

An Individual Herding Behaviour Model: The Role of Personality, Gender and Information Asymmetry

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Abstract—*Herding behaviour is one of the efficient market hypothesis anomalies. Investors display such behaviour when they imitate the actions of other investors; the behaviour occurs when there is constant interaction between rational investors, which prevents them from seeking information about market fundamentals. Herding behaviour arises because investors do not act in accordance with their private information, but refer to other investors' decisions. As a result, the process of social learning stops. Information asymmetry is claimed to be responsible for the emergence of such behaviour. Extensive literature and empirical studies have proven its existence in financial markets; however, the majority of these studies examined herding behavior in institutional contexts, or in terms of overall market movements. No studies have examined individual motivation for such behaviour. This paper builds a new model of individual herding behaviour to fill the lack of theory about such motivation. Aspects of personality, namely conscientiousness and neuroticism, together with gender, are important factors that affect the relationship between the asymmetry of information and herding behaviour.*

Keywords—*behavioral finance, conscientiousness, gender, herding behavior, information asymmetry, market condition, neuroticism.*

I. INTRODUCTION

Behavioural finance is a paradigm that states that emotions and subjective factors play an important role in investment decisions; these decisions are influenced by investor confidence and certain choices. This view differs from economic theory which gives more space to human preferences, but with little consideration of their ignorance or knowledge, their feelings of hope, doubt and fear, or the power of their imagination (Shackle, 1942). Individuals act not only on the basis of what they read and hear, but more often on their emotional reactions to the information. These reactions represent John Maynard Keynes' idea of animal spirits, which animate crowds and are the driving force of economic activity and investment.

Mauboussin (2006) explains that humans are not rational agents in the market, that there is no steady-state market price equilibrium as defined in economic theory, and that price changes are not normally distributed, meaning that the market is a complex adaptive system. This complexity triggers the emergence of individuals who are boundedly rational, and whose actions are further boosted by the psychological aspect. The assumption of complexity also means that the market has disequilibrium (unstable prices, even in the absence of new information), and that the distribution of stock prices is more "fat-tailed".

One factor that is believed to be the cause of markets not being in equilibrium nor efficient is herding behaviour. Investors display such behaviour when they imitate the actions of other investors; it occurs when there is constant interaction between rational investors, which prevents them from seeking information about market fundamentals. An investor will "herd" when he decides not to perform a transaction because it has not been done by other investors. In other words, herding behaviour arises because investors do not act in accordance with their private information, but based on actions taken by other investors. Such behaviour causes the social learning process to stop and is believed to occur in financial markets (Devenow and Welch, 1996).

Several studies have been conducted to estimate herding behaviour (e.g. Fu & Lin, 2010; Degirmen, Pabst & Songür, 2012; Capriani & Guarino, 2008). The majority of these have examined the herding behaviour in capital markets of institutional investors, as well as analysts and professionals. Most employed the theoretical framework proposed by Devenow and Welch (1996) to investigate its causes or motivation.

The studies on herding behaviour have focused more on the role of information and market conditions that lead to it (e.g. Christie & Huang, 1995; Kallinterakis, 2009; Degirmen, Pabst & Songür, 2012). Kim, Lee and Kim (2014) tested the herding behaviour of individual and institutional investors in the equity fund market. They found that individual investors tended to mimic the institutional ones. However, these studies are very limited in their explanation of the

motivation for individual herding behaviour, and none examine directly the factors that influence it.

This study attempts to fill this gap by considering aspects of personality and gender as factors that influence individual herding behaviour. It aims to develop a model of individual herding behaviour that can be used as a basis for conducting an empirical study of the factors that affect such behaviour.

II. LITERATURE REVIEW

A. Herding Behaviour in the Financial Market

Investors who replicate the actions of other investors are aware that their actions are affected by those of others. Investors are said to herd if they take a decision to make an investment without knowing the investment decisions of other investors, but when other investors do not invest, neither do they. Therefore, herding behaviour occurs when knowledge of the investment decisions of other investors changes someone's decision to invest.

In psychology, imitation action is often considered to be human nature. Hirshleifer (2001) showed that 'conformity' encourages people to replicate the actions of others around them. Such behaviour arises through interactive communication between individuals, both explicitly through talking to each other directly (Shiller, 1995), or tacitly through observation, as is the case in fashion (Bikhchandani, Hirshleifer & Welch, 1992).

