figure 6. This means that the presence of the AfD in the political arena

is positively associated with the hazard rate in East Germany, contradicting the derived hypothesis.

With respect to right-wing parties (see Table A1), there is no evidence for the relevance of political opportunities structure regarding arson attacks. However, we find a positive and significant main effect when analysing personal/miscellaneous attacks. This effect does not significantly differ between East and West Germany.

Figure 6: Interaction effect of East Germany and AfD voter share

Figure 6 approx. here

*Competition-for-Resources Hypothesis:* For personal/miscellaneous and arson attacks, we find a positive but insignificant main effect for the unemployment rate (Figure 7 and Models 1 in Table A1 in the appendix). In contrast to our theoretical reasoning, we do not find a smaller effect of unemployment rate on ethnic violence in contexts with overall better economic conditions.

Figure 7: Effect of unemployment rate (UR)

Figure 7 approx. here

Note: Comparison of 1st and 99th percentile, other variables hold at the mean.

*Opportunity-of-Contact Hypothesis:* In line with the basic contact hypothesis, the foreigner share at the district level has a negative and significant effect on the likelihood of personal/miscellaneous and arson attacks (at least on the 10-percent significance level; see Table A1 in the appendix). A change in the foreigner share of one unit leads to a decrease of the violence hazard of about four (personal/miscellaneous attacks) and six (arson attacks) percentage points, respectively. From a theoretical perspective, we expected that opportunities of contact with foreigners are less likely to lead to decreasing stereotypes about foreigners and ethnic violence in social contexts with more competition for resources, i.e. higher unemployment. Contrary to this, we find that in contexts with a higher unemployment rate, the effect of the foreigner share on the hazard rate is stronger. Figure 8 illustrates that the distances between the blue and green lines, comparing the effect of foreigner share in districts with low unemployment rates, are smaller than between the yellow and red line, comparing the effect of

foreigner share in districts with high unemployment rates, particularly for miscellaneous attacks.

Figure 8: Interaction effect of unemployment rate (UR) and foreigner share (FS)

Figure 8 approx. here

*East-West-Divide Hypothesis:* We find support for an East-West divide for personal/miscellaneous attacks and to a smaller extent arson attacks. Models presented in the supplementary material (Tables S3 and S4) reveal that the effect of the variable East Germany remains positive and statistically significant when controlling for each set of determinants of ethnic violence (proximity, similarity, etc.) separately, as well as including all sets of variables for personal/miscellaneous attacks. Including all sets of variables, the model on arson attacks still reveals a positive effect of East Germany; however, it is only significant at the 10-percent level. Figure 9 plots the estimated hazard functions for East-West differences based on models with (Plot A) and without further covariates (Plot B). It illustrates that differences in the effects for East and West Germany depend on the type of violence: While for both types of violence East-West differences are large in the models only including the variable for East Germany (Plot B), the differences in hazard rates are more pronounced for personal/miscellaneous attacks compared to arson attacks (Plot A) when including all other variables in the model.

Figure 9: Effect of East Germany

A) Effect of East Germany, model with all covariates

Figure 9A approx. here

B) Effect of East Germany, model with East Germany as only predictor

Figure 9A approx. here

Note: Comparison of 1st and 99th percentile, other variables hold at the mean.

With regards to interaction effects between time and the predictor variables, we find that the effect of the number of previous attacks decreases in strength for arson attacks over time. We also find that the positive effect of the AfD voter share in East Germany as well as the positive, but insignificant, main effect of right-wing parties decreases significantly over time. In regard to the unemployment rate, we find that its effect increases and becomes positive over time, while the effect regarding its context-specificity with GDP decreases over time (negative three-

way interaction effect between time, GDP and the unemployment rate). Lastly, the interaction effect between foreigner share and unemployment rate also weakens over time. Yet, considering the effect sizes and turning points, these interaction effects rather support our theoretical hypotheses or do not affect the overall direction of variable effects throughout the observation time.

## **Discussion and Conclusions**

### **Key results regarding the theoretical considerations**

Against the background of a remarkable increase (and subsequent decrease) in hostile behaviour towards refugees in Germany since 2014, as well as a persistence of violent incidents across Europe (FRA, 2019), we tested a range of theoretical considerations on the spread of ethnic violence across space and time in Germany, extending previous research by taking various context effects into account and differentiating different types of hate crimes. Table 2 provides an overview of our major findings in the light of the theoretical hypotheses tested. For both personal/miscellaneous and arson attacks, the results are in line with our theoretical reasoning regarding diffusion processes, geographical proximity (also found by Jäckle and König, 2017) and the contact hypothesis (also Jäckle and König, 2017, 2018). The positive effect of geographical proximity raises the question of its meaning: While we cannot clarify this in the present study, further studies on the micro-foundation of violent attacks can provide insights into whether this effect is due to, for example, direct links between offenders (i.e. social movement networks) or mobility of offenders across districts. With regard to opportunities of contact with foreigners, we find, next to a main effect, a context effect: The negative effect of the foreigner share on ethnic violence is stronger in contexts with a higher unemployment rate, i.e. contexts with more competition for resources. We expected the opposite effect, i.e. the effect of the foreigner share to be weaker in poor economic conditions due to more negative perceptions of foreigners. However, if we assume positive contacts/contact opportunities then the context effect in our study suggests that opportunities of contact with foreigners are less relevant for ethnic violence in good economic conditions compared with poor economic conditions. This should be followed up in future research.

Regarding the importance of political opportunity structures, competition for resources and differences between East and West Germany, the type of violence matters in our study. These factors are rather relevant for personal/miscellaneous attacks, but not for arson attacks. While

Braun and Koopmans (2010) find evidence that stronger right-wing representation leads to less xenophobic violence, Jäckle and König (2017) find that the strength of populist parties boosts it. Our study has shed light on important differences between West and East Germany, the type of political party and the type of violence under analysis. For personal/miscellaneous attacks, the hypothesis on political opportunity structures is supported in West Germany. Here, attacks are less likely where populist attitudes are represented in the political arena through the AfD; in East Germany, the presence of the AfD actually increases the occurrence of ethnic violence. Since the AfD is especially popular in East Germany it might be that its presence in the political arena increases the perceived legitimacy of prejudice and violence against refugees. This suggests a threshold where political opportunity structures have a positive instead of negative effect on ethnic violence. Also, there is some evidence that those in East Germany who identify politically with the AfD hold stronger negative attitudes towards refugees than those in West Germany (Lengfeld and Dilger, 2018), possibly resulting in differences in the political discourse which in turn could affect violence against refugees. In both, East and West Germany, the presence of other right-wing parties boosts the occurrence of personal/miscellaneous attacks on refugees.

Political opportunity structures are rather irrelevant for the occurrence of arson attacks. It might well be that political opportunity structures are less relevant for these events of heavy violence because the violent actors might have different characteristics than those who are more likely to conduct other forms of attacks, and the “heavily violent” might be less affected by the presence of populist parties (albeit it is difficult to disentangle motivations and characteristics of offenders, see Bjørge, 2003). However, this should be explored further in future research.

We do not find that competition for resources measured via unemployment rate matters for explaining the prevalence of ethnic violence. While Braun and Koopmans (2010) found support for the competition-for-resources hypothesis, their concrete operationalisation differs. In our analysis, structural differences between East and West Germany do not account (personal/miscellaneous attacks) or only partially account (arson attacks) for regional differences (contrary to Jäckle and König, 2017); attacks are more likely in East than West Germany. This might be explained by “East-West differences” in the prevalence of violence condoning norms (Crandall and Stangor, 2005; Küpper et al., 2019) concerning refugees and foreigners, respectively.

All in all, we find that some results are stable across both types of hate crimes, while others differ. However, even when the direction and significance level of effects are stable across both types of violence, effect sizes can differ. These findings suggest that the mechanism at work can depend on the type of violence and differentiating these can lead to valuable insights.

Table 2 approx. here

### **Limitations of the study and future research directions**

Our study has several limitations that need to be considered. First, while we used the best available measure of ethnic violence, we cannot guarantee that we captured all incidents that happened between 2014 and 2017. Second, some of the explanatory factors such as the number of refugee homes could only be measured at one point in time, while data on variation over time is clearly preferable. Third, we have no information about how many individuals were involved in ethnic violence; yet, the number of people participating in attacks on refugees and other migrants can be relevant (see Biggs, 2018 for research on social movements). Fourth, there are further explanatory factors for ethnic violence including the role of mass media and networks (Strang and Soule, 1998; Myers, 2000; Koopmans and Olzak, 2004) and threatening events (Legewie 2013; de Rooij et al. 2015; Jäckle and König, 2018), which were not considered in this study. We can thus not differentiate between events covered in the media and others; previous research has indicated the importance of the interplay between model-adopter similarity, newspaper coverage and bystander responses (Braun and Koopmans, 2010). Future studies could focus on this interplay and reveal how media attention affects the relevance of model-adopter similarity, i.e. to what extent information transmission via media across geographical units is an underlying mechanism of similarity effects. This limitation of our study might also be a reason why we do not find similarity effects. Also, while we controlled for unobserved time-fixed characteristics at the district level, there is recent evidence of historical path dependencies. Cantoni et al. (2019) found that municipalities with higher vote shares for the Nazi Party NSDAP in 1933 are more likely to vote for the AfD party in 2017. This historical dimension needs more attention in future research. Fifth, our analyses take place at the district level, but the theoretical considerations explicitly or implicitly refer to individual-level mechanisms. As previous research indicates, for example regarding the contact hypothesis, the level of analysis might play an important role (e.g., Dinesen and Sønderskov, 2015; Weber, 2015). It is one of the major tasks of future research to test micro-foundations and test mediation factors, as our results just show the plausibility of theoretical arguments.

This also applies to the role of social media and social norms for ethnic violence. Müller and Schwarz (2018) identified a causal effect of anti-refugee sentiment on Facebook on ethnic violence against refugees at the level of municipalities in Germany. Certain social contexts might result in the emergence of violence condoning norms which in turn can explain the spread of ethnic violence (see Crandall and Stangor, 2005 for a general discussion regarding the role of social contexts for social norms on prejudice).

