

University of Groningen

## Essays on the social dimensions of investor behavior

Hoffmann, Arvid Oskar Ivar

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*

2007

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Hoffmann, A. O. I. (2007). *Essays on the social dimensions of investor behavior*. [Thesis fully internal (DIV), University of Groningen]. s.n.

**Copyright**

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

**Take-down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

*Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.*

# **1. Introduction**

## **1.1 General Introduction**

This thesis describes an interdisciplinary study on individual investor behavior in The Netherlands. In general, interdisciplinary research is used to develop a greater understanding of a problem that is either too complex or wide-ranging to deal with using the knowledge and methodology of a single discipline. It draws from two or more academic disciplines and integrates their insights and methods in the pursuit of a common goal (Augsburg, 2005). The common goal of this thesis is to increase our understanding of the social dimensions of individual investor behavior.

This thesis combines theoretical insights from the behavioral finance, marketing, and social-psychology literature to investigate the relative importance of the different personal needs investors may strive to satisfy by investing and determines their average level of investment-related knowledge and experience. Subsequently, the effect of these two investor characteristics on their decision-making behavior is examined. With regard to this decision-making behavior, the thesis focuses on the social dimensions of investor behavior, like investors' conformity behavior.

A key characteristic of interdisciplinary research is not only that it draws from multiple theoretical perspectives, but also that it applies several different research methods. The methodology employed in this thesis is a combination of a literature study, a self-administered survey in the form of an online questionnaire, several descriptive and inferential statistical analyses, and a multi-agent social simulation model.

The interdisciplinary nature of the study is one of the key contributions of this thesis. Forming a bridge between different disciplines, this thesis aims to contribute both to theory development and application.

## **1.2 Background and Contribution of this Thesis**

For many investors, investing constitutes more than simply weighting the risk and expected returns of various investment assets. Or, as in the words of Fisher and Statman (1997: 48):

*"... some - perhaps most - investors have preferences that go beyond expected returns and risk. A preference for stocks of socially responsible companies is one example."*

These insights are supported by the recent literature in behavioral finance, in which marketing and consumer behavior theories and concepts are applied to distinguish between utilitarian and expressive characteristics of investing. Investing in the stocks of specific companies can offer utilitarian benefits like low risk and high returns, but also expressive benefits. For example, investments can help investors to demonstrate their feelings of patriotism, social responsibility and fairness or convey a position of high status to other investors (Statman, 1999; 2004). Investments, however, are private matters and contrarily to wearing exclusive watches or driving expensive sports cars, outsiders will in general be relatively ignorant with respect to the size and composition of one's investment portfolio. Considering this low visibility, investments could be assumed to have a limited signaling function towards outsiders. Statman (2004), however, argued that the *self-signaling* benefits of making e.g., socially responsible investments help to explain the preference of some investors for these stocks. By buying green investment funds, these investors signal their social responsibility to themselves, and this allows them to achieve the personal benefit of feeling like a social responsible citizen.

Notwithstanding the value of *self-signaling*, we argue that investors - like consumers - may sometimes also deliberately want to *signal to outsiders*, by displaying and discussing about their investments with other investors in their social networks. This may be in order to attain or maintain status; i.e. investments as a form of conspicuous consumption (Janssen & Jager, 2003; Veblen, 1899). Or this may be to satisfy other, more socially oriented needs, like the need to participate in investment related conversations or to affiliate with other investors.

For investment professionals, it is important to be aware that their clients may have multiple needs, and to discover and cater to these needs. After all, successful financial products, like all successful products, are those that meet the needs of customers (Statman, 1999: 25). This implies that investment professionals now explicitly have to deal with questions that were formerly considered to belong to the domain of marketing. Yet, investment professionals are reluctant to discuss marketing and in the academic literature few articles link marketing to the investment profession (Statman, 2004: 160).

Behavioral finance scholars have therefore recently called for a more explicit link between investments and marketing (Statman, 2004), and even Fama and French (2005) - two proponents of traditional finance - have recently questioned the strict distinction in decision-making processes for investments versus consumption goods.

Being aware of the many considerations and needs beyond risk and return that influence investors' behavior, it is surprising that finance journals are mostly confined to the utilitarian benefits of low risk and high expected returns (Statman, 2004: 154). Just as surprising is that until now there are no reports in the literature of empirical investigations on the multiple needs investors may try to satisfy by

investing, and whether there are significant differences in these needs between male and female investors, young and old investors, or investors with higher versus lower levels of investment-related knowledge and experience.

