journal of peace RESEARCH

Dynamics of political instability in the United States, 1780–2010

Journal of Peace Research
1–15

DOI: 10.1177/0022343312442078
jpr.sagepub.com
SAGE

Peter Turchin

Department of Ecology and Evolutionary Biology, University of Connecticut

Abstract

This article describes and analyses a database on the dynamics of sociopolitical instability in the United States between 1780 and 2010. The database was constructed by digitizing data collected by previous researchers, supplemented by systematic searches of electronic media archives. It includes 1,590 political violence events such as riots, lynchings, and terrorism. Incidence of political violence fluctuated dramatically over the 230 years covered by the database, following a complex dynamical pattern. Spectral analysis detected two main oscillatory modes. The first is a very long-term – *secular* – cycle, taking the form of an instability wave during the second half of the 19th century, bracketed by two peaceful periods (the first quarter of the 19th century and the middle decades of the 20th century, respectively). The second is a 50-year oscillation superimposed on the secular cycle, with peaks around 1870, 1920, and 1970. The pattern of two periodicities superimposed on each other is characteristic of the dynamics of political instability in many historical societies, such as ancient Rome and medieval and early-modern England, France, and Russia. A possible explanation of this pattern, discussed in the article, is offered by the structural-demographic theory, which postulates that labor oversupply leads to falling living standards and elite overproduction, and those, in turn, cause a wave of prolonged and intense sociopolitical instability.

Keywords

complex dynamics, database, political instability, riot, secular cycles, structural-demographic theory

Introduction

Political instability within states is one of the chief sources of human misery today, much more important even than warfare between states. Since the end of the Cold War, intrastate warfare has accounted for over 90% of battle deaths (Lacina & Gleditsch, 2005). Intrastate warfare is a primary cause of genocide and failed, or failing, states are breeding grounds for international terrorism. However, our understanding of causes and, especially, dynamics of political instability is still deficient.

Factors responsible for the onset of political instability are typically studied by correlating instability with various political, economic, and demographic variables in cross-national comparisons (for example, Goldstone et al., 2010). These analyses have yielded a number of very useful insights. A drawback of such *static* approaches, however, is that they focus on immediate effects of potential causal variables on instability (at best, they look back 5–10 years), while ignoring long-term dynamics. Yet quantitative historical studies indicate that long-term dynamics of political instability are not trivial. State-level societies experience waves of political instability, roughly a century long (sometimes longer), interspersed with century-long periods of relative internal peace and order. On top of these *secular* waves (with periods of two to three centuries) are superimposed cycles with periods of 50 ± 10 years. These empirical patterns will be reviewed in greater detail in the next section.

Static analyses of systems characterized by complex dynamics may misidentify the mechanisms generating change (Turchin, 2005, 2006a). Therefore, analyses of

Corresponding author:
Peter.Turchin@UConn.edu

cross-national data need to be supplemented by dynamical analyses focusing on long-term time-series data in a particular state or region. So far few empirical efforts have attempted to quantify the dynamics of political instability in the long term (but see Kiser & Linton, 2002; Turchin & Nefedov, 2009). The goal here is such an empirical analysis for one particular country, the United States from the beginnings of the Republic (c.1780) to the present (2010).

This article is organized as follows. The first section provides the empirical and theoretical background of the study with an overview of long-term patterns in political violence in agrarian states and mechanisms that generate instability waves. The second section addresses the question of how the theory, developed for agrarian states, should be reformulated to apply to industrializing societies, such as the USA. Next, I describe how the US political violence (USPV) database was constructed and analyzed. The article closes with a discussion of whether the observed empirical patterns are consistent with predictions by the structural-demographic theory.

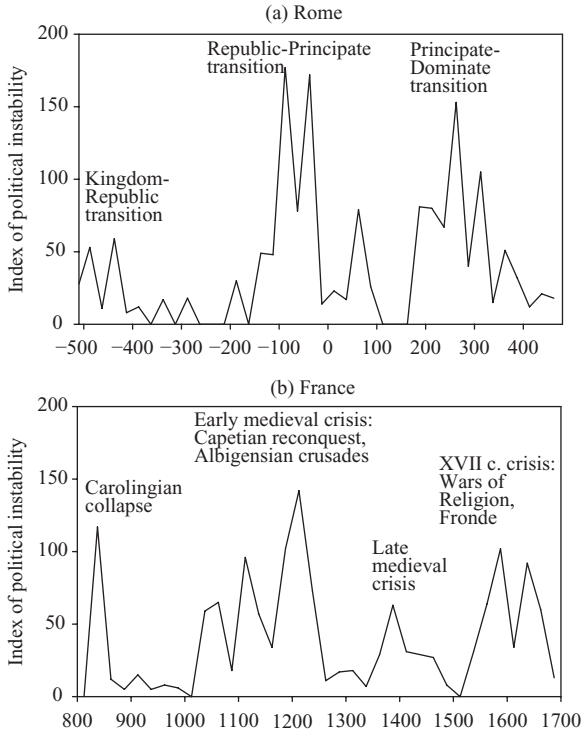

Figure 1. Long-term dynamics of sociopolitical instability in (a) Rome, 510 BCE–480 and (b) France, 800–1700
Data from Sorokin (1937). Data are plotted per 25-year interval. 'Index of Political Stability' combines measures of duration, intensity, and scale of political instability events, coded by a team of professional historians (see Sorokin, 1937, for details). The Roman trajectory is based on instability events that occurred only in Italy.

Complex dynamics of political instability in historical societies

Empirical patterns

Recent research indicates that the dynamics of sociopolitical instability in preindustrial states are not purely random. There is a regular, although dynamically complex pattern involving at least two cycles superimposed on each other (plus exogenous stochasticity on top of that). This dynamical pattern is apparent in Figures 1a and 1b. First, there are long-term waves of political instability with durations of a century or more that are interspersed with relatively stable periods. Second, the instability waves tend to look 'saw-toothed' (this will be discussed below).

It appears, thus, that a typical historical state goes through a sequence of relatively stable political regimes separated by recurrent waves of internal war. The characteristic length of both stable (or *integrative*) and unstable (or *disintegrative*) phases is a century or longer, and the overall period of the cycle is around two to three centuries.

Secular cycles are also observed in other world regions: in China with its dynastic cycles, in the Middle East (Nefedov, 1999), and in Southeast Asia (Lieberman, 2003), as can be seen in Figure 2. In fact, it is a general dynamic that is observed in all agrarian states for which the historical record is accurate enough (Korotayev, Malkov & Khaltourina, 2006; Turchin, 2003; Turchin & Nefedov, 2009).

As was noted above, the dynamical pattern of sociopolitical instability in agrarian societies is complex: it involves at least two types of cycles superimposed on each other (and exogenous stochasticity on top of that). For example, instability waves in Figures 1a and 1b appear 'saw-toothed': on the scale of 25 years there is a pattern of alternating ups and downs. Spectral analysis confirms that in addition to the longer-term secular cycles there is an oscillatory tendency with a period of c.50 years (Turchin, 2011). However, unlike the secular waves, 50-year cycles are not a universal feature of agrarian societies. For example, they do not show up in the Chinese data (Figure 2).

