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SOCIAL TIPPING POINTS AND TREND REVERSALS: A HISTORICAL APPROACH

The article is devoted to the problem of forecasting turning points in the development of societies. This paper analyzes the causes of social crises, political instability. The author relies on a historical approach and the demographic-structuraltheory.

Key words: *forecast; demographic-structural theory; Cliodynamics; tipping point; trend reversal; secular waves; integrative phase; disintegrative phase; elite overproduction; counter-elites.*

A useful approach to thinking about why outbreaks of political instability occur is to separate the causes into structural conditions and triggering events. Specific triggers of political upheaval, such as self-immolation of a Tunisian fruit vendor, are very hard, perhaps impossible to predict. On the other hand, structural pressures build up slowly and predictably, and are amenable to analysis and forecasting. The question is how do we gain a better understanding and, perhaps, ability to predict such social trend reversals as those leading from political stability to crisis — and then back to stability. Quantitative historical analysis reveals that complex human societies are affected by recurrent — and somewhat predictable — waves of political instability. The structural-demographic theory suggests that such seemingly disparate social indicators as stagnating or declining real wages, a growing gap between rich and poor, overproduction of young graduates with advanced degrees, and exploding public debt, are actually related to each other dynamically. Historically, such developments have served as leading indicators of looming political instability.

Introduction: Does History Matter?

In mature sciences deep understanding of the subject translates into ability to build and fix things. Thus, we know how to construct ships for space travel and we can cure many diseases and even eradicate some. Our current understanding of the dynamics and functioning of societies, in contrast, is nowhere near the point where it can be used in practical applications. In fact, our interventions to solve a particular societal problem at times lead to a precisely opposite result.

For example, it is doubtful that when the Assembly of French Notables rejected royal proposals for fixing the state budget in 1788 they intended to start the French Revolution, in which many of them would lose their heads to the guillotine. Yet that is precisely what happened. Similarly, the primary goal of the U.S. invasion of Afghanistan in 2001 was to build a stable democratic state that would deny harbor to international terrorists. Instead, the result (as of 2011) is a corrupt, illegitimate government that can barely control the vicinity of Kabul, a wave of suicide bombings, a resurgent Taliban insurrection, and a huge drain on the U.S. Treasury that it can ill afford.

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More generally, few social or political scientists today would agree that we know how to do "state building," and perhaps even more importantly, prevent state collapse. But failed or failing states provide the setting for civil wars, separatist insurrections, and other kinds of internal wars that result in enormous amounts of human suffering. Since the end of the Cold War ten times as many human lives have been lost in such conflicts, compared to more traditional wars between states. We spend huge resources, both material and intellectual, on researching human health, but nowhere near the comparative level on studying the health of societies.

A particularly difficult task facing social and political scientists is the prediction and, indeed, understanding of social tipping points and trend reversals. Using the mathematical framework of nonlinear dynamics (which allows us to speak precisely about these phenomena), a *tipping point* occurs when a dynamical system finds itself on a boundary separating basins of two attractors. A small exogenous perturbation can tip the trajectory into one or the other basin of attraction, resulting in very different behavior at the macroscopic level. A common mechanism for a *trend reversal*, on the other hand, is a negative feedback loop acting with a lag. To give an example from ecology, sustained population growth typically results in a build-up of countervailing forces — depletion of resources and increase in predators and pathogens — that eventually cause the population numbers to collapse. Such feedback loops can lead to a single boom followed by a bust or recurrent boom-bust cycles. Cyclical trend-reversals, unlike tipping-point dynamics, do not involve jumping between different attractors and are, therefore, somewhat more predictable.

It is important to remember that nonlinear dynamical systems can exhibit an extremely rich spectrum of behaviors, and tipping points and trend reversals are among the simpler ones. Nevertheless, given that the application of nonlinear dynamics to social systems is still in its infancy, a focus on identifying and studying such behaviors is appropriate.

