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The 2015/2016 New Year's Eve Cologne Event and Anti-refugee Crimes in Germany

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Abstract. During New Year's Eve 2015/2016, the German city of Cologne witnessed mass sexual assaults and thefts by perpetrators described as having an Arab-African appearance. This paper studies whether the event in Cologne led to a backlash in crimes against refugees in Germany. Difference-in-differences regressions reveal a significant jump in anti-refugee crimes immediately after the event. This rise is driven by assaults and miscellaneous crimes and is more pronounced in North Rhine-Westphalia (where Cologne is located), in wealthier counties, in counties with a higher share of refugees, and in the counties that had a refugee reception center. The immediate rise in anti-refugee crimes is also higher in counties where a higher share of German suspects has been involved in crimes against foreign victims. Regarding longer-term repercussions, I find evidence for an anniversary effect a year later, i.e., a rise in anti-refugee crimes after the next New Year's Eve.

Keywords: Refugees, hate crimes, immigration, anniversary effect.
JEL Classification: F22, J15, K42.

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1 Introduction

During New Year's Eve 2015/2016, the German city of Cologne witnessed an unprecedented number of sexual offenses and thefts; 1,168 crimes were reported among them 492 sexual assaults (Brenner and Ohlendorf, 2016). Female victims of these crimes indicated that suspects bore features typical of Arabic and North African ethnicities (Behrendes, 2016), which prompted assertions that refugees were responsible for these acts (in most cases, however, perpetrators ultimately did remain unidentified, and very few got convicted eventually). The New Year's Eve Cologne event (NYECE) was covered extensively in media, both nationally and internationally, raised massive public concerns, and had major political repercussions, including a revision of Germany's open-door policy concerning refugee migrants as practiced in the latter half of 2015 (see, for example, (Egg, 2017)). Germany had never experienced a similar incident. Hence, the 31st of December 2015 has been coined "the night that changed Germany" (Wiermer and Voogt, 2017) or "the night that changed everything" (Hark and Villa, 2017; Frey, 2020), NYECE also fueled anti-refugee xenophobic sentiments that may have caused retaliatory increases in hate crime directed at refugees.

This paper investigates whether NYECE indeed had such an immediate backlash on anti-refugee crimes in Germany. It also explores whether NYECE had longer-term repercussions in the form of an anniversary effect, i.e., a rise in anti-refugee crimes after the next New Year's Eve a full year later. Using daily data on such crimes at county level in temporal proximity to NYECE (i.e., in December 2015 and January 2016) and to New Year's Eve one year prior (i.e., in December 2014 and January 2015) in difference-in-differences (DiD) regressions, I find evidence for a statistically significant positive effect of NYECE on the level of anti-refugee crimes in early 2016. I corroborate this finding through a series of robustness checks, including (i) various sample restrictions to account for potential misdating of retaliatory assaults on refugees on December 31st, 2015, and January 1st, 2016; (ii) the use of alternative hate crime data; (iii) controls for potentially confounding events, such as the Charlie Hebdo attack in Paris in January 2015; and (iv) consideration of the fact that the German public was informed about NYECE and its scale only with a delay in early January 2016. My key finding remains robust in all of these sensitivity checks. The same holds true when I change the unit of analysis (to daily-state or monthly-county level), or when I employ other estimations models (than the linear probability model), such as Probit or Logit (i.e., alternative limited-dependent variable models) or Poisson and Negative Binomial models (i.e., count data models). I also carry out a number of effect heterogeneity analyses, which show that effect of NYECE on anti-refugee crimes is higher in the German federal state of North Rhine-Westphalia (NRW), where Cologne is located, in wealthier counties,

and in counties with a higher share of refugees or had a refugee reception center prior to New Year's Eve 2015/2016, and in counties which a saw higher share of German suspects involved in crimes with foreign victims in 2015 (German suspect rate). I find no evidence for effect heterogeneity at county level between East and West Germany, and for counties that witnessed higher, respectively lower, share of German victims in crimes involving refugee suspects (German victimization rate). Furthermore, additional explorations show that the immediate backlash of NYECE on anti-refugee crimes is driven by assaults and miscellaneous crimes, not arsons. To study potential anniversary effect a year after NYECE, I again run DiD regressions, but now on an expanded sample that includes also observations from December 2016 and January 2017. For the first two weeks of January 2017, I do find evidence that NYECE again led to an increase in anti-refugee crimes after the turn of the year, a full 12 months after NYECE, i.e., the actual event on New Year's Eve 2015/16. NYECE hence did not only have an immediate backlash on anti-refugee crimes (and possibly a longer-term level effect on such crimes), but also an anniversary effect.

This paper contributes to the literature in several ways. First, it adds to a growing body of research on the effects of terrorist attacks and other historic events on intergroup conflict, such as the 9/11 attacks in the USA in 2001 and their impact on Arabs, Muslims, and immigrants more generally, both in economics[1] and in other disciplines, such as sociology and political science.[2] Second, it complements and adds to existing empirical research on refugee immigration and crime in Germany in the context (or aftermath) of the 2015 mass inflow of refugees to Germany.[3] Third, it is one of the very few studies that explore the effects of NYECE on anti-foreign sentiments and crime. Czymara and Schmidt-Catran (2017), for instance, study changes in the public acceptance of immigrants in Germany from the onset of the 'migration crisis' to post the New Year's Eve 2015/2016. They find no changes in the acceptance of Muslims. Refugees too remained highly accepted, but the acceptance of immigrants originating from Arab or African countries decreased. Analyzing news discourses after NYECE through word associations in reporting from four national news outlets, Wigger et al. (2022) argue that media coverage and focus shifted after NYECE

[1]See, for example, Åslund and Rooth (2005); Davila and Mora (2005); Kaushal et al. (2007); Braakmann (2009); Goel (2010); Finseraas et al. (2011); Rabby and Rodgers (2011); Wang and Wang (2012); Cornelissen and Jirjahn (2012); Mason and Matella (2014); Hanes and Machin (2014); Gould and Klor (2016); Schüller (2016); Elsayed and De Grip (2018).

[2]See, for instance, Echebarria-Echabe and Fernández-Guede (2006); Daraiseh (2012); Legewie (2013); Disha et al. (2014); Jakobsson and Blom (2014); Nussio et al. (2019).

[3]Recent research in this area includes studies by Benček and Strasheim (2016); Jäckle and König (2017); Boers et al. (2017); Jäckle and König (2018); Huang and Kvasnicka (2019); Ziller and Goodman (2020); Frey (2020); Dehos (2021); Müller and Schwarz (2021); Graeber and Schikora (2021); Igarashi (2021); Gehrsitz and Ungerer (2022); Dancygier et al. (2022); Entorf and Lange (2023).

from concerns about terrorism to anxieties about sexual predation by dark-skinned males, which racialized the immigration discourse. Jäckle and König (2018), in turn, study the impact of various threatening events, such as NYECE but also terrorist attacks in Germany and in countries neighboring Germany, on anti-refugee violence and whether such violence (response) is magnified by public statements of politicians from anti-immigration parties. Their findings suggests that anti-refugee violence indeed is elevated by such statements. Frey (2020) too studies the impact of several threatening events on anti-refugee incidents, but focuses more heavily than Jäckle and König (2018) on NYECE and its effects. Using German daily county-level data on anti-refugee violence for the years 2014 to 2016 and investigating in logit regressions altogether 12 incidences (including nine fatal terrorist attacks in Europe, three non-fatal attacks in Germany, and NYECE) and their impact on anti-refugee violence one to four weeks after a specific event occurred, Frey shows that the daily rate of anti-refugee attacks rose significantly in Germany after NYECE (and that such rise was larger in counties with a lower track record of anti-refugee crimes and less far-right public support before NYECE.

This study differs from and adds to the findings of Jäckle and König (2018) and Frey (2020) in important ways, both in scope and in depth. Concerning scope, I investigate not only the short-term effects of NYECE on anti-refugee crimes in Germany, but also inquire into whether an anniversary effect, a full year later, is observable. To the best of my knowledge, such longer-term potential repercussions have not been studied for any major threatening event. If present and sizable, disregarding anniversary effect can severely underestimate the overall retaliatory crime tolls of such events.

