

## **Introduction to Ping Chen's Main Publications**

### **Ping Chen, March 7, 2007**

Ping Chen, "Market Instability and Economic Complexity: Theoretical Lessons from Transition Experiments," in Yang Yao and Linda Yueh eds., *Globalisation and Economic Growth in China*, Chapter 3, pp.35-58, World Scientific, Singapore (2006).

This is a review paper on transition experiment testing competing economic theories. The policy experiments in China, East Europe, and former Soviet Union reject atomic supply-demand model and Kornai model of soft-budget constraint in micro, Lucas model in macro, and Coase theory in property right school, while support Austrian theory of round-about production, financial Keynesian theory of financial instability, complex economic dynamics and evolutionary economics. The nature of Washington consensus is a new form of counter-Keynesian revolution led by Lucas.

Ping Chen, "Evolutionary Economic Dynamics: Persistent Business Cycles, Disruptive Technology, and the Trade-Off between Stability and Complexity," in Kurt Dopfer ed., *The Evolutionary Foundations of Economics*, Chapter 15, pp.472-505, Cambridge University Press, Cambridge (2005).

This is a review paper on Chen's work on economic chaos, evolutionary dynamics, and challenge to neoclassical models by Frisch, Lucas, random walk and Brownian motion. This is an invited paper as one of "original contributions" by Ilya Prigogine, Herbert Simon, and other pioneers in modern evolutionary economics.

Ping Chen, "Microfoundations of Macroeconomic Fluctuations and the Laws of Probability Theory: the Principle of Large Numbers vs. Rational Expectations Arbitrage," *Journal of Economic Behavior & Organization*, 49, 327-344 (2002).

This is a critical analysis of Lucas 1972 paper on money neutrality based on rational expectation and microfoundations. It found out that the Lucas model of island economy violated basic Principle of Large Numbers in probability theory. Rational expectation is a self-defeating model under arbitrage between work and leisure. There is weak empirical evidence of microfoundations of macro fluctuations

from labor or producer market, but strong evidence from financial market or industrial organization. The author proposed a three-layer model of micro-meso-macro as a better alternative of micro-macro framework in economic theory.

Ping Chen, "A Random Walk or Color Chaos on the Stock Market? - Time-Frequency Analysis of S&P Indexes," *Studies in Nonlinear Dynamics & Econometrics*, 1(2), 87-103 (1996).

This was the first paper on analyzing stock price movements by means of the new algorithm of time-frequency analysis, a non-parametric non-stationary time-series analysis based on Wigner transform in quantum mechanics and Gabor expansion in quantum optics. It found out that cyclic movements of Standard & Poor 500 index around the HP trend is mainly characterized by color chaos (nonlinear deterministic movements with narrow frequency band). Its characteristic period is about 4 years. In contrast, white noise accounted only about 30% of variance. Changing frequency pattern provides valuable tool of economic diagnosis in distinguishing external shock in oil price shock in 1973 and internal instability of stock market crash in 1987. It provides a strong evidence of color chaos dominating in stock price movements and natural experiments, which rejecting efficient market hypothesis based on Brownian motion (white noise) theory of stock price movements.

Ping Chen, "Trends, Shocks, Persistent Cycles in Evolving Economy: Business Cycle Measurement in Time-Frequency Representation," in W. A. Barnett, A. P. Kirman, and M. Salmon eds., *Nonlinear Dynamics and Economics*, Chapter 13, pp. 307-331, Cambridge University Press (1996).

This paper reviewed macro analysis by time-frequency analysis of HP filtered cycles. There are strong evidence of persistent cycles existed in macro indexes including real GDP, real consumption, real investment, unemployment rate, labor productivity, consumer price index, monetary index, long-term interest rate, and other macro indexes. Their characteristic periods were ranging from 3 to 5 years. It provided strong empirical evidence for Schumpeter theory of business cycles as biological rhythms but negative evidence for neoclassical theory of noise-driven cycles.

Ping Chen, "China's Challenge to Economic Orthodoxy: Asian Reform as an Evolutionary, Self-Organizing Process," *China Economic Review*, 4, 137-142 (1993).

This was a first paper to criticize shock-therapy based on Prigogine's evolutionary self-organizing perspective in studying economic transition.

Ping Chen, "Imitation, Learning, and Communication: Central or Polarized Patterns in Collective Actions," in A. Babloyantz ed., *Self-Organization, Emerging Properties and Learning*, pp. 279-286, Plenum, New York (1991).

This paper developed an alternative model based on nonlinear social interaction to Ising model in social psychology, which could explain fashion phenomenon with central or polarized distribution. It showed that imitation, learning, and communication play important role in collective behavior, which could not be understood by methodological individualism in neoclassical economics.

Ping Chen, "Needham's Question and China's Evolution - Cases of Non-equilibrium Social Transition", George Scott ed., *Time Rhythms and Chaos in the New Dialogue with Nature*, University of South Dakota at Vermillion, Iowa State University Press (1990).

This paper proposed a social evolutionary theory based on Prigogine's non-equilibrium thermodynamics for understanding culture bifurcation between the West and Chinese civilization in history. It sheds new light on Needham's question why science and capitalism emerged in West Europe rather than in China, India, or other civilizations. The degree of openness in ancient economy based on agriculture structure shaped by ecological conditions is the root of diversified development towards division of labor or self-sufficient society.

Ping Chen, "Empirical and Theoretical Evidence of Economic Chaos," *System Dynamics Review*, Vol. 4, No. 1-2, 81-108 (1988).

Also in B. L. Hao ed., *Chaos II*, World Scientific, Singapore (1990).

This was the first empirical and theoretical evidence of economic chaos in continuous-time from monetary indexes in US. The nonlinear feedback and time-delay provides basic mechanisms for generating economic chaos in economic dynamics. This work was widely reported by

mass media around the world, which was first reported in 1985 before the stock market crash in 1987.

Ping Chen, "Origin of Division of Labor and Stochastic Mechanism of Differentiation," *European Journal of Operational Research*, Vol. 30, No. 3, pp. 246-250 (1987).

This was a theoretical and empirical study of evolutionary dynamics on the origin of division of labor and multi-hump distribution caused by staged growth. The culture factor based on risk aversion vs. risk-taking behavior in learning by trying provides a key in evolutionary dynamics on market-share competition and understanding rise and fall of species or industries. It sheds new light on the complexity puzzle in ecological biology. The trade-off between stability and complexity can be shown in history of social and biological evolution.