**Network Origins of the Global Economy: East vs. West in A Complex Systems Perspective**

**KEYWORDS:** *network structure, economic development, political economy and institutional change, legal systems, innovation, complex systems*

When we consider global economic change, we take as axiomatic that “globalism,” “world order,” and “modernization” are synonyms reflecting a continuum in which rising incomes, improved health, economic openness, and pluralism are mutually reinforcing. But the relationships aren’t straightforward; and China’s rise and divergence from Western norms make it doubtful that global change will continue to approximate Western experience. Are digressions from liberal models random deviations, or are they determined by network structure? This work applies network science to often overlooked variables—e.g., rules governing dynastic succession, the relationship between custom and formal law, the receptivity of rulers to disruptive innovation—across European and Chinese history to chart structures of interdependent webs linking the economy and the polity, and to better understand the origins, variation, and demise of large-scale historical regimes. It also probes the uncertainties of a highly connected, multi-polar world facing issues of climate change, terrorism, pandemics, and wars—in which instability can arise from any region and cascade, like a contagion, across the system.

## About your book

**Title of the book**

*Network Origins of the Global Economy: East Vs. West in a Complex System Perspective*

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**Readership**

Political economy, economic development, economic history, network science, complex systems, international relations, international economic policy

### Your motivation

Please explain, in bullet points, what motivated you to write your book.

### Two areas of concern motivate this book: (1) current scholarship that has contributed much to the study of political economy of institutions but falls short in its explanation of long-term change processes of historical regimes and economic history; and (2) flawed policy that seeks to capture global volatility in terms of the rise or decline of regimes or regions, e.g., an ascendant East overtaking a declining West.

* Global change experts use “globalism,” “world order,” “modernization,” and “models of development” as if these were synonymous, reflecting a global continuum in which rising incomes, improved health, economic openness, and greater pluralism are mutually reinforcing. But this relationship is not straightforward, *and I am sceptical that global change will continue to approximate the Western experience of modernization.*
* Social scientists are shocked by the upheaval of the past two decades in part because they continue to update their traditional development models still hoping to portray a world of converging ideals. But their models fail in the real world. In truth, they worked best for closed systems near or at equilibrium. *We need a better way to understand future risks and why we must prepare for them.*
* I recognize global society as a complex adaptive system, and *I want to consider the dynamics to which such systems are prone—dynamics that can, on account of their own internal stresses, veer into conditions of criticality.* This also raises a question upon which this book rests: Is change best conceived in terms of mechanical or organic processes?

### The application of equilibrium models used in mechanical physics has been associated with great advances in economic theory. *My approach is to adapt models from statistical physics, which applies to systems with many degrees of freedom.* I understand the harsh debate among economists about whether equilibrium theory can describe the complexity, heterogeneity, and connectivity in the dynamical aspects of economic exchanges, more important, I want to explore what lies *beyond* it and undertake new research on questions fundamental to the stability of historical regimes and to their capacity for innovation.

### This means *I hope to shift attention away from the microscopic levels of particular agents—either individuals, groups, nations, or policy interventions—and toward their dynamic interactions.* This is not a repudiation of traditional economic approaches, but an effort to deal with issues of large-scale social change neglected by traditional approaches.

### I look at hegemonic efforts to drive global progress and see that they have missed an important insight: that globalization’s dense interconnectivity increases the risk that instability can come from almost anywhere and propagate widely. *So I ask questions about what this may mean for the architecture of globalization the West has tried to put into place, and what may happen to political risk and governance standards worldwide*.

### *I apply to social change processes the insights from political economy, complex systems, and computational social science, especially network science.* Using these tools, I found (1) that we can build a new framework for understanding economic change: learning effects, knowledge transfers, and the adaptive capacity for innovation; and (2) that it is possible to chart the structures of the interdependent webs of interactions that link the economy and the polity; (3) we can better evaluate the impacts of increasing returns, path dependency, and sensitivity to initial conditions on regime transitions; and (4) that it is to identify principles that relate network structure to the flow of “information” in the processes of social transformation.