Analysis of the dynamics and functioning of complex societies (typically organized as states) is part of the new science of *Cliodynamics*[1]. Cliodynamics is one of the historical sciences, such as astrophysics, geology, paleontology, and linguistics. Generally speaking, manipulative experiments (when we change some condition and detect its effect by a comparison with unmanipulated controls) are impossible in historical sciences. Instead, progress is made by formulating general theories whose predictions can be tested with historical data, constructing large databases, and relying on natural experiments and mensurative experiments — a planned comparison between the predictions of two or more rival theories and data. An explicitly historical approach is the key (which is why these disciplines are termed historical).

Such a focus on history, however, will strike many social scientists and, especially, policy makers as seriously misguided. We live in such a rapidly changing world that surely history cannot have any real lessons for us. There is a marked tendency among policy makers to deal with economic or political crises of today as though they were completely new and unprecedented. Such blindness to history often leads us to repeat old mistakes. As an example, investors have been caught in a speculative frenzy on numerous occassions throughout the centuries. Eventually, such financial bubbles always burst, but in the heady days before the crush the majority blithely believes that "this time is different".

In fairness, traditional history has generally not provided useful guidance for public policy. It is easy enough to buttress one's argument for a proposed course of action by this or that example from the historical record. The problem is, there usually are as many examples supporting the opposite course. Furthermore, the same historical evidence can be

[1] *Turchin P.* (2003, 2008), for more on Cliodynamics: http://cliodynamics.info/

used to make entirely different, and sometimes dimaterically opposed arguments. History's lessons must be extracted in an indirect way. We need theory in the broadest sense, which includes (1) general principles that explain the functioning and dynamics of societies; (2) models, usually formulated as mathematical equations or computer algorithms, and (3) empirical content that deals with discovering general empirical patterns, determining empirical adequacy of key assumptions made by models, and testing model predictions with the data from actual historical societies.

Different Meanings of "Prediction"

The usual meaning of "prediction" is a statement that a certain kind of event will occur at some future time. What distinguishes prediction in science from the common usage is that we must have an explicit scientific theory on which the prediction is based. This requirement leaves beyond the pale "predictions" (prophecies) propounded by pundits at TV talk shows (no explicit theory) or astrological predictions (the underlying "theory" is unscientific). Within the scientific usage, we can further distinguish three kinds of predictions. The first, and conceptually the simplest one, is projection. In a projection exercise we ask a "what if" question: assuming certain initial conditions and a certain mechanism of change, what would be the future trajectory of the modeled system? An example is demographic projections that we can run for different scenarios of future fertility changes in the US. Whether the total fertility rate stays constant, declines, or increases will have a strong effect on the future age structure of the US population.

A *forecast* is a prediction that a certain variable will reach a specified level (or will be within the specified range of values) at a certain point in the future. Unlike the projection exercise, forecasting requires that we accept the validity of the assumptions of the underlying theory. A common example of a forecast is the weatherman on the TV predicting that the temperature will be between 70 and 75 degrees F at noon two days hence. Forecasts are made for a variety of practical reasons usually having nothing to do with science.

The third kind of prediction (I will call it scientific prediction to distinguish from the others) is used to test scientific theories. Scientific prediction inverses the logic of forecasting: whereas in making forecasts we assume the validity of the underlying theory and want to know what will happen to observables, in a scientific prediction exercise we want to use the observables to infer the validity of the theory. We take it for granted that theories yielding predictions that are in good agreement with empirical patterns are preferable to those who make poor predictions. The distinction I make here between forecasts and scientific predictions roughly parallels the distinction between unconditional historical prophecies and (also) scientific predictions, made by Karl Popper and endorsed by Michael Hechter.

In my opinion, social scientists focus too much on forecasts, and not enough on scientific predictions. First, the state of social theory is simply not advanced enough to serve as a basis for making sound forecasts. At present time we are only beginning to understand the causes of revolutions and state collapse. When forecasts succeed, one is left with a feeling that it was simply by luck alone. When they fail (a much more frequent occurrence), we have learned nothing. On the other hand, making scientific predictions could be a very fruitful activity, if it is properly set up.