Explaining the empirical patterns

Such strong empirical patterns suggest that instability dynamics in agrarian societies may be governed by a general mechanism or mechanisms. One possible explanation of why agrarian societies experience periodic state breakdowns is the structural-demographic theory

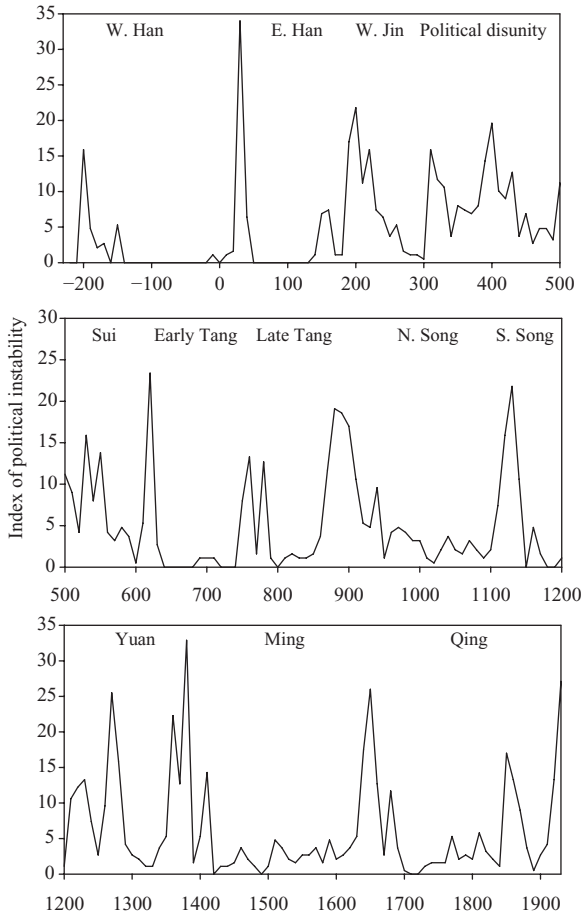

Figure 2. Long-term dynamics of sociopolitical instability in China

Data from Lee (1931). 'Index of Political Stability' refers to the number of instability events (civil wars, peasant uprising, major outbreaks of banditry, etc.) per 10-year interval. Unlike in Figure 1, where labels are assigned to instability waves, here labels indicate internally stable periods, associated with a unifying dynasty.

(Goldstone, 1991; Turchin, 2003). According to this theory, population growth in excess of the productivity gains of the land has several effects on social institutions. First, it leads to persistent price inflation, falling real wages, rural misery, urban migration, and increased frequency of food riots and wage protests. Rapid population growth also produces a 'youth bulge', and the growing size of the youth cohorts contribute to the mobilization potential of the populace (Goldstone, 1991: 136; Urdal, 2006). Second, rapid expansion of population results in *elite overproduction* – an increased number of aspirants for the limited supply of elite positions. Increased intra-elite competition leads to the formation of rival patronage networks vying for state rewards. As a result, elites become riven by increasing rivalry and factionalism. Third, population growth leads to expansion of the army and the bureaucracy and rising real costs. States have no choice but to seek to expand taxation, despite resistance from the elites and the general populace. Yet, attempts to increase revenues cannot offset the spiraling state expenses. As all these trends intensify, the end result is state fiscal crisis and bankruptcy and consequent loss of military control, elite movements of regional and national rebellion, and a combination of elite-mobilized and popular uprisings that manifest the breakdown of central authority.

Sociopolitical instability resulting from state collapse feeds back on population growth via demographic (birth, mortality, and emigration rates) and economic (disruption of production) mechanisms. Eventually, both popular immiseration and elite overproduction are abated, setting up conditions for the beginning of a new cycle (for a more detailed explanation of how structural-demographic processes result in secular cycles, see Turchin & Nefedov, 2009: Chapter 1).

Recent research has shown that the predictions of the structural-demographic theory find much empirical support in detailed case-studies of medieval and early-modern England and France, Muscovy-Russia, and ancient Rome (Turchin & Nefedov, 2009). Furthermore, wherever we can find quantitative data on the key structural-demographic variables, we find that relationships between them conform to those postulated by the theory. For example, the structure of dynamical feedbacks between population growth and sociopolitical instability is precisely as postulated by the model: population pressing against Malthusian limits causes instability to rise, while high instability depresses population growth leading to population decline or stagnation (Turchin, 2005). Other empirically strong feedbacks between variables include the negative relationship between the supply of labor and real wages and the positive association between popular immiseration and growth of elite numbers and incomes. The data also support a more nuanced structural-demographic (rather than a crude Malthusian) cause of instability waves, because the most reliable predictor of state collapse and high political instability was elite overproduction (Turchin & Nefedov, 2009: 314).

It is important to note that secular cycles are not cycles in the strict mathematical sense. The period of oscillations is not fixed; instead, there is a statistical tendency for instability waves and, alternatively, periods of vigorous population growth to recur on a characteristic time scale. It would be strange if it were otherwise – the structural-demographic model describes only one set, albeit an important one, of factors affecting population and instability dynamics.

An additional process (which is not part of the structural-demographic theory) that needs to be taken into account when studying secular cycles is the 'fathers-and-sons' dynamic (Turchin, 2003, 2006b). This mechanism operates during the prolonged disintegrative secular trends that are characteristic of secular cycles in Europe. The empirical observation is that disintegrative trends are not periods of continuous civil war; instead, they have internal structure with decades when sociopolitical instability is particularly high, interspersed with decades of relative pacification (Turchin & Nefedov, 2009: 310–11). A possible explanation is swings in the collective social mood.

Episodes of internal warfare often develop in ways similar to epidemics or forest fires (Turchin, 2006b: Chapter 9). In the beginning of the conflict, each act of violence triggers chains of revenge and counter-revenge. With time participants lose all restraint, atrocities become common, and conflict escalates in an accelerating, explosive fashion. After the initial explosion, however, violence drags on and on, for years and sometimes even for decades. Sooner or later most people begin to yearn for the return of stability and an end to fighting. The most psychopathic and violent leaders get killed off, or lose their supporters. Violence, like a disease epidemic, 'burns out'. Even though the fundamental causes that brought the conflict on in the first place may still be operating, the prevailing social mood swings in favor of cessation of conflict at all costs, and an uneasy truce gradually takes hold. Those people who directly experienced civil war become 'immunized' against it, and while they are in charge, they keep things stable. The peaceful period lasts for a human generation—between 20 and 30 years. Eventually, however, the conflict-scarred generation dies off or retires, and a new cohort arises, people who did not experience the horrors of civil war and are not immunized against it. If the long-term social forces that brought about the first outbreak of internal hostilities are still operating, then the society will slide into the second civil war. As a result, periods of intense conflict tend to recur with a period of roughly two generations (40–60 years).

These swings in the social mood may be termed 'bi-generation cycles' because they involve alternating generations that are either prone to conflict or not. Another example of such social mood swings, also with a period of roughly 50 years, has been noted, for example, by Schlesinger (1986).

From agrarian to industrial societies

The Industrial Revolution had a dramatic effect on the structure and dynamics of human societies. As a result, at least some of the relationships postulated by structural-demographic theory have been made obsolete. In particular, we could hardly expect that population increase in Western industrialized states would result in starvation. Other aspects of the theory, however, are more robust with respect to changes brought about by the Industrial Revolution. Can the theory be reformulated in a way that would make it useful for describing the dynamics of industrialized societies?

The starting point for a reformulation of the structural-demographic theory is provided by the three theory-motivated and empirically supported generalizations discussed at the end of *Secular Cycles* (Turchin & Nefedov, 2009: 313–14): (1) the neo-Malthusian principle, (2) the principle of elite overproduction, and (3) the structural-demographic causes of political instability. The neo-Malthusian principle – that sustained population growth inevitably leads to falling living standards and popular immiseration – has been, clearly, most impacted by the agrarian–industrial transition. However, it can be restated in more general terms of supply-demand relations (e.g. Borjas, 2009): when the supply of labor exceeds its demand, the price of labor should decrease (depressing living standards for the majority of population). In agrarian economies demand for labor is limited by the availability of cultivable land, and unchecked population growth inevitably leads to falling living standards. In modern economies, in contrast, the demand for labor is much more dynamic and can change as a result of technological advances and investments in physical and human capital. Additionally, modern societies are much more interconnected, and the balance of supply and demand for labor can be affected by international flows of people and jobs. Thus, the set of factors affecting living standards in modern societies is much more complex than for agrarian societies. Nevertheless, shifting balance between the demand and the supply of labor should have important consequences for popular well-being.