### Key features and benefits

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| Features | Benefits |
| **Feature 1:** Applies network analysis to transition in economic history to gain a better sense of how large, system-level transitions may unfold in the future; identifies the global properties that economic systems share with other complex systems; uses these general principles of complex self-organization to reveal historical patterns of regime variation, transition, and decay. It links development paths to system level properties that are not discernible on a county or even regional level.  | **Benefits 1:** The reader understands that an economy’s structures form and change over time as its individual agents change their behaviors in response to nearby agents and to changes in the larger system they inhabit. That feedback both shapes a system’s structure and is shaped by it, and small differences in network structure affect not only the degrees of naturally arising self-organizing behaviors, but also how a given stable state becomes unstable, and what qualitatively different state might result. |
| Feature 2: Examines five of the greatest transitions in economic history and the creation of order: (1) the rise of dynastic lordship (rules of succession) in Europe and China as the pivot of social organization; (2) the formation of Western law from the confluence of Germanic custom and the Rome’s civil laws; (3) the roots of the Industrial Revolution in a Europe-wide cultural ethos; (4) China’s trajectory from a planned socialist economy to a market-driven economy and a global power; and (5) the unfolding of a multipolar world that is vulnerable to unexpected shocks.  | **Benefit 2:** Throughout history, those living in the midst of each great transition were rarely aware of its breadth or import, and this is true today—wholesale shifts are not apparent from a microscopic perspective. Yet with a complex systems approach to each of the great historical transitions, the reader is able to better observe the dynamics of past shifts, draw inferences about the future, and think about patterns that might otherwise be overlooked but which can be a source of strategies to improve policy, and institutional design and contribute to global stability.  |
| **Feature 3:** Uses a complex system’s approach to enrich our understanding of innovation and the Great Divergence between China and the West. Where traditional arguments emphasize the differences in institutions (centralized versus decentralized), incentives (competition and property rights vs. mercantilist policies), and social organization (the influence of feudalism on the growth of cities and relations between rulers and merchant elites), we probe the system- level properties that are sources of higher-order connectivity, and establish a new direction for empirical research.  | **Benefit 3:** The reader learns to interpret the great drama of history in which, actions by the ruling class of both China and Europe to strengthen its own power had unintended consequences that ultimately led to the destruction of the system. We show that for both Europe and China, many of old challenges, inherent in each system’s structures, persist. Network analysis can provide additional insights about how their distinctive paths arose, the patterns of coalitional stability with which they are coupled, and why disruptive technologies like those associated with industrialization could occur in Europe but did not take place in China. |
| **Feature 4:** Explains how the structures responsible for China’s high growth deviate from the two conventional Western approaches—neoliberalism and institutionalism—and are unlikely ever to replicate them. Centralization is a tendency with a long past in China, but its “going global” campaign sets the country on an unprecedented journey that may change China fundamentally, just as an earlier transition point transformed the web of royal houses that once crisscrossed Europe. The book offers twelve possible scenarios of how China’s role in the global economy may unfold. | **Benefit 4:**The detailed context for China’s remarkable economic expansion helps the reader understand how leadership in a hub-and-spoke network system assumes that a state’s preferences, not market forces, should control the economy, and why the Chinese have failed to see a clear distinction between market and state. Yet the structure does allow competition to exist in China, between state-owned industries and the private sector, and between local governments to attract investments. The book explores the implications of China’s unique trajectory and ascendency, as a competitor and counterexample to the West. |

**CHAPTER TITLES AND KEY WORDS**

**OVERVIEW**

**KEYWORDS**: Complex systems, networks, equilibrium, path dependency, increasing returns, economic and institutional change, knowledge transfers, and comparative economic analysis.

Increasing global instability and lowered confidence in the solutions of the past amplify two sources of uncertainty: the halting advance of liberal democracy and the depiction of global change as an equilibrium phenomenon. Insights from political economy, complex systems, and computational and network science offer a fresh perspective on both. This book asks questions fundamental to the stability of historical regimes across Europe and China to determine characteristics shared by five great transitions in social organization that have fashioned the fundamental institutions for economic growth. These historical regimes are networks of networks continually processing “information” from interactions with other networks that are also undergoing constant “reorganization.” From often overlooked observables, such as the rules governing dynastic succession, relationships between custom and formal law, and the receptivity of rulers to disruptive innovation, the book applies network science to the political economy of institutions and moves beyond neoclassical economics and institutional structures into the origins and behaviors of the network structures themselves.