Second, it is important to remember that, as Yogi Berra said, making predictions is very difficult, especially about the future. Many mature sciences lack the ability to make accurate forecasts. For example, it is well known that no meaningful weather forecasts can be made farther in the future than 7–10 days, even though the theory underlying

weather dynamics is perfectly understood. In addition to chaos, social systems are highly vulnerable to exogenous perturbations due to mechanisms that are not included in the forecasting model. One does not need to take the extreme position of NassimTaleb (who sometimes sounds as though the future is nothing but one "Black Swan" striking after another) to admit this. Finally, and very importatly, social systems are self-referential, because social actors are capable of understanding and acting on forecasts. This leads to the twin problems of self-fulfilling and self-defeating prophecies. In fact, our forecasts of state collapse and an outbreak of bloody civil war had better be self-defeating. After all the goal is to prevent such failures of policy. This observation returns us to the main point, that ability to understand social forces that cause state collapse and civil wars is much more valuable then a mere forecast, because such understanding is essential for our capacity to fix such problems.

Complex dynamics of political instability in historical societies

Static and Dynamic Approaches to Political Instability

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). These analyses have yielded a number of very useful insights. A drawback of such static approaches, however, is that they focuse 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-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[2]. Therefore, static analyses of 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. I am currently conducting such an empirical analysis for one particular country, the United States from the beginnings of the Republic (c.1780) to the present.

In the following paragraphs I provide the empirical and theoretical background with an overview of long-term patterns in political violence in agrarian states and mechanisms that generate instability waves. Next I addresses the question of how the theory, developed for agrarian states, should be reformulated to apply to industrializing societies, such as USA. Finally, I present prelimianry results from the US political violence (USPV) database that was constructed and analyzed as part of this study.

Empirical patterns

Recent research indicates that 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 b. First, there are long-term waves of political instability with durations of a century or more that are interspersed

[2] *Turchin P.* (2005, 2006).

with relatively stable periods. Second, note how the instability waves tend to look "saw-toothed" — there is a shorter oscillation with an average period of c.50 years. These two periodicities are detectable with standard methods of time-series statistical analysis.

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-three centuries (Figure 1).

