

# Do It Yourself Community Security

*A comparative study of vigilante group activity across the  
African continent*

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## 1 Abstract

The provision of security in areas of the African continent governed by fragile states and dominated by frequent conflict is typically seen as limited, if not non-existent. An important question becomes how do people in these areas cope with this situation. Typically, it is assumed that they would either flee or choose to join state forces or rebel groups. Nevertheless, it has increasingly become evident that communities in these areas themselves actually choose to take up arms and provide for their own security by forming vigilante groups. However, comparative research regarding this phenomenon is not widespread, and research tend to lump vigilante groups together with militias and see such community initiatives as solely a project commissioned by governments.

This master's thesis departs from these approaches by arguing that vigilante groups and militias are distinct categories, because of their different aims, and viewing vigilante groups as governments' extended arm limits our theoretical understanding of why such groups emerge.

Testing what drives the emergence of vigilante groups, the thesis uses digitised road maps and the number of violent encounters in neighbouring areas, in order to illuminate how state access and the security environment that communities are situated in affect vigilante group mobilisation. Though since mobilising vigilante groups is, in essence, a form of collective action, it is postulated that the effect of state access and the security environment is conditioned on how able communities are at overcoming the collective action problem. This claim is tested by creating a unique measure that includes data on both social and natural environmental attributes of communities. The validity of this measure is tested using confirmatory factor analysis, and the drivers of vigilante group emergence is examined using a longitudinal hybrid multilevel regression model.

The thesis finds that an all-encompassing measure of communities' ability to conduct collective action based on social and natural factors cannot be established empirically, but instead a measure of institutions ability to facilitate collective action is uncovered. Furthermore, it is only security environments becoming more hostile that significantly affect vigilante group emergence. However, the thesis finds that the effect of state access on vigilante group emergence is conditioned on both social and natural environmental factors, though the findings are not robust to a change in model specification.

## 2 No such thing as an ungoverned space: An introduction

*“Staat ist diejenige menschliche Gemeinschaft, welche innerhalb eines bestimmten Gebietes - dies: das ”Gebiet“, gehört zum Merkmal - das Monopol legitimer physischer Gewaltsamkeit für sich (mit Erfolg) beansprucht”* (Weber 1926: 8)

*“In such condition, there is no place for Industry ... no Arts ... and which is worst of all, continual fear, and danger of violent death; and the life of man, solitary, poor, nasty, brutish, and short”* (Hobbes 2017: 78)

In the eyes of most policymakers and academics, civil war-torn states fall short of Weber's above definition of the state. A definition that underlines delineated territorial borders, a specified populace, and a monopoly on the legitimate use of force, as constituting the core traits of the state (Glawion 2020: 3). States that fail to live up to this definition are commonly seen as fragile or collapsed states. This definition of the state enjoys a form of paradigmatic agreement between actors in policy and academic circles, which affects how this cadre views the state of affairs in areas governed by fragile states (Risse-Kappen 2011). Because, as an echo of the above quote by the seventeenth-century philosopher Hobbes, the common notion is that inside those territories lacking an overarching state authority, total anarchy reigns, resulting in all-encompassing insecurity and everybody being worse off (Fukuyama 2004; Helman and Ratner 1992; Brüne, Ehrhart, and Justenhoven 2015: 3; Rotberg 2007).

Looking at the world atlas, we see fragile states and the appertaining areas of insecurity in regions like the Sahel in Africa (Bøås 2019), and according to an OECD report, around 57 fragile states can be identified in total. Which, for the most part, are to be found on the African continent (OECD 2020). If we follow the dominant Hobbesian logic described above, we would expect the lives of the nearly 460 million people inhabiting those areas to be nasty, brutish, and short.

This master's thesis aim is to analyse how people in these areas of the African continent deal with this insecure situation, though not through the usual channels of action where people choose to flee the area or either join state forces or rebel groups. Instead, the aim is to understand the determinants of why they choose to take matters into their own hands and form vigilante groups or self-defence groups.

In order to deal with this question, it is important first to apply a conceptual lens that breaks with the above notion of how security is provided in those areas. Because the focus on the Weberian state as the sole provider of security appears myopic preventing us from comprehending the nuances and the alternative sources of security in these settings (Glawion 2020: 5). Since equating fragile states with total anarchy seems to be only one part of the story of what is unfolding inside these states. According to a strand of the theory that can be denoted *“hybrid order”*, anarchy in fragile states is not an all-encompassing phenomenon that covers the entirety of a state's territory, but instead it has a more geographical narrow character that can be thought of as *“pockets of anarchy”* or areas of *“limited statehood”* (Zartman 1995; Stanislawski 2008; Risse-Kappen 2011;

Arjona 2014). In such areas, the state has lost its privileged role as the sole provider of goods such as security and, consequently, is forced to share its authority, legitimacy, and capacity with other non-state actors (Boege, Brown, and Clements 2009: 17; Bagayoko, Hutchful, and Luckham 2016; Boege, Brown, and Clements 2009). In this rubble of former state institutions, old and new non-state actors will either begin to revitalise traditional governance structures or enact new ones that, with the use of informal and formal governance mechanisms, will try to regulate human behaviour so to create order (Chojnacki and Branović 2011; Andersen, Møller, and Stepputat 2007; Arjona 2014).

When it comes to the provision of security in a hybrid order, the conventional wisdom influenced by the Hobbesian line of thought will tell us that this will be a scarce, if not a non-existent, commodity, hence ubiquitous insecurity is a condition for people inhabiting these areas. Contrary to this notion, the literature on hybrid order argues that, as described above, non-state actors crowds-in the security void after the state has lost its monopoly on the use of force and, thereof, creating a situation with different security providers (Chojnacki and Branović 2011: 89; Glawion 2020). Security is here seen as a situation in which means applied with the intention of maintaining protection against a defined group (Chojnacki and Branović 2011: 91). In these settings of a hybrid order, the provision of security is best conceptualised as akin to a market that is shaped by the demand for security and the actors supplying different forms of security that vary according to its scope of inclusion. The character of the actors involved in the market and how they supply security shapes the order of this space and consequential the security governance structure in the area of the security market in question (Chojnacki and Branović 2011: 91-92; Glawion 2020: 30; Schuberth 2015: 300).

An important question becomes, who, in the absence of the state, is active in this market? Beside the state conflict research has mainly dealt with rebel groups and the types of security goods they provide. For example, it has become evident that rebel groups, in some instances, mirror the behaviour of the state in this market. In these instances, rebel groups engage in the creation of legal courts and police units, as they aim to install themselves as security monopolists in their territory of control (Florea 2020; Loyle 2021; Loyle et al. 2021; Terpstra 2020; van Baalen 2021; Arjona 2014).

This duopoly view of the security market as being only inhabited by the central governments and rebel groups, mirrors how conflict research traditionally portrays conflict areas as having a dichotomous nature between the state and rebels (Jentzsch 2022: 13; Mazzei 2009: 5).

To help illustrate the character of a hybrid order, we can focus on the states in the Sahel region. An area that is commonly referred to as the hotbed of fragile states. What becomes evident is that total anarchy and vast areas of ungoverned spaces seems not to be the reality. Because various non-state actors beside rebel groups, such as traditional authorities, gangs, and international actors, in various degrees and sometimes in cooperation with what is left of the central government, are involved in governing these areas where the state's influence is limited (Raleigh and Dowd 2013; Strazzari 2014; Bøås 2014, 2019). As illustrated by the myriad of actors besides the government

and rebel groups providing governance in the Sahel region, the security market in this region seems to have a more oligopolistic nature. This picture is also confirmed if we gauge the security market in the Sahel using figure 1, which depicts the number of violent encounters between the 18 most active actors from 2020 to 2021<sup>1</sup>.

Surprisingly, figure 1 also reveals that communal militias are some of the most active actors in the security markets in the Sahel as they have frequent violent engagements with Jihadist rebel groups such as the Al-Qaeda coalition *JNIM*. These communal militias are, for instance, the traditional hunter groups, the *Dozos* and the *Koglweogos* in Burkina Faso, community self-defence groups in Northern Nigeria and Chad, and the civilian volunteer group; *Volunteers for the defence of the Fatherhood*, also in Burkina Faso. Two common characteristics of these groups can be identified, as they are made of civilians who are not part of the government ranks or rebel forces, and they have a common goal of protecting their community (Hagberg 2019; Samah 2019; Leclercq and Matagne 2020; Frowd 2022; Lar 2019; Tisseron 2021). These groups can all be seen more accurately as constituting a distinct category of actors labelled *vigilante groups* (Frowd 2022), which is a sub-category of non-state actors denoted *Community-Based Armed Groups* (hereafter CBAGs) (Schuberth 2015).

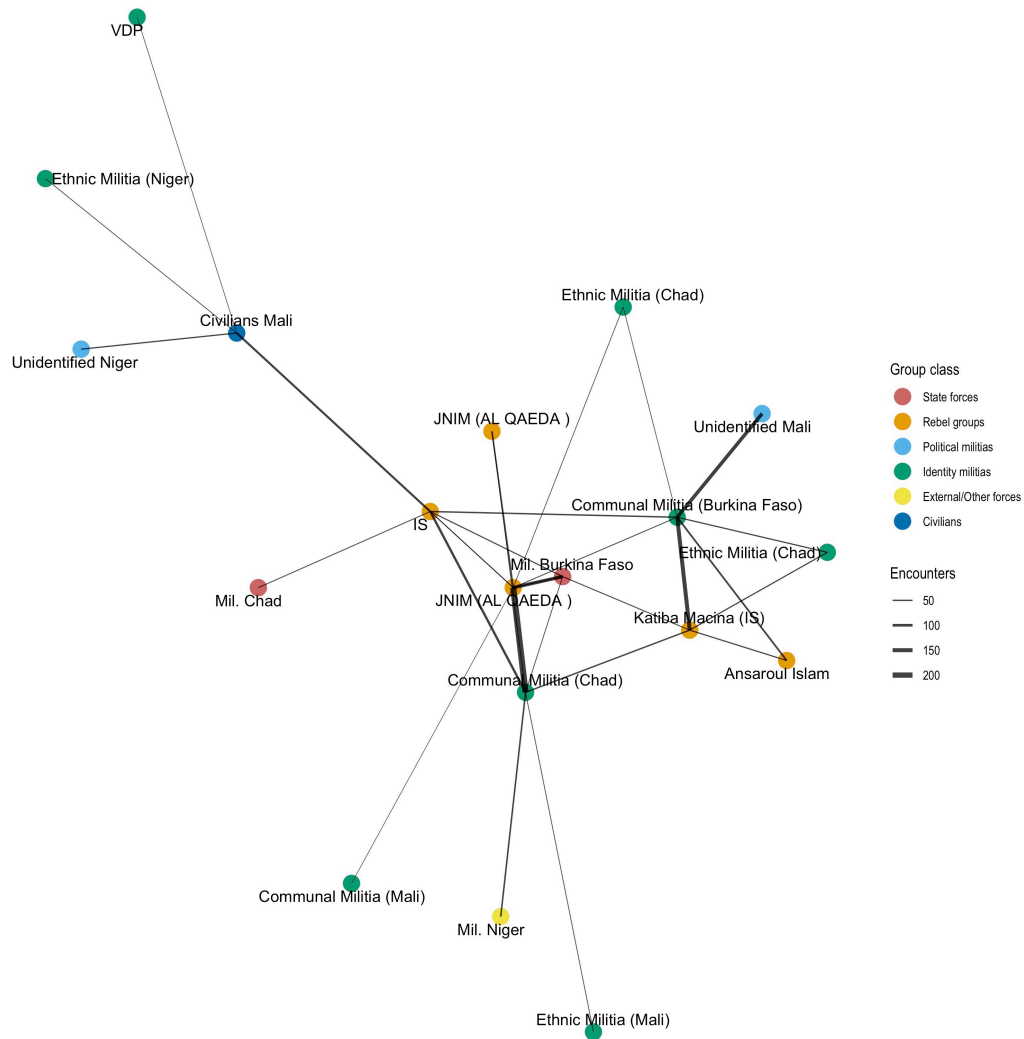
Importantly, vigilante groups are not just an isolated phenomenon specifically to the Sahel region but is for a matter of fact, both a historical and present re-occurring phenomenon in security markets in all of Africa (Frowd 2022: 112; Tisseron 2021: 6; Hoffman 2007; Jentzsch 2022; Arnold 2007; Blocq 2014; Humphreys and Weinstein 2008; Ibrahim Shire 2022).

The presence of vigilante groups indicates a form of civilian agency where civilians themselves actively participate in the provision of security in the market for security, thereby creating locale security governance from below (Frowd 2022: 112; Tisseron 2021: 6; Hagberg 2018; Leclercq and Matagne 2020: 22; Glawion 2020: 8; Jentzsch 2022: 12). This finding forces us to focus more on civilians as a third actor in conflicts, besides state forces and rebel groups, and thereby not just as passive bystanders (Jentzsch 2022: 13).

The frequent appearance of vigilante groups in the security market is, from a rational choice perspective a perplexing phenomenon, as the incentives for the individual to participate in especially this kind of collective violent endeavour, compared to participating in other violent groups, are nearly non-existent (Mason 2004: 3; Peic 2021). Furthermore, as the process of organising people in a vigilante group is a collective phenomenon (Osorio, Schubiger, and Weintraub 2021: 1568), and because of the bottom-up nature of vigilante groups where people need to organise themselves without an outside enforcer,

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<sup>1</sup>The graph shows the 18 most active actors in the Sahel region based on the number of violent encounters between them and another actor. The thicker line between actors, the more violent encounters between them. It is argued that the use of violence is an important indicator of the presence of actors in the security market since violence plays a vital role when it comes to defence and security, thus it is a necessary tool for an actor to participate in the market (Chojnacki and Branović 2011: 97; Grosjean 2014: 1290). Data comes from the ACLED project (Raleigh et al. 2010), and only includes observations with one or more deaths.



**Figure 1:** Violent encounters between the 18 most active actors in the Sahel region in the period from 2020 to 2021.



mobilisation of this kind is especially prone to the collective action problem (Olson 1968; Ostrom 2015: 9).

Nevertheless, vigilante groups appear to have a strong presence in conflict zones in Africa, and for us to be able to enlarge our understanding of how the dynamics in these situations are affected by the inclusion of such groups (Jentzsch, Kalyvas, and Schubiger 2015), we ought to understand the factors determining their emergence. Therefore, this thesis aims at answering the following research question:

*What determines vigilante group activity level in the security market?*

Research on vigilante groups has increased in recent years. Unfortunately, the research is characterised by an inconsistent use of definitions, as different scholars use a diverse set of denotations of what constitute vigilante groups (Schuberth 2015). As a consequence, it can be difficult to establish from study to study which causal mechanisms identified are applicable to other vigilante groups. This confusion of concepts is especially profound when it comes to research on vigilante groups and another sub-category of CBAGs, namely militias. Because the two groups are commonly lumped together, thereby creating a catch-all phenomenon that obfuscate their unique characteristics and limits our ability to make and investigate causal claims about their nature (Jentzsch 2022; Schuberth 2015; Jentzsch, Kalyvas, and Schubiger 2015; Mazzei 2009: 4). Moreover, a dominant tendency in the literature concerning both groups is that they, in the words of Staniland, are viewed as: “*intrinsically subservient junior partners of governments*” (Staniland 2015: 771). An analytical approach that can be described as the pro-government approach (Carey, Mitchell, and Lowe 2013). However, according to Staniland and others, this statist perspective on vigilante groups and militias is of limited utility, as we exclude vigilante groups that are created by communities without the assistance of the state, and the possibility for civilian agency (Staniland 2015: 771; Schuberth 2015: 306; Barter 2013: 79). Taking this criticism into account, this study will conduct a typological classification of CBAGs, so to be able to distinguish between vigilante groups and other non-state actors.

Regarding the emergence of vigilante groups, different theoretical mechanisms have been proposed as to where and when these groups will participate in the market for security. A common finding is that vigilante groups occur in areas of limited statehood and where security is in short supply and demand is high (Peic 2021; Thomson 2019; Meagher 2012: 1093; Barter 2013; Arjona and Kalyvas 2009; Osorio, Schubiger, and Weintraub 2021: 1571; Barter 2013: 79; Jentzsch 2022). However, the mobilisation of civilian vigilante groups is far from an automatic reaction to security threats against communities (Blocq 2014; Osorio, Schubiger, and Weintraub 2021). Research has studied how the different social structures in a community either facilitate or hamper communities’ ability to conduct collective action, thereby affecting the opportunity for mobilising vigilante groups. In African and Latin American cases, it has become evident that close-knit communities that live by themselves and have well-developed institutions for conducting non-violent collective action are more prone to develop their own vigilante groups (Humphreys and Weinstein 2008; Zech 2016; Forney 2015; Blocq 2014). Besides, scholars have found signs

of temporal and spatial diffusion mechanisms (Osorio, Schubiger, and Weintraub 2021; Jentzsch 2022).

These studies have come far in uncovering the precise nature of the different causal streams affecting vigilante groups' engagement in security markets. Yet because different methods and measures are applied, and the majority of studies of vigilante occurrence are single case studies or surveys of individuals in one country, it can be hard to establish if the theoretical mechanisms identified are valid across space and time. Therefore, we are unable to establish if these results are valid in other contexts that have yet to be investigated.

Furthermore, as there have been identified different drivers connecting attributes of a community with collective action, a coherent conceptualisation of how the character of communities shapes vigilante group mobilisation is needed. Thereby enabling a multifaceted approach to the investigation of collective action and the establishment of a framework by which we can compare cases.

To achieve this, the study will conduct a first-of-its-kind large-N analysis of vigilante group appearance in the African continent from 2000 to 2016. A hybrid multilevel regression model is applied to uncover the causal drivers of vigilante activity level.

In order to take into account the localised settings where vigilante groups are formed, the study applies ethnic settlement areas as the unit of analysis and statistical techniques to account for that.

Data on how developed the infrastructural road network is in ethnic settlement areas together with population data, and the mean number of violent encounters in neighbouring ethnic areas are applied, allowing this study to investigate how state access and the security environment affect vigilante group activity level.

Uncovering the effect of social structures' impact on communities' ability to mobilise vigilante groups, the study applies the Institutional Analysis and Development framework (IAD hereafter) to theoretically understand which community traits facilitate collective action. A framework that in a variety of settings has been used to understand how communities without a central enforcer are nevertheless able to provide different collective goods (Ostrom 2006: 9; Ostrom 2015; Cao, Zhang, and He 2020; Zang, Wang, and Su 2021; Ostrom, Gardner, and Walker 1994; Moran and Ostrom 2005; Fujiie, Hayami, and Kikuchi 2005; Araral 2009). Based on this, a latent variable of communities' ability to conduct collective action is proposed, which is made up of specific traits relating to ethnic groups, their rules, and the biophysical/material conditions in which they reside in. Using data on ethnic groups' institutional governance structures, satellite data on farming practices, and how dispersed group members are, a confirmatory factor analysis (CFA hereafter) is performed, thereby allowing the thesis to assess the presence of the proposed latent variable.

The final measure is used to conduct an interaction analysis of whether the proposed relationship between the security environment and state presence is conditioned on communities' ability to mobilise.

The core finding of the analysis is firstly that a single latent variable of ability to conduct

collective action cannot be established. Instead, a latent dimension, denoted collective institution, describing traditional governance institutions' propensity to facilitate collective action is uncovered empirically. Secondly, an insignificant effect of state access is found. However, the effect becomes significant when accounting for collective institutions and the proportion of members of an ethnic group using irrigation for farming. A significant positive effect of the security environment becoming more hostile on vigilante group activity level is moreover established.

## 2.1 Structure of the thesis

The thesis will begin with a theory section that defines vigilante groups and how they form a distinct sub-category of CBAGs. Thereafter, based on a literature review of vigilante mobilisation two hypotheses regarding state access and the security environment are derived. This is followed by a description of collective action and how the IAD framework can illuminate how communities are able to conduct collective action and as a result mobilise vigilante groups. After the related hypotheses have been deduced, the study will then move on to an operationalisation of the dependent-, independent variables and confounders. In this section, a CFA is performed, and the statistical model is developed. The analysis section begins with an investigation of the two main hypotheses and ends with a test of whether the proposed interaction mechanism can be found empirically. Afterwards, a series of sensitivity tests are conducted so to ensure that reporting bias is not affecting the final results and if the results are robust to a change in modelling techniques and data sources.

## 3 Theory

### 3.1 Community-Based Armed Groups: a three-dimensional space

In order to conceptualise what sets vigilante groups apart from other groups found in the conflict literature and achieve conceptual clarity, it is necessary that we begin with a definition of CBAGs. This is important as vigilante groups constitutes a sub-category of CBAGs, which is a sub-category of non-state actors. Hereafter, a conceptualisation of vigilante groups is devised based on a three-dimensional space that is used to create a typology of actors belonging to the umbrella category of CBAGs.

CBAGs distinguish themselves from other non-state actors on the following three dimensions. 1) *Independence*: Opposite rebel groups, CBAGs are not created with the aim of either achieving independence from a colonial power or a central government. 2) *State capture*: CBAGs do not possess a revolutionary/ideological agenda with the aim of capturing the state, but instead, they are focused on securing the *status-quo* or property (Schuberth 2015: 299; Peic 2021: 1022; Jentzsch 2022: 14). 3) *Informal/formal formation and regulation*: The last dimension helps us distinguish CBAGs from private

security companies or private military companies, who similarly do not fight for succession or state capture. Opposite to the before mentioned private companies, which are formally created when engaging in contractual relationships or regulated by state law, CBAGs have an informal relationship with their sponsor and are usually regulated by informal laws (Schuberth 2015: 298).

CBAGs are however an umbrella term covering a variety of groups found in the litterateur such as vigilante groups, community self-defence groups, militias, death squads, and criminal gangs. Intuitively, these actors do not seem to be alike, despite they all share the same traits relating to CBAGs. Therefore, in order to achieve a more refined typology, this thesis follows Schuberth's compartmentalisation of CBAGs into three ideal actor categories based on how pronounced an ideal actor is on the following three-dimensions that together constitute a three-dimensional space. The dimensions are as follows: 1) *Security*, 2) *Political*, and 3) *Economic* (Schuberth 2015).

The first ideal actor category is vigilante groups that are most pronounced on the security dimension, hence their core aim is to provide security for their community in a localised setting against internal and external threats. Another trait is that such groups are mainly formed by local citizens and operate at the village level, thereby being mobilised from the bottom-up (Schuberth 2015: 300; Jentzsch 2022: 16; Barter 2013: 79-80; Ibrahim Shire 2022: 4-5). In the literature, vigilante groups are also known as anti-crime groups, civilian self-defence groups, or militias (Schuberth 2015: 301-303; Peic 2021: 1022; Jentzsch 2022: 14). Empirically, they manifest themselves in the form of for instance the Macawiisley self-defence militia in Somalia or the Kamajors in Sierra Leone, as both were created by civilians with the aim of protecting local villages against rebel forces (Ibrahim Shire 2022: 17; Hoffman 2007: 642).

The second ideal type of CBAGs is *militias*, that are most pronounced on the political dimension. They engage in a patron-client relationship with either a political or an ethnic patron who, in turn, provides certain benefits to the militia members. These groups are mainly tasked with using violence against their patron's rivals, such as political opponents or insurgents, and are mobilised from the top-down (Dearing 2021; Reno 2007: 102; Raleigh and Kishi 2020: 582). Depending on the patron, a militia can be defined as a popular or an ethnic militia, where the former, besides incentives, follow a patron because of popular or ideological grounds, whereas the latter does it because of ethnic ties to the patron (Schuberth 2015: 305; Ahram 2011: 523; Mazzei 2009: 4).

The third ideal type of CBAG is *gangs* exemplified by drug cartels, which are most pronounced on the economic dimension and function as a "*continuation of economics by other means*" (Schuberth 2015: 308).

Importantly, the distinction between vigilante groups and militias is not just as what Mazzei defines as a rhetorical tool used by actors to "*insinuate virtuosity and legitimacy, and by opponents to indicate malevolence and illegitimacy*" (Mazzei 2009: 4). Because applying the three-dimensional space shows us analytical importance of being able to draw a demarcation line between vigilante groups and militias, which too often in the literature are lumped together. This lumping together of the two concepts obfuscates

their unique characteristics, and thereby as the above assessment shows we will lose analytical clarity (Jentzsch 2022; Schubert 2015; Barter 2013: 79; Jentzsch, Kalyvas, and Schubiger 2015). Furthermore, in relation to this study's research question, seeing these actors as one will lead to erroneous theoretical claims since they differ in both scopes and importantly how they are being mobilised.

It is important to pinpoint that in reality, the three ideal types do, in some instances overlap, and a group's location in the three dimensional space is not static but is of a fluid character; for example, a group can begin as a vigilante group but be captured by a local warlord and therefore be turned into a militia (Schubert 2015: 16).

