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ORIGINAL ARTICLE

A near-real-time analysis of societal responses to Ukrainian refugee migration in Europe

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Abstract

Recent events in Ukraine led to a surge in refugee migration originating from within Europe not seen since WWII. Using global data on daily news coverage, this research highlights that during the 8 weeks before the outbreak of open hostilities, there was no change in the relative interaction frequency between societal stakeholders and refugees. This changed dramatically in the 8 weeks thereafter: In neighbouring countries, the share of news reporting interactions with refugees rose from next to nothing to between 5 and 13%. In the rest of Europe, this share increased to 1% or 2%. Beyond governments, an event-study reveals inter-governmental organisations, civil societies and businesses as major societal forces driving not just the public discourse but levels of support for refugees. Initially, business actors displayed the strongest responsiveness to individuals in need: They became 25% points more likely to engage in material cooperation with refugees. Gradually fading support from non-government actors suggests that prolonged humanitarian crises may require a continuous near-real-time monitoring system and the coordination of various stakeholders' contributions to ensure an efficient provision of aid.

INTRODUCTION

The outbreak of open hostilities between Russian and Ukrainian military forces on 24 February 2022 has created a situation not seen in Europe since the end of the Second World War: In the first 7 days of the military conflict, almost 2 million Ukrainians fled their home country. Eight weeks after the first shot was fired, the overall number of Ukrainians seeking protection abroad stood at 5.1 million (UNHCR, 2022a). The number of externally displaced Ukrainians was thus more than thrice as large as the yearly number of asylum seekers coming to Europe during the so-called refugee crisis in 2015 and 2016 (UNHCR, 2022b).

Most Ukrainians who fled found temporary shelter in neighbouring countries, especially in Poland. Initially, this exodus from Ukraine has been met with high levels of support abroad. Immigration rules have been adjusted to facilitate the migration of hundreds of thousands of Ukrainians seeking refuge. Beyond government responses, other societal actors in Europe and across the globe have signalled their support. This support was not merely verbal but manifested in real actions, such as private sector donations to the UNHCR's Ukraine emergency response totalling $200 million after 3 weeks (UNHCR, 2022c). The picture concerning persistent levels of support proved to be more ambiguous. Contributions to the UN's Flash Appeal to support Ukraine, published in early March, fell still short of their target several months later (OCHA, 2022). Essential funding clusters related to food security, shelter, protection, or sanitation displayed a funding gap of $914 million in late June.

Whilst governments in Europe have stepped up their efforts to accommodate Ukrainians abroad, the level of preparedness was limited. Despite increasing tensions between Russia and Ukraine over 2021, societal stakeholders across Europe considered a military escalation, that is a full-scale war in Europe involving a major military power, to be extremely unrealistic. When the war finally broke out, this came as a surprise to actors from the realms of politics and civil society alike. As this research will show, hardly anyone across Europe expected the resulting exodus of Ukrainian citizens. Such unpreparedness may have notable repercussions, especially if the conflict turns into a longer-lasting military altercation and the displacement of Ukrainians continues.

This, however, is not simply an issue for policymakers in major host countries but a challenge to all European states. To ensure the implementation of solutions, which satisfy both humanitarian requirements and constraints in host societies, understanding how societies react to the emergence of such a crisis is crucial. Will non-government societal stakeholders, such as business or civil society representatives, maintain their levels of support for a prolonged period or can we expect levels of cooperation to fade quickly? Policymakers facing such a challenging situation may find academic discussions years after the fact only partly helpful to navigate the current crisis.

A major contribution of this research is the implementation of an analytical framework that allows tracing societal responses across European countries almost in real-time. Building on the Global Database of Events, Language and Tone (GDELT v2.0, https://www.gdeltproject.org/), this study examines how the frequency of interactions between various societal groups and refugees changed in 2022. Eventually, it provides a simple but rigorous approach to investigating dynamic response patterns of the main societal and political forces in an event-study context. It sheds light on cooperative and confrontational interaction modes of governments, legislatures, businesses, or civil society actors with Ukrainians being displaced by the conflict. More specifically, it provides insights into which actors in host countries change their interaction mode: Who becomes more likely to provide aid or express the intent to cooperate in the short run? Who disapproves or threatens? These dynamics can be monitored on a day-to-day basis. Such timely findings may be highly relevant for the design and coordination of public and private support policies in countries hosting Ukrainian refugees for the foreseeable future.

The remainder of this study is organised as follows: A brief overview of the literature on societal responses to refugee migration is provided in the next section. This is followed by a discussion of the main data source, its limitations and the empirical methodology applied to evaluate societal responses. Descriptive and event-study results are presented for aggregate response patterns and response patterns by main societal stakeholders or interaction modes. The last section concludes.

KNOWN RESPONSES TO REFUGEE MIGRATION IN HOST SOCIETIES

Related to changing migration patterns over the last decade, characterised by a notable increase of individuals seeking protection in Europe, the implications of refugee migration for host and transit countries have been scrutinised more frequently. One striking aspect is a divergence between economic and socio-political responses: Whilst the influx of (large) refugee populations is typically associated with positive impulses for the local economy, attitudes towards refugees and political preferences of native residents edge towards a more hostile position. This implies an area of tension with the potential to produce various response dynamics for different societal groups.

Despite public worries about how a sudden immigration wave may change employment perspectives for the worse, there is little empirical evidence to support such a proposition (Clemens & Hunt, 2019). Even when inflows are substantial, such as 125,000 Cuban refugees settling in Miami in 1980 or 700,000 Russians emigrating to Israel in the early 1990s, natives' wages or employment rates do not decline (Friedberg, 2001; Peri & Yasenov, 2019). This can be explained by (refugee) migrant workers being imperfect substitutes, often selecting occupations shunned by native workers. Another mechanism is the demand effect, where the influx of migrants spurs economic growth (Bodvarsson et al., 2008) and compensates for initial wage drops (Cohen-Goldner & Paserman, 2011). Most notably, the large-scale Syrian refugee migration waves to Turkey and Jordan did not manifest in worsening employment perspectives for natives in the formal labour market and created positive local demand effects, such as lower consumer prices (Fallah et al., 2019; Tumen, 2016).

On the macro level, economies in host countries seem remarkably robust when it comes to refugee migration. Focusing on direct interactions of economic stakeholders and refugees, the years since 2015 have also seen an almost fourfold increase in terms of collaborations between corporations and other stakeholders to support refugees (Yang et al., 2020).

Irrespective of the absence of adverse economic implications, public attitudes towards refugees can be volatile. Residents living near transit routes across the Balkan between 2010 and 2016 were much more sceptical about immigrants and their contribution to society (Ajzenman et al., 2022). Moreover, institutional trust and perceived political stability declined along these transit corridors. When it comes to supporting asylum seekers, European citizens display a distinct preference for those more likely to be easily integrated into labour markets or society, and those who are deemed more vulnerable (Bansak et al., 2016). Anti-refugee or anti-immigrant attitudes were found to be more prevalent amongst Europeans who are living in relative economic deprivation and who have fewer contact experiences with migrant groups (Albada et al., 2021). Similarly, prior contact in the form of friendships with minority group members translates into more positive attitudes towards newly arrived refugees (Lippard & McNamee, 2021).

Perceived symbolic or realistic threats, for example concerns about cultural differences or ensuing financial strains, may affect attitudes towards refugees (Landmann et al., 2019). This threat perception is an essential correlate of negative attitudes, much stronger than socio-demographic factors and political or prosocial preferences (Cowling et al., 2019). Depending on threat perception, individuals may not only have a more negative attitude towards refugees but also support more restrictive asylum policies or lower hosting capacity. Related factors that explain emerging negative attitudes towards refugees posit the influence of negative stereotypes or inter-group anxiety. According to the Unified Instrumental Model of Group Conflict, situational factors (e.g. general or economic instability) and ideologies may reinforce each other and induce competition with the outgroup of refugees (cf. Esses et al., 2017). This, in turn, influences the treatment of refugees. Eventually, the willingness to help in an inter-group context not only reflects attitudes or stereotypes but is also affected by the labels used in the discourse: Refugees, as opposed to (economic) migrants, are more likely to be offered dependency-oriented help, which is less focused on providing the tools to solve issues autonomously (Wyszynski et al., 2020). In light of these label-specific responses, differences in the terminology used across newspapers (tabloid versus broadsheet) highlight the relevance of countries' news media sectors (cf. Eberl et al., 2018).