This thesis contributes to the literature discussed above by performing a fine-grained empirical investigation on the multiple needs of individual investors using theories and research techniques originating from behavioral finance, marketing and social-psychology (i.e. consumer behavior) research.

If investors have more socially oriented needs, this can have important implications for their decision-making processes and market interactions. It would for example imply that they do not make their decisions in social isolation. Rather, individual investors would be susceptible to social influences from other investors and also they would exert social influence on other investors. Hirschleifer and Teoh (2003: 25) endorse this view, stating that:

*“We are influenced by others in almost every activity, and this includes investment and financial transactions”.*

Shiller (1984: 457) joins Hirschleifer and Teoh, characterizing investing in speculative assets as *“a social activity”*.

In consumer behavior and marketing research, the effects of social influence have been widely investigated by social-psychologists and sociologists. Recent studies on this topic have demonstrated that the real or imagined presence of others can significantly influence someone’s behavior (Abrams, 1994; Bearden et al., 1989; Kropp et al., 1999b; Lascu et al., 1995; Terry & Hogg, 1996). Furthermore, it has been found that when the results of decisions can affect both self-image and public image, social influences can play a particularly important role in someone’s decision-making behavior (Kropp et al., 1999a).

An important concept in the literature on social influence are processes of conformity; that is adjusting one’s behavior or thinking to match those of other people or a group standard (see e.g., Sherif (1936) and Cialdini and Goldstein (2004)). There has been a considerable amount of research on social influence in general and conformity influence in particular (summarized by e.g., Cialdini and Goldstein (2004)). Yet, until now the literature has only infrequently touched upon individual investors’ conformity behavior. The relevance of this behavior in an investment setting, however, was already suggested by De Bondt (1998: 835). He argued that:

*“...it seems likely that conformist behavior affects assets prices”.*

The effect of conformist behavior on asset prices could be quite substantial if it would lead to herding, which is considered one of the driving forces behind excessive stock market price movements like hypes, crashes, and bubbles (Lynch, 2001; Ofek, 2003; Sharma et al., 2005; Valliere & Peterson, 2004). Even policymakers like the International Monetary Fund are concerned that herding by

financial market participants exacerbates volatility, destabilizes markets and increases the fragility of the financial system (Bikhchandani & Sharma, 2000).

This thesis contributes by investigating the effect of more socially oriented needs as well as investors' level of investment-related knowledge and experience on these investors' propensity for conformity behavior. Subsequently, using a multi-agent social simulation model, the effect of this micro level investor behavior on macro level stock market dynamics like market volatility is investigated. A final contribution of this thesis therefore is that it investigates the dynamical properties of micro-macro level interactions in an investment setting.

The next section introduces the main research objectives and research questions that will be dealt with in this thesis.

### **1.3 Research Objectives and Research Questions**

In the previous sections, the background and contribution of this thesis were introduced and discussed. Having this in mind, the following research objectives are central to this thesis:

**RO 1** This thesis aims to contribute both to the understanding in the academic literature of as well as to the professional practitioners' knowledge on individual investors' personal needs, level of investment-related knowledge and experience, and the effect of afore-mentioned investor characteristics on (the social dimensions of) individual investors' decision-making behavior.

**RO 2** Moreover, this thesis aims to contribute both to the understanding in the academic literature of as well as to the professional practitioners' knowledge on the possible effects of the micro level investor behavior as identified in the first research objective on macro level stock market dynamics as measured by the occurrence of stylized financial market facts like e.g., volatility clustering.

To achieve the research objectives as outlined above, a number of research questions have been formulated. The main research questions of this thesis are:

**RQ 1** To what extent and in what way do different personal needs and individual investors' level of investment-related knowledge and experience exert influence on the social dimensions of these investors' decision-making behavior like their propensity to demonstrate conformity behavior?

**RQ 2** To what extent and in what way does the micro level individual investor behavior as meant in the first research question exert influence on macro level stock market dynamics as measured by the occurrence of stylized financial market facts like e.g., volatility clustering?

**RQ 3** To what extent and in what way can the micro level individual investors' decision-making behavior and their market interactions be influenced by the overall macro level stock market dynamics?

To achieve these research objectives and answer the research questions, an interdisciplinary research approach will be applied. In the next sections, the methodology of this thesis will be discussed in more detail.