To delve deeper, I analyze the heterogeneity of NYECE's impact on anti-refugee crimes through various dimensions. These include regional differences across East and West Germany, variations across federal states, pre-NYECE regional shares of refugee populations, the presence of regional refugee reception centers prior to NYECE, as well as pre-NYECE regional patterns of German suspect rate in crimes with foreign victims and in German victimization rate in crimes with refugee suspects. My findings from these analyses enhance our understanding of the causal pathways through which NYECE influences anti-refugee crimes. This understanding can inform and guide policies aimed at mitigating the effects of such crimes in the future and in response to other threatening events. Moreover, I explore and document which types of anti-refugee crimes react strongest in response to NYECE (assaults, miscellaneous crimes, or arsons).

In addition to broadening the scope and depth of research on NYECE, my analysis makes use of a more refined research strategy for identifying and quantifying the causal effect of NYECE on anti-refugee crimes. In particular, and unlike Frey (2020), I do control for common trend

changes in anti-refugee crimes from December to January, which might be typical for this change-of-year period, i.e., a general New Year's Eve effect, which could confound estimates of the NYECE effect. To address this, I implement DiD regressions that control for both level differences in such crimes between December/January 2014/15 and December/January 2015/16, as well as for common trend changes around each New Year's Eve. Frey (2020) makes little use of time-varying control variables, at county or country level, for the long period (i.e., a full three years) studied in this analysis.[4] Studying a shorter event window, as I do, is advantageous in this respect. It also allows me to exploit for identification daily Google search data in the very vicinity of NYECE to pinpoint the exact date of the first fully-fledged NYECE media coverage that could have sparked retaliatory anti-refugee crimes in January 2016.

The remainder of this paper is structured as follows: Section 2 provides background information on the societal, political, and media repercussions of NYECE, as well as descriptive statistics on the temporal and regional evolution of anti-refugee crimes before and after NYECE. Section 3 outlines the data and empirical strategy used in the analysis. Section 4 presents the main regression results on the immediate backlash of NYECE on anti-refugee crimes, along with findings from several robustness checks, analyses of effect heterogeneity, and results on my inquiry into potential anniversary effect of NYECE. Finally, Section 5 summarizes the main findings and concludes.

2 Background

This section outlines the societal, political, and media repercussions of NYECE. It also examines the evolution of anti-refugee crimes before and after NYECE, with a focus on both Germany as a whole and its 401 counties.

2.1 Societal, Political, and Media Repercussions of NYECE

The night of 31st December 2015 was a shifting point in the debate about refugees in Germany. It was a blow to those who were welcoming refugees and in favor of an open-border

[4]Among the few controls used, two appear highly problematic: Linearly interpolated county-level refugee populations and monthly total counts of asylum applications filed at the country level. The former is problematic because refugee populations, particularly in 2015, did not evolve linearly but witnessed dramatic increases/jumps at times, especially in the last 3–4 months of 2015. The latter is unreliable because asylum application data, particularly for late 2015, are highly inaccurate, as many refugees during this period had to wait weeks or months before they could formally file their asylum applications.

policy, as NYECE made people sceptical about refugees and raised concerns about the integration of refugees in German society. Furthermore, it served as an ideal pretext for far-right political movements and radical right-wing parties to boost their popularity and advocate their policies and attitudes towards refugees and migration (Fetscher, 2016). The support of the far-right political movement Patriotic Europeans Against the Islamisation of the West (*Patriotische Europäer gegen die Islamisierung des Abendlandes*, PEGIDA) and the Alternative for Germany (*Alternative für Deutschland*, AfD) increased notably. In public opinion polls, the popularity of the AfD jumped to 13% by the end of March 2016, up from a low 5% in September 2015 (Fetscher, 2016). Later in 2017, the AfD set a historic milestone by securing a first right-wing representative in the German parliament since 1945 (Ma, 2017; Meier-Braun, 2018).

Radical right-wing movements and parties also opportunistically utilized the event in Cologne to distort the public perception of refugees. They linked all types of fear in the public to immigration and refugees, including concerns about falling prosperity, shrinking societal cohesion, and declining safety (Braun-Klöpper, 2016). They reinforced prejudices and discrimination by portraying refugees as a sexual threat to blonde German women (Weiland, 2016) and as a contaminator of European values (Meisner and Wischmeyer, 2016; Weber, 2016b). To promote this negative image of refugees, radical right-wing movements and parties flooded social media with rumors and fake news about refugees (Fetscher, 2016; Meisner and Wischmeyer, 2016; Weber, 2016a). As a consequence, it became significantly more difficult for the general public to differentiate between factual information and demonizing narratives about refugees.

The public perception of refugees, however, was not only under attack from the radical right, but also from the media. In fact, the discourse in the media changed substantially after NYECE. Refugees were no longer predominantly portrayed as innocent victims of war or persecuted individuals in need of sanctuary in Europe. Instead, the media increasingly emphasized the adverse effects of their immigration on German society and the German economy (Becker, 2022; Weber, 2016a). In some cases, media items directly fueled anti-refugee sentiments, called for drastic measures, or made use of discriminatory language. An article in the populist magazine *Compact* bore the title "Asylum seekers began a war against Germany" (Pribnow, 2016), and controversial images were used in two major print media, *Focus* and *Süddeutsche Zeitung*. The first photo showed a slim naked blonde woman who is touched by several dark handprints; the other portrayed a caricature of a dark hand that goes between a white woman's legs (Boulila and Carri, 2017; Weber, 2016b; Wigger et al., 2022). Such images resembled, and evoked memories of, press photos during the French occupation of the Rhineland after the First World War that portrayed French African soldiers as a threat

to white German women (Maß, 2002; Weber, 2016a; Wigger et al., 2022). As a result of such media coverage, public opinion began to change markedly. In particular, public acceptance of immigrants from Arab countries and Africa deteriorated (Czymara and Schmidt-Catran, 2017), and in some places refugees began to experience heightened discrimination from local residents, being denied, for instance, on occasion entry to night clubs or public swimming pools (Boulila and Carri, 2017).

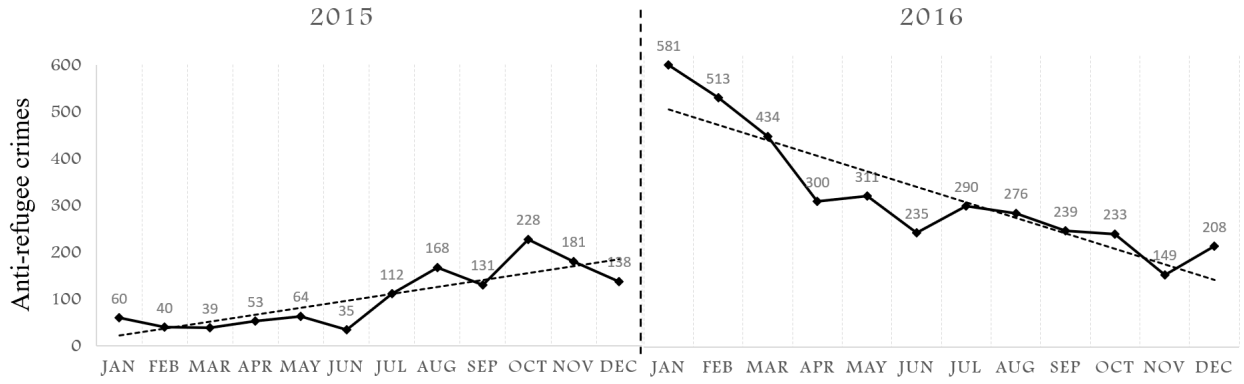
NYECE also had important political repercussions. Two weeks after the event, the German parliament convened to discuss its consequences. This meeting laid the foundation for several crucial decisions that shaped and altered Germany's stance on and approach to refugee migration (Weber, 2016a). Many voices called for North African countries (Morocco, Tunisia and Algeria) to be considered 'safe countries', so that asylum applicants from these countries could be rejected outright (Weber, 2016a). Three months later, a new asylum law ("Asylum Package 2") took force, which coincided with the signing of the EU's refugee agreement with Turkey (the so-called "EU-Turkey Statement"). Asylum Package 2 mainly accelerated asylum procedures for refugees coming from a country that was considered safe, and it limited the suspension of deportation strictly to cases of severe life-threatening illness. It also suspended family reunification for those who had subsidiary protection (Bundestag, 2016). This law was passed at a time which saw a dramatic increase in the percentage of asylum seekers who received subsidiary protection, from 1.2% of total asylum seekers who got asylum in Germany in 2015 to 35.4% in 2016 (Bundesamt für Migration und Flüchtlinge [BAMF], 2017). The agreement with Turkey, on the other hand, hindered refugees from reaching Europe by controlling the potential routes that lead to Europe from Turkey. These acts decreased the number of new arrivals of asylum seekers to about a quarter (Bundesministerium des Innern [BMI], 2017).