Acceptance of individuals seeking protection due to war tends to be higher (Von Hermanni & Neumann, 2019), yet can be lower for refugees from Eastern Europe, especially when fiscal concerns are factored in. Attitudes towards

refugees may also be shaped by news media consumption (De Coninck, 2020): Frequent consumers of public broadcasters or quality newspapers are more likely to display positive attitudes towards refugees; the reverse applies to regular viewers of commercial broadcast networks. Frequent media coverage of migration issues may also increase immigration worries (Benesch et al., 2019). This finding prevails even when the coverage is neutral or positive in tonality.

Changing attitudes towards refugees, such as anti-immigration sentiments, or daily interactions with refugees affect political preferences and electoral outcomes in host countries. This has been observed across Europe and was related to a surge of asylum seekers in 2015 and 2016. Support for right-leaning parties increased in the presence of refugee inflows across European countries (Dinas et al., 2019; Vasilakis, 2017). These effects have a geographical dimension: Observed increases in electoral support for far-right parties are more prominent in less urbanised areas (Dustmann et al., 2019). Moreover, if the information on the location of refugee accommodations is more easily accessible, electoral turnout and party support shifts emerge within communities living further away and having less exposure to refugees (Bratti et al., 2020).

The magnitude of voters' preference shifts, however, is associated with the degree of familiarity with refugee groups: The presence of millions of Syrian refugees in Turkey did not result in major political shifts, such as losses to the incumbent party (Altindag & Kaushal, 2021; Fisunoglu & Sert, 2018). Documented electoral responses were relatively strong in the case of refugee migration from culturally more different countries of origin, for example sub-Saharan Africa or the Middle East to Europe, and insignificant for refugee flows originating from neighbouring, culturally similar countries. At the same time, electoral effects due to the exposure to refugees can be compensated or even reversed in the presence of joint participation in social activities and prolonged contact between voters and refugees (Steinmayr, 2021).

Immigration dynamics not only affect party preferences but also policy preferences of the electorate: High-skilled immigration strengthens the electoral support for parties in favour of redistributive policies. Low-skilled immigration, however, results in political parties adjusting their programmes towards lower levels of redistribution (Moriconi et al., 2019). The negative effect on redistribution support may vanish a few years after the arrival of refugees, yet it tends to be stronger in areas without prior exposure or in the case of refugees from culturally more dissimilar origins (Zimmermann & Stutzer, 2021).

Overall, societal attitudes towards refugees depend strongly on the economic and institutional setting. Concomitantly, changing attitudes have the potential to shape the politico-economic environment in host countries. This, in turn, implies that a timely evaluation of response dynamics is crucial to managing refugee migration and integration successfully.

DATA AND METHODOLOGY

Measuring responses in near-real-time: GDELT

Near-real-time data from the Global Database of Events, Language and Tone (GDELT v2.0, https://www.gdelt-project.org/) allows for investigating whether interactions and tone between societal stakeholders and refugees have changed over time. Relying on a text-mining algorithm, this database offers detailed information on actors and types of interaction events, which are extracted from major media and news outlets around the globe (Leetaru & Schrodt, 2013). Updates every 15 min ensure a timely overview of events of societal relevance. A major advantage of GDELT v2.0 over previous versions is the integration of more translated events from non-English language news outlets. Presently, translations from 100 languages are considered.[1] This enables us to generate a nuanced picture regarding events considered to be relevant in (international) English language news and those debated in non-English speaking countries, such as neighbouring countries of Ukraine.

Applying the CAMEO coding scheme (cf. Schrodt, 2012), the GDELT text-mining algorithm searches the global news sphere and evaluates its written content.[2] Articles are evaluated sentence by sentence, screening for interaction events based on used verbs. Drawing on verb dictionaries, different verbs of similar meaning can be grouped: If a primary actor (being a sentence's subject) *asks*, *appeals*, or *petitions* for something, the event would be categorised as a request. When a primary actor *accuses* or *protests officially*, this would be a case of disapproval. Related statements or clarifying verbs, further describing what an actor does, are used to derive more specific event classifications. A news report featuring the sentence 'Oxfam Canada today called on the world community to help save tens of thousands of Afghan civilians threatened with starvation' would be classified as an *appeal for humanitarian aid*. Using further actor dictionaries, which are compilations of previously encountered entities with auxiliary information, the type of the primary actor can be identified as NGO, with Canada as the country affiliation.

For the purpose of the research at hand, relevant interaction events can be identified based on the following GDELT variables: primary and secondary actor groups, their country affiliation, types of interaction and the time and location an event took place.[3] These variables are extracted from the complete collection of all quarter-hourly data sets over 16 weeks, starting with 30 December 2021.[4] Within this timeframe, 19.03 million interaction events have been recorded on the global level; 56% of these feature a primary actor with readily available country affiliation. Using further information on events' locations allows imputing country affiliation for the remaining records.[5] After this, there are 6.9 million events, which relate to a primary actor with unambiguous European country affiliation.

Using the information on primary actors and their country affiliation, the country-level responses of stakeholders to Ukrainian refugee migration can be evaluated. These responses are investigated using GDELT event records where the type of the secondary actor has been identified as *refugee*. The text-mining algorithm retrieves secondary actors as the recipients of primary actors' actions. If a record contains information such as 'Turkey will allow up to 13,000 Turkish Kurd refugees who have lived in Iraq for more than a decade to return home as part of an UN-brokered deal' the interaction will be categorised as *expressing intent to cooperate*, that is *verbal cooperation*, between the Turkish government and a refugee group. The news item 'Croatian authorities are failing to uphold the property rights of Croatian Serb refugees, a human rights group protested here Wednesday' would be a case of *coercion* (due to the property being seized), and thus a *material conflict* between Croatian authorities and refugees.

Two aspects relating to secondary actors labelled as refugees must be considered: For one, this classification does not exclusively refer to individuals officially recognised as refugees under the 1951 convention. Whenever a record contains recipient information including the (translated) term refugee or describes recipients as fleeing, the secondary actor would be labelled as a refugee. Eventually, this coding would be closely aligned to the UNHCR's concept of Persons of Concern, referring to everyone seeking protection irrespective of their legal status. Secondly, the refugee label is also assigned to events where the secondary actor is an institution dedicated to human migration issues. Consequently, interaction events with 'refugees' as secondary actors can be interpreted as the outcome of primary actors' attitudes to refugee support in a broader sense. Considering that this research's focus is on societal responses to refugee migration as a general phenomenon, this is not a caveat. Within the sample of European primary actors with unambiguous country affiliations, there are 58,007 recorded events with refugees as secondary actors.

Based on the previously sketched GDELT text-mining algorithm, each retrieved interaction event between a European primary actor and refugees is classified according to one of the following four modes: *Verbal or material cooperation*, both reflecting positive attitudes and *verbal or material conflict*, indicating confrontational attitudes. These four interaction modes, respectively, their changing relative frequencies, will be referred to as societal stakeholders' responses to the presence of Ukrainian refugees. Going beyond this broad classification, the more detailed underlying coding scheme allows differentiating between 20 general interaction modes (Table 1).

For approximately 27% of all events during the 16 weeks considered in this study, a primary actor type has been assigned by the GDELT classification algorithm. Table 2 lists the 20 most frequent primary actor types, identifying a respective societal stakeholder group that interacted with refugees or entities dealing with migration and relocation issues.

TABLE 1 Interaction event classifications

Verbal cooperation (65.1%)	Material cooperation (26.0%)	Verbal conflict (5.1%)	Material conflict (3.8%)
Consult (28.1%)	Provide aid (17.7%)	Disapprove (1.8%)	Use conventional military force (1.8%)
Engage in diplomatic cooperation (12.5%)	Yield (3.5%)	Reject (1.3%)	Coerce (1.0%)
Express intent to cooperate (10.8%)	Engage in material cooperation (3.1%)	Threaten (1.0%)	Use unconventional violence (0.4%)
Make an appeal or request (8.2%)	Investigate (0.9%)	Demand (0.5%)	Reduce relations (0.3%)
Make statement (6.6%)		Engage in political dissent (0.2%)	Demonstrate military or police power (0.3%)
			Use unconventional mass violence (0.0%)

Note: Percentages reflect the relative share of all interaction modes with refugee actors between 30 December 2021 and 20 April 2022. The total number of recorded interaction events for European countries is 58,007.