Notwithstanding these limitations, we find support for structural conditions and their context-dependency such as the interaction between economic conditions and opportunity of contact with foreigners that can explain differences in the amount of ethnic violence at the district level in Germany. Taking the differences between the type of violence as well as context effects into account, our results indicate that one-fits-all solutions to the problem of ethnic violence are not likely to be successful. It seems to be important to focus on tailored responses at the regional level, e.g. regarding the discourse on populist parties, and to acknowledge differences between East and West Germany. A more detailed analysis of the motives of violent actors can help to better understand determinants of violence at the individual level, to differentiate between “racism as expression” and “racism as motivation” (Bjørge, 2003: 791) and to further inform intervention strategies. Albeit this remains to be proven and acknowledging historical-cultural differences between countries (Green et al., 2001: 489), similar to previous research (Koopmans, 1996) there is no reason to believe that Germany is an “exceptional case” regarding the effects of structural conditions on the extent of ethnic violence as well as the importance of within-country differences.

Based on our findings we believe it is a step forward in research on ethnic violence to more strongly differentiate and consider different types of violence and its context-dependence. While there is an increasing number of studies on violence against refugees, these studies mainly focus on Germany and it is therefore important to also conduct within-country analyses for other nations, which helps to clarify how robust effects of structural determinants of different forms of ethnic violence are across various national contexts.

## Notes

- <sup>1</sup> Up until 31.10.2016, Germany counted 402 districts. Two districts, Göttingen and Osterode am Harz, were then merged to a new district, Göttingen. For consistency, we

also merged Göttingen and Osterode am Harz. District data was summed up (for absolute values) or a weighted average was calculated (for relative values).

- <sup>2</sup> As previous research used different models, we present results of a piecewise exponential model in the supplementary material (Table S1) and provide some comments on model selection. The Cox and piecewise exponential model show similar results.
- <sup>3</sup> The striking jump of attacks in January 2016 might be partly due to changes in data collection by the Amadeus Antonio Foundation. This affects the baseline hazard which is not estimated in the Cox model but absorbed in the modelling approach. See the supplementary material (Table S1) for a piecewise exponential model, which includes binary variables for time and shows similar results to the Cox model.

## References

Adler, M. A. and Brayfield A. (1996). East-West Differences in Attitudes about Employment and Family in Germany. *The Sociological Quarterly*, **37**, 245-260.

Alesina, A. and Fuchs-Schündeln, N. (2007). Good-Bye Lenin (or Not?): The Effect of Communism on People's Preferences. *The American Economic Review*, **97**, 1507-1528.

Allport, G.W. (1954). *The Nature of Prejudice*. Reading: Addison Wesley.

Amadeu Antonio Stiftung (2015). *Rechte Hetze gegen Flüchtlinge - Eine Chronik der Gewalt 2014*. Download: <https://www.mut-gegen-rechte-gewalt.de/news/meldung/rechte-hetze-gegen-fluechtlinge-eine-chronik-der-gewalt-2014-03> (accessed 28 August 2018).

Amadeu Antonio Stiftung (2016). *Pressemitteilung der Amadeu Antonio Stiftung - Inland/ Rechtsextremismus. Verzerrtes Bild: Amadeu Antonio Stiftung zählt mehr Angriffe auf Asylsuchende als vom Bundeskriminalamt veröffentlicht. Angriffe auf Geflüchtete müssen konsequent bekannt gemacht und verfolgt werden. 2016 bereits 250 Angriffe, davon 37 Brandanschläge*. Download: <http://www.amadeu-antonio-stiftung.de/w/files/pdfs/pressemitteilungen/2016-02-25-pm-verzerrtes-bild-von-fluechtlingsfeindlicher-gewalt.pdf> (accessed 30 November 2019).



Amadeu Antonio Stiftung (2018). *Chronik flüchtlingsfeindlicher Vorfälle*. Download: <https://www.mut-gegen-rechte-gewalt.de/news/meldung/rechte-hetze-gegen-fluechtlinge-eine-chronik-der-gewalt-2014-03> (accessed 28 August 2018).

Andersen, P. K. and Gill, R. D. (1982). Cox's Regression Model for Counting Processes: A Large Sample Study. *The Annals of Statistics*, **10**, 1100-1120.

Arzheimer, K. and Berning, C. C. (2019). How the Alternative for Germany (AfD) and their voters veered to the radical right, 2013–2017. *Electoral Studies*, **60**, 102040.

Austin, P. C. (2017). A Tutorial on Multilevel Survival Analysis: Methods, Models and Applications. *International Statistical Review*, **85**, 185-203.

Barlow, F. K., Paolini, S., Pedersen, A., Hornsey, M. J., Radke, H. R. M., Harwood, J., Rubin, M. and Sibley, C. G. (2012). The Contact Caveat: Negative Contact Predicts Increased Prejudice More Than Positive Contact Predicts Reduced Prejudice. *Personality and Social Psychology Bulletin*, **38**, 1629-1643.

Biggs, M. (2018). Size Matters: Quantifying Protest by Counting Participants. *Sociological Methods & Research*, **47**, 351-383.

Bjørger, T. (1997). *Racist and Right-Wing Violence in Scandinavia: Patterns, Perpetrators, and Responses*. Oslo: Tano Aschehoug.

Bjørger, T. (2003). Violence against Ethnic and Religious Minorities. In: Heitmeyer, W. and Hagan, J. (Eds), *International Handbook of Violence Research*.. Dordrecht: Springer, pp. 785-799.

Braun, R. and Koopmans, R. (2010). The Diffusion of Ethnic Violence in Germany: The Role of Social Similarity. *European Sociological Review*, **26**, 111–123.

British Broadcasting Corporation (BBC) (2015). Migrant crisis: How long can Merkel keep German doors open? Download: <https://www.bbc.com/news/world-europe-34402001> (accessed 22 December 2019).

Brosig-Koch, J., Helbach, C., Ockenfels, A. and Weimann, J. (2011). Still Different after All These Years: Solidarity Behavior in East and West Germany. *Journal of Public Economics*, **95**, 1373–1376.

Burns, P. and Gimpel, J. G. (2000). Economic Insecurity, Prejudicial Stereotypes, and Public Opinion on Immigration Policy. *Political Science Quarterly*, **115**, 201-225.

Cantoni, D., Hagemeister, F. and Westcott, M. (2019). Persistence and Activation of Right-Wing Political Ideology. Discussion Paper No. 143. LMU Munich.

Collier, R. (1998). *Masculinities, Crime and Criminology*. Thousand Oaks: Sage.

Cox, D. R. (1972). Regression Models and Life-Tables. *Journal of the Royal Statistical Society. Series B (Methodological)*, **34**, 187-220.

Cox, D. R. (1975). Partial Likelihood. *Biometrika*, **62**, 269-276.

Cox, D. R. and Oakes, D. (1984). *Analysis of Survival Data*. London: Chapman&Hall.

Crandall, C.S. and Stangor, C. (2005). Conformity and Prejudice. In: Dovidio, J. F., Glick, P. and Rudman, L. A. (Eds), *On the Nature of Prejudice: Fifty Years after Allport*. Oxford: Blackwell, pp. 295-309.

Dancygier, R.M., Egami, N., Jamal, A. and Rischke, R. (2019). Hating and Mating: Fears over Mate Competition and Violent Hate Crime against Refugees. Available at SSRN: <https://ssrn.com/abstract=3358780>.

Decker, O., Kiess, J. and Brähler, E. (2014). *Die stabilisierte Mitte: Rechtsextreme Einstellung in Deutschland 2014 ("Mitte"-Studien der Universität Leipzig)*. Leipzig: Universität Leipzig, Kompetenzzentrum für Rechtsextremismus- und Demokratieforschung der Universität Leipzig (KReDo).

Diehl, C., Hinz, T. and Auspurg, K. (2018). Who is Afraid of Skilled Migrants from Europe? Exploring Support for Immigration Control in Switzerland. *Swiss Journal of Sociology*, **44**, 59-88.

Dinesen, P.T. and Sønderskov, K.M. (2015). Ethnic Diversity and Social Trust: Evidence from the Micro-Context. *American Sociological Review*, **80**, 550–573.

Dirksmeier, P. (2014). Are Urbanites More Permissive? Germany's Urban Geography of Prejudice. *Urban Affairs Review*, **50**, 835-863.

Dixon, J., Durrheim, K. and Tredoux, C. (2005). Beyond the Optimal Contact Strategy: A Reality Check for the Contact Hypothesis. *American Psychologist*, **60**, 697-711.

Deutsche Welle (DW) (2015a). Germans welcome thousands of newly arrived refugees. Download: <https://www.dw.com/en/germans-welcome-thousands-of-newly-arrived-refugees/a-18696722> (accessed 22 December 2019).

Deutsche Welle (DW) (2015b). CSU denounces Merkel's refugee policy as a 'mistake'. Download: <https://www.dw.com/en/csu-denounces-merkels-refugee-policy-as-a-mistake/a-18708181> (accessed 22 December 2019).

Deutsche Welle (DW) (2016). String of New Year's Eve sexual assaults outrages Cologne. Download: <https://www.dw.com/en/string-of-new-years-eve-sexual-assaults-outrages-cologne/a-18958334> (accessed 22 December 2019).

Deutsche Welle (DW) (2017). 25 years after Rostock-Lichtenhagen: 'Don't dwell on the past, learn from it'. Download: <https://www.dw.com/en/25-years-after-rostock-lichtenhagen-dont-dwell-on-the-pastlearn-from-it/a-40155429> (accessed 22 December 2019).

Deutsche Welle (DW) (2018). Violence in Chemnitz: A timeline of events. Download: <https://www.dw.com/en/violence-in-chemnitz-a-timeline-of-events/a-45262531> (accessed 22 December 2019).

Foged, M. and Peri, G. (2016). Immigrants' Effect on Native Workers: New Analysis on Longitudinal Data. *American Economic Journal: Applied Economics*, **8**, 1-34.