2.2 Anti-refugee Crimes in the Vicinity of NYECE

Prior to NYECE, anti-refugee crimes were trending upwards in 2015, as refugee arrivals to Europe increased sharply in the second half of the year. However, only after NYECE did the prevailing positive sentiment towards refugees in Germany shift markedly towards increased rejection and also violence. Figure 1 illustrates the monthly frequency of anti-refugee crimes in Germany in the 12 months before and after NYECE, i.e., from January 2015 to December 2016. As is evident, anti-refugee crimes started to rise already from July 2015. This rise seems tied to the large and growing influx of refugees in the third and fourth quarters of that year. In January 2015, only 32,229 refugees arrived to Germany, a number that rose to 206,101 in November (Bundesministerium des Innern [BMI], 2017). These rises in refugee

inflows and anti-refugee crimes were accompanied by a general rise in right-wing populism (Steinmayr, 2017, 2021; Wondreys, 2021). However, Figure 1 also shows an abrupt and sizeable jump in anti-refugee crimes right after New Year's Eve 2015, from 138 incidents in December 2015 to an unprecedented peak of 581 such crimes in January 2016 (Amadeu Antonio Stiftung, 2020). The subsequent decline in anti-refugee crimes throughout 2016 may have resulted from the waning impact of the Cologne event over time, but it could also reflect changes in German immigration and asylum policies designed to curb the influx of refugees.

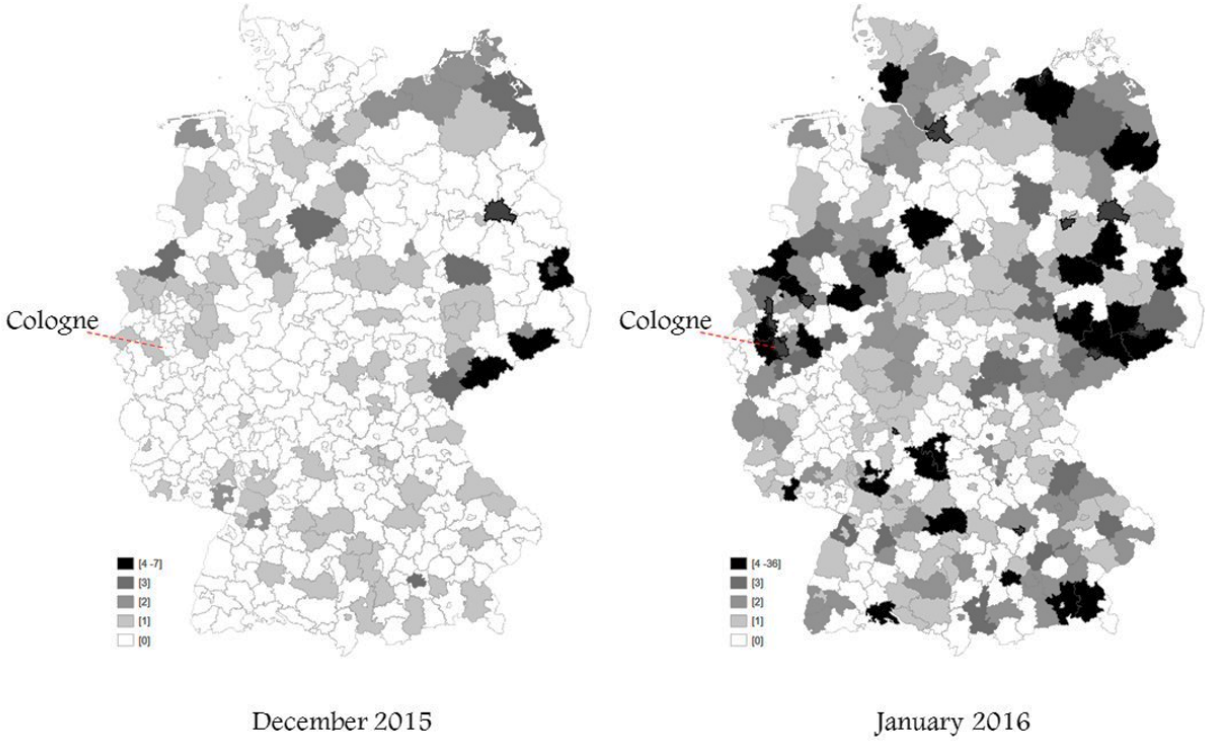
FIG. 1: Number of anti-refugee crimes per month in Germany in 2015 and 2016



Note: Data sourced from Amadeu Antonio Stiftung (2020). Graph created by the author.

Regionally, there was a pronounced increase in anti-refugee crimes in 212 out of Germany's 401 counties immediately following NYECE (Amadeu Antonio Stiftung, 2020). This signifies that approximately 53% of German counties saw an immediate and notable backlash. Figure 2, comprising two maps, portrays the regional distribution of anti-refugee crimes one month before and after NYECE. The left map depicts the county-level count of anti-refugee crimes in December 2015, while the right map shows the corresponding figures for January 2016. Prior to NYECE, the maps suggest that anti-refugee crimes were relatively rare and primarily concentrated in East Germany. However, in the aftermath of NYECE, a significant shift occurred. Now, the majority of German counties experienced anti-refugee crimes. What is more, sizeable increases are observable not only in Cologne or NRW, but also in numerous other parts of Germany.

Fig. 2: County-level distributions of the number of anti-refugee crimes in December 2015 and January 2016



Note: Data sourced from Amadeu Antonio Stiftung (2020). Graph created by the author.

3 Data and Empirical Strategy

3.1 Data

This paper utilizes data extracted from a project named *Mut Gegen Rechte Gewalt* [Courage Against Right Violence], which offers a public chronicle run by two non-governmental organizations, PRO ASYL and the Amadeu Antonio Foundation, which documents attacks against refugees and refugee group quarters.[5] The chronicle relies on a variety of sources, including newspaper articles, police press releases, parliamentary documents and reports from non-governmental organizations, as well as consultation centers for victims of right-wing and anti-Semitic violence (Amadeu Antonio Stiftung, 2020).

Given the focus of this study on NYECE at the 2015/16 change of year, I extract from this chronicle all recorded incidents of crimes against refugees in the years 2014 to 2017 that occurred in the vicinity of New Year's Eves in 2014/15, 2015/16, and 2016/17 (in December

[5]The data derived from this chronicle have been used in several studies, such as Benček and Strasheim (2016), Jäckle and König (2017), and Frey (2020).

and January). Each entry in the chronicle details the date, location, and type of a crime. The chronicle categorizes crimes into three main types, physical assaults/bodily injuries, arson attacks on refugee accommodations, and a miscellaneous category encompassing various other crimes, such as stone-throwing or xenophobic graffiti.[6]

The detailed chronicle, which records the dates and locations of incidents, enables the construction of daily county-level counts of anti-refugee crimes. This facilitates the analysis of the immediate backlash from NYECE and of a potential anniversary effect a year later. For identification, the high frequency daily data is particularly useful. Unlike monthly data, or even weekly data, it permits to study, like in an event history analysis, the backlash of NYECE on anti-refugee crimes in much greater detail, which includes effect heterogeneity analyses at regional level, and in the immediate vicinity of New Year's Eve 2015/16. Moreover, the highly granular data allow to exploit for identification changes in media coverage and hence public information on NYECE in the early days of January 2016.