The principle of elite overproduction also can be thought of as a consequence of the law of supply and demand. The elites (in both agrarian and capitalist societies) are consumers of commoner labor. Low price of labor leads not only to declining living standards for a large segment of population (employees, especially unskilled ones), but also to a favorable economic conjuncture for the elites (more specifically, for the economic elites – employers). There are several important consequences of this development. First, the elites become accustomed to ever greater levels of consumption. In addition, competition for social status

drives increased conspicuous consumption. Thus, the minimum level of resources necessary for maintaining elite status exhibits a runaway growth. Second, the number of elites, in relation to the rest of the population, increases. Favorable economic conjuncture for the employers enables large numbers of intelligent, hard-working, or simply lucky individuals to accumulate wealth and then attempt to translate it into social status. As a result, upward mobility into the ranks of the elites will greatly overmatch downward mobility. The third consequence is that the twin processes of declining living standards for the commoners and increasing consumption levels for the elites will drive up socio-economic inequality.

As a result of the growth in elite appetites and numbers, the proportion of the total economic pie consumed by them will increase, leading to the condition that has been termed *elite overproduction* (Turchin, 2003, 2006b). Intra-elite competition for limited elite positions in the economy and government becomes fierce. Competition will be particularly intense for government positions whose supply is relatively inelastic, especially at the top. A democratic system of government may allow for nonviolent rotation of political elites, but ultimately this depends on the willingness of established elites to relinquish access to power positions to ever growing numbers of elite aspirants. As a result, elite overproduction increases the probability of violent intra-elite conflict.

The wave of uprising and regime changes that swept the Arab countries in 2011 appears to be an excellent illustration of structural-demographic mechanisms in action (with a caveat that I am writing as these events are still unfolding and before they have been carefully analyzed). All main ingredients postulated by the theory appear to be present: rapid population growth resulting in youth bulges; growing economic inequality with poorer population strata increasingly immiserated, while the incomes at the top exhibit runaway growth; and elite overproduction as evidenced by a remarkable expansion of the numbers of university-educated youths without job prospects. Structural-demographic processes are directly referred to in such articles in the popular press as 'Jobs and age reign as risk factors for Mideast uprisings' (Hamdan, 2011) and 'Arab world built colleges, but not jobs: Unemployment, broad among region's angry youth, is high among educated' (Wessel, 2011). This is not to say that other frequently mentioned factors, for example democratization pressures in despotic regimes or the spread of social media, are unimportant. As I have stressed earlier, human societies are complex systems and such epochal events as revolutions and civil wars have many causes. Here I am concerned with 'universal' factors, processes resulting in waves of political violence in such greatly different societies as late-Republican Rome, former Han Dynasty, early modern France, and perhaps even today. It would be interesting to assess the relative importance of such generic, structural-demographic processes with respect to other factors in causing the 'Arab Spring' by a formal statistical analysis.

In summary, the theory suggests the following generalization: labor oversupply should lead to falling living standards and elite overproduction, which, in turn, should result in a wave of prolonged and intense socio-political instability. Although rapid population growth is one of the most important precursors of instability waves, it is important to stress that the structural-demographic theory is not a crude Malthusian model. Population growth causes political violence indirectly; its effect is mediated through social structures – most importantly, power relations between the elites and general population, and within the elites (the theory actually integrates insights of Malthus, Marx, and Weber). Thus, we should not expect *direct* correlations between rapid population growth and political instability. Indeed, cross-national analyses do not find consistent support for such effects (e.g. Urdal, 2005).

Furthermore, population growth is not the only mechanism that can lead to labor oversupply. A structural-demographic analysis of US history indicates that during the 19th century, immigration fluxes had a much greater effect than natural population growth on the dynamics of popular well-being and elite overproduction (Turchin, forthcoming). However, a detailed analysis of structural-demographic dynamics in the USA, including the effects of the massive immigration wave during the 19th century, has to be deferred to a forthcoming publication (Turchin, forthcoming). In this article my primary objective is the construction of an empirical database on US political violence and analysis of these data to determine whether long-term dynamics of instability conform to the previously observed pattern of secular waves with superimposed 50-year oscillations.

A database of political violence in the United States, 1780–2010

Defining a political instability event

Political instability is defined here as a violent group-level conflict within a state. Because it occupies the middle ground between interstate warfare and individual violence/crime, its boundaries are, of necessity, somewhat

imprecise. In the following I detail the definitions I employed when constructing the database. It is important to keep in mind that the purpose of the database is not to generate absolute measures of instability (e.g. the number of people killed in instability events per year per 100,000 people). When studying dynamics the primary goal is to quantify *relative* change with time, and any measure that is proportional to the variable of interest will do, as long as the coefficient of proportionality is (approximately) constant. This approach simplifies the task in several ways. First, the end result will not be unduly affected by specifics of where we draw the boundary of an 'instability event', as long as boundary cases are relatively infrequent. Second, we do not need to attempt to capture all the events in the database (which in many cases is an impossible task anyway). A fair sample will do as well. Finally, publishing the database makes it possible for other researchers to investigate how changing definitions may affect the end result.

Instability events vary in scale from intense and prolonged civil wars claiming thousands (and sometimes even millions) of human lives to a one-day urban riot in which several people are killed, or even a violent demonstration in which no lives are lost. In constructing the database I chose to include only *lethal* events. Such a conservative approach excludes a number of legitimate instability events, but it has two advantages. First, it clearly demarcates political violence from peaceful demonstrations and nonviolent labor strikes that are part of the normal functioning of a democratic society and, therefore, are not instances of political instability. Second, and even more important, events that involve loss of life are much more likely to be reported in the media. Thus, focusing on such events reduces the effect of various reporting biases.

Accordingly, in order for an event to be included in the database, there had to be at least a single fatality associated with it. At the opposite end of the scale from such single-fatality events we have the American Civil War (1861–65) that resulted in 620,000 battle deaths, which is orders of magnitude greater than the next largest instability event in US history, the New York City Draft Riots of 1863 (c.1,000 deaths). Because of this discontinuity, I chose not to include the Civil War in the database, but treat it as a *sui generis* event. For similar reasons, and because it largely falls before my period, the American Revolution (1776–83) is not part of the database.

Apart from lethality, instability events also need to be distinguished from external warfare, on one hand, and interpersonal violence, on the other. For the United States the boundary between internal and external warfare is usually non-controversial, except possibly in the case of the Indian Wars. I chose to treat conflicts between the Native Americans and the settlers of European origin as external warfare prior to 1890, the official date of the closing of the US frontier (Turner, 1921) and as political instability thereafter. I also did not include in the database the 9/11 attacks on the World Trade Center and the Pentagon. The boundary between political instability and individual-level violence is less distinct. Because my focus is not on crime, I excluded such borderline activities (in the sense that they shade into collective violence) as lethal conflicts between criminal societies (e.g. Mafia groups) or street gangs.

Classes of political instability events

As stated above, the database focuses on social (group-level) violence, rather than violence among individuals (crime). This general definition, however, includes many different kinds of collective violence. Incidents of political violence can be roughly classified by whether both opposing sides are substantial groups of people (e.g. more than 12 individuals), or whether one side is a group, and the other is one or few (less than 12) individuals. The boundary of 12 between 'few' and 'many' that I use is arbitrary, and in this I follow the precedent established by Gilje (1996). However, the proportion of borderline cases, in which it is difficult to decide whether we are dealing with a group or not, is in any case tiny.

The generic term for group-on-group violence used both in scientific literature (Gilje, 1996; Grimstead, 1998) and in US newspaper reports is *riot*. The historian of US riots, Paul Gilje, defines a riot as 'any group of twelve or more people attempting to assert their will immediately through the use of force outside the normal bounds of law' (Gilje, 1996: 4). I accept this basic definition, but with two changes. First, I distinguish between group-on-group violence (proper riots) and group-on-individual violence (termed lynchings, see below). Second, for reasons stated earlier I included in the database only riots that actually led to at least one death.