FRA - European Union Agency for Fundamental Rights (2019). *Migration: Key Fundamental Rights Concerns*. Quarterly Bulletin, 1.7.2019 to 30.9.2019. Luxembourg: Publications Office of the European Union.

Frey, A. (2020). 'Cologne Changed Everything'—The Effect of Threatening Events on the Frequency and Distribution of Intergroup Conflict in Germany. *European Sociological Review*.

Giugni, M., Koopmans, R., Passy, F. and Statham, P. (2005). Institutional and Discursive Opportunities for Extreme Right Mobilization in Five Countries. *Mobilization*, **10**, 145–162.

Granovetter, M. (1978). Threshold Models of Collective Behavior. *American Journal of Sociology*, **83**, 1420-1443.

Green, D.P., McFalls, L.H. and Smith, J.K. (2001). Hate Crime. *Annual Review of Sociology*, **27**, 479-504

Hainmueller, J. and Hopkins, D. J. (2014). Public Attitudes Toward Immigration. *Annual Review of Political Science*, **17**, 225–249.

Hedström, P. (1994). Contagious Collectivities: On the Spatial Diffusion of Swedish Trade Unions, 1890-1940. *American Journal of Sociology*, **99**, 1157-1179.

Independent (2015). Dresden riots: Protesters in Germany attack refugee buses shouting 'foreigners out'. Download: <https://www.independent.co.uk/news/world/europe/dresden-riots-protesters-in-germany-attack-refugee-buses-shouting-foreigners-out-10467287.html> (accessed 22 December 2019).

Jäckle, S. and König, P. D. (2017). The Dark Side of the German 'welcome Culture': Investigating the Causes Behind Attacks on Refugees in 2015. *West European Politics*, **40**, 223-251.

Jäckle, S. and König, P. D. (2018). Threatening Events and Anti-Refugee Violence: An Empirical Analysis in the Wake of the Refugee Crisis during the Years 2015 and 2016 in Germany. *European Sociological Review*, **34**, 728-743.

Jäckle, S. and König, P. D. (2019). Drei Jahre Anschläge auf Flüchtlinge in Deutschland—welche Faktoren erklären ihre räumliche und zeitliche Verteilung? *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, **71**, 1-27.

Kaplan, J. (2007). Islamophobia in America?: September 11 and Islamophobic Hate Crime. *Journal Terrorism and Political Violence*, **18**, 1-33.

Kleinbaum, D. G. and Klein, M. (2010). *Survival Analysis*. New York: Springer.

Koopmans, R. (1996). Explaining the Rise of Racist and Extreme Right Violence in Western Europe: Grievances or Opportunities? *European Journal of Political Research*, **30**, 185–216.

Koopmans, R. and Olzak, S. (2004). Discursive Opportunities and the Evolution of Right-wing Violence in Germany. *American Journal of Sociology*, **110**, 198–230.

Kriesi, H., Koopmans, R., Duyvendak, J. W. and Giugni, M. G. (1995). *New Social Movements in Western Europe: A Comparative Analysis*. Minneapolis, MN: University of Minnesota Press.

Krueger, A. B. and Pischke, J. S. (1997). A Statistical Analysis of Crime against Foreigners in Unified Germany. *The Journal of Human Resources*, **32**, 182-209.

Küpper, B., Schröter, A. and Zick, A. (2019). Alles nur ein Problem der Ostdeutschen oder Einheit in Wut und Hass? Rechtsextreme und menschenfeindliche Einstellungen in Ost- und Westdeutschland. In: Zick, A., Küpper, B. and Berghan, W. (Eds), *Verlorene Mitte – feindselige Zustände. Rechtsextreme Einstellungen in Deutschland 2018/19*. Berlin: Dietz, pp. 243-282.

Lazarsfeld, P.F. and Merton, R. K. (1954). Friendship as a Social Process: A Substantive and Methodological Analysis. In Berger, M. (Eds), *Freedom and Control in Modern Society*. New York: Van Nostrand, pp. 18–66.

Legewie, J. (2013). Terrorist Events and Attitudes Toward Immigrants: A Natural Experiment. *American Journal of Sociology*, **118**, 1199–1245.

Longhi, S., Nijkamp, P. and Poot, J. (2010). Meta-Analyses of Labour-Market Impacts of Immigration: Key Conclusions and Policy Implications. *Environment and Planning C: Government and Policy*, **28**, 819-833.

Los Angeles Times (1992). Germans Light Up Munich Night in Protest of Right-Wing Extremism: Demonstration: More than 300,000 form a 25-mile chain in stand against anti-foreigner violence. Download: <https://www.latimes.com/archives/la-xpm-1992-12-07-mn-1231-story.html>

Mayda, A. M. (2006). Who Is Against Immigration? A Cross-Country Investigation of Individual Attitudes Toward Immigrants. *Review of Economics and Statistics*, **88**, 510–530.

Mills, M. (2010). *Introducing Survival and Event History Analysis*. Thousand Oaks: Sage.

Müller, K. and Schwarz, C. (2018). Fanning the Flames of Hate: Social Media and Hate Crime. Available at SSRN 3082972.

- Myers, D. (1997). Racial Rioting in the 1960s: An Event History Analysis of Local Conditions. *American Sociological Review*, **62**, 94–112.
- Myers, D. (2000). The Diffusion of Collective Violence: Infectiousness, Susceptibility, and Mass Media Networks. *American Journal of Sociology*, **106**, 173–208.
- Neundorf, A. (2009). Growing up on Different Sides of the Wall—A Quasi-Experimental Test: Applying the Left–Right Dimension to the German Mass Public. *German Politics*, **18**, 201-225.
- Nicholls, W. (2009). Place, Networks, Space: Theorising the Geographies of Social Movements. *Transactions of the Institute of British Geographers*, **34**, 78-93.
- Nolan III, J. J. (2004). Establishing the Statistical Relationship Between Population Size and UCR Crime Rate: Its Impact and Implications. *Journal of Criminal Justice*, **32**, 547-555.
- Pettigrew, T. F. and Tropp, L. (2006). A Meta-analytic Test of Intergroup Contact Theory. *Journal of Personality and Social Psychology*, **90**, 751–83.
- Ravndal, J. A. (2018). Explaining right-wing terrorism and violence in Western Europe: Grievances, opportunities and polarisation. *European Journal of Political Research*, **57**, 845–866.
- de Rooij, E. A., Goodwin, M. J. and Pickup, M. (2015). Threat, Prejudice and the Impact of the Riots in England. *Social Science Research*, **51**, 369–383.
- Rogers, E. (1995 [1962]). *Diffusion of Innovations*. New York: Free Press.
- Ross, J. I. (1992). Contemporary radical right-wing violence in Canada: A quantitative analysis. *Terrorism and Political Violence*, **4**, 72-101.
- Scheve, K. F. and Slaughter, M. J. (2001). Labor Market Competition and Individual Preferences over Immigration Policy. *Review of Economics and Statistics*, **83**, 133-145.
- Schmieder, J. (2016). Lohn-und Beschäftigungseffekte der Zuwanderung nach Deutschland (No. 90). DIW Roundup: Politik im Fokus.

Schneider, S. L. (2008). Anti-Immigrant Attitudes in Europe: Outgroup Size and Perceived Ethnic Threat. *European Sociological Review*, **24**, 53–67.

Semyonov, M., Raijman, R., Tov, A. Y. and Schmidt, P. (2004). Population Size, Perceived Threat, and Exclusion: A Multiple-Indicators Analysis of Attitudes Toward Foreigners in Germany. *Social Science Research*, **33**, 681-701.

Simmel, G. (1908). *Soziologie*. Leipzig: Duncker & Humblot.

Simmel, G. (1971 [1908]). *On Individuality and Social Forms: Selected Writings*. Chicago: University of Chicago Press.

Strang, D. and Soule, S. (1998). Diffusion in Organizations and Social Movements: From Hybrid Corn to Poison Pills. *Annual Review of Sociology*, **24**, 265–290.

Wagner, U., van Dick, R., Pettigrew, T. F. and Christ, O. (2003). Ethnic Prejudice in East and West Germany: The Explanatory Power of Intergroup Contact. *Group Processes and Intergroup Relations*, **6**, 22–36.

Weber, H. (2015). National and Regional Proportion of Immigrants and Perceived Threat of Immigration: A Three-level Analysis. *Western Europe. International Journal of Comparative Sociology*, **56**, 116–140.

## **Appendix**

Table A1 approx. here



Table 1: Descriptive overview of variables

Variable	Mean	Standard Deviation	Min	Max
Cumulative number of attacks in the same district	5.774	13.723	0	346
Inverse distance to closest attack (log)	-3.687	1.280	-6.153	0
Right wing similarity	0.888	0.217	0.009901	1
AfD similarity	0.793	0.281	0.009901	1
Similarity in unemployment rate	0.751	0.248	0.009901	1
Similarity in foreigner share	0.675	0.280	0.009901	1
Similarity in urbanisation	0.864	0.337	0.009901	1
Voter share right wing parties (%) (tc)	1.023	1.782	0	11.7
Voter share AfD (%) (tc)	3.053	3.885	0	15.9
GDP per capita (log) (tc)	10,356	0,346	9,612	11,824
Unemployment rate (%)	5.498	2.862	0.4	17.0
Urbanisation: large cities (tc)	0.165		0	1
Urbanisation: urban districts (tc)	0.332		0	1
Urbanisation: rural districts with densely populated areas (tc)	0.257		0	1
Urbanisation: sparsely populated rural districts (tc)	0.247		0	1
Number of refugee homes (tc)	6.608	9.410	0	124
Foreigner share (%)	8.904	4.834	1.903	33.595
Population size (log)	11.971	0.656	10.434	15.074
Male share	49.304	0.671	47.141	51.400
East Germany (tc)	0.192		0	1
Number of observed days	552,578			
Number of subjects (districts)	401			

Number of events 5,470  
(personal/miscellaneous)  
315 (arson)

---

Notes: For time-constant variables (indicated by “tc”), standard deviation and mean are calculated on the basis of districts. For time-varying variables, these figures are calculated on the basis of observed days. For binary variables, no standard deviation is reported.

