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THE DIFFUSION OF ATROCITIES: A SPATIAL ANALYSIS ON THE ROLE OF REFUGEES

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Introduction

Whereas relations between states have always been the central topic in the field of international relations and in the study of conflict and the occurrence of violence, much academic research on the occurrence of atrocities has treated this phenomenon primarily as an 'internal' issue, assuming that the causes of atrocities and violence is primarily due to domestic factors. For example, Hultman (2007) examines whether the deliberate perpetrated violence against civilians is related to the performance of rebels on the domestic battlefield. Also Valentino, Huth, and Balch-Lindsay (2004) have focused primarily on domestic level variables such as regime type as a key explanatory factor, arguing that democratic norms are the key restraint against the killing of civilians.

The implicit assumption of these studies is that violence against civilians is mostly driven by processes occurring within the state's territorial boundaries. Although we do not deny the influence of these domestic processes, we are of the opinion that the field is flawed by a too narrow vision of what constitutes the occurrence of atrocities: individual states are treated as isolated units, unaffected by atrocities and actors in other states (Gleditsch 2009, 595). One important factor that is overlooked due to this 'closed polity' view is the possible effect that refugees can have on the spread of atrocities across borders. Refugees can transport weapons, spread violent ideologies, change the power balance between ethnicities, and inspire other people to rebel. Consequently, it is hypothesized that they can increase (pre-existing) tensions and the likelihood of atrocities in the host country. Refugees are in this respect then also not only considered as a terrible consequence of violence, but rather as a possible cause for the spread of it. Of course, we realize that the vast majority of refugees never directly engage in political violence. However, although we might not like the idea, we should regard the possibility that refugees might be the catalyst of human right abuses across territorial boundaries.

Although not specifically focused on the occurrence of atrocities, many researchers have presented evidence that seems to indicate that the presence of refugees from neighboring countries leads to an increased probability of conflict diffusion (e.g. Brown 1996; Gleditsch 2007; Salehyan and Gleditsch 2006). Even if we would assume that conflict goes hand in hand with the occurrence of atrocities against the civilian population, current investigations of the linkage between conflict diffusion and refugees suffer from some important methodological problems. Some studies have ignored the spatial context of conflict by focusing primarily on domestic conditions enhancing the occurrence of civil war. Other studies have ignored the temporal aspect of the diffusion of conflict. Fortunately, recent advances in spatial analyses and spatial econometrics offer opportunities for significant empirical and theoretical advancement in this respect (Raleigh, Witmer, and O'Loughlin 2009, 4).

To fill this scientific niche in research on the occurrence of atrocities, in this study we examine whether the presence of refugees from neighboring countries influence the probability that a country experiences human right abuses against the civilian population. We do so by employing the spatial lag model that includes a temporal component, as is developed by Franzese and Hayes (2009). The spillover effects of atrocities are in our application weighted by several different spatial matrices: a border length matrix together with a matrix composed of the absolute number of refugees. The statistical analysis is focused on African continental countries during the period of 1995-2010. This continent seems more prone to conflict and violence than others (Coeffler and Hoeffler 2002). Any disruption in security is especially threatening to the African populations, who are already living at the margins (Herbst 2004). Understanding the circumstances under which refugees can increase the likelihood of the occurrence of atrocities is then also crucial to help with creating better policies for managing relevant security concerns (Salehyan and Gleditsch 2006, 339).

This article proceeds as follow. First, we articulate the mechanisms through which refugees might contribute to the spread of atrocities and discuss previous research. The section that follows, describes the method and research design of this study. We then analyze the variation in atrocities with the spatio-temporal-lag model as described by Franzes and Hayes (2009). Finally, we conclude with a discussion of the results and their relevance.

Refugees as a Domino Effect

Although there is relatively little academic literature specifically on refugees and their influence on the spread of violence, there is now a growing body of work about the internationalization of conflict more broadly (e.g., De Silva and May 1991; Midlarsky 1992; Brown 1996; Carment and James 1997; Lake and Rothchild 1998). This body of work has identified refugee flows as one of the factors that might contribute to the cross-border spread of conflict.[1] The idea that refugee flows across national boundaries and internal displacement have influence on the spread of conflict stands in contrast with previous research, which consider refugee flows as the unfortunate consequences of violence and a humanitarian dilemma, rather than as part of the conflict dynamic itself (Salehyan 2007, 127-128).