TABLE 2 Primary actors interacting with refugees

Code	%	Stakeholder group	Code	%	Stakeholder group
GOV	43.5	Government	NGO	2.2	Non-governmental organisations
CVL	11.5	Civilian individuals or groups	HLH	1.7	Health actors
BUS	6.5	Business	LAB	1.7	Labour organisations
REF	6.4	Refugees, migration organisations	ELI	1.3	Elites
IGO	6.3	Inter-governmental organisations	JUD	1.0	Judiciary
EDU	4.5	Education	OPP	0.9	Political opposition
MED	3.7	Media	CRM	0.6	Criminals
LEG	2.6	Legislature	UAF	0.3	Unaligned/unknown armed forces
COP	2.4	Police forces	UIS	0.2	Unidentified state actors
MIL	2.4	Military	AGR	0.2	Agriculture-related entities

Note: Percentages reflect the relative share of all interactions of a given actor with a second actor, identified as refugee, between 30 December 2021 and 20 April 2022. The total number of fully classified interaction events is 15,372 for European countries.

Within the context of this research, these societal stakeholder groups can be assumed to be major influential groups, which shape political and economic decision-making processes and outcomes. Whereas governments and the legislature define the legal environments relevant for (refugee) migrants, police forces or the military would be involved in the enforcement of legal boundaries and physical borders. Inter-governmental and non-governmental organisations may be engaged in the immediate support of vulnerable groups, such as refugees. Opinion leaders, potentially influencing the political agenda-setting process, could be found within the media or elites; the latter comprising former officials and celebrities, who may also directly engage in fundraising to support refugees (Haeck, 2022). The involvement of private individuals would be reflected in the responses of stakeholders categorised as members of civil society. Economic stakeholders are represented by employers (businesses or multinational corporations) and workers, via organisations dedicated to labour issues.

This information on country-specific interaction events with refugees, differentiating by societal stakeholders and interaction modes, allows portraying detailed response dynamics across Europe on a daily basis. Eventually, these

heterogeneous responses allow more nuanced analyses, which help us to better understand the level of support, and its persistence over time, which could be expected in response to future large-scale refugee migration to Europe.

Event-study design and estimation strategy

Responses of stakeholders in European countries to (Ukrainian) refugees are examined in the context of an event-study design: Relative interaction frequencies between various societal stakeholders and refugees, respectively, the relative frequency of interaction modes, are investigated for the first 4 months of 2022.

A general overview of response dynamics builds on a comparison of the 8 weeks before the outbreak of military conflict (30 December 2021–23 February 2022) and the 8 weeks after open hostilities began (24 February 2022–20 April 2022). These graphical analyses are built on 7-day moving averages of observed interaction probabilities, based on a respective day's observation and the six prior observations. Presented results showcase smoothened country-level response dynamics for Ukraine itself, its seven direct neighbours and an aggregate comprising all other European countries.[6]

To provide more detailed insights into daily response dynamics across Europe, and to allow a more rigorous assessment of differences across groups, event-study models are estimated at the country level. The respective samples are balanced panels, spanning the 56 days before the outbreak of open hostilities and the 56 days thereafter. The panel dimension corresponds to the number of countries (7 neighbouring and 32 non-neighbouring countries) times the number of categories or groups of interest, for example interaction mode categories (4 or 20) or stakeholders (12).

Table 3 provides further details on dependent variables, their interpretation and sample sizes. All response dynamic variables represent interaction probabilities, based on shares of events with refugees as recipients relative to the overall number of relevant events documented for a given day and country. This ensures a normalisation in case of extremely eventful days.

The *aggregate response pattern analysis* draws upon the following model:

$$P_{c,t} = \beta_0 + \sum_{t=-55}^{56} \beta_t day_t + \sum_{t=-55}^{56} \gamma_t day_t \times neighbour_c + \mu_c + \varepsilon_{c,t} \quad (1)$$

Daily response patterns $P(REF)$, representing the probability that an interaction event in a country is directed at refugees, are estimated over the 56 days before and after the outbreak of hostilities. Day indicators are interacted with a neighbour indicator, which features three categories: safe neighbouring countries (not involved in the conflict), risky neighbouring countries (Belarus, Russia) and all non-neighbouring countries. The intercept β_0 corresponds to the average outcome in the reference period, which is the first day of the observation period. Estimates β_t represent day-specific deviations from the reference period (for non-neighbouring countries), whereas γ_t reflects day-specific deviations for neighbouring countries. Country-level fixed effects are included via μ_c. This equation is applied to two samples, namely the sample of event records retrieved from English-language news and the sample of events obtained from translated news.

Societal stakeholders' response dynamics are evaluated based on the model

$$P_{c,t,a} = \beta_0 + \beta_1 post_t + \sum_{a=1}^{A} \gamma_a post_t \times actor_a + \mu_c + \mu_a + \varepsilon_{c,t,a} \quad (2.1)$$

Response dynamics are estimated separately for the sample of direct neighbours and non-neighbouring countries. In this model, the intercept β_0 reflects the average outcome in the 8-week reference period before 24 February 2022. Stakeholder-specific dynamics are retrieved based on the interaction of a stakeholder indicator ($actor_a$) and $post_t$, the latter being zero before the conflict and one after it started. All specifications include country (μ_c) and

TABLE 3 Response model overview

Response model	Dependent variable	Interpretation	Total sample size
Aggregate responses (1)	$P_{c,t} = \frac{E^{REF}_{c,t}}{\sum E_{c,t}}$	Daily share of interaction events (E) directed at refugees, P(REF)	$C \times T = 4,368$
Responses by actor (2.1)	$P_{c,t,a} = \frac{E^{REF}_{c,t,a}}{\sum^{R} E_{c,t,a,r}}$	Actor attention: Probability actor interacts with refugees, P(REF | actor)	$C \times T \times A = 52,416$
	$P_{c,t,a} = \frac{E^{REF}_{c,t,a}}{\sum^{A} E^{REF}_{c,t,a}}$	Actor substitution: Probability experienced interaction is with given actor, P(actor | REF)	
Responses by interaction mode (2.2)	$P_{c,t,i} = \frac{E^{REF}_{c,t,i}}{\sum^{R} E_{c,t,i,r}}$	Interaction attention: Probability interaction mode occurs with refugees, P(REF | I)	$C \times T \times I_4 = 17,472$ $C \times T \times I_{20} = 87,360$
	$P_{c,t,i} = \frac{E^{REF}_{c,t,i}}{\sum^{I} E^{REF}_{c,t,i}}$	Interaction substitution: Probability interaction with refugees is of certain mode, P(I | REF)	
Heterogeneous responses by actor and interaction mode (2.3)	$P_{c,t,a,i} = \frac{E^{REF}_{c,t,a,i}}{\sum^{R} E_{c,t,a,i,r}}$	Interaction attention, by actor: Probability interaction mode occurs with refugees, P(REF | actor & I)	$C \times T \times A \times I_4 = 209,664$
	$P_{c,t,a,i} = \frac{E^{REF}_{c,t,a,i}}{\sum^{I} E^{REF}_{c,t,a,i}}$	Interaction substitution, by actor: Probability interaction with refugees is of certain mode, P(I | actor & REF)	

Note: The overall number of countries C comprises 7 neighbouring and 32 non-neighbouring countries. The time horizon T includes 112 days (56 days before and after the onset of conflict). The number of actors A is 12, including one residual group for unknown/other actors beyond the main actors.

stakeholder (μ_a) fixed effects. Response dynamics are investigated by two alternative variables: One represents *actor attention*, measured as the probability a given actor interacts with refugees, $P(REF|actor)$. The second is *actor substitution*, taking the refugee perspective, which indicates the probability an interaction is with a given actor, $P(actor|REF)$.

