Herding by Mutual Fund Managers in the Athens Stock Exchange

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Abstract:

Behavioural finance is a paradigm receiving great attention in the last decades and shaking the foundations of modern finance. A broadly discussed behavioural bias is herding, i.e. the tendency of investors to imitate each others' decisions. Herding is a phenomenon with far-reaching implications for financial markets, but its importance becomes even larger if it is exhibited by institutional investors. The present study attempts to investigate whether mutual fund managers in Greece herd when investing in the Athens Stock Exchange in the period 2001 – 2006. For this purpose, semi-annual portfolio holdings of 31 mutual funds are analysed using the methodology proposed by Lakonishok et al. (1992). The study concludes that mutual fund managers undoubtedly herd, with the extent of herding being irrelevant to the price movements observed in the market. Managers herd primarily when they trade in large capitalisation stocks or stocks that belong to the most "famous" indices.

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1. Introduction

Finance has traditionally been based on a specific set of assumptions regarding human behaviour. These assumptions, known as the VM (Von Neumann and Morgenstern) axioms, are highly questionable as a mode of behaviour, because they imply that investors are totally keen, penetrating and rational in calculating the numbers that are required for making investment decisions (Frankfurter and McGoun, 2001). Nevertheless, due to their simplicity and suitability for advanced mathematical models, these assumptions have formed a foundation that had not been questioned for several decades. This approach is termed "traditional finance" and its cornerstones are the Expected Utility (EU), the Efficient Market Hypothesis (EMH) and the Capital Asset Pricing Model (CAPM) paradigms. Today, this point of view is less widespread and it has become less plausible. The reasons are the extraordinary events of the last two decades of the twentieth century and primarily the emergence of a new approach (De Bondt, 2004).

The new approach attempts to reconsider the concept of the "homo economicus" altogether. The supporters of this point of view state that finance needs to be redefined so that it reliably represents the actions of real people. According to Frankfurter et al. (2004), the limitations of the traditional model have become too obvious to be ignored. This line of thought has been called "Behavioural Finance" by its supporters and draws many of its concepts from psychological findings regarding human behaviour. Limits to the exercise of arbitrage that have been documented (Barberis and Thaler, 2002) further question the validity of the main argument of the traditional approach, namely that deviations from the model's prescriptions will quickly disappear. Although heavily disputed and still controversial (opponents of the theory call it "the anomalies literature") Behavioural Finance (BF) is an idea that has shaken the very foundations of the traditional finance theory. BF does not refer to a single mode of human behaviour in order to explain phenomena, but rather on different human responses to various circumstances. Therefore, many different modes of behaviour that deviate from the prescriptions of traditional finance have been formed into categories explained by specific psychological traits. One interesting phenomenon is termed "herding" and refers to the tendency of people to imitate each other for various (rational or irrational) reasons when making decisions (Lemieux, 2003, 2004).

Herding becomes more important if such behaviour is exhibited by finance professionals and experts, since they are purported to be the most "rational" and "efficient" persons according to the traditional approach. Should these individuals not verify the traditional approach with their behaviour, the paradigm cannot hold at all. Several studies have been conducted to investigate the presence of herding by institutional investors and other professionals and the results might be considered controversial.

The present study attempts to investigate whether institutional herding can be established for mutual fund managers active in the Athens Stock Exchange (or

ASE). For this purpose, the semi-annual holdings of 31 mutual funds trading in the ASE between 2001 and 2006 have been gathered from the mutual fund management companies and the data have been analysed according to the methodology proposed by Lakonishok et al. (1992). The analysis confirms the existence of mutual fund managers' herding in the ASE throughout the period under examination. Furthermore, herding behaviour is documented primarily for large capitalisation and more renowned shares, leading to a set of questions regarding the quality and maturity of the market.

The remainder of this paper is structured in the following manner. Section 2 reviews theoretical concepts and empirical findings regarding Behavioural Finance and especially herding. Section 3 presents the purpose, the sample and the methodology of the research conducted. Section 4 provides the statistical analysis and the empirical results and Chapter 5 concludes the paper with the most important findings and limitations of the presented research.

2. Literature Review

A main accusation of the traditional paradigm proposed by the supporters of BF is the lack of testability and predictive power of the traditional models, due to the unrealistic assumptions (Mullainathan and Thaler, 2000; Shefrin, 2001a, 2001b; Kirman and Tuinstra, 2005). These features are considered the cornerstones of a modern science. On the other hand, their opponents typically claim that behavioural models are based on ambiguous assumptions of irrationality that cannot be disciplined by rigorous mathematics, leading to models that lack testable predictions of market behaviour (Brav et al. 2004). They also declare that, since the psychological biases that can be used to build behavioural models are numerous, it is difficult to distinguish data mining from genuine patterns (Chen, 2004).

There are, nevertheless, behavioural biases that have been documented and acknowledged by both sides. In this case, the emphasis lies on whether these biases are persistent and moreover on whether they affect the market structures and prices. Should these modes of behaviour be unable to cause stable deviations from the predictions of the traditional paradigm, there is no need for further examination, since the EMH does allow for short-term divergences in the market that are corrected (and exploited) by the "rational" investors. However, should long-term deviations appear, the expected utility model is at peril (Stangle, 2005).

One of the biases that claim to lead to persistent mispricing is called herding. Herding refers to the human tendency to imitate the behaviour of others, which leads to a group of people acting in a similar way (Lemieux, 2003, 2004). Herding can be a temporary "irrational" mode of behaviour by an individual, without further implications for the market, but it is often a very "rational" choice on the individual level, although it establishes a distinct deviation from the rational expectations paradigm. For example, herding behaviour exhibited by market

participants has been proposed as the reason for the heavy tails observed in the distribution of stock market returns (Cont and Bouchaud, 2000).