Another characteristic of this approach is the omission of a link between CBAGs and central government or foreign government entities that some scholars see as a central attribute of vigilante and militia groups. An approach that can be denoted as the *pro-government militia approach*. This approach has uncovered how governments can play an active role in both vigilante and militia formation and the effect of such a link on both civilian casualties or the prolonging of a civil wars (Jentzsch 2022: 15-16; Dearing 2021; Mazzei 2009; Raleigh and Kishi 2020; Ibrahim Shire 2022; Eck 2015). The omission of this link is based upon Staniland's and others reasoning that the government link is not a essential part of what defines CBAGs. Because *a)* vigilante groups and militias' relationship with the state has a changing nature, *b)* it prevents us from grasping the multiplicity of groups that do not have a direct connection to the state, and *c)* it does not allow for these group to have agency, thereby restricting our theoretical lens to only view them as tools and not as independent actor (Staniland 2015: 771; Schubert 2015; Ahram 2011; Barter 2013).

Summing up, instead of relying on a dichotomy between state and non-state actors, the study has expanded our conceptual universe of actors in the market for security with a particular focus on CBAGs. This expansion allows the study to focus on the core traits of vigilante groups and how this category is different from militias. The endeavour is made possible by viewing CBAGs as a, three-dimensional space consisting of the following dimensions; security, politics, and economics. Using these dimensions three distinct ideal groups of actors are devised: vigilantes, militia, and gangs, where vigilante groups are defined in relation to them being most pronounced on the security dimension.

### **3.2 The emergence of vigilante groups**

Explaining the appearance and activity level of vigilante groups in the market for security, we firstly need to understand the micro mechanism which not only affects civilians' demand curve for security but, moreover their preference to provide it themselves.

Beginning with the demand for security, it seems reasonable to assume that in order for civilians even to consider mobilising vigilante groups, there has to be a demand for

security. This demand curve is a product of the level of insecurity in security market in areas where the means of violence are not monopolised (Branović and Chojnacki 2011: 554). Building upon this and the literature on state fragility, a hypothesis regarding the ability of the state to monopolise the market for security and vigilante group mobilisation will be devised in section 2.2.1.

Though as the security market is inhabited by different state and non-state actors supplying security, the question thus becomes why would civilians not just pay others to supply security for them, or choose a second strategy of just fleeing the conflict torn area they have found themselves in. The two strategies only make up a subset of the non-violent strategies, which civilians can choose from in their endeavour to deal with their insecure situation, since they could moreover arrange community night patrols to alert people of potential attacks (Jentzsch 2022: 18). A set of strategies that compared to the violent strategy of participating in vigilante groups are associated with lower costs for the individual.

Explaining why civilians nevertheless prefer to mobilise vigilante groups and as result, engage in violent actions instead of non-violent ones, scholars have pointed to the character of the security environment that civilians find themselves in as inducing a preference to participate and mobilise vigilante groups (Jentzsch, Kalyvas, and Schubiger 2015: 761; Barter 2013: 79; Arjona and Kalyvas 2009: 6; Jentzsch 2022: 20; Zech 2016: 31). Based on this a hypothesis on how the security environment affects vigilante mobilisation is devised. Despite the ability of the state to assert itself, affecting the character of the security environment, the effect of the security environment is viewed as having an independent effect of state access, as studies have shown that vigilante groups appear in more developed states with strong military capabilities (Osorio, Schubiger, and Weintraub 2021; Mazzei 2009: 6-7; Arjona and Kalyvas 2009: 24; Peic 2021: 1036).

The two explanations only account for why civilians will establish a preference for becoming combatants themselves, but as Osorio *et. al.* points out, forming vigilante groups is a type of armed residence that is essentially a form of collective action (Osorio, Schubiger, and Weintraub 2021: 1568). As a result, despite being willing to form vigilante groups civilian communities must have some kind of social prerequisite allowing them to overcome collective action problems, which is needed in order to mobilise vigilante groups. If not so, the individual pre-assessment of whether to participate in this form of collective violent action will favour that the individual abstain as the associated costs are too high, thus preventing successful mobilisation (Osorio, Schubiger, and Weintraub 2021; Jentzsch 2022; Barter 2013; Peic 2021). Based upon this, the study proposes in section 2.2.4 that the effect of state absence and the security environment is conditioned on whether civilians are embedded in social structures that facilitate collective action, as such structures will affect whether the agent will perceive collective action as a viable strategy, thereby lowering the cost of participating in the mobilisation of vigilante groups. Drawing on the literature on collective action, a comprehensive understanding of what constitutes such social structures and the related attributes facilitating collective action is done.

### 3.2.1 A lack of state security

In line with the fragile state approach and along the same vein as the theory of militia formation, a common finding is that vigilante groups, along with other non-state actors, appear in areas of ungoverned spaces (Thomson 2019; Meagher 2012: 1093). In a study of vigilante and militia appearance in Indonesia in relation to the government's fight against a secessionist rebel group, Barter finds that militias emerge in areas where rebel groups are militarily weak and state forces have a strong military presence. On the other hand, vigilante groups will emerge in areas where the opposite is true (Barter 2013). Using either road density or vigilante members' own perception of whether the state ruled the area where they lived as a proxy for state capacity, a similar pattern of vigilante groups appearing in ungoverned spaces has been found in both Latin American, Asian and Middle Eastern cases (Arjona and Kalyvas 2009; Peic 2021).

The proposed mechanism linking the lack of government presence in an area with vigilante emergence is twofold. One line of thought argues that as militias, vigilante groups are essentially the state's extended arm and are mobilised by state actors as a proxy unit to suppress opponents of the state in areas where it is unable to enforce a monopoly on the use of violence, and do not have the bureaucratic capacity to control auxiliary forces (Mazzei 2009: 17; Peic 2021: 1022-1023; Böhmelt and Clayton 2018: 208). This mechanism is argued as exhibiting a myopic view of the state as being the sole initiator when it comes to mobilising forces against rebels and thereby excludes the security needs of civilians (Barter 2013: 79; Staniland 2015: 771; Jentzsch 2022: 14). Instead, we will see vigilante group mobilisation in fragile states as a reaction to the lack of supplied security for civilians in security market. In this case, the civilians being affected by insecurity have chosen to mobilise vigilante groups as an investment in their own security (Barter 2013; Chojnacki and Branović 2011: 95; Meagher 2012: 1090).

A common denominator of the two mechanisms is the emphasis on the state's ability to access territory and thus enforce its will. Accessibility is a vital component, as it allows for easy deployment of state agents, who can monitor and subsequently sanction behaviour. Thereby the state is able to exercise social control in an area and, thereby, security governance, which has been found to negatively affect the number of rebel groups (Müller-Crepon, Hunziker, and Cederman 2021).

Consequently, if the state has the ability to access a territory, it becomes much easier for it to deter potential adversaries from taking up arms against it, and thereof the need for citizens to actively engage in the creation of vigilante groups diminishes. Moreover, accessibility will allow the state to establish a social order where it monopolises the use of violence, which prevents a situation of anarchical violence from erupting, that in turn will minimise the need for civilians to mobilise vigilante groups. We can therefore devise the following hypothesis:

**Hypothesis 1:** *Vigilante groups are more likely to be more active in areas where the state does not have access.*

### 3.2.2 A hostile security environment

Scholars investigating vigilante group formation have highlighted how the character of the security environment that civilians find themselves in affects vigilante group mobilisation. Typically the power balance between state and rebel forces in civil wars and the tactics used by both parties are put forth as explanations of why civilians would prefer a strategy of vigilante mobilisation. In a case study of vigilante mobilisation in Mozambique, Jentzsch finds that the occurrence of military stalemates between the before mentioned parties and the lack of proper security guarantees for the civilian population played an important role in when vigilante groups were formed (Jentzsch 2022: 175). Barter, in a similar vein, finds that the number of rebel attacks against specific ethnic groups in Indonesia was decisive in getting groups to mobilise (Barter 2013: 89). The formation of vigilante groups is not just a response isolated to civilians finding themselves in a conflict between government and rebel forces. The appearance of, for instance, the Bakassi Boys in Nigeria and vigilante groups in Mexico who, both formed as a response to the hostile behaviour of criminal gangs (Meagher 2012; Osorio, Schubiger, and Weintraub 2021), shows that the mobilisation of vigilante groups is also a mean used by civilians in non civil war related security environments. In addition, scholars have highlighted that vigilante groups are moreover mobilised in an effort to deter and deal with rival ethnic groups (Thomson 2019; Peic 2021; Fumerton 2018).

The above examples thus illustrate that vigilante groups are formed by civilians as a response to different threats in the security environment they are located in. An important question thus becomes how we should conceptualise the security environment?

In order to do so, this study will utilise Zech's finding that in the Peruvian civil war, the emergence of vigilante groups exhibited some of the same characteristics as how structural realists in international politics explain state behaviour in the international system (Zech 2016: 31). Hereby this study will conceptualise the security environment based on a balance of threat logic. Thereby enabling the creation of a more general theoretical mechanism of vigilante group mobilisation that is not isolated to for instance civil wars. The overarching theoretical framework of structural realists is best viewed through Waltz's theory of balance of power (Jackson and Sørensen 2015: 75). The fundamental argumentation of Waltz's theory is that due to the anarchical nature of the international system where states only can rely on themselves as providers of security and since states are assumed to be unitary actors whose main preference is survival, we can predict the behaviour of states by looking solely at the properties of the international system. More specifically, how power is distributed since states will instinctively balance against power concentration in the system by either military rearmament or alliance formation with other states (Waltz 1979: 119-121). Though, in an important contribution to this strain of thought, Walt argues that it would be wrong to expect this behaviour when states are faced with a concentration of power, as they are more likely to display it when faced



with threats. Importantly, this balancing of threats is not an automatic behaviour, as the categorisation of another state as a threat to one's security is conditioned on the following four attributes: 1) aggregate power, 2) geographic proximity, 3) offensive capabilities, and 4) offensive intentions (Walt 1985: 8-9). Drawing on these insights, it would be reasonable to explain vigilante mobilisation with reference to a more localised version of the balance of threat theory, where it is civilian communities who mobilise against perceived threats instead of states mobilising against each other.

Thereby, when civilian communities are localised in a local security environment where competing groups fight each other for relative gains, thus creating a more uncertain environment, or when actors that constitute a threat to a group of civilians' survival begin to show offensive intentions, we would expect that as a response to this external stimuli, civilians' demand for security will increase and as a response they would begin to mobilise vigilante groups. For instance, this was the case in South Sudan where the *South Sudan Defense Force* formed as a loosely aligned vigilante group so to counter the rebel group *the Sudanese People's Liberation Army* (Arnold 2007). And in Colombia, where civilian communities frequently found themselves in an environment of imminent threat and thereof saw self-defence as a method to ensure the security of their community (Nussio 2011).

**Hypothesis 2:** *Vigilante groups are more likely to be more active in insecure security environments*

### 3.2.3 Having the ability to mobilise

The lack of state security and the hostile security environment explanations does only capture how civilians, because of the lack of security guarantees, are forced to provide for their own security in a security market that lacks a formal security monopolist. Though, as countless examples of refugees fleeing conflict zones instead of forming their own vigilante groups, it seems naive to expect that vigilante group formation is an automatic reaction to the self-help situation that civilians find themselves in. For instance, this becomes apparent in a study of the second civil war in Southern Sudan, where rebels from the Sudan People's Liberation Army attacked several villages, which all were outside of the government's control, though only a handful of villages organised vigilante groups so to provide for their own security (Blocq 2014: 716). A similar pattern is also identified in the Peruvian civil war (Zech 2016).

This indicates that the relationship between a change in preferences where people have become more willing to provide for their own security and thereby engage in the formation of vigilante groups are conditioned on some unknown factors.

From a theoretical perspective, rational choice theory would tell us that such a factor has to do with the fact that since mobilising vigilante groups are essentially a collective endeavour (Osorio, Schubiger, and Weintraub 2021: 1568), the agents involved would have to overcome the collective action problem in order to successfully mobilise armed forces for their own protection.

The rational choice explanation of why vigilante group mobilisation is hampered by the collective action problem is rooted in a micro level description of an agent's decision making process regarding whether to participate in collective action. Simply put, if the expected costs are higher than the expected benefits of participating, a rational agent would abstain and *vice versa* (Olson 1968). Especially when it comes to participating in vigilante groups, the individual benefits of joining seem dim. When comparing the conditions of a vigilante member with that of a government soldier, an insurgent or just an ordinary citizen, it seems odd that anyone would join such a group since: 1) The economic benefits are meagre compared to before mentioned occupations, as it is a very material, energy, and time consuming occupation. The resources used if joining could instead have been used on activities that more directly benefit oneself and one's family. 2) As the work in vigilante groups is of a more stationary nature, it is easier for opponents such as rebels to target and kill members. 3) Accommodation does not take place in well protected military barracks or in remote caves, but instead in one's own house, thus a member exposes both herself, her family, and the entire village of great risk (Arjona and Kalyvas 2009; Peic 2021). Moreover, assuming that agents are bounded rational, among other things meaning that the agent is limited in knowing how many are going to join a vigilante group. Taken together with the before mentioned risk of participating in a vigilante group, not knowing the number of other participants can act as a barrier for participation, since the number of participants influence the probability of damage being inflicted upon oneself (Lohmann 1994: 59; Chenoweth and Stephan 2011: 39-40; Oliver 1993: 289).

Lastly, because the outcome of establishing a vigilante group is security that can be assumed to be a public good, hence it will become available to that agent whether she participates or not, it is more cost-efficient for the agent just to free-ride instead of participating as she will still receive the good without taking the risk of getting hurt (Olson 1968; Mason 2004: 4-6).

Summing up using Magagna's thoughts on peasant rebellions; joining a vigilante group *"is a dangerous deed, and there is good reason to suppose that many individuals would prefer to be free riders if they cannot predict that they will not be killed in the process"* (Magagna 2019: 46).

Though, a series of scholars have pointed at how the character of the social structures that agents are embedded in can change the cost-benefit analysis performed by the agent and thus make it more likely that communities can overcome the collective action problem (Lichbach 1995; Putnam, Leonardi, and Nanetti 1993; Fukuyama 2001; Ostrom and Ahn 2007; Oliver 1993; Granovetter 1973). In relation to the emergence of vigilante groups, researchers have found that when statistically controlling for other explanations and in a single-case study of pro-government vigilante groups, such groups have been found to mostly come from provinces that are dominated by traditional tribal communities. The reason given by the researchers is that such communities use vigilante membership and the authority that comes with being part of the government's ranks, as a cover for pursuing private agendas concerning inter-tribal feuds (Thomson 2019; Peic 2021: 1027-1029; Fumerton 2018: 67). In addition, it is also argued that this finding is

due to traditional communities being especially defensive of their autonomy from outside intervention, thereby ensuring their way of life, and therefore are more likely to mobilise when faced with an outside insurgent threat (Peic 2021: 1029; Magagna 2019: 36). Though, an important flaw with these studies is that the before mentioned micro-mechanisms are not investigated, and because of that it can be difficult to verify the causal claim submitted. Building on research on how traditional tribal communities, in some instances, can constitute an effective vehicle for collective action (Magagna 2019: 47; Tieleman and Uitermark 2019: 708; Goist and Kern 2018), one could instead argue that it is because traditional communities have a series of attributes that enables them to overcome the collective action problem and in turn mobilise vigilante groups.

This notion is supported by a statistical study of former vigilante members in the Sierra Leone civil war, where it is found that they mostly came from remote and isolated communities, which the authors argue is because of the strong social structures developed in such communities that were used as an effective tool to mobilise new recruits (Humphreys and Weinstein 2008: 451). A problem with the study by Humphreys and Weinstein's study is that the applied measure of whether a community have strong social structures also captures whether a community is located in the periphery of the state. Therefore, we cannot be sure if it is the effect of people being more willing to mobilise because of a lack of state presence, or the effect of community structures. Though, case studies of the vigilante groups in the Sierra Leone civil war show that the groups emerged on the basis of pre-established, local systems of reciprocity and informal exchange (Forney 2015: 830). For instance, one of the largest vigilante groups, the *Kamajors* were, prior to the war a class of hunters among the Mende ethnic community who in the face of the civil war were seen by the rest of the community as natural guardians of the community and because of that it was seen as their duty to ensure security (Hoffman 2007: 642).

In a similar vein, other case studies in different settings have also pointed to the fact that frequently mobilisation efforts revolve around already established institutions. In analysing vigilante groups in the Peruvian civil war Zech finds that communities that had poor community organisations, which lacked a central focal point for social interactions, a shared belief system and no cooperative relationships with each other were not able to mobilise vigilante groups and instead fled or tried to survive in war zones (Zech 2016: 191). The communities that were able to mobilise vigilante groups had a series of characteristics that enabled them to overcome collective action problems, which the case of vigilante mobilisation in the Anchiwayto region illustrates. In this area, communities had a government mandate to autonomously enforce a system of communal land tenure and settle land disputes that were used as the organisational foundation for the organisation of vigilante groups. Moreover, they had a practice of communal meetings and a unified religious society, thereby creating more close knit communities that helped mobilise support for the establishment of vigilante groups (Zech 2016: 232).

Similar cases are seen in Mozambique, Somalia and Sudan, where traditional authorities played a vital role in organising members of the community to participate in the vigilante groups (Jentzsch 2022; Blocq 2014; Menkhaus 2007).

These examples illuminate that in order to form vigilante groups, agents need to be em-

bedded in some kind of social structure, which through different mechanisms, alters the cost-benefit analysis performed by the individual agent, thereby making it more likely that agents would participate in vigilante groups.

However, as the literature review shows, the precise causal mechanism linking a given attribute of a macro level structure with the rise of vigilante groups are plentiful, and no consistent understanding of what constitutes such social structures exists.

With basis in Lichbachs extensive review of how rebel groups can overcome the collective action problem and the literature review, this study firstly applies the concept of community as the theoretical unit representing the social structure that agents are embedded in. Lichbach defines communities as being: “*characterised by having strong social institutions, hold common beliefs and eventually engage in common behaviour*” (Lichbach 1995: 111). Secondly, in order to conceptualise which and how attributes of a community can help overcome the collective action problem, and have a theoretical framework that incorporates the different identified mechanisms affecting vigilante mobilisation, this study applies the Institutional Analysis and Development framework (IAD hereafter) developed by Ostrom and colleagues (Ostrom, Gardner, and Walker 1994). This theoretical framework is deemed fit for this task, as it has been explicitly developed and refined with the aim of creating a theoretical model that combines different insights of how the character of social institutions affects a rational agent’s propensity to participate in collective action (Ostrom 2006: 9-11). Moreover, the IAD framework has proven itself useful in uncovering how communities without a central enforcer are nevertheless able to provide different collective goods, such as common pool resources in the form of water for irrigation systems, despite strong incentives for agents to free-ride and thereof deplete the resource (Ostrom 2006: 9; Ostrom 2015; Cao, Zhang, and He 2020; Zang, Wang, and Su 2021; Ostrom, Gardner, and Walker 1994; Moran and Ostrom 2005; Fujiie, Hayami, and Kikuchi 2005; Araral 2009). This feature of the framework is appealing since, as noted in the conceptualisation of vigilante groups, a defining characteristic of this social entity is its bottom-up nature where communities themselves initiate its creation, and thereby the IAD model from a theoretical perspective would constitute a better fit in our quest to uncover the mechanisms driving vigilante group emergence.

### **3.2.3.1 Institutional Analysis and Development in a violent setting**

Explaining how attributes of a community affects collective action, the IAD framework applies an institutional approach to the phenomena. Institutions are defined as prescriptions that are used by agents in repetitive and structured interactions between them that in turn shape their behaviour. (Ostrom 2006: 3).

The conceptual starting point of the IAD framework is the action situation, which is the realm in which agents observe information, select actions, engage in patterns of interaction, and realise outcomes from their interaction (Ostrom 2006: 3; McGinnis 2011: 173). It is assumed that the calculations made by the agents on whether to choose a given action are affected by the following four variables; the expected costs, the expected

benefits, internal norms, and a discount rate (Ostrom 2015: 37). Moreover, the actor is presumed to be bounded rational, thus having limited cognitive capabilities and do not possess complete information of the choice situation (McGinnis 2011: 170).

Importantly for this study is the idea that the action situation does not reside in a vacuum but is shaped by a number of exogenous factors, which together constitute the context in which the decision-making process takes place. Thereby jointly affecting the types of actions that the agent can take, the benefits and costs of these actions and potential outcomes, and the likely outcomes achieved.

These factors fall into the following categories and encompass all aspects of the social, cultural, institutional, and physical environment that set the context of which the action situation is situated in:

- 1) *Attributes of Community*: The structure of the more general community that the arena is situated in,
- 2) *Rules*: Formal and informal rules used by participants as prescriptions of the kind of behaviour that are required, prohibited, and permitted.
- 3) *Biophysical/Material Conditions*: The attributes of the biophysical/material condition that the actors act upon (Ostrom 2006: 15; McGinnis 2011: 172).

Using the three factors as a framework for theorising which attributes of a community affect the action situation in such a way that it facilitates collective action, and together with literature relating to the subject of collective action, the study will go through each factor and describe the mechanisms linking the individual factor and collective action.

### 3.2.3.2 Attributes of Community

Based on the case studies of vigilante mobilisation above, we firstly see that for communities to successfully mobilise an organisational focal point is needed. The micro mechanism that connects organisational focal points with collective action begins with Granovetter's theoretical argument that the character of the social networks between agents is crucial in determining how well they can function as the underlying infrastructure for information exchange. He argues that a network that consists of strong ties between agents will have a tendency to form close-knit cliques where information will be encapsulated, whereas a network of weak ties is more adapt in connecting more agents, thus creating a larger network where information can travel greater social distances (Granovetter 1973: 1366). Information is important for the agent making the decision to engage in collective action, as it is vital when she evaluates the expected costs and benefits of such an action. Obtaining such information is associated with transaction costs (Ostrom 2015: 190, 194), though if embedded in a social network of weak ties, the costs will decrease.

Applying a threshold model of collective action, it is expected that an agent's participation in a collective endeavour is a function of whether she expects a certain number of people also will participate i.e., the threshold. This threshold is critical as it is part of the cost-benefit calculation, since violent collective action is associated with a high

probability of pain towards oneself, she, therefore needs information regarding whether others will participate so to deduce the potential cost of getting hurt (Lohmann 1994; Oliver 1993: 289).

Moreover, information is also important when detecting and sanctioning the breaching of shared norms in a community. Shared norms are important as they affect the agent's choice situation (Ostrom 2015: 194), and it seems reasonable that when a community decides to establish a vigilante group, expectations among members that everyone should contribute will be developed. As a consequence, the cost of not participating in the initiation of vigilante groups increases. Furthermore, especially in rural villages where the agent's survival is dependent on common resources, which are owned collectively by the village, such as grazing fields, the cost of not adhering to shared norms are high. A household that does not contribute its fair share to the creation of vigilante groups and thereby violates shared norms can, for instance, be sanctioned by the community by being restricted in its use of community owned resources or by being assigned a smaller or inferior plot of land (Mason 2004: 17).

According to *Marwell et. al.* who, through a series of agent-based computer simulations, investigated the strength of the effect of weak ties on collective action, it is not the weak ties, per se, but their tendency to be centralised around an organisational focal point. They define centralisation as "*the extent to which any particular person is an important link in the indirect network relations of others*" (Marwell, Oliver, and Prahl 1988: 506). Instead of a centralised organiser, others have pointed at the social institutions in communities as constituting an organisational focal point (Mason 2004). Social institutions are, for instance, governing councils or neighbourhoods that act as mobilising structures that, in this study is defined as "*those collective vehicles, both formal and informal, through which people come together and engage in collective action*" (McAdam, Tarrow, and Tilly 1997: 155 quoted in; Mason 2004).

A second identified mechanism is to what extent communities have pre-established arrangements that require cooperation between members of a community. Especially, norms of cooperation and coordination seem to be linked to how communities organise agricultural production, as Henrich *et. al.* illuminates in a series of experimental games consisting of the ultimatum game and public-goods games performed by people in different traditional communities around the globe. In the study, they discover that in communities where people more often participate in productive activities outside of the family realm that requires a degree of cooperation, people display more often norms of cooperation when playing these experimental games (Henrich et al. 2001). This mechanism of spill-over effects from modes of production into norms of reciprocity is corroborated by studies of agricultural production in both Brazil and China, as production methods that require more labour and coordinated behaviour have here too been found to affect people's willingness to engage in cooperate arrangements (Gneezy, Leibbrandt, and List 2016; Talhelm et al. 2014). Empirically and in line with vigilante mobilisation in the Anchiwayto region, using both case studies and statistical methods, scholars have identified that communities where land is considered a common good and governed by the community, instead of it being considered private property, are more able to mobilise

protests (Katz 2000; Trasberg 2021; Mearns 1996; Boone 2014).