There are many different kinds of riots (for reviews, see Gilje, 1996; Goldstone & Useem, 1999; Grimstead, 1998; Rucker & Upton, 2006; Wilkinson, 2009). One useful way to distinguish between different types is by the motivations/issues that led to the riot. The most common issues in the USPV database are (1) race or ethnicity, (2) labor-management conflicts, and (3) politics, including election disputes and sectional conflicts before the Civil War. Some riots have mixed motivations (for example, race and politics in the South during the

Reconstruction Era, or labor and ethnicity/race in many violent strikes), in which case I entered all codes that applied. In situations when the sources did not provide enough information to assign an issue, I left the entry blank.

While a conflict between groups of people is referred to in the database as a riot, lethal violence perpetrated by many on one/few individuals is designated as a 'lynching'. This usage differs somewhat from that in the voluminous literature on lynching (Blee, 2005; Brundage, 1993; Gonzales-Day, 2006; Pfeifer, 2011; Waldrep, 2002), although it should be noted that there is no universally agreed upon definition of lynching. The most common issue leading to a lynching in the USPV database was race or ethnicity. The next common class of lynchings can be termed as 'extralegal', when a group of citizens executes a person (or persons) accused of serious crimes such as murder or rape. In many cases race and extralegal motives are intermixed, and my coding reflected this fact. Finally, there are also some examples of lynchings following labor or political disputes, but these are relatively rare.

Violence perpetrated by one/few on many is more difficult to categorize. This class of events includes, first and most obviously, terrorism (Sandler, 2011; Smith, 1994). Terrorism is generally directed against some social or political institution, or the society as a whole. An important class of political violence – *assassination* – is the one in which an individual is targeted not as a private person, but as a representative or an embodiment of some social group or political institution. In other words, my decisions on whether a particular event should be included in the database or not were governed by the principle of 'social substitutability' (Kelly, 2000: 5), or 'fungibility of the victim' (Blee, 2005: 607). The most common issue motivating assassinations is politics, in which the victim is a government official or an elected representative. Other subtypes include assassinations motivated by religious, ethnic, or racial hatred.

Finally, there are *rampages* – a relatively new type of violence that has become common in the USA only in the last three or four decades. Whether rampages should be included in the database may be controversial. News reports tend to dismiss them as incidents of senseless mass murder resulting from mentally disturbed individuals who, for no apparent reason, 'snap' (Ames, 2005; this tendency is sometimes referred to as 'medicalizing mass murder', see Krauthammer, 2009). The appearance of senseless, random violence arises because the great majority of shooting rampages do not target specific individuals. Social science research, however, suggests that such attacks are not 'random' – school shootings are aimed at the entire school as an institution (Newman, 2004: 261), whereas workplace rampages attack the company or the corporate culture (Ames, 2005: 19). As Mark Ames (2005: 19) noted, 'there are no "random" victims – everyone in the targeted company is guilty by association, or they are collateral damage. The goal is to destroy the company itself. . . .' After 2000 an increasing number of rampages have been directed against state institutions – most frequently, the police and the courts, but sometimes such prominent symbols of the government as the Pentagon and the Capitol.

Thus, the 'random' appearance of this type of violence arises from the application of the principle of social substitutability/fungibility of the victim referred to above in the context of assassination. These considerations suggest that shooting rampages are a form of terrorism. In fact, it is a kind of suicide terrorism (Atran, 2003; Gambetta, 2005; Pape, 2005) because in a large proportion of mass shootings the perpetrators are killed by the police or shoot themselves. The survivors are invariably apprehended (or turn themselves in) and are imprisoned for life. As a result, killing rampages result in either physical or social death of the shooter. The only difference between a rampage shooter and a suicide bomber is in the weapon used to kill. Both aim not at individual people but at groups, social or political institutions, or entire societies.

The major rampage subtypes in the database include (1) workplace rampages, (2) school (including universities) rampages, and (3) attacks on government agents or institutions (coded as political rampages). Less frequent subtypes include rampages directed against a racial or ethnic group, and those attacking religious institutions. On the other hand, I did not include in the database incidences of multiple murder directed against family members, killing sprees perpetrated by current or former inmates of mental institutions, and mass murder resulting from crime, such as bank robberies, or gang disputes.

Constructing the database

Database construction relied primarily on two methods: (1) digitizing and merging data collected by previous researchers, and (2) systematic searches of electronic media archives. The first source that I used was the database of political violence events in the United States between 1819 and 1968, compiled by the Inter-University Consortium for Political and Social Research (ICPSR) (Levy, 1991). To extend the temporal period of the ICPSR database I used Lexis/Nexis to search the

New York Times for the period of 1969 to 2010 for occurrence of the keyword *riot* in the headline. The second database was compiled by the historian Paul Gilje for his book on American riots (Gilje, 1996). A detailed description of the methods I used in compiling the data is given in Appendix I, which also lists the secondary sources I checked on specific types of political violence.

These sources did not search for political violence events in a systematic or randomized manner over the whole period of interest. As a result, we should expect several biases that would affect the probability of an instability event being identified by one of the sources and therefore becoming an entry in the USPV database. As a check on the American Riots database (Gilje, 1996), which provided the bulk of data for the USPV database, I ran a computerized search of the electronic database *ProQuest Historical Newspapers* using *Hartford Courant* because it was the only newspaper that was digitized by ProQuest to the beginning of my period, 1780 (for details, see Appendix I).

Dynamical patterns of political instability

Overall dynamics

The USPV database includes 1,590 unique instability events. On average there are 35 events per 5-year interval, but these events are distributed highly unevenly through time (see Figure 3a). The period between 1780 and 1825 was characterized by a declining trend in political violence. While the post-revolutionary era saw several significant incidents (Pennamite-Yankee War, Shays' and Whiskey rebellions), these aftershocks of the Revolutionary War died out by 1800, and the first quarter of the 19th century was a remarkably peaceful period in US history. The second quarter of the century, on the other hand, was a period of rising political turbulence. The first spurt occurred during the 1830s, but the highest level of political violence was achieved during the 1860s.

From 1860 to 1920, the level of violence fluctuated around a very high level, with another spurt during the 1910s. The period between 1920 and 1960, however, saw a declining trend in instability. The 1940s and 1950s were the second peaceful period in US history. After 1960 the level of political violence began rising again.

Spectral analysis suggests that there are two major rhythms underlying the dynamics shown in Figure 3a. The first peak in the spectrum (with a period of roughly 150 years) indicates a long-term, or secular cycle (see Figure 4a). One complete oscillation was observed between roughly 1800 and 1950, and the rising trend