Response dynamics by interaction mode analyses investigate how actors in a country modify the way they interact with refugees. Changing probabilities of a certain interaction mode in the aftermath of the conflict outbreak are estimated as:

$$P_{c,t,i} = \beta_0 + \beta_1 post_t + \sum_{i=1}^{I} \gamma_i post_t \times interaction_i + \mu_c + \mu_i + \varepsilon_{c,t,i} \quad (2.2)$$

Two alternative interaction mode indicators reflect the categories depicted in Table 1, which differentiate between four broad categories of cooperative and confrontational interactions and 20 more detailed categories. μ_i represents interaction mode fixed effects. As in the case of the stakeholder analysis, response dynamics across interaction modes take on two forms: *Interaction attention* corresponds to the probability that a certain interaction mode I, for example material cooperation, is directed at refugees, $P(REF|I)$. Taking the refugee perspective, *interaction substitution* informs about the probability that an interaction with refugees is of a specific mode, $P(I|REF)$.

To assess *heterogeneous responses*, focusing on stakeholder-specific interaction mode changes, the last event-study model combines models (2.1) and (2.2):

$$P_{c,t,a,i} = \beta_0 + \beta_1 post_t + \sum_{a=1}^{A}\sum_{i=1}^{I} \gamma_{ai} post_t \times actor_a \times interaction_i + \mu_c + \mu_a + \mu_i + \varepsilon_{c,t,a,i} \quad (2.3)$$

Interaction modes are integrated using the general indicator with four categories. The two response dynamics variables, once again, come in two variations: One represents the probability that refugees experience a certain type of cooperative or confrontational behaviour when targeted by a given stakeholder $P(actor\&I|REF)$; the other reflects the probability that a stakeholder interacts with refugees when engaging in a certain interaction mode, $P(REF|actor\&I)$. These correspond to interaction substitution and attention, respectively, yet differentiating by stakeholders.

Models for the event-study analyses involving multiple groups produce a large set of coefficient estimates. To facilitate readability, group-specific differences between post- and pre-conflict response patterns are displayed graphically. All illustrated differences are reported with 95% confidence intervals to evaluate group-specific differences robustly.[7]

AGGREGATE RESPONSE PATTERNS

On the aggregate level, a notable change in the frequency of interactions with refugee groups occurred in the first 4 months of 2022 in Europe: In the 8 weeks before 24 February 2022 only 0.51% of all recorded events with a second actor were involving refugees. In the 56 days after the outbreak of hostilities, this share rose significantly to 4.17% (Table 4). Interactions with refugee groups, previously a niche phenomenon, became a topic of high relevance in the European public discourse. The overall relevance of refugees in the news is also salient in the respective share of interactions involving refugees either as main actors or recipients.[8]

This increasing prominence of refugee-related issues is, however, not a development that manifested to the same extent across the European continent. Figure 1 displays the probabilities that interaction events recorded in English or translated news are directed at refugees for Ukraine, its direct neighbours and the rest of Europe.[9] Depicted 7-day moving averages suggest that the prevalence of refugees in the public discourse surged from the first day of the conflict onwards: Interaction probabilities with refugees rose for Slovakia, Poland, Hungary and Romania to 6%–8%; for Moldova, it increased to around 11%.

Relative interaction frequencies obtained from English language and translated sources tend to move similarly, yet there are some noteworthy differences too: In the case of Romania, Moldova and Russia, interaction probabilities originating from translated news increased faster and peaked earlier. Further analyses of the original language and the internet top-level domain of online sources reveal that this is driven by local news.[10] Typically, the peak in interaction frequency occurred after 2 or 3 weeks. From then onwards, documented interactions with refugees did not

TABLE 4 Recorded events involving refugees

Refugees as	Overall (30 December 2021–20 April 2022)		8 weeks before		8 weeks after		Test: Refugee share difference (after – before)
Recipient (actor 2)	58,007	2.78%	4051	0.51%	53,956	4.17%	0.0366***
Main actor (actor 1)	52,590	1.93%	3816	0.35%	48,774	2.97%	0.0262***
Main actor or recipient	109,617	2.65%	7822	0.48%	101,795	4.04%	0.0355***

Note: Overall number of recorded events with the primary actor linked to a European country is 6,903,237. For 39.5% (30.3%) of these records, a primary (secondary) actor type has been identified. The test on differences of refugee shares (8 weeks after vs. 8 weeks before) was implemented as regression of a dummy variable indicating an interaction involving refugees on an indicator for the 8 weeks after.

***$p < 0.01$.

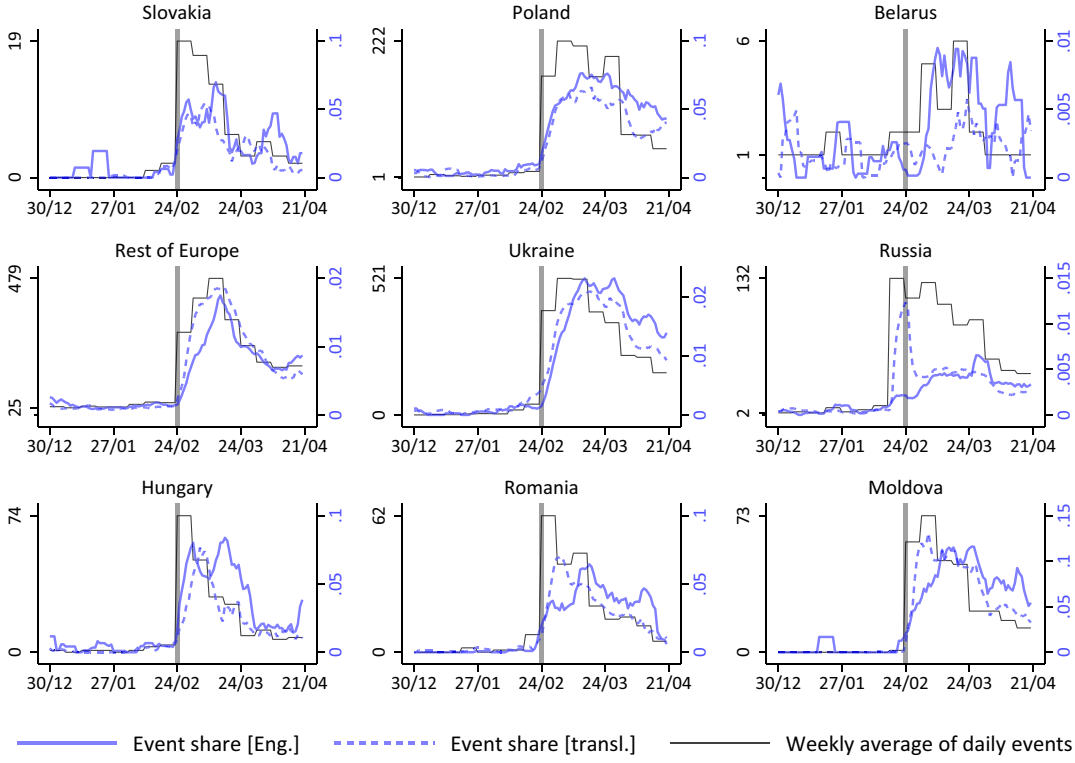


FIGURE 1 Overview of interaction frequency with refugees documented in the news. Relative interaction frequency, *P*(*REF*), is measured as a 7-day moving average of event shares of interactions (in English or translated news outlets) between any actor and refugees (as secondary actors) over all interactions in a country (right axis). Average daily event counts are calculated for 7-day intervals before and from 24 February 2022 onwards (left axis).

gain prominence or even lost relevance in the public conversation. This is particularly striking for Slovakia, Hungary and Romania where event shares originating from translated news fell by almost 50%.

Estimated interaction frequencies from the event-study analysis on the country-level (based on model 1), spanning the 56 days before and after the outbreak of open hostilities, are also integrating different levels of urgency: Direct neighbours would be more immediately affected by a surge in Ukrainians seeking protection abroad. This would then lead to a more frequent representation of refugees in the national media. Concomitantly, some countries could be considered more plausibly as safe harbours than others, for example they can be reached without crossing front lines or did not serve as deployment zones before the war.