Summing up, having such arrangements will thereby facilitate the creation of strong commitments and interdependence among users, thereby creating norms of reciprocity. Moreover, as Axelrod has emphasised if the agent expects that these arrangements will continue in the long run and thereof expect to interact more frequently, she is more inclined to choose a strategy of cooperation over one of free-riding (Axelrod 2006). Thus, it seems reasonable that combined with norms of reciprocity, communities that have pre-established arrangements of cooperation are more likely also to cooperate in ensuring their own security. Furthermore, these arrangements can also increase the visibility of non-participation, and generate greater enforcement capabilities to sanction noncompliance during mobilisation (Zech 2016: 40, 284; Tsai 2007: 88).

### 3.2.3.3 Rules

To understand how rules affect vigilante group mobilisation I will focus on if the existing institutions that actors are embedded in before the decision to mobilise, have the formal arrangements to create rules that shape the incentives of the agent.

In this setting, rules are a set of formal and informal instructions shared by agents that, in turn, shapes the action situation in a particular environment since they enforce what actions are required, prohibited, or permitted (Ostrom 2006: 17-18; Ostrom 2015: 51). The effect of rules is the costs they impose on certain actions that the agent can choose. These costs can either be material, such as monetary costs, or be immaterial in the form of a loss of reputation that will deter other agents' willingness to cooperate with the rule-breaking agent in the future (Ostrom 2015: 98). When it comes to mobilisation and similar acts of collective action, describing how rules can help rebels solve the collective action problem Lichbach argues that the importance of rules lies in their ability to sustain collective action (Lichbach 1995: 129). He identifies two avenues of reasoning: Firstly, viewing interactions between agents as a repeated *Tit-for-Tat* game, agents who feel assured through the presence of rules that cooperation from their side will be reciprocated are more likely to choose to cooperate. Secondly, successful mutual exchange agreements between agents enforced by explicit rules in a specific area can lead to a general notion of reciprocity between agents in other areas (Lichbach 1995: 133-134).

Though the importance of rules is conditioned on the presence of either a formal or an informal institutional setup that ensures that agents comply (Lichbach 1995: 132; Ostrom 2006: 20).

Concretely, in some ethnic communities, we see such rules in the form of customary law that embodies a body of rules and norms that constitutes the basis for internal decision-making and judicial processes for the ethnic community in question (Holzinger et al. 2019: 1784; Eck 2014: 416; Wig and Kromrey 2018: 418).

The effect of rules on cooperative behaviour is seen in a study of collective action in ethnic-diverse communities in Uganda. Through a series of game-theoretical experiments and surveys, the study finds that selfish individuals prone to free-riding are, when controlled for other explanations, more inclined to participate in collective

action when it is in an institutional setting where universal norms of reciprocity and third-party enforcement mechanisms are present (Habyarimana et al. 2009: 157).

The effect of informal institutions on collective action are moreover witnessed in China as Xu and Yao conduct a causal study of the presence of third-party enforcement mechanisms measured by the size of the village chairperson's clan. They find that the larger the clan that the village chairperson is a member of, the more money citizens of rural villages donate to common projects, which the authors argue is because of the village chairperson's ability to use informal clan institutions to enforce norms of reciprocity in local communities (Xu and Yao 2015). In a similar setting, it is also investigated how rules affect the willingness and behaviour of farmers when it comes to the preparation and maintenance of common pool resources. These studies find a significant and substantial positive effect of the presence of general rules of enforcement and more specific ones regarding the maintenance of common pool resources on both the propensity and willingness of farmers to contribute to these collective efforts (Cao, Zhang, and He 2020; Zang, Wang, and Su 2021).

Therefore, the presence of both informal and formal rules appears likely to affect whether communities are able to mobilise vigilante groups, as they can foster reciprocity and thereby alter the agent's expectation that others will participate in the vigilante group. But also, as the presence of rules and enforcement mechanisms affects the cost benefit analysis conducted by the individual. For instance, one can imagine a situation where a lack of engagement in the provision of the village's security might affect how others view the agent's tendency to comply with norms in other areas, and thereby fellow village inhabitants would be less likely to cooperate with the agent in the future.

#### **3.2.3.4 Biophysical/ Material Conditions**

The character of the physical aspects of the environment that actors face in have both been identified as playing a key role in how rural communities can create and manage collective goods themselves, and the ability for groups to mobilise violent collective action. There can be identified two avenues of reasoning of how this characteristic affects communities' ability to perform collective action.

Firstly, scholars have found that the spatial features of a group's settlement pattern can facilitate the development of social networks, as more densely populated groups have the ability to have more frequent interactions with each other, and thereby have better opportunities for conducting violent collective action (Nils B. Weidmann 2009: 538).

This mechanism also seems to be evident in the case of what determines rural populations' willingness to engage in protest or similar political collective action. For example, in a description of the French peasantry of smallholders, Marx argues that due to their isolation and the mode of cultivation of the small sized farms where a division of labour is not required, smallholders will have a more self-reliant nature. As a consequence, the family becomes the focal point of social interactions creating small knit social networks without much connection to others outside of the family: "*Each individual peasant family*



*is almost self-sufficient, directly produces most of its consumer needs, and thus acquires its means of life more through an exchange with nature than in intercourse with society*" (Marx 1852: 62). Because of this isolation and spatial dispersion, the social structure for mobilisation of a class-based political organisation that can initiate collective action is absent, which is a relationship other scholars in different countries also have observed (Paige 1975: 35; Stinchcombe 1961: 45-46).

The second avenue of reasoning is how the biophysical features of the land that people inhabit shape social interactions and, subsequently the structure of social institutions, the kind of agricultural production it allows and how it is cultivated. In a historical analysis of societies' use of either shifting hoe cultivation versus plough cultivation, Boserup observes that a variation in the method applied by societies influenced gender norms regarding whether women should be able to participate freely in jobs outside the home. She explains this difference with reference to the required strength of performing the method and the amount of labour needed. Compared to hoe cultivation, ploughing requires more upper-body strength to steer the plough, which creates an advantage for men. When applied the method does not require the same amount of labour as hoe cultivation, thus creating a specification of production along gender lines (Boserup 1972). This observation is confirmed in a large-N statistical study of the choice of cultivation method effect on present gender norms and female labour participation (Alesina, Giuliano, and Nunn 2013).

In line with this reasoning, it has also been investigated how settlers in America who either came from communities in Europe that were pastoralists herding animals from place to place or agriculturalists farming the same plot of land, have developed contrasting norms of masculinity. Because of the nomadic lifestyle of pastoralists, these communities developed a *culture of honour* that encourage males to actively use violence in the case of retaliation and frown those who do not, so to ensure justice and honour in their communities. Using both experimental evidence and historical settlement patterns, scholars have found that violent interpersonal behaviour is more widespread among white males from the southern States of America than compared with those from the north, which they argue is because of the culture of honour that European pastoralists brought with them when they immigrated to the South, whereas European agriculturalists communities who settled in the north instead had a culture of cooperation and coordination (Cohen et al. 1996; Grosjean 2014).

Drawing on Wittfogel's seminal work on hydro societies and the extensive work by Ostrom and colleagues on irrigation systems as common pool resources that require a substantial degree of cooperation to work probably, I will argue that the presence of such systems, whose location is for the most part due to natural conditions dictated by the environment, fosters norms of cooperation that affects communities ability to mobilise.

As Wittfogel explains in his comparative analysis of oriental powers, because of the large amount of labour required to erect irrigation systems in arid and semiarid landscapes so to be able to farm these areas, people were forced to cooperate and create organisations that could manage these large projects (Wittfogel 1957: 18). Subsequently, these organ-

isations of cooperation laid the foundation of a social and political structure contrary to the one found in rainfed agricultural systems in the west.

These organisations developed into effective and centralised bureaucracies seen in ancient states such as Egypt and Babylon, whose power to organise people stemmed from the need to coordinate the management of water (Wittfogel 1957).

Having also irrigation practises as a central theme for her research on common pool resources, Ostrom has extensively worked with the puzzle of how people are able to uphold common irrigation systems despite strong incentives to follow one's own narrow self-interest and, as a consequence, deplete the resource (Ostrom 2015; Ostrom and Gardner 1993; Lam and Ostrom 2010). In her research on communal irrigation systems that vary across settings and for how long they have operated, it becomes apparent that to sustain these resource systems, users, have through multiple interactions and without outside intervention themselves developed complex institutions based on rules, monitoring mechanisms and norms of proper behaviour and cooperation (Ostrom 2015: 88-89; Ostrom and Gardner 1993: 109; Ostrom et al. 1999: 280).

Therefore, it seems fruitful to not just look at irrigation systems as only an example of successful social mobilisation, but also constituting a base for it. Because of its high demands on people to organise themselves for it to be a successful resource, it shapes the way people see themselves in relation to others and functions as an organisational focal point for social interaction.

Indeed this mechanism appears to be unfolding, as Talhelm *et. al.* show in a quasi-experimental setting in China measuring the degree of collectivism, as they find that people from districts where rice is cultivated have more developed norms of collectivism, compared to those coming from similar districts cultivating wheat (Talhelm et al. 2014). A finding they explain is because of the amount of labour and cooperation needed to uphold an irrigation system, which is vital for cultivating rice that creates an interdependent relationship between farmers. In the case wheat cultivation, a similar imperative for cooperation is not present as it does not demand the same amount of water as rice cultivation (ibid: 604). Besides affecting norms of collectivism, using econometric and experimental methods, it has become visible that farmers in the Philippines who either in the past or in the present have participated in irrigation schemes have been found to demonstrate more cooperative behaviour than farmers relying on rainfed farming techniques (Tsusaka et al. 2015; Fujiie, Hayami, and Kikuchi 2005). In Pakistan, people have moreover come to see traditional irrigation systems as a focal point for social interaction, and thereby as a vital part of the social structure of a well functioning community (Mustafa and Qazi 2007). This is also characteristic of communities in India that uses irrigation as they are more likely to attend public meetings and view their communities as being more peaceful (von Carnap 2017).

Based on the above, rural areas that rely on irrigation seems to have to a large degree than other farming communities evolved norms of cooperation and social networks connecting multiple individuals, thus it would be likely that such communities are more adapt in mobilising vigilante groups.

### 3.2.3.5 A latent dimension determining the ability to conduct collective action

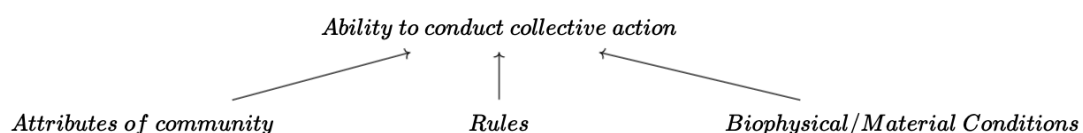
On the basis of the IAD framework, the study takes the view that in order to fully understand why some communities are able to mobilise vigilante groups and others fail, the three exogenous factors do not individually affect communities' ability to overcome collective action problems. Instead, they are associated with the same latent variable describing communities' ability to conduct collective action, as it affects the action situation that agents are situated in. That subsequently affects the agent's cost-benefit analysis on whether to participate in the collective act of mobilising vigilante groups. This latent variable is denoted *Ability to conduct collective action*, and its structure is depicted in figure 2. Thereby, based on community attributes, the latent variable determines the likelihood of a group being successful in organising a vigilante group.

This theoretical approach is in some aspects akin to one found in the social capital literature that argues that a latent variable describing the character of social networks in communities and social trust also affects the ability of agents to conduct collective action (Putnam, Leonardi, and Nanetti 1993; Fukuyama 2001; Ostrom and Ahn 2007). The two approaches depart, as the approach outlined in this study has a stronger focus on institutions and also consider how biophysical/material factors determine communities' ability to perform collective action.

As argued at the beginning of this section a group's ability to overcome collective action problems does not have a direct causal effect on vigilante mobilisation, but instead acts as a conditioning element on the effect state presence and the security environment. This leads to the following two conditional hypothesis:

**Hypothesis 3:** *The effect of state presence on vigilante mobilisation is stronger in communities able to overcome collective action problems.*

**Hypothesis 4:** *The effect of the security environment on vigilante mobilisation is stronger in communities able to overcome collective action problems.*



**Figure 2:** The three dimensions constituting the latent dimension of communities' ability to conduct collective action.

## 4 Data and operationalisation

Testing the proposed theoretical relationships is done in an African context using ethnic settlement areas as the unit of analysis. The choice of ethnic groups is grounded in the fact that ethnic groups in the region function as an essential community identifier for individuals (Ekeh 1975: 107). As a result, it allows the study to come closer to the actual social units that shape the agent's behaviour, thereby more accurately gauging how communities condition vigilante mobilisation.

Furthermore, when an agent finds herself in a situation of insecurity and thereby becomes uncertain about her prospects, her decision-making process is likely rooted in shared knowledge and behavioural schemes from her immediate social environment (Jentzsch 2022: 25-26). Building again upon Ekeh's argumentation of the relationship between the agent and ethnic communities (Ekeh 1975), it seems reasonable that when individuals in an African context find themselves in violent situations causing a high degree of uncertainty, they are likely to resolve to patterns of behaviour specific to their ethnic group.

Thirdly, having ethnic settlement areas as the unit of analysis allows us to have a more fine-grained spatial unit instead of overtly wide units, which is important as violent actions are not something that covers the entirety of the state and the proposed theoretical mechanisms focus on the group level. Moreover, using smaller spatial units will also circumvent the problem of ecological inference, which states that we cannot infer from a result based on aggregated data to a lower-level unit such as groups (Cederman and Gleditsch 2009; Toshkov 2016: 253). Data on ethnic settlement areas are provided by the Geo-referencing Ethnic Power Relations (GeoEPR hereafter) project, which collects information on the relationship between state power and politically relevant ethnic groups. The project defines ethnicity as: "*any subjectively experienced sense of commonality based on the belief in common ancestry and shared culture*", and accounts a group as being politically relevant if a significant political actor claims to represent it in the political arena or if the group is experiencing political discrimination.

The collection of data on ethnic settlement areas is done through expert surveys where country experts are asked to provide maps of the areas inside a state that a given ethnic group inhabits (Wucherpfennig et al. 2011: 427). A map of the final collection of ethnic settlement areas appears in figure 3 below. Though, as pointed out by Wig and Kromrey, in Somalia, it is not ethnicity that is the main social institution that people reflect themselves in. Instead, it is clans that constitute the main social fabric in the country (Wig and Kromrey 2018). Because GeoEPR only records ethnic settlement areas, the analysis is not able to capture the effect of this Somali social organisation. However, as GeoEPR is time-variant, the analysis is able to account for the changing nature of settlement patterns due to, for instance, sociodemographic or political changes. Secondly, it covers the whole of the African continent, and contrary to survey-based methods of identifying settlement patterns, it is able to capture settlement patterns where surveys cannot be conducted due to, for instance, civil war.

#### 4.1 The dependent variable: Vigilante activity

Vigilante mobilisation is measured using geo-referenced data on conflict events. Data is provided by The Armed Conflict Location & Event Data Project (ACLED). It is generated using news sources, expert and NGO reports on violent and non-violent conflict events worldwide, with a particular focus on Africa.

Conflict events consist of a series of actions realised by one actor or between multiple actors. Contrary to similar data sets, there is not a fatality-based threshold for the inclusion of events, nor do they have to be part of pre-defined modes of organised violence. This approach allows the study to include a broader subset of actions carried out by vigilante groups. Actors recorded in the data set range from state actors to non-state actors and they need to have an organisational structure that is cohesive and not mobilised for a single event (Raleigh et al. 2010). Importantly for this study, ACLED records if an actor can be labelled as a *communal militia* or an *identity militia* which is defined as: “organised around a collective, common feature including community, region, religion or, in exceptional cases, livelihood” and is commonly referred to for instance “communal” or “local” militias.

Moreover, such groups act locally and, among other things, in pursuance of resources and security (ACLED 2021: 23-24). The study will argue that this categorisation fits the definition of vigilante groups as it has a bottom-up nature and is most present in the security dimension in the universe of CBAGs. Besides, ACLED also categorises whether groups can be defined as *political militias*, thus it is ensured that our signal of the appearance of vigilante groups is not confused with that of militias.

Using the location and time of conflict events between vigilante groups and the other identified actors, a group-year data set is created that measures the activity level of vigilante groups inside ethnic settlement areas per year.

However, using ethnic settlement areas runs the risk of ascribing the presence of vigilante groups to an ethnic group where they do not originate. Thus, the measure is blurred when vigilante groups are active in areas of another ethnic group. Secondly, it can be argued that the data source inhibits what Weidman describes as reporting bias. Because of the sampling of events is partially conditioned on media presence, we will underestimate vigilante activity where media coverage is not that widespread, i.e., rural areas. Besides underestimating the effect, reporting bias does not constitute a major problem as it only leads to type two errors. Though if the independent variable also inhibits the same bias, thereby creating a situation where the errors in both the dependent and independent variable are correlated, the estimates will be biased (Nils B. Weidmann 2016). Compared to other data sources on vigilante groups, a major advantage of this data is that unlike the pro-government militia database that records both vigilante and militia groups (Magid and Schon 2018), vigilante mobilisation in this case is derived from observable events and not just by their existence (Raleigh and Kishi 2020). This approach is also in line with other scholars who have investigated the determinants of rebel and militia mobilisation (Müller-Crepon, Hunziker, and Cederman 2021; Wig and Kromrey 2018).

The variable ranges from 0 to 256 violent encounters where vigilante groups have been involved per year, per group. Its spatial distribution of total vigilante activity level on a log scale throughout the study period and the temporal distribution for the 21 ethnic groups who are experiencing the most vigilante group activity is depicted in figure 3. Here we can see that vigilante group activity is mostly centred in West and North Africa, and that vigilante group activity has increased over the years.

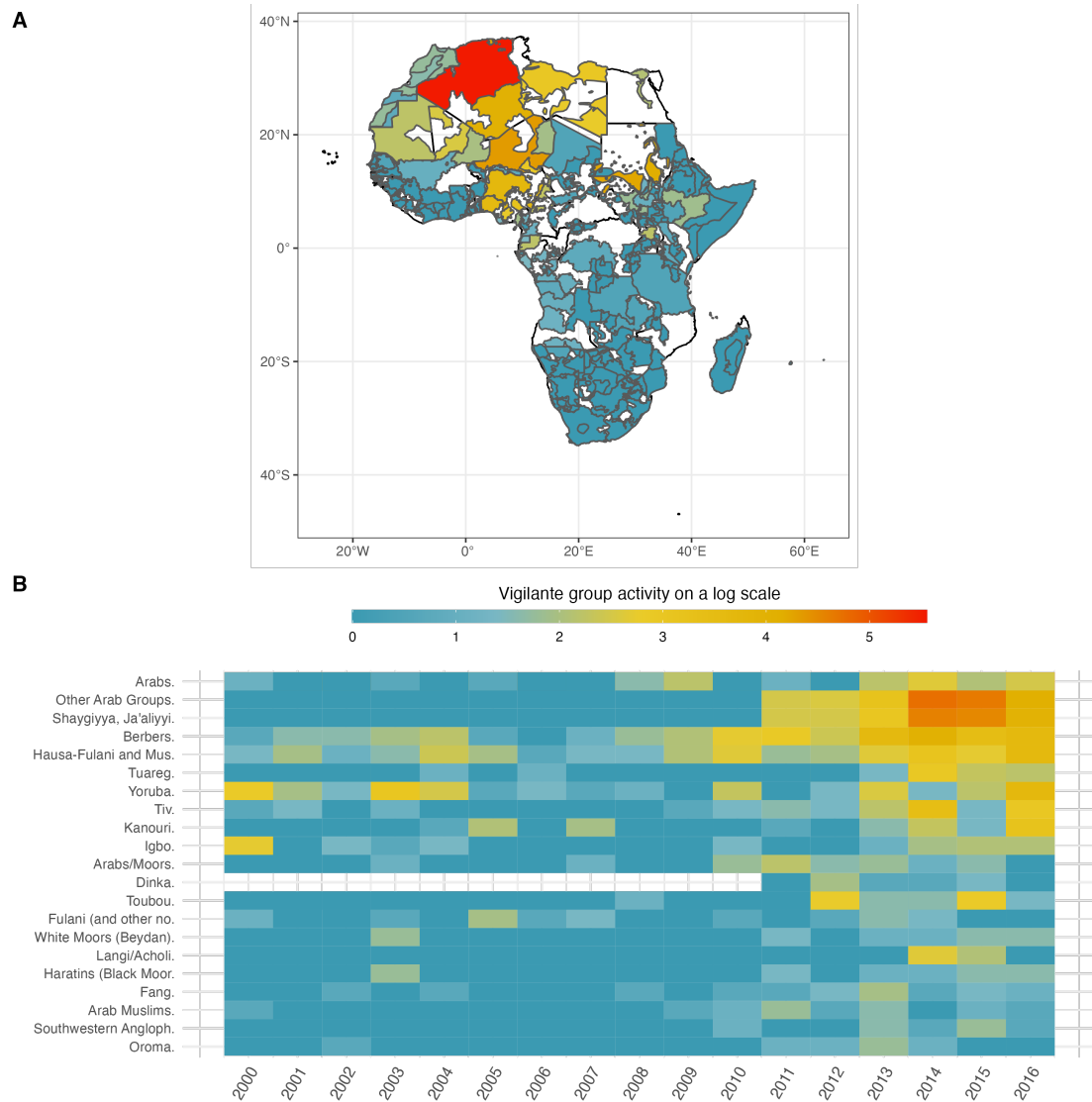
## 4.2 Independent variables

### 4.2.1 State access

As pointed out by scholars, state access in Africa is closely connected with the state's ability to physically reach its population. Here the character of a state's transportation network plays a vital role since it constitutes the foundational infrastructure that permits the state to build and maintain institutions that can ensure social order (Müller-Crepon, Hunziker, and Cederman 2021: 568). Following Müller-Crepon and Müller-Crepon *et. al.* measuring how well the state can access ethnic groups inside its territory and thereby be able to assert itself is done based on the average travel time from a country's capital or regional capitals to individuals inside an ethnic group's settlement areas. This is calculated using a weighted population average that has the following mathematical form:

$$stateaccess_g = \ln \left( \frac{1}{I_g} \sum_{i=1}^{I_g} 1 + time_{C,i} \right)$$

Here  $time_{C,i}$  denotes the travelling time from the country or regional capital,  $C$ , to an individual  $i$  using the shortest possible path.  $I_g$  enumerates individuals belonging to an ethnic settlement area ( $g$ ), constituting the population weight used in the formula. Using a population-weighted mean ensures that the travelling time to more densely populated areas is weighted higher than that of sparsely populated ones. I follow Müller-Crepon and log transform the measure, since it better captures the convex relationship between the capacity of the state to assert itself in an area and travelling time (Müller-Crepon 2021: 2). To compute the formula gridded raster data on travelling times and population counts are used together with EPR polygons to devise the final measure. Data on travelling time is provided by Müller-Crepon, who uses digitised road networks of Africa to estimate the travelling time from a given grid-cell to either the national or regional capital per year. The approach is similar to Google maps and considers the condition of roads when estimating travelling time (Müller-Crepon 2021). The main advantage of this data source is the time scale of the data, as it allows us to investigate the within variation in our independent variable. Population data is provided by the WorldPop project that, through the use of UN population census data and covariates, is combined in a machine learning model so to be able to accurately estimate the number



**Figure 3:** Vigilante group activity inside ethnic settlement areas from 2000 to 2016 on a log-scale. Figure A shows the spatial distribution of the sum of vigilante group activity throughout the studied period. Figure B shows yearly vigilante group activity for the 21 ethnic groups experiencing most vigilante group activity

of people living inside grid-cells (WorldPop 2018). This information is used to calculate the population size of ethnic groups members inside a given settlement area  $I_g$  and the approximate location of individual group members  $i$  per year. The thesis opts for the unconstrained version of the population dataset that does not take into consideration settlement patterns when estimating population counts, as the accuracy of these data sources has been found to vary through time and between spatial units, thereby limiting the comparative potential of the analysis (Stevens et al. 2015).

The final measure based on travelling time from the national capital ranges from -0.58 to 4.12, where higher values indicate an increase in the mean travelling time to members of an ethnic group on a log scale.