I restrict the final estimation sample to days in December and January surrounding New Year's Eves 2014/15, 2015/16, and 2016/17. This approach enables the estimation of DiD regression-based NYECE impacts on anti-refugee crimes, both immediately and one year later, while controlling for end-of-year and change-of-year fixed effects. For the main analysis, the study of the immediate backlash of NYECE on anti-refugee crimes, I use data from the first two of these periods, i.e., from the "event period" (EP) which includes NYECE (December 2015 and January 2016) and the "pre-event period" (PREP) (December 2014 and January 2015). Total sample size in this case is 49,724 (county-day observations for four months with 31 days each and 401 counties). For the analysis of a potential anniversary effect a year after NYECE, data from a third "post-event period" (POSTEP), i.e., December 2016 and January 2017, are added to the estimation sample, increasing its size to 74,586 county-day observations.

Additional data from the German Federal Statistics Office are used to construct covariates for the socio-demographic and economic structure of counties, which might influence local attitudes towards foreigners and hence be of consequence for anti-refugee crimes. The covariates for the years 2014, 2015, and 2016 include the following (stock variables are measured on December 31st): First, the population share of asylum seekers, which might be correlated with the number of anti-refugee crimes. Second, the absolute population size (in logs), as the count of anti-refugee crimes is likely to be higher in counties with larger populations. Third, the crime rate, defined as the ratio of total offences to population size at county

[6]It is worth mentioning that the chronicle only includes assault cases where the victim is a refugee. For instance, if the assault is against a volunteer who helps refugees or a journalist who covers a xenophobic event, it would not be included in the chronicle (Amadeu Antonio Stiftung, 2020).

level.[7] Fourth, the unemployment rate (annual average) and GDP per capita in counties as indicators for the state of the local economy. The latter may shape natives' attitudes towards foreigners and also directly impact criminal behavior. Finally, I control for weekday fixed effects and public-holiday fixed effects in all regressions, as anti-refugee crimes (and possibly criminal activity in general) may vary across both days of the week, workdays and holidays.

3.2 Empirical Strategy

To estimate the causal impact of NYECE on anti-refugee crimes, I use daily county data on anti-refugee crimes in close proximity to NYECE (+/- 31 days). Unlike most fatal terrorist attacks in Europe or non-fatal events in Germany in 2014-2016, NYECE occurred on a very special day of the year, i.e., New Year's Eve, which followed upon a very special period of the year, i.e., Christmas holidays. This is important because such a day and period may have led to changes in criminal activity, including anti-refugee crimes, at the turn of the year, even if NYECE had not occurred. If left unaccounted for, any such trend could bias estimates of the effect that NYECE had on anti-refugee crimes in early 2016.
For this reason, I use data from one year prior to the event, namely December 2014 and January 2015, i.e., "pre-event period" (PREP) data on New Year's Eve 2014/15. I estimate DiD regression-based NYECE impacts on anti-refugee crimes, both immediately (in January 2016 in the actual "event period" (EP)) and a full year later when studying potential anniversary effects of NYECE (in January 2017 in a "post-even period" (POSTEP)), that allow for both end-of-year and change-of-year fixed effects. To study immediate NYECE impact, I estimate variants of the following DiD linear probability model:

$$Y_{it} = \alpha + \beta_1 January_t + \beta_2 EP_t + \beta_3 (January_t * EP_t) + \boldsymbol{X_{it}'}\boldsymbol{\lambda} + \boldsymbol{\delta}_i + \boldsymbol{\eta}_t + \boldsymbol{\theta}_{it} + \varepsilon_{it}, \quad (1)$$

where Y_{it} is a binary variable that takes value 1 if one or more anti-refugee crimes occur in county i on day t, and 0 otherwise. In my data, more than 98% of county-day observations[8] reported no anti-refugee crime. For this reason, I estimate linear probability models, using the binary indicator described above as the dependent variable. This model setup is suitable

[7] Offenses that constitute violations of asylum laws, i.e., violations of the Residence Act, the Asylum Procedure Act, and the Free Movement of Persons Act/EU (key 725000), are excluded from the count of total offences. Such violations increased substantially during the heyday of the refugee crisis in late 2015.

[8] For county-day observations with at least one anti-refugee crime, the average number of such crimes is 1.158.

to explore the effect that NYECE had on the likelihood of a county to witness an anti-refugee crime on a particular day. $January_t$ is a dummy variable for January observations, which controls for common trend changes between December (base month) and the start month of a year. EP_t, in turn, is a dummy variable for the event period (EP), which encompasses December 2015 and January 2016. The interaction term $January_t * EP_t$ is the main variable of interest and denotes January 2016 observations. Its coefficient β_3 captures the treatment effect of NYECE, i.e., the difference between EP and PREP in the December-to-January change in the daily likelihood of a county experiencing anti-refugee crimes. $\boldsymbol{X_{it}'}$ it is a vector of annual control variables, consisting of 2014 observations for PREP (2014/15) and 2015 observations for EP (2015/16). $\boldsymbol{\delta}_i$ and $\boldsymbol{\eta}_t$ are vectors controlling for county fixed effects and weekday fixed effects, as anti-refugee crimes might vary in likelihood and number across counties and days of the week for reasons unrelated to NYECE. Similarly, vector $\boldsymbol{\theta}_{it}$ controls for time-varying county-specific public holidays effects, as crimes too may vary systematically on public holidays. Finally, ε_{it} is an error term. Throughout, I cluster standard errors at the county level to account for both heteroskedasticity and autocorrelation within counties across time.

4 Results

4.1 Main Estimates

Table 1 shows the results from estimating different versions of Equation (1), where each column reports a distinct model specification. Model (1) is the most parsimonious. Model (2) adds county fixed effects, and Model (3) additional covariates. The base group in all three specifications are observations in December 2014. The coefficient associated with the "January" indicator variable hence measures the average difference in the daily probability of anti-refugee crimes at the county level between December 2014 and January 2015. The coefficient on the indicator "EP", in turn, measures the mean differential in the daily probability of such crimes between December 2014 and December 2015. It captures any level difference (or trend) in anti-refugee crimes before the treatment. The coefficient on the interaction term "January*EP" is the main coefficient of interest. It measures the treatment effect, i.e., the difference in the December-to-January change in the daily probability of anti-refugee crimes at county level between 2014/15 and 2015/16. The following main findings emerge from Table 1. First, the average daily probability of witnessing anti-refugee crimes within a county rose from December 2014 to January 2015 by 0.18 percentage points, a change that is statistically significant at the 10% level (see Model (3)).

TABLE 1: The Immediate Impact of the NYECE on Anti-Refugee Crimes

	Model 1	Model 2	Model 3
January	0.0019**	0.0019**	0.0018*
	(0.0009)	(0.0009)	(0.0009)
EP	0.0079***	0.0079***	−0.0003
	(0.0012)	(0.0012)	(0.0033)
January*EP	0.0289***	0.0289***	0.0289***
	(0.0026)	(0.0026)	(0.0027)
Covariates	No	No	Yes
County-fixed effects	No	Yes	Yes
Observations	49,724	49,724	49,724

Notes: The estimation sample consists of daily county-level observations for the months of December 2014, January 2015, December 2015, and January 2016. The models are based on equation (1). Additional covariates considered in Model (3) include the population share of asylum seekers in a county, log county population size, the county crime rate, the unemployment rate in a county, and county-level GDP per capita. Model (3) also includes weekday fixed effects and public-holiday fixed effects. Clustered standard errors at the county level are reported in parentheses. ***p<0.01, ** p< 0.05, * p<0.1.

