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Does criminal violence spread? Contagion and counter-contagion mechanisms of piracy☆

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ABSTRACT

Research shows that political and criminal violence cluster spatially but neglects the wide range of mechanisms driving contagion and, more importantly, the role of counter-contagion efforts. After identifying permissive conditions for piracy, I hypothesize that piracy clusters in locations conducive to successful attacks. Pirates engage in risk-reducing behaviour: they return to areas where they have been previously successful but also adapt this learning-based decision to constraints imposed by EU counter-piracy. The analysis relies on uniquely detailed data on piracy and counter-piracy in monthly grid-cells off Somalia (2005–2013). Results show that although successful attacks foster more attacks and contagion, EU counter-piracy reduces contagion. Even within most successful locations, rescue operations reduce incidence of piracy by 89% in the following month. The article contributes to existing contagion/diffusion literature by identifying specific channels of contagion (contiguity and learning) and by factoring in containment policies that can limit and reduce criminal and political violence.

Introduction

Contagiousness is a feature of many social and political phenomena, including conflict, terrorism, protests and crime. Research on violence finds that not only violence clusters in space but it also spreads geographically. Whether this occurs as effect of contiguity, competition, learning, emulation or other diffusion mechanisms is less commonly investigated. Among several typologies of organized crimes, maritime piracy has emerged as a global threat to international security. Piracy incidents are reported all over the world, from South-East Asia and Indian Ocean to Latin America and Caribbean. Yet the distribution of piracy incidents appears to exhibit geographical concentration; indeed, a map of incidents easily identifies hotspots of pirates' activity. Recognizing the presence of crime hotspots, however, *does not* indicate diffusion or contagion per se and cannot explain why spatial clustering emerges. Research has shown that piracy clusters not only in space but also in time (Marchione & Johnson, 2013), thus pointing towards not just clustering but actual contagion processes.[1] However, two question still stands, namely (1) under which conditions piracy diffuses and (2) whether military intervention is apt to contain contagion.

As first contribution, I provide answers to these questions showing that pirates return to location they are familiar with and move around their proximity. This is what I call contagion by reinforcement and contiguity. In addition to this, pirates assess likelihood of success based on previous achievements. This is the third contagion mechanism, which works through learning. A counter-piracy force, however, may limit the geographical diffusion of criminal activities by threatening to or actually imposing costs on criminals. More precisely, deterrence and compellence counter not only piracy occurrence but also its contagion. The inclusion of contagion inhibitors is the second distinctive contribution of the manuscript and improves the comprehensiveness of the contagion mechanisms under investigation. I use unique data on counter-piracy that matches when, where and which incidents resulted in a response from the EU Navy operation (EUNAVFOR) and how pirates subsequently adjusted to this. Focusing on the Somali case, this manuscript argues that pirates' strategic behaviour helps explaining the spatial pattern of attacks and possible contagion. My argument implies that pirates' decision-making is strategic and dependent on their previous history of attacks and assessments of success. Third, the manuscript contributes to the existing literature on spatial contagion by taking advantage of studying contagion and counter-contagion dynamics in an environment with few confounders. On-land phenomena may pose more challenges as they are the result of social interactions and micro dynamics that are more difficult to capture. Thus, it is more

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[1] The distinction between diffusion as conditioned behaviour and contagion as imitative behaviour are from Midlarsky et al. (1980). Since main argument made in the article is that pirates behaviour is indeed purposive rather than random, the term contagion is preferred and used throughout the article.

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straightforward to account for few confounders at sea and explore whether other factors (e.g. learning) have strategic value in decision-making of criminal actors. Therefore, the findings presented here provide further evidence that strategic decisions by violent and criminal actors lead to spread of their activities. This is not the first attempt to detect contagion of piracy (see Marchione & Johnson, 2013), but it is the first one conceptualizing contagion as a *process* and thus proposing explanations for why we see contagion as an *outcome* (Elkins & Simmons, 2005).

The manuscript is organized as follows. First, I summarize the main scholarly contributions on spatial contagion, particularly in the study of violence and crime. In the theoretical section, I argue that attacks by pirates are not completely random and that some locations are potentially preferred not only because of location-specific risk factors (e.g. distance from coast or weather conditions), but also because of pirates' experience of successes and disruptions by EUNAVFOR counter-piracy in that location. To test these hypotheses, I propose a statistical analysis of piracy and counter-piracy efforts in Somalia from 2005 to 2013. Results corroborate contagiousness of piracy as predicted by the reinforcement, contiguity and learning hypotheses on contagion. Additionally, I find that the deployment of the EU mission has overall curbed the incidence of piracy off Somalia in recent years (deterrence) and that pirates avoid areas where EUNAVFOR disrupted their attacks (compellence), though this effect only lasts one month. The conclusion discusses the relevance of piracy for understanding the contagion of violence and (transnational organized) crime and how identifying different mechanisms of contagion or diffusion should lead to different policy interventions.