**CHAPTER 1 Great transitions in economic history**

**KEYWORDS:** *historical continuity and transition, complex networks, economic development, legal system, volatility, global connectivity and stability.*

The upheavals of recent decades have shocked social scientists who continue to base their development models on the West’s economic trajectory and the idea that as modernization and economic cooperation take hold, the world’s nations, in some broad linear convergence, will operate with free markets, limited government, and greater pluralism and tolerance. But it is clear that authoritarian states can host prosperous, efficient economies as readily as full-fledged democracies, and that the global system is not edging toward some equilibrium state, or neoliberal “end of history.” Nor are world’s societies all part of an overarching order that can be fine-tuned with equilibrium models. They are parts of open, adaptive, complex systems—and we must consider the dynamics to which such systems are prone. We look at how network dynamics determine system stability: how, for example, China has attained global leadership, and why the West struggles to maintain influence. Models of the network topography of premodern Europe and China illustrate how linkages once formed, create actors, shape behaviors, and mold relationships that to hold sway over the trajectories of the societies in which they arise.

**CHAPTER 2 Growth, form, and self-organization in the economy**

**KEYWORDS:***complex systems, network models—random, scale free, and small world, average path length, betweenness centrality, decentralized network, self-organization, institutions, rules,**equilibrium, hierarchy, phase transition, economic transitions, sensitivity to initial conditions, information diffusion, China, West, innovation, cascades, and change threshold.*

Understanding network formation is essential to building a cohesive theory of network connectivity in the social relations that form historical regimes. Using diagrams of network structure in which nodes represent components and lines represent their interactions, we can recognize essential features of the interactive configurations leading to patterns (institutions) and behaviors and emergent properties. When we capture how agents interact and self-organize, we can infer structure; and knowing structure we can infer patterns of information transmission and thus collective behavior, including why system growth or breakdown follows a critical event. Theoretical network models—random, scale-free, small-world, and hub-and-spoke—capture these regularities and allow us to infer principles underlying their construction and the trade-offs of stability and resilience. Knowing patterns of structure and interaction, we gain a deeper grasp of two critically important and strongly correlated phenomena of contemporary political economy: the Great Divergence of East and West, and the global impact of China’s contemporary and unprecedented economic transformation.

**CHAPTER 3 Human evolutionary behavior and political economy**

**KEYWORDS:** *Modernization theory, global connectivity, authoritarianism, dictatorship and democracy, development, specialization, coevolution, convergence, niche construction theory, diversity, variation, optimization, fitness landscape, evolutionary social psychology, emerging nations, social learning, spread of behaviors, cognition, peer monitoring, copying.*

Niche construction theory, popular in evolutionary biology, can help us understand the lag between economic growth and political reform in highly interconnected states, where competition for resources drives adaptation via the selection of strategic opportunities, ranging from the predatory and parasitical to the symbiotic. A rugged or smooth fitness landscape, created of the system’s topology, determines how a society makes choices on the path toward its own fitness peak. No two societies will start from the same point or follow the same path to its local or global optimum. This makes it difficult to simply transfer strategies, norms, or institutions across cultures. Evolutionary social psychology teaches that individuals and societies alike exhibit bounded rationality, practice heuristics and imitate local models and cultures they know. ESP may also help explain why China’s developmental experience can be a more familiar starting point than a Western alternative, and more easily copied by other emerging nations. Nevertheless, disordered activity may keep the overall global system in balance.