Several reasons for rational herding have been proposed. These can be categorised into imperfect information, reputational concerns and compensation structures, although these categories are interdependent factors of herding (Bikhchandani and Sharma, 2000). The first type of herding can be assumed to apply primarily for individual investors, while the other two broad categories are usually linked to institutional investors (Sias, 2004).

The most usual phenomenon based on imperfect information is cascading, i.e. the situation where an investor is influenced by others acting before him and decides to undervalue or even ignore his own (private) information and estimation (Hirshleifer and Teoh, 2003).

Herding becomes a very interesting phenomenon if it can be traced in the behaviour of institutional investors, because this type of investor makes up a large proportion of the trading volume and their behaviour affects market prices. Furthermore, professionals, who are purported to be extremely rational, knowledgeable and keen according to the criteria of the "rational investor" referred to by the EMH paradigm, manage the funds. Should these investors exhibit behavioural biases, there is hardly any person left to prove that the models proposed by the traditional school of thought are realistic (Keim and Madhavan, 1995). For these reasons, institutional herding is considered and evaluated separately as a matter for discussion (Sias, 2004).

Institutional investors may herd not so much because of imperfect information, although this might happen as well, but primarily (and for the long term) due to reputational concerns (Bernhardt et al. 2006) and compensation structures (Clarke and Subramanian, 2006). An investment manager will probably not face personal professional damage if he fails when the others have failed as well, but is very likely to lose his job if he significantly underperforms the market (Hirshleifer and Teoh, 2003). Consequently, this could lead to permanent behavioural biases for the investment managers, since a risk-averse manager has a large incentive to follow the market consensus to avoid professional implications.

There are many studies concerning the presence of herding in different markets and its potential impact on asset prices, which do not always reach the same conclusions.

Chevalier and Ellison (1999) argue that the loss of investment managers' job is more performance-sensitive for younger managers, which gives younger managers a stronger incentive to avoid unsystematic risk and to herd into more popular stocks.

Nofsinger and Sias (1999) document strong positive correlation between changes in the portfolio holdings of institutional investors and returns measured over the same period. Their results suggest that institutional investors positive-feedback trade more than individual investors and that their herding behaviour has a larger impact on stock prices than that of individual investors.

Wermers (1999) analyses the trading activity of mutual funds to determine whether funds herd when they invest in shares and to investigate the impact of herding on share prices. Although mutual funds do not seem to herd substantially in the average share, since little such evidence is found, the levels of herding are much higher in trades of small shares and in trading by growth-oriented funds.

Oehler and Chao (2000) analyse herding by institutions in the German bond market and their results resemble the conclusions of studies in the stock market, i.e. that there is only weak evidence of herding in individual bonds, while market-wide herding appears to be a relevant phenomenon. However, the degree of herding is generally lower than in the stock market, which can probably be attributed to the big variety of bonds.

Iihara et al. (2001) use long-term data to examine the presence and effect of herding in the Tokyo Stock Exchange and conclude that both herding by institutions and herding by foreign investors affect stock prices.

Hwang and Salmon (2001) use a linear factor model based on the cross-sectional standard deviation of the factor loadings of the individual assets. Their model is used to examine the US, UK, and South Korean stock markets and find that herding toward the market returns is heavily affected by the Asian and Russian Crises in 1997 and 1998, respectively. Their study also suggests that advanced markets such as the US and UK are subject to smaller degrees of herding than emerging markets such as South Korea, which is explained by a larger degree of information asymmetry between investors in emerging markets than in advanced markets.

Lobão and Serra (2002) concern themselves with the level of herding in the trades of Portuguese mutual funds. The overall level of herding observed in the market is very significant. The level of herding remains fairly constant over time or when a minimum number of funds to trade a given stock is imposed and it is significant in both sides of the market, purchases and sales. The average level of herding for Portuguese mutual funds is much higher than that found for the US and the UK mutual funds in previous studies, which suggests that herding is higher on more volatile markets.

Kyröläinen and Perttunen (2003) examine momentum trading and herding of both active and passive investors during the information technology (IT) stock bubble period of 1997-2000 in Finland. They find that primarily large active investors engage in momentum trading. Active investors in general also tend to herd when taking their trading decisions, with their tendency to herd increasing monotonically every year.

Hwang and Salmon (2004) propose an approach for the detection and the measurement of herding based on the cross-sectional dispersion of the factor sensitivity of assets. This method enables them to examine the presence of herding towards particular sectors in the market, including the market index itself. Furthermore, they claim to be able to critically separate such herding from common movements in asset returns caused by changes in the fundamentals. They find that

herding towards the market shows significant movements for the US and South Korean stock markets and appears to be persistent independently from any given market conditions. There is also evidence of herding towards the market portfolio both when the market is rising and when it is falling.

Fong et al. (2004) utilize a database of daily trades and monthly portfolio holdings of active Australian equity managers to examine herding by institutional investors. The data suggest that active managers herd more when selling stocks, when trading in small stocks, and when moving between industries. They also find some evidence of leader-follower relationships; in particular, managers tend to follow those managers with higher past performance.

Sias (2004) finds that institutional investors appear to be momentum traders. Only little of their herding behaviour, however, can be considered a result of momentum trading. Moreover, demand by institutions is more strongly related to lag demand by the institutions than lag returns. Institutional herding declines with time and seems to differ across capitalizations and types of investors.

Chang and Dong (2005) use Japanese data and offer evidence at both portfolio and firm level that variations in firm idiosyncratic volatility are related to behavioural as well as fundamental factors. They find strong evidence that shares of firms subject to institutional herding have high idiosyncratic volatility and that the relationship between herding by institutions, firm earnings and idiosyncratic volatility remains significant in a joint regression.