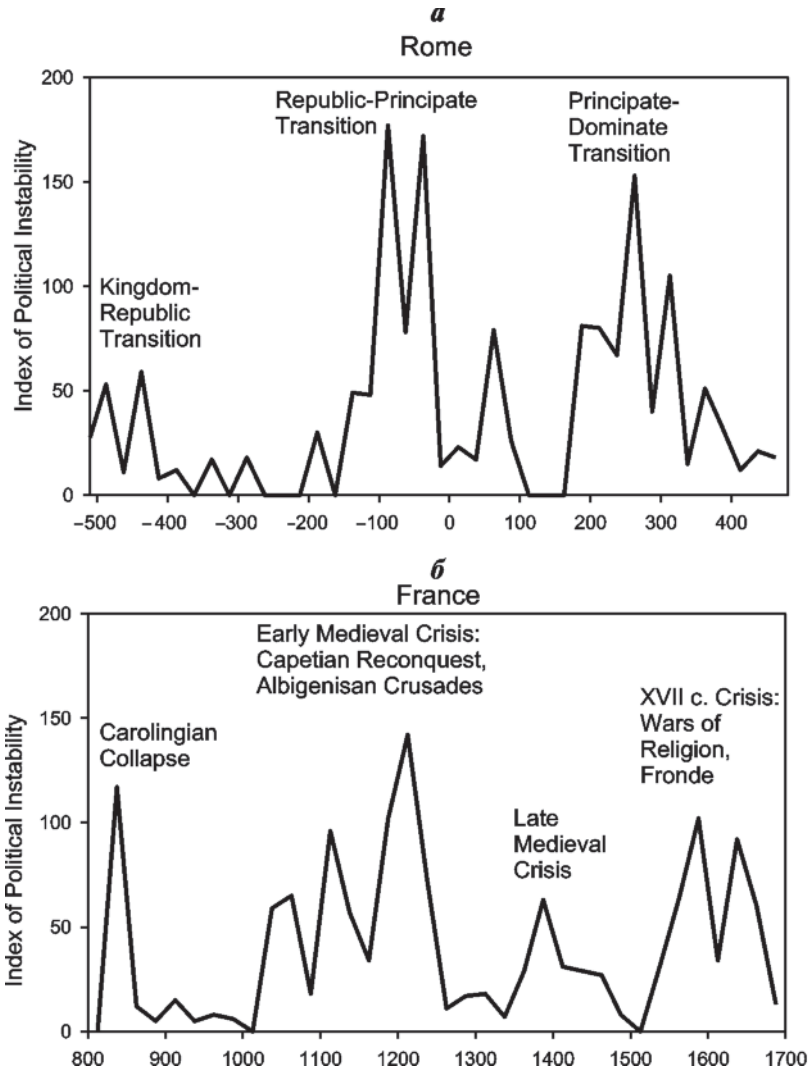

Figure 1. Long-term dynamics of sociopolitical instability in (a) Rome, 510 BCE–480 and (b) France, 800–1700 (data from Sorokin 1937). Data are plotted per 25-year interval. "Index of Political Stability" combines measures of duration, intensity, and scale of political instability events, coded by a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

Historians' periodizations tend to reflect this pattern of multi-secular (or *secular*, for short) cycles. For example, Roman history is usually separated into Regal (or Kingdom),

Republican, Principate, and Dominate periods. Transitions between these periods, in all cases, involved prolonged waves of sociopolitical instability (Figure 1a).

Similarly, the Germanic kingdoms that replaced the Roman Empire after it collapsed in the West went through a sequence of secular cycles that roughly corresponded to the dynasties that ruled them (Table 1). The instability waves have also been noted by historians, and sometimes given specific labels. The best known are the Crisis of Late Middle Ages between 1300 and 1450 and the Crisis of the Seventeenth Century. Seventeenth century's crisis affected polities across the whole of Eurasia, although the precise dates varied from region to region. In France, for example, the crisis unfolded during the century following 1560 (see Table 1 and Figure 1b).

Table 1

A summary of the chronological sequence of secular cycles in Western Europe. This chronology focuses on the dominant state within Western Europe: first on the Roman Empire, then shifts to medieval German empires, and finally to France (modified from Turchin and Nefedov 2009: Table 10.1). The only exception is the Late Antiquity, when two parallel cycles for Eastern Roman Empire and the Franks are shown. The naming convention is to use the dynasty that ruled during the integrative phase for the whole secular cycle (thus, the datings of dynasties and cycles do not correspond precisely).

Dominant Polity	*Secular cycle*	*Integrative phase*	*Disintegrative phase*
Rome	Regal	650–500 BCE	500–350 BCE
Rome	Republican	350–130 BCE	130–30 BCE
Rome	Principate	30 BCE–165 CE	165–285
Eastern Roman Empire	Dominate*	285–540	540–700
Frankish Empire	Merovingian*	480–640	640–700
Frankish Empire	Carolingian	700–820	820–920
German Empire	Ottonian-Salian	920–1050	1050–1150
France	Capetian	1150–1315	1315–1450
France	Valois	1450–1560	1560–1660
France	Bourbon	1660–1780	1780–1870

* Merovingian cycle in the West, and the Dominate cycle in the Eastern Roman Empire overlapped in time.

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

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). Note that instability waves in Figures 1a and b 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 2011b). However, unlike