Table 2: Overview of results regarding no (NO), some (PARTLY) or strong support (YES) for each theoretical hypothesis

<b>Hypothesis</b>	<b>Personal / Miscellaneous Attacks</b>	<b>Arson Attacks</b>
Diffusion	YES	YES
Geographical-Proximity	YES	YES
Model-Adopter-Similarity	NO	NO
Political-Opportunity-Structure	PARTLY	NO
Competition-for-Resources	NO	NO
Opportunity-of-Contact	PARTLY	PARTLY
East-West-Divide	YES	PARTLY

Table A1: Full Cox survival models on personal/miscellaneous attacks and arson attacks, with and without interaction effects

	Cox Model – Hazard Ratio			
	Personal and Miscellaneous Attacks		Arson Attacks	
	Model 1	Model 2	Model 1	Model 2
<b><i>Diffusion</i></b>				
Cumulative number of attacks in the same district	1.008*** (7.92)	1.013*** (8.74)	1.032* (2.35)	1.035* (2.45)
Time * cumulative number of attacks in the same district			0.99997* (-2.34)	0.99997* (-2.33)
<b><i>Geographical proximity</i></b>				
Inverse distance to closest attack (log)	1.281*** (6.32)	1.107*** (7.84)	1.202*** (3.50)	1.198*** (3.44)
Time * inverse distance to closest attack (log)	0.99983*** (-3.89)			
<b><i>Model-adopter-similarity</i></b>				
Right wing similarity	1.054 (0.36)	1.012 (0.09)	3.183* (2.12)	2.781+ (1.84)
AfD similarity	0.954 (-0.40)	0.942 (-0.50)	1.464 (0.90)	1.420 (0.82)
Similarity in unemployment rate	1.218 (1.51)	1.237+ (1.65)	0.514 (-1.46)	0.508 (-1.47)
Similarity in foreigner share	1.002 (0.02)	1.024 (0.21)	0.838 (-0.42)	0.896 (-0.26)
Similarity in urbanisation	1.108 (0.78)	1.135 (0.95)	2.346+ (1.94)	2.271+ (1.86)
<b><i>Political opportunity structure</i></b>				
Voter share AfD (%)	1.028+ (1.81)	0.974*** (-3.34)	0.987 (-0.62)	0.984 (-0.68)
Time * voter share AfD	0.99995** (-3.14)			
Voter share AfD * East Germany		1.187*** (6.82)		0.995 (-0.11)
Time * voter share AfD * East Germany		0.99984*** (-6.13)		
Voter share right wing parties (%)	1.082** (2.67)	1.046 (1.18)	1.015 (0.33)	0.965 (-0.39)
Time * right wing parties	0.99991*** (-3.31)	0.99991*** (-3.00)		
Voter share right wing parties * East Germany		1.045 (1.30)		1.067 (0.62)

<b>Competition for resources</b>				
Unemployment rate (%)	1.018 (1.43)	0.968 (-1.36)	1.046 (1.36)	1.056 (1.49)
Time * unemployment rate		1.00008** (2.93)		
GDP per capita (log)	0.906 (-0.49)	0.903 (-0.48)	1.399 (1.05)	1.446 (1.13)
Time * GDP per capita (log)	1.00064** (3.22)	1.00071** (3.14)		
GDP per capita (log) * unemployment rate		0.762** (-3.16)		0.997 (-0.03)
Time * GDP per capita (log) * unemployment rate		1.00041*** (4.27)		
<b>Contact</b>				
Foreigner share (%)	0.960*** (-4.23)	0.961*** (-4.08)	0.947+ (-1.90)	0.943* (-1.97)
Foreigner share * unemployment rate		1.021*** (4.65)		1.026** (2.59)
Time * foreigner share * unemployment rate		0.99997*** (-5.46)		0.99997** (-2.74)
<b>East-West-divide</b>				
East Germany (Reference: West Germany)	2.151*** (8.26)	1.730*** (4.64)	1.806* (2.32)	1.675 (1.60)
<b>Controls</b>				
Population size (log)	2.232*** (14.86)	2.129*** (14.23)	4.013*** (8.74)	3.917** (8.59)
Male share (%)	0.973 (-0.61)	0.997 (-0.07)	1.190 (1.29)	1.192 (1.28)
Number of refugee homes	1.025*** (6.03)	1.028*** (6.58)	0.977** (-2.62)	0.975** (-2.74)
Time * number of refugee homes	0.99997*** (-8.16)	0.99997*** (-8.78)		
Urbanisation: large cities (Reference)	1.000	1.000	1.000	1.000
Urbanisation: urban districts	1.096 (1.00)	1.125 (1.24)	1.840* (2.38)	1.812* (2.28)
Urbanisation: rural districts with densely populated areas	1.325** (2.69)	1.319** (2.60)	1.758+ (1.89)	1.799+ (1.84)
Urbanisation: sparsely populated rural districts	1.287* (2.25)	1.329* (2.48)	2.102* (2.41)	2.150* (2.28)
LL	-30214	-30184	-1698	-1694
N	552,578	552,578	552,578	552,578

AIC	60477	60429	3436	3438
BIC	60746	60777	3660	3718

---

Notes: Exponentiated coefficients; *t* statistics in parentheses; shared gamma frailty for districts for all models; +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Figure 1