Massa and Patgiri (2005) test the theory of managerial herding based on reputational and career concerns by focusing on the mutual fund industry and studying how incentives included in managers' contracts affect the magnitude of risks taken by managers and their herding. They argue that reputation and career concerns induce managers to herd and that compensation seems to contrast this tendency. A compensation structure with greater incentives might induce managers to enter categories with less effective herding and to adopt trading strategies different from their peers, thereby taking more risk.

Voronkova and Bohl (2005) investigate the degree of herding by pension fund investors and whether they engage in feedback trading behaviour as well as their effects on prices in the developing stock market of Poland, where such investors face limitations in their investment activity. The values of herding and positive feedback trading for Polish pension funds found are considerably higher than the corresponding values reported for mature markets; these findings are attributed to the local regulatory framework that includes relative performance evaluation and penalties and the high concentration in the Polish pension fund industry. Herding is detected in both past winners and past extreme losers; however, they do not find a significant effect on the prices of Polish stocks due to herding and positive feedback trading by the institutions.

Sharma et al. (2006) examine the behaviour of institutional investors during the internet bubble and crash of 1998-2001 in the US and its impact on stock prices. They find that all types of institutions displayed herding behaviour into internet

stocks during the bubble with a high intensity. Most importantly, they also find positive excess returns contemporaneous with institutional buy herding and negative abnormal returns (reversals) at the cease of the herding. This finding suggests that institutions' herding behaviour created temporary price pressures, thereby probably contributing to the bubble.

On the other hand, there are also studies denying the existence or influence of herding in stock markets, as for instance, Chang et al. (2000) for the US and Hong Kong markets, Henker et al. (2003) for the Australian stock market, and Demirer and Kutan (2006) for both Chinese markets (Shanghai and Shenzhen).

3. Research Method

3.1 The Purpose of Study
The present study aims to investigate the presence of herding in the trading behaviour of institutional investors in the Athens Stock Exchange. More specifically, the focus is on herding by managers of mutual funds available to Greek private investors. The importance of herding by this subgroup of "traders" has been documented previously. Another major reason why this issue is of interest lies in the fact that similar studies in different countries have led to contradictory results; there appears to be a tendency of higher levels of herding in less mature financial markets. Furthermore, no such study has yet been conducted for Greece (to the knowledge of the authors).

Empirical research distinguishes between two types of herding in stock markets (Oehler, 1998): stock-picking herding, which refers to the tendency of managers to buy or sell a particular stock at the same time, and market-wide herding, which is the tendency to be on the same side of the market in general (buying or selling) without focusing on each stock separately. The second type of herding is a broader definition, which can be disputed by opponents of the behavioural finance theory; the fact that open-end mutual funds have to invest the capital entrusted every time there is an inflow may lead to a buying position that does not constitute herd behaviour (and the opposite). In this study, only stock-picking herding is considered, so the hypothesis tested can be stated in the following way:

H0: No stock-picking herding occurs in the behaviour of mutual funds in the ASE.
H1: Stock-picking herding occurs in the behaviour of mutual funds in the ASE.

This hypothesis is tested initially for the market as a whole (for all stocks), but it is considered informative to further examine the presence and magnitude of herding in particular sub-groups of the market. These sub-groups are the large capitalisation shares (the way they are defined by the ASE), the small and medium capitalisation shares, the shares that constitute two well-known indices of the

market, i.e. the General Index and the FTSE 20 index, and the shares in each of the seventeen industries identified by the governing body of the ASE. The results are then evaluated in comparison with the results for the market.

3.2 The Sample

The list of mutual fund management companies (henceforth, MFMC) provided by the "Association of Greek Investment Companies and Mutual Fund Management Companies" or, as it is usually abbreviated, "Association of Greek Institutional Investors" (henceforth, AGII) and containing twenty-five firms (at September 30th 2005) was utilised as the starting point for the data collection process. All open-end MFMC legally operating in Greece are members of the AGII. To reduce the amount of work necessary for the purpose of this research, firms with a market share of less than 0.30 percent of the total volume of funds managed at both January 1st 2005 and September 30th 2005 were excluded from the sample, leaving seventeen firms and 98.71 percent of the market to be considered. One of the MFMC (namely, Social Security Organisations MFMC) is responsible for managing the funds of the public insurance and pension funds and institutions and therefore does not resemble the other firms. Out of the remaining sixteen companies, seven responded to the request for data of their mutual funds (45.41 percent of the funds managed and 47.33 percent of the funds to be considered). The other nine firms chose either not to respond to the request or to allege the absence of a database of the data requested. Table 1 provides a list of the twenty-five firms, their relevant market shares and the availability of data concerning the mutual funds they manage. Since the study focuses on herding in shares, only mutual funds investing a significant proportion (over 10 percent) of their resources in shares were considered.

Table 1. Overview of the Mutual Fund Management Companies (MFMC) active in Greece, their market shares (September 30th 2005) and their response to the request for data

Name	Number of Funds	Market Share (%)	Provision of Data
Alico AIG MFMC	16	1.76	New company without sufficient data
Allianz MFMC	10	1.18	Data available
Alpha Asset Management MFMC	25	17.28	Data available
Alpha Trust MFMC	12	1.20	Data available
Aspis International MFMC	10	0.78	New company without sufficient data
ATE MFMC	10	2.50	No response to request
Attica MFMC	6	0.29	New company without sufficient data
Diethniki MFMC	21	23.21	Data available
EFG MFMC	35	33.02	No response to request
Egnatia MFMC	8	0.44	New company without sufficient data
European Reliance MFMC	8	0.23	Market share less than 0.30%
Greek Postal Savings Bank & Hellenic Post MFMC	3	0.22	Market share less than 0.30%
Hellenic Trust MFMC	8	0.44	New company without sufficient data
Hermes MFMC	11	8.05	Data available
HSBC (Hellas) MFMC	10	2.20	Data available
ING Piraeus MFMC	12	2.23	No data – absence of database
International MFMC	7	0.34	Data available
Kyprou MFMC	5	0.81	No response to request
Laiki MFMC	4	0.16	Market share less than 0.30%
Marfin MFMC	10	0.09	Market share less than 0.30%
Omega MFMC	7	0.15	Market share less than 0.30%
P&K MFMC	12	0.50	No response to request
Social Security Organizations MFMC	2	2.77	Funds not traded publicly
Profund MFMC	3	0.09	Market share less than 0.30%
Proton MFMC	3	0.05	Market share less than 0.30%