This increase could be due to the fact that the month of January always sees more crimes than the month of December, which hosts the Christmas period when people might be more peaceful and spend less time outside their homes. However, this increase could also be due to an immediate backlash after the attack on the Charlie Hebdo magazine headquarters in Paris on 7$^{\text{th}}$ January 2015, which was followed on 11$^{\text{th}}$ January 2015 by an attack on another newspaper in Germany, the Hamburger Morgenpost. Both incidents might have fueled anti-immigrant sentiment, which, in turn, could have led to more anti-refugee crimes (Virchow, 2016). On 12$^{\text{th}}$ January 2015, more than 25,000 PEGIDA supporters demonstrated in Dresden against immigrants (Brady, 2015). Furthermore, in the evening of the same day, an Eritrean asylum seeker was found murdered, which might have been connected to the anti-immigrant demonstration (Connolly, 2015). However, if the Charlie Hebdo attack and the accompanying incidents indeed increased anti-refugee crimes exceptionally in January 2015, then this would downward bias, not upward bias, my estimate of the effect of NYECE on anti-refugee crimes. In other words, my estimate would merely be a conservative one constituting a lower bound of the true effect. Second, the average daily probability of anti-refugee crimes in a county in December 2015 exceeds the same in December 2014 (at least in Models 1 and 2), indicating a rise in anti-refugee crimes over time. This rise may be attributed to the growing popularity of anti-immigration parties, rising anti-foreign sentiments, and the

increase in refugee arrivals, especially during the second half of 2015 (Jäckle and König, 2017; Entorf and Lange, 2023). Third, and most importantly, the coefficient of the interaction term indicates that NYECE caused a 2.89 percentage point increase in the December-to-January change in the daily probability of witnessing anti-refugee crimes in the 2015/16 period. This coefficient, compared to the mean of the outcome variable (0.0151), is approximately twice as large. This highlights the substantial magnitude of NYECE's immediate backlash on anti-refugee crimes in Germany. Finally, and reassuringly, adding county fixed effects and additional covariates to the model has no impact on the DiD coefficient estimates.

4.2 Robustness Checks

4.2.1 Alternative Sample Restrictions, Units of Analysis, and Estimation Models

Table 2 reports results from three kinds of robustness checks to substantiate the results. First, I exclude December 31st, January 1st, or both day from the analysis. I do so, because anti-refugee crimes might have occurred already before midnight on the 31st of December 2015 in immediate reaction to incidences of sexual assaults carried out by perpetrators before the turn of the year. Furthermore, at least around midnight, crimes might have been recorded with some measurement error concerning whether or not they occurred after midnight, i.e., in January 2016 rather than December 2015. For all three sample restrictions, however, the estimated DiD effect remains virtually identical to that in my baseline regression in column (3) in Table 1 (see columns (1) to (3) in Table 2). Second, I conduct a parallel analysis at both daily-state and monthly-county levels. Again, my finding proves robust (see column (4) and (5) in Table 2). At both levels of analysis, the estimated DiD effect remains positive and highly statistically significant, evidencing a causal increase in the likelihood of anti-refugee crimes attributable to NYECE. Third and finally, I estimate alternative limited-dependent-variable models (logit and probit models) and also count data models (Poisson and Negative Binomial (NB) models) to gauge whether the econometric model employed does matter for the (qualitative) results I obtain for the NYECE effect on anti-refugee crimes. As is evident from columns (6) to (9) in Table 2, this is not the case, further corroborating my baseline results.

TABLE 2: Robustness Checks I: Alternative Sample Restrictions, Unit of Analysis, and Estimation Models

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	Drop 31 Dec and/or 1 Jan			Observation level		Model			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	31 Dec	1 Jan	31Dec & 1 Jan	Daily-State	Monthly- County	Probit	Logit	Poisson	NB
January*EP	0.0290***	0.0290***	0.0291***	0.2897***	0.3292***	0.4187***	0.9129***	0.9828***	1.0056***
	(0.0027)	(0.0026)	(0.0027)	(0.0436)	(0.0397)	(0.0899)	(0.2451)	(0.2600)	(0.2604)
Public-holiday fixed effects	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes
Weekday fixed effects	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes
State fixed effects	-	-	-	Yes	-	Yes	Yes	Yes	Yes
County fixed effects	Yes	Yes	Yes	-	Yes	-	-	-	-
Observations	48,922	48,922	48,120	1,984	1,604	49,724	49,724	49,724	49,724

Notes: All models adhere to the baseline specification in column (3) in Table 1 and control for the Population share of asylum seekers in a county, log county population size, the county crime rate, the unemployment rate in a county, and county-level GDP per capita. State fixed effects are utilized when county fixed effects are not applicable. Clustered standard errors at the county level (state level in column (4)) are reported in parentheses. ***p<0.01, ** p< 0.05, * p<0.1.

4.2.2 Alternative Hate-Crime Data (Hate Crimes At/Near Refugee Group Quarters)

Schwitter and Liebe (2023) criticize methodological changes in the quantification of anti-refugee crimes within the datasets amassed by PRO ASYL and the Amadeu Antonio Foundation through the dataset of the project *Mut Gegen Rechte Gewalt*, challenging the findings by Frey (2020) on the consequences of NYECE on the scale of crimes against refugees. In 2016, the Federal Criminal Police Office broadened its definition of politically motivated crimes to encompass a wider spectrum of anti-refugee violence. The Federal Criminal Police Office is one of the main sources for the dataset from the project *Mut Gegen Rechte Gewalt*. Prior to this revision in 2016, the Federal Criminal Police Office's classification of anti-refugee incidents was limited to attacks occurring at or near refugee accommodations. The 2016 revision introduced an additional sub-category, i.e., crimes against refugees occurring outside such facilities. Schwitter and Liebe (2023) provide anecdotal evidence that the observed increase in anti-refugee crimes subsequent to NYECE in early 2016 might be driven by this broader recording of politically motivated crimes. Frey (2023) modified his approach to account for this concern by either excluding all attacks added to the dataset due to the introduction of a new sub-topic in 2016 or restricting the analysis to attacks sourced exclusively from non-governmental sources. His findings indicate that NYECE persists in exerting a substantial impact on the frequency of anti-refugee crimes. This suggests that the aforementioned concern regarding data measurement is not of critical importance for the identification and quantification of the effects of NYECE on anti-refugee crimes.

However, it is possible that the expansion of the coverage of politically motivated crimes was driven by the rise in the number and types of such crimes. For this reason, I replicate my analysis utilizing an alternative official dataset from the Federal Criminal Police Office, which focuses on politically motivated crimes classified under the category of hate crimes that occurred at or in proximity to refugee accommodations. This category existed prior to 2016 and saw no change in recording or definition at the 2015/16 turn of the year. Table 3 reports the main regression results of this robustness check (see column (2)). To ease comparison, column (1) of Table 3 reproduces my baseline results from column (3) in Table 1. As can be seen from column (2) in Table 3, the coefficient on January is still positive, but now smaller in magnitude and only imprecisely estimated, and the coefficient on EP is now positive and statistically significant. Most importantly, however, the coefficient of the interaction term remains positive and significant. NYECE hence continues to exert a positive effect on anti-refugee crimes when studying its impact using alternative hate-crime data. My baseline finding hence proves robust also to this check of sensitivity of my results.

4.2.3 Restricting the Sample to (January) Days before the Charlie Hebdo Attack on January 7, 2015

To test whether the Charlie Hebdo Attack can explain the positive DiD effect on anti-refugee crimes I estimated for NYECE, I re-estimate my baseline model in column (3) in Table 1 on a restricted sample which excludes all January days after January 6th (and hence January days after the Charlie Hebdo attack on January 7th 2015 and also the very day of its occurrence). As shown in column (3) of Table 3, however, I still find evidence for a statistically significant positive effect of NYECE on the likelihood of counties to witness anti-refugee crimes.[9]

Table 3: Robustness Checks II: Alternative Hate Crimes Data and Charlie Hebdo Attack on January 7, 2015

	Baseline specification	Hate crimes at/near refugee group quarters	Excluding days after January 6
	(1)	(2)	(3)
January	0.0018*	0.0007	-0.0014
	(0.0009)	(0.0006)	(0.0011)
EP	-0.0003	0.0054**	0.0043*
	(0.0033)	(0.0021)	(0.0024)
January*EP	0.0289***	0.0039**	0.0164***
	(0.0027)	(0.0017)	(0.0038)
Observations	49,724	49,724	29,674

Notes: All models adhere to the baseline specification in column (3) in Table 1, which is reproduced for convenience in column (1) in this table. All models control for the population share of asylum seekers in a county, log county population size, the county crime rate, the unemployment rate in a county, and county-level GDP per capita, as well as county-fixed effects, weekday-fixed effects, and public holiday-fixed effects. Clustered standard errors at the county level are reported in parentheses. ***p<0.01, ** p< 0.05, * p<0.1.