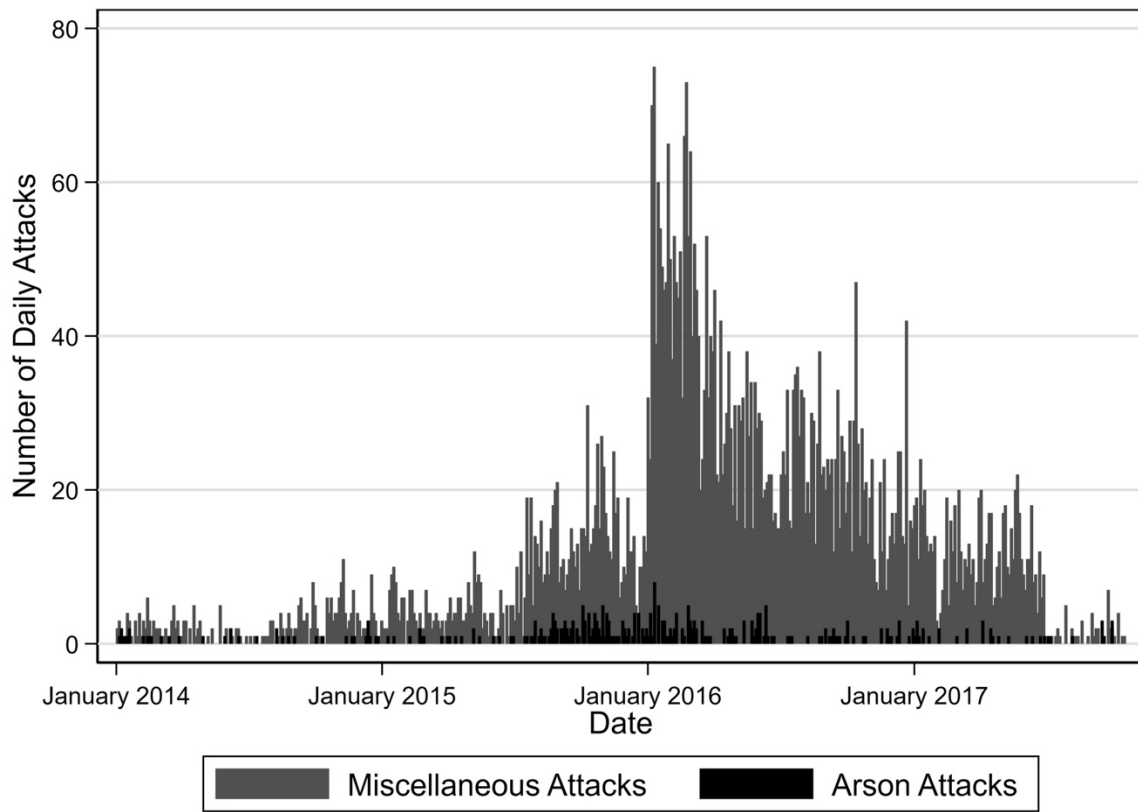


Figure 2

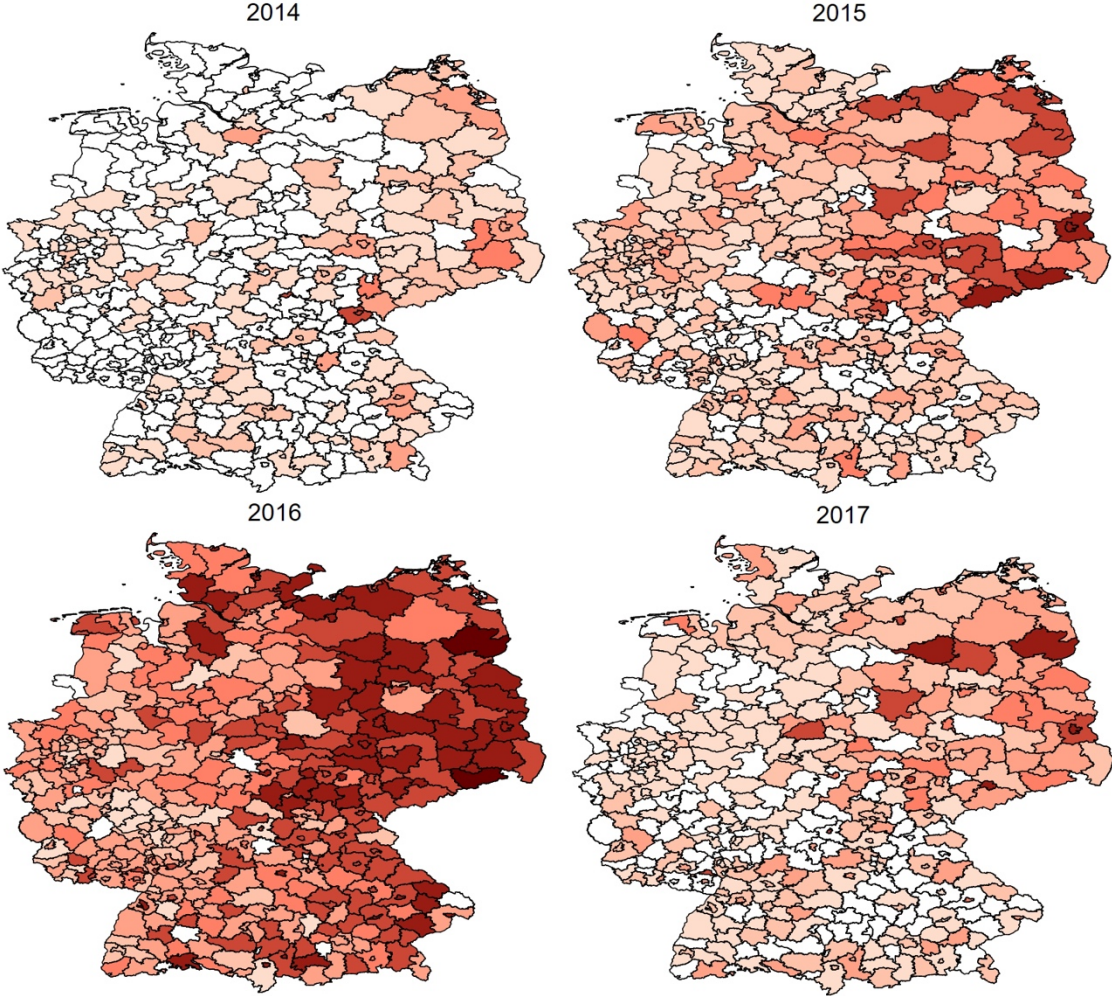




Figure 3

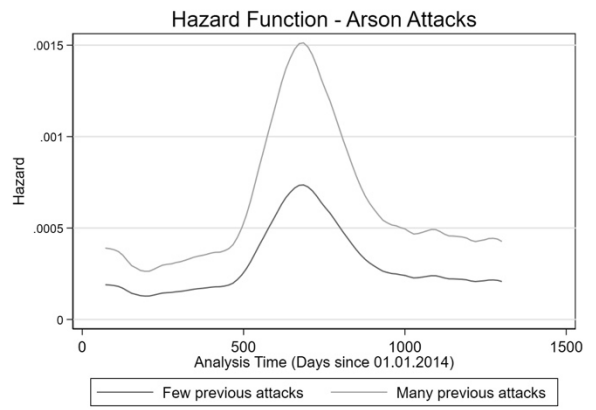
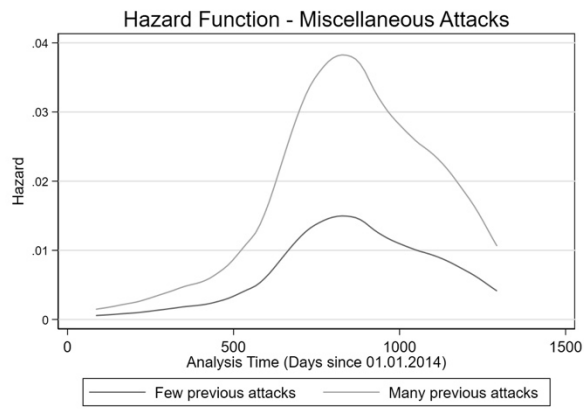


Figure 4

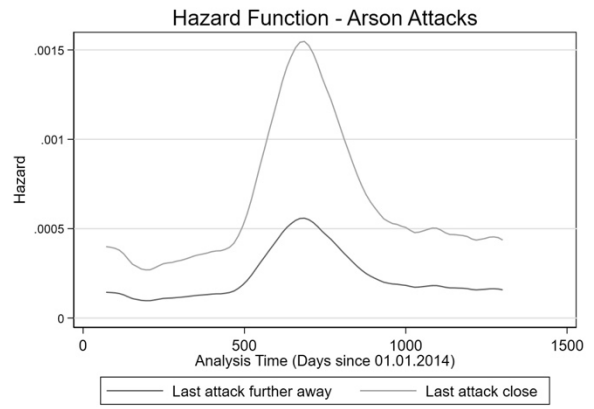
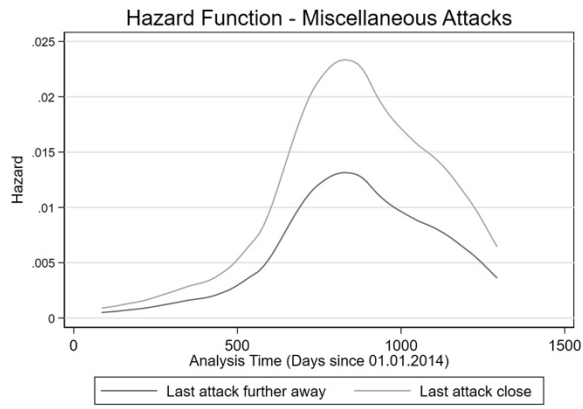


Figure 5

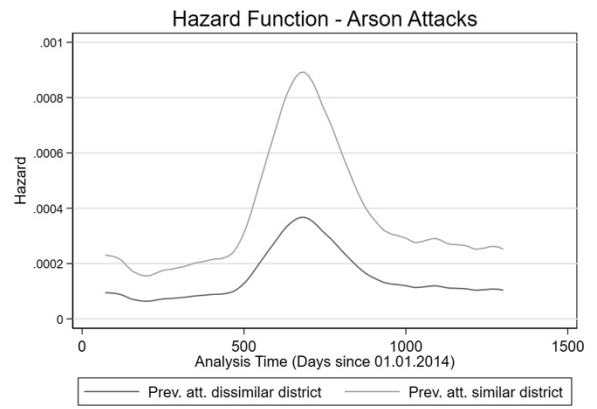
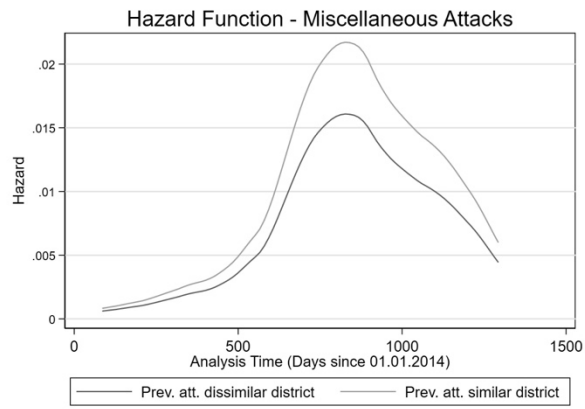


Figure 6

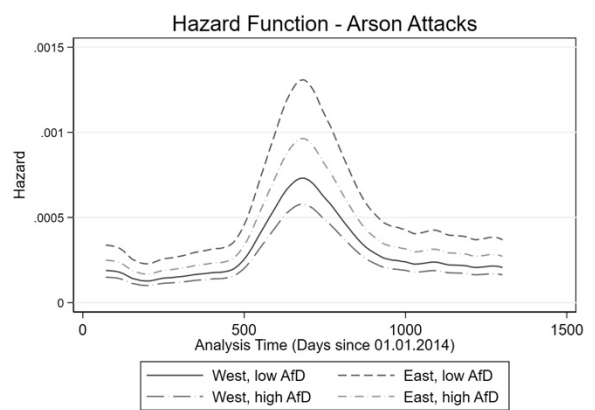
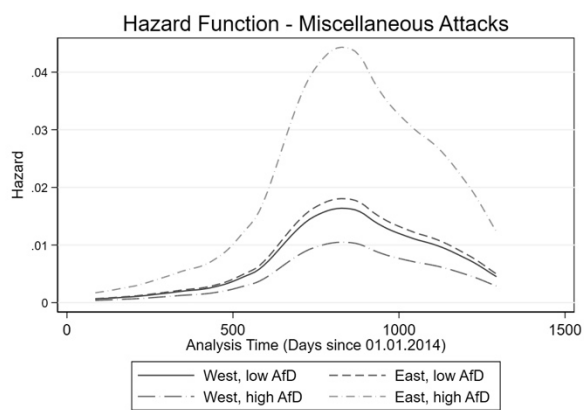
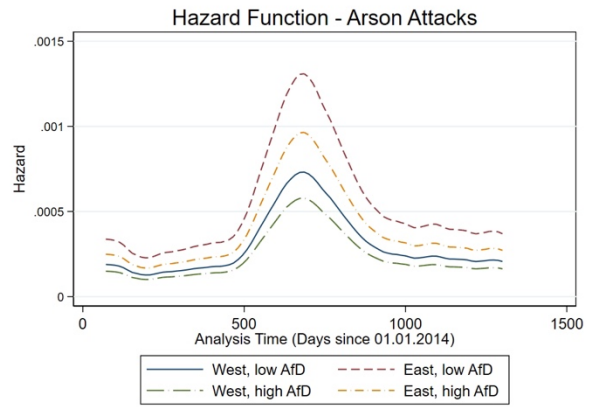
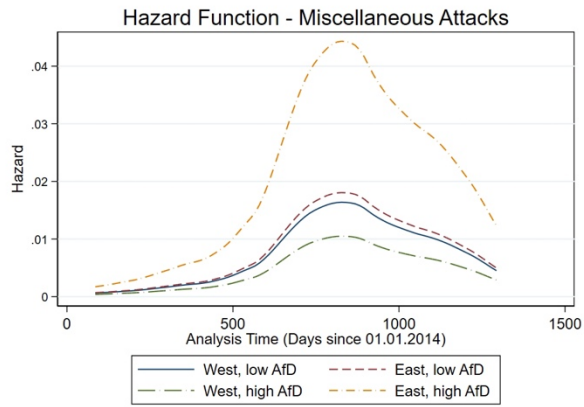