The Greek legislation demands that these companies publish every six moths (at June 30th and December 31st) a detailed report of their portfolio holdings resembling a balance sheet. This data is the only publicly available reports of the investment decisions made by the funds' managers. Attempts to attain further data – data referring to direct investment decisions or to shorter intervals – addressed to some companies were rejected with the explanation that it would create much work and harm the companies' interests. The study utilised data concerning portfolio

holdings from June 30th 2001 to June 30th 2006, because holdings of earlier periods were not accessible for many of the firms in the sample and furthermore because the crash in 1999 and 2000 in the Athens Stock Exchange might lead to unreliable results regarding the herding behaviour exhibited. The mutual funds whose portfolio holdings formed the database for the study appear in Table 2.

Table 2. Mutual Funds forming the sample for the present study

MFMC	Mutual Fund
Allianz MFMC	Aggressive Strategy Domestic Equity Fund
	Domestic Balanced Fund (Unit Linked)
	Domestic Balanced Fund
	Domestic Equity Fund
Alpha Asset Management MFMC	Athens Index Domestic Equities Fund
	Domestic Equities Fund
	Domestic Balanced Fund
Alpha Trust MFMC	Selected Value Domestic Equity Fund
	Growth Domestic Fund
	New Enterprises Domestic Equity Fund
	Eurostar Domestic Balanced Fund
Diethniki MFMC	Blue Chips Fund
	Financial Domestic Equity
	Top-30 Domestic Equity
	Information & Technology (Hi-Tech) Domestic Equity
	Infrastructure & Construction Domestic Equity Fund
	Small Cap Domestic Equity Fund
	European Fund
	Balanced Fund
	"Syllogiko" Domestic Balanced
Hermes MFMC	Dynamic Domestic Equity
	Protoporos Domestic Equity
	Balanced Domestic
HSBC (Hellas) MFMC	Greek Equity Fund
	TOP 20 Greek Equity Fund
	Pan-European International Equity Fund
	Emerging Markets International Equity Fund
International MFMC	Equity Fund Domestic
	Domestic Balanced Fund
	Equities Selection Equity Domestic Fund
	Balanced Foreign Fund

Furthermore, data concerning the fluctuation of the General Index of the ASE, the composition of certain indices and the classification of shares into groups and industries by the Stock Exchange where necessary. This data was obtained from the ASE directly. Since the composition of the indices and the classification of shares are not constant throughout the period examined, those stocks that changed

categories at some point in the period where not taken into consideration when the focus was on specific groups.

3.3 Measured Variables

For the estimation of herding this study has utilized the measure proposed by Lakonishok, Schleifer and Vishny (1992), henceforth LSV. This measure determines initially those mutual funds that have been buyers and sellers of a share in a given period; the herding of the managers in a share i in the period t is then calculated as

$$H(i) = \left| \frac{B(i)}{B(i) + S(i)} - p(t) \right| - \left(\frac{n}{np(t)} \right) p(t)^{np(t)} (1 - p(t))^{n(1-p(t))}$$

(1), where H(i) is the herding in stock i in period t, B(i) is the number of mutual funds buying the stock in the period, S(i) is the number of mutual funds selling the stock, p(t) is the average change that an active fund is a buyer for all stocks in the period, i.e.

$$p(t) = E\left(\frac{B(i)}{B(i) + S(i)} \right)$$

, and n is the number of funds trading the stock in the period, i.e. n = B(i) + S(i). This function measures the herding in a particular stock (stock-picking herding), rather than the general tendency of the traders to be sellers or buyers in a certain period. The same measure has been utilised by a series of studies concerning herding for different markets and countries, sometimes with slight variations (e.g. Oehler, 1998, Wermers, 1999, Oehler and Chao, 2000, Lobão and Serra, 2002, and Voronkova and Bohl, 2005).

The function used for calculating herding may obviously lead to disputable results if certain considerations are not made. For example, a company going public or issuing new shares would probably appear to have more buyers than sellers, although this cannot be considered herding behaviour. The opposite would be the case for a firm that is acquired or undergoes a merger or even goes bankrupt. To mitigate the effect of such incidents, function (1) is not calculated for a share whenever such an incidence occurs, except for the case of a new issue of an already listed firm (because it was impossible to determine the effect of each such case). The same treatment occurs whenever only one fund is trading in a stock (n=1), because the calculation would overestimate herding.

4. Statistical Analysis - Results

The results of the analysis provide evidence of herding in the ASE as a whole, consistent with findings of other studies for developing markets. The H0 hypothesis is clearly rejected for all periods. The herding measures calculated are provided in table 3.

Table 3. Results of the data analysis for the market as a whole

| Semi-annual Period	Number of Shares Traded[a]	LSV Measure	Significance (Two-Tailed)
01.07.01 – 31.12.01	148	0.0934	0.000[b]
01.01.02 – 30.06.02	155	0.1010	0.000[b]
01.07.02 – 31.12.02	153	0.1197	0.000[b]
01.01.03 – 30.06.03	147	0.0544	0.005[b]
01.07.03 – 31.12.03	137	0.2194	0.000[b]
01.01.04 – 30.06.04	135	0.0941	0.000[b]
01.07.04 – 31.12.04	113	0.0541	0.018[c]
01.01.05 – 30.06.05	102	0.0623	0.007[b]
01.07.05 – 31.12.05	101	0.1624	0.000[b]
01.01.06 – 30.06.06	109	0.1029	0.000[b]

[a] The number of shares traded is the total number of all shares in which at least two mutual funds were active.
[b] LSV measure significant at the 99 percent significance level.
[c] LSV measure significant at the 95 percent significance level.

