Accepted Manuscript

Ising model, econophysics and analogies

Christophe Schinckus

PII: S0378-4371(18)30608-3
DOI: https://doi.org/10.1016/j.physa.2018.05.063
Reference: PHYSA 19603

To appear in: *Physica A*

Please cite this article as: C. Schinckus, Ising model, econophysics and analogies, *Physica A* (2018), https://doi.org/10.1016/j.physa.2018.05.063

Ising Model, Econophysics and Analogies

Prof. Christophe Schinckus, RMIT University Vietnam
christophe.schinckus@rmit.edu.vn

Abstract

Econophysics emerged in the 1990s by importing statistical physics into economics and finance. Such extension of physics to another context generated a lot of epistemological debates and although it this transfer appears to be internally (disciplinary) justified, there exist a number of works questioning the justification of such extension of physics in economics\finance. This article aims at analysing how econophysicists implicitly promote a Duhemian way of perceiving scientific research by expanding their work into economics.

Keywords: Econophysics, Analogy, Ising model, Statistical Physics

I. Introduction

In the 1990s physicists turned their attention to economics, and particularly financial economics[1]. The term "econophysics" [2] is a neologism associated with this extension of physics to the study of problems generally considered as falling within the sphere of economics. Mantegna and Stanley (1999, p.2) defined econophysics as "a quantitative approach using ideas, models, conceptual and computational methods of statistical physics". Econophysics nowadays refers to a vast literature all around the world (Mantegna and Stanley, 1999; Bouchaud, 2001, 2002; Rohner, 2002; Takayasu, 2003; Sornette, 2003; 2006; McCauley, 2004). Several authors (Gringras and Schinckus, 2012; Schinckus, 2016; Jovanovic and Schinckus, 2017) showed that econophysics can actually be seen as a new field developed by physicists for

[1] The influence of physics on the study of financial markets is not new, as witnessed by the work of Bachelier (1900) and Black and Scholes (1973). Nevertheless, we cannot yet refer to Black and Scholes' model as econophysics in the term's current meaning, since it was completely integrated into the dominant theoretical current of economics and finance. Econophysics is not an "adapted import" of the methodology used in physics; rather, it is closer to an independent approach developed outside of economics invasion.

[2] The movement's official birth announcement came in a 1996 article by Stanley *et al*. (1996)We would point out, however, that Kutner and Grech (2008) trace the informal birth of the approach to the paper by Mantegna (1991) that studied the evolution of returns on financial markets in terms of Lévy processes.