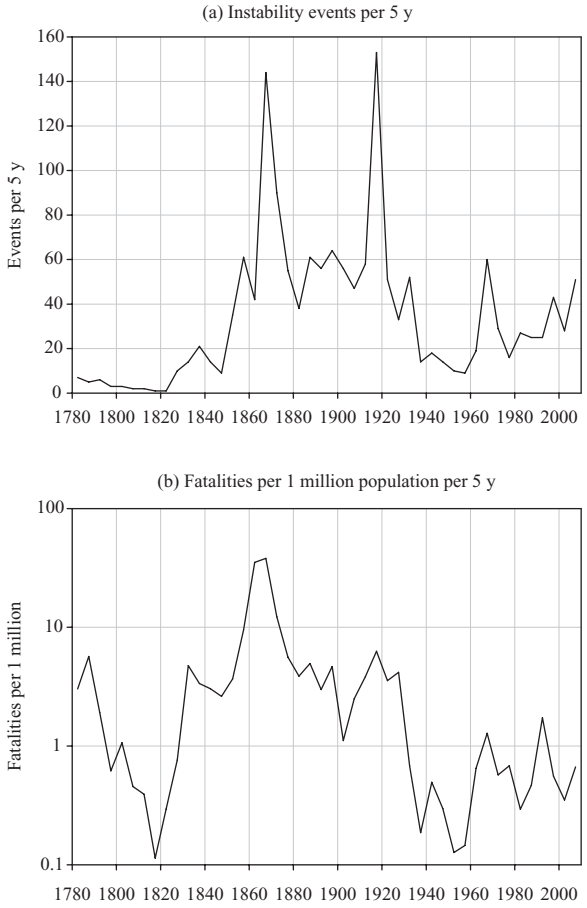

Figure 3. Temporal dynamics of sociopolitical instability in the United States, 1780–2010: (a) Fluctuations in the number of instability events per 5-year intervals, (b) Number of people killed in instability events per 1 million population per 5 years

after 1960 may indicate the beginning of the next secular cycle. The second peak in the spectrum is associated with a period of c.50 years (Figure 4a). Other, smaller peaks at frequencies of 0.04, 0.06, etc. are probably the harmonics of the 50-year cycle (because they are multiples of the frequency 0.02 y^{-1}). If so, these frequencies capture the deviations of the shape of the sharply peaked 50-year oscillation from a smooth sinusoid wave. The 50-year cycle is observed in the prominent outbreaks of political violence around 1870, 1920, and 1970. The smaller spurt during the 1830s may or may not be part of this pattern. Interestingly, the American Revolution (1775–83) also appears to fit this sequence.

An alternative method for visualizing the dynamics of instability is to focus not on the number of political violence events, but on the number of people killed in such events, scaled by the total population of the United States (see Figure 3b). This view of the data shares many

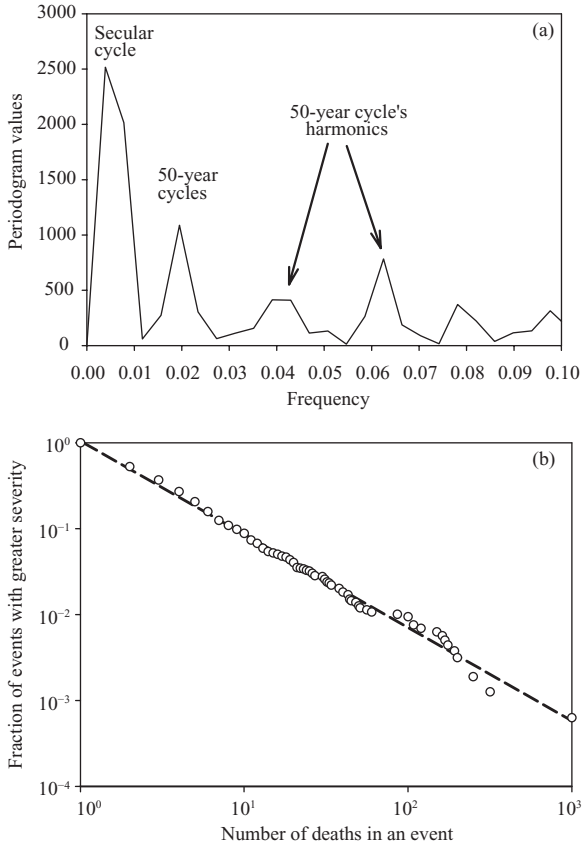

Figure 4. Statistical analyses
(a) Spectral analysis of the incidence of instability events, 1780–2010. Because frequency is an inverse of period, frequency of 0.02 y^{-1} corresponds to the period of 50 years. (b) A double-logarithmic plot of frequency versus severity (number of deaths) of political violence events. The estimated scaling parameter (see Clauset, Shalizi & Newman, 2009, for methods) is $\alpha = 2.08 \pm 0.07$.

similarities with the trajectory of event counts, but it emphasizes the secular cycle. In particular, it shows the magnitude of the instability wave of the second half of the 19th century. Thus, the per capita fatality rate increased between 1820 and 1860 more than 100-fold (note that because the database reports only a sample of instability events, the absolute numbers of deaths per million of population are meaningless; what is important is the relative change from one time period to another). The decline from 1920 to 1950 was of similar magnitude, roughly 50-fold.

The 50-year cycle, on the other hand, appears less prominently in the trajectory of per capita fatalities. The fatalities spectrum still contains the peak for the 50-year periodicity, but its height is greatly diminished compared to the event count spectrum. The reason for this is not hard to fathom. Shorter-term dynamics appear to be 'drowned' in random noise because of the statistical

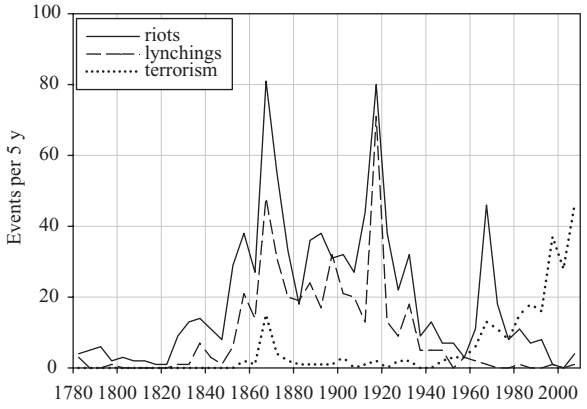

Figure 5. Dynamics of different types of political violence: riots, lynchings, and terrorism
The last category also include assassinations and rampages.

properties of the variable that is being averaged, the number of deaths per instability event. As a double-log plot of the frequency–severity distribution shows (Figure 4b), this variable is characterized by approximate scale invariance in which the frequency scales as an inverse power of the severity (Clauset, Young & Gleditsch, 2007). Thus, although the most common fatality rate per event was 1 (48% of cases), in rare cases the 'butcher bill' could run into hundreds (less than 1% of events had a fatality rate of 100 or more). As a result, the rare but bloody events have a disproportionate effect on the trajectory. A good example of this effect is the latest 'peak' in the trajectory (during the 1990s) – it is entirely due to 168 deaths associated with a single event, the 1995 Oklahoma City bombing. The sensitivity to rare but bloody events makes the number of deaths a less useful quantity for the analysis than simply counting the number of events, and the following results are all reported as event numbers per unit of time.

Evolution of political violence forms and issues

For 200 years between 1780 and 1980 the most common form that sociopolitical violence took was the riot (see Figure 5). Overall, riots account for 56% of all violence events in the database. Therefore, it is not surprising that the trajectory of riot counts traces out both the secular wave of the second half of the 19th century, and the peaks of 1870, 1920, and 1970.

The second most common type of violence was lynching, which accounts for 28% of events in the database (but as we shall see below, this is likely a serious underestimate). The number of lynchings per 5-year period also exhibits the secular instability wave and two of the three peaks (around 1870 and 1920). After 1930, however, the

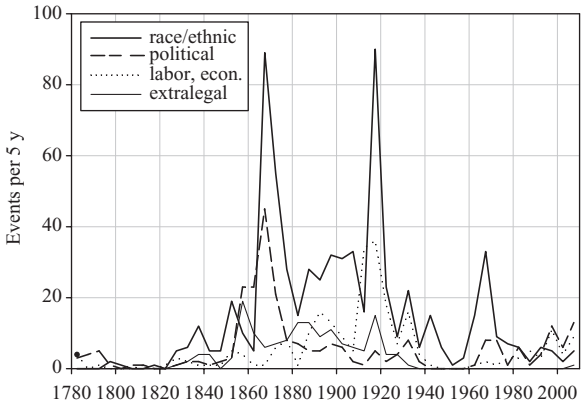

Figure 6. Temporal evolution of issues motivating political violence

incidence of lynchings rapidly declined. In more recent times this form of political violence has become rare.