Using this measure improves the measurement validity of this phenomenon compared to other studies in this field that uses either a straight line from the capital to a given location or the density of paved roads in settlement areas (Raleigh and Kishi 2020: 593; Peic 2021: 1036; Arjona and Kalyvas 2009: 11). This is due to the fact that it more closely mirrors the proposed causal mechanism of the state's ability to exercise power in populated areas, and not as road density that instead can be argued to capture the degree of internal connectedness between group members (Müller-Crepon, Hunziker, and Cederman 2021). It can be argued that the measure overestimates a state's ability to project power in an area, as it also depends on other factors such as the presence of police stations or similar government institutions. However, the measure has been found to correlate very well with the state capacity index developed by Afrobarometer, which is a citizen-focused survey of the appearance of government institutions in Africa (Müller-Crepon 2021: 3). Furthermore, using this measure has a couple of advantages, as it firstly recognise that a state's projection of power is not a constant throughout its territory, which national focused indices assume. Moreover, opposite indices, such as the fragile state index developed by *The Fund for Peace* (Nasri et al. 2021) or the OECD equivalent (OECD 2020), it does not include normative indicators such as human rights violations or militias' presence in a country in its assessment of whether a state can provide security, which would clutter our ability to measure the hypothesised relationship. Lastly, it should be noted that there is a possibility that this measure introduces a reporting bias in the final results since reporting of violent events is related to how accessible an area is (Nils B. Weidmann 2016: 208). Though, as the ACLED data does not rely solely on media sources, it should be less susceptible to reporting bias (ibid.: 215). A sensitivity analysis of this problem is done by creating a dichotomised version of dependent variable, and conducting a logistic regression analysis. This is done as it decreases the effect of reporting bias (Pierskalla and Hollenbach 2013: 212; Hollenbach and Pierskalla 2017), though not eliminating it (Nils B. Weidmann 2016).

#### 4.2.2 Security environment

When it comes to investigating how the security environment in which ethnic groups reside in affects the propensity to mobilise vigilante groups, this study devises a measure



based on the number of violent encounters in neighbouring ethnic areas. Using ACLED data, a subset of violent encounters are chosen based on whether rebels, militias or other vigilante groups are involved in violence or one-sided violence against government forces, civilians or between the before mentioned groups. These encounters are chosen as research has highlighted that vigilante groups have, in a number of cases, been mobilised as a response to the activity level of these groups (Zech 2016; Peic 2021; Jentzsch 2022). The number of violent encounters in neighbouring ethnic areas are applied, so to create a spatial lag of the average threat level in neighbouring ethnic groups' settlement area, thereby capturing the potential for aggression towards a given ethnic group. The spatial-lag is given by the following formula, where  $N_g$  is the number of neighbouring ethnic groups and  $activity_n$  is the activity level in each of the neighbouring areas ( $n$ ).

$$\text{security environment} = \frac{1}{N_g} \sum_{i=1}^{N_g} activity_n$$

The measure is time-varying and is deemed to have a higher measurement validity compared to that of state-level measures, such as the presence of civil war, as they do not take into account the geographical proximity of where violence is unfolding. Thus, a more localised measure of the threat environment is obtained. The measure ranges from 0 to 984, where higher values are related to an increase in the mean activity level of violent actors in neighbouring areas.

### 4.3 Ability to conduct collective action

To gauge community attributes, rules and norms relating to a given ethnic group, data on ethnic groups' traditional institutions is applied. This data source is chosen as it focuses on the character of ethnic communities' traditional institutions, thus allowing the analysis to illuminate how the institutional context that agents are embedded in affect collective action.

The data originates from a web survey where a diverse set of experts on ethnic groups were asked to answer a series of questions about the group of their expertise. The questions revolve around the internal institutional structure of an ethnic group and their level of centralisation, as well as their formal and informal interactions with state institutions. A total of 2580 responses to 1557 groups were submitted<sup>2</sup>. When more answers were given to one question, aggregation was applied to obtain a collective assessment of the given group attribute in question (Holzinger et al. 2019).

Matching the ethnic groups identified in this data source with that of the EPR groups

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<sup>2</sup>These data are from the Reinhart Koselleck Project "Traditional Governance and Modern Statehood" carried out at the University of Konstanz, Germany (German Research Foundation (DFG) grant HO 1811/10-1 PI: Katharina Holzinger). Data collection by Katharina Holzinger, Axel Bayer, Daniela Behr, Roos Haer, Clara Neupert-Wentz, Fabian Bergmann, and Sven-Patrick Schmid.

was achieved by the use of a matching scheme developed by Neupert-Wentz (Neupert-Wentz 2020). After matching a total of 196 groups remained, whose spatial settlement area appear in figure 3.

#### 4.3.1 Attributes of Community

Measuring whether ethnic groups have an institutional setting that can act as an organisational focal point to disperse information between members, the following collective decision-making bodies have been chosen:

- Council of elders
- Customary assembly
- Level of customary institution

The first two components are binary measures of whether ethnic groups either have a council of elders or customary assemblies. The *Level of customary institutions* is an ordinal measure gauging whether a group's highest level of traditional institution exists either at the kingdom, regional or locale level. These measures are argued to be in line with a similar measure developed by Goist and Kern (Goist and Kern 2018). When it comes to the existence of cooperative arrangements between individuals in ethnic communities, the following unofficial and official functions of traditional institutions are chosen as they require cooperation:

- Land administration
- Natural resource management
- Security matters, peace, and order
- Infrastructural provisions

The chosen components are all binary, indicating the presence of such a function. They are chosen on the ground on whether they are assessed as requiring cooperation between individuals.

#### 4.3.2 Rules

Gauging the presence of rules and norms in a community, the following three binary questions bellow regarding the presence of customary rules and norms and institutional organs to deal with such rules are chosen. Firstly, they are chosen on the ground that they capture the presence of both informal and formal rules used to regulate an agent's behaviour. Moreover the presence of customary institutional bodies that can enforce such rules are important since they act as a third-party enforcement mechanisms in ethnic groups, thereby ensuring that agents comply with the rules and norms, and thereof increase the cost of breaking them (Wiessner 2020).

- Whether ethnic groups have customary rules and norms
- Whether ethnic groups have customary courts
- Whether ethnic groups have mechanisms for dispute resolutions

#### 4.3.3 Biophysical/ Material Conditions

The biophysical/material conditions of an ethnic community are measured using two measures.

Firstly, when measuring the spatial dispersion of a group, this study follows the proposed method by Weidmann of how to calculate the degree that members of an ethnic group is dispersed. The central measure is denoted “ $D$ ” where higher values correspond to more dispersed groups, and is calculated using the below formula:

$$D = \frac{\sum_{i,j \in \{1..N\}, i < j} p(c_i)p(c_j)\log(d(c_i, c_j))}{\sum_{i,j \in \{1..N\}, i < j} p(c_i)p(c_j)}$$

Using gridded population data from the WorldPop project, the formula uses the number of people inside each settlement cluster, denoted “ $P(C_n)$ ” and the logged minimal geodesic distance between each cluster “ $d(...)$ ”. By computing a population-weighted average of the logged minimal geodesic distances between clusters, a measure is created where the distance between heavily populated clusters is weighted higher than that of sparsely populated ones (Nils B. Weidmann 2009: 536). The measure ranges from 0 to 6.31, where lower values indicate that an ethnic group is more centralised, whereas higher values indicate a more dispersed ethnic group.

The second measure captures to what extent an ethnic group is cultivating their land using irrigation techniques. The measure is devised using satellite data from *The Copernicus Climate Change Service* (CCI) on land use and population data from the WorldPop project. The land use data is generated using an algorithm that applies different satellites and machine learning classification techniques so to be able to generate yearly assessments of what a given grid-cell of land is being used for in accordance with the UN Land Cover Classification System. Importantly for this study, the data records whether a grid-cell is classified as “*Cropland, irrigated or post-flooding*”, indicating if irrigation is used as the primary cultivating technique in an area (ESA 2017). The final measure is created by combining land use data, ethnic settlement areas and WorldPop population data, enabling the study to calculate the percentage of an ethnic group’s members living in crop land areas being irrigated. Since there do exist a large-scale land survey or governmental data on the location of irrigation systems, it can be hard to gauge the measurement error due to the challenge of estimating the different parameters from outer space. Though, in a comprehensive investigation of the accuracy of the classification model, where model predictions were compared to other models using

satellite data and field studies, the algorithm achieved an accuracy between 83% and 89% (ESA 2017: 41). Thereby indicating that the validity of this measure is high, and as it is the same approach used to classify all the years in the analysis the reliability is also high. Moreover, as it is not affected by the dependent variable i.e. conflict related violence, it is ensured that the measure does not induce a systematic bias in the final results (Schultz and Mankin 2019). The scale of the measure ranges from 0% to 100% where higher values indicate that a larger share of members of an ethnic group living in areas being irrigated.

#### 4.3.4 Latent factor analysis

In order to test if the different measures related to community attributes, rules, and biophysical/material conditions all capture the same latent dimension of *ability to conduct collective action*, a confirmatory factor analysis (CFA) is performed (Mair 2018: 39). Because only the population dispersion and the share of people living in areas being irrigated are time-varying measures they are converted to their average level in the CFA. The final result appears in table 1, which shows the factor loadings of each measure and how well the models fit the data:

From the CFA, it becomes clear that in model A where all measures are included, only the measures relating to community attributes and rules capture the same latent dimension ranging from 0.34 to 0.79, though having dispute resolutions negatively loads with the latent dimension. Moreover, the biophysical/material indicators either do not have significant loadings or have large negative loadings, which, together with dispute resolutions, go against the theoretical expectation. Because of that, a CFA is also conducted where the biophysical/material indicators are excluded (Model B). Surprisingly, the factor loadings of the existence of dispute resolutions in ethnic groups become negative like the other measures. Furthermore, looking at fit indices Model B achieves both lower RMSEA and  $\chi^2$  and much higher values on the comparative fit index (CFI) and Tucker-Lewis index (TLI) when compared to Model A, which combined indicates that Model B constitute a much better fit to the data than Model A.

Based on the above CFA it is assessed that only the measures related to community attributes and rules capture the same latent dimension, which is used to create a final index of the degree to which communities have an institutional setting facilitating collective action, which is denoted *Collective institutions*. Each ethnic group's score on this index is calculated using the factor score from the CFA, which are the weighted sum of the measures relating to community attributes and rules. Thereby, each measure's contribution to the index depends on how well it relates to the latent variable. This approach ensures that the index reflects that each measure has a unique association with the latent variable of collective institutions and not an uniform one, hence the index more precisely encapsulate the latent variable's numerical form (Mair 2018: 29).

It could be argued that this measure instead has more to do with governmental functions in ethnic groups, which scholars have categorised as the existence of formal customary

Table 1 - Conformitory factor analysis

|   | Model A                | Model B   |
|---|------------------------|-----------|
|   | Estimate               | Estimate  |
|   | <u>Factor Loadings</u> |           |
| <u>Attributes of Community</u>          |                        |           |
| Council of elders                       | 0.48***                | -0.49***  |
| Customary assembly                      | 0.34***                | -0.39***  |
| Level customary institution             | 0.43***                | -0.51***  |
| Land administration                     | 0.55***                | -0.71***  |
| Natural resource management             | 0.48***                | -0.75***  |
| Security provisions                     | 0.50***                | -0.78***  |
| Infrastructure                          | 0.56***                | -0.55***  |
| <u>Rules</u>                            |                        |           |
| Dispute resolution                      | -0.68***               | -0.80***  |
| Customary rules                         | 0.60***                | -0.78***  |
| Customary courts                        | 0.79***                | -0.78***  |
| <u>Biophysical/ Material Conditions</u> |                        |           |
| Pop. in irrigated areas                 | -3.44***               |           |
| Pop. dispersion                         | -0.09                  |           |
|   | <u>Fit Indices</u>     |           |
| $\chi^2$                                | 451.21                 | 31.18     |
| RMSEA.SCALED                            | 0.19                   | 0.03      |
| CFI.SCALED                              | 0.60                   | 0.99      |
| TLI.SCALED                              | 0.51                   | 0.98      |
| Scaled $\chi^2$                         | 363.15(54)***          | 40.34(35) |
| +Fixed parameter                        |                        |           |
| * p<0.05, ** p<0.01, *** p<0.001        |                        |           |

institutions or the democraticness of customary institutions (Wig and Kromrey 2018: 418; Neupert-Wentz, Kromrey, and Bayer 2022). However, such indices do not include the unofficial and official functions of traditional organisations, underscoring this index's uniqueness in capturing whether ethnic groups have institutions that facilitate collective action.

In order to also investigate whether the biophysical/material indicators condition the effect of the two independent variables, the fraction of community members living in irrigated areas and ethnic groups spatial dispersion are also included in the analysis, but as two separate measures. An exploratory factor analysis (EFA) is also conducted as a sensitivity test, distinguishing itself from a CFA by not assuming the number of latent dimensions beforehand. The result of the EFA appears in appendix 1 and corroborates the results of there being more than one latent dimension in the data. Moreover, the EFA shows that most of the variation in the data is explained by the collective institution measure.

The final index achieves a Cronbach's alpha of 0.87, indicating a high measurement reliability. The index ranges from -2.05 to 1.03 where higher values are associated with groups having more developed institutions for conducting collective action.

## 5 Estimation strategy

The final data set consists of repeated observations of 196 ethnic groups within 37 African states from 2000 to 2016, resulting in 3009 group years. This data structure allows the study to investigate the hypotheses using a hybrid-multilevel regression model that applies the causal identification strategy found in fixed-effects models while at the same time being able to take into account the nested structure of ethnic groups within countries (Bell, Fairbrother, and Jones 2019; Paul David Allison 2005: 32; Hamaker and Muthén 2020; Morgan 2013: 118). Central to this model is the decomposing of time-varying predictors into two parts; one representing the between-group variation, whereas the other representing the within-group variation. The between-group estimate is the specific mean for group  $i$  on the time-varying predictors, which is denoted as:  $\bar{x}_i$ , and captures the average effect between groups. The within estimator is calculated using the demeaned method where the time-varying predictor for group  $i$  in year  $t$  is subtracted from the group mean:  $x_{i,t} - \bar{x}_i$ . This estimator is akin to the conditional estimator found in fixed-effect models and controls for unobserved time-invariant confounders, thus increasing the internal validity of the analysis (Paul David Allison 2005: 33; Morgan 2013: 118).

A linear time trend is included in the analysis so to account for simultaneous but unrelated time trends in both the between and within estimator and the dependent variable (Fairbrother 2014; Finch, Bolin, and Kelley 2019: 76).

An advantage of conducting this operation in a multilevel regression framework is the possibility to explicitly model the nested structure of the data. Firstly, this is important

as the analysis is working with group-years which are nested in groups. Secondly, as indicated by figure 3, the activity level of vigilante groups seems also to be clustered within state borders. Analysing how much observations correlate together on the dependent variable within states results in an inter class coefficient (ICC) of 0.526, which supports the notion that vigilante activity is nested within states. This structure violates the assumption of observations coming from the same population and being independent, which biases estimates and standard errors (Gelman and Hill 2007: 7-8). Therefore, in order to deal with this structure, a two-level random intercept model is applied, where observations are nested in ethnic groups, who are moreover nested in states.

Another advantage of the multilevel framework is the possibility of being more flexible when choosing the suitable functional form for the statistical analysis (Paul D. Allison and Waterman 2002; Morgan 2013: 118). Because of the non-negative nature of the dependent variable linear regression constitutes an ill fit since it assumes a continuous response variable that can take on both negative and positive values and that the error term follows a Gaussian distribution.

Event count models in the form of Poisson or Negative-Binomial models appear to have a more appropriate functional form, as they can only take on non-negative values and integers. To choose between the two forms, an analysis of whether the dependent variable suffers from overdispersion, a situation where the variance is higher than expected, is performed (Paul David Allison 2005: 93; King 1998: 121; Hoffmann 2016: 132). It is found that overdispersion is present, which indicates that the central assumption of equal means and variance in the Poisson model is violated, and thereby a Negative-Binomial model is chosen as the functional form for the analysis. Other functional forms and linear fixed-effects models will be used as a sensitivity analysis of whether the results are robust to a change in the choice of modelling approach.

When testing time-varying interaction effects in a hybrid multilevel framework two methods have been proposed. Firstly, Schunck argues that the product term between the dependent variable and the interaction variable for group  $i$  in year  $t$ :  $x_{i,t} z_{i,t}$  should as the main predictors, be decomposed into a between estimator,  $\bar{x}_i \bar{z}_i$ , and a within estimator:  $x_{i,t} z_{i,t} - \bar{x}_i \bar{z}_i$  (Schunck 2013).

Opposite to Schunck's approach, Giesselmann and Schmidt-Catran argue that this method will do fine when only the dependent variable is time-varying, but when the interaction term is also time-varying unobserved time-invariant confounders are not controlled for, thus the final estimate will be biased. To obtain an unbiased interaction term, they propose the double demeaned method where one takes the product between the two demeaned terms:  $(x_{i,t} - \bar{x}_i)(z_{i,t} - \bar{z}_i)$ . This product term should when be decomposed into a between term,  $(\bar{x}_i - \bar{x}_i)(\bar{z}_i - \bar{z}_i)$ , and a within component that controls for unobserved time-invariant confounders:  $(x_{i,t} - \bar{x}_i)(z_{i,t} - \bar{z}_i) - (\bar{x}_i - \bar{x}_i)(\bar{z}_i - \bar{z}_i)$  (Giesselmann and Schmidt-Catran 2022).

Based on the above, the analysis will rely on the double demeaned method, though as a sensitivity analysis the Schunck method will also be used.

Despite being able to control for unobserved time-invariant confounders, the within es-

timator will not be able to control for time-varying confounders. As a result, omitted variable bias will be introduced in the analysis. In order to account for that, a series of time-varying confounders on both the group and state level are included in the analysis. In this endeavour, the study follows Pearl's recommendation that only confounders that affect both the dependent and independent variable are included, which besides guarding against noncausal correlations, ensures that collider bias is not introduced in the analysis (Pearl 2000). This bias is introduced when an analysis controls for a variable that is influenced by either the dependent or independent variable, which is problematic since its presence will cause spurious relationships in the analysis and thereby bias the final results (Cunningham 2021: 98).

Moreover, using this selection criterion also ensures that we do not include variables that are at least in part consequences of the key theoretical predictors in question. If such a variable is included, it will introduce post-treatment bias in the analysis and bias the final estimates (King and Zeng 2006: 147).

On the group level, the logged total population of an ethnic group is included, as it can be expected that more populous groups would be more able to mobilise vigilante groups since they have a larger pool of potential recruits that can be enrolled (Neupert-Wentz 2020). Furthermore, it would seem reasonable to expect that areas, where more people are located are also the areas that will be prioritised by governmental infrastructural developers when considering the location of new roads. Thus, more populous areas are expected to have more developed road networks (Burrier 2019). Regarding the effect of population size on the number of violent events in neighbouring ethnic areas, strong empirical evidence supports the theoretical claim that an increase in population size increases the probability of violent conflicts inside a territory (Brückner 2010). However, when it comes to the effect on violence levels in neighbouring areas it has not received the same degree of empirical evaluation. Two possible avenues of reasoning linking population size and violence in neighbouring areas, can be identified. Firstly, according to Weiner, an increase in population size will increase the number of migrants in neighbouring areas, who might not be welcomed by the population in the host area, thereby acting as a destabilising factor (Weiner 1992). Secondly, the population size in the home country of foreign fighters has been found to affect the number of foreign fighters participating in conflicts in neighbouring areas (Pokalova 2019), thus it seems reasonable to assume that an increase in violent conflicts will be a side effect of this phenomena. Population data comes from the WorldPop project.

Three other confounders are controlled for on the state level. Firstly, GDP per capita adjusted for inflation is included as it has been found to affect both vigilante mobilisation, road infrastructure and violence levels (Dao 2008; Peic 2021; Collier and Hoeffler 2004; Fearon and Laitin 2003). Secondly, more democratic states are expected to affect vigilante mobilisation and violence in neighbouring ethnic areas through lower levels of violence inside a state's borders, which is opposite to autocratic states, which are generally connected with higher levels of violence (Krishnarajan et al. 2017). The level of democracy is also expected to affect the expansion of road infrastructure, as having locally elected leaders increases the likelihood that new infrastructure will be built in



their particular constituency (Ikezue and Ezeah 2016; Burrier 2019). Measuring the level of democracy is done using the V-dem egalitarian democracy index. The index captures whether a state can be considered an electoral democracy and, moreover, if resources and power are distributed equally among groups (Coppedge 2021). Thirdly, to account for the general conflict level in a state, a binary measure of whether there is ongoing conflict within a state is provided by the UCDP armed conflict database (Sundberg and Melander 2013). Its inclusion ensures that the effect on vigilante mobilisation is not a response to the general security situation in the state, as it seems reasonable that both violence in neighbouring ethnic areas and road infrastructure are affected by the overall conflict level in a state.

**Table 2 - Summary Statistics**

| Variable                            | N    | Mean        | Std. Dev.   | Min    | Pctl. 25  | Pctl. 75    | Max          |
|-------------------------------------|------|-------------|-------------|--------|-----------|-------------|--------------|
| Vigilante group activity            | 3541 | 1.169       | 10.386      | 0      | 0         | 0           | 256          |
| State access from capital           | 3541 | 2.092       | 0.863       | -0.58  | 1.55      | 2.617       | 4.128        |
| Security environment                | 3541 | 12.518      | 54.139      | 0      | 0         | 1.5         | 984.5        |
| State access from regional capital  | 3539 | 1.225       | 0.701       | -0.593 | 0.718     | 1.573       | 3.883        |
| % of pop. living in irrigated areas | 3541 | 2.07        | 7.22        | 0      | 0         | 0.925       | 68.273       |
| Pop. dispersion                     | 3541 | 1.729       | 2.051       | 0      | 0         | 3.675       | 6.318        |
| Collective institutions             | 2427 | -0.062      | 0.791       | -2.058 | -0.657    | 0.608       | 1.035        |
| Population in ethnic areas          | 3541 | 3519109.329 | 6653436.588 | 252.03 | 295176.81 | 3752379.053 | 56309612.625 |
| GDP per. capita in country          | 3475 | 0           | 0.967       | -2.081 | -0.847    | 0.779       | 3.282        |
| Democracy score                     | 3075 | 0.283       | 0.157       | 0.036  | 0.158     | 0.437       | 0.572        |
| Violent conflict in country         | 3541 |             |             |        |           |             |              |
| ... No conflict                     | 2431 | 68.7%       |             |        |           |             |              |
| ... Conflict                        | 1110 | 31.3%       |             |        |           |             |              |

## 6 Results

The statistical test of hypothesis 1 and 2 appears in table 3, which shows the results of three negative binomial models that model the log of the expected activity level of vigilante groups as a function of the main variables of interest and confounders.

When discussing the results, the estimated effects are also presented on a multiplicative scale by converting them to *Incidence Ratio Rates* (IRR) using the exponent of the estimates ( $e^\beta$ ) and on an additive scale by calculating the *Average Marginal Effect* (AME). The former highlighting how the ratio by which vigilante group activity changes with a unit change in the independent variables, whereas the latter underlines the average expected change on a probability scale (Hoffmann 2016: 137-138; Buis 2010). In all models, confounders are included.

The between estimator is denoted “*M*” and the within estimator is denoted “*DM*”. The analysis will primarily focus on the within estimators as they do not, to the same extent as the between estimators, suffer from omitted variable bias. However, the between effect should not be discarded as it illuminates on average, how much does ethnic groups differ on the same independent variable. Thereby, allowing the thesis to understand the

contextual effects of the independent variables, for instance, the effect of groups being situated in general more hostile security environments throughout the studied period (Bell, Fairbrother, and Jones 2019; Hamaker and Muthén 2020; Howard 2015).

As the estimation of confidence intervals in non-linear multilevel models rests on a series of assumptions, which are commonly violated due to the complex structure of the model (Thai et al. 2014; Meijler, Bausing, and Leeden 1998), confidence intervals are derived using parametric bootstrapping with 500 iterations. A method where samples are drawn with replacement from the original dataset and the model is re-fitted on the new sample. The results are then used to obtain estimates of the confidence intervals (Meijler, Bausing, and Leeden 1998). Because of this is a computational heavy process only models presented in this section of the study are bootstrapped. Opposite the confidence intervals, P-values are calculated analytically using Welch t-test.

