Online Appendix

Hate Crimes and Gender Imbalances:
Fears over Mate Competition and Violence against Refugees

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A Background Information

A.1 Internal Migration and Gender Imbalances in Germany

Several trends have come together to lead to regional gender imbalances in Germany and in other developed economies. In many "post-industrial" economies shifts towards service-based employment and away from industrial production have been especially pronounced in urban centers. Moreover, the skills-gap between cities and more peripheral regions has also increased. These dynamics coincide with a rise in the educational attainment of women overall and, in some cases, with particularly pronounced gender-based differences in educational aspirations in rural areas. Moreover, men are more likely to seek employment in manufacturing, whereas women are often pursuing work in the tertiary sector. The educational and employment opportunities found in urban areas are therefore major pull factors for women in particular (Eckhard and Stauder, 2018; ESPON & Leibniz Institute for Regional Geography, 2012).

These dynamics also help explain internal east-west migration within Germany. After reunification in 1989, migration rates from eastern to western states were very high and dominated by young age cohorts. It is only in 2017 that migration from west to east surpasses east-to-west migration for the first time since reunification (Bangel et al., 2019). Females, particularly those with higher levels of education, were more likely to migrate westwards; between 1999 and 2005, two thirds of migrants from east to west were female (Geis and Orth, 2017). Reasons were both structural and socialization-related. In terms of structural pull factors, western states were characterized by a larger service sector associated with more opportunities for female employment and career prospects. In terms of socialization, a "strong [female] employment orientation" (Mau, 2019, p. 194) and a more egalitarian view of gender relations overall in the former GDR (exemplified by high female labor force participation rates, women routinely returning to work after childbirth as well as high average female education levels) resulted in relatively good prospects for economic integration in the west (Mau, 2019; Kröhnert and Klingholz, 2007). Consistent with this line of argument, males have also been more likely to return to the east compared to females. While female-dominated migration has slowed down substantially, and the gendered migration pattern between east and west saw a small net shift towards males in 2008, areas with excess males persist and are concentrated in – yet not limited to – eastern states (Geis and Orth, 2017).

Where skewed sex ratios have been a long-term trend, the shortage of women has become a salient local issue and has been picked up by print and TV media, think tanks, and regional governments struggling with low fertility rates and shrinking populations. Table A1 lists some examples. These sources connect local concentrations of excess males to dating and marriage markets, frequently portraying the difficulties that men face in finding a partner and starting a family.

Title	Source	Date
Allein in Norden	NDR (TV documentary)	19-Sep-11
Sag mir, wo die Frauen sind:		
Single-Männer in Ostdeutschland	ZDF (TV Documentary)	7-Oct-19
Not am Mann: Von Helden der Arbeit	Berlin-Institut für Bevölkerung	05-2007
zur neuen Unterschicht	und Entwicklung	
Wer kommt? Wer geht? Wer bleibt? Eine Studie zur		
Verbesserung der Verbleibchancen qualifizierter		
Frauen im Landkreis Görlitz	Landratsamt Görlitz	12-2016
Regensburg ist neue Single-Hochburg	Mittelbayerische	12-Jan-10
Frauenmangel erschwert Partnersuche auf dem Land	Agrar Heute	1-Jan-19
Im Landkreis werden die Frauen knapp	Ostsee Zeitung	20-Aug-05
Mädels, wo seid ihr? Niederbayern hat statistisch		
den größten Männerüberschuss in Westdeutschland.		
Das macht die Partnersuche gerade für Jungbauern		
noch schwieriger	Süddeutsche Zeitung	24-Aug-19
Mitten in Bayern; Chinesische Verhältnisse	Süddeutsche Zeitung	9-Mar-18
Männer haben es schwerer bei der Partnersuche	Mitteldeutsche Zeitung	15-Dec-17
Partnerschaft; Unter Männern	Zeit Online	8-Mar-17

Table A1: Examples of Sources Discussing Shrinking Female Populations and Men's Dating Prospects (Germany)

A.2   Public Attention to Refugee-Native Dating and Relationships

In this section we provide information on the sources that have covered the topic of refugee-native relationships. Given that the refugee population in 2015-16 consisted primarily of men (see Figure C.10 below), this coverage was mainly about refugee men dating German women and teenage girls.

Table A2 lists 65 references (primarily newspaper articles, but also TV and radio shows) that have been published by mainstream sources in Germany and internationally. As the table shows, so-called flirt classes were covered widely, even beyond Germany. Other examples include human interest stories about relationships between German women/girls and refugee men (e.g., "My daughter is in love with a refugee: this is how inter-cultural love works", "Kristin from Trier takes in refugees in her shared flat – and falls in love") and controversies about German teenage girls dating Syrian men. A recent study (Salomo, 2019) linking the relationship between excess males and xenophobia to unbalanced dating and marriage markets also gained considerable attention.

Table A3 lists 59 references that have appeared on far-right websites (in particular *Politikversagen,*"Failure of Politics"; `http://www.politikversagen.net`), that generally adopt a harsh, anti-immigrant tone. Publications fall into two categories: original content produced by far-right sources and content that first appeared on mainstream sources, but that is re-posted by far-right sites and often given a negative spin. In the case of flirt classes, the organizers of these classes conducted their own media analysis and concluded that whereas the reception in the mainstream media was mainly positive, it was hostile on right-wing sites: "The fascist fake news platform Breitbart as well as thousands of AFD sympathizers have massively criticized our free course. The criticism had the pitiful tenor, "now they [refugees] not only steal our jobs – but also our women" (Flirt University, 2017).

Far-right sources are also more likely than mainstream media to discuss the surplus of males (*Männerüberschuss*) among refugees and the subsequent shortage of women (*Frauenmangel*). For example, *"Männerüberschuss"* (excess males) is its own own category on the site *Politikversagen*, featuring 241 articles as of June 3, 2020. Further, demographic imbalances are directly linked to incoming refugees and the topic of mate competition. In addition to lamenting the perceived competition, violence is considered to inevitably arise both from sexual frustration and associated aggressiveness both among refugees and native males.

Finally, AfD politicians have also publicly made the connection between the predominantly male composition of the refugee populations and its potential impact on refugee-native relationships. Two AfD politicians elected to Hamburg's parliament posed an official inquiry to the city-state's government asking about the male surplus among the refugee population and highlighting that the majority of male migrants belong to the age group (18-34 year-olds) that is "particularly relevant when it comes to looking for a romantic partner and starting a family" (Bürgerschaft der Freien Hansestadt Hamburg, 2019). In the state of Rheinland-Pfalz, the AfD parliamentary group sent an official inquiry to the state government entitled "Relationships between teenage girls and male asylum seekers" (Landtag Rheinland-Pfalz, 2019). The inquiry included several questions pertaining to the frequency of and nature of these relationships.

Title	Source	Date
Let's talk about sex	Stern	28-Jan-16
Kölner Flirt-Coach schult Essener Flüchtlinge	Westdeutsche Allgemeine Zeitung	26-Aug-16
Flirt-Experte bietet Beziehungs-Workshop für Flüchtlinge an	Welt	29-Aug-16
Flirt-Experte bietet Beziehungs-Workshop für Flüchtlinge an	Neue Rhein/Neue Ruhr Zeitung	29-Aug-16
Flirt-Experte bietet Beziehungs-Workshop für Flüchtlinge an	Westfalen Post	29-Aug-16
Flirt-Experte bietet Beziehungs-Workshop für Flüchtlinge an	Die Glocke	29-Aug-16
Integration in Sachen Liebe	Deutsche Welle	7-Sep-16
Erster Flirtkurs fuer Fluechtlinge	Bild	8-Sep-16
Erster Flirtkurs fuer Fluechtlinge	Bild Ruhrgebiet	8-Sep-16
So verliebt man sich in Deutschland	Bild Plus	8-Sep-16
Flirt-Coach schult Flüchtlinge	N24 Transkripte (TV)	9-Sep-16
Anfeindungen; Ein Flirtkurs für Flüchtlinge - von Security bewacht	Welt online	11-Sep-16
Migrants will get lessons in flirting to help them settle in Germany	Metro (UK)	13-Sep-16
L'Allemagne donne des leçons de séduction aux réfugiés	Le Monde Magazine (France)	24-Sep-16
"Was kommt bei Mädchen gut an?"	Salzburger Nachrichten	14-Oct-16
Workshop in Dortmund; Flirt-Experte erklärt Flüchtlingen die deutschen Frauen	Focus Online	28-Nov-16
Top dating tips for migrants from Germany's 'Mr Flirt'	The Canadian Press	28-Nov-16
Germany's 'Mr Flirt' teaches refugees how to pick up women	Associated Press	28-Nov-16
Top dating tips for migrants from Germany's 'Mr Flirt'	Associated Press International	28-Nov-16
Migrants are taught how to attract women and sexually arouse them in German seminars run by 'Mr Flirt' following spate of sex assaults across the country	Daily Mail	28-Nov-16
Germany's 'Mr Flirt' teaches refugees how to pick up women	Toronto Sun	28-Nov-16
'Mr. Flirt' teaches new migrants how to approach women in Germany	Euro News	28-Nov-16
Germany's 'Mr Flirt' teaches refugees how to pick up women	Darpan Magazine (Canada)	28-Nov-16
Refugees get top dating tips from Germany's 'Mr Flirt'	India TV	29-Nov-16
Germany's 'Mr Flirt' teaches refugees how to pick up women	Charleston Gazette-Mail (US)	29-Nov-16
Syrian refugees taught pickup lines by Germany's 'Mr Flirt'	Pretoria News (South Africa)	29-Nov-16
Germany's 'Mr. Flirt' teaches refugees how to approach women	Toronto Star	29-Nov-16
Mr. Flirt leert asielzoekers versieren	De Telegraaf (Holland)	29-Nov-16
Refugees learn art of flirting	The Bismarck Tribune (North Dakota)	29-Nov-16
Syrian migrants attend classes on how to PICK UP WOMEN by Germany's 'MR FLIRT'	Daily Express (UK)	29-Nov-16
Another minefield for those fleeing war: how to hit on a fraulein	The Australian	30-Nov-16
Pick-up lines lost in translation? Refugees flirt with fräuleins	i-Independent Print Ltd	1-Dec-16
Refugees learn art of the pickup; Mr. Flirt offers asylum seekers free classes on 'How to fall in love in Germany'	Times Colonist (Victoria, British Columbia)	2-Dec-16
Refugees find refuge learning to flirt	Daily Press (Newport News, VA)	5-Dec-16
Experten fordern mehr Frauen-Verstehkurse für Flüchtlinge	Focus Online	9-Dec-16