#### **1.4 General Methodological Perspective of this Thesis**

As stated in the introduction, this thesis reports on an interdisciplinary study in which a number of different research methods are applied. These research methods are complementary: each and every research method has its specific limitations, and multiple methods are required to overcome the limitations of these individual methods in order to achieve the research objectives and answer the research questions.

For example, a *literature study* can be used to identify the diverse theoretical concepts that might be relevant for investor behavior, like the different needs investors may strive to satisfy by investing. Yet, an *empirical (survey) study* is necessary to determine whether real-life investors actually strive to satisfy these different needs, to estimate the relative importance of these different needs, and to investigate the possible consequences of striving to satisfy these different needs for these investors' decision-making behavior. Nonetheless, an *empirical (survey) study* cannot provide us with insights in the aggregate effects of the investors' resulting decision-making behavior on overall stock market dynamics. For such insights, other methods are called for, like *multi-agent social simulation*. The latter method allows a researcher to e.g., create an artificial stock market with investor agents that use empirically plausible trading and interaction rules and to observe the overall stock market dynamics that result from the trades and social interactions between the investor agents. Nevertheless, to estimate the empirical plausibility of the simulated stock market data, a comparison has to be made between the simulation-generated data and the real-life data using e.g., *econometric analyses*.

To summarize, the research methodology of this thesis can be broken down in three main parts with strong connections between the consecutive parts:

1. A literature study.
2. A survey study with corresponding data analysis.
3. A multi-agent social simulation (computer) model with corresponding experiments and data analyses.

In the upcoming sections, each of the methods listed above will be briefly introduced. A more in-depth discussion of these methods and the relevant literature can be found in later chapters of this thesis in which the findings of this thesis are also presented.

### **1.5 Literature Study**

In order to achieve a clear understanding of the current state of the literature on individual investor behavior and concepts that might be relevant for this behavior, an extensive literature study was performed. Scientific journals in finance, behavioral finance, marketing, consumer behavior, economic psychology, sociology, psychology and social-psychology were filtered for concepts such as (individual) investor behavior, investors' needs, conformity behavior, social influence, stock market dynamics, herding processes, informational cascades, and a variety of stylized financial market facts.

Based on this literature study, we identified a gap in the literature as discussed in section 1.2 which this thesis aims to narrow. Moreover, in line with the first research question, a number of specific hypotheses on the interrelationships between the most important concepts were formulated. Subsequently, using a survey study we collected primary data to empirically test these hypotheses.

### **1.6 Survey Study**

To examine the relationships that are represented in the hypotheses, an online questionnaire was developed and administered in 2005-2006. We collected data on e.g., investors' importance of different personal needs, their level of investment-related knowledge and experience, their propensity for conformity behavior, the role other investors in their social networks and investment experts play in their decision-making behavior, numerous transaction and portfolio related information, as well as several descriptive characteristics, like the respondents' age and gender.

To allow for suggestions on the structure of the questionnaire as well as to assess the content and face validity of the questionnaire (Mitchell, 1996), several consumer behavior and investment experts were consulted. Moreover, before using the questionnaire to collect final data, it was pilot tested amongst 78 Bachelor and Master Students of the University of Groningen.

The final questionnaire was distributed online. Visitors of 4 well-known Dutch investment-related websites were asked to complete the questionnaire. These websites offer a wide range of investment-related information, as e.g., analysts' reports on overall market developments or individual stocks, and financial news items. Moreover, they feature online discussion groups and provide access to

online trading systems. These characteristics made visitors of these websites an appropriate respondent group.

Before completing the questionnaire, it was made clear to all participants that it was a non-commercial academic study and that under no circumstances their individual data would be made available to any third party. It was, moreover, possible for respondents to complete the questionnaire anonymously. For some more sensitive questions, for example with regard to the respondent's portfolio size and their age, it was indicated that these questions did not need to be answered. In these instances, missing answers did not lead to deletion of the questionnaire. In all other cases, incomplete questionnaires were deleted, after which 486 questionnaires remained for further analysis.

After the data were collected, diverse descriptive statistical techniques were used to get an insight into the characteristics of the respondents. Moreover, diverse inferential statistical techniques like multiple regression analyses were used to test the hypotheses.

The survey study as described above was capable of greatly improving our knowledge of micro level investor behavior. Yet, the statistical techniques that were used in this study, like for example regression analyses, have a number of limitations. Most importantly, they are less suitable to investigate the dynamical properties of the interactions between micro level investor behavior and macro level stock market dynamics which are central to the second and third research question.

Multi-agent social simulation, however, does not suffer from these limitations and is an excellent method to study these interactions.