Spatial diffusion and contagion of violence and crime

Early political science studies on diffusion paid particular attention to the spread of violence. Starr and Most (1985) indicate reinforcement and diffusion as possible processes through which war spreads across countries. Intuitively, they argue that countries are at greater risk of war if they have experienced war in the past or are proximate to other countries at war. Braithwaite and Li (2007) also finds that countries located in terrorist hotspots are more likely to experience terrorist attacks in the immediate future.

The connections among countries may be defined by different criteria, one of which is geographic proximity. Contiguity provides the opportunity for inter-state interactions, which facilitate the diffusion of violence across countries (Braithwaite, 2006; Lake & Rothchild, 1998). While proximity plays a role in the diffusion of phenomena or adoption of policies, it is not the only channel (Braithwaite, 2010; Buhaug & Gleditsch, 2008; Zhukov, 2012). Alliances, shared membership in IGO, intergovernmental ties, migration flows and even civilization lines are alternative channels through which phenomena, as infections, spread faster than proximity would predict (Bove & Böhmelt, 2016; Most & Starr, 1989; Neumayer & Plümper, 2010; Zhukov & Stewart, 2013). For example, Midlarsky, Crenshaw, and Yoshida (1980) argue that the risk terrorism contagion depends on the diplomatic status of the country where terrorism occurs since status indicates a degree of "imitability". Indeed, non-state actors e.g. terrorists and criminals, *observe* how other groups and the results of such actions; according to what they see, they decide whether to adopt the tactic or not (Elkins & Simmons, 2005). Observing who adopts a strategy and its outcome implies a learning process. Learning, in opposition to mimicry, emulation and imitation, involves a rationalist adoption of a practice based on its observed consequences and consistency with one's own objectives.[2] Also, likelihood of adopting a tactic such as suicide terrorism largely depends on the capability of a group to do so (Horowitz, 2010). Notably, however, while for military strategies like suicide bombings capability is a significant constraints, pirates do not incur in major costs when deciding to move to locations where attacks are more successful.

Insurgents and terrorists are not the only non-state actors whose activities diffuse via contagion and learning. Crime is as infectious as violence and terrorism (Cohen & Tita, 1999; Ye & Wu, 2011). Criminology has developed its own theoretical framework to explain the spatial distribution of crimes which distinguishes two mechanisms, namely flag and boost effects (Pease, 1998). Some victims "advertise their vulnerability" (Johnson & Bowers, 2004, p. 12), for example, a house with poor lighting is a potential target for any burglar. This heterogeneity in risk is at the core of the flag effect. The second mechanism driving crime diffusion is the boost effect, namely the tendency of offenders to learn from their previous crimes and use this information to choose future targets. Burglars are likely to return to previously robbed houses because they have knowledge of the environment and consequently may feel confident to operate more efficiently.

Political Science and Criminology have used different terms and methods to explore similar mechanisms behind patterns of diffusion. As argued below, compared to Criminology, the so-called Galton's Problem of distinguishing risk heterogeneity from spatial interdependence (Galton, 1889) is more explicitly addressed in the violence and terrorism literature, both theoretically and methodologically. Conversely, research on crime contagion identifies hotspots without distinguishing whether these result from spatial distribution of crime-prone features (i.e. common exposure[3]) or actual contagion of crime. As Buhaug and Gleditsch (2008) pointed out, hotspots of conflicts may also be the result of countries' individual characteristics that cluster in space, rather than a neighbourhood effect. This clustering could emerge not as consequence of interdependence among units but more as consequence of Tobler's first law of geography according to which closer things are more similar than distant things (Tobler, 1970).

This distinction between spatial *interdependence* and spatial *heterogeneity* or common exposure (Franzese & Hayes, 2008) is crucial as it has theoretical and methodological implications. First of all, arguing that the geographical clustering of conflict is only the result of the distribution of countries' features supports the conclusion that, for example, terrorism in neighbouring countries is not a threat for other states. Second, if there is an actual neighbourhood effect (diffusion or contagion), non-independence of observations is a problem for statistical inference. This manuscript acknowledges these issues and connects the Criminology and Political Science literature using piracy as instance of transnational violent crime to pin down contagion and counter-contagion mechanisms underlying the geography of piracy.

Risk factors of maritime Piracy in Somalia

Identifying factors that affect the occurrence of piracy is important for separating contagion (spatial interdependence) from common exposure (clustering of risk factors). The literature on the occurrence of piracy adopts an aggregated perspective and identifies three classes of risk factors.

First, states' institutional capacity affects the intensity of piracy activities within states' territorial waters. Scholars have argued for a non-linear relationship, with weak states being more likely to be affected by endemic piracy than failed states (Groot et al., 2011; Hastings, 2009). More sophisticated typologies of piracy require some degree of governance and are threatened by instability caused by violent conflicts and anarchy (Shortland & Percy, 2013). Daxecker and Prins (2013)

[2] For a discussion of differences, see Maggetti & Gilardi, 2015.

[3] In the manuscript, the term common exposure is borrowed from Franzese and Hayes to indicate "similar exogenous internal/domestic or external/foreign stimulus" (2008:4). In the same vein, common exposure is implied in Buhaug and Gleditsch (2008:215) when the authors mention "similar distribution of relevant country characteristics" associated with the emergence of the phenomenon of interest.