Title	Source	Date
Aufgeklärt	Der Spiegel	10-Dec-16
Flirt-Coach schult Flüchtlinge unter Polizeischutz	Kronen Zeitung (Austria)	12-Dec-16
Kurse für männliche Asylbewerber: Neue Initiativen zur Integration	The European	14-Dec-16
Eine Menge schiefgelaufen	Der Spiegel	23-Dec-16
Professor of flirting defies death threats	The Times (London)	6-Jan-17
Navigating A New Culture, A Syrian Refugee In Germany Seeks A Dating Coach's Advice	NPR	26-Sep-17
Zur Integration gehört auch der Sex	Sonntagszeitung	18-Feb-18
Dieser Kölner gibt Flirtkurse für Flüchtlinge	Rheinische Post	20-Jul-17
Flirten für Flüchtlinge	Frankfurter Allgemeine	13-Jul-17
Top dating tips for migrants from Germany's 'Mr Flirt'	Fox News (US)	28-Nov-16
Was an Vorurteilen über Flüchtlinge dran ist	Sächsische Zeitung	21-Nov-14
German Dating 101	Aljazeera	2-Dec-16
Völkerverständigung in Sachen Liebe: Ein Flirtkurs für Flüchtlinge	Youtube - Der Spiegel	4-Feb-17
Dating-Kurs für Flüchtlinge in Dortmund	Youtube - Deutsche Welle	29-Nov-17
Flirtcoach für Flüchtlinge:"Ab wann hat man in Deutschland das erste Mal Sex"	Youtube - RT Deutsch	25-Sep-16
Mit dem Herzen ankommen	Süddeutsche Zeitung	16-Feb-16
Wenn ein Flüchtling eine Deutsche liebt	Süddeutsche Zeitung	17-Feb-16
Die unwahrscheinliche Liebesgeschichte von Toni und Ahmad	Der Tagesspiegel	11-Feb-17
Drei Geflüchtete kämpfen um ihre Liebe zu einer Deutschen	Chilli - Freiburger Stadtmagazin	15-Mar-17
Das deutsche Mädchen, der Flüchtling und die Liebe	Medienmagazin	1-Jan-18
Sabine, 52, heiratet Mahmoud, 25. Sie stammt aus Leer in Ostfriesland, er aus Damaskus in Syrien. Kann das Liebe sein?	Zeit Online	26-Oct-17
Lisa liebt Tunesier: Jetzt muss er Deutschland verlassen!	SAT.1 Frühstücksfernsehen	24-May-18
Deutsch-Syrisches Paar kämpft für die Liebe	SWR, Landesschau Baden-Württemberg	14-Mar-16
Deutsch-syrische Liebe	WDR for you	14-Oct-19
Eine grenzenlose Liebe zwischen Syrien und Deutschland	DW Deutsche Welle	17-Feb-19
Meine Tochter liebt einen Flüchtling: So geht interkulturelle Liebe	Sat1 Frühstücksfernsehen	10-May-15
Kristin aus Trier nimmt Flüchtlinge in ihrer WG auf - und verliebt sich	DASDING Trier	14-Sep-16
Doku im Kika: Deutsches Mädchen liebt syrischen Jungen	YouTube - BL Unterhaltung	10-Jan-18
Kika-Protagonist auf Facebook:"Das war als Scherz gemeint"	Welt	16-Jan-18
Liebe ohne Schweinefleisch	Frankfurter Allgemeine	15-Jan-18

Table A2: Articles and Videos about Refugee Men Dating or Marrying Native Women in Germany, Published in Mainstream Sources

Title	Source	Date
CDU-Familienwerbung mit weißer Frau und schwarzem Mann	Journalistenwatch	25-Jan-20
Erfolgreiches Speed-Dating für Migranten in Chemnitz	tag24.de*	30-Oct-19
Experten fordern mehr sexuelle Bildung für Flüchtlinge	welt.de*	27-Sep-19
Achtung Männerüberschuss	Youtube Neverforgetniki	7-Aug-19
Demonstration der Stärke	Young German	14-May-19
Zuwanderung, Männerüberschüsse, Partnermarkt und öffentliche Sicherheit	Philosophia Perennis	25-Dec-18
Versechsfacht! Jeder vierte junge Mann in Chemnitz ist Ausländer	bild.de*	27-Sep-18
Die Erpressung	Journalistenwatch	8-Aug-18
Warum finden einheimische Mädchen Asylanten so attraktiv?	Journalistenwatch	16-Jun-18
Forscherin zum Fall Susanna F.:"Das ist jetzt kein Einzelfall mehr"	welt.de*	10-Jun-18
Die neuen Nachbarn sind 20 junge Männer	rnz.de*	24-May-18
Ins Grauen	der-kleine-akif.de	30-Apr-18
Stellvertretende Bürgermeisterin heiratet Flüchtling	op-marburg.de*	3-Feb-18
Der Import der falschen Söhne	pi-news.net	7-Jan-18
Wie junge Migranten den Umgang mit Frauen lernen	Augsburger Allgemeine*	6-Dec-17
Unbewaffnete übernehmen Europa	Youtube STOPP Schlafschaf 2	30-Aug-17
Streit um ein Mädchen - 40 Jugendliche liefern sich Massenschlägerei	bild.de*	24-Aug-17
Für ihren Flüchtling ließ sie ihre behinderte Tochter sitzen	blick.ch*	2-Aug-17
Sugar Mamas	Youtube	1-Aug-17
Sugar Mamas und ihre Flüchtlinge	dasbiber.at*	23-Jul-17
Flirten für Flüchtlinge: "Küsst erst den Hals"	faz.net*	14-Jul-17
Kondomtraining für Flüchtlinge	hna.de*	11-May-17
Manchmal fehlen selbst den Dolmetschern die Worte	Stuttgarter-zeitung.de*	28-Apr-17
Revierkämpfe am Rhein	Youtube SAT1*	4-Apr-17
Flirtkurse für junge muslimische Männer - ein Gegenvorschlag	achgut.com	31-Mar-17
"Wir wollen eine Freundin"	derwesten.de*	27-Mar-17
Wieder Flirtkurs für Flüchtlinge	Youtube Spiegel TV*	19-Feb-17
Migranten in Schweden desillusioniert und frustriert: "Ihr habt unser Leben ruiniert"	epochtimes.de	4-Jan-17
Deutsche Freundin gesucht	Youtube euronews*	1-Dec-16
Omar will eine deutsche Freundin	freiezeiten.net	30-Nov-16
Die meisten suchen nach Frauen	youtube krosta.tv	14-Oct-16
Streit um Frauen endet blutig	berliner-zeitung.de*	29-Sep-16
Flüchtling sucht Frau	tageszeitung.it*	27-Jun-16
Demographische Verdrängung. Raum ohne Volk	Junge Freiheit	19-Jun-16
Degenerieren bis der Irrenarzt kommt	der-kleine-akif.de	11-Jun-16
Fucking Deutsch	der-kleine-akif.de	12-Sep-16
Arbeiterwohlfahrt organisiert Flirt-Kurs für Flüchtlinge	wdr*	9-Sep-16

Table A3 – continued from previous page

Title	Source	Date
Flirt-Coach schult Essener Flüchtlinge	derwesten.de*	30-Aug-16
Asylbewerber kommen wegen blonder Frauen nach Deutschland	freiezeiten.net	11-Aug-16
Der Flüchtlingshelfer, der Pfarrer und das Testosteron	achgut.com	29-Jun-16
Flirtkurse für Flüchtlinge	Youtube BR*	6-May-16
Massenmigration bringt gefährlichen Männerüberschuss mit sich	contra-magazin.com	6-May-16
Was Flüchtling über deutsche Frauen lernen müssen	sueddeutsche.de*	10-Apr-16
Der postheroische Mann	nzz.ch*	3-Feb-16
Eure Frauen werden unsere Huren, eure Kinder unsere Sklaven	unzensuriert.at	1-Feb-16
Gunnar Heinsohn über den muslimischen Männerüberschuss	welt.de*	22-Jan-16
Merkels importierte Männer	rolandtichy.de	21-Jan-16
Sex-Dschihad	blauenarzissen.de	10-Jan-16
Ich möchte eine Frau, Kinder und Arbeit	youtube der spiegel*	1-Dec-15
Der Sex und die Flüchtlinge	achgut.com	17-Nov-15
Lehrerverband warnt junge Mädchen vor schnellem Sex mit Muslimen	stern.de*	8-Nov-15
ARD räumt falsches Flüchtlingsbild ein	focus.de*	20-Oct-15
Merkels demographischer Männerbauch	rolandtichy.de	25-Sep-15
Mit Jungmännern in den Untergang	ef-magazin.de	13-Sep-15
Falsche Bilder der "Völkerwanderung"	pi-news.net	8-Sep-15
Deutschland 2016: 20% Mehr Männer als Frauen zwischen 18 und 35	Wissensmanufaktur	19-Apr-16
Arbeiterwohlfahrt bringt Flüchtlingen Flirten bei	Junge Freiheit	8-Sep-16
Resource Frau	Neuland.mustermann	4-May-16
Männer ohne Frauen	Neuland.mustermann	3-Aug-15

Table A3: Articles and Videos about Refugee Men Dating or Marrying Native Women in Germany, Published and Curated by Far-Right Sources. *Note:* * Denotes references originally published by mainstream sources. Publication dates refer to the date when references appeared on far-right sources.