**CHAPTER 4 Network assemblage of regime stability and resilience**

**in Europe and China**

**KEYWORDS:** *dynastic succession, long-term economic performance, regime collapse Imperial China, dynastic transitions, resilience of historical regimes Old Regime Europe, hypernetwork, centralized hub and spoke networks, small world, scale free, institutional longevity, episodic transformations, macro-system stability, path length, marriage networks, World War I.*

The first of the book’s five great transitions is the creation of institutions of dynastic succession in Europe and China. Orderly, incontestable hereditary succession afforded dynastic longevity from the ninth century onward, and was a key institutional determinant of long-term economic performance, serving as a *hypernetwork* that contributed to system-level dynamics. In Europe and China the hypernetwork structures were very different, one being scale-free, the other star-like. Each presented trade-offs between properties of stability and resilience that arose according to widely different adaptive strategies. Historical meta-regimes offer evidence that qualities embedded in macro structures are distinct from those at the micro levels, and that long-standing institutions are likely to be gradual in formation, but sudden in their demise. Redundancies in Europe’s network of connected dynasties ruling across the continental “fabric” lent resilience to the macro system. China utilized a far more efficient system, but with the attendant risk that the collapse of a lone central hub reliant on a powerful bureaucracy would produce cycles of decay during which the population suffered on massive scales.

**CHAPTER 5 Network formation and the emergence of law: feudalism and the transition to small-world connectivity**

**KEYWORDS:** *legal systems, Western legal tradition, communitarian law, Germanic law, feudalism, roman law, rationalization of law, small-world connectivity**, limited government, credible commitment, sovereignty, parliaments, national assemblies, Chinese legalism, Confucianism, and unification of China.*

The second great transition is the organic development of the Western legal system—from legal frameworks for succession and transmitting landed property to the oaths of fealty, on into a macroscopic nexus of institutions, practices, and beliefs that formed a hypernetwork within the wider society. The evolution of the legal tradition, forging a system of strong but limited states, is a story of increasing returns. No legal document or pact like the Magna Carta exists in China. Its aristocracies never gained sufficient military, political, or ideological strength to demand rights that could constrain the sovereign via institutions. Imperial officialdom did not intend to negotiate with a corporate body in possession of its own resources and rights. Nor did the bureaucratic clans have any incentive to stem the centralization of authority. They acted as representatives of the state’s interests, not those of civil society. The Legalist/Confucian state exercised authority over economic resources to an extent that no European monarch could hope to accomplish. It also counterbalanced power with a code of ethical responsibilities to ensure the basic needs of the population.

**CHAPTER 6 The network foundations of the great divergence**

**KEYWORDS:** *disruptive innovation, centralization, overseas expansion, Great Divergence, technology and innovation, Confucian officialdom.*

Theories of niche construction and near-decomposability, which correspond to competition and decentralization in economic parlance, illuminate how respective networks of authority served parochial purposes, with motivations related to specific challenges: in China, to rule a large territory, and in Europe, to enhance the competitive power of small states in a fragmented landscape. A shift toward outward expansion made European elites less parochial and resulted in an explosive wave of innovation. China’s centralized network enabled periods of unmatched stability and prosperity; but the merit-based bureaucracy stifled innovation, preventing the rise of a merchant class, an independent private sector, and outward expansion, all of which were associated with Europe’s industrialization. China’s inward gaze ensured the paramount political power of bureaucratic elites, resulting in systemic corruption that grew extensively over time, impoverishing the peasantry and causing rebellions, chaos, and conflict—a process that repeated itself throughout China’s history.

**CHAPTER 7 Has the baton passed to China?**

**KEYWORDS:** *socialist market economy, market reforms, state capitalism, Chinese Communist Party,*

Their powerful dynasties may have passed into history, but both Europe and China face issues that can be traced to their structural past. European nations still seek a functional integration of their economic and social systems while demanding an equal role in determining aggregate change. And even as modern China embarks on a massive campaign of overseas expansion for resources, its governance structure may contain the same weaknesses that felled dynasties—multitudinous layers and siloes of bureaucracy under central control, with admission to the privileged ranks of the party’s elite determined via rigorous examination and proof of loyalty, and susceptible to corruption. This chapter looks at the history of China’s economic transition, and asks if it is incomplete, faltering, or transitioning into a market economy that is distinctive from the West’s, even as it shares some fundamental properties. The Chinese approach to transition has left China’s development as a market economy with a structural impediment: it has not transitioned into a society in which a good rule-of-law environment is the backbone of mutual trust.