**Table 3 - Negative Binomial multilevel models of vigilante group activity, 2000-2016**

|  | M1                              | M2                              | M3                              |
|--|---------------------------------|---------------------------------|---------------------------------|
| <i>Predictors</i>                                    | <i>Log-Mean</i>                 | <i>Log-Mean</i>                 | <i>Log-Mean</i>                 |
| Intercept  | -18.701 ***<br>[-24.55; -13.78] | -14.439 ***<br>[-20.03; -10.46] | -19.076 ***<br>[-25.57; -13.90] |
| Time   | 0.138 ***<br>[ 0.07; 0.22]      | 0.116 ***<br>[ 0.04; 0.20]      | 0.115 ***<br>[ 0.03; 0.20]      |
| State access M (log)                                 | 1.030 **<br>[ 0.36; 1.67]       |                                 | 1.001 **<br>[0.40; 1.73]        |
| State access DM (log) (SADM)                         | 1.235<br>[ -1.28; 3.01]         |                                 | 1.090<br>[ -1.95; 2.65]         |
| Security environment M                               |                                 | 0.008 *<br>[ -0.01; 0.02]       | 0.008 *<br>[ -0.00; 0.02]       |
| Security environment DM (SEDM)                       |                                 | 0.002 *<br>[ -0.00; 0.01]       | 0.002 *<br>[ -0.00; 0.01]       |
| Confounders  | Yes                             | Yes                             | Yes                             |
| Random Effects                                       |                                 |                                 |                                 |
| $\sigma^2$   | 5.68                            | 5.63                            | 5.64                            |
| $\tau_{00}$  | 1.84 Group:State<br>7.00 State  | 1.98 Group:State<br>6.33 State  | 1.79 Group:State<br>5.45 State  |
| ICC  | 0.61                            | 0.60                            | 0.56                            |
| N  | 196 Group<br>37 State           | 196 Group<br>37 State           | 196 Group<br>37 State           |
| Observations   | 3009                            | 3009                            | 3009                            |
| Marginal R <sup>2</sup> / Conditional R <sup>2</sup> | 0.148 / 0.667                   | 0.132 / 0.649                   | 0.182 / 0.642                   |
| AIC  | 2497.225                        | 2495.989                        | 2488.496                        |
| log-Likelihood                                       | -1236.612                       | -1235.994                       | -1230.248                       |

95% bootstrap confidence intervals in square brackets [lower; upper] (500 iterations)  
P-values computed using welch t-test: \* p<0.05 \*\* p<0.01 \*\*\* p<0.001

Before assessing the hypothesis, it is worth noting that in all three models, the estimate of a yearly increase from 2000 to 2016 is associated with a significant positive effect on vigilante activity. In model 3, which controls for both for the main independent variables and confounders, a yearly increase in the studied period is associated with an increase in the IRR of vigilante group activity by a factor of 1.12 or an AME of 15%

in expected activity level. This result indicates that throughout the studied period, vigilante groups have become more active on the African continent.

When it comes to the effect of the state's ability to be present in ethnic settlement areas investigated in model 1, both the between and the within estimates have a positive effect. This indicates that when the mean travelling time from the state capital to members of an ethnic group increases, vigilante groups become more active. Though, only the between estimate is significantly different from zero. As a result, the analysis is only able to establish that there are signs of a significant positive difference of 1.030 in the expected log count of vigilante activity. This effect corresponds to an IRR increase by a factor of 2.801 and an AME of 141% when moving from ethnic groups where on average the state easily can assert itself to groups located in areas that are less accessible. The effect is substantial and the confidence interval for the effect ranges from 0.36 to 1.67 on a log-scale. Though, as noted above, this estimate does not control for unobserved time-invariant confounders on the group level, hence we are unable to ensure that this relationship is not spurious.

A possible explanation for the difference between the between estimate and the within estimate could possibly be due to the short time frame of the study. Because of the slow construction time associated with infrastructure projects, sufficient variation in the within estimate cannot be established.

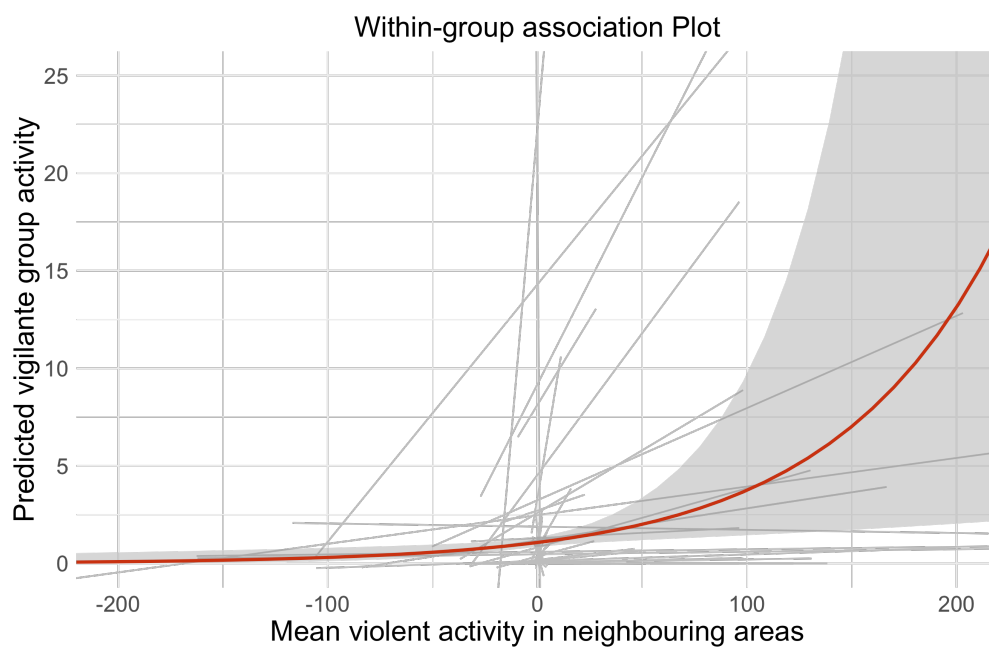
Firstly, looking at model 1, it becomes apparent that both the between and the within estimates of a change in security environments becoming more insecure has a significant positive effect on the activity level of vigilante groups. Thereby, a unit increase in the mean activity level of neighbouring conflicts, is associated with an increase of 0.002 in the expected difference in the logs of the expected activity level of vigilante groups, while holding the other variables in the model constant. Using IRR, it becomes evident that this effect is akin to a 1.002 factor increase in vigilante activity or an AME of 0.3%, which is a small effect. The confidence interval attests that the within effect is borderline significant.

Together with the within change for each group in the study period, the effect of a unit increase in the security environment on predicted vigilante activity is depicted in figure 3.

Lastly, model 3 investigates whether the inclusion of both predictors alters the above result, which is not the case, thereby underlining that the effect of a change in the security environment is independent of state capacity.

The analysis of hypothesis 3 and 4 on whether the effects of state access and the security environment are conditioned on ethnic communities' ability to conduct collective action and biophysical/material conditions appear in table 4. Together with the interaction terms, the constitutive terms and confounders are also included in all models.

Looking at model 4 and 7, which explore the conditioning effect of collective institutions, it becomes evident that it is only the effect of state access that is significantly conditioned on ethnic groups having institutions that facilitate collective action (model 4). However,



**Figure 4:** The observed within change in security environments becoming more hostile for each group and associated vigilante group activity (grey line). Red line is the estimated effect of a within change in security environments on the predicted vigilante activity level (95 confidence intervals).

the effect of the interaction term, *SADM X Collective institution*, runs counter to the theoretical expectation. Because the effect of state access on vigilante activity decreases with -3.682 on a log scale equivalent to an IRR of 0.025 or a 97% decrease with a unit increase on the collective institution measure. The confidence interval for the effect is estimated to be between -7.06 and -0.77 on a log-scale. Indicating, that collective institutions have a hampering effect on communities' ability to mobilise vigilante groups. This is a perplexing finding that illuminates that locale institutions affect collective action, though additional research is needed in order to understand if other aspects of collective action is also affected.

Turning to the effect of the biophysical/material indicators investigated in models 5 to 9, we see again that only the effect of state access is affected significantly. The interaction term *SADM X Irrigated pop DM* measures how the within effect of state access changes with a within change in the share of people living in irrigated areas. The interaction term is negative and statistically significant. This relationship is modelled in model 5, which estimates that a 1% increase in the share of ethnic members living in irrigated areas is associated with a -33.99 decrease in the effect of state access on expected vigilante group activity on a log-scale. The effect is estimated to range from -54.58 to -22.98 on a log-scale, and corresponds to an IRR of  $0.2^{10^{-16}}$  or an AME of -52.8%. Thereby being a substantial effect.

The effect is depicted in figure 5, which shows the estimated level of vigilante group activity with a change in state access conditioned on whether 0%, 1% or 2% of members of an ethnic group living in irrigated areas. Despite the large confidence interval, it becomes clear that only groups who do not live in areas being irrigated will mobilise vigilante groups when the state is absent. This finding goes against the theoretical expectation, which might be due to the fact that the irrigation measure is instead capturing another phenomenon, such as the degree of land inequality and locale authoritarianism (Bentzen, Kaarsen, and Wingender 2012), the degree of institutionalism (Asrat and Anteneh 2019) or drought in an area. Though it is unclear how these variables affect vigilante group mobilisation. Nevertheless, it shows the importance of incorporating biophysical/material factors into our model when explaining collective action.

Regarding the interaction effect between population dispersion and the two independent variables investigated in model 6 and 9, the conditioning effect is estimated to have a positive effect on state access and a negative impact on the effect of the security environment. However, both effects are statistically insignificant.

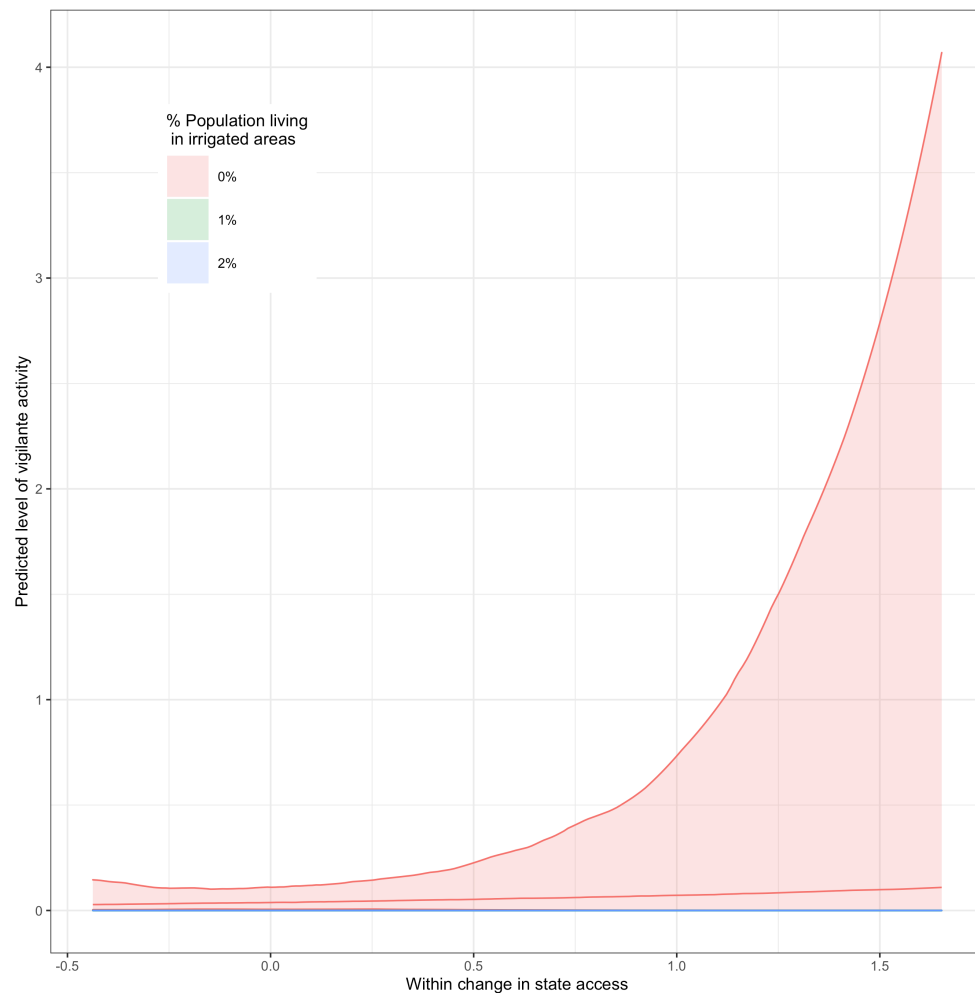
Summing up, the analysis is only able to find support for hypothesis 2 that a more insecure security environment is related to an increase in vigilante activity. Thereby indicating that when threats around a community begin to multiply, communities will begin to mobilise their own vigilante groups with the aim of ensuring their own security. However, the effect is borderline significant.

Regarding the effect of the state's ability to access ethnic group's settlement areas and thereby provide security guarantees for ethnic communities, the analysis only finds partial support for this hypothesis. Because there can only be established a positive signif-

Table 4 - Negative Binomial multilevel models of vigilante group activity, 2000-2016

|  | M4                                 | M5                                 | M6                                | M7                                 | M8                                 | M9                                 |
|--|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Predictors   | Log-Mean                           | Log-Mean                           | Log-Mean                          | Log-Mean                           | Log-Mean                           | Log-Mean                           |
| Intercept  | -21.115 ***<br>[-27.73;<br>-14.85] | -18.689 ***<br>[-24.18;<br>-13.82] | -20.014 ***<br>[-25.98; -14.96]   | -20.922 ***<br>[-27.39;<br>-15.53] | -19.381 ***<br>[-26.59;<br>-13.86] | -19.921 ***<br>[-26.20;<br>-14.87] |
| Time   | 0.357 ***<br>[0.26; 0.45]          | 0.089 ***<br>[0.02; 0.16]          | 0.105 ***<br>[0.02; 0.19]         | 0.388 ***<br>[0.29; 0.48]          | 0.090 ***<br>[0.03; 0.18]          | 0.114 ***<br>[0.04; 0.18]          |
| State access M (log)                                 | 0.495<br>[-0.21; 1.15]             | 1.176 ***<br>[0.57; 1.91]          | 1.149 ***<br>[0.46; 1.76]         | 0.480<br>[-0.17; 1.25]             | 1.210 ***<br>[0.46; 1.97]          | 1.110 **<br>[-0.21; 1.15]          |
| State access DM (log) (SADM)                         | 4.062 ***<br>[1.62; 5.47]          | 0.707<br>[-2.08; 2.55]             | 1.093<br>[-1.88; 2.79]            | 2.644 **<br>[0.40; 3.84]           | 1.571<br>[-1.21; 3.09]             | 1.127<br>[-1.33; 2.67]             |
| Security environment M                               | 0.016 **<br>[0.00; 0.03]           | 0.006<br>[-0.01; 0.01]             | 0.008 *<br>[-0.01; 0.02]          | 0.016 **<br>[0.00; 0.03]           | 0.007 *<br>[-0.01; 0.02]           | 0.008 *<br>[-0.01; 0.02]           |
| Security environment DM (SEDM)                       | -0.003 **<br>[-0.01; -0.00]        | 0.003 **<br>[-0.00; 0.01]          | 0.002 *<br>[-0.00; 0.01]          | -0.003 *<br>[-0.01; 0.00]          | 0.003 **<br>[-0.00; 0.01]          | 0.002 *<br>[-0.00; 0.01]           |
| Collective institution                               | 0.185<br>[-0.37; 0.69]             |                                    |                                   | 0.134<br>[-0.40; 0.80]             |                                    |                                    |
| SADM X Collective institution                        | -3.682 *<br>[-7.06; -0.77]         |                                    |                                   |                                    |                                    |                                    |
| Irrigated pop M                                      |                                    | 0.071 *<br>[-0.00; 0.13]           |                                   |                                    | 0.079 *<br>[0.01; 0.14]            |                                    |
| Irrigated pop DM                                     |                                    | -0.591 ***<br>[-1.06; -0.15]       |                                   |                                    | -0.994 ***<br>[-1.06; -0.15]       |                                    |
| SADM X Irrigated pop DM                              |                                    | -38.449 ***<br>[-54.58;<br>-22.98] |                                   |                                    |                                    |                                    |
| Dispersion M   |                                    |                                    | -0.126<br>[-0.34; 0.04]           |                                    |                                    | -0.127<br>[-0.33; 0.06]            |
| Dispersion DM  |                                    |                                    | 2.493<br>[-11.31; 16.26]          |                                    |                                    | 1.572<br>[-1.23; 4.60]             |
| SADM X Dispersion DM                                 |                                    |                                    | 47.649<br>[-546.10;<br>590.83]    |                                    |                                    |                                    |
| SEDM X Collective institution                        |                                    |                                    |                                   | 0.001<br>[-0.00; 0.01]             |                                    |                                    |
| SEDM X Irrigated pop DM                              |                                    |                                    |                                   |                                    | 0.003<br>[-0.06; 0.07]             |                                    |
| SEDM X Dispersion DM                                 |                                    |                                    |                                   |                                    |                                    | -0.018<br>[-0.30; 0.37]            |
| Confounders  | Yes                                | Yes                                | Yes                               | Yes                                | Yes                                | Yes                                |
| Random Effects                                       |                                    |                                    |                                   |                                    |                                    |                                    |
| $\sigma^2$   | 5.07                               | 5.33                               | 5.63                              | 5.13                               | 5.44                               | 5.63                               |
| $\tau_{00}$  | 1.26<br>Group:State<br>3.50 State  | 1.39<br>Group:State<br>6.19 State  | 1.81<br>Group:State<br>5.39 State | 1.22<br>Group:State<br>3.41 State  | 1.69<br>Group:State<br>6.88 State  | 1.78<br>Group:State<br>5.55 State  |
| ICC  | 0.48                               | 0.59                               | 0.56                              | 0.47                               | 0.61                               | 0.57                               |
| N  | 132 Group<br>35 State              | 196 Group<br>37 State              | 196 Group<br>37 State             | 132 Group<br>35 State              | 196 Group<br>37 State              | 196 Group<br>37 State              |
| Observations   | 2030                               | 3009                               | 3009                              | 2030                               | 3009                               | 3009                               |
| Marginal R <sup>2</sup> / Conditional R <sup>2</sup> | 0.399 / 0.690                      | 0.390 / 0.748                      | 0.289 / 0.688                     | 0.388 / 0.679                      | 0.181 / 0.682                      | 0.190 / 0.648                      |
| AIC  | 1546.196                           | 2437.720                           | 2493.290                          | 1551.753                           | 2472.840                           | 2494.322                           |
| log-Likelihood                                       | -757.098                           | -1200.860                          | -1228.645                         | -759.876                           | -1218.420                          | -1229.161                          |

95% bootstrap confidence intervals in square brackets [lower; upper] (500 iterations)  
P-values computed using welch t-test: \*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$



**Figure 5:** The predicted effect of state access on vigilante group activity level conditioned on the share of ethnic group members living in irrigated areas.

icant relationship when comparing the contextual effect of travel time between groups and not when it varies within groups, the analysis is not able to sufficiently ensure that the estimate is not affected by omitted variable bias.

Turning to the interaction effect of how communities' ability to conduct collective action conditions the effect of the state access and the security environment, the analysis is unable to confirm both hypothesis 3 and 4. When investigating a total of six interaction effects, only the effect of state access is found to be significantly conditioned on collective institutions and the share of people from an ethnic community living in irrigated areas. Surprisingly, these two variables do not increase the effect of state access but instead decrease the effect. This indicates that counter to the theoretical expectation, traditional institutions with certain attributes facilitating collective action and biophysical/material conditions forcing people to cooperate will hamper communities' ability to mobilise.

## 6.1 Sensitivity analysis

In order to test whether the findings in the analysis are affected by reporting bias and to understand if the analytical choices made regarding model specification and operationalisation are sensitive to a change in configuration, the study conducts a series of sensitivity analyses.

Firstly, table 5 shows three hybrid-multilevel logistic regression models fitted to the same data set as the analysis, but where the dependent variable has been dichotomised so that it only measures whether vigilante groups are not present or present in a given year.

Similar to model 2 in table 3, we see that the positive but non-significant effect of an increase in the mean travel time from the capital to ethnic settlement areas is still valid in model 10, as a one unit increase is associated with a positive increase in the probability of vigilante groups appearing. Moreover, looking at model 11, it becomes apparent that here too there is a positive statistical significant effect of the security environment becoming more hostile on vigilante group appearance.

Testing if reporting bias affects the interaction hypothesis, table 2 in appendix 2 investigates whether the findings in table 4 in the analysis change when using the dichotomised dependent variable. Here we see that the interaction effects *SADM X Collective institution* and *SADM X Irrigated pop DM* both become insignificant, indicating that reporting bias might be affecting this area of the analysis.

It could be argued that the above result is instead a product of the change in functional form from a negative binomial to a logistic form. In order to assess whether that is the case, four specification curve analyses are performed regarding how a change in functional form affects the results relating to hypotheses 1 and 2 and the two before mentioned interaction terms. In these analyses, different regression models are fitted to the original dataset using the following four functional forms:

1. Hybrid-multilevel model using a Poisson distribution (*ML poisson*)



Table 5 - Logistic regression multilevel models of vigilante group activity, 2000-2016

|  | M10                               | M11                              | M12                               |
|--|-----------------------------------|----------------------------------|-----------------------------------|
| <i>Predictors</i>                                    | <i>Log-Odds</i>                   | <i>Log-Odds</i>                  | <i>Log-Odds</i>                   |
| Intercept  | -12.348 ***<br>(-15.040 – -9.656) | -8.972 ***<br>(-10.785 – -7.159) | -11.925 ***<br>(-14.513 – -9.337) |
| Time   | 0.388 ***<br>(0.275 – 0.501)      | 0.344 ***<br>(0.229 – 0.459)     | 0.357 ***<br>(0.242 – 0.473)      |
| State access M (log)                                 | 1.564 ***<br>(0.760 – 2.367)      |                                  | 1.481 ***<br>(0.704 – 2.258)      |
| State access DM (log) (SADM)                         | 2.637<br>(-0.044 – 5.319)         |                                  | 2.340<br>(-0.319 – 4.999)         |
| Security environment M                               |                                   | 0.013 **<br>(0.003 – 0.022)      | 0.011 *<br>(0.002 – 0.019)        |
| Security environment DM (SEDM)                       |                                   | 0.006 *<br>(0.001 – 0.011)       | 0.006 *<br>(0.001 – 0.011)        |
| Confounders  | Yes                               | Yes                              | Yes                               |
| Random Effects                                       |                                   |                                  |                                   |
| $\sigma^2$   | 3.29                              | 3.29                             | 3.29                              |
| $\tau_{00}$  | 2.94 Group:State<br>10.78 State   | 3.52 Group:State<br>8.02 State   | 2.74 Group:State<br>8.39 State    |
| ICC  | 0.81                              | 0.78                             | 0.77                              |
| N  | 196 Group<br>37 State             | 196 Group<br>37 State            | 196 Group<br>37 State             |
| Observations   | 3009                              | 3009                             | 3009                              |
| Marginal R <sup>2</sup> / Conditional R <sup>2</sup> | 0.244 / 0.854                     | 0.221 / 0.827                    | 0.290 / 0.838                     |
| AIC  | 920.768                           | 926.904                          | 913.472                           |
| log-Likelihood                                       | -449.384                          | -452.452                         | -443.736                          |

\*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$

2. Hybrid-multilevel model using a Negative Binomial distribution (*ML negative binomial*)
3. Linear hybrid-multilevel model where vigilante group activity is on a log-scale (*ML linear (log)*)
4. A linear fixed effect model where vigilante group activity is on a log-scale (*FE linear (log)*)

Besides varying the functional form, the analyses also investigate how changing which confounders are included affects the result. Only the models where all confounders are included will be considered in this section.

