Chapter 16
DemoscopoPhysics:
A New and Interdisciplinary Research Field

M.P. Hanias
National and Kapodistrian University of Athens, Greece

L.Magafas
Kavala Institute of Technology, Greece

ABSTRACT

Inspired from the application of physics in economy (Econophysics) and society (Sociophysics), the authors introduce the term DemoscopoPhysics as the latest interdisciplinary research field that applies theories and methods originally developed by physicists in order to predict election results by using mainly Non Linear Dynamics (chaotic dynamics). For this purpose, they applied chaotic analysis on samples from political survey for the Euro election results in Hellas, Greece in 2009, and also for the Hellenic National elections of October 4, 2009 in order to predict election results.

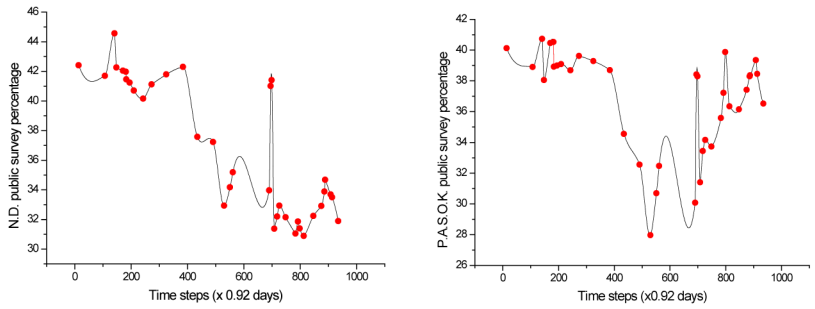
INTRODUCTION

Many people believe that human behavior cannot be calculated by any model, so no mathematical equation can model the behavior of a single person. But a statistical approach to human nature never applies to single persons, only to large crowds (Chakrabarti, Chakraborti, & Chatterjee, 2004). In a large crowd individual properties are lost and groups may be labeled by certain features. This is expressed in political parties forming interactive complex systems. These systems may obey to physical laws. As an example in elections (opinion growth) the winning party leader determines the political direction of more than 100 million people. This corresponds to the crystallization of liquids. In crystal growth one nucleus determines the crystal direction of 1023 molecules. Crystal growth and opinion formation may both be modeled from the Lagrange function (Chakrabarti, Chakraborti, & Chatterjee, 2004). The present work proposes the use, for the first time, Physical models especially methods from non linear analysis and chaos theory, in order to predict and study election results,, defining the new scientific term called "DemoscopoPhysics" in the sense of application of physics models to social phenomena modeling.

The term DemoscopoPhysics consists from two words Demoscopie and Physics. The first word

DOI: 10.4018/978-1-4666-2509-9.ch016

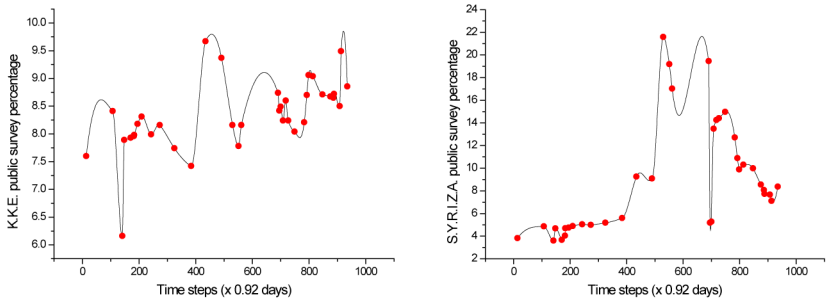
Figure 1. a. Interpolated time series for ND public survey for period 16-1-2007 to 23-04-2009; b. Interpolated time series for PASOK public survey for the same period (solid line) and raw data (dots)



a. b.

is a Hellenic ancient word that means political survey. This work was inspired from the emerging field of economo-physics which mainly consists of autonomous mathematical physics models that apply to the financial markets.We have used these particular aspects of the complex nonlinear dynamics of political survey, in order to predict the Hellenic Euro and National election results. The idea to apply chaotic analysis on samples concerning election results seems to be valid, since the election system is a complex system, like the system of economy and can be influenced by similar factors. Another point is that the political shocks and financial crisis are phenomena frequently happened, which are innate elements in chaotic systems so for their predictability it can be used the chaos theory. The idea is to analyze not the given dynamic system, which remains mostly unknown, but an image-system with the same topology that preserves the main characteristics of the genuine. Taking into account the results of opinion polls we have done regression in intension to vote. These new data are the raw data now. If we had applied statistical methods to these data we would take static results with very short horizon forecasting. For this reason we apply dynamic methods based on chaos theory in order to show the hidden potential of each

Figure 2. a. Interpolated time series for KKE public survey for period 16-1-2007 to 23-04-2009; b. Interpolated time series for SYRIZA public survey for the same period (solid line) and raw data (dots)



a. b.