B   Hate Crime Data

B.1   Description

We are using hate crime data cataloging attacks against refugees and refugee housing since 2015 provided by "*Mut gegen rechte Gewalt*" (Courage against right-wing xenophobic violence – a joint chronicle by the Amadeu Antonio Foundation and PRO ASYL).

The data on attacks against refugees and refugee housing allows differentiation between: 1) arson attacks against refugee housing; 2) other attacks against refugee housing (e.g. vandalism); 3) personal injuries against refugees; and 4) rallies and demonstrations. Attacks against refugee housing refer to inhabited accommodation as well as housing that is planned to be allocated to or constructed for refugees (both shared and private housing). It also includes attacks against facilities that are explicitly committed to catering for refugees needs. Due to high numbers of cases, since 2016, *Mut gegen rechte Gewalt* only reports rallies and demonstrations that resulted in "litigable incidences." Since it is not possible to isolate such cases in 2015, in order to ensure comparability across time, we do not include demonstrations in our analysis.

Several points are worth noting: First, double counting of an offense is possible if it falls into several categories (e.g. an attack against refugee housing that resulted in a physical injury of inhabitants). Second, physical attacks are only reported if the victim has been identified as refugee (not in a legal, but a de facto sense, i.e., including asylum seekers). Thus, attacks against refugees, especially within the categories considered here represent one segment of xenophobic attacks directed against immigrants and ethnic minorities. In addition, similar to other cases of violent attacks, a significant number of cases are expected to not be reported.

We manually compared the data collected by *Mut gegen rechte Gewalt* that we use in the paper to data that is published by federal and state parliaments in response to requests by political parties (parliaments in turn use data from the BKA (the federal office of criminal investigations)).[1] Our comparison generally confirms the comprehensiveness of the data we use. While we do find some discrepancies, they appear to be non-systematic.

B.2   General Differences in Statistics and Potential Reporting Biases

Differences in individual statistics related to hate crimes are well established (Deutscher Bundestag, 2017; Frey, 2015; Münstermann, 2016, 2017) and are partly due to technicalities. For instance, in a response to a parliamentary inquiry about BKA statistics related to attacks against refugees and refugee housing, violent attacks against planned housing were not reported since per definition, no refugee was in "immediate physical danger" – the phrasing used in the original parliamentary inquiry (Deutscher Bundestag, 2015*b*, p.6, own translation).

When inquiring directly about differences in statistics between the BKA, civil society organizations (such as *Mut gegen rechte Gewalt*) and news reports (e.g. Münstermann, 2016), the parliament responses refer to the following:

1) Technicalities, i.e., different statistics referring to (slightly) different types of questions resulting in different inclusion criteria.

2) Registering different cases, i.e., referring to the notion that not all xenophobic incidents are reported to the police while some of them are reported to civil society organizations and vice versa.

3) Different access to information and in part to different reporting periods, i.e., criminal police records providing "standardized and systematic" (Deutscher Bundestag, 2015*b*) information

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[1]We did so for the convenience sample of North-Rhine-Westphalia (Germany's most populous state) during the 3rd quarter of 2015.

that the public does not have access to and that is subject to change in the process of criminal investigation.

4) The mode of registering crimes: Some sources (including *Mut gegen rechte Gewalt*) count crimes and thus double count a given incident if different criminal acts were committed at the same time. BKA statistics, however, report incidents and assign only one crime type per incident (the most severe in terms of the "quality of the criminal act, and the threat of punishment" (Deutscher Bundestag, 2015*b*, p.3, own translation) (Deutscher Bundestag, 2015*c,b,a*).

Other sources additionally point out that, despite the standardization of procedures of registering crimes, the application of these regulations varies across space (e.g. von Gostomski, Küpper and Heitmeyer, 2007). It can be influenced, for instance, by media attention that is drawn to specific crimes (Koopmans and Olzak, 2004). This is especially true for the category of politically motivated crimes, which rests on subjective assessments about the dominant motive for a given crime. There are other relevant interactions between media coverage and police activity: the extent to which press releases are issued on reported crimes is not expected to be constant across time and space.[2]

Definitions of different crimes and statistics can change across time. In the time frame under investigation, for instance, a change in regulations for how politically motivated crime was registered and reported to our data source by the BKA is partly to blame for the increase in incidents between 2015 and 2016: within the scope of the BKA data released in response to the parliamentary requests used by our data source, prior to 2016, attacks against refugees themselves were only reported if the person was attacked on the very premises (i.e., an attack at the bus stop in front of a refugee shelter would not have been reported by the BKA). This reporting practice changed in 2016 (Deutscher Bundestag, 2017, 2015*c*).

One important question that this discussion brings up is whether these registration and reporting differences vary systematically with the variables that predict hate crime in the ecological, municipality-level analysis. The BKA features a "quality control" team that cooperates with state representatives to work towards uniform implementation of hate crime reporting, but regional discrepancies remain. These are partly the result of police behavior: for a given crime, it is individual police officers that initially decide whether or not a right-wing extremist motivation exists. If police officers are less likely to record such a motive if they themselves harbor far-right, anti-refugee sentiments, and if these police sentiments correlate with sentiments held in their local municipalities writ-large, systematic under-reporting at the municipality level will result. Note that under-reporting may also occur because victims of hate crime are less likely to report these incidents if they perceive the police to be prejudice against refugees.[3]

For our analyses, this implies that under-reporting will produce biases that make it more difficult for us to establish a correlation between *Excess Males* and anti-refugee hate crime if anti-refugee sentiments and *Excess Males* move in tandem. When we regress *Excess Males* on anti-refugee sentiment (consisting of 8 questions) we find a positive relationship, which holds in the West and the East, but is statistically significant in the West only. However, the magnitude is quite small, as measured by correlation coefficients ($r = .07$ overall, $r = .02$ in East, $r = .06$ in West), leading us to conclude that this particular bias is likely not strong.

Following a similar rationale, we focused on variation in education levels (i.e., low education could lead to lower levels of reporting) and found that the predictive effect of *Excess Males* on hate crime is not moderated by the percent of the population with a university entrance exam.

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[2]In Berlin, for instance, police press releases were issued for 3/29 reported attacks against refugee housing in the first half of 2016, while the number is 16/39 for similar attacks in 2014 (Berliner Abgeordnetenhaus, 2016*b,a*).

[3]See `https://www.bpb.de/politik/extremismus/rechtsextremismus/158566/ungezaehlte-opfer` and `https://www.bpb.de/politik/extremismus/rechtsextremismus/264158/pmk-methoden-und-debatten`.

C Contextual Analysis: Incidence of Hate Crime

C.1 Different Model Specification

Type of Dependent variable:	Dependent variable (Binary): Hate Crime – Logistic Regression					
	Sum	Annual	Sum	Annual	Sum	Annual
Excess Males (Age 15 - 44)	2.127***	2.132***	1.598***	1.549***	1.406***	1.537***
	(0.491)	(0.432)	(0.491)	(0.411)	(0.463)	(0.412)
Log (Population)	1.730***	1.519***	1.619***	1.392***	1.522***	1.372***
	(0.056)	(0.041)	(0.060)	(0.044)	(0.055)	(0.042)
Log (Population Density)	0.098	0.087*	0.052	0.039	0.017	−0.002
	(0.070)	(0.052)	(0.070)	(0.051)	(0.066)	(0.049)
Log (Unemployment Rate)			1.087***	1.028***	0.634***	0.715***
			(0.180)	(0.142)	(0.156)	(0.130)
% of population change (2011 vs 2015)			−0.617	−0.235	−0.299	0.020
			(0.975)	(0.608)	(0.851)	(0.541)
Vote share for AfD (2013)			5.618*	4.822**	5.358	3.178
			(3.116)	(2.406)	(3.384)	(2.718)
County-level variables:						
Log (Refugee Inflow) (2014 vs 2015)					0.857***	0.734***
					(0.324)	(0.261)
Log (Refugee Size) (2014)					−0.210**	−0.192**
					(0.104)	(0.084)
Log (General Violence per capita)					0.136	0.022
					(0.189)	(0.151)
% Highly Educated					−0.022*	−0.018*
					(0.013)	(0.011)
Change in Manufacturing Share (2011 vs 2015)					8.177**	9.588***
					(4.062)	(3.167)
Share of Manufacturing					0.057	−0.306
					(0.750)	(0.606)
Male Disadvantage					0.920**	0.846***
					(0.371)	(0.319)
County Fixed Effects	✓	✓	✓	✓		
State Fixed Effects					✓	✓
Year Fixed Effects		✓		✓		✓
Observations	10,307	30,921	10,029	30,087	9,282	27,846

Note: *p<0.1; **p<0.05; ***p<0.01

Table C1: The Effect of Excess Males on the Probability of Observing at least One Hate Crime. *Note*: We present two different outcome types: Sum (equals one if a municipality witnessed at least one hate crime over the three-year period, and zero otherwise) and Annual (for each year of the three-year period, equals one if a municipality witnessed at least one hate crime and zero otherwise) across three different model specifications. Logistic regression with standard errors clustered at the county level. (The inclusion of *Change in Unemployment Rates*, which is not consistently significant, does not alter the main results.)

For completeness, we report the model specification for the regression in the sixth column. The other regressions in Section C include a subset of variables as indicated in each table. See definitions of the variables in Section C.11. Hate Crime ∼ Excess Males + Log (Population) + Log (Population Density) + Log (Unemployment Rate) + % of population change + Vote share for AfD + Log (Refugee Inflow) + Log (Refugee Size) + Log (General Violence per capita) + % Highly Educated + Change in Manufacturing Share + Share of Manufacturing + Male Disadvantage + State-Fixed Effects + Year-Fixed Effects.