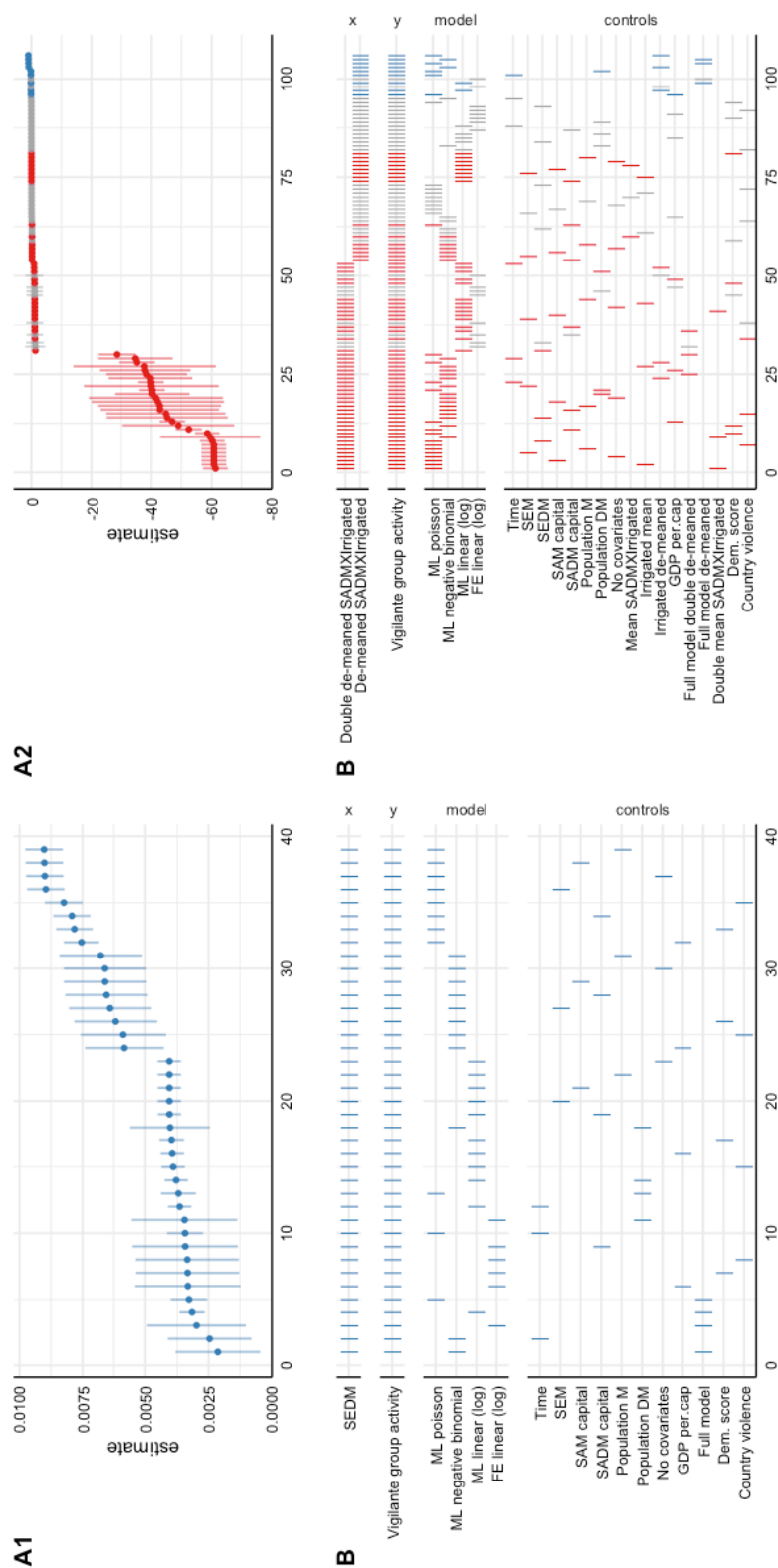
Figure 6 depicts two specification curves relating to how the above analytical decisions affects the effect of a change in the security environment (A1), and the interaction hypothesis *SADM X Irrigated pop DM* is shown in figure 6.A2.

Looking at plot 6.A1, we see that changing the functional form of the model only has a limited effect on the final results regarding the effect of the security environment since all models estimate the within effect to be between 0.0021 and 0.0031 on a log-scale, and be significantly different from zero.

A different pattern emerges when it comes to the within effect of state access, which is depicted in figure 3A in appendix 2. Here both ML negative binomial and FE linear (log) estimates an insignificant effect of 0.2, whereas ML Poisson and ML linear (log) estimate a significant effect spanning from 0.2 to 4. Moreover, changing the state access measure to one where transport time is calculated from the regional capital (*SADM (regional)*) instead of the national capital also has a major impact on the final result, as all models with the exception of the FE linear (log) estimates a significant effect ranging from 0.3 to 4.9. Thereby, lending support to hypothesis 1.

Moving to plot A2 in figure 6, depicting a specification curve for the interaction term *SADM X Irrigated pop DM* two surprising results becomes apparent. Firstly, the choice of functional form has a noteworthy effect on the effect size, as the nonlinear models estimate a significant effect ranging from -38.4 to -28.6. In contrast, the linear models estimate it to be around 1, and it is only significant when estimated using ML linear (log). Secondly, it also becomes apparent that how the interaction term is created affects whether the effect of the interaction term becomes negative or positive. When the interaction term is calculated using the double de-meaned method it becomes negative, whereas when using the de-meaned method it is either close to zero or positive. A similar effect of the choice of functional form is also seen when it comes to the effect size of the interaction term *SADM X Collective institution*, which is depicted in figure A4 in appendix 2.

The sensitivity analysis shows that the results of the analysis regarding hypotheses 1 and 2 are not affected by reporting bias. Though there are indications that it affects the estimation of the interaction hypotheses. However, the method used to assess whether reporting bias is present is not able to discern between if it is reporting bias or the change in the functional form of the statistical model that is affecting the final results. In order to understand whether that is the case, a series of specification curve analyses



**Figure 6:** Specification curve analysis. AB1 depicts the effect of a within change in security environment (SEDM). AB2 investigates how the interaction term *SADM X Irrigated pop DM* is affected.

were conducted, making it possible to assess if a change in the functional form, number of confounders, the use of national or regional capital in calculating transportation time, and how interaction terms are created affect the final results.

Overall, the significant effect of a change in the security environment is the most robust finding in this study. When it comes to the effect of state access, changing the functional form has an effect on the estimated size and significance level. Most noteworthy calculating state access using regional capitals instead of only the national ones has a substantial effect on the findings of the analysis as the within effect becomes significant. Furthermore, both a change in functional form and how interaction effects are created also have a substantial effect on the findings of this thesis. Firstly, it indicates that we should be conscious of how to assess interaction hypotheses in nonlinear models. Secondly, these results do not mean that the double de-meaned estimator is a misspecification, actually the opposite as the non-double de-meaned estimator estimates a positive effect, which conflicts with the graphical representation in figure 5. However, it is assessed that the estimated effects of the interaction terms are not robust.

Despite a methodological discussion of interaction effects is not the scope of this thesis, the above results nevertheless become a part of the debate (Greene 2010; Karaca-Mandic, Norton, and Dowd 2012; Berry, DeMeritt, and Esarey 2010), since it highlights the importance of conducting robustness tests of this modelling technique.

## 6.2 Validity of the results

In this part of the thesis, the analysis will be assessed using the commonly applied research validity criteria. Firstly, it is argued that the internal validity of the analysis is deemed high, as the research design allows to efficiently block the effect of time-invariant unobserved confounders on the group level, and take into account both the nested structure of ethnic groups within countries and control for country-level confounders. It must be noted that the design is not able to sufficiently guard against reverse causality, which is a possibility as it can be theorised that higher levels of vigilante group activity could affect the development of infrastructural projects as governments would be less willing to invest in areas governed by vigilante groups. Moreover, it could also be that groups in a given ethnic group's security environment is reacting to the ethnic group in question's increase in vigilante group activity, and as a consequence begin to mobilise their own vigilante groups. However, as vigilante group activity level only constitute a small to medium fraction of the total level of violent activity in an area, it is judged that the effect of reverse causality is small.

Relating to the statistical validity, using bootstrapped confidence intervals to assess the uncertainty of the obtained results ensures a high degree of statistical validity. Because estimating the degree of uncertainty using bootstrapped confidence intervals enhances the trustworthiness of these estimates since they do not rely on the same number of assumptions as the analytical ones. Furthermore, the use of a multilevel regression framework and a proper functional form also heightens the analysis's statistical validity as it ensures both an accurate estimation of the effect size and the confidence intervals.

An important asset of this thesis is its high construct validity, which is foremost rooted in the combination of fine grained data sources and ethnic settlement areas, allowing the thesis to create novel operationalised measures that more closely mirrors the theoretical mechanisms investigated. For instance, using a measure of the dependent variable that allows to investigate activity and not just presence of vigilante groups ensures the possibility of an in-depth analysis that not just lumps all active vigilante groups together, but views it as a question of degree. In addition, especially the measure of social organisations and the biophysical/material environment's effect on collective action ensures that the thesis is able to encapsulate the multifaceted nature of the IAD framework. Though, the analysis results highlight that these measures might capture other theoretical phenomena, indicating that more research is needed in order to understand the measures connection to other incidences of collective action in order to establish its construct validity. Relating to the construct validity is the reliability of the measures, which because of standardised collection procedures, is considered to be high.

The external validity of the analysis, is judged to be very high, because of the large sample of ethnic groups included in the analysis, and the temporal and spatial coverage of the analysis. In relation to the spatial coverage, the analysis use of more fine-grained spatial units in the form of ethnic settlement areas evades the problem of ecological inference, thereby making it possible to infer the results to other groups on the same scale. Furthermore, there are good reasons to expect that the results of the analysis generalise beyond Africa. Because similar theoretical dynamics are also seen when it comes to the appearance of vigilante groups in Asia, Latin America and the Middle East (Arjona and Kalyvas 2009; Osorio, Schubiger, and Weintraub 2021; Mazzei 2009; Barter 2013; Ahram 2011; Fumerton 2018; Zech 2016).

## 7 Conclusion

Using a comparative lens, this master's thesis has tried to understand what determines the activity level of vigilante groups across the African continent. To the author's knowledge, a similar study in relation to the number of cases and time frame of this phenomenon has not been conducted before.

Understanding this actor is important as vigilante groups have increasingly become an important supplier of security in African security markets, especially in areas of failed states. Despite this, comparative research regarding this actor is sparse. Moreover, research has a tendency to lump vigilante groups together with militias and view vigilante groups as governments' extended arm used for the projection of state power.

Therefore, this thesis has based on the literature on vigilante groups and militias developed a definition of vigilante groups being mobilised from the bottom-up, and not being interested in revolutionary change or government takeover, but instead in community security.

Two hypotheses relating to the effect of the state's presence and the security environment on vigilante group appearance have been developed. Besides, it is theorised that as vigilante groups are mobilised from the bottom-up, the effect of the two proposed hypotheses is conditioned on whether locale communities are able to overcome the collective action problem, and, thereof be successful in mobilising vigilante groups.

Using the IAD framework together with theories on collective action, a novel measure of African ethnic communities' ability to overcome the collective action problem has been derived. It focuses on how attributes and the rules of communities, and the biophysical/material environment in which they are situated in, jointly constitute a latent variable determining communities' ability to perform collective action. An important benefit of using a multi-dimensional measure, is that it does not focus on a single attribute as being the decisive component fostering collective action in communities, but instead views it as a multifaceted phenomenon where different institutional attributes of communities through different mechanisms increase the likelihood that members of a community will work together instead of free-riding.

Ethnic settlement areas are applied as the main unit of analysis, thereby more accurately representing the theoretical mechanisms. Data sources relating to vigilante activity level, transportation time, population counts, satellite data on land use, and traditional institutions are combined with ethnic settlement areas in order to create a uniquely localised data set.

Applying this data set, the empirical validity of the proposed measure of communities' ability to conduct collective action is tested using a CFA. The analysis rejects the existence of a single latent dimension shared by all the measures, as the biophysical/material measures do not capture the same dimension as the other measures. Instead, the study uncovers that the measures related to community attributes and customary rules are all manifestations of the same latent variable, and are therefore used to create a measure denoted collective institutions.

The biophysical/material measures relating to how agricultural practises, in the form of irrigation, nurture cooperation, and population dispersion, are moreover found to each be measuring their own unique phenomena.

The hypotheses are tested using a longitudinal hybrid-multilevel regression model. A core advantage of this model is that it allows the thesis to control for unobserved time-invariant confounders while at the same time take into account how ethnic groups are nested within countries. This approach thereby ensures the causal and statistical validity of the estimates in the analysis.

Investigating the effect of the state's ability to access territory and thereby be active in the market for security, the analysis fails to establish a significant causal link. Indicating that when the state is unable to provide security in an area, civilians will not, as a response, begin to provide for their own security by the formation of vigilante groups. Although there are signs of a significant and positive effect when comparing ethnic groups' mean level across the studied period. Furthermore, when using regional capitals instead of national ones in the calculation of state access, a significant within

effect is established. A possible reason for these mixed results, could be due to the short period analysed, which limits the amount of variation needed.

Opposite to the effect of state access, a significant and positive effect of security environments becoming more hostile is established. Thereby, when civilians find themselves in more insecure security markets, they are more likely to establish vigilante groups to provide for their own security. Thereby, stipulating that civilians do not just choose non-violent tactics when responding to insecurity and threats, but will actively opt for violent ones as a way to cope with hostile security environments. Indicating civilian agency in violent conflicts. This effect is still valid when controlling for state access, thus underlining that the effect of security environments becoming more hostile is independent of state capacity. Though, the effect is fairly small and borderline significant.

Exploring if the effects of state access and the security environment are conditioned on ethnic communities' collective institutions and the biophysical/material environment they reside in, the analysis finds that it is only the effect of state access that significantly is being altered. Though the effects run counter the theoretical expectations. Because the analysis exposes that communities characterised by having strong collective institutions characterised by cooperation and rules fostering collective action will significantly be less likely to mobilise vigilante groups when state access diminishes. The same trend is also present when it comes to the biophysical/material measure of how the agricultural practice of irrigation affects vigilante mobilisation.

These results firstly highlight the importance of including both social, institutional, and natural factors in order to understand what drives collective action. Hence, we should not just focus on social networks and trust when explaining collective action, as the social capital literature argues, but view it as a product of different factors. Secondly, the results perplexing character underscores the need for more research relating to how these measures not just affect vigilante group mobilisation but other acts of collective action. An important endeavour as it will enable research to develop measures that would allow to compare groups' propensity to conduct collective action.

A series of sensitivity analyses were performed, in order to understand if the results obtained from the analysis are robust to the different analytical choices made in the analysis. The most robust finding is the effect of security environments. However, most noteworthy is that the estimated effect size and significant level of the interaction terms are very volatile to a change in the functional form of the statistical model and the method used to calculate such terms. For this reason one should be careful when interpreting the results of the conditioning effect of communities ability to conduct collective action. This finding calls for closer scrutiny of the debated issue of how to include interaction effects in especially nonlinear statistical models. Future studies could also try to test if choosing another spatial unit or the use of conflict data from the Uppsala Conflict Data Program (UCDP) to identify vigilante group activity level, would change the results. However, the last option would require the coding of UCDP data in order to be able to identify vigilante groups.

Lastly, the study has uncovered that an unknown time varying variable has a substantial

and significant effect on the emergence of vigilante groups. By that a yearly increase from the beginning of studied period to its end, is strongly related to an increase in vigilante group activity. Highlighting that an unknown time-varying variable or multiple variables driving vigilante group mobilisation have yet to be uncovered.

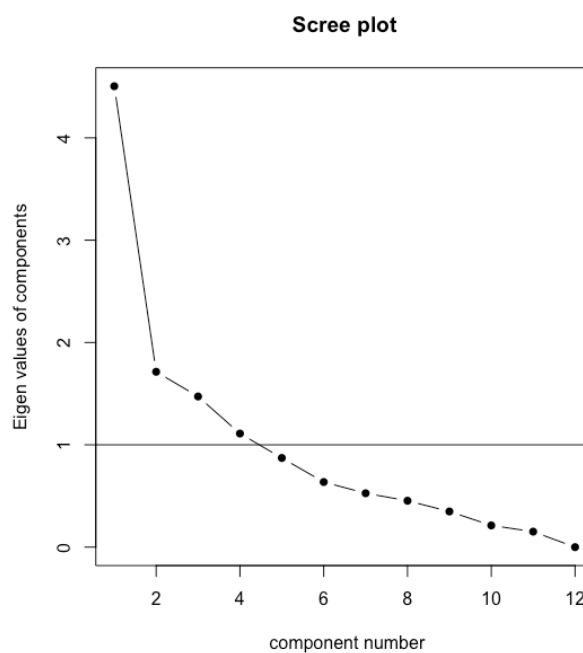
Winding up, this master's thesis has come closer to understanding in which contexts vigilante groups will appear and how active they will be. There is however, still unexplored areas related not only to what drives vigilante group mobilisation, but also how they affect conflicts and civilian casualties. Because will the presence of vigilante groups prolong conflicts as they are essentially a sign that civil society has become militarised? (Osorio, Schubiger, and Weintraub 2021). Moreover, will their embeddedness in communities due to their bottom-up mobilisation mean that they will be less hostile towards civilians, which evidence from Afghanistan indicates (Dearing 2021: 15), or will they be used to oppress for instance sub-ethnic groups?



## 8 Supplementary material

### 8.1 Appendix 1 - Exploratory factor analysis

Looking at figure A1 that shows a graphical representation of a scree plot analysis, there can be identified one strongly dominating factor using the *elbow* criteria (Mair2018: 30). This factor explains about 37% of the variation in the data, though there be identified three other factors that have an eigenvalue above one, which indicates the existence of a total of four factor in the data. It should be noted that these factors combined only capture 35% of the variation in the data.

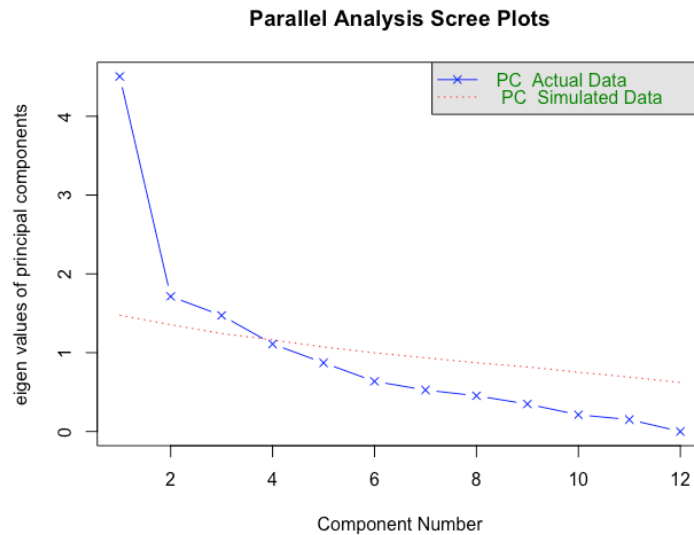


**Figure A1:** Scree Plot analysis of factors.

Moving to a parallel analysis in figure A2, where the factor analysis is performed on resampled data as well as on random, uncorrelated data matrices drawn from a normal distribution (*ibid.*: 31), there can be identified three factors in the data. But as before, a single dominant factor is present.

A *very simple structure analysis* of the numbers of factors results in a score of 0.7 and 0.8 for a one and three factor solution, respectively, suggesting that either a one or three factor solution would best represent the data. The Velicer MAP is 0.59 for a one-factor solution, and it achieves an RMSEA of 0.65. Whereas the Velicer MAP is 0.079 for a three-factor model, and its RMSEA value is 0.77, thus indicating that a one-factor solution is a better choice. Lastly, using the empirical *Bayesian Information Criteria*

(BIC) as a metric for comparing models, a three-factor model would be the best choice as it obtains a score of -48.0, whereas the score for a one-factor solution is 159.2.



**Figure A2:** Parallel analysis of factors.

Concludingly, we see evidence supporting both a one- and a three-factor solution, though there seems to be a dominant factor explaining most of the variation in the data. In order to understand, which variables in the data set are related to which factor, the study performs two factor analyses with one and three factors. The one-factor solution appears in table A1, and the three-factor solution appears in table A2.

The results from table A1 confirm the results from the CFA that the biophysical/material variables do not capture the same dimension as the other variables, because their factor loadings are very close to 0. Applying a three-factor model instead, we see that the factor loadings for all the variables minus the biophysical/material ones still loads relatively high on the same dimension (Factor 1), thus suggesting they capture the same dimension. Besides, from the results, it also becomes evident that biophysical/material condition variables do load exclusively on the same factor, thereby dismissing the idea of a clear biophysical/material latent variable.

Lastly, we see that the inclusion of the two other factors influencing the loadings of the variables in such a way that some variables begin to load higher on other factors than the first one, which could be an indication of the presence of an alternative structure than the theoretical proposed one. But as the analysis above has highlighted that factors 2 and 3 do not capture nearly as much variation as the first factor. As there is not a clear theoretical expectation of this particular three-factor loading structure, the study rejects the notion of three dimensional measure. Hereby, the analysis has showed that

**Table A1. Factor Analysis one-factor**

|                              | <b>Factor 1</b> |
|------------------------------|-----------------|
| Pop. in irrigated areas      | <b>-0.18</b>    |
| Pop. dispersion              | <b>-0.09</b>    |
| Customary courts             | <b>0.71</b>     |
| Council of elders            | <b>0.49</b>     |
| Customary assembly           | <b>0.36</b>     |
| Customary rules              | <b>0.73</b>     |
| Land administration          | <b>0.73</b>     |
| Natural ressource managment  | <b>0.75</b>     |
| Security provisions          | <b>0.78</b>     |
| Infrastructure               | <b>0.59</b>     |
| Dispute resolution           | <b>0.58</b>     |
| Level customary institutions | <b>0.35</b>     |

**Table A2. Factor Analysis three-factors**

|                              | <b>Factor 1</b> | <b>Factor 2</b> | <b>Factor 3</b> |
|------------------------------|-----------------|-----------------|-----------------|
| Pop. in irrigated areas      | <b>-0.17</b>    | <b>-0.28</b>    | <b>0.06</b>     |
| Pop. dispersion              | <b>0.14</b>     | <b>-0.34</b>    | <b>-0.02</b>    |
| Customary courts             | <b>0.88</b>     | <b>0.10</b>     | <b>0.08</b>     |
| Council of elders            | <b>0.44</b>     | <b>0.32</b>     | <b>-0.04</b>    |
| Customary assembly           | <b>0.52</b>     | <b>0.08</b>     | <b>0.07</b>     |
| Customary rules              | <b>0.83</b>     | <b>0.15</b>     | <b>-0.00</b>    |
| Land administration          | <b>0.43</b>     | <b>0.56</b>     | <b>0.03</b>     |
| Natural ressource managment  | <b>0.51</b>     | <b>0.56</b>     | <b>-0.10</b>    |
| Security provisions          | <b>0.48</b>     | <b>0.65</b>     | <b>0.12</b>     |
| Infrastructure               | <b>0.24</b>     | <b>0.73</b>     | <b>0.45</b>     |
| Dispute resolution           | <b>0.42</b>     | <b>0.54</b>     | <b>-0.73</b>    |
| Level customary institutions | <b>0.24</b>     | <b>0.24</b>     | <b>0.94</b>     |

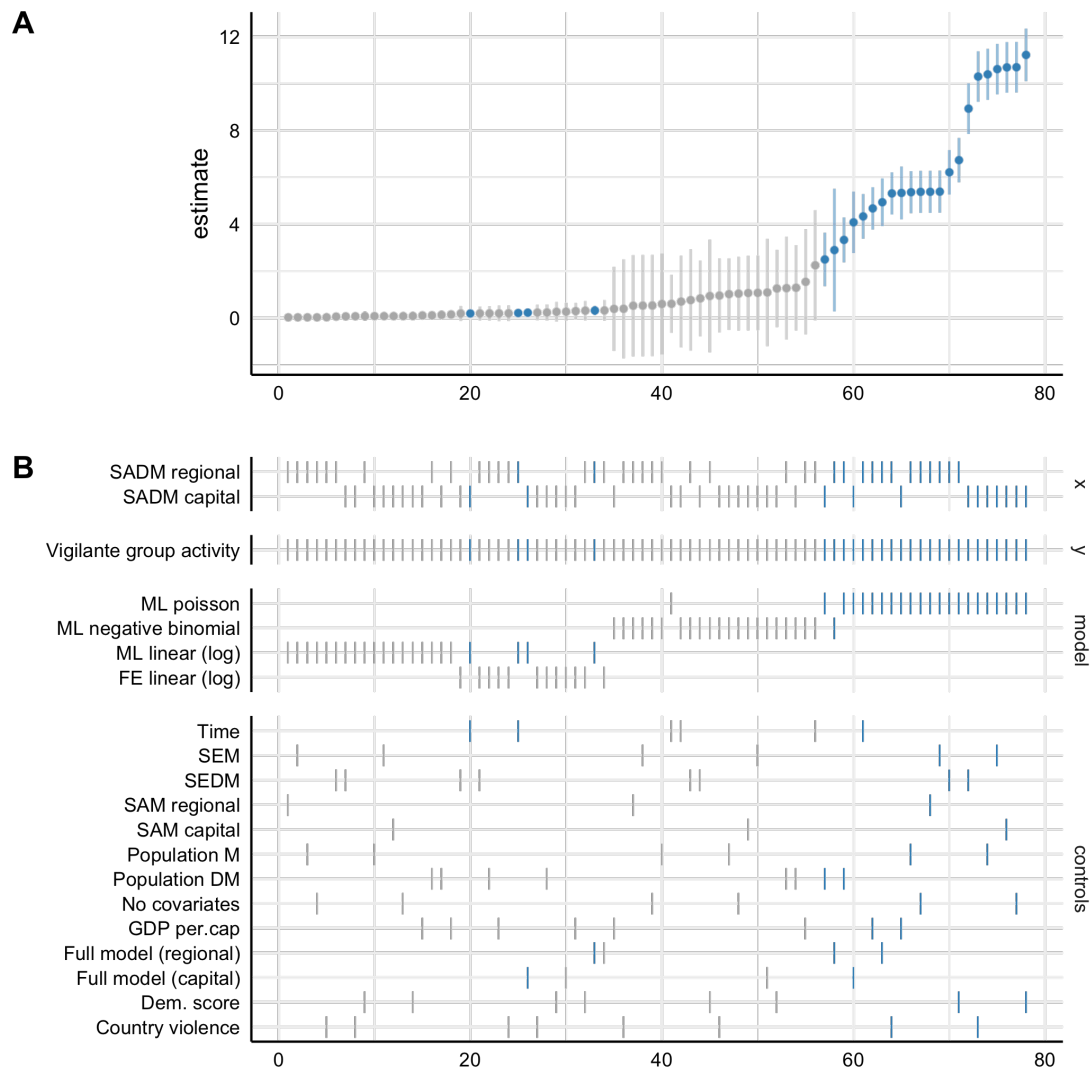
there can be found empirical support for creating a measure consisting of community attributes and customary rules, and using the biophysical/material variables individually in an analysis.