Weiner (1992, 94) was among the first to emphasize the linkage between international migration and security consequences. He, for example, emphasized that migration (economic migration and refugee flows) might cause conflict in cases where migrants mobilize against their home country. When their home country retaliates, the conflict can even escalate into a full-scale international war. Lake and Rotchild (1998, 30) for example explain, "it can lead to recriminations between the two affected states, and in cases of 'hot pursuit', direct border clashes that may spiral out of control." The idea that refugees might sometimes turn into combatants, also called 'refugee warriors', is not a new concept. Zolberg, Suhrke, and Aguayo (1989) were among the first to argue that refugee communities frequently become prime recruitment areas for combatant groups. Refugees have often grievance against the state from which they fled. These grievances in combination with the few prospects for education, livelihood opportunities, or freedom of movement, lead many young people in protracted refugee situations have few opportunity costs for joining a rebel or terrorist movement (Salehyan 2007, 132; Betts and Loescher 2011, 16). In recent years for instance, Western governments have identified the refugee camps that host Palestinian refugees in the Middle East or Somali refugees in East Africa or Afghan refugees in Pakistan as a source of Islamic radicalization and of recruitment for terrorist cells (Betts and Loescher 2011, 16).

[1] Of course, there are many other possible factors that might increase the likelihood of the spreading of violence and conflict. Some of the factors, such as particular issues or actors, form a direct link between states. However, in some cases, a civil war in one country may also increase the risk of conflict in other states, even in the absence of these direct functional links.

With the end of the Cold War and the decline of external support, the phenomenon of refugee warriors has even proliferated (Whitaker 2003, 214). Increasingly, combatants have integrated themselves among civilian refugees and refugees have become combatants. This does not only violate refugee-protection and human right principles, but can constitute further security concerns such as drug smuggling and trafficking in women and children (Loescher and Milner 2005, 153). In addition, it might cause illegal arms trafficking because the presence of refugees may put pressure at the border in customs, therefore reducing the ability of the receiving country to police and patrol its border and its customs, leading to an increase in the illegal arms smuggling into the host country (Narcisco 2011).

Most of the research on refugee warriors has focused on the effect of these refugees on the home country. However, refugees might also have important security consequence for the host country. Scholars on the spread of civil conflict have identified a series of spillover or external effects of conflicts (Salehyan 2009). Quantitative and qualitative research has, for example, shown that due to transnational ethnic ties, refugee influx can exacerbate previously existing ethnic antagonisms and change the balance of power in the host state by altering the state's ethnic composition (Whitaker 2003, 213; Saideman 2001; Woodwell 2004). Especially, through a 'demonstration effect', conflict in one country can lead actors in other states to update their beliefs about the efficiency and desirability of challenging their won governments (Beissinger 2002, Kuran 1998). This process of diffusion (as termed by Lake and Rothchild 1998) can lead to possible chain reactions in which for example one ethnic conflict causes refugees, who de-stabilize their host state by causing more war, causing more refugees and so on (Fearon 1998, 112). This concern about ethnic balance was made explicit in Macedonia's reluctance to accept Kosovar Albanian refugees in March 1999. Macedonian officials then briefly closed the borders with Kosovo, after the sudden arrival of more than 2 million ethnic Albanian refugees, which threatened the government's fragile coalition between the Macedonian (two-third of the population) and the Albanian (one fourth of the population) (Alter and Power 1999).

Other statistical analyses have emphasized a series of more indirect effects of refugees on the possible likelihood of conflict. Murdoch and Sandler (2002), although not explicating focusing on the effect of refugees, have shown that a civil war reduces economic growth and welfare in neighboring states. There is good reason to believe that migration contributes, at least in part, to these effects (Salehyan 2007, 133). Loescher and Milner (2005, 161) for example, state that competition over scarce resources, especially in the context of declining donor engagement in protracted refugee situations, can also be a source of conflict between refugees and the local population. Besides the effect of refugees on the level of economic growth and the occurrence of civil war, there are also some scholars mentioning the importance of the linkage between refugees and infectious diseases (e.g. Collier et al. 2003).

Modeling Spatial Effects and the Influence of Refugees

Besides many qualitative studies on refugees as a negative externality, such as Loescher and Milner (2005) and Whitaker (2003), quantitative empirical studies primarily focused on unit-level (individual, domestic) factors, ignoring contextual effects and interdependence processes. Other studies have adopted the so-called context-conditional approach, in which the possible spatial dependence is modeled in such a way that the exogenous-external conditions affect units' outcomes but unit's outcomes do not directly affect other units' outcomes (Franzese and Hayes 2008, 752). A good example of such a contextual-conditional approach is the study conducted by Salehyan and Gleditsch (2006). In this study, the authors model the number of refugees that a state receives from neighboring states as an independent variable in their analysis. Consequently, the occurrence of conflict depends among others on the refugee context but this context remains exogenously external to the dependent variable. However, in truly interdependent processes, an outcome in some units directly affects other units' outcomes, implying some feedback. Ignoring (in the case of primarily focusing on unit-level explanations) or inadequately modeling of interdependence processes (in the case of modeling the context exogenously external to units) leads to the misestimation (usually overestimation) the strength of interdependence at the expense of unit-level factors (Franzese and Hayes 2008, 752). At the same time, simply controlling for spatial-lag processes, as is done by Salehyan and Gleditsch (2006) introduces simultaneity biases, often exaggerating interdependence effects and understating domestic/unit-level, exogenous-external, and context-conditional impacts (Franzese and Hayes 2009, 244).