4.2.4 Exploiting Delayed Media Coverage of NYECE for Identification

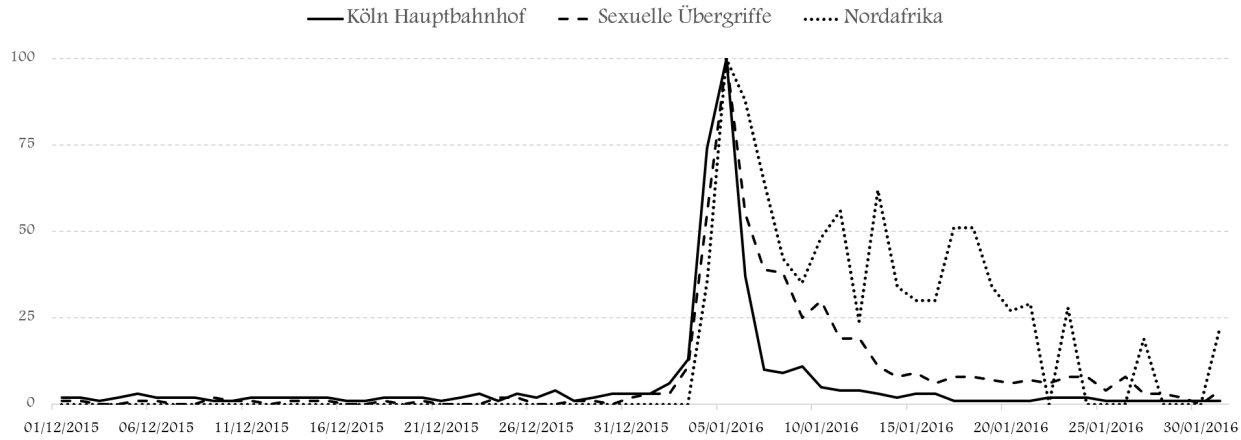
The public dissemination of information on NYECE by the media occurred only gradually and with a lag. Initial media reports, emerging on January 2nd, 2016, documented that 30 women had registered complaints of being subjected to assaults in Cologne by groups of men. This narrative underwent a substantial revision by January 4th, 2016, with updated

[9]Restricting the estimation sample even further to the last six days before and the first six days after New Year produces similar results.

accounts/reports indicating that approximately a thousand North African men had been involved in the attacks on women in Cologne (Boulila and Carri, 2017).

For identification, I can exploit this change in media coverage and hence public awareness of NYECE and its scale. Before I do so in my regression analysis, I document the temporal evolution of public knowledge of (and need for information on) NYECE in the first days of 2016. For this purpose, I utilize Google Trends, a tool that tracks the popularity of specific search terms on Google.[10] I focus on three keywords (in German) and their usage in Google searches conducted in Germany from December 1st, 2015, to January 31st, 2016. The selected keywords are *"Köln Hauptbahnhof"* (Cologne Central Station, the location of the event), *"Sexuelle Übergriffe"*(sexual assaults, the sort of crimes dominating NYECE), and *"Nordafrika"* (North Africa, the alleged prime origin of suspects). As shown in Figure 3, a significant increase in the usage of these keywords is observable only after January 3rd and peaking on January 5th. Subsequently, search frequencies for these terms begin to fall relatively rapidly, indicating a decline in the need of information on NYECE by the public.

Fig. 3: Public Interest in NYECE: Google Trends Data (December 2015–January 2016)



Note: This graph illustrates Google Trends data for three German keywords: *"Köln Hauptbahnhof", "Sexuelle Übergriffe"*, and *"Nordafrika"* during the period from December 1, 2015, to January 31st, 2016. The data reflects the relative search interest, scaled from 0 to 100, where 100 indicates the peak search popularity of the terms in Germany in the selected period. This peak occurred on January 5th, 2016. Graph created by the author.

If NYECE indeed had a positive impact on anti-refugee crimes as a retaliatory response, one would expect a more pronounced rise in such crimes after the first three or four days of January 2016. To check whether this was the case, I estimate the following variant of my baseline model, which calculates separate treatment effects for the initial three (or four)

[10]Google Trends data provide information on the relative frequency of a search term compared to the total search volume in a specific location and time range. The data is normalized and scaled from 0 to 100, where 100 represents the peak popularity of the term within the selected time frame and location.

days, the subsequent three (or four) days, and the remaining days of January:

$$Y_{it} = \alpha + \beta_1 J_{1t} + \beta_2 J_{2t} + \beta_3 J_{3t} + \beta_4 EP_t + \beta_5 (J_{1t} * EP_t) + \beta_6 (J_{2t} * EP_t) + \beta_7 (J_{3t} * EP_t) + \boldsymbol{X_{it}'} \boldsymbol{\lambda} + \boldsymbol{\delta}_i + \boldsymbol{\eta}_t + \boldsymbol{\theta}_{it} + \varepsilon_{it}, \tag{2}$$

where J_{1t}, J_{2t}, and J_{3t} are binary indicators for the first three days, subsequent three days, and remaining 25 days of January (see column (1) of Table 4), respectively the first four, subsequent four, and remaining 23 days of January (see column (2) of Table 4). The coefficients β_5 to β_7 on the respective three interaction terms hence capture the impact of NYECE on anti-refugee crimes at different points in January 2016.

TABLE 4: Robustness Checks III: Time Structure of NYECE's Immediate Impact on Anti-Refugee Crimes in Early 2016

	3-day interval	4-day interval
	(1)	(2)
J1 * EP	0.0109**	0.0123***
(Initial phase of Jan 2016)	(0.0049)	(0.0040)
J2 * EP	0.0225***	0.0356***
(Subsequent phase of Jan 2016)	(0.0054)	(0.0053)
J3 * EP	0.0317***	0.0305***
(Final phase of Jan 2016)	(0.0029)	(0.0030)

Notes: The models are based on equation (2). Only interaction term (DiD) coefficients for the three sub-periods in January are presented. Apart from indicators for these sub-periods and the EP period, all models control for the population share of asylum seekers in a county, log county population size, the county crime rate, the unemployment rate in a county, and county-level GDP per capita, as well as county-fixed effects, weekday-fixed effects, and public holiday-fixed effects. Clustered standard errors at the county level are reported in parentheses. ***p<0.01, ** p< 0.05, * p<0.1.

The results, presented in Table 4, align with expectations and correspond to the Google Trends patterns discussed above. The likelihood of anti-refugee crimes increased throughout January, with a particularly sharp rise observed after January 3$^{\text{rd}}$ (which becomes evident when comparing the second-period to the first-period treatment effects reported in columns (1) and (2)). Furthermore, during the remainder of January (i.e., the third sub-period examined within the first month of the year), the risk of anti-refugee crimes remains elevated, indicating that the impact of NYECE was quite lasting. The time structure of the growth in increase in anti-refugee crimes observed in early 2016 proves consistent with the temporal

response expected from the delayed media coverage of NYECE in the press. My core finding hence receives support also from this test of sensitivity.[11]

4.3 Effect Heterogeneity

In the following, I explore whether NYECE's impact on anti-refugee crimes differed across counties along various dimensions (Section 4.3.1) and whether the same turned out heterogeneous, rather than uniform, across different types of anti-refugee crimes (Section 4.3.2).

