

Historical Dynamics: Why States Rise and Fall

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Historical Dynamics: Why States Rise and Fall, by **Peter Turchin**. Princeton, NJ: Princeton University Press, 2003. 241 pp. \$35.00 cloth. ISBN: 0-691-11669-5.

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When an individual from the natural sciences takes on a complex issue in the social sciences, the result can be either an exercise in naive determinism bordering on the absurd, or a set of provocative insights bringing new perspectives to classical problems. In the latest volume in Princeton's "Studies in Complexity" series, biologist Peter Turchin has accomplished the latter.

Turchin's topic is mechanisms for explaining human behaviors that change in regular patterns over time spans on the order of centuries. These changes may be in magnitude, as with fluctuations in population; spatial, as in the expansion and decline of empires; or cultural, as in the replacement of one religion or language by another. Turchin uses a variety of mathematical methods adapted from population biology, his professional specialty, to approach these issues.

The author eschews the hyper-parameterized, computer-dependent approach found in many contemporary modeling efforts, and instead focuses on variants of three basic and well understood differential equation models: the exponential, logistic, and predator-prey. Despite its methodological roots in the biological sciences, the work is free of any taint of social Darwinism, and the author's focus is generally on cultural evolution, albeit under biological constraints.

The models are tested against a wide variety of historical statistics, although due to limitations in data availability, the cases largely involve Europe, the Eurasian steppes, and China. Often the models are only rough approximations, but in some instances the convergence between model and data is dramatic: The two-parameter logistic model fits a five-century time series on Persian elite conversion to Islam with an r^2 in excess of 0.999. These statistical studies are interspersed with numerous historical anecdotes, and the penultimate chapter provides detailed case studies (well, as detailed as one can get when covering 1500 years in 26 pages) of the models applied to France and Russia.

To support his analyses, Turchin has delved extensively into the historical, sociological, and anthropological literature-the book's bibliography contains over 300 entries. A recurring theme is the use of the work of fourteenth-century North African social theorist Ibn-Khaldun to derive mechanisms for the dynamics of imperial growth: Much of the book is essentially Ibn-Khaldun translated into differential equations (an intellectual debt Turchin readily acknowledges).

However, one potential empirical weak point lies in the fact that the core driving principle for many of the models-Ibn-Khaldun's concept of *asabiya*, the ability of a society successfully and efficiently to organize for collective action (think social capital)-is difficult to measure in a non-tautological manner, particularly across a time span of centuries.

This is a book full of interesting new ideas, many of which could readily seed additional research. For example, Turchin derives a "reflex theory" for the formation of challenging states at the edge of declining empires: Less-developed polities can gain resources by raiding across the imperial frontier, but then use these to expand territorially at the expense of other less-developed neighbors. Consequently the initial territorial consolidation of a challenger is away from, not inward toward, the imperial center. This makes perfect sense once one sees the underlying mechanism, and Turchin provides numerous historical instances, but is not a standard interpretation. There are many similar gems scattered through the book.

As with any set of models presented at this level of generality, there are places where the reader will be thinking "But what about. . . ." For example, in Chapter 7, Turchin suggests that the differing rates of recovery in England and Egypt following the Black Death can be explained by the differences in landholding and elite structures. However, an alternative explanation might lie in differences in the agricultural systems: the rain-fed fields of England presumably benefited from an uncultivated fallow period, whereas the complex hydraulic systems of Egypt may have required years of reconstruction after experiencing several flood cycles without proper maintenance.

More generally, many of the historical behaviors are over-determined. This is particularly problematic with the logistic model, which is equally valid for the growth of a population subject to resource constraints (a biological explanation) and the spread of an innovation or ideology (a cultural explanation). Turchin is generally aware of such alternatives-and for example, buttresses his comparison of the effects of the plague on England and Egypt with a comparison of Roman Egypt with Mamluk Egypt-and fully cognizant that he is frequently treading on contentious theoretical ground.

The level of mathematical knowledge required to understand the book is relatively low provided one is willing to accept the author's explanations at face value (and these are quite honest). Familiarity with graphical idioms such as the distinction between linear and exponential growth may be more important than a knowledge of algebra or differential equations. Those delving into the mathematical framework, however, will find a clean notation that follows well-established standards from population biology, and a refreshing absence of the epicycles of subscripts and superscripts that obscure many presentations of models in the social sciences. Overall, this is a clearly written, well argued, and creative effort that is likely to inspire substantial derivative analysis in the years to come.