Those empirical studies that have tried to capture this spatial and possible temporal inter-dependence and to solve the so-called Galton's problem generally fall into two general approaches: a data-driven and a theory-driven approach (Franzese and Hays 2007). The first approach treats spatial and temporal dependences as a data problem and seeks to correct rather than estimate it. Models that fall into this category are, for example, semi-naïve models (such as panel-corrected standard errors) or spatial-error models in which spatial dependence is in generally treated as a stochastic component attributable to unmeasured covariates only. The weakness of these kinds of models is that inter-dependence among units of analysis can only have an effect through inter-related error terms. For example, if the amount of atrocities in country *i* changes because of a parameter that is not modeled, it affects the amount of atrocities in country *j*. However, when it changes because of a modeled parameter, this would have no impact on neighboring countries.

Theoretically-driven spatial models, in contrast, such as the spatial lag regression model, aim at explicitly modeling and estimating spatial and/or temporal effects. It differs from the spatial error model in that both the error terms and the covariates in nearby units impact the current unit (Beck, Gleditsch and Beardsley 2006, 30). In this model, the spatial autocorrelation is accounted for by the disturbance in the lagged dependent variable weighted by the connectivity matrix. As Beck, Gleditsch and Beardsley (2006) conclude, this makes the lagged dependent variable model more preferable for estimating social theories.

Franzese and Hayes (2009) developed a specific type of a spatially lagged model (a refined version of the spatial maximum likelihood model), a spatio-temporal lag model with multiple spatial weights matrices, which helps to reduce bias by allowing to explicitly model all the sources of the interdependence. This model is able to jointly estimate unit-level effects (e.g. country-specific variables), temporal effects, as well as the effect of the interdependence among units. This model can be written in matrix notation as follow:

$$\mathbf{y} = \rho\mathbf{W}\mathbf{y} + \varphi\mathbf{M}\mathbf{y} + \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\varepsilon} \tag{1}$$

Where $\mathbf{y}$, the dependent variable is an $NT \times 1$ vector of cross sections stacked by period. ρ is the spatial autoregressive coefficient, and $\mathbf{W}$ is an $NT \times NT$ spatial weighting matrix (also called the higher order data). Consequently, $\mathbf{Wy}$ is the spatial lag, reflecting the spatial connectivity between each unit of observation. $\mathbf{My}$ is the yearly time-lagged dependent variable, with φ its coefficient. The matrix $\mathbf{X}$ contains NT observations on k independent variables, with $\boldsymbol{\beta}$ their $k \times 1$ vector of coefficients. $\mathbf{X}\boldsymbol{\beta}$ is then also the nonspatial component (or the so-called lower order data) of the model formed by domestic unit-level factors of the host country j that determine the number of perpetrated atrocities. Finally, $\boldsymbol{\varepsilon}$ is a $NT \times 1$ vector of stochastic components, assumed independent and identically distributed.

Data Measurement and Operationalization

To implement a spatio-temporal lag model with multiple spatial weights matrices, it is necessary not only to define the lower order data, i.e. the independent variables included in our analyses, but also and perhaps even more important the higher order data in the form of different weighting matrices. Carefully and accurately specifying $\mathbf{W}$, the spatial weighting matrix, is then also crucial for modeling correctly patterns of relative interconnectivity. In this application, we model the interdependence with two different weighting matrices: $\mathbf{W_1}$ and $\mathbf{W_2}$

The first weighting matrix, $\mathbf{W_1}$, compromises a standard matrix, in which the amount of kilometers of border length between countries is coded. The data on the exact border length between countries is coming from the CIA World Factbook and was coded manually. This spatial weighting matrix is based on the assumption that the likelihood of refugees fleeing into a host country is partly determined by the length of border with the country of origin. Those countries that do not share a border receive a value of 0. The maximum amount of border length shared by African countries is more than 10.000 kilometers, this is solely due to the Democratic Republic of the Congo. See Table I for more descriptive statistics on this weighting matrix. Note, that although theoretically the border length weighting matrix is a $N \times N$ matrix (assuming that border lengths do not change over time), practically for the implication of the spatio-temperol lag model, this matrix is transformed into a $NT \times NT$ matrix.[2]