4.3.1 Effect Heterogeneity Across Counties by Region, Immigration and Crime Levels, and Economic Prosperity

I begin by studying effect heterogeneity across counties. Specifically, I explore whether the impact of NYECE on anti-refugee crimes at the county level differed between East and West Germany or varied across federal states. I also check whether the immediate backlash of NYECE on anti-refugee crimes at the county level depends on factors such as the size of the pre-NYECE refugee inflow to a county, the pre-NYECE presence of a regional refugee reception center in a county, the pre-NYECE German victimization rate in crimes with refugee suspects, the pre-NYECE German suspect rate in crimes with foreign victims, and GDP per capita in a county.

To study potential effect heterogeneity, I estimate a modified version of my baseline model (see equation (1)). This modified model includes an additional indicator variable, D_i, on the right-hand side of the regression equation. The variable D_i enters the model in three forms: As a level term (D_i), as a double interaction ($EP_t * D_i$), and as a triple interaction ($January_t * EP_t * D_i$) (see equation (3)). The coefficient γ_3 on the triple interaction term is of primary interest, as it captures any difference in the response of anti-refugee crimes to NYECE in counties that are in East Germany, in NRW, where Cologne is located, rather than in some other federal state, or in counties with an above-median level of refugee-related crimes (German victimization rate in crimes with refugee suspects), an above-median level of foreigner related crimes (German suspect rate in crimes with foreign victims), or an above-median level of GDP per capita.

$$\begin{aligned} Y_{it} = {} & \alpha + \beta_1 J_t + \gamma_1 J_t * D_i + \beta_2 EP_t + \gamma_2 EP_t * D_i + \beta_3 (J_t * EP_t) + \gamma_3 (J_t * EP_t) * D_i \\ & + \boldsymbol{X}_{\boldsymbol{it}}' \boldsymbol{\lambda} + \boldsymbol{\delta}_i + \boldsymbol{\eta}_t + \boldsymbol{\theta}_{it} + \varepsilon_{it}. \end{aligned} \tag{3}$$

[11] The same holds true, when I estimate count models (i.e., Poisson and Negative Binomial Models) using otherwise identical model specifications. The results of these regressions are available upon request.

The results are presented in Table 5. Columns (1) and (2) report the estimated differential impacts for NRW and East Germany, columns (3) and (4) for the two indices characterizing pre-NYECE refugee immigration levels and housing arrangements in a county, columns (5) and (6) for the two indicators of pre-NYECE crime levels, and column (7) for GDP per capita as a proxy for county-level economic prosperity before NYECE.

As shown in column (1), counties in NRW, where Cologne is located, indeed witnessed more of a rise in the likelihood of anti-refugee crimes after NYECE. In contrast, no significant difference in impact is observed between East and West Germany (see column (2)).[12] This absence of regional variation is somewhat surprising, given the higher incidence of anti-foreigner crimes in East Germany during the early 1990s (Krueger and Pischke, 1997).

Regarding pre-NYECE refugee immigration levels and housing arrangements, the results indicate that NYECE had a stronger impact on anti-refugee crimes in counties that experienced an above-median refugee inflow shock during the 2015 refugee crisis.[13] Similarly, counties hosting initial refugee reception centers prior to NYECE in 2014 exhibited a significantly larger impact. In fact, the impact is double in size the impact NYECE had in counties without such centers.

Concerning counties' pre-NYECE German victimization rate in crimes with refugee suspects and counties' pre-NYECE German suspect rate in crimes with foreign victims, I use special data extract for 2015 provided by the Federal Criminal Police Office on the number of Germans victimized in crimes with victim recording (e.g., bodily injuries, or robberies) in which refugees were suspects, and the number of German suspects involved in crimes against foreign victims. I find mixed results. There is no evidence that NYECE's backlash on anti-refugee crimes differed for counties that had seen an above-median level of German victimization rate in crimes with refugee suspects in 2015. However, in counties with an above-median German suspect rate in crimes with foreign victims in 2015, NYECE caused a larger rise in anti-refugee crimes. This suggests that in counties inherently more hostile towards foreigners, NYECE led to more hostile actions against refugees.

Finally, I find that more prosperous counties, i.e., those with above-median levels of GDP per capita in 2015, saw a more pronounced rise in anti-refugee crimes in response to NYECE. This finding is unexpected, as sociological research indicates that economic frustration and hardship is often associated with increased anti-immigrant violence (Quillian, 1995; Olzak,

[12]Berlin is excluded from the sample in this analysis because it cannot be assigned exclusively to East or West Germany.

[13]Following Huang and Kvasnicka (2019), this shock is proxied by the change in the end-of-year stock of asylum seekers in a county between 2014 and 2015 (i.e., excess arrivals in 2015), normalized by the county's population in 2014.

TABLE 5: Effect Heterogeneity of NYECE's Immediate Impact on Anti-Refugee Crimes Across Counties

	Geographical region		Refugee		Crime		Econ. Prosperity
	NRW	East	Immigration	Reception centre	German victimization rate with refugee suspect	German suspect rate with foreign victim	GDP per capita
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
January*EP	0.0267***	0.0275***	0.0241***	0.0236***	0.0262***	0.0230***	0.0204***
	(0.0028)	(0.0028)	(0.0037)	(0.0026)	(0.0030)	(0.0031)	(0.0031)
Interaction	0.0172**	0.0039	0.0096*	0.0228***	0.0055	0.0119**	0.0170***
(January*EP*heter.dummy)	(0.0085)	(0.0072)	(0.0053)	(0.0076)	(0.0053)	(0.0053)	(0.0052)
Observations	49,724	46,600	49,724	49,724	49,724	49,724	49,724

Notes: The models are based on equation (3). Only coefficients of the treatment and the treatment interaction for effect heterogeneity are reported. Other control variables used in all models are identical to these in my baseline model (see column (3) in Table 1). Clustered standard errors at the county level are reported in parentheses. ***p<0.01, ** p< 0.05, * p<0.1.

1994). Summarizing the above, NYECE's impact on anti-refugee crimes was not uniform geographically, and influenced also by counties' history of administrative structures for refugee immigration, past levels of crime involving foreigners, and general prosperity. Such findings of heterogeneity may inform future policies to mitigate, and possibly prevent, retaliatory hate crimes after events like NYECE.

4.3.2 Effect Heterogeneity by Type of Crime

Thus far, the analysis has focused on total anti-refugee crimes, encompassing assaults, arsons, and miscellaneous crimes.[14] Among these, assaults and arsons represent more severe crimes, while miscellaneous crimes include actions such as threats, stone-throwing, hate-inspired graffiti, and property damage. Given the varying severity of these categories, it is of interest to learn whether all three of these crimes were affected alike by NYECE or some were impacted more than others.

To explore this potential effect heterogeneity, I re-estimate the baseline model (see column (3) in Table 1) separately for assaults, arsons, and miscellaneous crimes. The results, presented in Table 6, reveal notable differences. For assaults, NYECE increased the daily probability of occurrence in a county during January 2016 by 0.29 percentage points— reveal times greater, approximately 1.5 times higher than the average (0.0018) and seven times greater than the typical December-to-January change, as captured by the January coefficient (see column (1) of Table 6).

For miscellaneous crimes, the effect of NYECE is even more pronounced (on increase of 2.6 percentage points) both in absolute terms and compared to what could be expected from a normal December-to-January switch (see column (3) of Table 6). Finally, for arsons (see column (2) in Table 6), the effect of NYECE is insignificant but estimated also to have exerted a small positive effect. Arson is a risky and complex act that often requires group coordination and carries a high risk of causing harm, including fatalities among vulnerable individuals. Such incidents would inevitably prompt thorough investigations. These significant risks and consequences make a sharp short-term increase in arson incidents unlikely, as such acts typically demand careful planning to avoid detection.

[14]The proportion of arsons, assaults, and miscellaneous crimes in daily county-level crime counts for December/January 2014/15 and 2015/16 is minimal, with 99.91%, 99.82%, and 98.76% of observations, respectively, recording no incidents.