An alternative explanation of herding behaviour is 'rational herding'. Devenow and Welch (1996) argue that herding behaviour arises because of rational considerations; that is, it is more sensible for investors to mimic decisions taken by other investors in order to have an informational advantage. This rational consideration occurs when a person (a) has no private information; (b) has private information but is hesitant about its quality; (c) considers that the ability of other people to process information is better; or (d) believes that other investors have better information. Rational considerations can be explained from the viewpoint of career and reputation. Investment managers and financial analysts are required to maintain their career and reputation; when their performance is evaluated by comparing it with others in the same position, it is quite reasonable for those who have lower ability/reputation to replicate the actions of other investment managers who have higher ability and reputation in order to improve their own image (Scharfstein & Stein, 1990). However, investment managers who have higher ability and reputation may also choose to follow the investment decisions taken by the majority of other managers, even if these are suboptimal, when they perceive that the risk of potential failure is greater than that of success if they act alone (Graham, 1999).

Several studies have been conducted on herding behaviour in developed and emerging markets. Choe,

Kho and Stulz (1999) examined the phenomenon in international markets, while Degirmen, Pabst and Songür (2012) conducted the same examination in developing and developed markets. Degirmen et al. (2012) argue that the quality of information is one of factors that differentiates the herding behaviour of developing and developed markets. The accuracy of information signals in the market influences the behavior. The more informative the signals received by investors, the weaker the herding behavior tends to become, because investors trust their private information. Further, Degirmen et al. (2012) state that the distribution of market information in developing markets is relatively less informative than developed markets. In other words, the quality of market information in developed markets is better than that in developing markets. Therefore, herding behaviour is more common in developing markets due to the relatively low precision of information.

Kallinterakis (2009) examines herding behaviour in Vietnam, a thin market; that is, a market in which shares are rarely traded. Thin markets are one of the characteristics of emerging markets. Kallinterakis found that the phenomenon of herding behaviour in thin markets is caused by the illiquidity of the market structure.

B. Motivation for Herding Behavior

The intentional herding model assumes that the amount of information that is available and reliable in the market is very small, so investors become hesitant to make decisions and finally decide to follow other investors' decisions. In contrast, in unintentional herding investors believe that they have reliable information, which they interpret in the same way, until finally taking the same decision. Therefore, both intentional and unintentional herding behaviours are strongly associated with uncertainty about the availability of information.

According to the rational perspective, the motivation for herding behaviour is driven by various factors, including:

1) Herding based on information and its spread

Benerjee (1992), Bikhchandani et al. (1992) and Welch (1992) assume that investment opportunities are available to all individuals at the same price, leading to perfectly elastic supply. Individuals face similar investment decisions under uncertainty and have imperfect private information. In this context, the private information owned by an investor may be a result of their research and observations. On the other hand, all the relevant information on investment is public information, although investors still face uncertainty about the quality of this information. Individuals can observe the actions of each other, but cannot observe the private or signaling information received by others. This information asymmetry drives individual herding behaviour.

2) Herding based on reputation

Scharfstein and Stein (1990) and Graham (1999) propose another theory about the motivation for herding, which is that it is due to financial managers or financial analysts wanting to maintain their reputation. Reputation or career orientation is affected by uncertainty about the ability or expertise of managers. Those with low ability tend to deliberately follow the decisions of senior investors, and ignore their private information because they believe that the decision made by their senior is based on better information. In this way, they can manage their reputation in the market (Devenow and Welch, 1996).

3) Herding based on compensation

Maug and Naik (2011) analytically examined the links between asset allocation decisions taken by professional fund managers and compensation schemes. When such a scheme is based on a performance benchmark, they showed that fund managers tend to ignore their own superior information and prefer to adjust their portfolio allocation to that of other fund managers.

In summary, the first motivation for herding behaviour is individual, while the other two are mostly institutional.

III. METHODS

The snowball method is used to develop the herding model. Based on the literature review, the paper explores the determinants of individual herding behaviour in the capital market.

IV. DISCUSSION

Research on herding behaviour based on institutional motivation has previously been conducted, but studies on individual motivation are still very limited. This article builds a model of individual motivation for herding behavior, as shown in Figure 1.