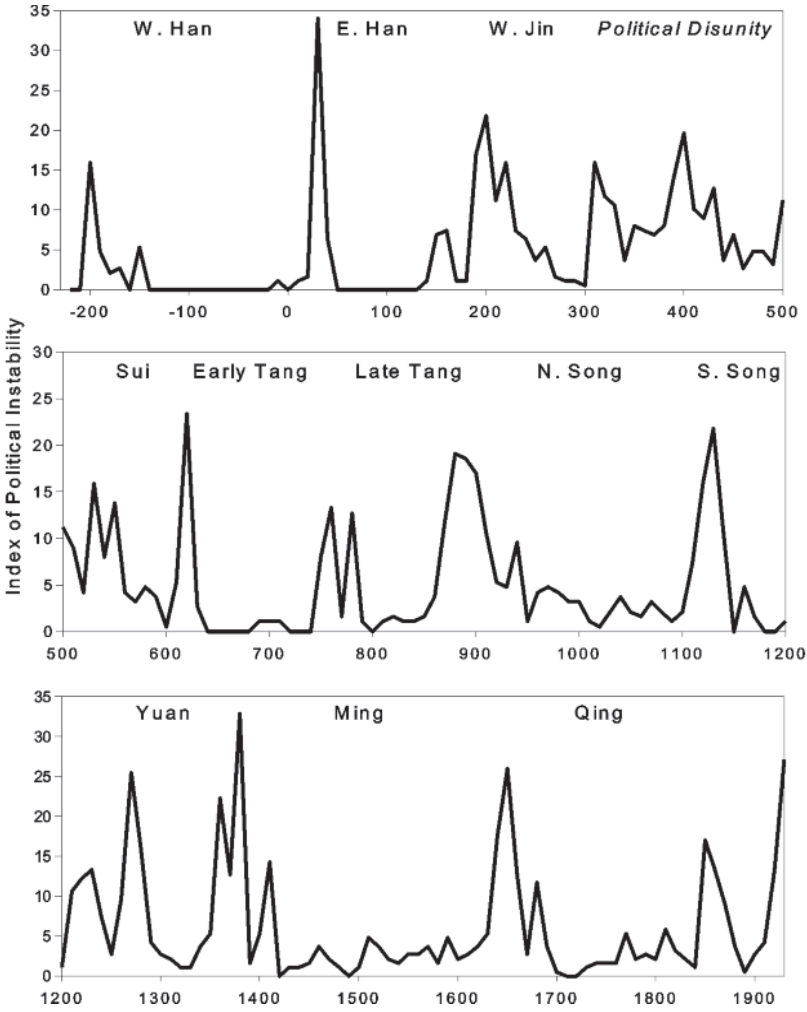

Figure 2. Long-term dynamics of sociopolitical instability in China (data from Lee 1931). "Index of Political Stability" refers to the number of instability events (civil wars, peasant uprising, major outbreaks of banditry, etc) per 10-year interval. Note that unlike in Figure 1, where labels are assigned to instability waves, here labels indicate internally stable periods, associated with a unifying dynasty

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 has been advanced by the demographic-structural theory (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 wageprotests. Rapid

population growth also produces a "youth bulge," and the growing size of the youth cohorts contribute to the mobilization potential of the populace. Second, rapid expansion of population results in *elite overproduction* — an increased number of aspirants for the limited supply of elite positions. Increased intraelite 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 the 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 rates and 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 demographic-structural processes result in secular cycles see Turchin and Nefedov 2009: Chapter 1).

Recent research has shown that the predictions of the demographic-structural theory find much empirical support in detailed case-studies of medieval and early-modern England and France, ancient Rome, and Muscovy-Russia (Turchin and Nefedov 2009). Furthermore, wherever we can find quantitative data on the key demographic-structural variables, we find that relationships between them conform to those postulated by the theory. Thus, 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 elite incomes and numerical growth. The data also indicate that one of the most reliable predictors of state collapse and high political instability is elite overproduction.

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 demographic-structural 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 demographic-structural theory) that needs to be taken into account when studying secular cycles, is the "fathers-and-sons" dynamic [Turchin, 2003 #194; , 2006 #847]. This mechanism operates during the prolonged disintegrative secular trends, which 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, interspered with decades of relative pacification.

To illustrate this dynamic, note that during the disintegrative trend of late-medievial France ("the Hundred Years of Hostility"), good reigns alternated with bad ones (Turchin 2006b: 243–247). Thus the reign of John II (1350–64) was the period of social dissolution and state collapse, while that of his son Charles V (1364–1380) was the time of national

consolidation and territorial reconquest. The next reign, that of Charles VI (1380–1422) was another period of social disintegration and collapse. It was followed by the period of internal consolidation and national resurgence under Charles VII (1422–61), which finally lifted France out of the late medieval depression. This is a general dynamical pattern of alternation between very turbulent and relatively peaceful spells that is observed repeatedly during the secular disintegrative phases. 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 an epidemic or a forest fire, "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, like the generation of Charles the Wise, 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 twenty and thirty 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, which 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 Arthur M. Schlesinger Jr. [, 1986 #886].