Figure 7

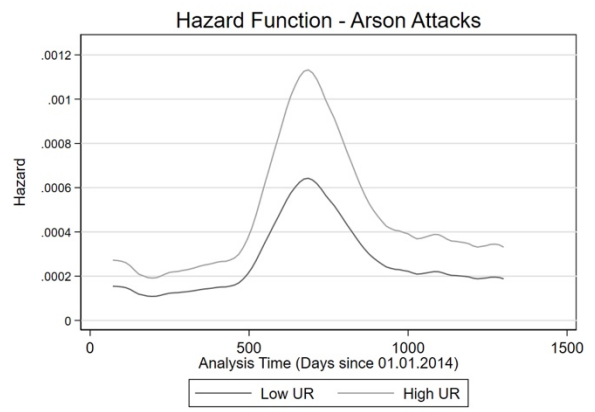
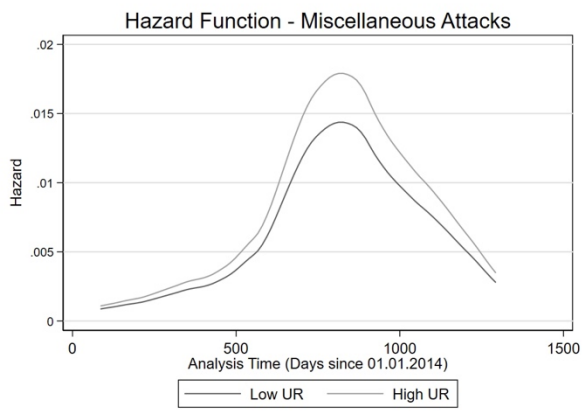


Figure 8

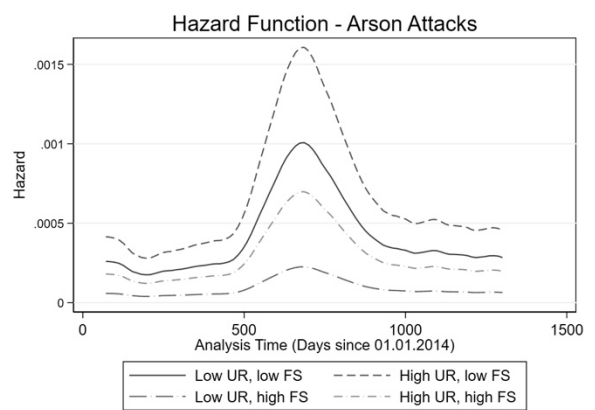
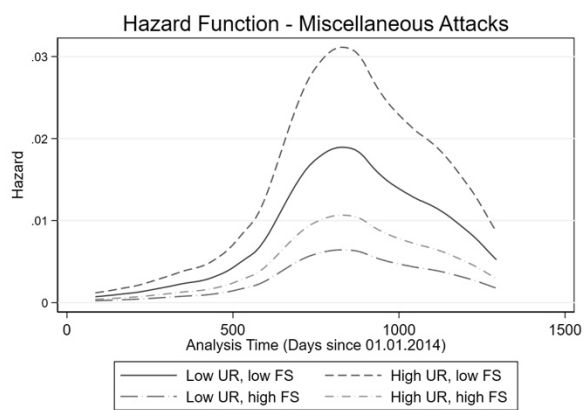
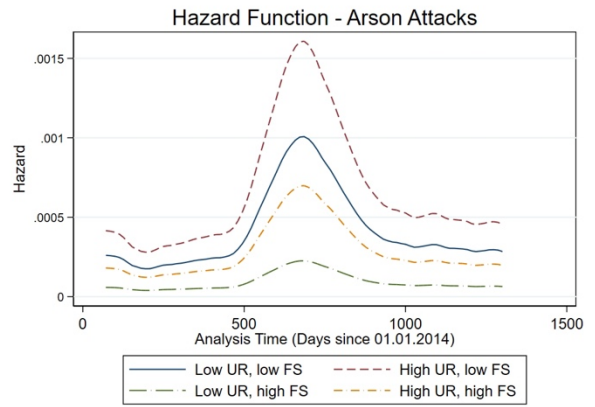
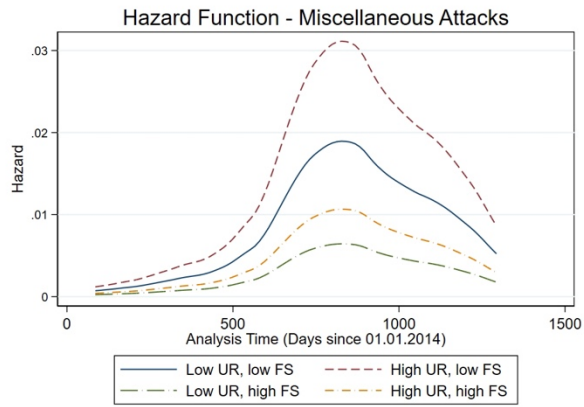
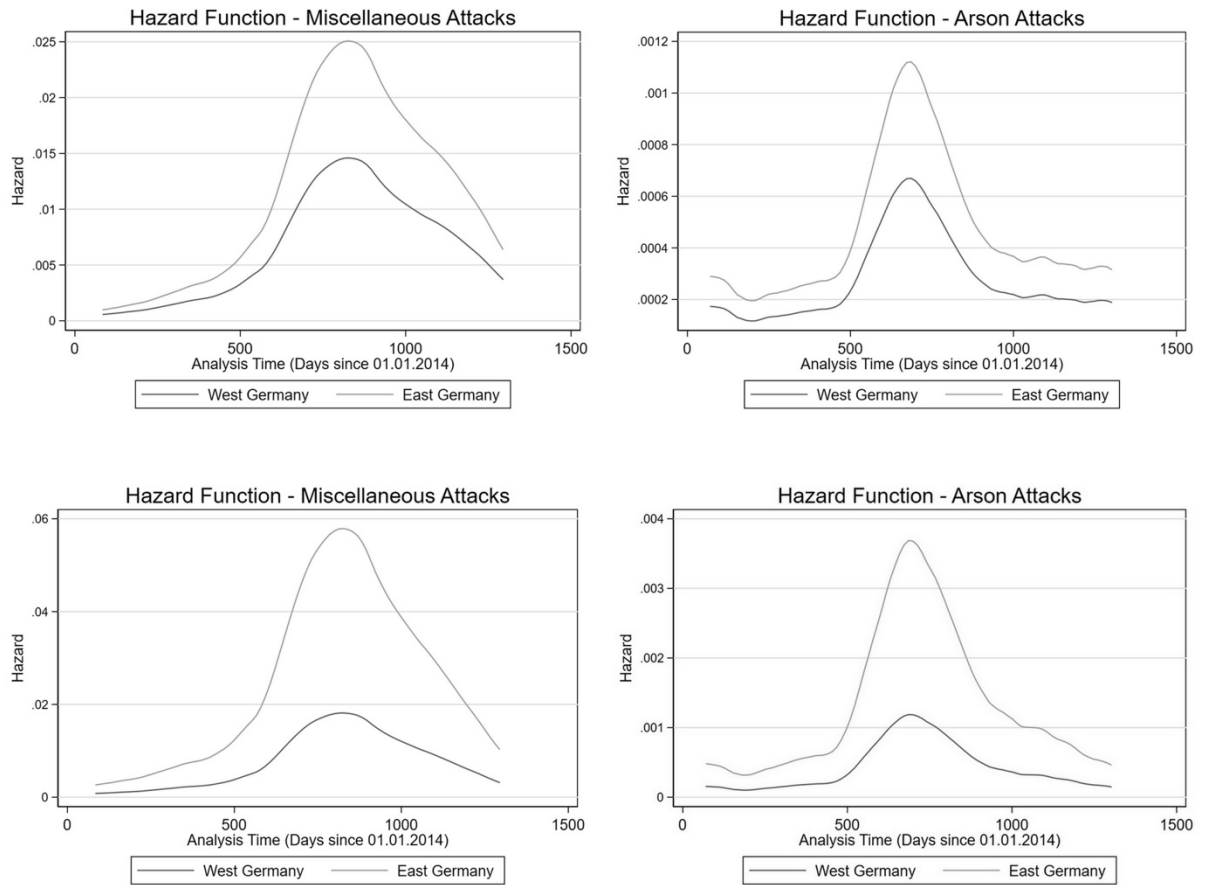


Figure 9



## Supplementary Material

### Explaining Ethnic Violence. On the Relevance of Geographic, Social, Economic and Political Factors in Hate Crimes on Refugees

#### Validation of the measure of the number of refugee homes

To validate the measure, we compare the number of refugee homes per federal state according to the mentioned map with the Königsteiner Key (Königsteiner Schlüssel). In Germany, refugees are distributed according to a quota system which is based on the so called Königsteiner key. The Königsteiner key specifies to which proportion the separate states of Germany are to participate in joint finances; it is based on a state's tax revenue and its population size. How refugees are distributed between the districts is not federally regulated: State's may employ their own regulations on how to distribute refugees to their districts and these regulations are generally not made public. To validate the map, we correlate the Königsteiner key with the number of refugee homes per federal state and we find the expected, strong and positive correlations (Spearman's Rho equals 0.8676, Pearson's correlation coefficient equals 0.9204). These are the correlations between number of refugee homes and the Königsteiner key 2016. Königsteiner key values are relatively stable over time. Our results do not change when using the values for 2014, 2015 or 2017.

#### Piecewise exponential model

Previous research on the spread of ethnic violence has employed differing analytical approaches. For example, Braun and Koopmans (2010) used semi-parametric Cox models; Jäckle and König (2018) have analysed attacks on refugees using a logistic regression and contrasting its results with parametric survival models. These differing analytical approaches have not yet been employed in a comparative manner in this context, even though it has been shown that semi-parametric and parametric models can lead to differing results (e.g., Nardi and Schemper, 2003 for applications to medical research). In general, semi-parametric models offer greater flexibility as they do not make assumptions about the shape of the hazard; however, belonging to the proportional hazards family of models, they do make assumptions about how the covariates affect the shape of the hazard function over time.

