

# ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ

ΔΙΑΤΜΗΜΑΤΙΚΑ ΠΡΟΓΡΑΜΜΑΤΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ

Υπολογιστική Μηχανική

&

Μαθηματική Προτυποποίηση στις Σύγχρονες Τεχνολογίες και την Οικονομία

## ΣΕΜΙΝΑΡΙΟ

### Nonlinear Economic Dynamics: Trick or Treat?

*Views from a social scientist-engineer*

Dr. Stelios Bekiros

AUEB, EUI, CeNDEF, RCEA

**Abstract:** *“Laws are important and valuable in the exact natural sciences, in the measure that those sciences are universally valid...In the social sciences, the knowledge of the universal or the general is never valuable in itself”* (Max Weber, “Objectivity in Social Science and Social Policy” 1949 [1904]: 49-112). Is economics a so-called pseudo-science? How is the formation of expectations unfolded and how beliefs are updated in the learning process? Many economists do not believe that there are "laws of nature" in economics, because human economic behavior is too complex or random to be guided by any law. Could be suggested that whenever there is a stock crash or an economic depression, several “natural laws of economics” are violated?

Noble laureates (2002) Kahneman and Smith integrated psychological research into human decision making processes under uncertainty. One could argue that there is nothing wrong with economics imitating a natural science like physics as long as the validity of a model could be tested by rigorous statistical methods (econometrics). However, long run economic models are unable to keep an exact relationship between the input and the output, because unlike in physics, in economics we cannot repeat an experiment to get rid of the error term from equations and find universal constants that can be used repeatedly. Moreover, the time-variant economic variables form a dynamic process over infinite past and future that cannot be quantified through physics-like experiments. In economics, it is impossible to find absolute time-invariant variables, because of the changing nature of human behavior.

The implementation of adequate quantitative models is a vital concern for all economists and financial analysts. Is nonlinear economic dynamics a solution? Nonlinearities may be so weak that linear approximations do not constitute an essential error in modeling the system e.g., whether or not the system converges to an equilibrium state. Whilst this is true for many low-dimensional systems, the effects of nonlinearities in higher-dimensional systems cannot always be anticipated with accuracy, implying that linear approximations should be treated with scepticism especially when the nonlinearities obviously diverge from linear structures. Furthermore, if economic dynamic systems are chaotic they cannot be predicted in the long-run.

A synopsis of some modelling techniques for real-world problems is presented. Aside from financial and economic theory these methodologies are drawn from diverse disciplines, such as engineering, physics, biology and psychology.

Τετάρτη, 27/3/2013, ώρα 2:00 μμ  
Αίθουσα “Κουμούτσου”, Σχολή Χημικών Μηχανικών ΕΜΠ