TABLE 6: The Immediate Impact of the NYECE on Assaults, Arsons, and Miscellaneous Crimes Against Refugees

	Assaults	Arsons	Miscellaneous
January	0.0004	−0.0003	0.0017**
	(0.0004)	(0.0002)	(0.0008)
EP	−0.0014	0.0010	0.0002
	(0.0009)	(0.0007)	(0.0028)
January*EP	0.0029***	0.0005	0.0260***
	(0.0008)	(0.0006)	(0.0024)
Observations	49,724	49,724	49,724

Notes: The models adhere to the main baseline specification in column (3) in Table 1 and control for the population share of asylum seekers in a county, log county population size, the county crime rate, the unemployment rate in a county, and county-level GDP per capita, as well as county-fixed effects, weekday-fixed effects, and public holiday-fixed effects. Clustered standard errors at the county level are reported in parentheses. ***p<0.01, ** p< 0.05, * p<0.1.

4.4 Anniversary Effect of NYECE

The one-year anniversary of NYECE may have resurfaced distressing recollections and emotions, potentially reigniting acts of violence towards refugees akin to those witnessed in the immediate aftermath of NYECE in early 2016. To examine the possibility of such an "anniversary effect", I expand my estimation sample by a post-event period (POSTEP), covering December 2016 and January 2017 (see Section 3.1 and 3.2 for further details). To estimate DiD regression-based NYECE impacts on anti-refugee crimes a full year later (in January 2017), I furthermore augment my regression model as follows:

$$\begin{aligned} Y_{it} = \alpha + \beta_1 January_t + \beta_2 EP_t + \beta_3 (January_t * EP_t) + \beta_4 POSTEP_t + \\ \beta_5 (January_t * POSTEP_t) + \boldsymbol{X_{it}'}\,\boldsymbol{\lambda} + \boldsymbol{\delta}_i + \boldsymbol{\eta}_t + \boldsymbol{\theta}_{it} + \varepsilon_{it}. \end{aligned} \tag{4}$$

The coefficient β_5 on the new interaction term $January_t * POSTEP_t$ captures the anniversary effect of NYECE. A priori, one might expect this effect to have the same sign (i.e., positive) as the immediate impact of NYECE on anti-refugee crimes in early 2016, represented by β_3, albeit with a smaller magnitude. Moreover, any anniversary effect, if present, is likely to be less persistent than the immediate backlash against refugees observed shortly after NYECE. To investigate this possibility, I examine four different estimation samples: One that includes

all days in December and January for 2014/15, 2015/16, and 2016/17, and three restricted subsamples focusing exclusively on the first fifteen, ten, or five days of January in these periods.

As shown in column (1) of Table 7, NYECE exerts no statistically significant anniversary effect on anti-refugee crimes when the estimation sample includes all days in December and January (the baseline sample). When I restrict my estimation sample to January days shortly after New Year's Eve (see columns (2) to (4)), however, my estimate of the positive anniversary effect grows substantially in size and becomes also statistically significant in all three restricted samples I consider in the analysis. These findings provide evidence for the existence of an anniversary effect of NYECE on anti-refugee crimes a full year after the events in Cologne on New Year's Eve 2015/16.[15]

In line with my first conjecture, I find that the anniversary effect shares the same sign as the immediate effect of NYECE and that it is smaller in magnitude than NYECE's immediate impact on anti-refugee crimes. In line with my second conjecture, the anniversary effect also demonstrates less persistence compared to NYECE's immediate impact. In facts, the anniversary effect decreases in magnitude as the post-New Year's Eve outcome period increase.

Despite being smaller than the immediate effect, the anniversary effect is far from negligible when evaluated against the typical December 2015 baseline. The average daily probability of anti-refugee crimes at the county level in December 2015 is 0.0106. Relative to this baseline, the estimated anniversary effects reported in columns (2) to (4) in Table 7 correspond respectively to approximately 40%, 53%, and 64% of their average daily probability. In comparison to the immediate NYECE effect, the anniversary effect is also relatively large. It represents about 15% of the NYECE effect when the sample includes the first half of January, approximately 20% when focusing on the first 10 days of January, and around 52% when restricting the analysis to the first 5 days of January.

An overall retaliatory crime response assessment of NYECE needs to take this anniversary effect into account. Failing to do so will cause (downward) bias in any such assessment. Furthermore, policy needs to address, and try to prevent or at least lessen, such anniversary retaliatory crime responses.

[15] On December 19, 2016, a terror attack occurred at a Christmas market in Berlin, leading to a deterioration in attitudes toward refugees immediately afterward (Nägel and Lutter, 2020), which may have resulted also in more anti-refugee crimes in late December 2016. However, my analysis provides no evidence for such an increase, as the coefficient estimates for the POSTEP period turn out statistically insignificant and close to zero in size across all specifications (see Table 7). In any case, my DiD anniversary effect estimates would be unaffected, even if this attack did have an effect on anti-refugee crimes in late 2016.

TABLE 7: The Immediate Impact and the Anniversary Effect of the NYECE on Anti-Refugee Crimes

	Whole month	15 days	10 days	5 days
	(1)	(2)	(3)	(4)
January	0.0019**	0.0012	-0.0011	-0.0010
	(0.0010)	(0.0010)	(0.0009)	(0.0012)
EP	0.0021	0.0010	0.0011	0.0003
	(0.0021)	(0.0024)	(0.0023)	(0.0024)
January*EP	0.0289***	0.0290***	0.0284***	0.0132***
	(0.0026)	(0.0032)	(0.0033)	(0.0039)
POSTEP	0.0014	-0.0006	-0.0002	-0.0011
	(0.0028)	(0.0034)	(0.0032)	(0.0033)
Anniversary effect	0.0008	0.0042*	0.0056**	0.0068*
(January*POSTEP)	(0.0018)	(0.0023)	(0.0025)	(0.0035)
Observations	74,586	55,338	49,323	43,308

Note: The models are based on equation (4) and control for the population share of asylum seekers in a county, log county population size, the county crime rate, the unemployment rate in a county, and county-level GDP per capita, as well as county-fixed effects, weekday-fixed effects, and public holiday-fixed effects. Clustered standard errors at the county level are reported in parentheses. ***p<0.01, ** p< 0.05, * p<0.1.

5 Conclusion

The New Year's Eve 2015 event in Cologne was marked by widespread sexual assaults and robberies, primarily targeting women, with perpetrators allegedly of North African or Middle Eastern descent. Its impact on politics and public perceptions and attitudes was tremendous. Public opinion toward refugees deteriorated sharply after NYECE and German immigration policy took a much more restrictive stance. Refugees themselves may have faced harm and been subjected to retaliatory violent attacks and crimes. In this paper, I studied this question, both for the shorter run (immediate backlash against refuges) and the longer run (anniversary effect of NYECE).

Using detailed county-level daily data in the vicinity of New Year's Eves in 2014/15 (pre-event period), 2015/16 (event period) and 2016/17 (post-event period) in DiD regressions, I find evidence for a sizeable immediate backlash of NYECE on anti-refugee crimes and also a sizeable anniversary effect of NYECE a full year later. Both effects share the same positive

sign, indicating an increase in anti-refugee crimes as a result of NYECE.

The short-term findings are supported by extensive robustness checks, and I explored potential heterogeneity in the effects along a number of dimensions. The latter provided novel insights on how different socio-demographic and economic factors shaped (i.e., strengthened or mitigated) NYECE's backlash on anti-refugee crimes at regional level. These findings can guide public policy in the future to better address and possibly prevent retaliatory hate crimes following high-profile events like NYECE.

Future research is required on high-profile events like NYECE, their impacts (both in the short and longer run), and the factors that moderate their impacts. As this study is the first to inquire into and document the existence of a sizeable anniversary affect, this is particularly true for the longer-term effects that such events may have. Such research can inform policy, aid crisis management, and help decision makers to develop strategies for preventing or mitigating their potential adverse repercussions. This is important for both social cohesion, successful refugee integration, and overall public safety.

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