Which model should best be employed in which situations is not trivial and should ideally be guided by theoretical arguments (Braun and Koopmans, 2010: 115; Box-Steffensmeier and Jones, 2004: 45). The piecewise exponential model is another popular choice in many disciplines for survival analysis and we present the results in the following table. Overall, it indicates the results of the Cox and piecewise exponential model are rather similar. Compared to the exponential model which assumes a flat (i.e. constant) baseline hazard, it makes the additional assumption that time is divided into different periods and the hazard rate is then only assumed to be constant within these time periods. The hazard rate becomes a step function of the time. Each time period is given a 'time dummy variable' with the estimates for each dummy representing the hazard function of that particular time period. Survival time is divided into intervals and the assumption is that the hazard is constant within each interval but can vary across intervals.

While the piecewise exponential model assumes a specific parametric form of the baseline hazard, the Cox model leaves the time dependency unspecified. It generally fits the data well, regardless of which parametric function underlies the process (Mills, 2010: 90-91). While the non-parametric estimates of the hazard function offer greater flexibility, the estimations of a parametric models are more precise if the model better fits the data. However, if the chosen parametrisation is incorrect, model estimates and



subsequent interpretations can also be invalid as covariates are sensitive to the specification of the distribution (Mills, 2010: 139; Bergstroem and Edin, 1992; Larsen and Vaupel, 1993). So far, there are only few accessible discussions devoted to model choice in survival time modelling (Mills, 2010: 144-146). While sometimes theory can motivate a particular model choice, often times practical considerations such as software availability or computational costs underlie these choices (Wu, 2003). Even though the results of the Cox model and the piecewise exponential model are rather similar, some estimated effects vary, in particular those regarding the model-adopter hypothesis. This sensitivity is grounded in the differing specification of the time variation of the baseline hazard (Wu, 2003). Without a clear theoretical rationale and at least as a starting point, the semi-parametric Cox model can be considered as an appropriate model, as the choice of parametric models can become arbitrary.

### *References*

- Bergstroem, R. and Edin, P. A. (1992). Time Aggregation and the Distributional Shape of Unemployment Duration. *Journal of Applied Economics*, **7**, 5-30.
- Box-Steffensmeier, J. M. and Jones, B. S. (2004). *Event History Modelling. A Guide for Social Scientists*. (Series: Analytical Methods for Social Research). Cambridge: Cambridge University Press.
- Braun, R. and Koopmans, R. (2010). The Diffusion of Ethnic Violence in Germany: The Role of Social Similarity. *European Sociological Review*, **26**, 111–123.
- Jäckle, S. and König, P. D. (2018). Threatening Events and Anti-Refugee Violence: An Empirical Analysis in the Wake of the Refugee Crisis during the Years 2015 and 2016 in Germany. *European Sociological Review*, **34**, 728-743.
- Larsen, U. and Vaupel, J. W. (1993). Hutterite Fecundability by Age and Parity: Strategies for Frailty Modelling of Event Histories, *Demography*, **30**, 81-102.
- Mills, M. (2010). *Introducing Survival and Event History Analysis*. Thousand Oaks: Sage.
- Nardi, A. and Schemper, M. (2003). Comparing Cox and Parametric Models in Clinical Studies. *Statistics in Medicine*, **22**, 3597-3610.
- Wu, L. (2003). Event History Models for Life Course Analysis. In Mortimer, J. and Shanahan, M. J. (Eds), *Handbook of the Life Course*. Boston: Springer, pp 477-502.

**Table S1: Piecewise exponential survival models on personal/miscellaneous attacks and arson attacks**

	Piecewise Exponential Model – Hazard Ratio	
	Personal and Miscellaneous Attacks	Arson Attacks
<b><i>Diffusion</i></b>		
Cumulative number of attacks in the same district	1.019*** (5.31)	1.044* (2.86)
Time * cumulative number of attacks in the same district	0.999993** (-2.62)	0.99997* (-2.65)
<b><i>Geographical proximity</i></b>		
Inverse distance to closest attack (log)	1.181*** (4.90)	1.212*** (4.02)
Time * inverse distance to closest attack (log)	0.99990* (-2.54)	
<b><i>Model-adopter-similarity</i></b>		
AfD similarity	1.162 (1.35)	1.288 (0.63)
Right wing similarity	1.222 (1.52)	2.101 (1.48)
Similarity in unemployment rate	1.169 (0.66)	0.576 (-1.30)
Time * similarity in unemployment rate	1.0006* (2.07)	
Similarity in foreigner share	1.461*** (3.61)	0.960 (-0.10)
Similarity in urbanisation	1.496*** (3.65)	2.114+ (1.90)
<b><i>Political opportunity structure</i></b>		
Voter share AfD (%)	0.979** (-2.79)	0.980 (-0.85)
Voter share AfD * East Germany	1.140*** (5.07)	1.142* (2.08)
Time * voter share AfD * East Germany	0.99988*** (-4.52)	0.9998** (-2.71)
Voter share right wing parties (%)	1.061 (1.56)	0.958 (-0.47)
Time * right wing parties	0.99990** (-3.20)	

Voter share right wing parties *	1.043	1.077
East Germany	(1.24)	(0.70)
<b>Competition for resources</b>		
Unemployment rate (%)	0.945*	1.062+
	(-2.52)	(1.66)
Time * unemployment rate	1.0001***	
	(4.92)	
GDP per capita (log)	1.584***	1.462
	(4.26)	(1.15)
GDP per capita (log) * unemployment rate	0.779**	1.007
	(-3.03)	(0.07)
Time * GDP per capita (log) * unemployment rate	1.00036***	
	(3.89)	
<b>Contact</b>		
Foreigner share (%)	0.931***	0.946+
	(-4.39)	(-1.81)
Time * Foreigner share	1.00005**	
	(3.04)	
Foreigner share * unemployment rate	1.020***	1.025*
	(4.12)	(2.42)
Time * foreigner share * unemployment rate	0.99997***	0.99997**
	(-5.23)	(-2.65)
<b>East-West-divide</b>		
East Germany (Reference: West Germany)	1.648***	1.550
	(4.20)	(1.34)
<b>Controls</b>		
Population size (log)	2.606***	3.683***
	(16.19)	(8.05)
Time * population size (log)	0.99974***	
	(-8.47)	
Male share (%)	1.014	1.181
	(0.32)	(1.20)
Number of refugee homes	1.017***	0.969**
	(4.14)	(-3.02)
Time * number of refugee homes	0.99998***	
	(-5.76)	
Urbanisation: large cities (Reference)	1.000000	1.000000

Urbanisation: urban districts	1.108 (1.07)	1.896* (2.22)
Urbanisation: rural districts with densely populated areas	1.302* (2.46)	1.794+ (1.80)
Urbanisation: sparsely populated rural districts	1.308* (2.32)	2.141* (2.23)
<b><i>(Half-)Yearly Dummies</i></b>		
Year 2014 (Reference)		
Year 2015 1-6	3.449*** (10.48)	0.936 (-0.22)
Year 2015 7-12	12.663*** (17.43)	4.499*** (5.85)
Year 2016 1-6	41.742*** (20.47)	2.952*** (3.80)
Year 2016 7-12	42.457*** (17.20)	1.272 (0.76)
Year 2017	46.524*** (14.94)	1.454 (1.23)
Ln theta	0.116*** (-16.14)	0.121* (-2.53)
LL	10492.69	-354.73
N	552,578	552,578
AIC	-20903.39	775.46
BIC	-20443.27	1145.798

Notes: Exponentiated coefficients; *t* statistics in parentheses; shared gamma frailty for districts for all models; +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

**Table S2: Cox survival models on personal/miscellaneous attacks and arson attacks with similarity index**

	Cox – Hazard Ratio	
	Personal and Miscellaneous Attacks	Arson Attacks
<b><i>Diffusion</i></b>		
Cumulative number of attacks in the same district	1.013*** (8.76)	1.037** (2.58)
Time * cumulative number of attacks in the same district		0.99997* (-2.43)
<b><i>Geographical proximity</i></b>		
Inverse distance to closest attack (log)	1.105*** (7.93)	1.169** (3.13)
Time * inverse distance to closest attack (log)		
<b><i>Model-adopter-similarity</i></b>		
Similarity index	1.059 (1.13)	1.278 (1.41)
<b><i>Political opportunity structure</i></b>		
Voter share AfD (%)	0.978** (-3.10)	0.979 (-0.96)
Voter share AfD * East Germany	1.186*** (6.55)	0.997 (-0.08)
Time * voter share AfD * East Germany	0.99984*** (-6.14)	
Voter share right wing parties (%)	1.049 (1.27)	0.939 (-0.72)
Time * right wing parties	0.99990** (-3.09)	
Voter share right wing parties * East Germany	1.046 (1.33)	1.075 (0.70)
<b><i>Competition for resources</i></b>		
Unemployment rate (%)	0.969 (-1.35)	1.066+ (1.75)
Time * unemployment rate	1.00007*** (2.85)	
GDP per capita (log)	0.904 (-0.48)	1.402 (1.03)
Time * GDP per capita (log)	1.00071**	

	(3.16)	
GDP per capita (log) *	0.765**	0.982
unemployment rate	(-3.12)	(-0.17)
Time * GDP per capita (log) *	1.0004***	
unemployment rate	(4.25)	
<b>Contact</b>		
Foreigner share (%)	0.962***	0.947+
	(-4.08)	(-1.85)
Time * Foreigner share		
Foreigner share * unemployment rate	1.021***	1.027**
	(4.65)	(2.82)
Time * foreigner share * unemployment rate	0.99997***	0.99997**
	(-5.48)	(-2.94)
<b>East-West-divide</b>		
East Germany (Reference: West Germany)	1.751***	1.554
	(4.76)	(1.37)
<b>Controls</b>		
Population size (log)	2.138***	3.813***
	(14.33)	(8.42)
Male share (%)	0.993	1.212
	(-0.17)	(1.40)
Number of refugee homes	1.027***	0.974**
	(6.57)	(-2.77)
Time * number of refugee homes	0.99997***	
	(-8.82)	
Urbanisation: large cities (Reference)	1.000000	1.000000
Urbanisation: urban districts	1.127	1.816*
	(1.26)	(2.10)
Urbanisation: rural districts with densely populated areas	1.323**	1.745+
	(2.62)	(1.75)
Urbanisation: sparsely populated rural districts	1.334*	2.047*
	(2.52)	(2.14)
LL	-30186.6	-1697.95
N	552,578	552,578
AIC	60425.21	3437.9
BIC	60716.99	3673.57