Before 24 February 2022, the prominence of interactions with refugees was negligible (Figure 2). From the first day of the conflict, safe neighbouring countries were 5%–6% points (pp) more likely to record interactions with refugees. For Belarus and Russia, both deployment zones before the invasion and accessible via more risky evacuation routes, there is hardly any effect. For other European countries, the observed effect amounts to approximately 1 pp in case of events documented in English language media and around 2 pp for events retrieved from non-English news outlets. For safe neighbouring countries, the interaction patterns obtained from translated sources reveal a decline at the end of the second conflict week. This indicates that after a phase of very frequent interactions with refugees, respectively, high attention in the media, country-level response patterns seem to fall gradually towards their usual levels. Furthermore, it signifies that GDELT event records mirror related real-world conditions quite precisely: The number of daily border crossings of Ukrainians dropped from week three onwards (UNHCR, 2022a).

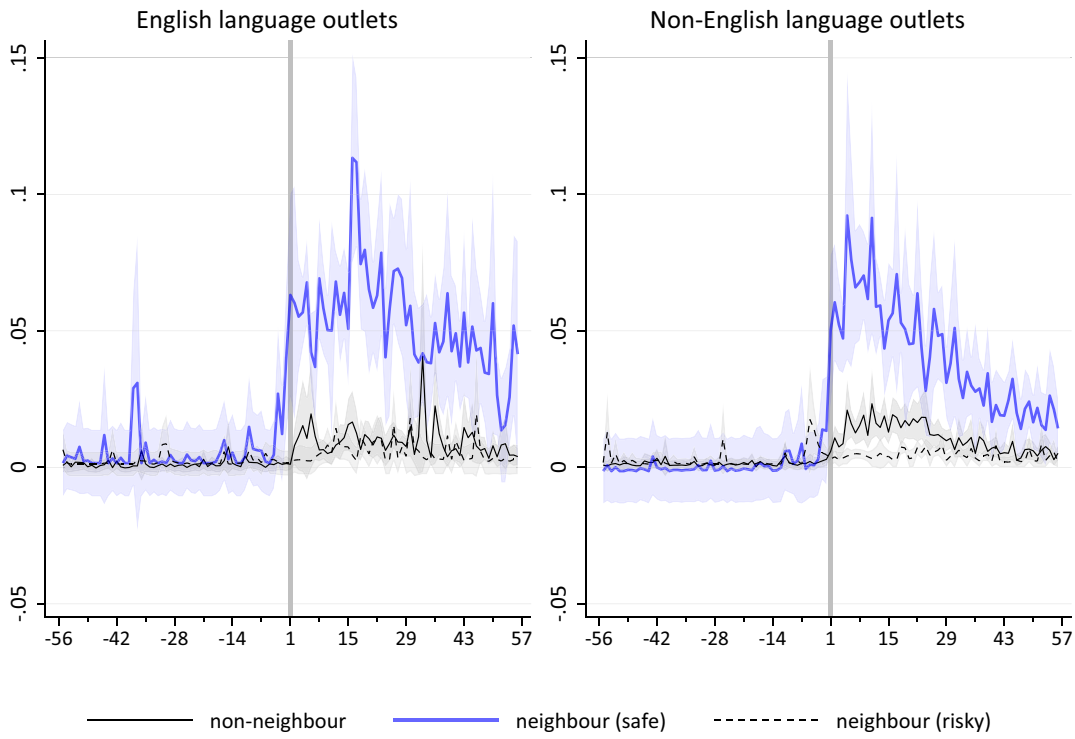


FIGURE 2 Event-study results for interactions on the country level. Symmetrical event-study design with days before and since the outbreak of conflict on the horizontal axis. 95% confidence intervals reported.

SOCIETAL STAKEHOLDERS' RESPONSE DYNAMICS

Across all countries, governmental actors are the most relevant societal stakeholders interacting with refugees. With the exemption of Hungary and Slovakia, 40 to 65% of interactions with refugees originated initially from governmental actors. For neighbouring countries and Ukraine, however, the relative importance of governments declined substantially in the weeks after the conflict outbreak (Figure A2). Other relevant main actors emerged from civil society, inter-governmental organisations, or businesses. One noteworthy exemption is Hungary where hardly any interactions were recorded in the period before. During the Ukrainian exodus, governmental actors' interaction frequency is rivalled by elites, which comprise former officials or celebrities.[11]

The event-study analysis for response dynamics across societal stakeholders, based on model (2.1), contrasts changes in the relevance of a given actor going from the 56 days before the conflict outbreak to the 56 days afterwards.

Depicted results in the lower two panels of Figure 3 illustrate the changing probability (from the perspective of refugees) that interaction occurs with a given actor. In neighbouring countries, the relevance of media, inter-governmental organisations, civil society actors and businesses increased by around 1%–1.5% points (pp). The only non-governmental actor displaying a significant change in response patterns for non-neighbouring countries are businesses. From the perspective of refugees, interactions with governments became 5 pp more likely in non-neighbouring countries and 2.5 pp in neighbouring countries.

The upper panels represent the probability a given actor interacted with refugees. Showcased changes reflect how much attention was redirected towards refugees. Despite the practical implications of political responses, governments display only an increase in the interaction likelihood between 0.75 and 1.5 pp. If recorded interactions reflect an actor's priorities, governments' priorities changed only moderately. More substantial changes can

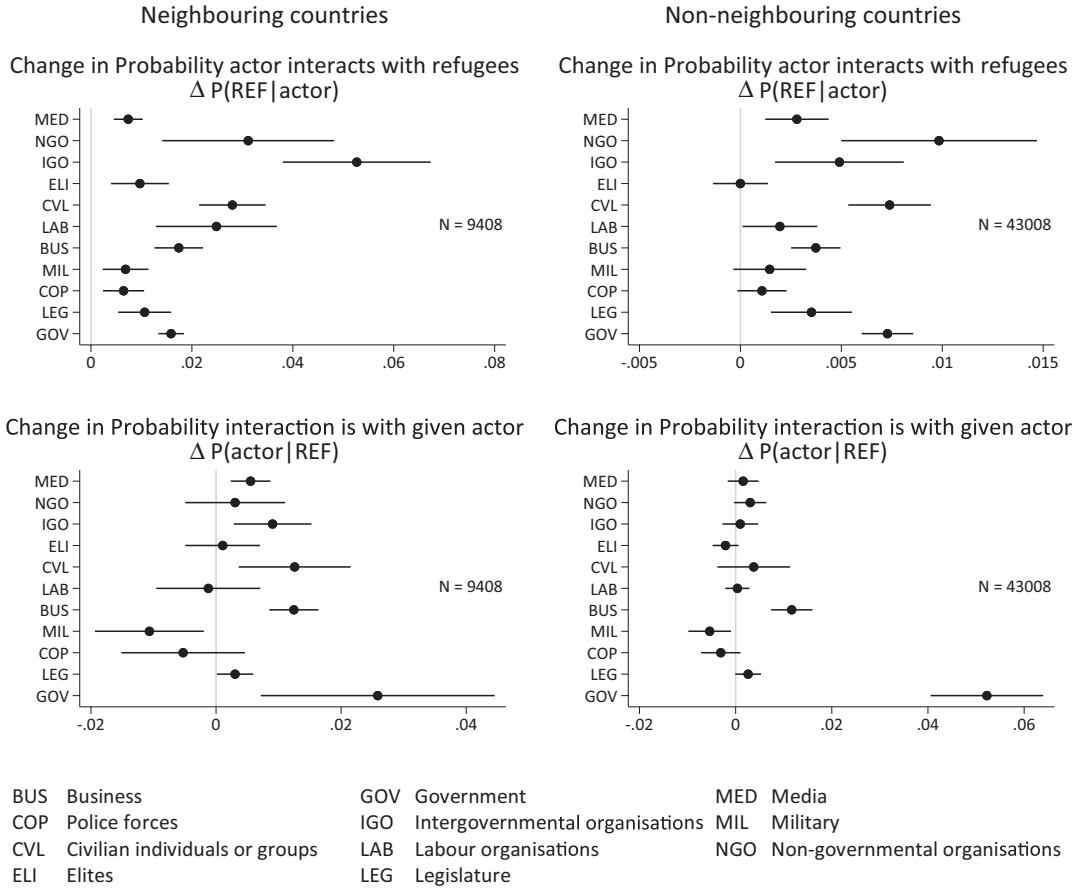


FIGURE 3 Event-study results for interactions by stakeholders. Top panels report actor attention changes; bottom panels illustrate actor substitution dynamics. 95% confidence intervals depicted. Reference group is unknown/other (not included in the graph).

be observed for inter-governmental organisations (IGO), non-governmental organisations (NGO), civil society actors (CVL) and labour-related entities (LAB) in the case of Ukraine's neighbours. In non-neighbouring countries, stronger priority adjustments are documented for NGOs and civil society actors.