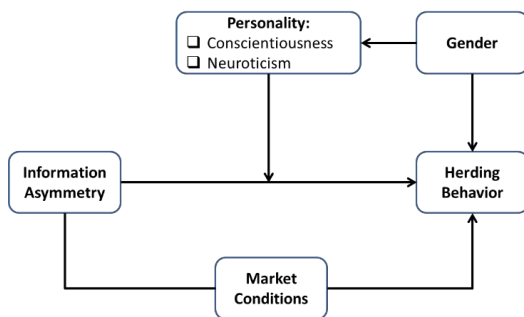


Fig. 1. Individual Herding Behavior Model

A. Information Asymmetry, Information Cascades and Herding Behaviour

Lobao and Serra (2007) argue that the herding behaviour that takes place in emerging markets can be attributed to incomplete regulatory frameworks, particularly in terms of the transparency of information.

A low level of information disclosure and associated quality drive the emergence of uncertainty in the market, casting doubt on the reliability of public information, and consequently making it harder to make fundamental analysis.

Lakonishok, Shleifer and Vishny (1992) define herding as the tendency of a group of investors to buy (or sell) a particular stock in line with other traders, but that this behaviour will be different when they make investment decisions independently. For example, an investor might imitate other investors when deciding not to invest in a particular stock, but after observing that other investors are buying the stock, he might change his mind and also decide to invest.

Initially, herding behaviour is observed as the effects of psychological factors. However, economists have modelled the rational behaviour of investors. The spread of herding behaviour in the market will drive collective action that affects market efficiency adversely, regardless of the motivation for such behaviour. If many investors decide to ignore their private information and be free riders of other investors, this will speed up the informational cascade (Banerjee, 1992; Bikhchandani, Hirshleifer & Welch, 1992), with the result that the process of information aggregation in security prices is slower.

In certain situations, investors herd because they think that other investors have better and more relevant information than they have. The less information that is owned by uninformed investor than informed investor makes uninformed investor to be hesitant of his decision and is concerned about making mistakes that result in potential investment losses. For these uninformed investors, it is rational to follow other investors so that their investment performance is not worse than market performance. So, in conditions of high information asymmetry the probability of the occurrence of herding behavior is higher.

Proposition 1: Information asymmetry has a positive effect on herding behaviour.

B. Market Conditions and Herding Behaviour

Herding behaviour can be influenced by market conditions, which are closely related to investor behaviour itself. It can be said that changes in market conditions will be followed by changes in investor behaviour, and changes in economic activity and government policies in order to stimulate the market or stabilise the existing activities in the market.

Investors have to deal with uncertainty about the quality and quantity of available information, not only because of the limited information available in the market, but also the limitations of individual cognition to process the information. In conditions of high uncertainty, investors tend to think that other investors have better and more critical information than them. This leads individual investors to follow the decisions

of other investors. In other words, when investors feel there is high uncertainty, they tend to practise herding.

High uncertainty situations often occur when market conditions are stressed. Christie and Huang (1995) argue that the decision-making process of investments made by market participants depends on overall market conditions. During normal periods, rational asset pricing models predict that the dispersion of returns will increase as the absolute value of the market returns, because individual investors make trades based on their different private information. However, when market conditions change markedly, people tend to ignore their personal opinions and follow the collective tendency of investment decision-making in the market.

Lam and Qiao (2015) examined market and industrial herding behaviour on the Hong Kong stock market. They separated their testing into two periods: the period after the unification of the four stock exchanges in Hong Kong; and the period after the introduction of regulations on short selling and stock options. They found that there was market and industrial market herding in up market periods in large enterprises, as well as in small companies in the first period. Herding was also found when trading volume and volatility were high. However, their study also found that herding behaviour also took place in down market conditions.

Proposition 2: Market conditions mediate the relationship between information asymmetry and herding behaviour.

C. Role of Personality in Individual Herding Behaviour

The role of personality in the quality of decision-making, especially when dealing with conflicting decisions, has been studied by various psychologists (e.g. Janis, 1985; Radford et al., 1991). Their results show that emotional vulnerability may negate the ability to examine the options available and to evaluate the advantages and disadvantages (Radford et al., 1989).

Based on conflict theory, when people have to make decisions, they often find themselves in a state of decisional conflict. This ambivalence arises because individuals feel that they face potential risks when making a decision. One strategy used to overcome such conflict is hypervigilance (Mann et al., 1997). This is a panic condition characterised by impulsive decisions that are based on a simple decision rules; for example, mimicking the decisions made by others. Conscientiousness is one aspect of personality dimensions, which include a person's desire to achieve something, self-motivation and self-confidence (or efficaciousness). Conscientiousness also includes components related to regularity, reliability and prudence.