It should be noticed that, although stock-picking herding appears to be relatively weak, nevertheless it remains statistically significant at a 99 percent significance level for nine out of ten periods and at a 95 percent significance level for the other period. Therefore, the presence of herding in the ASE as measured with the LSV function cannot be disputed. The following graph demonstrates how the extent of herding changes from period to period and also presents the changes in the price levels observed in the ASE.

Graph 1. Comparison of LSV measure with price movements in the ASE
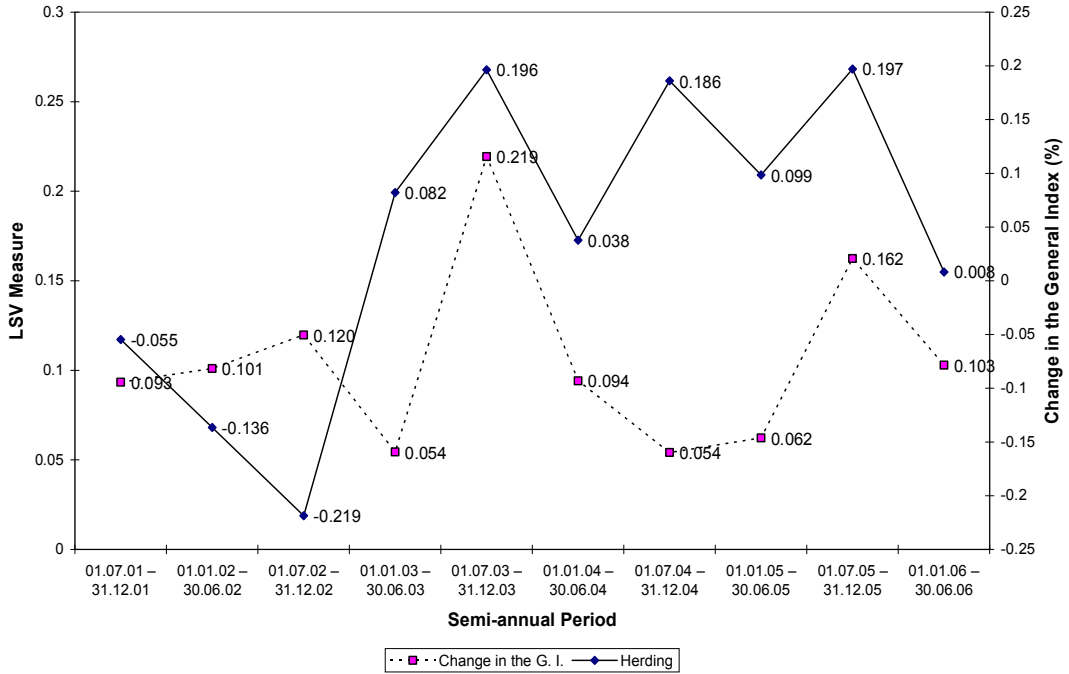
The above graph 1 reveals large fluctuations of herding with time. These fluctuations, contrary to other studies, cannot be (statistically) associated with the price movements in the market.

Further analyses attempt to identify the nature of the herding behaviour observed in the market. It can reasonably be assumed that managerial herding in shares of companies with little market capitalisation or in shares of firms that appear less in the financial news will occur primarily due to imperfect information and not due to reputational concerns. On the other hand, the opposite will probably be the case for shares with large market capitalisation or for shares that are more "famous" among financial investors, because information for these shares is plentiful. Therefore, shares are divided into large capitalisation shares and small and medium capitalisation shares and the herding measures are calculated for each group independently. The categorisation of the shares utilised is the one conducted by the Stock Exchange authorities. The following table displays the measures computed for each period compared with the market's measures.

Table 4. Comparison of herding measures for large capitalisation companies, small and medium capitalisation companies and the market

| Period	Large Capitalisation	Small & Medium Capitalisation	Market
01.07.01 – 31.12.01	0.1667 (0.000[a])	0.0168 (0.662[c])	0.0934 (0.000[a])
01.01.02 – 30.06.02	0.1520 (0.000[a])	0.0609 (0.062[c])	0.1010 (0.000[a])
01.07.02 – 31.12.02	0.1460 (0.000[a])	0.0538 (0.075[c])	0.1197 (0.000[a])
01.01.03 – 30.06.03	0.1251 (0.000[a])	-0.0225 (0.541[c])	0.0544 (0.005[a])
01.07.03 – 31.12.03	0.2073 (0.000[a])	0.2722 (0.000[a])	0.2194 (0.000[a])
01.01.04 – 30.06.04	0.1400 (0.000[a])	-0.0092 (0.812[c])	0.0941 (0.000[a])
01.07.04 – 31.12.04	0.0615 (0.017[b])	0.0200 (0.718[c])	0.0541 (0.018[b])
01.01.05 – 30.06.05	0.1053 (0.000[a])	-0.2726 (0.003[a])	0.0623 (0.007[a])
01.07.05 – 31.12.05	0.1907 (0.000[a])	-0.1773 (0.014[b])	0.1624 (0.000[a])
01.01.06 – 30.06.06	0.1433 (0.000[a])	-0.0026 (0.955[c])	0.1029 (0.000[a])

[a] LSV measure significant at the 99 percent significance level.