C.2 Different Age Range of "Excess Males" (Age 25 - 44)

Type of Dependent variable:	Dependent variable (Binary): Hate Crime – Logistic Regressions					
	Sum	Annual	Sum	Annual	Sum	Annual
Excess Males (Age 25 - 44)	1.595***	1.794***	0.958**	1.066***	0.932**	1.192***
	(0.454)	(0.400)	(0.456)	(0.373)	(0.430)	(0.364)
Log (Population)	1.726***	1.511***	1.614***	1.387***	1.518***	1.365***
	(0.056)	(0.041)	(0.059)	(0.043)	(0.054)	(0.042)
Log (Population Density)	0.082	0.073	0.030	0.019	0.001	−0.014
	(0.070)	(0.052)	(0.070)	(0.051)	(0.066)	(0.049)
Log (Unemployment Rate)			1.120***	1.039***	0.642***	0.704***
			(0.184)	(0.145)	(0.157)	(0.131)
% of population change (2011 vs 2015)			−0.463	−0.023	−0.207	0.156
			(0.905)	(0.554)	(0.816)	(0.511)
Vote share for AfD (2013)			5.974*	5.282**	5.776*	3.771
			(3.088)	(2.400)	(3.366)	(2.699)
County-level variables:						
Log (Refugee Inflow) (2014 vs 2015)					0.859***	0.705***
					(0.324)	(0.263)
Log (Refugee Size) (2014)					−0.211**	−0.191**
					(0.103)	(0.084)
Log (General Violence per capita)					0.130	0.019
					(0.187)	(0.149)
% Highly Educated					−0.022*	−0.018*
					(0.013)	(0.010)
Change in Manufacturing Share (2011 vs 2015)					8.213**	9.464***
					(4.029)	(3.139)
Share of Manufacturing					0.076	−0.318
					(0.748)	(0.603)
Male Disadvantage					0.910**	0.856***
					(0.369)	(0.316)
County Fixed Effects	✓	✓	✓	✓		
State Fixed Effects					✓	✓
Year Fixed Effects		✓		✓		✓
Observations	10,378	31,134	10,097	30,291	9,288	27,864
Note:					*p<0.1; **p<0.05; ***p<0.01	

Table C2: The Effect of Excess Males on the Probability of Observing at least One Hate Crime. *Note*: We present two different outcome types: Sum (equals one if a municipality witnessed at least one hate crime over the three-year period, and zero otherwise) and Annual (for each year of the three-year period, equals one if a municipality witnessed at least one hate crime and zero otherwise) across three different model specifications. Logistic regression with standard errors clustered at the county level.

C.3 Linear Probability Model

Type of Dependent variable:	Dependent variable (Binary): Hate Crime – Linear Probability Model					
	Sum	Annual	Sum	Annual	Sum	Annual
Excess Males (Age 15 - 44)	0.116***	0.069***	0.089***	0.051***	0.095***	0.057***
(2015)	(0.027)	(0.015)	(0.025)	(0.013)	(0.026)	(0.014)
Log (Population)	0.162***	0.086***	0.156***	0.081***	0.152***	0.078***
(2015)	(0.009)	(0.005)	(0.008)	(0.004)	(0.008)	(0.004)
Log (Population Density)	0.011	0.011***	0.010	0.011***	0.008	0.008**
(2015)	(0.007)	(0.004)	(0.007)	(0.003)	(0.007)	(0.003)
Log (Unemployment Rate)			0.137***	0.090***	0.093***	0.066***
(2015)			(0.015)	(0.009)	(0.014)	(0.008)
% of population change			−0.059	−0.031	0.024	0.025
(2011 vs 2015)			(0.086)	(0.041)	(0.100)	(0.050)
Vote share for AfD			0.307**	0.120*	0.370**	0.106
(2013)			(0.147)	(0.069)	(0.182)	(0.089)
County-level variables:						
Log (Refugee Inflow)					0.075	0.046
(2014 vs 2015)					(0.051)	(0.029)
Log (Refugee Size)					−0.019	−0.011
(2014)					(0.014)	(0.007)
Log (General Violence per capita)					0.010	0.007
(2015)					(0.021)	(0.011)
% Highly Educated					−0.003*	−0.002**
(2011)					(0.002)	(0.001)
Change in Manufacturing Share					0.725	0.583**
(2011 vs 2015)					(0.489)	(0.243)
Share of Manufacturing					0.021	−0.023
(2015)					(0.092)	(0.048)
Male Disadvantage					0.114**	0.063**
(2015)					(0.047)	(0.025)
County Fixed Effects	✓	✓	✓	✓		
State Fixed Effects					✓	✓
Year Fixed Effects		✓		✓		✓
Observations	10,307	30,921	10,029	30,087	9,282	27,846

Note: *p<0.1; **p<0.05; ***p<0.01

Table C3: The Effect of Excess Males on the Probability of Observing at least One Hate Crime. *Note*: We present two different outcome types: Sum (equals one if a municipality witnessed at least one hate crime over the three-year period, and zero otherwise) and Annual (for each year of the three-year period, equals one if a municipality witnessed at least one hate crime and zero otherwise) across three different model specifications. Linear probability model with standard errors clustered at the county level.

C.4   Different Definition of Dependent Variable: Physical Attacks

Type of Dependent variable:	Dependent variable (Binary): Physical Attack – Logistic Regressions					
	Sum	Annual	Sum	Annual	Sum	Annual
Excess Males (Age 15 - 44)	3.773***	3.038***	2.624***	1.906**	2.719***	1.634*
(2015)	(0.938)	(0.818)	(0.910)	(0.744)	(0.944)	(0.902)
Log (Population)	1.775***	1.640***	1.562***	1.429***	1.442***	1.366***
(2015)	(0.120)	(0.090)	(0.124)	(0.100)	(0.106)	(0.101)
Log (Population Density)	0.096	0.071	0.080	0.045	0.046	−0.018
(2015)	(0.134)	(0.109)	(0.129)	(0.103)	(0.113)	(0.105)
Log (Unemployment Rate)			1.591***	1.515***	1.179***	1.309***
(2015)			(0.346)	(0.304)	(0.282)	(0.256)
% of population change			−0.837	−0.368	0.023	0.154
(2011 vs 2015)			(0.772)	(0.721)	(0.580)	(0.555)
Vote share for AfD			2.058	0.875	0.588	0.763
(2013)			(6.640)	(6.184)	(5.209)	(5.080)
County-level variables:						
Log (Refugee Inflow)					0.262	−0.091
(2014 vs 2015)					(0.686)	(0.646)
Log (Refugee Size)					−0.429**	−0.288
(2014)					(0.210)	(0.202)
Log (General Violence per capita)					−0.303	−0.288
(2015)					(0.383)	(0.383)
% Highly Educatied					−0.011	−0.018
(2011)					(0.024)	(0.023)
Change in Manufacturing Share					4.548	−0.633
(2011 vs 2015)					(8.376)	(8.393)
Share of Manufacturing					1.859	2.050
(2015)					(1.742)	(1.632)
Male Disadvantage					1.258	1.217
(2015)					(0.800)	(0.786)
County Fixed Effects	✓	✓	✓	✓		
State Fixed Effects					✓	✓
Year Fixed Effects		✓		✓		✓
Observations	10,307	30,921	10,029	30,087	9,282	27,846

Note: *p<0.1; **p<0.05; ***p<0.01

Table C4:   The Effect of Excess Males on the Probability of Observing at least One Physical Attack. *Note*: We present two different outcome types: Sum (equals one if a municipality witnessed at least one physical attack over the three-year period, and zero otherwise) and Annual (for each year of the three-year period, equals one if a municipality witnessed at least one physical attack and zero otherwise) across three different model specifications. Logistic regression with standard errors clustered at the county level.

C.5   Negative-Binomial Regression

Type of Dependent variable:	Dependent variable (Count): Hate Crime	
	Sum	Annual
Excess Males (Age 15 - 44)	1.150***	1.246***
(2015)	(0.366)	(0.363)
Log (Population)	1.264***	1.249***
(2015)	(0.039)	(0.038)
Log (Population Density)	−0.032	−0.030
(2015)	(0.045)	(0.045)
Log (Unemployment Rate)	0.703***	0.729***
(2015)	(0.131)	(0.129)
% of population change	0.072	0.096
(2011 vs 2015)	(0.508)	(0.457)
Vote share for AfD	4.464*	4.088
(2013)	(2.670)	(2.670)
County-level variables:		
Log (Refugee Inflow)	0.588**	0.541*
(2014 vs 2015)	(0.280)	(0.272)
Log (Refugee Size)	−0.189**	−0.180*
(2014)	(0.093)	(0.093)
Log (General Violence per capita)	0.034	−0.016
(2015)	(0.161)	(0.165)
% of High Education	−0.017	−0.017*
(2011)	(0.011)	(0.011)
Change in Manufacturing Share	10.081***	10.432***
(2011 vs 2015)	(3.333)	(3.452)
Share of Manufacturing	−0.028	−0.035
(2015)	(0.651)	(0.632)
Male Disadvantage	0.617*	0.656*
(2015)	(0.337)	(0.345)
State Fixed Effects	✓	✓
Year Fixed Effects		✓
Observations	9,282	27,846
θ	1.247*** (0.088)	0.842*** (0.053)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table C5: The Effect of Excess Males on the Number of Hate Crimes. *Note*: We present two different outcome types: Sum (the total number of hate crimes over the three-year period) and Annual (the number of hate crimes in each year of the three-year period) for Negative Binomial regression. Standard errors are clustered at the county level.