## 1.7 Multi-Agent Social Simulation

The complexity of the relationship between the micro and macro level makes it practically impossible to study this phenomenon in the real world. A common solution to this problem is to create a *model* of this *target* (Doran & Gilbert, 1994; Zeigler, 1976) (the target being the real world micro-macro level relationships), which is simpler to study than the target itself (Gilbert & Troitzsch, 1999). Notwithstanding the fact that models are always simplifications of real-life targets, the model and the target should be sufficiently similar for the conclusions drawn about the model also to apply to the target.

In this thesis, we apply a multi-agent social simulation methodology in which the model of the target is a computer program of investor behavior, which we will call an artificial stock market. Running this program is called *simulation* and results in simulated data on e.g., stock market returns over time. After each simulation run, the similarity of this data to real-life stock market data will be observed.

In general, social simulation as a research method has a number of valuable features for social science research (Gilbert & Troitzsch, 1999). First, it is well adapted to developing and exploring theories concerned with social processes and



capable of representing dynamic aspects of change. Second, it can help with understanding the often complex relationship between the attributes and behavior of individuals (the micro level) and aggregate effects on a higher level of abstraction (the macro level).

A recurring theme of social simulation research therefore is that even when agents are programmed with very simple rules, the aggregate behavior of the agents can turn out to be highly complex. Complexity theory aims to develop general results about such nonlinear systems (Kauffman, 1995; Lewin, 1999; Waldrop, 1992) and one of the most important ideas that came from this interdisciplinary field is a formal notion of emergence. Emergence occurs whenever interactions among objects at one level give rise to different types of objects at another level: a phenomenon is emergent if it requires new categories to describe it which are not required to describe the behavior of the underlying components (Gilbert & Troitzsch, 1999: 10).

Amongst other things, nonlinearities are thought to play a role in eye-catching phenomena like landslides and stock market crashes. The only generally effective way of exploring nonlinear behavior is to simulate it by building a model and then running the simulation. Yet, even when one can get some understanding of how the nonlinear systems work, in principle they remain unpredictable. That is, no matter how intensively one studies the properties of sand or stock markets, it will remain impossible to predict the (exact) timing of landslides or stock market crashes. Therefore, when working with complex systems in which nonlinearities play an important role, one should focus on understanding instead of prediction. Complexity theory illustrates that even if researchers would have a complete understanding of all the factors affecting individual actions, this would not be sufficient to predict the behavior of a group or institution (Conte & Castelfranchi, 1995).

The general developmental path of computer simulation in the social sciences was more or less parallel to that of the introduction of computers in university research in the early 1960s. The early models mainly consisted of discrete event simulation and system dynamics. Initially, these early models, like the Club of Rome studies on the future of the world economy (Meadows et al., 1992; Meadows et al., 1974), gave simulation an undeserved poor reputation when it became clear that the results of these models depended very heavily on the specific quantitative assumptions that were made about the models' parameters, and the fact that many of those assumptions were backed by rather little empirical evidence. Another reason for the somewhat difficult start of computer simulation in the social sciences was that the early work focused on prediction, while in general social scientists tend to be more concerned with purposes of understanding and explanation of the specific phenomena under study (Gilbert & Troitzsch, 1999).

Apart from microsimulation, little was heard about simulation during the 1980s (Gilbert & Troitzsch, 1999). During the 1990s, however, this situation changed radically as a result of the development of multi-agent social simulation models (see e.g., Axelrod (1997a)). These models have a number of specific advantages, which make them particularly appropriate for social science research and the

topics that are dealt with in this thesis. Amongst the advantages that these models have to offer are (1) the ease with which it is possible to limit agent rationality, (2) the facilitation of heterogeneity in the agent population, (3) the possibility of generating an entire dynamical history of the processes under study, and (4) the ease with which it is possible to have agents interact in social networks (Axtell, 2000).