The second spatial weighting $NT \times NT$ matrix used in the analyses, $\mathbf{W_2}$, weights the amount of refugees coming from country i in period t and being host by country j in that same period, relatively to the total amount of refugees from that year. The information on the number of refugees comes from the United Nation High Commissioner for Refugees (UNHCR) Statistical Online Population Database. This online database provides data and trends on the "Population of concern to UNHCR" in more than 150 countries, among others the amount of refugees. Detailed information on country of asylum and origin is listed, for some population categories going back to 1951, the year UNHCR was created. The annual data contains dyadic records of refugee stocks, organized by the origin and asylum countries. For example, the dataset contains information on the more than 2.2 million people that fled Rwanda to neighboring countries in 1994. See Table I for more descriptive statistics on the refugee weighting matrix.

Note that all the weighting matrices are row-standardized before used in the analysis. This does not change the relative dependence among neighboring countries, but it does change the total impact of neighboring countries across observations.

Table I. Descriptive statistics of the higher order data

Weighting Matrices	Obs.	Min	Max	Mean	Std. Dev.
$\mathbf{W_1}$; $N \times N$ border length matrix	2916	0	10730	3017	2305
$\mathbf{W_2}$; $NT \times NT$ refugee matrix	52488	0	2256984	58704	156071

Our lower order data consist of the regular variables necessary to build our models, i.e. our dependent and independent variables (see Table II for the descriptive statistics). Data on the dependent variable, the number of atrocities against the civilian population, comes from the Political Instability Task Force (PITF) worldwide atrocities dataset.

[2] A good example, in which the border length changes, is in the case of South Sudan. However, for the sake of simplicity, we have treated this new country as being part of Sudan.

This event-dataset describes, in quantitative terms, the deliberate killing and harming of individuals who may be combatants in a different context, but who at the time they were killed or harmed were unarmed and unable to defend themselves, in the context of a wider political conflict. The current version covers January 1995 to April 2011 and includes about 6500 events. For our dependent variable, we collapsed this dataset on the country-year level, resulting in 779 observations across 54 African countries. In cases where there was a so-called 'campaign', i.e. a set of reportedly related atrocities perpetrated by members of a single organization or by multiple organizations reportedly acting in concert, over a distinct period of time within a single country, the number of events were averaged over the distinctive years. The number of atrocities resulting in the death of civilians in the host country forms our main dependent variable. However, some of our models are focused on injured civilians in host countries or on the total number of civilian victimized (death and injured together).

Taking refugees into account may explain part of the diffusion of atrocities. However, other state and spatial attributes might also have an effect. To avoid bias in the estimated coefficients, we included several variables that are identified in the general literature on atrocities, for having an effect. Firstly, the strategic literature on the occurrence of one-sided violence argues that atrocities against the civilian population especially occur when warring parties are desperate to win (Downes 2006). Targeting the noncombatant population allows these warring parties to continue fighting, reduce casualties, and possibly win the war by coercing the adversary to quit. One of the indicators for this "desperation idea" is battlefield losses (see for example Hultman 2007). The more members of warring parties are killed, the higher their level of desperation and the more likely they will target the civilian population. Battlefield losses are conceptualized in the amount of battle-deaths per country-year. In our analyses we included the logged number of best estimated amount of battle-deaths per country-year of the host country as well as that of the neighboring countries. These two measures were constructed on the basis of the UCDP Battle-Related Deaths Dataset, version 5 of 2011.

Secondly, also related to the strategic idea on the occurrence of atrocities, we include the number of active rebel groups involved in the conflict per country-year. This number might complicate the bargaining process: when several groups are competing with each other or with the government, it can create a process of intra-group competition for the support of the civilian population. This competition might lead to violence against the noncombatant population if they are considered to be (potential) supporters for opponents. Eliminating these potential supports, also called the 'fifth column', reduces not only the strength of opponents, but also decreases the likelihood that civilians revolt in an army's rear area, as well as potential revolts that might occur later on (Downes 2006). We coded the number of rebel groups per conflict per country-year on the basis of the UCDP/PRIO Armed Conflict Dataset version 4, 2011. Some countries had no active rebel groups, while others had a maximum of 3 groups present. In addition, we used this dataset to construct a variable measuring the number of rebel groups in neighboring countries. See Table II for some descriptive statistics on these variables.

Although, atrocities against the civilian population does not necessarily have to take place in the context of an armed conflict, Eck and Hultman (2007, 237) found that less than 1% of the total civilian fatalities take place in conflict divided countries. To include these conflict dynamics on the occurrence of violence against civilians, we used the UCDP/PRIO Armed Conflict Dataset (version 4) to construct a variable counting the <u>number of intrastate wars</u> in neighboring countries. This variable ranges from 0 to 7, with a mean of 1.023. See Table II for more descriptive statistics.