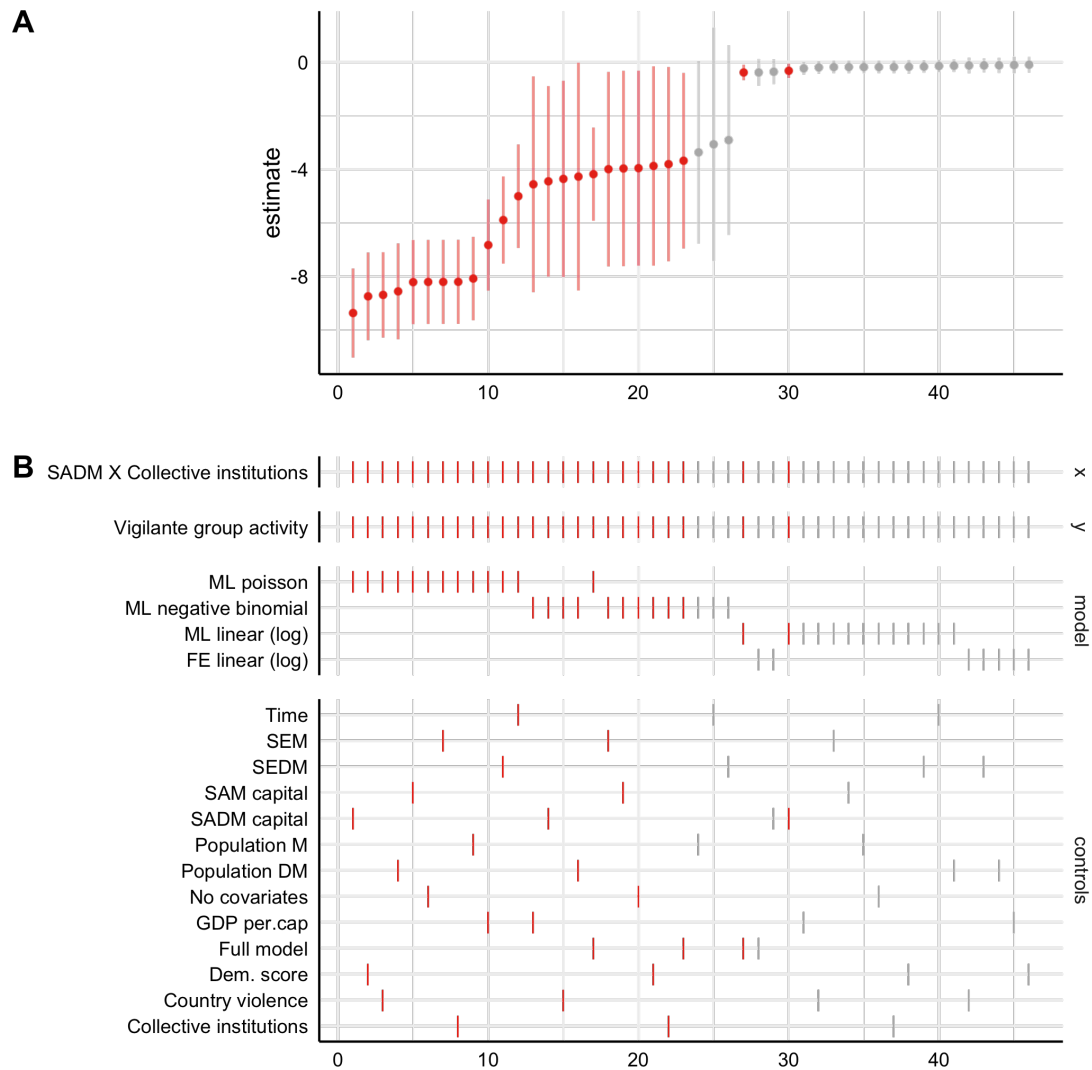
## **8.2 Appendix 2 - Sensitivity analysis**

Table 3A - Logistic regression multilevel models of vigilante group activity, 2000-2016

|  | M4                                | M5                                | M6                                 | M7                                | M8                                | M9                                |
|--|-----------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Predictors   | Log-Odds                          | Log-Odds                          | Log-Odds                           | Log-Odds                          | Log-Odds                          | Log-Odds                          |
| Intercept  | -10.874 ***<br>(-13.462 – -8.285) | -11.864 ***<br>(-14.500 – -9.228) | -12.004 ***<br>(-14.528 – -9.480)  | -10.738 ***<br>(-13.298 – -8.178) | -11.853 ***<br>(-14.435 – -9.271) | -11.866 ***<br>(-14.415 – -9.317) |
| Time   | 0.445 ***<br>(0.293 – 0.597)      | 0.335 ***<br>(0.220 – 0.451)      | 0.354 ***<br>(0.236 – 0.471)       | 0.437 ***<br>(0.285 – 0.588)      | 0.335 ***<br>(0.220 – 0.450)      | 0.361 ***<br>(0.245 – 0.477)      |
| State access M (log)                                 | 0.741<br>(-0.037 – 1.519)         | 1.569 ***<br>(0.779 – 2.359)      | 1.644 ***<br>(0.788 – 2.501)       | 0.741<br>(-0.034 – 1.517)         | 1.559 ***<br>(0.774 – 2.343)      | 1.569 ***<br>(0.763 – 2.375)      |
| State access DM (log) (SADM)                         | 4.047 **<br>(1.236 – 6.858)       | 2.208<br>(-0.455 – 4.872)         | 2.606<br>(-0.058 – 5.269)          | 2.577 *<br>(0.137 – 5.017)        | 2.344<br>(-0.289 – 4.977)         | 2.340<br>(-0.307 – 4.988)         |
| Security environment M                               | 0.020 **<br>(0.008 – 0.032)       | 0.010 *<br>(0.001 – 0.018)        | 0.011 **<br>(0.003 – 0.019)        | 0.020 **<br>(0.008 – 0.032)       | 0.011 *<br>(0.002 – 0.019)        | 0.011 *<br>(0.002 – 0.019)        |
| Security environment DM (SEDM)                       | 0.005<br>(-0.002 – 0.013)         | 0.006 *<br>(0.001 – 0.011)        | 0.007 *<br>(0.002 – 0.013)         | 0.003<br>(-0.007 – 0.013)         | 0.006 *<br>(0.000 – 0.011)        | 0.007 *<br>(0.001 – 0.012)        |
| Collective institution                               | 0.157<br>(-0.457 – 0.770)         |                                   |                                    | 0.157<br>(-0.451 – 0.764)         |                                   |                                   |
| SADM X Collective institution                        | -4.064<br>(-9.038 – 0.911)        |                                   |                                    |                                   |                                   |                                   |
| Irrigated pop M                                      |                                   | 0.059<br>(-0.015 – 0.133)         |                                    |                                   | 0.064<br>(-0.010 – 0.138)         |                                   |
| Irrigated pop DM                                     |                                   | -0.478<br>(-1.177 – 0.220)        |                                    |                                   | -0.546<br>(-1.278 – 0.186)        |                                   |
| SADM X Irrigated pop DM                              |                                   | -2.243<br>(-34.342 – 29.857)      |                                    |                                   |                                   |                                   |
| Dispersion M   |                                   |                                   | -0.130<br>(-0.387 – 0.127)         |                                   |                                   | -0.140<br>(-0.389 – 0.109)        |
| Dispersion DM  |                                   |                                   | 14.879<br>(-10.403 – 40.161)       |                                   |                                   | 0.520<br>(-4.326 – 5.367)         |
| SADM X Dispersion DM                                 |                                   |                                   | 1296.098 *<br>(280.679 – 2311.517) |                                   |                                   |                                   |
| SEDM X Collective institution                        |                                   |                                   |                                    | 0.004<br>(-0.008 – 0.016)         |                                   |                                   |
| SEDM X Irrigated pop DM                              |                                   |                                   |                                    |                                   | -0.010<br>(-0.053 – 0.033)        |                                   |
| SEDM X Dispersion DM                                 |                                   |                                   |                                    |                                   |                                   | 0.269<br>(-0.091 – 0.630)         |
| Confounders  | Yes                               | Yes                               | Yes                                | Yes                               | Yes                               | Yes                               |
| Random Effects                                       |                                   |                                   |                                    |                                   |                                   |                                   |
| $\sigma^2$   | 3.29                              | 3.29                              | 3.29                               | 3.29                              | 3.29                              | 3.29                              |
| $\tau_{00}$  | 1.41 Group:State<br>4.61 State    | 2.36 Group:State<br>7.97 State    | 2.86 Group:State<br>7.51 State     | 1.41 Group:State<br>4.29 State    | 2.46 Group:State<br>7.47 State    | 2.73 Group:State<br>7.58 State    |
| ICC  | 0.65                              | 0.76                              | 0.76                               | 0.63                              | 0.75                              | 0.76                              |
| N  | 132 Group<br>35 State             | 196 Group<br>37 State             | 196 Group<br>37 State              | 132 Group<br>35 State             | 196 Group<br>37 State             | 196 Group<br>37 State             |
| Observations   | 2030                              | 3009                              | 3009                               | 2030                              | 3009                              | 3009                              |
| Marginal R <sup>2</sup> / Conditional R <sup>2</sup> | 0.451 / 0.806                     | 0.400 / 0.855                     | 0.490 / 0.877                      | 0.449 / 0.798                     | 0.297 / 0.825                     | 0.311 / 0.833                     |
| AIC  | 636.349                           | 914.574                           | 910.089                            | 639.369                           | 916.299                           | 917.446                           |
| log-Likelihood                                       | -303.175                          | -440.287                          | -438.044                           | -304.684                          | -441.149                          | -441.723                          |

\*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$





**Figure A4:** Specification curve analysis of the interaction term *SADM X Collective institutions*.

## References

- ACLED. 2021. "ACLED\_Codebook\_v1\_January-2021.pdf." ACLED. [https://acleddata.com/acleddatanew/wp-content/uploads/2021/11/ACLED\\_Codebook\\_v1\\_January-2021.pdf](https://acleddata.com/acleddatanew/wp-content/uploads/2021/11/ACLED_Codebook_v1_January-2021.pdf).
- Ahram, Ariel I. 2011. "Origins and Persistence of State-Sponsored Militias: Path Dependent Processes in Third World Military Development." *Journal of Strategic Studies* 34 (4): 531–56. <https://doi.org/10.1080/01402390.2011.561103>.
- Alesina, Alberto, Paola Giuliano, and Nathan Nunn. 2013. "On the Origins of Gender Roles: Women and the Plough\*." *The Quarterly Journal of Economics* 128 (2): 469–530. <https://doi.org/10.1093/qje/qjt005>.
- Allison, Paul David. 2005. *Fixed Effects Regression Methods for Longitudinal Data Using SAS*. Cary, N.C: SAS Institute.
- Allison, Paul D., and Richard P. Waterman. 2002. "7. Fixed-Effects Negative Binomial Regression Models." *Sociological Methodology* 32 (1): 247–65. <https://doi.org/10.1111/1467-9531.00117>.
- Andersen, L., B. Møller, and F. Stepputat, eds. 2007. *Fragile States and Insecure People?: Violence, Security, and Statehood in the Twenty-First Century*. 2007th edition. New York: Palgrave Macmillan.
- Araral, Eduardo. 2009. "What Explains Collective Action in the Commons? Theory and Evidence from the Philippines." *World Development* 37 (3): 687–97. <https://doi.org/10.1016/j.worlddev.2008.08.002>.
- Arjona, Ana. 2014. "Wartime Institutions: A Research Agenda." *Journal of Conflict Resolution* 58 (8): 1360–89. <https://doi.org/10.1177/0022002714547904>.
- Arjona, Ana, and Stathis N Kalyvas. 2009. "Rebelling Against Rebellion: Comparing Insurgent and Counterinsurgent Recruitment." In, 4:436–55.
- Arnold, Matthew B. 2007. "The South Sudan Defence Force: Patriots, Collaborators or Spoilers?" *The Journal of Modern African Studies* 45 (4): 489–516. <https://doi.org/10.1017/S0022278X07002856>.
- Asrat, Dagninet, and Adugnaw Anteneh. 2019. "The Determinants of Irrigation Participation and Its Impact on the Pastoralist and Agro-Pastoralists Income in Ethiopia: A Review Study." Edited by Fatih Yildiz. *Cogent Food & Agriculture* 5 (1): 1679700. <https://doi.org/10.1080/23311932.2019.1679700>.
- Axelrod, Robert M. 2006. *The Evolution of Cooperation*. Rev. ed. New York: Basic Books.
- Baalen, Sebastian van. 2021. "Local Elites, Civil Resistance, and the Responsiveness of Rebel Governance in Côte d'Ivoire." *Journal of Peace Research* 58 (5): 930–44. <https://doi.org/10.1177/0022343320965675>.
- Bagayoko, Niagale, Eboe Hutchful, and Robin Luckham. 2016. "Hybrid Security Governance in Africa: Rethinking the Foundations of Security, Justice and Legitimate Public Authority." *Conflict, Security & Development* 16 (1): 1–32. <https://doi.org/10.1080/14678802.2016.1136137>.
- Barter, Shane Joshua. 2013. "State Proxy or Security Dilemma? Understanding Anti-



- Rebel Militias in Civil War.” *Asian Security* 9 (2): 75–92. <https://doi.org/10.1080/14799855.2013.795546>.
- Bell, Andrew, Malcolm Fairbrother, and Kelvyn Jones. 2019. “Fixed and Random Effects Models: Making an Informed Choice.” *Quality & Quantity* 53 (2): 1051–74. <https://doi.org/10.1007/s11135-018-0802-x>.
- Bentzen, Jeanet Sinding, Nicolai Kaarsen, and Asger Moll Wingender. 2012. “Irrigation and Autocracy.” *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2124952>.
- Berry, William D., Jacqueline H. R. DeMeritt, and Justin Esarey. 2010. “Testing for Interaction in Binary Logit and Probit Models: Is a Product Term Essential?” *American Journal of Political Science* 54 (1): 248–66. <https://doi.org/10.1111/j.1540-5907.2009.00429.x>.
- Blocq, Daniel S. 2014. “The Grassroots Nature of Counterinsurgent Tribal Militia Formation: The Case of the Fertit in Southern Sudan, 1985–1989.” *Journal of Eastern African Studies* 8 (4): 710–24. <https://doi.org/10.1080/17531055.2014.946336>.
- Bøås, Morten. 2014. *The Politics of Conflict Economies: Miners, Merchants and Warriors in the African Borderland*. 0th ed. Routledge. <https://doi.org/10.4324/9781315754802>.
- . 2019. *The Sahel Crisis and the Need for International Support*.
- Boege, Volker, M. Anne Brown, and Kevin P. Clements. 2009. “Hybrid Political Orders, Not Fragile States.” *Peace Review* 21 (1): 13–21. <https://doi.org/10.1080/10402650802689997>.
- Böhmelt, Tobias, and Govinda Clayton. 2018. “Auxiliary Force Structure: Paramilitary Forces and Progovernment Militias.” *Comparative Political Studies* 51 (2): 197–237. <https://doi.org/10.1177/0010414017699204>.
- Boone, Catherine. 2014. *Property and Political Order in Africa: Land Rights and the Structure of Politics*. Cambridge Studies in Comparative Politics. New York: Cambridge University Press.
- Boserup, Ester. 1972. *The conditions of agricultural growth: the economics of agrarian change under population pressure*. London: G. Allen and Unwin.
- Branović, Željko, and Sven Chojnacki. 2011. “The Logic of Security Markets: Security Governance in Failed States.” *Security Dialogue* 42 (6): 553–69. <https://doi.org/10.1177/0967010611424423>.
- Brückner, Markus. 2010. “Population Size and Civil Conflict Risk: Is There a Causal Link?” *The Economic Journal* 120 (544): 535–50. <https://doi.org/10.1111/j.1468-0297.2010.02352.x>.
- Brüne, Stefan, Hans-Georg Ehrhart, and Heinz-Gerhard Justenhoven, eds. 2015. “European Union External Action Service. Strategy for Security and Development in the Sahel.” In *Frankreich, Deutschland Und Die EU in Mali*, 235–46. Nomos. [https://doi.org/10.5771/9783845259604\\_235](https://doi.org/10.5771/9783845259604_235).
- Buis, Maarten L. 2010. “Stata Tip 87: Interpretation of Interactions in Nonlinear Models.” *The Stata Journal: Promoting Communications on Statistics and Stata* 10 (2): 305–8. <https://doi.org/10.1177/1536867X1001000211>.
- Burrier, Grant. 2019. “Politics or Technical Criteria? The Determinants of Infrastruc-

- ture Investments in Brazil.” *The Journal of Development Studies* 55 (7): 1436–54. <https://doi.org/10.1080/00220388.2018.1438596>.
- Cao, Yu, Xiaoling Zhang, and Lingxiao He. 2020. “Collective Action in Maintaining Rural Infrastructures: Cadre-Farmer Relationship, Institution Rules and Their Interaction Terms.” *Land Use Policy* 99 (December): 105043. <https://doi.org/10.1016/j.landusepol.2020.105043>.
- Carey, Sabine C, Neil J Mitchell, and Will Lowe. 2013. “States, the Security Sector, and the Monopoly of Violence: A New Database on Pro-Government Militias.” *Journal of Peace Research* 50 (2): 249–58. <https://doi.org/10.1177/0022343312464881>.
- Carnap, Tillmann von. 2017. “Irrigation as a Historical Determinant of Social Capital in India? A Large-Scale Survey Analysis.” *World Development* 95 (July): 316–33. <https://doi.org/10.1016/j.worlddev.2017.02.035>.
- Cederman, Lars-Erik, and Kristian Skrede Gleditsch. 2009. “Introduction to Special Issue on ‘Disaggregating Civil War.’” *Journal of Conflict Resolution* 53 (4): 487–95. <https://doi.org/10.1177/0022002709336454>.
- Chenoweth, Erica, and Maria J. Stephan. 2011. *Why Civil Resistance Works: The Strategic Logic of Nonviolent Conflict*. Columbia University Press.
- Chojnacki, Sven, and Željko Branović. 2011. “New Modes of Security: The Violent Making and Unmaking of Governance in War-Torn Areas of Limited Statehood.” In *Governance Without a State? Policies and Politics in Areas of Limited Statehood*, 89–114.
- Cohen, Dov, Richard E Nisbett, Brian F Bowdle, and Norbert Schwarz. 1996. “Insult, Aggression, and the Southern Culture of Honor: An ‘Experimental Ethnography,’” 16.
- Collier, Paul, and Anke Hoeffler. 2004. “Greed and Grievance in Civil War.” *Greed and Grievances in Civil War*, Oxford Economic Papers, 56.
- Coppedge, Michael. 2021. “V-Dem Dataset 2021.” Varieties of Democracy (V-Dem) Project. <https://doi.org/10.23696/VDEMDS21>.
- Cunningham, Scott. 2021. *Causal Inference: The Mixtape*. New Haven ; London: Yale University Press.
- Dao, M Q. 2008. “The Determinants of Infrastructure Development in Developing Countries.” *Studies in Economics and Econometrics* 32 (3): 43–54. <https://doi.org/10.1080/10800379.2008.12106456>.
- Dearing, Matthew P. 2021. *Militia Order in Afghanistan: Guardians or Gangsters?* 1st ed. London: Routledge. <https://doi.org/10.4324/9781003149071>.
- Eck, Kristine. 2014. “The Law of the Land: Communal Conflict and Legal Authority.” *Journal of Peace Research* 51 (4): 441–54. <https://doi.org/10.1177/0022343314522257>.
- . 2015. “Repression by Proxy: How Military Purges and Insurgency Impact the Delegation of Coercion.” *Journal of Conflict Resolution* 59 (5): 924–46. <https://doi.org/10.1177/0022002715576746>.
- Ekeh, Peter P. 1975. “Colonialism and the Two Publics in Africa: A Theoretical Statement,” 23.

- ESA. 2017. "Land Cover CCI Product User Guide Version 2. Tech. Rep." [http://maps.elie.ucl.ac.be/CCI/viewer/download/ESACCI-LC-Ph2-PUGv2\\_2.0.pdf](http://maps.elie.ucl.ac.be/CCI/viewer/download/ESACCI-LC-Ph2-PUGv2_2.0.pdf).
- Fairbrother, Malcolm. 2014. "Two Multilevel Modeling Techniques for Analyzing Comparative Longitudinal Survey Datasets." *Political Science Research and Methods* 2 (1): 119–40. <https://doi.org/10.1017/psrm.2013.24>.
- Fearon, James D., and David D. Laitin. 2003. "Ethnicity, Insurgency, and Civil War." *American Political Science Review* 97 (01): 75–90. <https://doi.org/10.1017/S0003055403000534>.
- Finch, W. Holmes, Jocelyn E. Bolin, and Ken Kelley. 2019. *Multilevel modeling using R*. 2nd edition. Chapman & Hall/CRC Statistics in the Social and Behavioral Sciences Series. Boca Raton: CRC Press.
- Florea, Adrian. 2020. "Rebel Governance in de Facto States." *European Journal of International Relations* 26 (4): 1004–31. <https://doi.org/10.1177/1354066120919481>.
- Forney, Jonathan Filip. 2015. "Who Can We Trust with a Gun? Information Networks and Adverse Selection in Militia Recruitment." *Journal of Conflict Resolution* 59 (5): 824–49. <https://doi.org/10.1177/0022002715576752>.
- Frowd, Philippe M. 2022. "The Politics of Non-State Security Provision in Burkina Faso: Koglweogo Self-Defence Groups' Ambiguous Pursuit of Recognition." *African Affairs* 121 (482): 109–30. <https://doi.org/10.1093/afraf/adab033>.
- Fujiie, Masako, Yujiro Hayami, and Masao Kikuchi. 2005. "The Conditions of Collective Action for Local Commons Management: The Case of Irrigation in the Philippines." *Agricultural Economics* 33 (2): 179–89. <https://doi.org/10.1111/j.1574-0862.2005.00351.x>.
- Fukuyama, Francis. 2001. "Social Capital, Civil Society and Development." *Third World Quarterly* 22 (1): 7–20. <https://www.jstor.org/stable/3993342>.
- . 2004. "The Imperative of State-Building." *Journal of Democracy* 15 (2): 17–31. <https://doi.org/10.1353/jod.2004.0026>.
- Fumerton, Mario Antonio. 2018. "Beyond Counterinsurgency: Peasant Militias and Wartime Social Order in Peru's Civil War." *European Review of Latin American and Caribbean Studies / Revista Europea de Estudios Latinoamericanos y Del Caribe* 0 (105): 61. <https://doi.org/10.18352/erlacs.10374>.
- Gelman, Andrew, and Jennifer Hill. 2007. *Data Analysis Using Regression and Multi-level/Hierarchical Models*. Analytical Methods for Social Research. Cambridge; New York: Cambridge University Press.
- Giesselmann, Marco, and Alexander W. Schmidt-Catran. 2022. "Interactions in Fixed Effects Regression Models." *Sociological Methods & Research* 51 (3): 1100–1127. <https://doi.org/10.1177/0049124120914934>.
- Glawion, Tim. 2020. *The Security Arena in Africa: Local Order-Making in the Central African Republic, Somaliland, and South Sudan*. 1st ed. Cambridge University Press. <https://doi.org/10.1017/9781108623629>.
- Gneezy, Uri, Andreas Leibbrandt, and John A. List. 2016. "Ode to the Sea: Workplace Organizations and Norms of Cooperation." *The Economic Journal* 126 (595): 1856–

83. <https://doi.org/10.1111/ecoj.12209>.
- Goist, Mitchell, and Florian G. Kern. 2018. "Traditional Institutions and Social Cooperation: Experimental Evidence from the Buganda Kingdom." *Research & Politics* 5 (1): 205316801775392. <https://doi.org/10.1177/2053168017753925>.
- Granovetter, Mark S. 1973. "The Strength of Weak Ties," 22.
- Greene, William. 2010. "Testing Hypotheses about Interaction Terms in Nonlinear Models." *Economics Letters* 107 (2): 291–96. <https://doi.org/10.1016/j.econlet.2010.02.014>.
- Grosjean, Pauline. 2014. "A HISTORY OF VIOLENCE: THE CULTURE OF HONOR AND HOMICIDE IN THE US SOUTH: A History of Violence." *Journal of the European Economic Association* 12 (5): 1285–1316. <https://doi.org/10.1111/jeea.12096>.
- Habyarimana, James, Macartan Humphreys, Daniel N. Posner, and Jeremy M. Weinstein. 2009. *Coethnicity: Diversity and the Dilemmas of Collective Action*. Russell Sage Foundation. <http://www.jstor.org.ez.statsbiblioteket.dk:2048/stable/10.7758/9781610446389>.
- Hagberg, Sten. 2018. "Beyond Regional Radars: Security from Below and the Rule of Law in the Sahel." *South African Journal of International Affairs* 25 (1): 21–37. <https://doi.org/10.1080/10220461.2018.1417903>.
- . 2019. "Performing Tradition While Doing Politics: A Comparative Study of the Dozos and Koglweogos Self-Defense Movements in Burkina Faso." *African Studies Review* 62 (1): 173–93. <https://doi.org/10.1017/asr.2018.52>.
- Hamaker, Ellen L., and Bengt Muthén. 2020. "The Fixed Versus Random Effects Debate and How It Relates to Centering in Multilevel Modeling." *Psychological Methods* 25 (3): 365–79. <https://doi.org/10.1037/met0000239>.
- Helman, Gerald B., and Steven R. Ratner. 1992. "Saving Failed States." *Foreign Policy*, no. 89 (Winter): 3. <https://doi.org/10.2307/1149070>.
- Henrich, Joseph, Robert Boyd, Samuel Bowles, Colin Camerer, Ernst Fehr, Herbert Gintis, and Richard McElreath. 2001. "In Search of Homo Economicus: Behavioral Experiments in 15 Small-Scale Societies." *American Economic Review* 91 (2): 73–78. <https://doi.org/10.1257/aer.91.2.73>.
- Hobbes, Thomas. 2017. *Leviathan*. Penguin Classics. Harmondsworth, Meddlesex: Penguin Books.
- Hoffman, D. 2007. "The Meaning of a Militia: Understanding the Civil Defence Forces of Sierra Leone." *African Affairs* 106 (425): 639–62. <https://doi.org/10.1093/afraf/adm054>.
- Hoffmann, John P. 2016. "Poisson and Negative Binomial Regression Models." In *Regression Models for Categorical, Count, and Related Variables*, 1st ed., 131–58. An Applied Approach. University of California Press. <http://www.jstor.org.ez.statsbiblioteket.dk:2048/stable/10.1525/j.ctv1wxrfr.10>.
- Hollenbach, Florian M., and Jan H. Pierskalla. 2017. "A Re-Assessment of Reporting Bias in Event-Based Violence Data with Respect to Cell Phone Coverage." *Research & Politics* 4 (3): 205316801773068. <https://doi.org/10.1177/2053168017730687>.