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 the demographic-structural 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 demographic-structural theory is provided by the three theory-motivated and empirically supported generalizations discussed at the end of *Secular Cycles*(Turchin and Nefedov 2009:313–14): (1) the Neo-Malthusian principle, (2) the principle of elite overproduction, and (3) the demographic-structural 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 avail-

ability 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 segment of the 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 maintaing the elite status exhibits a runaway growth. Second, the numbers of elites, in relation to the rest of the population, increase. Favorable economic conjuncture for the employers enables large numbers of intelligent, hard-working, or simply lucky commoners 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 the 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 socioeconomic 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). Intraelite 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 intraelite conflict. One common response by the established elites under these conditions is to close the ranks and exclude other elite aspirants from power, which causes the latter to organize as *counter-elites*.

The wave of uprising and regime changes that has been sweeping the Arab countries in the winter of 2011 appears to be an excellent illustration of demographic-structural 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 exhibiting runaway growth; and elite overproduction as evidenced by a remarkable expansion of the numbers of university-educated youths without job prospects. Demographic-structural 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, e.g., despotic regimes and the spread of social media, are unimportant.

As I have stressed earlier, human societies are complex systems and such epochal evetns as revolutions and civil wars have many causes. The relative importance of demographic-structural processes with respect to other factors in the "Arab Spring" needs to be assessed 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 sociopolitical instability. Although rapid population growth is one of the most important precursors of instability waves, it is important to stress that the demographic structural theory is not a crude Malthusian model. Population growth causes political violence not directly; its effect is mediated through social structures, most importantly power relations (thus, the theory actually integrates insights of Malthus, Marx, and Weber). Furthermore, population growth is not the only mechanism that can lead to labor oversupply. A demographic-structural analysis of American history indicates that during the nineteenth century immigration fluxes had a much greater effect, than internal population growth, on the dynamics of popular well-being and elite overproduction (Turchin 2012). Thus, we should expect that immigration waves would play an important role in explaining the dynamics of political violence in the USA. However, a detailed analysis of demographic-structural dynamics in America will have to be deferred to a forthcoming publication (Turchin 2012). In this paper my primary objective is the construction of an empirical database on American political violence and analysis of these data to determine whether long-term dynamics of instability conform to the previously observed patter on secular waves with superimposed 50-year oscillations.

Dynamical Patterns of Political Instability in the United States: an Overview

The USPV database includes 1590 unique instability events. On average there are 35 events per 5-year interval, but these events are distributed highly unevenly through time (Figure 3). The period between 1780 and 1825 was characterized by a declining trend in

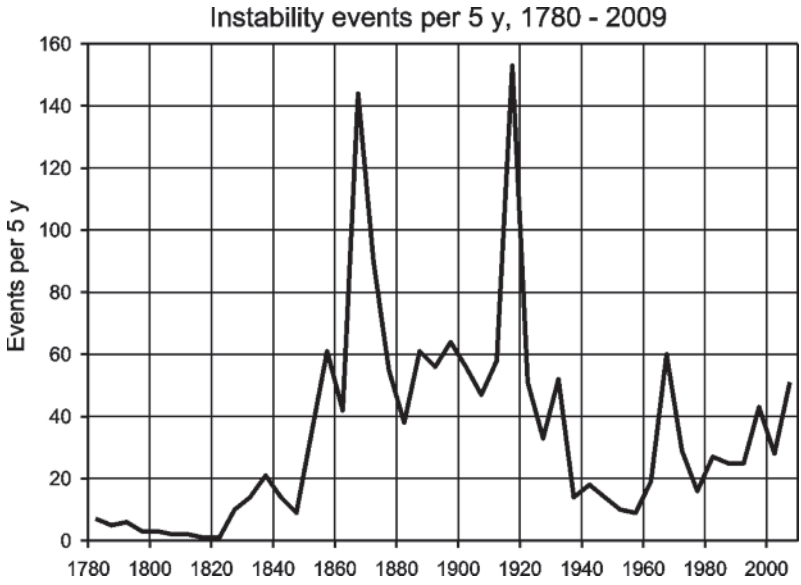

Figure 3. Temporal dynamics of sociopolitical instability in the United States, 1780–2009: fluctuations in the number of instability events per 5-year intervals

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 nineteenth century was a remarkably peaceful period in American 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 American 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 3. The first peak in the spectrum (with a period between 115 and 230 years) indicates a long-term, or secular cycle. One complete oscillation was observed between roughly 1800 and 1950, and the rising trend after 1960 may indicate the beginning of the next secular cycle. The second peak in the spectrum is associated with a period of between 46 and 57 years. These are the prominent peaks observed 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) appears to fit this sequence.