We also include a variable measuring the <u>total country population (logged)</u>. It is hypothesized that the larger the population size of a specific country, the more likely a conflict occurs, resulting in refugee flows. Furthermore, as a 'gravity model' of international migration would suggest, refugees may be especially likely to migrate to larger countries (Salehyan and Gleditsch 2006, 354). The data on the population size per country-year comes from the World Development Indicators (WDI) collected by the World Bank. This dataset is also used for the construction of the variable capturing the <u>natural log of the gross domestic product</u> (GDP) per capita. We included this particular indicator because we expect that refugee flows are more likely to spread violence in weak host states. The governments of such states, lack the capacity either to resettle the refugees or to force them to abandon their armed struggle to avoid retaliation by their state of origin (Atzili 2006, 152). Consequently, we expect fewer atrocities taking place in host countries with a relative high GDP per capita. In addition, conflict research has shown that civil conflicts are less likely to occur in wealthier states (see for example, Fearon and Laitin 2003). Descriptive statistics on both macro-level indicators can also be found in Table II.

Furthermore, we include in our analyses a variable capturing the importance of ethnicity. In situations where the refugee-generating conflict has ethnic dimensions, a high level of polarizations of ethnic identities in the host country may contribute to violence and instability. To capture this possible mechanism we include the standard variable measuring the amount of ethnic fractionalization of the host country. For this, we used Alesina's et al. (2003) measurement for ethnic fractionalization that ranges between 0 (non-ethnical fractionalized country) and 1 (highly fractionalized country).

Lastly, we control for regime type. Scholars who evoked democracy as an explanation of human right abuses, however, disagree over the effect that it has, and this dispute reflects the norms versus institutions divide in the broader democratic peace literature (Downes 2006, 159). According to some scholars, democracies – which adhere to liberal norms that proscribe killing innocent civilians, are less likely to target civilians than non-democracies which are not so constrained. Studies of democratic institutions, however, imply just the opposite: democracies could be more likely to target noncombatants because the vulnerability of leaders to public opinion makes them wary of incurring heavy costs in the battlefield for fear of losing support home. This fear could compel democratic elites to target noncombatants to avoid costs or to win the war quickly (e.g., Reiter and Stam 2002; Downes 2006, 153-154). In addition, a country whose political climate is characterized by collapses or deteriorating state that lacks popular legitimacy may be more vulnerable to conflict in the event of a refugee influx. To control for the effect of regime type, we used the Polity 4 data, which contains an institutionalized democracy scale ranging from -10 for the least democratic political system to value of 10 for democratic polities. In the analyses, we include a term for a country's Polity score as well as its square to control for the inverted U-curve hypothesis, i.e. the idea that the risk of conflict and violence is the highest in states that are not fully democratic but also not quite autocratic (see for instance, Hegre et al. 2001). See Table II for the descriptive statistics of these lower order data.

Table II. Descriptive statistics of the lower order data

Variable	Obs.	Min	Max	Mean	Std. Dev.
No. killed host country	972	0	107831	358.45	4780.84
No. killed neighbouring countries	972	0	120098	2640.68	14369.72
No. injured host country	972	0	24589	88.24	851.37
No. injured neighbouring countries	972	0	24745	385.01	1512.45
No. total victimized host country	972	0	107874	445.69	4881.49
No. total victimized neighbouring countries	972	0	120376	3025.68	14472.41
Polity	867	-9	10	0.54	5.35
Polity squared	867	0	100	28.89	25.77
No. rebel groups	918	0	3	0.32	0.70
No. rebel groups in neighbouring countries	972	0	13	1.61	2.13
No. civil wars in neighbouring countries	972	0	7	1.02	1.25
GDP per capita (log)	874	14.39	23.02	21.62	1.06
Population size (log)	901	11.23	22.72	15.70	1.65
No. battle deaths host country	972	0	50000	246.47	2274.62
No. battle deaths neighbouring countries (log)	972	0	53400	1326.60	4514.27
Ethnical fractionalisation	884	0	0.93	0.63	0.25

Analyses and Preliminary Results

Before turning to the preliminary analyses and results, it is worth mentioning that estimation of the spatio-temporal lag model with multiple spatial weights matrices is computationally intense, especially in combination with pooled time-series data (repeated observations on fixed units).[3] This task is further complicated by the space, memory and speed limitations of the available statistical software. The models show below should then also be considered as first attempts to apply this specific kind of spatial analyses to the study of refugees and atrocities. In all calculated models, we have used two weighting matrices: the $N \times N$ matrix, $\mathbf{W_1}$, which captures the amount of kilometers of border length between countries (see Rho 2 in the tables below) and the

[3] We used the Stat spreg command developed by MacMillan, Franzese and Hayes (2009).