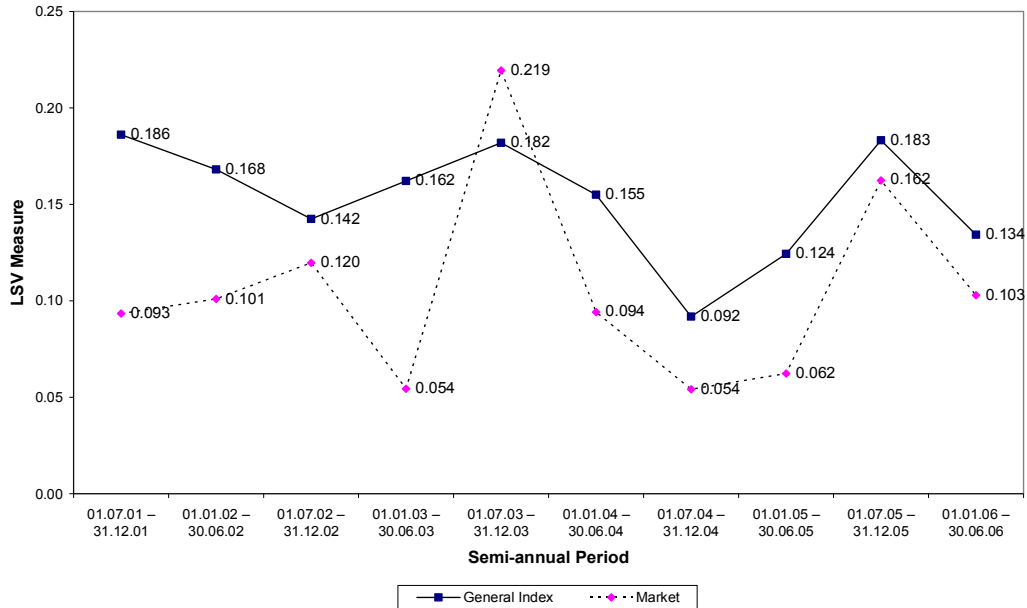[b] LSV measure significant at the 95 percent significance level.

[c] LSV measure not significant at an acceptable level.

From the above table it becomes obvious that the herding behaviour observed in the ASE can be attributed to the investment decisions regarding large capitalisation stocks. Small and medium capitalisation shares do not appear to be subject to herding, since only in one period the LSV measure can be conceptually explained and is statistically significant. The two other statistically significant values have no explanatory power, because they are negative. They are considered a result of the drawbacks of the LSV measure that have been identified previously. On the contrary, the herding measures for the large capitalisation firms are statistically significant in all periods and usually larger than those of the market. This is presented in graph 2:

Graph 2. Comparison of LSV measure for large capitalisation companies with the market's measure
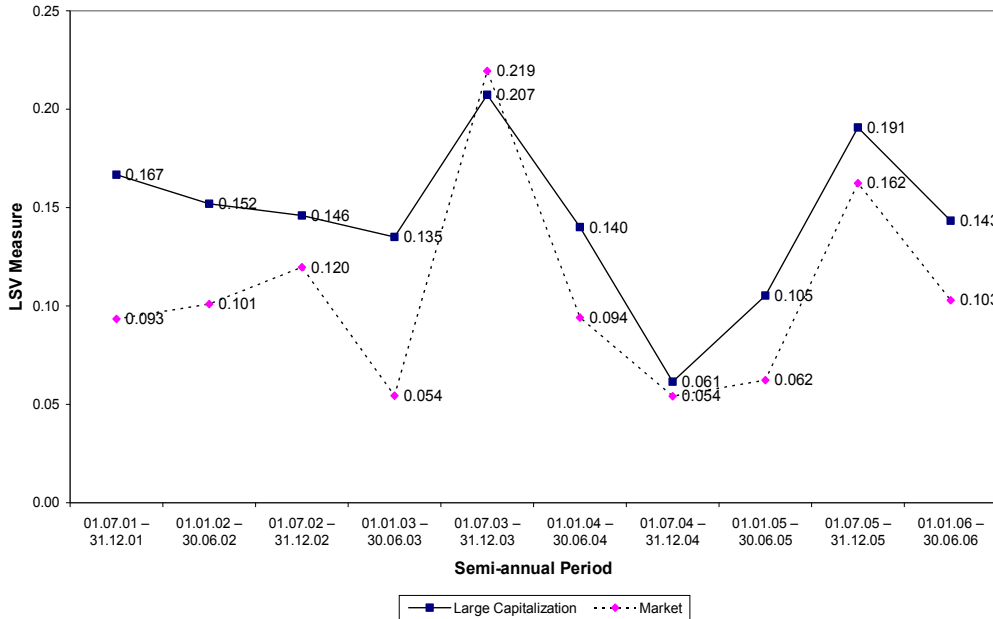

A further analysis conducted in order to identify the reasons for mutual fund herding in the ASE focuses on the trading behaviour concerning the shares comprising the two most renowned indices, the General Index and the FTSE 20 index. Although both indices primarily include large capitalisation shares, and the effect of the "size" of a firm has already been shown previously, the shares comprising the indices represent the "fame" of a share as a reason for better herding behaviour and provide additional information about the trading patterns of managers. The results of the analysis for the General Index are shown in Graph 3:

Graph 3. Comparison of LSV measure for the General Index with the market's measure

From the above graph 3 it can be concluded that herding in the General Index stocks is by far greater than that for the market as a whole. The measures calculated for the General Index are statistically significant at the 99 percent level for all periods. This graph displays that herding is greater for more popular shares, a finding strengthening the conclusion reached after comparing the herding measures for large capitalisation and small and medium capitalisation shares. In the following graph 4, the same analysis is presented for the FTSE 20 index.

