

Chapter 7

Financial Decision-making

The purpose of this chapter is to discuss how to study financial decision-making in the stock market. Results that will be presented and discussed, here, are from a multinational study aimed to investigate brain activity associated with trading decision using a stock market game simulator. Electroencephalogram (EEG) is used to record brain activity and techniques discussed in Chapters 6 and 10 are used to analyze acquired data and results are interpreted assuming the brain as a distributed intelligent system (Chapter 4). Experiments were done in Brazil, the Netherlands and Portugal (Rocha *et al.*, 2015; Vieito *et al.*, 2015). Data selected from experiments in Portugal are available on *EEG_StockMarket* book that may be downloaded from <http://www.eina.com.br/software/>.

7.1 Designing Trading as an Ecological Game

As discussed in Chapter 6, an ecological approach of trading decision-making has to use real but controllable data. For such a purpose, prices $p(c, d)$ of stocks c traded at BMFBovespa¹ were collected from December 4, 2010, to December 30, 2012 (Rocha *et al.*, 2015; Vieito *et al.*, 2015). During this time interval, the Brazilian and other stock markets experienced distinct periods of volatility and price tendencies that characterized different periods of *Bull* or *Bear* markets. Careful selection of these periods allows for some control over variables of interest for financial decision, such as price evolution,

¹www.bmfbovespa.com.br.