$NT \times NT$ weighting matrix, $\mathbf{W_2}$, which captures the amount of refugees coming from one country going to another (see Rho 1 in the tables below).

Table III shows the first few computed spatial models. All three models are focused on examining the influence of those independent variables that are spatial determined on the level of atrocities in the host country. The difference between the three presented models lies in the dependent variable. In the first model, we focus on explaining the variation in the number of civilians killed in the host country, in the second model we have focused on the number of injured civilians, and the last model is focused on the total amount of civilians killed and harmed in the host country. Note that coefficients in the presented models cannot be directly interpreted. They represent the (usually unobservable) pre-interdependence impetuses to outcomes from each independent variable (Hayes et al. 2010, 15). Their effects are usually interpreted through the effects of counterfactual shocks to some units of themselves or other units over time. Consequently, we focus in our analyses on the direction of the effect and whether it is statistical significant.

Table III. Preliminary spatial analyses focused on the spatial dependent variables

Models:	Model 1:	Model 2:	Model 3:
Variables:	Death	Injured	Total
Constant	0.456***	0.495***	0.563***
	(0.115)	(0.093)	(0.128)
No. killed neighbouring (log)	0.118***		
	(0.035)		
No. injured neighbouring (log)		-0.0004	
		(0.033)	
No. total neighbouring (log)			0.092**
			(0.036)
No. battle deaths neighbouring (log)	-0.063*	-0.015	-0.050
	(0.037)	(0.032)	(0.042)
No. rebel groups neighbouring	0.193*	0.211**	0.238**
	(0.101)	(0.087)	(0.111)
No. of civil wars neighbouring	0.245	0.037	0.190
	(0.177)	(0.153)	(0.194)
Rho 1: Refugee matrix	0.176***	0.087**	0.162**
	(0.041)	(0.043)	(0.041)
Rho 2: Border length matrix	-0.095*	0.029	-0.059

	(0.054)	(0.053)	(0.053)
Sigma	2.161***	1.862***	2.374***
	(0.049)	(0.042)	(0.054)
N	972	972	972
Log-Likelihood	-2128	-1984	-2220
AIC	4272	3984	4456

Note: Standard errors in parentheses. ***Significant at the .01 level; **Significant at the .05 level; * Significant at the .10 level.

The first model in Table III has a dependent variable the number of killed civilians (log) in the host country. In order to explain the variation in this measure, we first examine those variables that are spatial distributed. One important variable that might explain this variation is the number of killed civilians in neighboring countries. This variable is positive and significant on the 0.01 level. In other words, when the number of civilians killed in neighboring countries increases, the amount of civilians killed in the host country also increase. This outcome confirms our expectations. Furthermore, we have included a variable measuring the number of battle deaths in neighboring countries. This variable has a negative coefficient and is statistical significant. The negative coefficient of -0.063 indicates, that the more battle related deaths in neighboring countries, the fewer civilians are killed in the host country. One explanation of this puzzling result might be that the more battle related deaths in neighboring states, the more intense the conflict is. An intense conflict might result in fewer civilians daring to flee the area to a safer host country. Another possible explanation might be that because large numbers of combatants are killed, fewer combatants with weapons are hiding among the refugee population. This in turn would then diminish the amount of atrocities occurring in the host country. Further analyzes should examine these possibilities.

Additionally, we controlled for the amount of rebel groups active in neighboring countries. We hypothesized that the more groups are present, the more they compete for civilian support, which might result in the killing of the so-called 'fifth column'. The number of rebel groups in neighboring countries has a positive and statistical significant influence on the number of killed civilians in the host country, which again confirms our expectation. Also included is a variable, measuring the number of civil wars in neighboring countries. This variable has a positive but not significant effect. We have also tested for the effect of the two spatial weighting matrices and for the temporal effect. Rho 1 and Rho 2 are the two spatial weighting matrices used in the analyses. Both spatial matrices are statistical significant, indicating that analyzing the amount of killed civilians in a host countries has indeed a spatial component. The positive coefficient of the refugee weighting matrix indicates a positive interdependence between the amount of refugees and the number of civilians killed. This confirms our general expectation that refugees have an impact on the spread of violence. The coefficient of the second weighting matrix is negative, primarily due to the amount of zeros, i.e. many countries do not share a border with each other.

In addition, the temporal lag is highly significant, meaning that the data has a clearly time trend.