Graph 4. Comparison of LSV measure for the FTSE 20 index with the market's measure
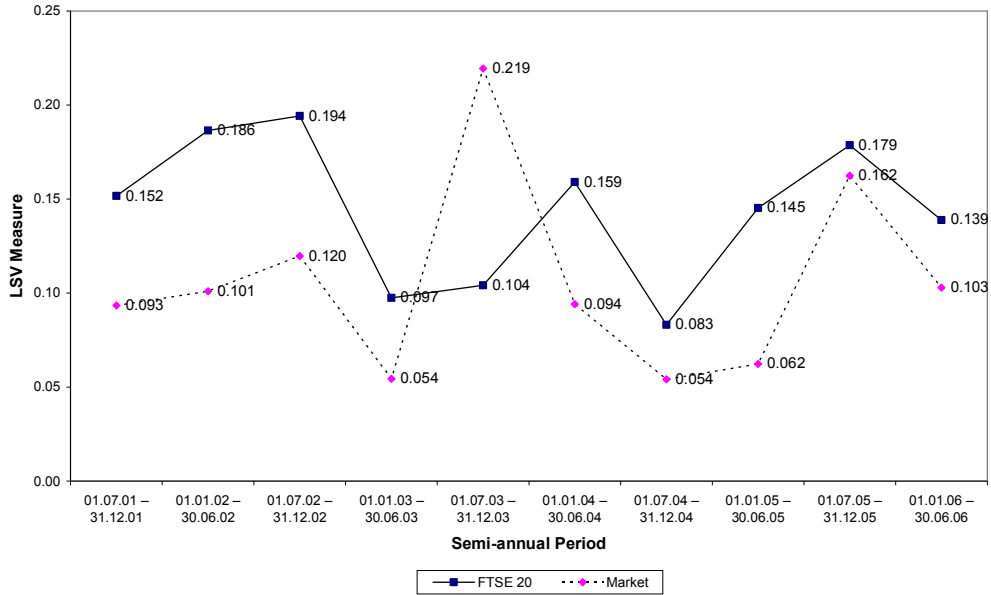
We notice here that the results are also similar with those discussed previously for the General Index (graph 3). All measures are statistically significant at the 99 percent level, except for the LSV measures for period 5, which is significant at the 95 percent level, and for period 7, which is significant at the 90 percent level. This may nevertheless be attributed to the small number of shares comprising the index. However, it is noticeable that herding in the FTSE 20 index appears to be slightly less intense than in the General Index; the General Index is older and more "famous" than the FTSE 20 index.

Finally, the attempt to examine the presence of herding in each sector, according to the categorisation of the firms performed by the governing body of the ASE, did not yield significant results, because the small number of shares in most industries did not permit any meaningful statistical analysis. The following table 5 presents the number of firms in each sector (only the firms whose category has not changed in the period under investigation are included).

Table 5. Industry sectors identified by the ASE and the number of companies in each sector

Sector	Average Number of Firms
Oil & gas	2
Chemicals	3
Basic Resources	9
Construction & Materials	14
Industrial Goods & Services	10
Food & Beverage	10
Personal & Household Goods	10
Health Care	2
Retail	3
Media	5
Travel & Leisure	11
Telecommunications	2
Utilities	4
Banks	10
Insurance	1
Financial Services	7
Technology	11

For the three industries with more than ten active shares the LSV measures were nevertheless calculated and are shown in Graph 5. Besides the fact that herding does not seem to differ significantly between the three sectors, no other conclusions can be drawn due to the small number of the firms.

Graph 5. Herding measures for the industries with the highest number of firms (statistically non-significant values are not displayed)
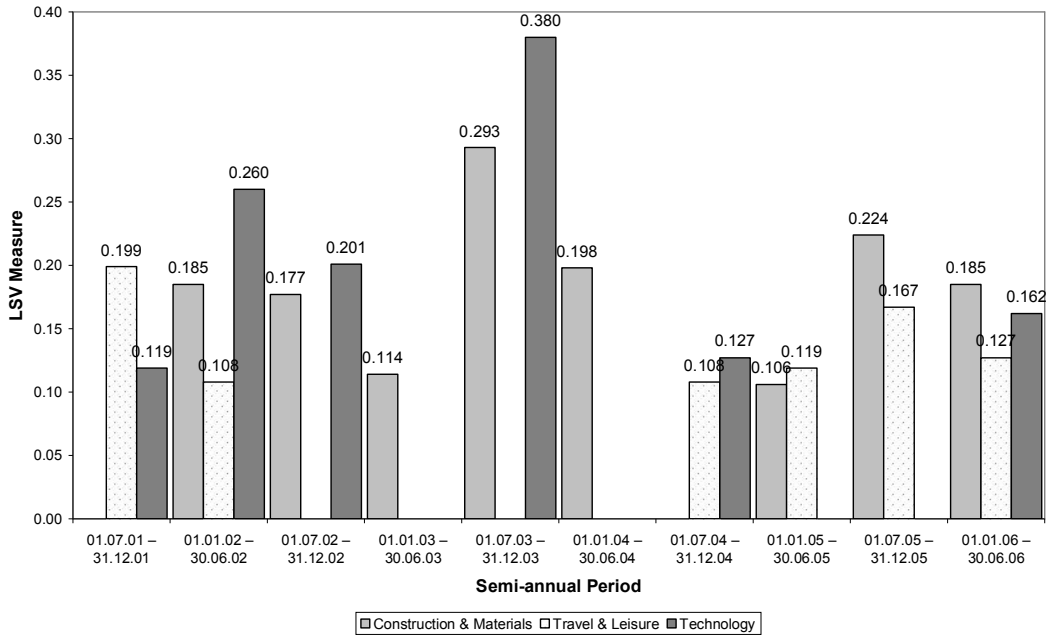
5. Conclusions

The present study can be classified as part of the research concerning the existence and effect of herding. This research has led to a large volume of studies throughout the world that often reach contradictory conclusions. Herding is a bias identified by the proponents of the Behavioural Finance paradigm that has received a lot of attention internationally and has been documented for several markets. It has been claimed that the emergence of herding behaviour by investors can lead to a destabilisation of the market, creating bubbles and crashes. Herding becomes an even more important phenomenon if it is exhibited by institutional investors, as has been explained previously.