C.6 Interaction with East and West

	Dependent variable: Hate Crime – Logistic Regression			
	Sum	Annual	Sum	Annual
Excess Males (Age 15 - 44)	1.291***	1.442***	1.588**	1.445**
	(0.462)	(0.410)	(0.791)	(0.701)
West	0.075	−0.124	0.542	−0.119
	(0.161)	(0.118)	(1.063)	(0.913)
Excess Males × West			−0.419	−0.004
			(0.938)	(0.812)
Log (Population)	1.484***	1.340***	1.485***	1.340***
	(0.046)	(0.039)	(0.046)	(0.039)
Log (Population Density)	0.046	0.030	0.046	0.030
	(0.061)	(0.048)	(0.061)	(0.048)
Log (Unemployment Rate)	0.585***	0.653***	0.577***	0.653***
	(0.148)	(0.124)	(0.151)	(0.128)
% of population change	0.050	0.308	0.072	0.308
(2011 vs 2015)	(0.772)	(0.499)	(0.765)	(0.497)
Vote share for AfD	3.865	3.183	3.860	3.183
(2013)	(3.223)	(2.624)	(3.223)	(2.625)
County-level variables:				
Log (Refugee Inflow)	1.475***	1.282***	1.471***	1.282***
(2014 vs 2015)	(0.326)	(0.247)	(0.328)	(0.247)
Log (Refugee Size)	−0.397***	−0.386***	−0.396***	−0.386***
(2014)	(0.094)	(0.079)	(0.094)	(0.079)
Log (General Violence per capita)	0.083	−0.092	0.086	−0.092
	(0.166)	(0.138)	(0.166)	(0.139)
% of High Education	−0.027**	−0.021**	−0.027**	−0.021**
	(0.012)	(0.010)	(0.012)	(0.010)
Change in Manufacturing Share	7.554*	8.568**	7.560*	8.568**
(2011 vs 2015)	(4.241)	(3.509)	(4.247)	(3.509)
Share of Manufacturing	−0.332	−0.611	−0.337	−0.611
	(0.666)	(0.504)	(0.666)	(0.505)
Male Disadvantage	1.077***	1.015***	1.084***	1.016***
	(0.369)	(0.317)	(0.370)	(0.318)
Year Fixed Effects		✓		✓
Observations	9,282	27,846	9,282	27,846
Note:			*p<0.1; **p<0.05; ***p<0.01	

Table C6: Interaction between Excess Males and East/West Germany. *Note*: We present two different outcome types: Sum and Annual. Logistic regression with standard errors clustered at the county level.

For completeness, we report the model specification for the regression in the fourth column. The other regressions include a subset of variables as indicated above. See definitions of the variables in Section C.11. Hate Crime ∼ Excess Males + West + Excess Males × West + Log (Population) + Log (Population Density) + Log (Unemployment Rate) + % of population change + Vote share for AfD + Log (Refugee Inflow) + Log (Refugee Size) + Log (General Violence per capita) + % Highly Educated + Change in Manufacturing Share + Share of Manufacturing + Male Disadvantage + Year-Fixed Effects.

C.7 Interaction between Excess Males and Refugee Inflow

	Dependent variable: Hate Crime – Logistic Regressions	
	Sum	Annual
Excess Males (Age 15 - 44)	−8.441	−17.754
(2015)	(18.923)	(15.168)
Log (Refugee Inflow)	−0.544	−2.018
(2014 vs 2015)	(2.711)	(2.185)
Excess Males × Log (Refugee Inflow)	1.290	2.524
	(2.477)	(1.987)
Log (Population)	1.522***	1.372***
(2015)	(0.055)	(0.042)
Log (Population Density)	0.019	0.001
(2015)	(0.066)	(0.049)
Log (Unemployment Rate)	0.630***	0.708***
	(0.155)	(0.130)
% of population change	−0.299	0.017
(2011 vs 2015)	(0.856)	(0.548)
Vote share for AfD (2013)	5.358	3.192
(2015)	(3.386)	(2.726)
Log (Refugee Size) (2014)	−0.209**	−0.190**
(2015)	(0.104)	(0.085)
Log (General Violence per capita)	0.141	0.035
(2015)	(0.190)	(0.152)
% Highly Educated	−0.022*	−0.019*
(2011)	(0.013)	(0.011)
Change in Manufacturing Share	8.200**	9.647***
(2011 vs 2015)	(4.077)	(3.200)
Share of Manufacturing	0.044	−0.335
(2015)	(0.750)	(0.606)
Male Disadvantage	0.929**	0.865***
(2015)	(0.372)	(0.321)
State Fixed Effects	✓	✓
Year Fixed Effects		✓
Observations	9,282	27,846
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table C7: Interaction between Excess Males and Refugee Inflow. *Note*: We present two different outcome types: Sum and Annual. Logistic regression with standard errors clustered at the county level. The interaction term between "Excess Male" and "Refugee Inflow" is positive but is not statistically significant at the 0.05 level.

For completeness, we report the model specification for the regression in the second column. The other regression includes a subset of variables as indicated above. See definitions of the variables in Section C.11. Hate Crime ∼ Excess Males + Log (Refugee Inflow) + Excess Males× Log(Refugee Inflow) + Log (Population) + Log (Population Density) + Log (Unemployment Rate) + % of population change + Vote share for AfD + Log (Refugee Size) + Log (General Violence per capita) + % Highly Educated + Change in Manufacturing Share + Share of Manufacturing + Male Disadvantage + Year-Fixed Effects + State-Fixed Effects.
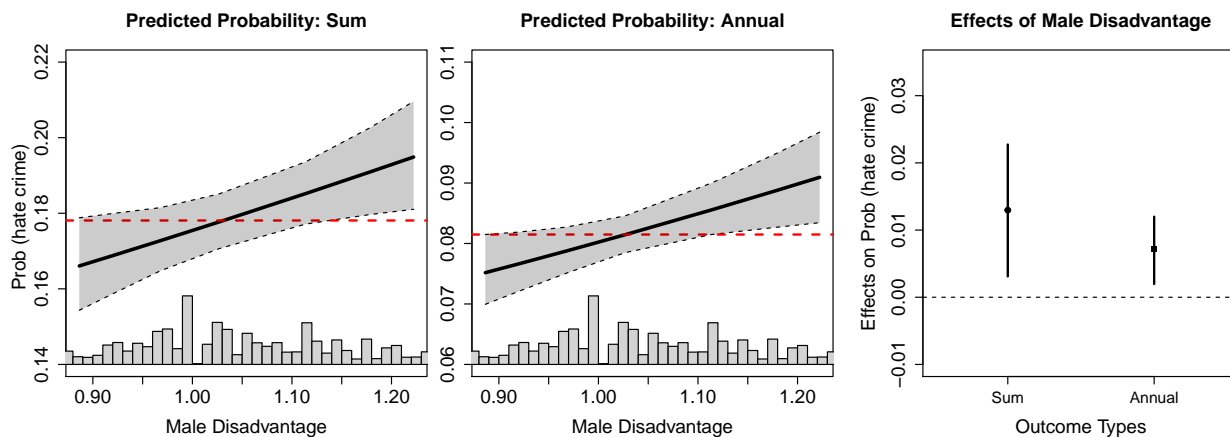
C.8 The Effect of Male Disadvantage

Figure C8: The Effect of Male Disadvantage on the Predicted Probability of Observing at least One Hate Crime. *Note*: Logistic regression with standard errors clustered at the county level (see the Appendix for the full results and all included controls). We present two different outcome types: Sum (equals one if a municipality witnessed at least one hate crime over the three-year period, and zero otherwise) and Annual (for each year of the three-year period, equals one if a municipality witnessed at least one hate crime and zero otherwise). In the left and center panels, the histograms present the distribution of *Male Disadvantage*, measured at the county level. We do not use the municipality level because nearly 6,000 municipalities had a population of less than 2,000; the correspondingly small population that is active in the labor force (especially when broken down by gender) makes this measure less informative at the municipality level. The red dotted lines indicate the means of each outcome type. The right-most panel depicts the effect of changing *Male Disadvantage* from 1 (no imbalance) to 1.15 ($\approx$ 80th percentile).

C.9   Placebo Analysis

We rely on a placebo design to test whether we suffer from unmeasured confounding. Building on the negative control literature (Lipsitch, Tchetgen Tchetgen and Cohen, 2010; Egami, 2018), we employ a placebo treatment design. In this design, we assume that a placebo treatment and the main treatment share the same confounding structure, but the placebo treatment has no causal effect on the outcome of interest. Under this assumption, the conditional association between the placebo treatment and the outcome of interest provides evidence for unmeasured confounding. Intuitively, there is no causal relationship between the two variables, so any residual associations come from confounding. This design is most credible when we have panel data and the outcome variable does not affect future treatments (Miao and Tchetgen Tchetgen, 2017). In our substantive context, this means that the outcome of interest, the incidence of hate crimes, does not affect the main predictor, "Excess Males", in the subsequent years. Note that our definition of "Excess Males" is the gender ratio in each municipality based on everyone counted in the German census. So, if many German citizens move to and from municipalities based on hate crimes, this assumption is violated. However, while the number of refugees in each municipality might be strongly affected by the incidence of hate crimes, "Excess Males" is unlikely to change significantly, and thus, this assumption is reasonable in our context. To make the assumption more plausible, we also conduct a placebo analysis by restricting to municipalities with population size larger than the median in Germany, where the change in "Excess Males" is even less likely. Under this assumption, we can detect unmeasured confounding by testing whether the future "Excess Males" is associated with the incidence of hate crimes after controlling for "Excess Males" in the current year and all other observed confounders.

Table C.9 shows the results. For 2015, 2016, and 2017, as well as the pooled analysis (pooling all the years), we find that the future treatments are not associated with the current outcome, meaning that this analysis produces no evidence of unmeasured confounding. Comparing the values of coefficients to our main regression coefficients in Table C1, we can see that these results are not driven by large uncertainties. The fifth column shows the same evidence when we restrict our samples to large municipalities where the required assumption is more plausible.