In the third column of Table III, the dependent variable has changed. Instead of trying to explain the amount of civilians killed, atrocities is defined as the number of injured civilians in the host country. Like the previous model, the amount of rebel groups in neighbouring countries have a positive influence on the amount of injured civilians in the host country. However, all other spatial determined variables have lost significance. We presume that this is because of the lack of variance in the dependent variable. In addition, it might be the case that the number of injured civilians is only recorded whenever information on civilian killings is available. It is important, however, to note that even though the general significance level has declined, the refugee spatial weighting matrix (Rho 1) and the temporal lag is still significant.

The last model presented in Table III attempt to explain the variation in the total amount of killed and injured civilians in the host country. However, this model does not show any major difference with the previous two models. The number of total victimized civilians in neighbouring countries has a positive and significant influence on those victimized in the host country. Also the number of rebel groups active in neighbouring countries has again a positive and significant effect on the total amount of victimized civilians in the host country. In addition, the refugee weighting matrix and the temporal lag is again of importance in explaining this variation.

In Table IV, we have estimated several additional models, each explaining the variation in the number of killed civilians in the host country. We focus on this particular dependent variable because this measure of atrocities show not only the most amount of variation but has also a high number of observations, which is important for calculation of the different spatial temporal lag models.

Table IV. Preliminary spatial analyses on the role of refugees in the spread of civilian killings

Models: Variable:	Model 4: Macro	Model5: Strategic	Model 6: Complete	Model 7: Significant
Constant	-6.935***	0.329***	-5.885***	-5.314***
	(1.774)	(0.101)	(1.504)	(0.719)
No. killed neighbouring (log)		0.096***	0.055	
		(0.032)	(0.033)	
No. rebel groups		0.919***	0.704***	0.705***
		(0.187)	(0.185)	(0.182)
No. rebel groups neighbouring		0.161*	0.172**	0.187***
		(0.086)	(0.083)	(0.047)
No. battle deaths (log)		0.279***	0.291***	0.293***
		(0.054)	(0.053)	(0.053)
No. battle deaths neighbouring (log)		-0.070**	-0.077**	-0.0751**
		(0.033)	(0.033)	(0.031)
Polity	0.002		0.024*	0.030**
	(0.015)		(0.013)	(0.013)
Polity squared	-0.013***		-0.005*	-0.009***
	(0.003)		(0.003)	(0.003)
GDP per capita (log)	-0.015		0.017	
	(0.069)		(0.058)	
Population size (log)	0.556***		0.395***	0.395***
	(0.052)		(0.046)	(0.045)
No. civil wars neighbouring		0.068	0.006	
		(0.150)	(0.147)	
Ethnic Fractionalization	-0.076		0.030	
	(0.330)		(0.288)	
Rho 1: Refugee matrix	0.217***	0.053	0.035	0.0497
	(0.043)	(0.034)	(0.037)	(0.037)
Rho 2: Border length matrix	-0.034	-0.076	-0.058	0.009
	(0.047)	(0.049)	(0.054)	(0.043)
Sigma	2.071***	1.816***	1.731***	1.760***
	(0.050)	(0.042)	(0.042)	(0.042)

N	847	918	847	867
Log-Likelihood	-1819	-1850	-1667	-1721
AIC	3700	3769	3364	3463

Note: Standard errors in parentheses. ***Significant at the .01 level; **Significant at the .05 level; * Significant at the .10 level.

In the fourth model of Table IV, the macro non-spatial model, the amount of civilian killings in the host country is explained with a batch of control variables that are solely focused on the influence of domestic factors. Consistent with earlier studies on the onset of conflict, we find an inverted-U relationship between the Polity score and the number of killed civilians in the host country. The positive coefficient estimate for the Polity and the negative coefficient for the squared term of Polity suggested that both democracies (positive values) and authoritarian governments (negative values on the Polity scale) are less likely to experience atrocities perpetrated against the civilian population. We also found that the natural log of GDP per capita has no significant effect on the amount of the number of killed civilians. In other words, the GDP per capita does not seem to relate to the occurrence of atrocities in that same country. This finding opposes the general idea that countries with a higher GDP per capita are better able to manage the incoming refugees and consequently can diminish the amount of civilian killing perpetrated in their territory. Population size in is contrast to the GDP per capita significant, indicating that the larger the population size the more likely atrocities against the civilian population occurs. Ethnic fractionalization, on the other hand, does not seem to influence the amount of killed civilians in the host country at a significant level. The direction of the coefficient, however, indicate that the more ethnical fractionalization, the fewer civilians are killed. This confirms the theoretical idea that having ethnical dominant group in the country decreases the likelihood of war and violence. Only one of the two spatial weighting matrices seems to have a profound impact on the level of atrocities in the host country, namely the one that takes into account the relative number of refugees. Also the temporal lag is highly significant, indicating that time is an important predictor for the level of atrocities.

The fifth model in the table is focused on testing the strategic logic of the killing of civilians. This strategic logic argues that the killing of civilians might be rational considering the strategic environment in which these act against humanity takes place.