The third form of political violence, terrorism in the broad sense (which also includes assassinations and shooting rampages), shows a somewhat different pattern. There is a peak around 1870, primarily associated with the wave of assassinations targeting both black and white Republican politicians during the Reconstruction Era (post-Civil War period). The next peak around 1970 is associated with assassinations of political leaders and the first mass appearance of the shooting rampage. The post-1980 rise is partly due to the increase in traditional forms of terrorism, but mainly is a result of the current wave of shooting rampages.

As to the issues motivating political violence, the most common is race or ethnicity, followed by labor and politics (see Figure 6). Race/ethnicity has been an important issue throughout US history, and was the common motive of riots, lynchings, and assassinations during the peaks of 1870, 1920, and 1970. In contrast, the importance of other issues waxed and waned. Thus, politics was an important issue in c.1870 (election riots and sectional violence) and again in c.1970 (the Civil Rights and Anti-war Movements). In contrast, labor issues (in the form of violent and increasingly lethal strikes) reached their peak c.1920. What is interesting, however, is that despite the evolution of forms of political violence and the changing landscape of issues motivating it, none of the periods of enhanced instability (1870, 1920, and 1970) was dominated by either a single form or a single issue.

Data consistency issues

Because the database contains only a sample of all instability events, its primary purpose is to detect *relative* changes in the incidence of political violence with time. The critical question is whether there are any systematic biases affecting the sampling process that would distort temporal dynamics. I probed for such biases by comparing two independent (or as independent as possible) samples: the American Riots (AR) database and the results of a computerized search of *Hartford Courant* archives.

Paul Gilje constructed the AR database by recording riots mentioned in the various books and articles he read (Gilje, 1996: 183). Thus, the great majority of the events he recorded come from secondary sources. Additionally, he consulted other newspapers (mainly the *New York Times*), but the *Hartford Courant* never appears as one of his sources. This does not mean that the *Courant* sample is truly independent from the AR sample – a large proportion of *Courant* reports on riots were obtained via telegraph or were directly reprinted from other newspapers. Thus, ultimately, there had to be a certain degree of overlap between the sources of the two samples. Still, no two sampling procedures, especially in history, can be truly independent, and as we shall see shortly, the degree of overlap between the two samples was surprisingly low. Therefore, these two views provide a reasonably good check on potential sampling biases.

Focusing first on riots, as defined in this article (that is, political violence involving substantial groups of antagonists), the AR database yielded 538 events and the search of *Hartford Courant* found 307 events. The proportion of events found in both samples was only 16% of the total (115 out of 730 unique events). Recollect that these numbers refer to the period 1780–1985, due to the end point in the ProQuest database for historical *Hartford Courant*.

Assuming that these two samples are independent (but see below), and using the standard formula for mark-recapture in ecological applications (Southwood & Henderson, 2000), we can estimate that the total universe of events from which these two samples were drawn is approximately

$$X = 538 \times 307/115 = 1436 \qquad (1)$$

Because the two samples collectively detected 730 events, the probability of detection (an event making it into the database) can be estimated as roughly 50%. However, the two samples are clearly not independent, and therefore this estimate should be treated as a lower boundary on the possible range. Perhaps a useful way to think of this estimate is that roughly half of riots in the universe of *riots that were reported* (by some newspaper or another source available to historians) are in the

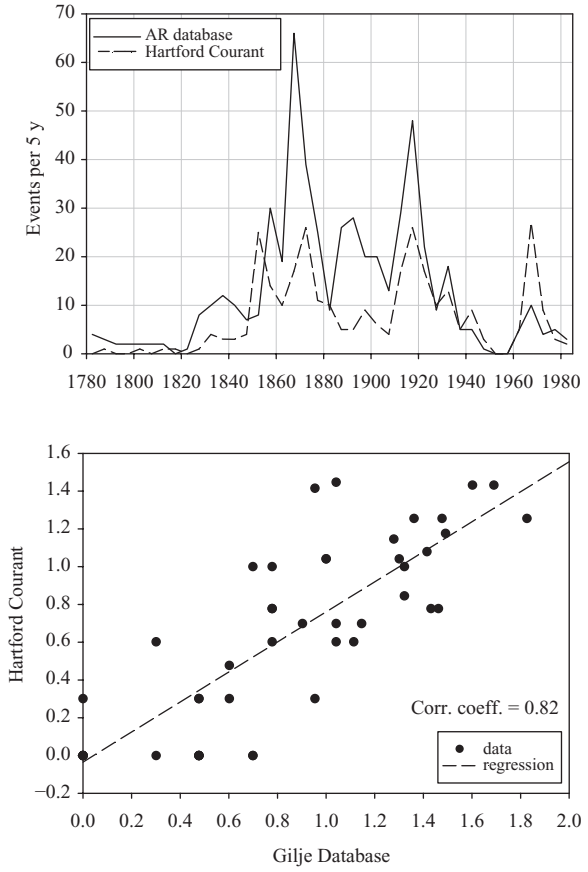

Figure 7. Dynamics of riot incidence in the American Riots database and of riots reported in *Hartford Courant.*

database. We may expect that the probability of detection will increase with the number of fatalities. Indeed, the estimated probability of detection (using the same method) for riots claiming three or more lives is over 70%.

Given that the overlap between the two samples is reasonably low, a comparison between the two trajectories should be instructive (see Figure 7). One unmistakable pattern is that before c.1900 the *Courant* sample substantially undercounts the AR sample. Thereafter the two trajectories converge, and after 1940 it is the Gilje sample that undercounts the *Courant* sample. The probable explanation of this pattern is long-term biases affecting each sample but running counter to each other. For reasons stated above, the probability of an event being reported in a newspaper, such as the *Hartford Courant*, gradually increased between 1780 and 2010. In contrast, the main focus of Paul Gilje's (1996) study, as well as the sources that he consulted, was on the pre-World War II period and especially the 19th century. Interestingly, a combined sample is less biased than either of the two separate samples, because the two opposing trends cancel each other to a certain degree. Nevertheless, the overall conclusion is that the database should not be used to make comparisons between temporally distant eras. For example, although the data indicate that the first quarter of the 19th century and the middle decades of the 20th century were unusually strife-free periods in US history, we cannot tell whether one of these periods was more peaceful than the other.

On shorter time scales the two samples indicate very similar dynamics. The two peaceful periods with a secular instability wave between them are obvious in both samples, and the peaks of 1870, 1920, and 1970 are equally apparent. However, there is one additional puzzling peak in the *Courant* sample during the early 1850s. This local peak was largely due to a cluster of ethnic riots involving the Irish that was, apparently, overreported in the *Hartford Courant* because of its northeastern location (or underreported in the AR sample). Despite this discrepancy and the long-term biases discussed earlier, the correlation coefficient between the log-transformed riot counts in the two samples is a healthy 0.82. In summary, the overall dynamics of riots – a secular wave with 50-year cycles superimposed on it – appear to be a robust empirical finding.

The situation is somewhat different when we deal with lynchings. Several considerations suggest that the number of lynchings in the database seriously underreports the actual number (this was also noted by Gilje, 1996: 183). According to *Historical Statistics of the United States* (Carter et al., 2004: Table Ec251–253), lynchings between 1882 and 1964 claimed at least 4,745 victims. The number of lynching victims for the same period in the USPV database is only 451. The problem is that lethal violence against Blacks (and certain categories of Whites) in the South was so common and routinized that newspapers, especially in the Northeast, simply did not bother to report most of these incidents. On the other hand, the relative dynamics in the *Historical Statistics* data and the USPV database are the same: a peak in late 19th/early 20th century and a rapid decline after 1920. The underreporting bias in the database is highest in the early decades after 1882 and progressively decreases towards 1964. This finding suggests that the magnitude of the instability wave of the second half of the 19th century is even greater than is apparent in Figure 3.