REFERENCES

Bois, G. 1984. The Crisis of feudalism. Cambridge University Press, Cambridge.

Bois, G. 2000. La grandedépressionmédiévale: XIVe-XVe siècles. Presses Universitaires de France, Paris.

Borjas, G.J. 2009. The Analytics of the Wage Effect of Immigration (March 2009). NBER Working Paper Series No. w14796.

Diamond, J., and *J.A. Robinson*. 2010. Natural Experiments of History. Belknap, Cambridge, MA.

Goldstone, J.A. 1991. Revolution and Rebellion in the Early Modern World. University of California Press, Berkeley, CA.

Goldstone, J.A., R.H. Bates, D.L. Epstein, T.R. Gurr, M.B. Lustick, M.G. Marshal, J. Ulfelder, and M. Woodward. 2010. A Global Model for Forecasting Political Instability. American Journal of Political Science 54:190–208.

Hamdan, S. 2011. Jobs and Age Reign as Risk Factors for Mideast Uprisings. New York Times:February 2, 2011.

Hechter, M. 1995. Symposium on prediction in the social sciences. Introduction: reflections on historical prophecy in the social sciences. American Journal of Sociology 100:1520–1527.

Kiser, E., and *A. Linton*. 2002. The Hinges of History: State-Making and Revolt in Early Modern France. American Sociological Review 67:889-910.

Korotayev, A., A. Malkov, and *D. Khaltourina*. 2006. Introduction to Social Macrodynamics: Secular Cycles and Millennial Trends. URSS, Moscow.

Lee, J.S. 1931. The periodic recurrence of internecine wars in China. The China Journal (March-April Issue):111–163.

Lee, R., and *S. Tuljapurkar.* 2001. Population forecasting for fiscal planning: issues and innovations. Pages 7–57 *in* A. J. Auerbach and R. D. Lee, editors. Demographic change and fiscal policy. Cambridge University Press, Cambridge.

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

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

Reinhart, C.M., and *K. Rogoff*. 2009. This Time is Different: Eight Centuries of Financial Folly. Princeton University Press, Princeton.

Sorokin, P.A. 1937. Social and cultural dynamics. Vol. III. Fluctuations of social relationships, war, and revolution. American Book Company, New York.

Trevor-Roper, H.R. 1966. The Crisis of the Seventeenth Century; Religion, the Reformation, and Social Change. Harper & Row, New York.

Tuchman, B.W. 1978. A distant mirror: the calamitous fourteenth century, 1st edition. Knopf, New York.

Turchin, P. 2003. Historical dynamics: why states rise and fall. Princeton University Press, Princeton, NJ.

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

Turchin, P. 2006a. Scientific prediction in historical sociology: IbnKhaldun meets Al Saud. Pages 9–38 *in* P. Turchin, L. Grinin, A. Korotayev, and V. C. de Munck, editors. History and Mathematics: Historical Dynamics and Development of Complex Societies. URSS, Moscow.

Turchin, P. 2006b. War and Peace and War: The Life Cycles of Imperial Nations. Pi Press, NY.

Turchin, P., and *A. Korotayev.* 2006. Population Dynamics and Internal Warfare: a Reconsideration. Social Science and History 5(2):121–158.

Turchin, P. 2008. Arise 'cliodynamics'. Nature 454:34–35.

Turchin, P., and *S. Nefedov.* 2009. Secular cycles. Princeton University Press, Princeton, NJ.

Turchin, P. 2011a. Dynamics of Political Instability in the United States, 1780–2009.

Turchin, P. 2011b. Wheels within Wheels: Complex Dynamics of Political Instability. Manuscript.

Turchin, P. 2012. A demographic-structural analysis of American History, 1780–2010. Book in prep.

Wessel, D. 2011. Arab World Built Colleges, but Not Jobs: Unemployment, Broad Among Region's Angry Youth, Is High Among Educated. New York Times: Februrary 4, 2011.