RESPONSE DYNAMICS BY INTERACTION MODE

Interaction frequency represents the quantitative aspect of interactions with refugees. Another potentially relevant question relates to the quality of interactions, for example does cooperation probability increase during an emerging crisis?

Regarding cooperative behaviour, both verbal and material cooperation is more frequently displayed towards refugees in the weeks after the outbreak of conflict (Figure 4). For some countries there exists a peak of material cooperation 1 week into the conflict: 11% of all material cooperative behaviour is directed towards refugees for Slovakia, 15% for Hungary and 25% for Moldova before a steep decline sets in. In the case of other major destination countries, respectively, the rest of Europe, the peak occurs after 3 weeks. Around this time, the share of material conflict in interactions with refugees increases for Poland and Hungary, implying that 4%–6% of material confrontational behaviour is directed at refugees.

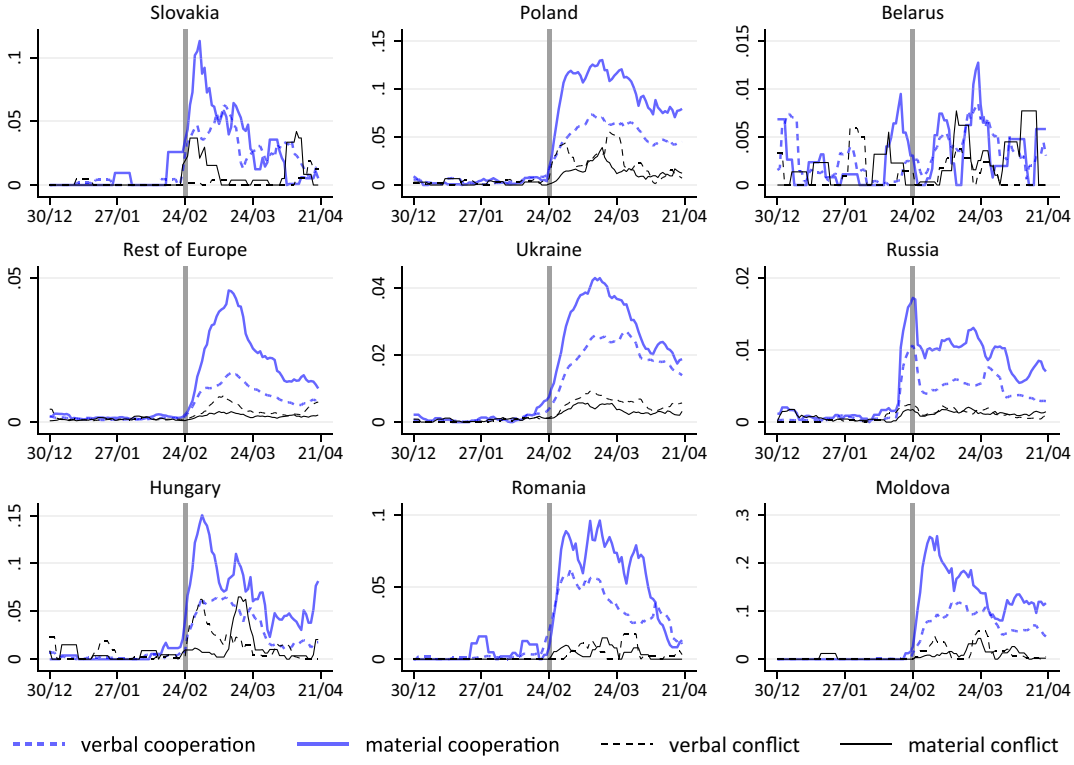


FIGURE 4 Refugee-targeted prevalence of interaction modes (Interaction attention). Depicted are 7-day moving averages of P(REF|I). A 10% material cooperation prevalence implies that 10% of all material cooperation interactions are directed towards refugees.

From the perspective of refugees, there is no evident change in the probability of experiencing confrontational behaviour (Figure A3). Before and after the onset of open conflict, verbal cooperation is the most likely interaction mode. Yet there is a distinct substitution of verbal and material cooperation: If the prevalence of material cooperation increases, the prevalence of verbal cooperation seems to experience a compensating drop.

Event-study results (based on model 2.2) indicate that refugees in non-neighbouring countries were significantly less frequently exposed to material conflict (bottom right panel in Figure 5). For neighbouring and non-neighbouring countries, both verbal and material cooperation became more prevalent: Material cooperation events became 12 pp more likely; for verbal cooperation, the increase was 36 pp in neighbouring countries and 30 pp in non-neighbouring countries.

Concerning the probability that a certain interaction mode is directed towards refugees (top panels in Figure 5), indicating an attention shift, all four forms of interaction behaviour are more likely to be observed for interactions with refugees after the conflict started. There is, however, a difference in the order of magnitude between Ukraine's neighbours and other European countries. Most notably, the biggest gains are documented for material cooperation instead of verbal cooperation. The share of material cooperation displayed towards refugees amongst all interactions of this type increased by 6 pp for neighbouring countries and 1.8 pp for non-neighbouring countries.

These findings can be further disaggregated, based on more detailed event codes.[12] The most notable shift in attention redirected towards refugees emerges for the interaction mode *provide aid* (top panels of Figure A5): 10 pp in neighbouring countries and 4 pp in non-neighbouring countries. From the perspective of refugees, the prevalence of being provided with aid is comparable across country groups. This interaction mode became 11 pp more likely

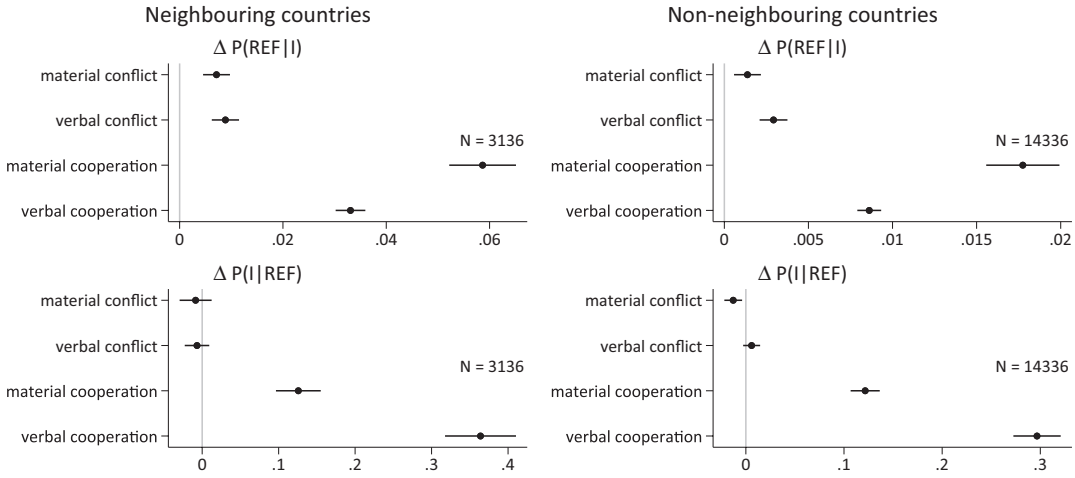


FIGURE 5 Event-study results by interaction mode. Top panels report interaction attention changes; bottom panels illustrate interaction substitution dynamics. 95% confidence intervals depicted.