Notes: Exponentiated coefficients;  $t$  statistics in parentheses; shared gamma frailty for districts for all models; +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



**Table S3: Cox survival models with East Germany – Personal and miscellaneous attacks**

	Model 1- East	Model 2 - East	Model 3.1 - Diffusion	Model 3.2 - Diffusion	Model 4 - Proximity	Model 5 - Similarity	Model 6 – Political Opp.	Model 7 – Political Opp.	Model 8 = Comp. Resources	Model 9.1 - Contact	Model 9.2 - Contact	Model 10 - Control	Model 11 – Full model without East interactions
East Germany	3.274855*** (12.13)	3.991507*** (10.25)	3.839966*** (10.09)	2.836204*** (10.98)	2.942901*** (11.71)	3.185383*** (11.82)	3.054269*** (9.26)	1.585916** (2.78)	3.538977*** (10.93)	5.240222*** (9.34)	3.735703*** (10.52)	2.988510*** (15.77)	2.050357*** (7.31)
Time * East Germany		0.999762* (-2.12)	0.999610** (-3.22)							0.999617** (-3.02)			
Cumulative number of attacks in the same district			1.014934*** (4.64)	1.014251*** (4.44)									1.009804*** (8.81)
Time * cumulative number of attacks in the same district			0.999990*** (-3.92)	0.999990*** (-4.00)									
Inverse distance to closest attack (log)					1.307089*** (-8.19)								1.263316*** (5.91)
Time * inverse distance to closest attack (log)					0.999824*** (-4.68)								0.999846*** (-3.52)
Right wing similarity						0.835265 (-0.71)							1.014904 (0.10)
Time * right wing similarity						1.000656* (2.19)							
AfD similarity						1.162260 (1.34)							0.946368 (-0.47)
Similarity in unemployment rate						1.843299*** (4.83)							1.189341 (1.33)
Similarity in foreigner share						1.423287*** (3.37)							1.012677 (0.11)
Similarity in urbanisation						1.154098 (1.10)							1.106214 (0.76)
Voter share right wing parties (%)							1.062059+ (1.76)	1.154887* (2.24)					1.116760*** (3.57)
Time * voter share right wing parties (%)							0.999923** (-3.01)	0.999801** (-3.08)					0.999868*** (-4.29)
Voter share AfD (%)							1.074720*** (4.79)	1.003313 (0.30)					1.023625 (1.46)
Time * Voter share AfD (%)							0.999959** (-3.21)						0.999951** (-2.86)
Voter share AfD * East Germany								1.225086*** (6.97)					
Time * voter share AfD * East Germany								0.999945*** (-3.78)					
Voter share right wing parties *								0.912967 (-1.22)					



East Germany					
Time * voter	1.000159*				
share right wing	(2.41)				
parties * East					
Germany					
GDP per capita		0.980644			0.744982
(log)		(-0.09)			(-1.37)
Time * GDP per		1.000562**			1.000958***
capita (log)		(2.63)			(4.24)
Unemployment		1.034051	1.016160	1.025807	0.970112
rate (%)		(1.62)	(0.99)	(1.61)	(-1.29)
Time *		1.000001			1.000070**
unemployment		(0.03)			(2.69)
rate					
GDP per capita		1.129055**			0.761021**
(log) *		(3.09)			(-3.13)
unemployment					
rate					
Time * GDP per					1.000422***
capita *					(4.41)
unemployment					
rate					
Foreigner share			1.014192***	1.017937***	1.017651***
* unemployment			(4.34)	(4.40)	(3.79)
rate					
Time * foreigner			0.999987***	0.999985***	0.999974***
share *			(-3.96)	(-4.22)	(-5.00)
unemployment					
rate					
Foreigner share			1.029769**	0.992828	0.957291***
(%)			(3.07)	(-0.44)	(-4.54)
Urbanisation:					
large cities				1.000000	1.000000
(Reference)				(.)	(.)
Urbanisation:				1.059915	1.100113
urban districts				(0.67)	(0.99)
Urbanisation:				1.445522***	1.328389**
rural districts				(3.77)	(2.63)
with densely					
populated areas					
Urbanisation:				1.398262**	1.303210*
sparsely				(3.18)	(2.28)
populated rural					
districts					
Number of				1.014377***	1.021234***
refugee homes				(3.53)	(4.53)
Time * number				0.999987***	0.999973***
of refugee				(-5.22)	(-5.76)
homes					
Population size				2.399759***	2.809811***
(log)				(14.72)	(9.33)
Time *					0.999717*
population size					(-2.39)
Male share (%)				0.930460	0.990817
				(-1.54)	(-0.21)

LL	-30496.54	-30494.28	-30480.97	-30486.1	-30419.09	-30461.56	-30480.32	-30458.31	-30482.3	-30476.36	-30477.06	-30331.77	-30193.63
N	552,578	552,578	552,578	552,578	552,578	552,578	552,578	552,578	552,578	552,578	552,578	552,578	552,578
AIC	60995.08	60992.57	60969.94	60978.2	60844.18	60937.13	60970.63	60932.61	60976.6	60964.72	60966.12	60679.53	60447.27
BIC	61006.3	61015.01	61014.83	61011.87	60877.84	61015.68	61026.75	61022.39	61043.93	61032.05	61033.45	60769.31	60783.94

Notes: Exponentiated coefficients; *t* statistics in parentheses; shared gamma frailty for districts for all models; +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.010$ , \*\*\*  $p < 0.001$ .

**Table S4: Cox survival models with East Germany – Arson Attacks**

	Model 1 - East	Model 2 - Diffusion	Model 3 - Proximity	Model 4 - Similarity	Model 5 – Political Opp.	Model 6 – Political Opp.	Model 7 – Comp. Resources	Model 8 – Comp. Resources	Model 9 - Control	Model 10 – Full model without East interactions
East Germany	3.115161*** (6.34)	2.197598*** (4.62)	2.466531*** (5.33)	3.209227*** (6.22)	3.108946*** (5.17)	1.661453 (1.60)	2.638463*** (4.32)	3.078514*** (4.48)	2.885573*** (6.59)	1.602317+ (1.70)
Cumulative number of attacks in the same district		1.079823*** (4.58)								1.041186** (2.89)
Time * cumulative number of attacks in the same district		0.999934*** (-4.15)								0.999970*
Inverse distance to closest attack (log)			1.586353*** (-4.68)							1.202557*** (3.51)
Time * inverse distance to closest attack (log)			0.999733* (-2.08)							
Right wing similarity				3.790225* (2.57)						2.794088+ (1.86)
AfD similarity				1.798104 (1.52)						1.341728 (0.70)
Similarity in unemployment rate				0.974531 (-0.06)						0.484680 (-1.58)
Similarity in foreigner share				1.604860 (1.23)						0.798682 (-0.54)
Similarity in urbanisation				2.175295+ (1.79)						2.275991+ (1.86)
Voter share right wing parties (%)					0.975900 (-0.47)	0.949770 (-0.62)				1.010085 (0.22)
Voter share AfD (%)					1.153550*** (3.73)	1.008301 (0.35)				0.978176 (-1.04)
Time * Voter share AfD (%)					0.999869** (-2.82)					
Voter share AfD * East Germany						1.262005*** (4.07)				
Time * voter share AfD * East Germany						0.9998764* (-2.52)				
Voter share right wing parties * East Germany						1.05225 (0.48)				
GDP per capita (log)							0.959496 (-0.15)			1.439001 (1.11)
Unemployment rate (%)							1.061372+ (1.77)	1.048154 (1.35)		1.047931 (1.31)
GDP per capita (log) * unemployment rate							1.379471+ (1.79)			0.984462 (-0.14)
Time * GDP per capita (log) * unemployment rate							0.999551* (-2.09)			
Foreigner share * unemployment rate								1.025004**		1.000017

Time * foreigner share * unemployment rate								(2.94)		(0.00)
Foreigner share (%)								0.999971**		
								(-2.78)		
								1.009645		0.949742+
								(0.46)		(-1.76)
Urbanisation: large cities (Reference)									1.000000	1.000000
									(.)	(.)
Urbanisation: urban districts									1.774469**	1.904015*
									(2.63)	(2.25)
Urbanisation: rural districts with densely populated areas									1.949949**	1.783772+
									(2.59)	(1.80)
Urbanisation: sparsely populated rural districts									2.349966**	2.150379*
									(3.12)	(2.27)
Number of refugee homes									1.000319	1.006260
									(0.03)	(0.56)
Time * number of refugee homes									0.999968**	0.999942***
									(-2.90)	(-3.31)
Population size (log)									4.426481***	3.886681***
									(9.72)	(8.55)
Male share (%)									1.100496	1.165880
									(0.75)	(1.12)
LL	-1784.252	-1767.745	-1762.183	-1774.234	-1776.947	-1772.662	-1780.574	-1777.597	-1719.419	-1692.669
N	552,578	552,578	552,578	552,578	552,578	552,578	552,578	552,578	552,578	552,578
AIC	3570.503	3541.491	3530.366	3560.467	3561.894	3557.324	3571.148	3565.194	3454.839	3431.338
BIC	3581.726	3575.158	3564.033	3627.801	3606.783	3624.658	3627.26	3621.306	3544.617	3689.452

Notes: Exponentiated coefficients; *t* statistics in parentheses; shared gamma frailty for districts for all models; +  $p < 0.10$ ,