Discussion

Dynamical patterns

The main finding coming from the analysis of the database is that the incidence of political violence fluctuated

dramatically in the USA between 1780 and 2010. Furthermore, the dynamical pattern revealed by the data, a secular wave with 50-year (bigenerational) cycles superimposed on it, was similar to that observed for historical societies.

During the second half of the 19th century the United States experienced a massive wave of sociopolitical instability. From 1820 to 1860 the estimated number of deaths due to political violence, scaled by the total population, increased c.100-fold. From 1860 to 1920 instability remained at high levels. However, during the three decades after 1920 it declined c.50-fold.

In addition to this secular wave, the dynamics of instability exhibited shorter-term peaks, recurring with a period of approximately 50 years. These instability peaks were not dominated by a single issue, and the violence took multiple forms, suggesting that they were caused by fundamental social forces affecting the US polity. For example, political violence in the antebellum USA included a slave rebellion, a massive wave of urban riots, a prelude to the Civil War in Kansas ('Bleeding Kansas'), and even a religious war (against the Mormons). This explosion of political violence crested with the American Civil War, the bloodiest war in the history of the USA, which was followed by racial and political conflicts in the South and vigilante violence in the West.

Political violence in the years around 1920 similarly took multiple forms and was motivated by diverse issues. During the Red Summer of 1919 there were no fewer than 26 major race riots that collectively caused more than 1,000 fatalities. This was also a period of intense class warfare, with labor strikes becoming increasingly more violent. To give just one example, the Battle of Blair Mountain in West Virginia in 1921 was the largest organized armed uprising in US labor history (it was also the only time in US history when the government used military aircraft against its own people). Elite insecurity was further aroused by the terror campaign conducted by Italian anarchists and by electoral challenges from the populists and socialists. The widespread belief among the elites during the Red Scare of 1917–21 that the country was on the brink of revolution was not just paranoia. The incidence of political violence events more than doubled during this period even above the already elevated level characterizing the secular instability wave (see Figure 3a).

The last clearly defined peak around 1970 was also due to a variety of incidents: urban riots and violent campus demonstrations, political assassinations, and terrorism. However, the level of violence achieved during this peak was much milder than that during the previous peaks.

Extending the sequence of 1870, 1920, and 1970 forward suggests that the next instability peak should occur in the United States around 2020. This is a simple projection, rather than a scientific prediction (which requires an understanding of mechanisms bringing about outbreaks of political violence; see Turchin, 2006a). The analysis of structural causes of instability waves is beyond the scope of this article and will be pursued elsewhere (Turchin, forthcoming). However, an examination of the empirical trends in the data suggests that the period since the 1950s has been characterized by a general upward tendency, albeit with significant up-and-down fluctuations (see Figure 3).

The dominant component of the rising trend during the last three decades was terrorism (Figure 5), both in its classical form and especially in a novel form of suicide terrorism, the killing rampage. As I discussed earlier, the broad significance of the ongoing explosion in the incidence of shooting rampages is still in question. If these violent incidents are a surface reflection of deeper social shifts taking place in the United States, then they constitute a truly worrying sign of troubles to come. According to this interpretation, the trajectory is on track towards another instability peak. In that case, rampages should eventually be joined by other forms of political violence, since multiple forms of instability was the pattern in all previous peaks. An alternative hypothesis is that the outbreak of shooting rampages will eventually fizzle out. Although they will, obviously, have a huge impact on the lives of thousands of individuals directly involved as perpetrators or victims, there will be no comparable impact on society as a whole. The next decade will show which of these alternatives is correct.

A preliminary test of the structural-demographic predictions

The observation that the dynamics of sociopolitical instability in the United States are governed by broadly the same rhythms that affected historical agrarian societies (secular waves and bigenerational cycles) suggests that similar mechanisms generated these dynamics in both cases. In the section 'From agrarian to industrial societies', I sketched an outline of how the structural-demographic theory can be adapted to changes resulting from the industrial revolution. This theory makes quantitative predictions that can be empirically tested with the US data.

A proper test of the theory would require much more space than is available in a journal publication, and I defer the full description of the results to a future publication (Turchin, forthcoming). Here, however, it is

Table I. Proxies used for structural-demographic variables (see Appendix II)

Structural-demographic variable	*Proxy variable*
Labor oversupply	Proportion of population born outside the USA
Price of labor	Wage in relation to GDP per capita
Biological well-being/ Health	Average stature and life expectancy
Wealth inequality	Largest fortune in relation to the median wage
Intra-elite competition/ conflict	Political polarization in the Congress
Sociopolitical instability	Fatalities per 5 years per 1 million population

possible to report on a more limited, preliminary test that focuses on the dynamics of main structural-demographic variables in relation to political instability. In Appendix II, I show that useable proxies can be found for each of the main structural-demographic variables (see Table I). These particular proxies were selected because they cover the whole (or nearly whole) period 1780–2010. In the forthcoming publication (Turchin, forthcoming) I show that a much richer set of variables and proxies is well represented by the five I focus on here.

The theory predicts that these variables should change during a secular cycle in a predictable way. In particular, oscillations of instability should be positively correlated to labor oversupply, wealth inequality, and intra-elite competition/conflict, and negatively correlated with economic and biological measures of well-being (price of labor, health). We do not expect this correlation to be perfect, due to measurement and process noise, and, in some cases, time lags affecting feedbacks between variables. Nevertheless, if the feedbacks postulated by the theory are strong enough, strong and statistically significant correlations of the correct sign should be detected.

A plot of instability together with the five proxies suggest that all variables indeed are a part of the same dynamical complex (see Figure 8; because we expect that economic and biological measures of well-being will be *negatively* correlated with the rest of the variables, the figure plots *inverse* values of these two variables). Cross-correlations between instability and the five proxies are of the correct sign and statistically significant, ranging in magnitude between 0.44 and 0.68. Such a striking congruence between the dynamics of instability and key structural demographic variables provides strong empirical support for the theory.

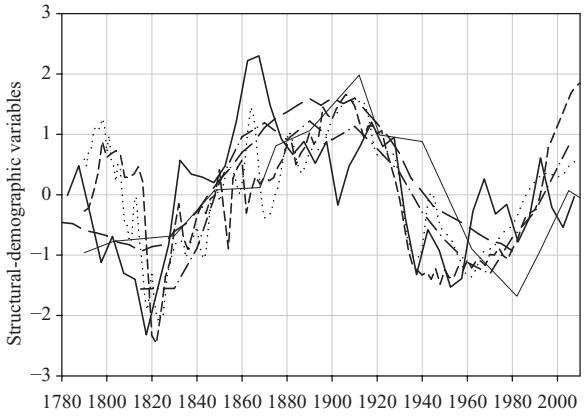

Figure 8. Dynamics of main structural-demographic variables in the USA

Instability (thick solid line), immigration (dash-dot line), the inverse wage/GDP ratio (dotted line), inverse health (long-dash line), inequality (thin solid line), and polarization (short-dash line). All variables have been linearly detrended and scaled to the same mean and variance.

Any particular pairwise correlation, however, should not be taken as evidence for direct causation. For example, the correlation between instability and the proportion of the population born outside the USA is 0.68, but this does not mean that high immigration causes instability. First, in the structural-demographic theory immigration is only one of the factors affecting labor supply. Second, oversupply of labor affects instability indirectly, via its effect on standards of living and, most importantly, elite overproduction.

Understanding what causes outbreaks of political violence is a necessary basis for learning how to eventually eliminate them. Throughout this article I have deliberately strived to maintain an objective, dispassionate tone. Yet the events recorded in the database represent an enormous amount of concentrated human misery. Some of the violent incidents in the database were so horrific that it took an effort of will to finish reading their descriptions. We spend an enormous amount of resources, intellectual and material, on learning how to preserve the physical health of individuals. Shouldn't we invest a similar amount into understanding how to maintain and restore the health of whole societies?