Multi-agent simulation models are a specific instance of agent-based modeling (ABM). ABM differs from other simulation methods on a number of aspects, and can be used to study research questions which feature complex systems with numerous interdependencies and nonlinear interactions (Garcia, 2005). Garcia (2005) summarizes the differences between ABM and non-agent-based simulation methods, noting that ABM as a method to study complex adaptive systems is not a competitor to ordinary causal models, but rather fulfills a complementary task. ABM's objective is to build theory, increase the understanding of established findings, and assist in identifying previously unexplained causalities, instead of representing a descriptively accurate or predictive model of the studied phenomenon per se. The three main differences between ABM and other simulation methods are (Garcia, 2005):

1. In ABM, the primary unit of study is the agent or individual. Agents are heterogeneous entities that interact with other agents and/or their environment in a repetitive process from which macro trends and behavior evolves.
2. ABM focus on the adaptiveness of the agents as heterogeneous individuals at the micro level within the larger system that can adapt at their own pace and in their own unique way to macro level changes. Heterogeneous agents allow a more realistic representation of real-world phenomena than models that assume homogeneity or agents that follow some kind of average behavior as in for example the representative agent approach (Kirman, 1992).
3. ABM are easy to use by non-computer programmers, without the need to understand differential equations, integrals, or even statistics. However, a basic level of computer programming skills is both helpful as well as advisable.

To summarize, multi-agent social simulation should in general not aim to create exact copies of real-life systems, but should rather focus on exploring the consequences of various contingencies and should be seen as a tool for theory-refinement as described by e.g., Bonabeau (2002).

In the next section, we will discuss how the different research methods of this thesis are combined and how the different chapters contribute to achieving the research objectives as well as answering the research questions. This is done by giving an overview of the organization of this thesis.

## **1.8 Organization of this Thesis**

In order to achieve the research objectives and to answer the research questions, this thesis is organized in a number of different chapters. Chapters 2 and 3 contribute to achieving the first research objective and answering the first research question. Chapters 4 and 5 contribute to achieving the second research objective and answering the second and third research question, respectively. Chapters 2 and 3 are empirically oriented and present the results of our investment survey. Chapters 4 and 5 present two multi-agent social simulation models that are used to improve our understanding of the dynamical properties of the interactions between micro level individual investor behavior and macro level stock market dynamics. In the following, we will briefly outline the content of each of these chapters.

### **Chapter 2**

In chapter 2, we present the first results from our empirical study. The goal of this chapter is to empirically prove whether real-life investors do actually care about more than risk and expected returns as has been argued by the recent behavioral finance literature. This literature states that investing may offer expressive benefits like status and social responsibility besides utilitarian benefits such as low risk in combination with high expected returns (Fisher & Statman, 1997; Statman, 1999; 2004). Yet, there have been no reports in the literature of empirical studies on this topic. We therefore contribute by performing a survey study on the different needs investors aim to satisfy by investing. This investment survey made a fine-grained distinction between these different needs and showed important differences for male and female, old and young investors, and investors with a high level of investment-related knowledge and experience and investors with a low level of investment-related knowledge and experience. In general, it was found that the investors that participated in our investment survey cared about more than only risk and expected returns. Although financially oriented needs were rated as very important, more socially oriented needs and needs focused at investing as a nice free-time activity were also reported to be important.

### **Chapter 3**

In chapter 3, we perform a number of more elaborate analyses on the data that was obtained from the empirical study. In this chapter, the effects on investors' decision-making behavior of the importance of the different needs they may strive to satisfy, as well as their level of investment-related knowledge and experience were investigated. More specifically, using regression analyses, we investigated the effect of the before-mentioned factors on investors' conformity behavior. It was found that individual investors that gave a greater importance to socially oriented needs or had lower levels of investment-related knowledge and experience had a greater propensity to perform both more informational

conformity behavior as well as more normative conformity behavior. Exact definitions of these two concepts can be found in chapter 3.

The second research objective and the second and third research questions focus on the aggregate effect of investors' decision-making processes as investigated in the chapters 2 and 3 on overall stock market dynamics. Yet, as explained in previous sections of this introduction, empirical (survey) studies and the accompanying statistical analyses are less suitable methods to answer these types of questions. To answer these types of questions and achieve the second research objective, other methods are called for, like multi-agent social simulation. In chapter 4 and 5, multi-agent social simulation is applied to answer the before mentioned research question and achieve the before mentioned research objective, respectively.

#### Chapter 4

In chapter 4, the model of investor behavior by Day and Huang (1990) is re-formalized in a multi-agent social simulation environment. This specific model is a representative example from a class of models in which so-called 'rational' traders, often called *fundamentalists*, are let to interact with so-called 'irrational' traders, which in alternation have been called *chartists*, *technical analysts*, or *noise traders* and which subsequently observes the stock market dynamics that result from these market interactions (Hommes, 2006; LeBaron, 2000). These types of markets illustrate how simple interactions at the individual, micro level can cause sophisticated structures and emergent phenomena at the aggregate, macro level.