The main goal of this study was to identify, during the period from January 2001 to June 2006, whether the presence of herding by mutual fund managers active in the Athens Stock Exchange could be established. To accomplish this goal, the herding measure devised by Lakonishok et al. (1992) has been utilised. The research conducted led to the conclusion that, overall, managers herd in all semi-annual periods examined, with the measures calculated being similar to those observed by other studies for developing markets (Lobão and Serra, 2002). The measures are statistically significant throughout the period 2001 – 2006; therefore, although certain limitations of the methodology and the sample are acknowledged, the existence of a herding behaviour is sufficiently documented. It has not been possible

to associate the variation in the value of the LSV measure with the price movements of the General Index in the ASE (this index is purported by the ASE authorities to represent the market as a whole).

Further analysis was conducted in an attempt to identify the reasons for herding by managers. The shares traded in the ASE were grouped into categories based on criteria set by the Stock Exchange itself. Using the market capitalisation as a criterion, shares were divided into large capitalisation shares and small and medium capitalisation shares. It was found that herding for large capitalisation shares is significantly higher than for the market as a whole in all periods, while herding for small and medium capitalisation shares could not even be documented at all (except for one period only).

In addition, the shares comprising the most popular index of the ASE, the General Index, were also formed into a group. The same procedure was followed for the shares comprising the FTSE 20 index, which includes large firms with high reputations. The firms included in these indices can reasonably be considered "famous" and information for these firms is plentiful in the financial news. The measures for the General Index shares were overall significantly greater than those for the market. The same conclusion was drawn for the FTSE 20 index, although, due to the small number of shares comprising the sample, the measure was not statistically significant at the desired level for one period.

The usefulness of the above analysis, apart from describing the herding behaviour observed more precisely, lies in the inferences that can be attempted about the reasons for managerial herding. Two main reasons for herding have been proposed: imperfect information and reputational concerns and compensation structures (Bikhchandani and Sharma, 2000). Imperfect information as a reason for herding assumes the presence of information asymmetries or at least perceived information asymmetries. Such asymmetries are more likely to occur for shares with smaller market capitalisation or for less popular shares. On the other hand, the reputation of managers can be damaged more severely if wrong investments are made in shares with larger market capitalisation or in more popular shares, because their performance can more closely be monitored. From the above, the main argument extracted is that imperfect information as a reason for herding should lead to greater LSV measures for small and medium capitalisation shares, compared to the large capitalisation shares, and that index shares should be subject to smaller degrees of herding. The opposite should be the case for herding due to reputational concerns and compensation structures. Taking into consideration the measures actually calculated, the conclusion reached is that herding by mutual fund managers in the ASE most probably occurs primarily due to reputational concerns.

Finally, the shares were grouped into categories based on the sector of the economy each firm is placed into by the governing body of the Stock Exchange. The ASE identifies seventeen industries and it was attempted to investigate differences in the intensity of herding between them. Unfortunately, the small number of firms

in each sector did not allow comparisons, since the measures calculated lack statistical significance in most cases.

This study follows a pattern devised to conduct an initial examination of the herding behaviour in a market. In a sense, the measure calculated merely scratches the surface of this issue. It is possible only to infer the reasons of herding and the effect of this herding behaviour on the stock prices cannot be appreciated. Furthermore, it is impossible to distinguish genuine herding behaviour from decisions based on changes in the fundamentals. Nevertheless, since mature markets do not usually exhibit stock-picking herding, an important implication of this study is the fact that the ASE is still a developing market with important inefficiencies. Moreover, it is necessary to examine the investing strategies adopted by managers and to closer review their decisions. Perhaps it is the duty of the controlling body of the Stock Exchange to control market makers more closely, in order to prevent large market swings, bubbles and crashes due to herding.

5.1 Limitations of the study
The present study is subject to certain limitations and shortcomings, which are partially related to the layout of the study per se and partially to the measure utilised. As far as the study is concerned, it should be noticed that the sample does not cover a large proportion of the market, leaving the quality of the results under some dispute. As far as the measure is concerned, although it has been used widely, due to its simplicity and conceptual clarity, it carries certain drawbacks. First of all, the LSV measure cannot identify the reason managers are lead to similar decisions (Voronkova and Bohl, 2005). A severe change in the fundamentals of a firm or in the information available to traders would lead to a value similar to the one observed when great herding occurs. Although such large movements due to rational decision-making are not very likely to appear, nevertheless the values observed must be treated with caution.

Since the measure only captivates the change between two given reference points, it cannot trace strategies that occur inside a period (in this case, in the semi-annual period) and are reversed in the same period (Oehler and Chao, 2000). This drawback cannot be overcome unless actual trading data become available. Furthermore, it does not measure the effect of the herding behaviour on the stock prices, which is a very important aspect of this issue. In order to estimate this effect, it would be necessary to consider the volume of the buy and sell trades and not only the number of active managers (Wermers, 1999). Also, it must be noticed that managers of funds managed by the same MFMC often share the same information; although this constitutes a form of herding, it is nevertheless often mentioned as a reason why the LSV measure might overestimate actual deliberate herding behaviour (Lobão and Serra, 2002).

Finally, the measure overestimates herding when short-selling is prohibited, because the binomial distribution used as the basis for the calculations is not an absolutely realistic assumption (Oehler and Chao, 2000) and may underestimate

herding   for   low   activity   stocks,   because   the   expression
$$\left(\frac{n}{np(t)}\right)p(t)^{np(t)}(1-p(t))^{n(1-p(t))}$$
(used in the formula to take into account random variations in the trading behaviour) may take large values (Lobão and Serra, 2002).

It should be noticed that more sophisticated measures have been proposed for measuring herding, which focus primarily on share return dispersions, but they also face certain drawbacks and conceptual ambiguities (e.g. Hwang and Salmon, 2001, Hwang and Salmon, 2004, and Demirer and Kutan, 2006).

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