- Holzinger, Katharina, Roos Haer, Axel Bayer, Daniela M. Behr, and Clara Neupert-Wentz. 2019. "The Constitutionalization of Indigenous Group Rights, Traditional Political Institutions, and Customary Law." *Comparative Political Studies* 52 (12): 1775–1809. <https://doi.org/10.1177/0010414018774347>.
- Howard, Andrea L. 2015. "Leveraging Time-Varying Covariates to Test Within- and Between-Person Effects and Interactions in the Multilevel Linear Model." *Emerging Adulthood* 3 (6): 400–412. <https://doi.org/10.1177/2167696815592726>.
- Humphreys, Macartan, and Jeremy M. Weinstein. 2008. "Who Fights? The Determinants of Participation in Civil War." *American Journal of Political Science* 52 (2): 436–55. <https://doi.org/10.1111/j.1540-5907.2008.00322.x>.
- Ibrahim Shire, Mohammed. 2022. "Protection or Predation? Understanding the Behavior of Community-Created Self-Defense Militias During Civil Wars." *Small Wars & Insurgencies* 33 (3): 467–98. <https://doi.org/10.1080/09592318.2021.1937806>.
- Ikezue, Clement Emeka, and Peter Chukwuma Ezeah. 2016. "The Role of Democracy in Infrastructural Development of Anambra West Local Government Area, Southeast, Nigeria." *The Nigerian Journal of Sociology and Anthropology* 14 (2). [https://doi.org/10.36108/NJSA/6102/14\(0250\)](https://doi.org/10.36108/NJSA/6102/14(0250)).
- Jackson, Robert H., and Georg Sørensen. 2015. *Introduction to International Relations: Theories and Approaches*. Sixth Edition. Oxford; New York, NY: Oxford University Press.
- Jentzsch, Corinna. 2022. *Violent Resistance: Militia Formation and Civil War in Mozambique*. 1st ed. Cambridge University Press. <https://doi.org/10.1017/9781108936026>.
- Jentzsch, Corinna, Stathis N. Kalyvas, and Livia Isabella Schubiger. 2015. "Militias in Civil Wars." *Journal of Conflict Resolution* 59 (5): 755–69. <https://doi.org/10.1177/0022002715576753>.
- Karaca-Mandic, Pinar, Edward C. Norton, and Bryan Dowd. 2012. "Interaction Terms in Nonlinear Models." *Health Services Research* 47 (1pt1): 255–74. <https://doi.org/10.1111/j.1475-6773.2011.01314.x>.
- Katz, Elizabeth G. 2000. "Social Capital and Natural Capital: A Comparative Analysis of Land Tenure and Natural Resource Management in Guatemala." *Land Economics* 76 (1): 114. <https://doi.org/10.2307/3147261>.
- King, Gary. 1998. *Unifying Political Methodology: The Likelihood Theory of Statistical Inference*. Techniques in Political Analysis. Ann Arbor: University of Michigan Press.
- King, Gary, and Langche Zeng. 2006. "The Dangers of Extreme Counterfactuals." *Political Analysis* 14 (2): 131–59. <https://doi.org/10.1093/pan/mpj004>.
- Krishnarajan, Suthan, Jørgen Møller, Lasse Lykke Rørby, and Svend-Erik Skaaning. 2017. "Democracy, Democratization, and Civil War" 2017: 9.
- Lam, Wai Fung, and Elinor Ostrom. 2010. "Analyzing the Dynamic Complexity of Development Interventions: Lessons from an Irrigation Experiment in Nepal." *Policy Sciences* 43 (1): 1–25. <https://doi.org/10.1007/s11077-009-9082-6>.
- Lar. 2019. "Violence and Insecurity in Northwest Nigeria: Exploring the Role and



- Resilience of Local Actors.” *African Conflict and Peacebuilding Review* 9 (2): 123. <https://doi.org/10.2979/africonfpeacrevi.9.2.07>.
- Leclercq, Sidney, and Geoffroy Matagne. 2020. “‘With or Without You’: The Governance of (Local) Security and the Koglweogo Movement in Burkina Faso” 2020: 22.
- Lichbach, Mark Irving. 1995. *The Rebel’s Dilemma*. Economics, Cognition, and Society. Ann Arbor: University of Michigan Press.
- Lohmann, Susanne. 1994. “The Dynamics of Informational Cascades: The Monday Demonstrations in Leipzig, East Germany, 1989-91.” *World Politics* 47 (1): 42–101. <https://doi.org/10.2307/2950679>.
- Loyle, Cyanne E. 2021. “Rebel Justice During Armed Conflict.” *Journal of Conflict Resolution* 65 (1): 108–34. <https://doi.org/10.1177/0022002720939299>.
- Loyle, Cyanne E., Kathleen Gallagher Cunningham, Reyko Huang, and Danielle F. Jung. 2021. “New Directions in Rebel Governance Research.” *Perspectives on Politics*, September, 1–13. <https://doi.org/10.1017/S1537592721001985>.
- Magagna, Victor. 2019. *Communities of Grain: Rural Rebellion in Comparative Perspective*. <https://doi.org/10.7591/9781501737107>.
- Magid, Yehuda, and Justin Schon. 2018. “Introducing the African Relational Pro-Government Militia Dataset (RPGMD).” *International Interactions* 44 (4): 801–32. <https://doi.org/10.1080/03050629.2018.1458724>.
- Mair, Patrick. 2018. *Modern Psychometrics with R*. Use R! Cham: Springer International Publishing. <https://doi.org/10.1007/978-3-319-93177-7>.
- Marwell, Gerald, Pamela E. Oliver, and Ralph Prahl. 1988. “Social Networks and Collective Action: A Theory of the Critical Mass. III.” *American Journal of Sociology* 94 (3): 502–34. <https://doi.org/10.1086/229028>.
- Marx, Karl. 1852. *The Eighteenth Brumaire of Louis Bonaparte*. <https://www.marxists.org/archive/marx/works/download/pdf/18th-Brumaire.pdf>.
- Mason, T. David. 2004. *Caught in the Crossfire: Revolutions, Repression, and the Rational Peasant*. Lanham, Md: Rowman & Littlefield.
- Mazzei, Julie. 2009. *Death Squads or Self-Defense Forces? How Paramilitary Groups Emerge and Challenge Democracy in Latin America*. Chapel Hill: University of North Carolina Press.
- McAdam, Doug, Sidney Tarrow, and Charles Tilly. 1997. “Toward an Integrated Perspective on Social Movements and Revolution.” In *Comparative Politics: Rationality, Culture, and Structure*.
- McGinnis, Michael D. 2011. “An Introduction to IAD and the Language of the Ostrom Workshop: A Simple Guide to a Complex Framework: McGinnis: IAD Guide.” *Policy Studies Journal* 39 (1): 169–83. <https://doi.org/10.1111/j.1541-0072.2010.00401.x>.
- Meagher, Kate. 2012. “The Strength of Weak States? Non-State Security Forces and Hybrid Governance in Africa: *Non-State Security Forces and Hybrid Governance in Africa*.” *Development and Change* 43 (5): 1073–1101. <https://doi.org/10.1111/j.1467-7660.2012.01794.x>.

- Mearns, Robin. 1996. "Community, Collective Action and Common Grazing: The Case of Post-socialist Mongolia." *Journal of Development Studies* 32 (3): 297–339. <https://doi.org/10.1080/00220389608422418>.
- Meijler, Erik, Frank Bausing, and Rien van der Leeden. 1998. "Estimating Bootstrap Confidence Intervals for Multilevel Models" 1998.
- Menkhaus, Ken. 2007. "Local Security Systems in Somali East Africa." In *Fragile States and Insecure People?*, edited by Louise Andersen, Bjørn Møller, and Finn Stepputat, 67–97. New York: Palgrave Macmillan US. [https://doi.org/10.1057/9780230605572\\_4](https://doi.org/10.1057/9780230605572_4).
- Moran, Emilio F., and Elinor Ostrom, eds. 2005. "Theories Underlying the Study of Human-Environment Interactions." In *Seeing the Forest and the Trees*. The MIT Press. <https://doi.org/10.7551/mitpress/6140.003.0005>.
- Morgan, Stephen L., ed. 2013. *Handbook of Causal Analysis for Social Research*. Handbooks of Sociology and Social Research. Dordrecht: Springer Netherlands. <https://doi.org/10.1007/978-94-007-6094-3>.
- Müller-Crepon, Carl. 2021. "State Reach and Development in Africa Since the 1960s: New Data and Analysis." *Political Science Research and Methods*, November, 1–10. <https://doi.org/10.1017/psrm.2021.60>.
- Müller-Crepon, Carl, Philipp Hunziker, and Lars-Erik Cederman. 2021. "Roads to Rule, Roads to Rebel: Relational State Capacity and Conflict in Africa." *Journal of Conflict Resolution* 65 (2-3): 563–90. <https://doi.org/10.1177/0022002720963674>.
- Mustafa, Daanish, and Muhammed Usman Qazi. 2007. "Transition from Karez to Tubewell Irrigation: Development, Modernization, and Social Capital in Balochistan, Pakistan." *World Development* 35 (10): 1796–1813. <https://doi.org/10.1016/j.worlddev.2007.06.002>.
- Nasri, Patricia Taft, Nate Haken, Wendy Wilson, Sarah Cockey, Adèle Diop, Katelin Reger, Natosha Hoduski, et al. 2021. "FRAGILE STATES INDEX ANNUAL REPORT 2021."
- Neupert-Wentz, Clara. 2020. "Traditional Authorities, Norm Collisions, and Communal Conflict" 2020: 58.
- Neupert-Wentz, Clara, Daniela Kromrey, and Axel Bayer. 2022. "The Democraticness of Traditional Political Systems in Africa." *Democratization* 29 (2): 296–319. <https://doi.org/10.1080/13510347.2021.1953476>.
- Nussio, Enzo. 2011. "How Ex-Combatants Talk about Personal Security. Narratives of Former Paramilitaries in Colombia." *Conflict, Security & Development* 11 (5): 579–606. <https://doi.org/10.1080/14678802.2011.641725>.
- OECD. 2020. *States of Fragility 2020*. States of Fragility. OECD. <https://doi.org/10.1787/ba7c22e7-en>.
- Oliver, Pamela E. 1993. "Formal Models of Collective Action," 30.
- Olson, Mancur. 1968. *Logic of Collective Action: Public Goods and the Theory of Groups*. New impression edition. New York: Schocken Books Inc., U.S.
- Osorio, Javier, Livia Isabella Schubiger, and Michael Weintraub. 2021. "Legacies of Resistance: Mobilization Against Organized Crime in Mexico." *Comparative Political*

- Studies* 54 (9): 1565–96. <https://doi.org/10.1177/0010414021989761>.
- Ostrom, Elinor. 2006. *Understanding Institutional Diversity*. Princeton University Press. <https://doi.org/10.1515/9781400831739>.
- . 2015. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9781316423936>.
- Ostrom, Elinor, and T. K. Ahn. 2007. “The Meaning of Social Capital and Its Link to Collective Action.” SSRN Scholarly Paper. Rochester, NY. <https://papers.ssrn.com/abstract=1936058>.
- Ostrom, Elinor, Joanna Burger, Christopher B Field, Richard B Norgaard, and David Policansky. 1999. “Revisiting the Commons: Local Lessons, Global Challenges” 284: 6.
- Ostrom, Elinor, and Roy Gardner. 1993. “Coping with Asymmetries in the Commons: Self-Governing Irrigation Systems Can Work.” *Journal of Economic Perspectives* 7 (4): 93–112. <https://doi.org/10.1257/jep.7.4.93>.
- Ostrom, Elinor, Roy Gardner, and James Walker. 1994. *Rules, Games, and Common-Pool Resources*. Ann Arbor: University of Michigan Press.
- Paige, Jeffery M. 1975. *Agrarian Revolution: Social Movements and Export Agriculture in the Underdeveloped World*. New York: Free Press.
- Pearl, Judea. 2000. *Causality: Models, Reasoning, and Inference*. Cambridge, U.K.; New York: Cambridge University Press.
- Peic, Goran. 2021. “Divide and Co-Opt: Private Agendas, Tribal Groups, and Militia Formation in Counterinsurgency Wars.” *Studies in Conflict & Terrorism* 44 (12): 1022–49. <https://doi.org/10.1080/1057610X.2019.1620432>.
- Pierskalla, Jan H., and Florian M. Hollenbach. 2013. “Technology and Collective Action: The Effect of Cell Phone Coverage on Political Violence in Africa.” *American Political Science Review* 107 (2): 207–24. <https://doi.org/10.1017/S0003055413000075>.
- Pokalova, Elena. 2019. “Driving Factors Behind Foreign Fighters in Syria and Iraq.” *Studies in Conflict & Terrorism* 42 (9): 798–818. <https://doi.org/10.1080/1057610X.2018.1427842>.
- Putnam, Robert D., Robert Leonardi, and Raffaella Nanetti. 1993. *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton, N.J: Princeton University Press.
- Raleigh, Clionadh, and Caitriona Dowd. 2013. “Governance and Conflict in the Sahel’s ‘Ungoverned Space.’” *Stability: International Journal of Security & Development* 2 (2): 32. <https://doi.org/10.5334/sta.bs>.
- Raleigh, Clionadh, and Roudabeh Kishi. 2020. “Hired Guns: Using Pro-Government Militias for Political Competition.” *Terrorism and Political Violence* 32 (3): 582–603. <https://doi.org/10.1080/09546553.2017.1388793>.
- Raleigh, Clionadh, Andrew Linke, Håvard Hegre, and Joakim Karlsen. 2010. “Introducing ACLED: An Armed Conflict Location and Event Dataset: Special Data Feature.” *Journal of Peace Research* 47 (5): 651–60. <https://doi.org/10.1177/0022343310378914>.



- Reno, William. 2007. "Protectors and Predators: Why Is There a Difference Among West African Militias?" In *Fragile States and Insecure People?*, edited by Louise Andersen, Bjørn Møller, and Finn Stepputat, 99–121. New York: Palgrave Macmillan US. [https://doi.org/10.1057/9780230605572\\_5](https://doi.org/10.1057/9780230605572_5).
- Risse-Kappen, Thomas, ed. 2011. *Governance Without a State? Policies and Politics in Areas of Limited Statehood*. New York: Columbia University Press.
- Rotberg, Robert I. 2007. "The Failure and Collapse of Nation States." In *Staatszerfall Und Governance*, edited by Marianne Beisheim, Gunnar Folke Schuppert, Marianne Beisheim, and Gunnar Folke Schuppert, 57–97. Nomos. <https://doi.org/10.5771/9783845201009-57>.
- Samah, Albert. 2019. "Taking Our Security into Our Hands: The Role of Vigilante Groups in the Fight Against Boko Haram Terrorist Group in the Lake Chad Basin" 13 (03): 7.
- Schuberth, Moritz. 2015. "The Challenge of Community-Based Armed Groups: Towards a Conceptualization of Militias, Gangs, and Vigilantes." *Contemporary Security Policy* 36 (2): 296–320. <https://doi.org/10.1080/13523260.2015.1061756>.
- Schultz, Kenneth A., and Justin S. Mankin. 2019. "Is Temperature Exogenous? The Impact of Civil Conflict on the Instrumental Climate Record in Sub-Saharan Africa." *American Journal of Political Science* 63 (4): 723–39. <https://doi.org/10.1111/ajps.12425>.
- Schunck, Reinhard. 2013. "Within and Between Estimates in Random-Effects Models: Advantages and Drawbacks of Correlated Random Effects and Hybrid Models." *The Stata Journal: Promoting Communications on Statistics and Stata* 13 (1): 65–76. <https://doi.org/10.1177/1536867X1301300105>.
- Staniland, Paul. 2015. "Militias, Ideology, and the State." *Journal of Conflict Resolution* 59 (5): 770–93. <https://doi.org/10.1177/0022002715576749>.
- Stanislawski, Bartosz H. 2008. "Para-States, Quasi-States, and Black Spots: Perhaps Not States, But Not 'Ungoverned Territories,' Either." *International Studies Review* 10 (2): 366–96. <https://doi.org/10.1111/j.1468-2486.2008.00795.x>.
- Stevens, Forrest R., Andrea E. Gaughan, Catherine Linard, and Andrew J. Tatem. 2015. "Disaggregating Census Data for Population Mapping Using Random Forests with Remotely-Sensed and Ancillary Data." Edited by Luís A. Nunes Amaral. *PLOS ONE* 10 (2): e0107042. <https://doi.org/10.1371/journal.pone.0107042>.
- Stinchcombe, Arthur L. 1961. "Agricultural Enterprise and Rural Class Relations," 13.
- Strazzari, Francesco. 2014. "Captured or Capturing? Narcotics and Political Instability Along the 'African Route' to Europe," 33.
- Sundberg, Ralph, and Erik Melander. 2013. "Introducing the UCDP Georeferenced Event Dataset." *Journal of Peace Research* 50 (4): 523–32. <https://doi.org/10.1177/0022343313484347>.
- Talhelm, T., X. Zhang, S. Oishi, C. Shimin, D. Duan, X. Lan, and S. Kitayama. 2014. "Large-Scale Psychological Differences Within China Explained by Rice Versus Wheat Agriculture." *Science* 344 (6184): 603–8. <https://doi.org/10.1126/science.1246850>.
- Terpstra, Niels. 2020. "Rebel Governance, Rebel Legitimacy, and External Intervention:

- Assessing Three Phases of Taliban Rule in Afghanistan.” *Small Wars & Insurgencies* 31 (6): 1143–73. <https://doi.org/10.1080/09592318.2020.1757916>.
- Thai, Hoai-Thu, France Mentré, Nick Holford, Christine Veyrat-Follet, and Emmanuelle Comets. 2014. “Evaluation of Bootstrap Methods for Estimating Uncertainty of Parameters in Nonlinear Mixed-Effects Models: A Simulation Study in Population Pharmacokinetics” 2014: 30.
- Thomson, Andrew. 2019. “Ethnic Conflict and Militias.” In *The Palgrave Handbook of Ethnicity*, edited by Steven Ratuva, 559–76. Singapore: Springer Singapore. [https://doi.org/10.1007/978-981-13-2898-5\\_41](https://doi.org/10.1007/978-981-13-2898-5_41).
- Tieleman, Joris, and Justus Uitermark. 2019. “Chiefs in the City: Traditional Authority in the Modern State.” *Sociology* 53 (4): 707–23. <https://doi.org/10.1177/0038038518809325>.
- Tisseron, Antonin. 2021. “Pandora’s Box. Burkina Faso, Self-Defense Militias and VDP Law in Fighting Jihadism,” 42.
- Toshkov, Dimitar. 2016. *Research design in political science*. Political analysis. London New York, NY: Palgrave, Macmillan Education. <https://doi.org/10.1007/978-1-137-34284-3>.
- Trasberg, Mart E. 2021. “Informal Customary Institutions, Collective Action, and Sub-municipal Public Goods Provision in Mexico.” *Latin American Politics and Society* 63 (3): 146–70. <https://doi.org/10.1017/lap.2021.26>.
- Tsai, Lily L. 2007. *Accountability Without Democracy: Solidary Groups and Public Goods Provision in Rural China*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511800115>.
- Tsusaka, Takuji W., Kei Kajisa, Valerien O. Pede, and Keitaro Aoyagi. 2015. “Neighborhood Effects and Social Behavior: The Case of Irrigated and Rainfed Farmers in Bohol, the Philippines.” *Journal of Economic Behavior & Organization* 118 (October): 227–46. <https://doi.org/10.1016/j.jebo.2015.04.022>.
- Walt, Stephen M. 1985. “Alliance Formation and the Balance of World Power.” *International Security* 9 (4): 3. <https://doi.org/10.2307/2538540>.
- Waltz, Kenneth N. 1979. *Theory of International Politics*. Addison-Wesley Series in Political Science. Reading, Mass: Addison-Wesley Pub. Co.
- Weber, Max. 1926. *Politik Als Beruf*. München: Duncker & Humblot.
- Weidmann, Nils B. 2009. “Geography as Motivation and Opportunity,” *Journal of conflict resolution*, 19.
- Weidmann, Nils B. 2016. “A Closer Look at Reporting Bias in Conflict Event Data.” *American Journal of Political Science* 60 (1): 206–18. <https://doi.org/10.1111/ajps.12196>.
- Weiner, Myron. 1992. “Security, Stability, and International Migration.” *International Security* 17 (3): 91. <https://doi.org/10.2307/2539131>.
- Wiessner, Polly. 2020. “The Role of Third Parties in Norm Enforcement in Customary Courts Among the Enga of Papua New Guinea.” *Proceedings of the National Academy of Sciences* 117 (51): 32320–28. <https://doi.org/10.1073/pnas.2014759117>.
- Wig, Tore, and Daniela Kromrey. 2018. “Which Groups Fight? Customary Institutions

- and Communal Conflicts in Africa.” *Journal of Peace Research* 55 (4): 415–29. <https://doi.org/10.1177/0022343317740416>.
- Wittfogel, Karl August. 1957. *Oriental Despotism: A Comparative Study of Total Power*. 1st Vintage Books ed. New York: Vintage Books.
- WorldPop. 2018. “Global 1km Population.” University of Southampton. <https://doi.org/10.5258/SOTON/WP00647>.
- Wucherpennig, Julian, Nils B. Weidmann, Luc Girardin, Lars-Erik Cederman, and Andreas Wimmer. 2011. “Politically Relevant Ethnic Groups Across Space and Time: Introducing the GeoEPR Dataset.” *Conflict Management and Peace Science* 28 (5): 423–37. <https://doi.org/10.1177/0738894210393217>.
- Xu, Yiqing, and Yang Yao. 2015. “Informal Institutions, Collective Action, and Public Investment in Rural China.” *American Political Science Review* 109 (2): 371–91. <https://doi.org/10.1017/S0003055415000155>.
- Zang, Liangzhen, Yahua Wang, and Yiqing Su. 2021. “Does Farmland Scale Management Promote Rural Collective Action? An Empirical Study of Canal Irrigation Systems in China.” *Land* 10 (11): 1263. <https://doi.org/10.3390/land10111263>.
- Zartman, I. William, ed. 1995. *Collapsed States: The Disintegration and Restoration of Legitimate Authority*. SAIS African Studies Library. Boulder: L. Rienner Publishers.
- Zech, Steven T. 2016. “Between Two Fires: Civilian Resistance During Internal Armed Conflict in Peru,” 310.