Replication data

The USPV dataset can be found at http://www.prio.no/jpr/datasets and on http://cliodynamics.info.

Acknowledgments

My greatest debt of gratitude is to Paul A Gilje who generously shared his American Riots database. I also wish to

thank my research assistant Ryan Jones, who put in innumerable hours entering data. I thank Paul A Gilje and Kristian Skrede Gleditsch for valuable feedback on a previous version of the manuscript, and Aaron Clauset for his help in estimating the scaling parameter for the power law distribution in Figure 4b.

Funding

The construction of the database was made possible by funds provided by the Santa Fe Institute and the University of Connecticut.

References

Ames, Mark (2005) *Going Postal: Rage, Murder, and Rebellion from Reagan's Workplaces to Clinton's Columbine and Beyond*. Brooklyn, NY: Soft Skull.

Atran, Scott (2003) Genesis of suicide terrorism. *Science* 299(5612): 1534–1539.

Blee, Kathleen M (2005) Racial violence in the United States. *Ethnic and Racial Studies* 28(4): 599–619.

Borjas, George J (2009) The analytics of the wage effect of immigration (March 2009). NBER Working Paper Series no. w14796.

Brundage, W Fitzhugh (1993) *Lynching in the New South: Georgia and Virginia, 1880–1930*. Champaign, IL: University of Illinois Press.

Carter, Susan B; Scott Sigmund Gartner, Michael R Haines, Alan L Olmstead, Richard Sutch & Gavin Wright, eds (2004) *Historical Statistics of the United States: Millennial Edition*. New York: Cambridge University Press.

Clauset, Aaron; Maxwell Young & Kristian Skrede Gleditsch (2007) On the frequency of severe terrorist events. *Journal of Conflict Resolution* 51(1): 58–87.

Clauset, Aaron; Cosma R Shalizi & MEJ Newman (2009) Power-law distributions in empirical data. *SIAM Review* 51(4): 661–703.

Gambetta, Diego, ed. (2005) *Making Sense of Suicide Missions*. New York: Oxford University Press.

Gilje, Paul A (1996) *Rioting in America*. Bloomington, IN: Indiana University Press.

Goldstone, Jack A (1991) *Revolution and Rebellion in the Early Modern World*. Berkeley, CA: University of California Press.

Goldstone, Jack A & Bert Useem (1999) Prison riots as microrevolutions: An extension of state-centered theories of revolution. *American Journal of Sociology* 104(4): 985–1029.

Goldstone, Jack A; Robert H Bates, David L Epstein, Ted Robert Gurr, Michael B Lustick, Monty G Marshal, Jay Ulfelder & Mark Woodward (2010) A global model for forecasting political instability. *American Journal of Political Science* 54(1): 190–208.

Gonzales-Day, Ken (2006) *Lynching in the West: 1850–1935*. Durham, NC: Duke University Press.

Grimstead, David (1998) *American Mobbing, 1828–1861: Towards Civil War*. New York: Oxford University Press.

Hamdan, Sara (2011) Jobs and age reign as risk factors for mideast uprisings. *New York Times*, 2 February.

Kelly, Raymond C (2000) *Warless Societies and the Origin of War*. Ann Arbor, MI: University of Michigan Press.

Kiser, Edgar & April Linton (2002) The hinges of history: State-making and revolt in early modern France. *American Sociological Review* 67(6): 889–910.

Korotayev, Andrey; Artemy Malkov & Daria Khaltourina (2006) *Introduction to Social Macrodynamics: Secular Cycles and Millennial Trends*. Moscow: URSS.

Krauthammer, Charles (2009) Medicalizing mass murder. *Washington Post*, 13 November.

Lacina, Bethany & Nils Petter Gleditsch (2005) Monitoring trends in global conflict: A new dataset of battle deaths. *European Journal of Population* 21(2): 145–166.

Lee, JS (1931) The periodic recurrence of internecine wars in China. *China Journal* (March–April): 111–163.

Levy, Sheldon G (1991) Political violence in the United States, 1819–1968. Computer file. Ann Arbor, MI: Inter-University Consortium for Political and Social Research.

Lieberman, Victor (2003) *Strange Parallels: Southeast Asia in Global Context, c.800–1830. Volume I: Integration on the Mainland*. Cambridge: Cambridge University Press.

Nefedov, Sergey (1999) The method of demographic cycles in a study of socioeconomic history of preindustrial society. PhD dissertaion, Ekaterinburg University (in Russian). Ekaterinburg, Russia.

Newman, Katherine S (2004) *Rampage: The Social Roots of School Shootings*. New York: Basic Books.

Pape, Robert A (2005) *Dying to Win: The Strategic Logic of Suicide Terrorism*. New York: Random House.

Pfeifer, Michael J (2011) *The Roots of Rough Justice: Origins of American Lynching*. Champaign, IL: University of Illinois Press.

Rucker, Walter & James Nathaniel Upton, eds (2006) *Encyclopedia of American Race Riots*. Westport, CT: Greenwood.

Sandler, Todd (2011) New frontiers of terrorism research: An introduction. *Journal of Peace Research* 48(3): 279–286.

Schlesinger, Arthur M, Jr (1986) *The Cycles of American History*. Boston, MA: Houghton Mifflin.

Smith, Brent L (1994) *Terrorism in America: Pipe Bombs and Pipe Dreams*. Albany, NY: SUNY Press.

Sorokin, Pitirim A (1937) *Social and Cultural Dynamics. Vol. III. Fluctuations of Social Relationships, War, and Revolution*. New York: American Book Company.

Southwood, T. Richard E & Peter A Henderson (2000) *Ecological Methods*, 3rd edn. New York: Wiley.

Turchin, Peter (2003) *Historical Dynamics: Why States Rise and Fall*. Princeton, NJ: Princeton University Press.

Turchin, Peter (2005) Dynamical feedbacks between population growth and sociopolitical instability in agrarian states. *Structure and Dynamics* 1(1): article 3.

Turchin, Peter (2006a) Scientific prediction in historical sociology: Ibn Khaldun meets Al Saud. In: Peter Turchin, Leonid Grinin, Andrey Korotayev & Victor C de Munck (eds) *History and Mathematics: Historical Dynamics and Development of Complex Societies*. Moscow: URSS, 9–38.

Turchin, Peter (2006b) *War and Peace and War: The Life Cycles of Imperial Nations*. New York: Pi.

Turchin, Peter (2011) Wheels within wheels: Complex dynamics of political instability. Manuscript.

Turchin, Peter (forthcoming) *A Demographic-Structural Analysis of American History, 1780–2010*. Book in preparation.

Turchin, Peter & Sergey Nefedov (2009) *Secular Cycles*. Princeton, NJ: Princeton University Press.

Turner, FJ (1921) *The Frontier in American History*. New York: Holt.

Urdal, Henrik (2005) People vs. Malthus: Population pressure, environmental degradation, and armed conflict revisited. *Journal of Peace Research* 42(4): 417–434.

Urdal, Henrik (2006) A clash of generations? Youth bulges and political violence. *International Studies Quarterly* 50(3): 607–630.

Waldrep, Christopher (2002) *The Many Faces of Judge Lynch: Extralegal Violence and Punishment in America*. New York: Palgrave-Macmillan.

Wessel, David (2011) Arab world built colleges, but not jobs: Unemployment, broad among region's angry youth, is high among educated. *New York Times*, 4 February.

Wilkinson, Steven I (2009) Riots. *Annual Review of Political Science* 12: 329–343.

PETER TURCHIN, b. 1957, PhD in Biology (Duke University, 1985); Professor of Ecology and Evolutionary Biology, University of Connecticut (1994–); most recent books: *War and Peace and War* (Plume, 2005) and *Secular Cycles* (Princeton University Press, 2009, coauthored with Sergey Nefedov).