BOOK REVIEW

Masanao Aoki and Hiroshi Yoshikawa,

Yoshi FUJIWARA

NiCT/ATR CIS Applied Network Analysis Lab, Kyoto 619–0288, Japan.
E-mail: yfujiwar@atr.jp, yoshi@yoshi-idea.org

When I had a first chance to talk with Masanao Aoki at an international conference on statistical physics a decade ago, I was actually shocked by his unique approach to macroeconomics, which employed population genetics in biology and random combinatorics in statistics and mathematical physics.

He often begins to say, “though I am not a mainstream economist, …” to me, an alien researcher working in econophysics, during conversations. But after having enjoyed opportunities to talking and collaborating with him since then, and recently with Hiroshi Yoshikawa, I now realized that my first response to and belief in the importance of their approach to macroeconomics was correct. The present book is its proof showing that a new approach to macroeconomics is not only possible but it is essential.

This book begins with a phrase in the preface by Hiroshi Yoshikawa, “macroeconomics has gone astray”. In the “mainstream” approach, the agenda of having microeconomic foundations for macroeconomics has been taken as building sophisticated optimization of an individual economic agent into a macro model, typically in a representative agent model. Behavior of heterogeneous and interacting agents is simply assumed to be irrelevant. But heterogeneity and interaction are responsible for most phenomena in macroeconomics!

The purpose of this book is to explain the necessity of the new approach for macroeconomics, different from the standard equilibrium theory. The approach is based on Masanao Aoki’s research efforts, and a long-term collaboration with Hiroshi Yoshikawa, “to revising the commonly adopted frameworks for modeling and analysis.

JEL: C02, E10, Y30.
by mainstream macro-economists” (quoted from the preface by Masanao Aoki). For Aoki’s previous works and collaborations with Yoshikawa, see Aoki (1996, 2002). Nevertheless, to be significant, the present book has a numerous examples in macroeconomics, to which those new methods are applied to the extent, much further than in the previous books. These examples in macroeconomics constitute a backbone in this book, and are described in the Section 1 of Introduction.

The examples are rather extensive:

- Role of demand in macroeconomics (Section 3)
- Policy ineffectiveness and long stagnation in economy (Section 4)
- Slack dynamics and inflexible prices (Section 5)
- Business cycles (Section 6)
- Labor market (Section 7)
- Demand saturation and economic growth (Section 8)
- Heterogeneous investors in stock markets (Section 9)
- Stock prices and real economy (Section 10)

and are fully treated in each section indicated.

How can one treat the heterogeneity and interaction among economic agents, and model the above phenomena? The answer lies in tools of statistical physics and in a relatively new branch in mathematics. The first component is continuous-time Markov chain models for stochastic interactions among agents. The second is a combination of stochastic processes and new mathematical methods in combinatorics. This is relatively new and is called combinatorial stochastic processes. The two components are explained in Section 2 in a compact way.

Unfortunately, the readers in evolutionary and institutional economics are not usually trained to mathematics of stochastic processes, and may feel uneasy. I suggest that such readers could obtain prerequisite knowledge from the books, Aoki (2002, 2003), and textbooks referred to in them. If you are a novice, you have benefit from reading a modern textbook such as Ross (2007) to learn elementary things in stochastic models. For a few methods such as Fokker-Planck equation in statistical physics, which is not popularized outside of physics, one can consult a textbook such as Gardiner (2004). On the other hand, the combinatorial stochastic processes would be quite new to many researchers. With an appropriate knowledge on basics on stochastic models, you can take a look at Pitman (2006). As far as I know, the approach of combinatorial stochastic processes in economics was first taken in Aoki’s papers.

Fortunately, however, each of the sections indicated above has a nice description of