	Dependent variable (Binary): Hate Crime				
	2015	2016	2017	Pooled	Pooled (Large Municipalities)
Future-Treatment	−1.326	0.480	0.544	−0.277	−0.243
	(1.551)	(1.061)	(1.592)	(0.773)	(1.043)
Controls at Municipality-level	✓	✓	✓	✓	✓
Controls at County-level	✓	✓	✓	✓	✓
State Fixed Effects	✓	✓	✓	✓	✓
Year Fixed Effects				✓	✓
Observations	8,939	8,681	8,679	26,299	13,147
Note:					*p<0.1; **p<0.05; ***p<0.01

Table C.9: Placebo Analysis. *Note:* Each model controls for "Excess Males" in the current year in addition to all other control variables we included in our main regression models in Table C1.
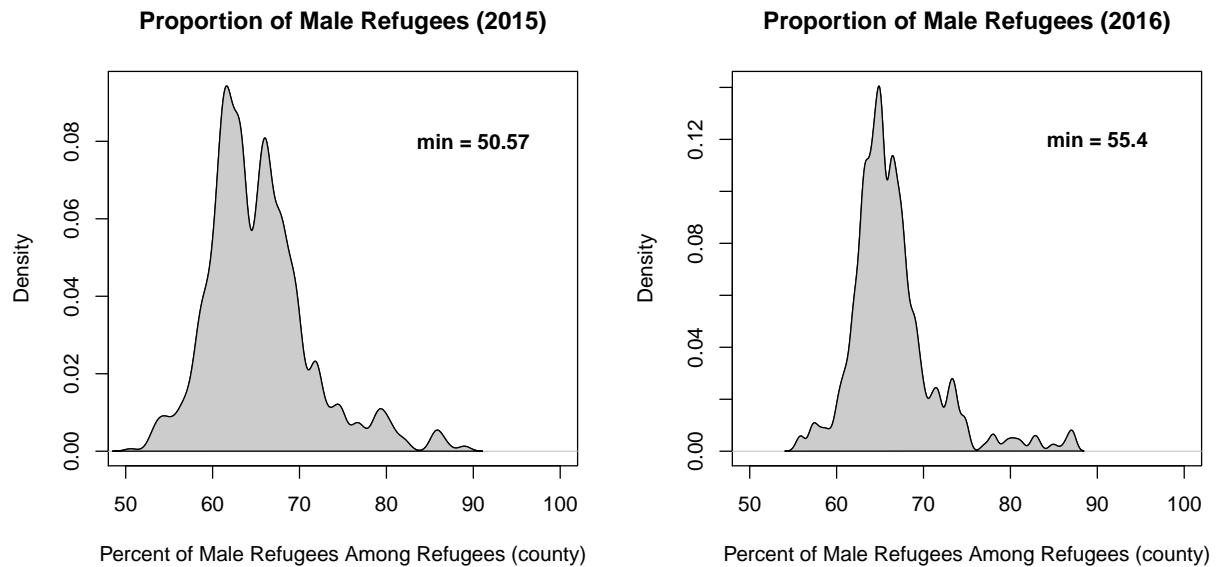
C.10   Descriptive Statistics

Proportion of Male Refugees (2015) — min = 50.57

Proportion of Male Refugees (2016) — min = 55.4

Figure C.10: Proportions of Male Refugees at the County level.

C.11   Definitions of Variables

Municipality-level variables	
Population	Population size in 2015
Population density	Population density in 2015
Unemployment rate	Unemployment rate in 2015
Population change	Percent population change between 2011 and 2015
Vote share for AfD	Vote share for AfD in 2013
County-level variables	
Refugee Inflow	Number of refugees in 2015 minus number of refugees in 2014
Refugee Size	Number of refugees in 2014
Violence per capita	Number of general violence incidents per capita in 2015
Highly Educated	Percent of the population with university entrance exam, including still in school in 2011
Change in Manufacturing Share	Percentage point change in proportion working in manufacturing between 2011 and 2015
Share of Manufacturing	Percent working in manufacturing in 2015
Male Disadvantage	Male unemployment rate divided by female unemployment rate in 2015

Table C.11: Variables Included in Analyses Predicting the Incidence of Hate Crime.

D Survey Analysis

D.1 Survey Administration

The Respondi panel covers the online, 18+ German population. Our initial set of respondents (wave 1) was sampled from Respondi's panel to be nationally representative on age, gender, and region. Respondi's quality standards, along with further details on their sampling methodology, are reported below:

> Membership and participation are voluntary and follow a double opt-in registration process. The panel is actively and centrally managed by a professional panel team. In order to ensure a high standard of quality, the panel undergoes a continuous quality control process using a thorough scoring and controlling system. Since we recruit via our own opinion platforms and the telephone, the focus is on intrinsic motivation thus preventing sample bias due to "professional" respondents. A guaranteed panel response rate of 60 % within the first seven days serves as proof of this high standard of quality (Respondi, "Quality Standards").

Our panel survey design was archived in [withheld for anonymity]. The panel survey consisted of 4 waves, with the first wave consisting of 3,435 respondents. We added fresh samples in each wave, both to avoid panel conditioning and to maintain the per-wave sample size at close to 3,000. We also embedded a simple attention check every wave and analyze only observations that passed this check. Our 15-month panel lasted from September 2016 to December 2017, bracketing the German federal election in September 2017. In each wave, we retained about 70% of respondents from each previous wave. Around 44% of respondents participated in all four waves.

Wave	Date	Sample Size	Fresh Sample	Sample Size (Analyze)
Wave 1	09/05/2016 − 09/23/2016	3435	–	3419
Wave 2	01/04/2017 − 01/17/2017	2907	10.3 %	2883
Wave 3	06/19/2017 − 06/30/2017	3538	38.7 %	3274
Wave 4	12/07/2017 − 12/22/2017	3083	23.1 %	3019

Table D.1.1: Sampling Design

	Until Wave 1	Until Wave 2	Until Wave 3	Until Wave 4
From Wave 1	100	75.9	58.0	44.2
From Wave 2	–	100	74.6	56.3
From Wave 3	–	–	100	67.0
From Wave 4	–	–	–	100

Table D.1.2: Attrition Rate.

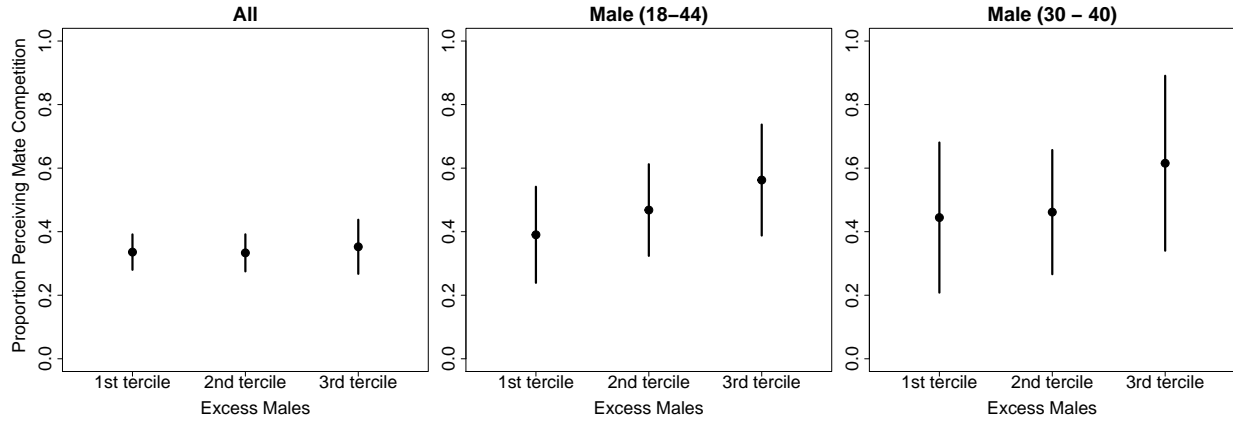## D.2 Respondents with strong anti-refugee sentiments

Figure D.2: Individuals Living in Municipalities with a Higher Degree of *Excess Males* Perceive More Mate Competition. *Note*: Among respondents with strong anti-refugee sentiments (top 25 percentile defined by an average of 8 questions related to refugees), we represent the proportion of respondents who agree that the inflow of refugees makes it more difficult for native men to find female partners (with 95% confidence intervals) across terciles of *Excess Males*. Among respondents with strong anti-refugee sentiments (top 25 percentile), the panels include all respondents, male respondents aged between 18 and 44, and male respondents aged between 30 and 40, respectively.