The quality of decision making in specific situations is influenced by conscientiousness. Someone who does not have commitment nor is highly self competent tends to ignore or lower their goal performance after performing a series of bad decisions, made for reasons that were unclear or not very understandable (Le Pine, Colquitt and Erez, 2000). If associated with investment decisions, people with a high level of conscientiousness tend to take decisions carefully and are more confident in their behaviour, so they are not easily swayed by the behaviour of others. In other words, individuals with higher conscientiousness tend to exhibit lower herding behaviour than those with lower levels of conscientiousness, even if there are high information asymmetry conditions and uncertainty.

Neuroticism is a general tendency to experience negative affections, such as fear, sadness, shame, anger, guilt and other unpleasant feelings. Costa and McCrae, cited in Bullock-Yowell et al. (2015) state that neuroticism may also be indicative of people who tend to have emotional ideas, weak control of personal desires, and cope with problems less well in stressful condition. Individuals with high neuroticism tend to become less confident and rely more on others as benchmarks for their decision. In other words, individuals with high neuroticism tend to display more herding behaviour. In neurotic episodes, individual predisposition to herding behaviour also increases, in line with with the increasing uncertainty as a result of high information asymmetry.

Proposition 3: Personality dimensions (i.e. conscientiousness and neuroticism) moderate the relationship between information asymmetry and herding behaviour.

D. Influence of Gender on the Individual Herding Behaviour Model

Economic theory assumes that people act highly rationally, but in fact individuals often behave irrationally (Barber and Odean, 2001). Research in behavioural finance applies various theories of psychology to financial decisions by introducing deviations from the assumption of rationality that is observable, systematic and very humane. One form of deviation in investment strategies is caused by gender differences. Psychological research shows that in the context of financial decision making, women have different views and preferences from men (Schumell, 1996).

Research on gender differences in investment decisions has concluded two facts: (i) women investors tend to be risk averse, and (ii) women have a level of confidence which is lower than men's in the same conditions. Empirical evidence shows that men and women have different attitudes toward risk. Barsky et al. (1997) conclude that women are more risk-averse than men, while Jianakoplos and Bernasek (1998)

report that approximately 60% of women respondents in a 1989 Survey of Consumer Finance expressed no desire to take financial risks.

Although men and women show levels of overconfidence, men are generally more overconfident than women. Several studies have confirmed these conclusions, such as those of Deaux and Emswiller (1974), Lenney (1977), and Beyer and Bowden (1997). Men tend to feel more competent than women in terms of finance (Prince, 1993). Barber and Odean (2001) also conclude that in the financial field, men show a higher degree of overconfidence than women. Women are less confident than men in their ability to make the right financial decisions (Schumell, 1996), and consider that investment is somewhat frightening (Bach, 2000). Estes and Hosseini (1988) found that women investors have lower confidence in investment decisions, even when background and education are controlled.

Proposition 4: Gender influences personality and herding behaviour.

The differences in the degree of confidence indicate that gender affects the levels of conscientiousness and neuroticism. Individuals with high conscientiousness or low neuroticism are shown to be more confident in their personal capacities, so decisions are taken more carefully and reliably, and not emotionally. Those with low conscientiousness or high neuroticism are often identified as woman because of their characteristic of lack of confidence, meaning they easily panic and have negative affections. Therefore, it can be assumed that gender affects the level of individual personality.

V. CONCLUSION

The debate concerning asset pricing has identified two main views in determining stock prices, namely fundamentals and investor sentiment. Fundamental value represents the discounted value of future cash flows, while investor sentiment is a condition that goes beyond the fundamental view. The crowd psychology, irrationality, herd mentality and animal spirit that were popularised by Keynes are often regarded by academics and investors as playing a role in setting market prices.

Herding behaviour is one of the anomalies of rationality assumption. Previous research has examined the conditions that lead to herding behaviour, but empirical research that directly tests individual motivation for such behaviour is still very limited. Asymmetry of information, reputation and compensation are suspected to be factors that encourage herding behaviour. However, these three factors are more appropriately tested in the context of institutional investors. When analysing herding behaviour at the individual level, personality dimensions become an important factor for investigation. This paper suggests a number of

propositions in individual herding behaviour models that can be used to build a framework for empirical research. More technical specifications of individual herding behaviour models are offered in the study to give opportunities to researchers to elaborate this conceptual framework in empirical studies.

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