In this specific model, the fundamentalists base their investment decisions upon market fundamentals and expect the asset price to move towards its fundamental value and buy (sell) assets that are undervalued (overvalued). In contrast, the chartists or technical analysts are more socially oriented and look for simple patterns, like for example trends in past prices and base their investment decisions upon extrapolation of these historical patterns.

More specifically, in chapter 4 the model of Day and Huang (1990) was used to investigate the effect on the stock market price and returns dynamics of changing proportions of 'rational' investors who are mainly interested in the fundamentals of a stock versus socially oriented trend following investors, changing sizes of the investor population, as well as the effect of heterogeneous versus homogeneous investor populations. It was found that increasing the proportion of socially oriented trend following investors or the size of the investor population leads to increasingly volatile stock market price and returns dynamics. Moreover, markets populated by homogenous investors following identical investment strategies reached higher levels of volatility earlier than markets that were populated by heterogeneous investor populations.

Yet, even after we made a number of modifications to the original model specification, the model inspired by Day and Huang (1990) has a number of limitations, which justified the development of a more realistic multi-agent social

simulation model of investor behavior. In chapter 4, these limitations will be discussed more extensively.

## **Chapter 5**

In chapter 5, we present a model on investor behavior that takes the limitations of the model as discussed in chapter 4 into account. Most importantly, this model, called SimStockExchange™<sup>1</sup>, uses more realistic agent rules that are derived from the empirical studies of which the results were reported in chapters 2 and 3. Moreover, SimStockExchange allows for far more elaborate processes of social interaction to take place amongst the investor agents.

More specifically, in this chapter we give a practical example of the possible combination of empirical micro and macro level data, theoretical micro and macro level perspectives, and a multi-agent social simulation approach in the development of an artificial stock market. In this artificial stock market, investor agents make investment decisions using empirically estimated decision rules and socially interact in different social network structures. From these market interactions, macro level price and returns time series result, which are subsequently compared to empirical macro level data. These comparisons illustrated the agreement between the simulated market data and real market data with regard to a number of stylized financial market facts and also pointed out a number of opportunities for future research.

## **Chapter 6**

In chapter 6, we will draw a number of overall conclusions based on the previous chapters, summarize the results of this thesis and outline possibilities for future research.

### **1.9 Included Publications**

The chapters in this thesis are based on papers that are either published, accepted for publication, or currently under publishing consideration. Consequently, each of these chapters is readable as an individual contribution. Yet, the chapters are

---

<sup>1</sup> More information and a downloadable demonstration version of this model can be found at [www.simstockexchange.com](http://www.simstockexchange.com).

closely related and should preferably be read in the included order. The chapters are based on the following papers (with the corresponding chapter numbers), respectively:

**Chapter 2:**

- Hoffmann, A. O. I. (2007). Individual Investors' Needs and the Investment Professional: Lessons from Marketing. *The Journal of Investment Consulting*, 8 (2), 82-93.

**Chapter 3:**

- Hoffmann, A. O. I., Von Eije, J. H., & Jager, W. (2006b). Individual Investors' Needs and Conformity Behavior: An Empirical Investigation. SSRN Working Paper Series No. 835426.

**Chapter 4:**

- Hoffmann, A.O.I. & Jager, W. (2005). The Effect of Different Needs, Decision-making Processes and Network Structures on Investor Behavior and Stock Market Dynamics: a Simulation Approach. *ICFAI Journal of Behavioral Finance*, 2, 49-65.

- Hoffmann, A. O. I., Delre, S. A., Von Eije, J. H., & Jager, W. (2005). Stock Price Dynamics in Artificial Multi-Agent Stock Markets. In: P. Mathieu, B. Beaufils, & O. Brandouy (Eds.), *Artificial Economics: Agent-Based Methods in Finance, Game Theory and Their Applications* (pp. 191-201). Heidelberg: Springer Verlag.

- Hoffmann, A. O. I., Delre, S. A., Von Eije, J. H., & Jager, W. (2006a). Artificial Multi-Agent Stock Markets: Simple Strategies, Complex Outcomes. In: C. Bruun (Ed.), *Advances in Artificial Economics: The Economy as a Complex Dynamic System* (pp. 167-176). Heidelberg: Springer Verlag.

**Chapter 5:**

- Hoffmann, A. O. I., Jager, W., & Von Eije, J. H. (2007). Social Simulation of Stock Markets: Taking it to the Next Level. *Journal of Artificial Societies and Social Simulation*, 10 (2).

