Violence and property rights

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A R T I C L E   I N F O

A B S T R A C T

Since the middle ages, when Europe was still at a Malthusian stage of development, interpersonal violence has been in steady decline, and institutions and norms limiting violence – in particular property rights – have expanded. Here we put forward a Malthusian model of violence where these trends can be interpreted as a response to easing population pressure, following an acceleration in technological progress. The idea is that agents rationally risk dying in violent resource competition in order to make more of their children survive starvation. Violence carries a positive externality, because those who die free up resources for survivors. This generates a socially optimal level of violence, which can be implemented with the right amount of property rights protection. It is shown that faster technological progress can lead to a decline in violence and improved property rights protection, similar to the path followed by Europe.

1. Introduction

> Because individuals always have the option of competing with one another for resources or status through violence, a necessary corollary to limiting violence [...] is placing limits on competition.
> North et al. (2009, p. 14)

It is well known that poor countries tend to have higher rates of interpersonal violence than rich. It has also been documented that the richer and more peaceful regions of the world today began the process of pacification long before they transited out of Malthusian stagnation. Medieval Europe already had lower homicide rates than most documented preagricultural societies.

In this paper we propose a theory of what drives violence in Malthusian environments, and the early emergence of institutions that limit violence, which we interpret as property rights. The idea is that both violence and property rights protection are rational responses to population pressure.

In our model agents maximize their expected number of offspring, facing a trade-off by which less aggression improves the chances to survive long enough to have children, but – because aggression affects the distribution of resources – also results in fewer resources being appropriated, and thus fewer children surviving starvation.

Violence carries a conventional negative externality, since resources could be distributed peacefully by a planner, without anyone having to risk violent death. However, violence here also carries a positive externality, because those who die free up resources for survivors. The model thus generates a "socially optimal" level of violence, in the sense that it

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maximizes the ex ante welfare of every agent active in a given period, as well as the society's overall population growth. Property rights, by protecting resources from deadly competition, serve to implement that optimal amount of violence.

One result of our model is that faster technological progress can make better property rights protection optimal. Intuitively, faster technological progress implies lower population pressure on the balanced growth path, making the need for violence to "cull" the population less acute. This suggests a mechanism through which an early acceleration in technical change, in particular in Western Europe, could have caused reduced violence and improved property rights, where other theories have rather pointed to the opposite direction of causation.

We also examine an extended setting where property rights impact the rate of technical change, and where property rights slowly gravitate towards their optimal level. This generates a feedback loop, through which initial improvements in property rights accelerate technological progress, thus reducing population pressure, in turn nudging the economy towards more violence-reducing property rights protection. This extended setting can replicate at least qualitatively the joint trends toward reduced violence and rising per-capita incomes observed in European history.

This paper relates to several strands of the literature. Theories on the rise of property rights include those that focus on increased efficiency gains from such institutions (Demsetz, 1967), and changes in the return to an elite to seize control of otherwise equally shared resources (Lagerlöf, 2009; Fenske, 2012), but the concept of property rights as a regulator of violence does not seem to have been explored or modelled yet.

Economic theories of conflict typically focus on agents' trade-offs between producing goods and appropriating (stealing) them (e.g., Grossman, 1991; Grossman and Kim, 1995; Hirshleifer, 1988, 2001; see Skaperdas, 2003 for a nice overview). In such models, better property rights can shift efforts from appropriation to production. In contrast, to illustrate the particular mechanisms we have in mind, we completely abstract from production.

The mechanism linking resource scarcity to violence in our model is closely related to that in Grossman and Mendoza (2003). In particular, they show that the starvation survival function must be such that the elasticity with respect to consumption is decreasing in consumption, for worse scarcity to lead to increased violence; the function used here satisfies this condition.

Most importantly, our model differs from (almost) all existing conflict models in allowing for the endogenous dynamic evolution of population, in particular endogenous *interaction* between population pressure and violence.[1]

Models examining the link between growth, conflict, and property rights in the modern world (e.g., Benhabib and Rustichini, 1996; Besley and Persson, 2009) typically do not model violence per se, or Malthusian population dynamics.[2] A different growth literature aims to generate transitions from Malthusian stagnation to sustained growth in per-capita incomes (Galor and Weil, 2000; Hansen and Prescott, 2002; Lagerlöf, 2003, 2006), but we focus on a purely Malthusian environment.

Models of joint Malthusian population and resource dynamics (Brander and Taylor, 1998; De la Croix and Dottori, 2008) do not explicitly model violence, either as an input in resource competition or a source of mortality. Some do conjecture that many ecological disasters were very violent events (Diamond, 2005).

The rest of this paper is organized as follows. Next, Section 2 discusses some patterns in interpersonal violence that motivate this exercise. In Section 3 we set up the model, and derive expressions for the equilibrium and optimal death rates from violence, and the optimal property rights regime. Section 4 analyzes the dynamics, under different assumptions about how property rights are set. Section 5 explores a setting where property rights feed back into technological progress. Section 6 ends with a concluding discussion.

2. Background

Below we summarize some historical trends and contemporary patterns in violence. We show that factors which can be interpreted as causes of "population pressure" in our model – in particular high birth rates and low rates of technological progress – are associated with high rates of violence.

We consider three sets of sources: modern cross-country homicide data; historical homicide trends in different European regions; and estimates of violence in indigenous and other preagricultural societies.

2.1. Cross-country patterns

Fig. 1 plots current homicide rates (murders per year and 100,000 people) against crude birth rates (births per 1000 population) averaged over 1950–2010. (See Appendix A for data sources.) We use past birth rates since our ambition is to proxy for the current population pressure, and focus on 87 poor countries (with below-median per-capita GDP levels in 2005), since, in light of our model later, we are interested in potentially Malthusian environments.

Clearly, high past birth rates are associated with high current murder rates. The pattern may seem unsurprising, since poorer countries are well known to have larger families and also tend to have, e.g., weaker states and less effective law

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[1] One exception may be Baker (2003), who uses a conflict model to analyze property-rights patterns in primitive societies. He also allows for endogenous population pressure, in the sense that groups enter or exit depending on whether the realized payoffs fall above or below subsistence requirements. However, there is no direct mortality from violence, or trade-off between death from violence and death from starvation.

[2] Lagerlöf (2010) sets up a model where governments go to war against one another, but our focus here is more on interpersonal violence.