The first independent variable looks at the influence of the number of killed civilians in the neighbouring country. The coefficient of this variable is positive and highly significant. Indicating the atrocities in neighbouring countries is related to atrocities in the host country. Also the amount of rebel groups in the host and neighbouring countries have a positive and significant effect on the number of civilians killed in the host country. Like the other models, the number of battle deaths in the host country has a significant positive impact on the number of killed civilians. However, like in the previous analyses, we find that the number of battle death in neighbouring countries is negative related to the number of civilians killed in the host country. We purposefully excluded the variable measuring the number of civil wars in the host country from the strategic model, because the intra-state war measure is calculated on the basis of the battle-related deaths information. If there are battle-related deaths, then there is civil war, whether minor or major. Note that the two spatial weighting matrices have lost significant and that the AIC value has increased.

The last two models are summarizing the findings of the previous ones. The sixth model, the complete model, includes all variables from the previous models. The results suggest tht our findings are robust. Although some of the variables lose some of their power, because of a decrease in the degrees of freedom, the effect of most variables stay the same. The last model, that is calculated, includes all variables that are significant in the previous models. The significant level of the variables in the full model has increased. However, the AIC value indicates that even though only the significant variables are included in the analyses the strategic model has a better fit.

Conclusion and Discussion

This study is a first attempt to employ a spatial framework to explain the occurrence of atrocities. Instead of arguing that atrocities against the civilian population are primarily due to domestic conditions, such as the presence of rebel groups, we argue that atrocities might also be the result of conditions in neighboring countries. This spatial view on atrocities stands in sharp contrast with the common view in political science, which treats countries and their local conditions somewhat like 'atoms' floating in space (Agnew 1994; O'Louglin and Raleigh 2007, 3).

We assume that refugees are one of the causal mechanisms connecting different countries and causing the spread of atrocities across borders. Refugees can not only transport weapons to the host country, but can spread radical ideologies, change the power balance between ethnicities and serve as an example for those people that want to take up their weapons. Consequently, understanding the role of refugees in the spread of atrocities is essential if we want to explain its occurrence and variation. Only then the policy community can develop and implement effective measures protecting those that need to be protected.

In our examination of the role of refugees in the spread of violence, we have employed a rather new spatial method, the spatio-temperol lag model. In this model, a temporal lag (year) is included together with a spatial element. This spatial part of the model is defined in our application by two separate weighting matrices: one constituting the amount of refugees fleeing from the country of residence to a host country per year and another who takes into account the border length between countries. Consequently, in contrast to other studies, we have not modeled the amount of refugees as a separate independent variable. Rather, we consider refugees as a factor influencing the intensity of the spread of atrocities.

The different calculated models show that it is important to include spatial defined variables in order to explain the variation in civilian killings. The analyzes show that refugees have a significant impact on the amount of perpetrated atrocities. Given the number of observations and degrees of freedom, the strategic model is the best in explaining the variation. The amount of civilians killed in neighboring states, the amount of rebel groups within the host state and neighboring countries, and the amount of battle deaths in the host country have all a highly significant influence. Other variables like ethnic fractionalization and the number of civil wars in neighboring countries are of less importance.

It is important to note that some of the hypothesized causal linkages are less significant than expected. This is primarily due to two reasons. First, the term 'refugee' means different things in different contexts (Betts and Loescher 2011). In the vernacular, the term 'refugee' is often very broad. It is popularity seen by the media and the public as incorporating people fleeing a range of causes including authoritarian regimes; conflict; human rights violations; large-scale development projects;

environmental disasters; resulting from hurricanes, tsunamis, and climate change. However, under international law, a refugee is a person who 'owing to a well-founded fear of prosecution… is outside of his or her country of nationality'. In that sense refugees are defined by a number of aspects – notably being outside the country of origin and fleeing prosecution. This definition is also employed by the UNHCR and forms the basis of their data on refugee flows.

Secondly, using the spatio-temporal lag model requires precise and consistent data. However, this data is not always available in such terms. For example, in this application we have ran models taking into account 54 African countries from 1995 to 2010. However, our dependent variable does not have information on each possible country for each possible year. These 'empty-cells' might cause problems when running the models since the number of observations decreases significantly. It is then also of crucial importance for the development of new spatial model and for their application in conflicts studies that data is collected in a more consistent way taking into account the spatial settings. For example, this study has focused on African countries due to a lack of refugee data on lower levels of analysis. However, it might be interesting to disaggregate our research to the regional level. In addition, it can also be fruitful to extend the current analyses to a Bayesian approach that can handle smaller numbers of observation. However, to our knowledge this has so far not been modeled and applied in political science.

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