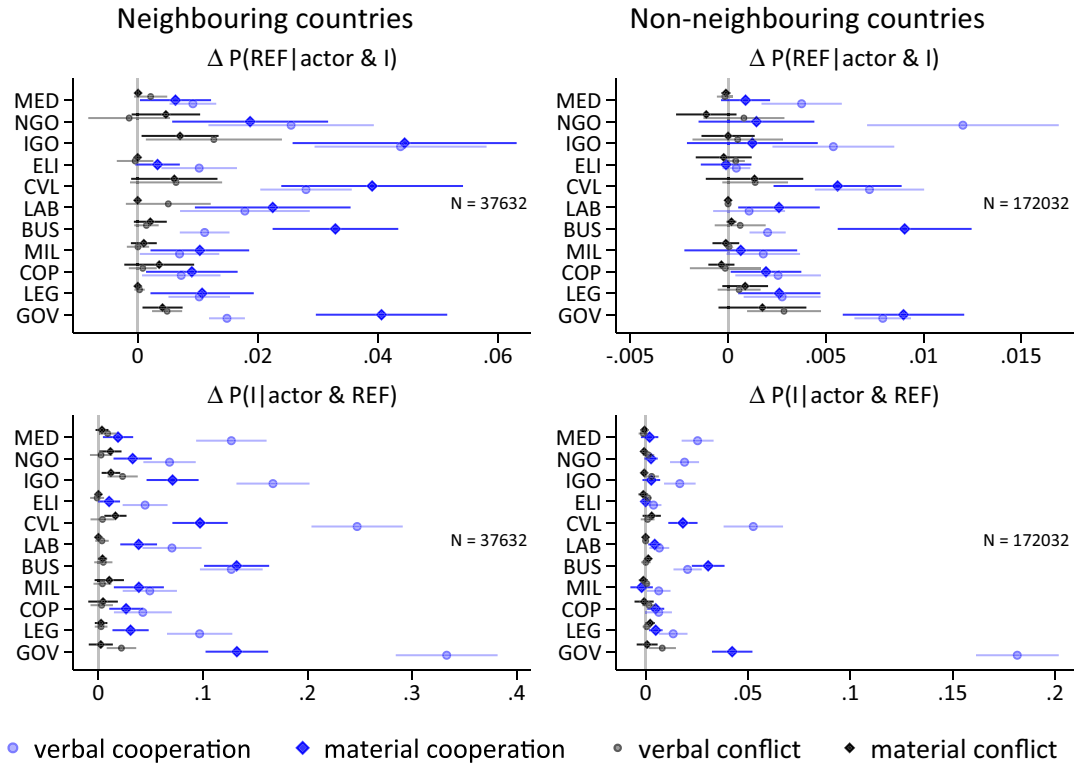
(bottom panels of Figure A5). The probability to become a recipient of diplomatic cooperation endeavours or consultations (both verbal cooperation modes) was higher in neighbouring countries.

HETEROGENEOUS RESPONSES

The final event-study design investigates changing probabilities of interaction modes by actors (model 2.3). This analysis highlights the main societal forces behind a specific form of interaction. The top panels of Figure 6 inform about the changing probability that a stakeholder shifts attention and engages more frequently in cooperative or confrontational behaviour towards refugees, relative to all interactions of this type. In neighbouring countries, it is mostly inter-governmental organisations that are relatively more likely to display both verbal and material cooperative behaviour towards refugees (4.5 pp). Other actors exhibiting major attention shifts in form of redirecting material cooperation towards refugees are governments, civil societies and businesses. For non-neighbouring countries, this attention shift is much weaker.

From the perspective of refugees (bottom panels of Figure 6), the probability that government actors substitute material cooperation for any other interaction mode increases by 4 pp in non-neighbouring countries and by 13 pp in neighbouring countries. The probability that businesses offer material cooperation instead of any other interaction mode after the onset of the conflict increases by 3 pp in the rest of Europe and by 13 pp in neighbouring countries.

Acknowledging significant responses of government-related entities (GOV, IGO), actors from civil society (CVL, NGO) and the economy (BUS, LAB) in neighbouring countries, the question remains how persistent these responses are. This evolution of cooperation is explored in an extended event-study design, which estimates weekly dynamics from 24 February 2022 relative to the 8 weeks before. Focusing on material cooperation, most major stakeholders exhibit significantly elevated attention levels for the first 6 weeks (top right panel in Figure 7) – they redirect their material cooperation from other recipients towards refugees. In terms of substituting material cooperation for less supportive interactions (bottom right panel in Figure 7), we see a notable decline in heightened material cooperation probabilities for business actors over time.[13] Whereas on average, government and business actors display similarly elevated cooperation patterns (cf. Figure 6), business stakeholders' engagement vanishes after two months.[14] Contrasting inter-governmental organisations (IGO) with



BUS	Business	GOV	Government	MED	Media
COP	Police forces	IGO	Intergovernmental organisations	MIL	Military
CVL	Civilian individuals or groups	LAB	Labour organisations	NGO	Non-governmental organisations
ELI	Elites	LEG	Legislature		

FIGURE 6 Event-study results by interaction mode and actor. 95% confidence intervals depicted. Reference group is unknown/other (not included in graph).

non-governmental organisations (NGO), we observe rather volatile elevated cooperation levels of the former and mostly insignificant smaller cooperation shifts for NGOs. Relative to verbal cooperation dynamics, material cooperation tends to decline more slowly for most stakeholder groups.

CONCLUSION

The exodus of Ukrainian citizens, amounting to approximately 12% of the overall population in just 2 months, is arguably the most severe humanitarian challenge originating within Europe in the last few decades. Depending on the further development of the underlying military conflict, this situation may persist for many months or even years to come.

Understanding how such large-scale refugee migration is received in other countries is an integral aspect of designing suitable policies and thus relevant for decision-makers across the continent. Recent experiences related to the influx of asylum seekers from non-European countries show that levels of public support may erode over time. Eventually, adverse reactions amongst the population of host societies may ensue and create fragile socio-political

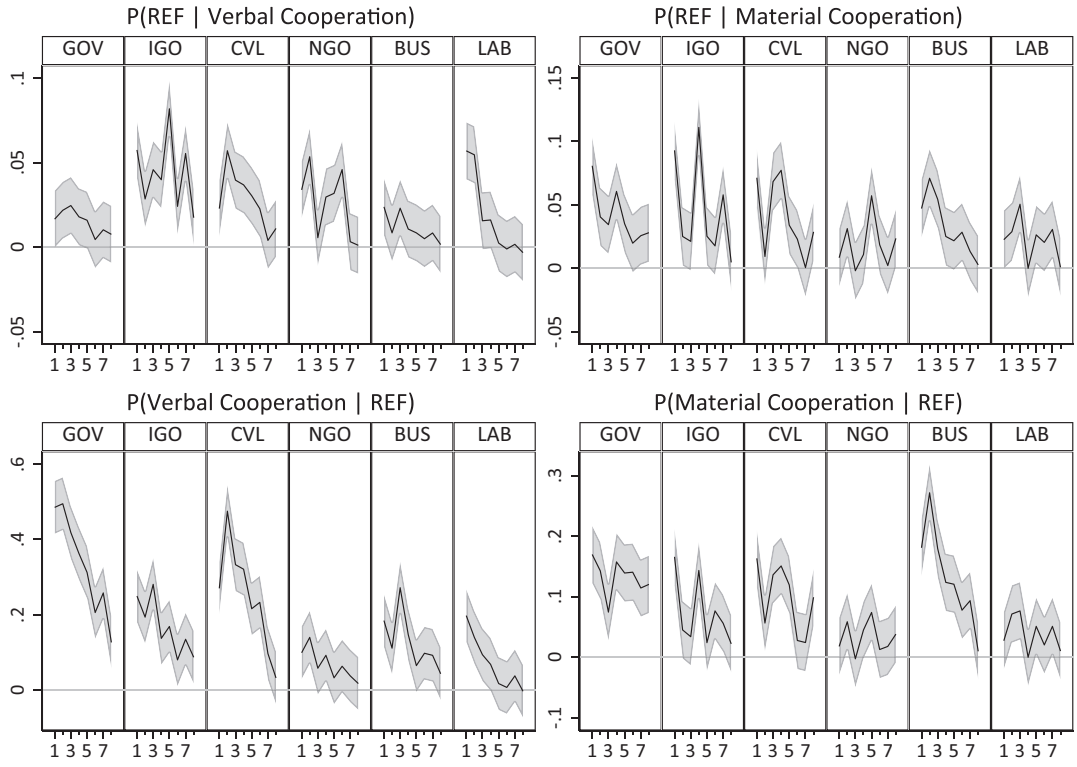


FIGURE 7 Evolution of cooperation in neighbouring countries for major stakeholders. Results indicate week-specific changes in cooperation probabilities relative to the 8-week period before the outbreak of conflict. Sample size is $C \times T \times A = 9{,}408$. Estimates are retrieved from complete interactions of stakeholder groups and conflict weeks (depicted on the horizontal axis). 95% confidence intervals reported.

outcomes. Typically, such developments tend to be observed only with a substantial delay, which makes more immediate interventions hardly feasible.