D.3   Variables Predicting Mate Competition vs. Other Views About Refugees

Coefficients of Male x Single
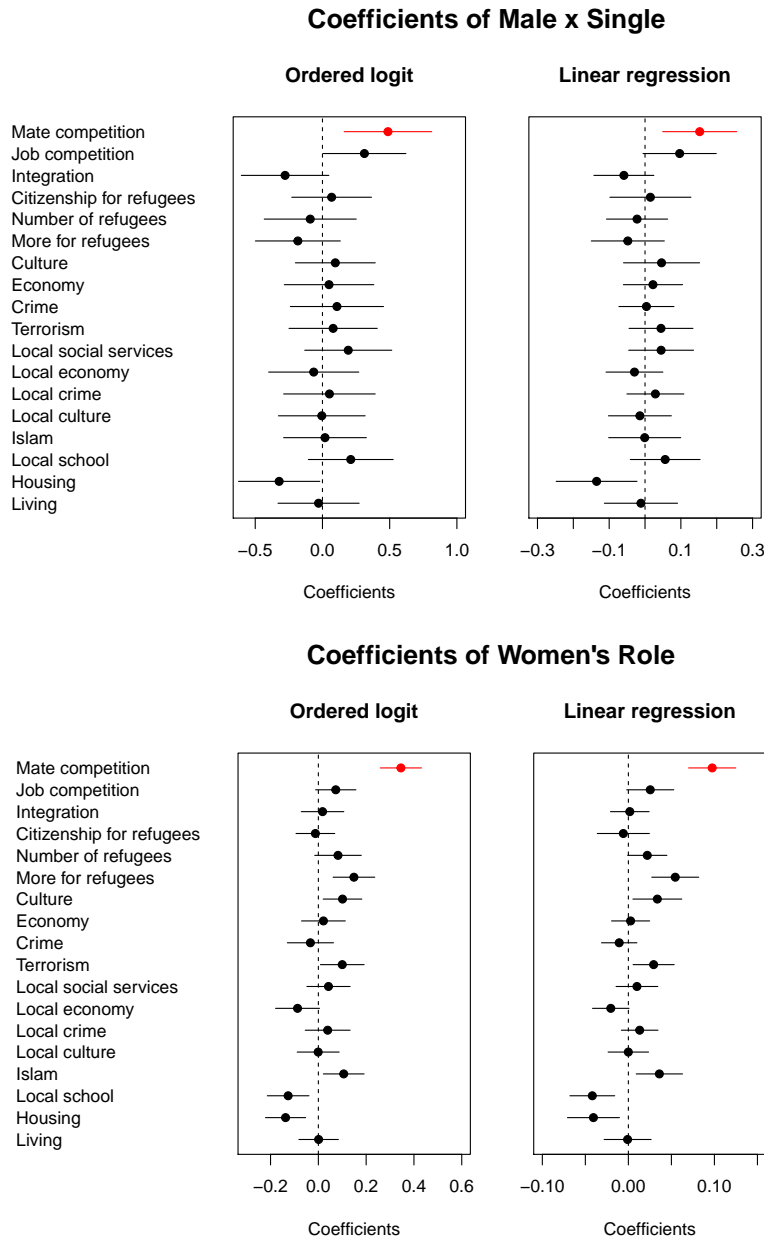

Coefficients of Women's Role

Figure D.3: This figure displays the effect of being male and single (top panel) and of *Women's Role* (bottom panel) on a given listed variable, controlling for all other listed variables. It shows that being a single man/agreeing that "women should take their role as wife and mother more seriously" (4-point scale) strongly predicts *Mate Competition*, controlling for the other 17 variables. (Note that the effect of being male and single on *Mate Competition* is significant and positive when we control for socio-demographic variables. Views about "Women's Role" have an especially distinct effect among women (not shown)). See Table D.7 (national and local-level refugee variables; coded so that higher values indicate greater hostility) for variable definitions.
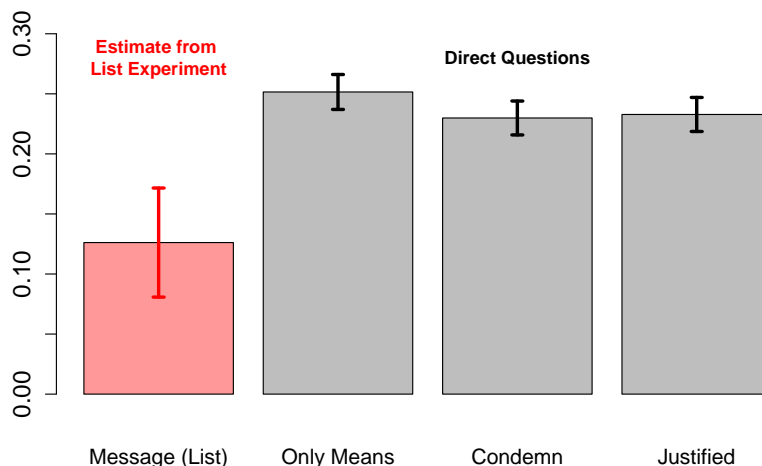
D.4   List Experiment from Wave 1

Figure D.4.1: Proportion of respondents who agree with each of the four statements in Wave 1: (1) Only Means: "When it comes to the refugee problem, violence is sometimes the only means that citizens have to get the attention of German politicians." (2) Message: "Attacks against refugee homes are sometimes necessary to make it clear to politicians that we have a refugee problem," (3) Condemn: "Politicians should condemn attacks against refugees more forcefully," (4) Justified: "Hostility against refugees is sometimes justified, even when it ends up in violence." Note: we only conducted a list experiment about the first question, Message. Because questions differed, we administered the direct question and the list experiment to the entire sample. Error bars indicate 95% confidence intervals.
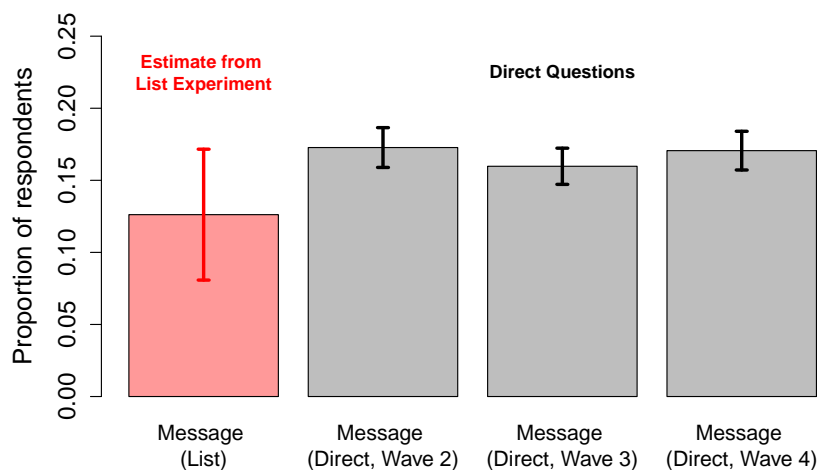

Figure D.4.2: Proportion of respondents in each wave who agree with the following statement: "Attacks against refugee homes are sometimes necessary to make it clear to politicians that we have a refugee problem." *Note*: We conducted a list experiment containing the above statement (*Message*) in Wave 1, and we also directly asked the same question in the other three waves. Error bars indicate 95% confidence intervals.

D.5 Different Dependent Variables

	Dependent variables (OLS)				
	Means	Justified	Message	Prevent	Condemn
Mate Competition	0.155***	0.173***	0.192***	0.204***	0.027
	(0.019)	(0.019)	(0.019)	(0.018)	(0.021)
Job Competition	0.056***	0.050***	0.097***	0.087***	0.017
	(0.019)	(0.019)	(0.019)	(0.018)	(0.021)
Life Satisfaction	−0.0001	−0.009	−0.004	−0.011*	−0.007
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Socio-Demographics	✓	✓	✓	✓	✓
Attitudes toward Refugees (National)	✓	✓	✓	✓	✓
Attitudes toward Refugees (Local)	✓	✓	✓	✓	✓
Additional Controls	✓	✓	✓	✓	✓
Observations	3,008	3,008	3,008	3,008	3,008
R^2	0.459	0.453	0.448	0.469	0.347
Adjusted R^2	0.431	0.424	0.419	0.441	0.313

Note: *p<0.1; **p<0.05; ***p<0.01

Table D.5.1: Mate Competition Predicts Support for Hate Crime. *Note*: OLS with standard errors in parentheses. The dependent variables are *Only Means, Justified, Message, Prevent,* and *Condemn.* The main independent variable is *Mate Competition* (both range from (1) disagree strongly to (4) agree strongly; *Condemn* is reverse-coded). See below for definitions of all control variables.

For completeness, we report the model specification for the regressions. Each regression uses a different definition of outcomes as indicated above. See definitions of the variables in Section D.7. Support for Hate Crime ∼ Mate Competition + Job Competition + Life Satisfaction + Age + Gender + Citizenship + Marital Status + Religion + Education + Main activity + Income + Socio-economic self-assessment + Household size + Integration + Citizenship for refugees + Number of refugees + More for refugees + Culture + Economy + Crime + Terrorism + Local social services + Local economy + Local crime + Local culture + Islam + Local school + Housing + Living + Left-Right Scale + Closeness to AfD + Attitudes toward AfD + Attitudes toward Muslims + Contact with Refugees + Distance to refugee reception centers + Settlement of refugees living in area + State-Fixed effects.

	Dependent variables (OLS)				
	Means	Justified	Message	Prevent	Condemn
Mate Competition	0.100***	0.151***	0.171***	0.143***	0.079**
	(0.035)	(0.036)	(0.036)	(0.034)	(0.039)
West	−0.071	−0.052	−0.034	−0.142*	0.037
	(0.079)	(0.081)	(0.080)	(0.076)	(0.088)
Mate Competition × West	0.072*	0.032	0.029	0.079**	−0.059
	(0.037)	(0.038)	(0.038)	(0.036)	(0.041)
Job Competition	0.050***	0.045**	0.092***	0.083***	0.015
	(0.019)	(0.019)	(0.019)	(0.018)	(0.021)
Life Satisfaction	−0.0001	−0.010	−0.005	−0.011*	−0.007
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Socio-Demographics	✓	✓	✓	✓	✓
Attitudes toward Refugees (National)	✓	✓	✓	✓	✓
Attitudes toward Refugees (Local)	✓	✓	✓	✓	✓
Additional Controls	✓	✓	✓	✓	✓
Observations	3,008	3,008	3,008	3,008	3,008
R^2	0.457	0.448	0.445	0.468	0.343
Adjusted R^2	0.431	0.422	0.419	0.443	0.311

Note: *p<0.1; **p<0.05; ***p<0.01

Table D.5.2: Mate Competition Predicts Support for Hate Crime (with East/West Interaction). *Note*: OLS with standard errors in parentheses. The dependent variables are *Only Means, Justified, Message, Prevent,* and *Condemn.* The main independent variable is *Mate Competition* (both range from (1) disagree strongly to (4) agree strongly; *Condemn* is reverse-coded).

D.6 Replicate Results among Males Only

D.6.1 Replicate Table 1

	Dependent variable (OLS): `Violence is sometimes the only means`					
Mate Competition	0.445***	0.267***	0.257***	0.211***	0.188***	0.154***
	(0.023)	(0.029)	(0.030)	(0.028)	(0.028)	(0.027)
Job Competition		0.255***	0.223***	0.059**	0.035	0.020
		(0.028)	(0.028)	(0.029)	(0.029)	(0.028)
Life Satisfaction		−0.008	−0.0002	0.005	0.005	0.005
		(0.009)	(0.010)	(0.009)	(0.009)	(0.009)
Socio-Demographics			✓	✓	✓	✓
Attitudes toward Refugees (National)				✓	✓	✓
Attitudes toward Refugees (Local)					✓	✓
Additional Controls						✓
Observations	1,560	1,560	1,554	1,554	1,554	1,554
R^2	0.198	0.241	0.315	0.426	0.449	0.506
Adjusted R^2	0.197	0.239	0.276	0.383	0.399	0.454

Note: *p<0.1; **p<0.05; ***p<0.01

Table D.6.1: Mate Competition Predicts Support for Hate Crime (Sample consists of Males Only). *Note*: OLS with standard errors in parentheses. The dependent variable is *Only Means*, and the main independent variable is *Mate Competition* (both range from (1) disagree strongly to (4) agree strongly).

