

POVERTY AND VIOLENCE: EVIDENCE FROM THE LITTLE ICE AGE IN CHINA

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At the beginning of the early modern period, many parts of the world entered into a prolonged period of cooling, commonly referred to as the “Little Ice Age”.¹ For China, the worst of the Little Ice Age was in the first half of the 17th century. Under persistent drought, famine occurred and in several instances, lasted for decades. Incidences of conflict and cannibalism went rampant. Historians have seen negative weather shocks as directly responsible for the collapse of the Ming Dynasty (1366-1644).

In a largely agrarian society, a sharp decline in agricultural output, combined with liquidity constraints, leads to extreme poverty. In this paper, I study the impact of extreme poverty on violence. Despite a large number of empirical studies on weather shocks and violence, the majority of studies focus on the transitory effect of those economic shocks. These effects typically work through the mechanism of lowering the opportunity cost of committing violence. A notable exception is Iyigun, Nunn, and Qian (2017), which documents the long-run dynamics of cooling periods on conflict in Europe. In this paper, I demonstrate a credible channel through which extreme poverty can permanently change the level of violence—through the transformation of beliefs about violence.

I first construct a continuous treatment in exposure to extreme poverty: years under severe drought. I begin my analysis by examining the last 10 years of the Ming Dynasty (1635-1644). The effects of extreme weather on poverty could be cumulative. Using professionally made maps based on Central Meteorological Bureau of China

¹Whether the Little Ice Age actually happened remains debatable. Kelly and Ó Gráda (2013), for example, shows that there were “major breaks, cycles, or trends that could be associated with the existence of a Little Ice Age”.

(1981), I create a prefecture-level drought index. My main measure of exposure to extreme poverty is the number of years a prefecture spent under “Severe Drought”.²

One possible concern is data quality. Indeed, missing values are common in Central Meteorological Bureau of China (1981). Hence I use an alternative method to construct my main explanatory variable. Climatologists have reconstructed temperature and rainfall for the past thousand of years. Using such data, combined with information on monsoonal flow, I can recover the pattern of drought at a local level. This approach yields a second measure of exposure to extreme poverty. One of the advantages of this measure is that it should correct for the type of error related to the first measure.

For outcomes related to violence, I compile several primary and secondary sources to construct a number of proxies over the course of 400 years. First, I look at incidences of violence before 1644. Thanks to a NSF project funded in the 1980s, a large number of gazetteers compiled during the Ming Dynasty have been coded up by categories such as peasant revolts and cannibalism. I interpret both revolts and cannibalism as coping strategies Chinese peasants were forced into under extreme poverty. Second, I examine post-1644 gazetteers. I first find search records containing the Chinese phrase *sharen* (“killing”). Within those search records, I locate additional phrases that appear together with *sharen*. Third, I extract indicators of violence from modern social media. With these sets of outcomes, I attempt to test the hypothesis that exposure to extreme, prolonged poverty led to forced uses of drastic measures, including committing violence, crime and other anti-social survival strategies. Such adaption strategies, when used extensively by the vast majority of individuals within a community, can eventually reshape the cultural norms surrounding the proper use of violence.³

My preliminary findings are stated as follows: first, I establish a positive relationship between years under severe drought and incidences of violence between

²In Central Meteorological Bureau of China (1981), five values are assigned: 1 for “Severe Flood”, 2 for “Flood”, 3 as “Normal”, 4 as “Drought”, 5 as “Severe Drought”.

³See Edgerton-Tarpley (2008) for cultural responses to famine in premodern China.

1580-1650. A simple interpretation is that drought led to resource scarcity. When driven below subsistence levels, peasants began to revolt (Jia, 2014). This result is robust to controlling for all pre-1570 characteristics, including measures of pre-1570 propensity for violence.

Second, for places with more years under drought, not only were there more conflicts during the period of 1580-1650, there were also more conflicts after 1650. Using panel data of historical conflicts (Chen, 1939), I find this to be true for the entire 18th century. The significance of this result is that it provides preliminary evidence that the impact of exposure to extreme poverty lasted way beyond the period of exposure. After a rapid population recovery, by 1700, most places had returned to their pre-modern steady-states. Hence the difference in the likelihood of having conflicts cannot be easily explained by economic mechanisms. To be more conclusive about the nature of the impact, and to verify whether there was a change in cultural norms, I plan to perform a text analysis of a wide variety of historical texts as an attempt to extract indicators of violence during this period. The result is robust to additional factors such as contemporaneous drought after 1650.

Third, using modern-day court cases, I uncover a positive relationship between years under severe drought between 1580 and 1650, and the number of bodily injury cases between 2010 and 2017.⁴ This result is robust to the inclusion of various modern and historical controls, including average frequency of disaster. In particular, this result is not sensitive to controlling for modern economic conditions, suggesting that a greater number of bodily injury cases is not a mere reflection of a region being underdeveloped economically. This part of the paper is still preliminary. The next step is to perform a social media analysis to collect for more indicators of violence.

In addition, I also plan to investigate the heterogeneous effects of exposure to poverty. Did fiscal transfers to prefectures going through severe drought mitigate its negative impact? How did the effect of an intensive period of severe drought interact

⁴Court cases before 2010 are not accessible to the public yet. In China bodily injury can be prosecuted under either civil or criminal law. More serious cases are prosecuted under criminal law. The results are stronger for cases prosecuted under criminal law.

with the initial propensity for violence? Further data collections are necessary in order to answer those questions.

One of the key innovations of this paper is to collect exhaustive information on pre-existing cultural characteristics supportive of violence, including various proxies of violent behavior observed in a prefecture. Another merit of this paper is the application of text analysis methods in extracting cultural indicators. This includes both historical proxies of attitudes towards violence and a social media analysis of modern populations. A similar method has been used in Michalopoulos and Xue (2017).

This paper is the first quantitative study of the long-run impact of the Little Ice Age on China. The Little Ice Age has been commented upon by historians of China who have noted that unusual scale of weather-related natural disasters for 1580-1650. In fact, historians frequently remark that the usually harsh weather was a proximate cause of the demise of the Ming Dynasty and that the associated shocks were severe even by the standard of a disaster-ridden country like China. This paper confirms that the Little Ice Age has indeed had a substantial impact on China, both historically and to the present day.

In addition to enriching our historical knowledge of China, this paper also aims to deepen our understanding of the relationship between poverty and violent behavior. Extreme poverty can affect violent behavior through a number of channels, including by the lowering opportunity costs of committing crimes, and extreme poverty is often an outcome of violent behavior itself. By focusing on a period of extreme poverty, and relating it to outcomes that happened long after economic recovery, I derive a causal estimate of the effect of extreme poverty on violent behavior. Moreover, by showing that extreme poverty could lead to a change in attitudes towards violence, and that through which it increased violent behavior in the very long run, this paper shows that the importance of alleviating poverty goes beyond its negative effect on contemporaneous economic and social conditions, but is also closely tied to maintaining a healthy social fabric of local communities and the well-being of future

generations in the long run.

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