**CHAPTER 8 China’s ambitions and the future of the global** economy

**Keywords:** *market reforms, outward investment, global capitalism, globalization, state capitalism, path dependency*

If China’s far-reaching market reforms make it the world’s largest economy, then another momentous shift in global dynamics may be under way—a change in the very structure of global capitalism—making the system of global trade and investment more compatible with the Chinese model. How will China’s version of state capitalism affect its trading partners? And will other countries be likely to adopt and adapt some of China’s policy innovations, making its experience a source of new variations in global governance? In the West, officials criticize China as a free-rider on the stability of the political order that it treats with skepticism and which it is now trying to change to fit its own interests. But they are complacent in their confidence that a nexus between open markets and open polities is a universal feature of economic prosperity. A larger concern also looms: Going global may transform China into a hub within a larger system, and a giant hub at that, but one that is not centrally positioned to control all others. The complexity of the global economy far exceeds the capability of the CCP as a controlling mechanism.

**CHAPTER 9 Global networks over time**

**Keywords:***international relations, hierarchy, hegemony, network density and centrality, globalization, liberal internationalism.*

Metrics of network structure are applied to critical global networks representing military, political, and economic power over multiple decades to highlight the dynamics of interstate relations. Densely constructed networks continually transform international relations, flows of influence, and network properties. Globalization’s dense interconnectivity and heightened competition inherently weaken hierarchical control structures in an environment of many powerful forces jostling for influence. The strategic designs of various agents matter, but the patterns of self-organizing regularities of the wider ecology matter even more. In the absence of hierarchical structures or consensus on global governance, state actors will be drawn to nationalism as methods of conflict resolution. The administration of a “grand strategy” is insufficient in a complex, densely networked whose various agents trade and communicate according to their own self-interests. What happens on any one scale will depend on interacting self-organizing processes at scales above and below. This makes determining what threats are of greatest importance fruitless. Their interconnectedness is the dilemma we now face.

**CHAPTER 10:** A future of diminishing returns or massive transformation?

**Key words:** *regime stability, dissolution and collapse, system failure, global innovation and competition, diminishing returns and phase transitions.*

The fast-growing economies of the combined lower- and middle-income countries have propelled them into new strategic and economic alliances, often bypassing the developed world. These changing patterns of global connectivity are rewiring the underlying grid. The West is no longer blindly imitated by others, even among its developing-nation allies. The very quality that sets the Western legal tradition apart—its judicial institutions whose legitimacy resides in binding those who govern to the same laws as other citizens—rarely has transferred effectively to regions where the cultural antecedents are absent. It is no longer possible to deny that China’s spectacular performance in raising its living standards has shown an alternative. Inevitably, this divergence will be projected onto struggles for shaping the policies of global institutions, their governance, and perceptions of their legitimacy. How China or the West handle other threats—of forced migration, internal displacement, global radicalization—will have a great bearing on their relative global influence and ability to shape the trajectory of the world economy.

**CHAPTER 11 Network structure and economic change: East versus West**

**Keywords:** *communication webs, connectivity, information diffusion, innovation, system transitions, path-dependency, bridge nodes, Chinese culture, self-organization, complex systems, social networks.*

Europe’s network structure had evolutionary advantages in its adaptability in innovation and resistance to collapse. While China’s imperial dynasties bequeathed political, social, and ideological foundations for national unity that endured largely intact for two millennia, behind that legacy resides a source of enduring structural weakness. Its system stability comes at a loss of flexibility. Fear of emerging chaos is memorialized in the narrative by which the Chinese Communist Party justifies its grip on power. An awareness of how vulnerability has led to failures predisposes China’s leaders to take insulating measures, e.g., censoring the Internet, constraining academic course content, imposing party oversight on enterprise, and hindering the acquisition of power and prestige that is independent of the regime. But bolstering system stability by strengthening centralized control mechanisms may undermine system resilience, reproducing the very weaknesses its designers seek to avoid and causing a massive disruption in the future. As these two great cultural systems begin to impinge on one another, network analysis has much to reveal about the choice of separation or integration that is before us.

### Biography

Dr. Hilton Root teaches political economy at George Mason University, the Schar School of Public Policy and Government. Other academic appointments include the University of International Business and Economics (Beijing), King’s College London, the California Institute of Technology, University of Pennsylvania, and Stanford University. He advises the US Department of the Treasury, the Asian Development Bank, the UNDP and the World Bank and has authored more than 200 publications, including ten books.