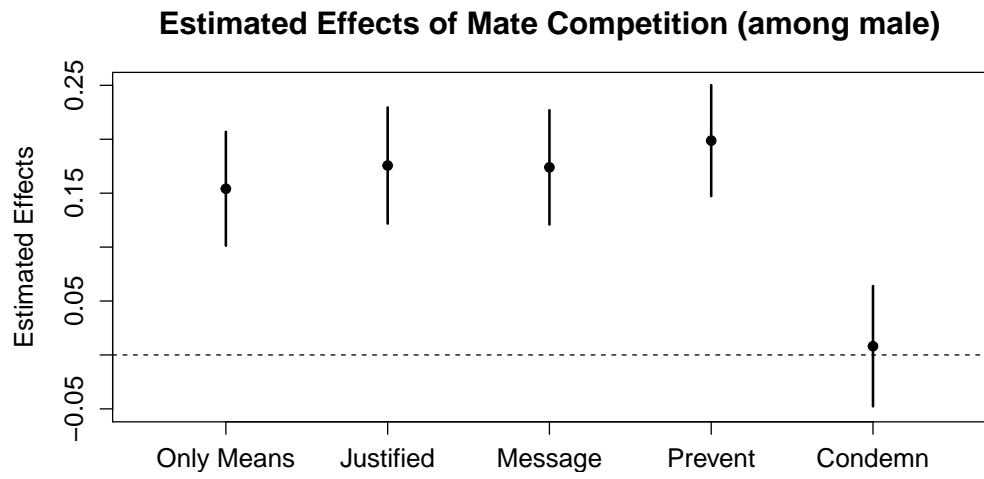## Estimated Effects of Mate Competition (among male)

Figure D.6.2: Estimated Effects of Mate Competition on Support for Hate Crime (Sample Consists of Males Only). *Note*: Outcome variables range from 1 to 4 where a larger value corresponds to stronger support for hate crime (or stronger opposition to elite sanctions). The main predictor, *Mate Competition*, ranges from (1) disagree strongly to (4) agree strongly. For each outcome, we present the effect of changing *Mate Competition* by one unit.

D.6.3 Replicate Table D.5

	Dependent variables (OLS)				
	Means	Justified	Message	Prevent	Condemn
Mate Competition	0.154***	0.176***	0.174***	0.199***	0.008
	(0.027)	(0.027)	(0.027)	(0.026)	(0.028)
Job Competition	0.020	0.015	0.088***	0.062**	−0.004
	(0.028)	(0.029)	(0.028)	(0.027)	(0.030)
Life Satisfaction	0.005	−0.018**	−0.013	−0.025***	−0.011
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)
Socio-Demographics	✓	✓	✓	✓	✓
Attitudes toward Refugees (National)	✓	✓	✓	✓	✓
Attitudes toward Refugees (Local)	✓	✓	✓	✓	✓
Additional Controls	✓	✓	✓	✓	✓
Observations	1,554	1,554	1,554	1,554	1,554
R^2	0.506	0.480	0.480	0.496	0.423
Adjusted R^2	0.454	0.426	0.426	0.443	0.363

Note: *p<0.1; **p<0.05; ***p<0.01

Table D.6.3: Mate Competition Predicts Support for Hate Crime (Sample Consists of Males Only). *Note*: OLS with standard errors in parentheses. The dependent variables are *Only Means, Justified, Message, Prevent,* and *Condemn.* The main independent variable is *Mate Competition* (both range from (1) disagree strongly to (4) agree strongly; *Condemn* is reverse-coded).

D.7   Definition of Variables

Socio-Demographics	
Age	Q1. Age group
Gender	Q2. Gender
State	Q3. State of Residence
Citizenship	Q7. Citizenship_Germany
Marital status	Q14. Marital status
Religion	Q17. Religious affiliation
Education	Years of education
Main activity	Q25. Main activity/occupation
Income	Q33. Income
Socio-economic self-assessment	Q51. Socio-economic self-assessment
Household size	Q79. The number of people in household

National level Refugee Variables	To what extent do you agree with the following statements?
Integration	Q73.1 Refugees are integrating well into Germany
Citizenship for refugees	Q73.2 Refugees who live in Germany permanently should be entitled to German citizenship
Number of refugees	Q73.3 The number of refugees should be reduced
More for refugees	Q73.4 More is being done for refugees than for native Germans
Culture	Q73.5 Refugees should be willing to give up much of their culture of origin and instead adopt German culture
Economy	Q73.6 Refugees are good for the German economy
Crime	Q73.7 Refugees increase crime
Terrorism	Q73.8 The inflow of refugees increases the risk of terrorism

Local level Refugee Variables	If additional refugees came to your town this would
Local social services	Q75.1 Present a burden on local social services
Local economy	Q75.2 Benefit the local economy
Local crime	Q75.3 Increase crime in my town
Local culture	Q75.4 Enrich the local culture
Islam	Q75.5 Increase the influence of Islam in my town
Local school	Q75.6 Be a big challenge for our local schools
Housing	Q75.7 Increases competition for housing in my town
Living	Q75.8 Would change the way in which we live in my town

Additional Controls	
Left-Right Scale	Q21. Left-Right Scale
Closeness to AfD	Q23. Closeness to AfD (from 0 to 100)
Attitudes toward AfD	Attitudes toward AfD: between 0 and 1 (average of 3 questions in Q24)
Attitudes toward Muslims	Attitudes toward Muslims: between 0 and 1 (average of 8 questions in Q15)
Contact with Refugees	Contact with refugees: between 0 and 1 (average of 6 questions in Q67 and Q68)
Distance to refugee reception centers	Q71. Self-assessed distance to refugee reception centers
Settlement of refugees living in area	Q72. Self-assessed size of refugees settled in town

Table D.7: Variables Included in Survey Analyses (Support for Hate Crime)

D.8 Robustness Check with YouGov Survey Data

	Dependent variable: `Violence is sometimes the only means`				
Mate Competition	0.413***	0.374***	0.266***	0.256***	0.248***
	(0.026)	(0.026)	(0.028)	(0.028)	(0.028)
Aggressiveness		0.508***	0.428***	0.430***	0.404***
		(0.077)	(0.074)	(0.074)	(0.074)
Socio-Demographics	✓	✓	✓	✓	✓
Refugee questions			✓	✓	✓
Contact with Refugees				✓	✓
Closeness to AfD					✓
Observations	1,527	1,527	1,527	1,527	1,527
R^2	0.254	0.276	0.354	0.365	0.374
Adjusted R^2	0.223	0.245	0.314	0.316	0.326
Note:				*p<0.1; **p<0.05; ***p<0.01	

Table D.8.1: Mate Competition Predicts Support for Hate Crime. *Note*: OLS with standard errors in parentheses. The dependent variable is *Only Means*, and the main independent variable is *Mate Competition* (both range from (1) disagree strongly to (4) agree strongly). "Socio-Demographics" includes age, gender, marital status, religious affiliation, education, household income, household size, left-right scale, and state of residence. See below table for definitions of other controls.

	Dependent variable: `Violence is sometimes the only means`				
Mate Competition	0.433***	0.406***	0.295***	0.281***	0.270***
	(0.037)	(0.038)	(0.042)	(0.042)	(0.042)
Aggressiveness		0.346***	0.289***	0.270**	0.261**
		(0.107)	(0.107)	(0.107)	(0.106)
Socio-Demographics	✓	✓	✓	✓	✓
Refugee questions			✓	✓	✓
Contact with Refugees				✓	✓
Closeness to AfD					✓
Observations	729	729	729	729	729
R^2	0.294	0.305	0.372	0.416	0.427
Adjusted R^2	0.231	0.242	0.286	0.314	0.326
Note:				*p<0.1; **p<0.05; ***p<0.01	

Table D.8.2: Mate Competition Predicts Support for Hate Crime (Sample Consists of Males Only). *Note*: OLS with standard errors in parentheses. The dependent variable is *Only Means*, and the main independent variable is *Mate Competition* (both range from (1) disagree strongly to (4) agree strongly). "Socio-Demographics" includes age, gender, marital status, religious affiliation, education, household income, household size, left-right scale, and state of residence.

For completeness, we report the model specification for the regression in the fifth column. The other regressions include a subset of variables as indicated above. See definitions of the variables in Table D.8.3. Support for Hate Crime ∼ Mate Competition + Aggressiveness + Age + Gender + Marital Status + Religion + Education + Income + Household size + Left-Right Scale + Local social

services + Local economy + Local crime + Local culture + Islam + Job Competition + Local school + Housing + Living + See Refugees on Road + See Refugees in Stores + See Refugees at Refugee Centers + See Refugees at Schools + See Refugees at Work + Closeness to AfD + State-Fixed effects.

Aggressiveness	Average of 3 Questions
	If I have to resort to violence to protect my rights, I will
	I have become so mad that I have broken things
	Given enough provocation, I may hit another person
Refugee Questions	9 Questions
	Present a burden on local social services
	Benefit the local economy
	Increase crime in my town
	Enrich the local culture
	Increase the influence of Islam in my town
	Make it more difficult to find jobs and training for the residents of my town
	Be a big challenge for our local schools
	Increases competition for housing in my town
	Would change the way in which we live in my town
Contact with Refugees	5 Questions
	On the road, on public transport or in the park
	In stores
	At a refugee center or refugee home
	At school
	At work
Closeness to AfD	measure between 0 to 100

Table D.8.3: Variables Included in YouGov Survey Analysis (in addition to "Socio-Demographics")

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