Implementing an event-study framework, drawing on daily updates of interactions covered in news outlets around the globe, this research provides timely insights into how societal stakeholders adjust their behaviour when it comes to interactions with refugees.

Three main findings emerge: First, despite intensifying tensions between Ukraine and Russia, hardly any societal stakeholders expected and prepared for any notable humanitarian migration streams originating from Ukraine. Before the end of February, observed daily interactions with refugees remained in the single-digit range and can be attributed predominantly to governmental actors.

Second, in some of Ukraine's neighbouring countries, support for refugees peaked already 1 week into the conflict. Observed events of cooperative behaviour are less frequently directed at refugees afterwards. For most other countries, relative support levels either plateaued after 2 weeks or showed signs of a decline after 3 weeks. Continuous inflows of refugees suggest that this cannot be rationalised by a declining need for support. Diminishing support levels are, however, in line with findings on *compassion fade*, illustrating that higher numbers of individuals in need can negatively impact helping intent or behaviour (Butts et al., 2019). With more refugees arriving, perceived per victim contributions diminish and are seen as less beneficial to potential providers of support (Erlandsson et al., 2014). Due to vanishing attentional focus in the presence of a continuously increasing refugee group, empathic concern and thus support levels may fall further (Dickert & Slovic, 2009). This may be reinforced by *issue fatigue*, triggered by the regular presence of refugees in the media, which lowers audiences' willingness to engage with an issue (Gurr & Metag, 2021; Song et al., 2017).

A third finding pertains to the driving societal forces behind the observed responses to refugee migration: Whilst governments are key players, for example by defining immigration rules and providing support, businesses and civil society stakeholders are important actors as well. For Ukraine's neighbours, it is actors from the business world who showed the strongest responses in terms of engaging more frequently with refugees. More importantly, these strong adjustments seem not solely focused on verbal cooperation but manifest in more frequent material cooperation with refugees. To some degree, this may originate from a desire to provide help by utilising available space to host refugees or provide support to organise private accommodation (IOM, 2022). This can be driven by a phenomenon, called CEO activism, where business leaders take on the role of moral leaders by advancing social non-profit goals (Branicki et al., 2021). Yet more strategic considerations could play a role too: Providing (temporary) support to refugees may facilitate their integration and allow employers to tap into an emerging labour market segment to address labour shortages (Daunfeldt et al., 2019; Wikström & Sténs, 2019).

Considering the documented peak support across all societal stakeholders in the first 3 weeks of the conflict, an essential question is whether elevated levels of cooperative behaviour will be maintained by the main societal actors. Empirical evidence suggests that initially enthusiastic material support from businesses may vanish over a period of 2 months. Governments and inter-governmental organisations tend to have more staying power. This illustrates the need for continuous monitoring and coordination of various stakeholders when support must be provided over an unknown time horizon.

Eventually, the implemented event-study design can be used to establish such a continuous monitoring system to gauge the sentiment towards vulnerable migrant groups and to track support levels amongst societal stakeholders in host countries. The global perspective of the underlying data source implies that the presented methodology can be easily adapted to investigate the evolution of cooperation and support levels abroad in response to any major conflict or humanitarian crisis around the globe. Since these support dynamics are derived based on national and international news in 100 languages, such near-real-time monitoring can be applied to countries and crises, which have been often overlooked or lost their presence in national news. Another extension of this work could shed light on how support dynamics and conflict intensity are related. This would allow us to carve out how responsive various stakeholders are to escalating conflicts within their sphere of interest. A refined understanding of how societal stakeholders raise or reduce their support levels, and how they reciprocally adjust their engagement, may facilitate the planning and coordination of relief measures to improve outcomes for displaced individuals locally and globally.

CONFLICT OF INTEREST

There are no conflicts of interest.

PEER REVIEW

The peer review history for this article is available at https://publons.com/publon/10.1111/imig.13071.

DATA AVAILABILITY STATEMENT

DATA ACCESS

All data used in this research originates from the publicly accessible Global Database of Events, Language and Tone (GDELT v2.0, https://www.gdeltproject.org/). Direct access to the event database material can be obtained via the respective website (https://blog.gdeltproject.org/gdelt-2-0-our-global-world-in-realtime/).

To replicate the presented findings both the English and Translingual files are required. The 15-minute data compilation intervals imply that for each day 192 files are needed in total. Batch downloads can be set up by directly navigating to the respective download source addresses: http://data.gdeltproject.org/gdeltv2/YYYYMMDDhhmm00.export.CSV.zip for events retrieved from English language news; http://data.gdeltproject.org/gdeltv2/YYYYMMDDhhmm00.translation.export.CSV.zip for events obtained from machine-translated news sources.

The dates to be inserted follow the usual conventions. The only valid inputs for minutes are 00, 15, 30, or 45. To obtain further information on the underlying news items, the mentions files can be accessed by replacing export with mentions in the above syntax.

DOCUMENTATION MATERIAL

In addition to the descriptions on the respective websites, the essential documentation material can be found in the following two documents:

- GDELT 2.0 Event Database Codebook (on the GDELT website), proving information on the detail and structure of the event data base.
- CAMEO Conflict and Mediation Event Observations Event and Actor Codebook (Schrodt, 2012), with a complete overview of actor, role and interaction definitions.

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ENDNOTES

[1] This includes languages of countries in Eastern Europe, such as Polish, Slovak, Hungarian, Romanian, Ukrainian and Russian.

[2] CAMEO stands for Conflict and Mediation Event Observations.

[3] The GDELT variable names are: Actor1Type1Code and Actor2Type1Code to identify actor groups; Actor1CountryCode and Actor2CountryCode to retrieve their country affiliation; QuadClass and EventRootCode provide details on the type of interactions; SQLDATE and ActionGeo_CountryCode yield time and location of an event.

[4] This collection includes in addition to the English language event data sets the GDELT translingual data sets, which comprise events retrieved from machine-translated news.

[5] Assigning an actor with an unknown country affiliation to the country where they are active allows inferring something about the general climate towards refugees in the respective country. Solely event-based country affiliation procedures have been tested as well. Results across various specifications were found to be robust and are available upon request.

[6] The direct neighbours are: Poland, Slovakia, Hungary, Romania, Moldova, Belarus and Russia. The other European countries are: Albania, Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Kosovo, Latvia, Lithuania, Luxemburg, North Macedonia, Malta, Montenegro, Netherlands, Norway, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

[7] Full results are available upon request.

[8] Depending on the phrasing of a news item, there may be no secondary actor, or the GDELT algorithm failed to retrieve one. As these descriptive statistics and Figure A1 indicate, the general trends are comparable, irrespective of how refugee interaction events are defined. Further checks suggest that major events are reported across multiple news sources, countries and languages. This raises the probability of a correct recipient identification drastically. For conceptual reasons, the main analyses focus on events with refugees as recipients.

[9] Figure A1 (in the appendix) shows the corresponding graphs for the share of events with refugees either as main actors or recipients.

[10] 68.3% of event records referring to Moldovan primary actors are translated from Romanian, the country's main language. For Romania, this share amounts to 62.7%. The prime source of retrieved Romanian event records is Romanian webpages, as identified by the country's internet top-level domain (.ro). 32.7% of Moldovan event records were retrieved from websites with the country's top-level domain (.md), slightly below the share of sources from commercial top-level domains (.com).

[11] The prominence of non-government actors in Hungary is plausibly related to the government's restrictive views on immigration, culminating in regular 'pushbacks', which have been ruled unlawful by the European Court of Justine (ERC, 2020).

[12] Figure A4 provides a descriptive overview for Ukraine's neighbours.

[13] Real-world examples of material cooperation are the provision of accommodation by a logistics company, an airline offering free transportation, or aesthetic dentists offering free emergency treatments.

[14] A similar observation can be made for non-neighbouring countries (Figure A.6).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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