"AN INVESTIGATIVE STUDY ON HERDING BEHAVIOR IN THE IRISH STOCK MARKET"

Raghavendra Prasad Bangalore Nagendra

Master of Science in Finance

National College of Ireland

Submitted to National College of Ireland, August 2022

ABSTRACT

The herd mentality factor influences investors' capacity to make prudent financial decisions as well as behavioral biases or bad choices. The aim of the study is to better understand how market players behave, with a focus on herd behavior, which occurs when investors copy the trading strategies of other investors. With a particular focus on the Irish stock market, it further examines the magnitude of these behavior not only under standard conditions but also during significant upturns and extreme downturns. The stock that makes up the Irish stock index ISEG - 20 is used to analyze herd behavior using daily returns for the period of 2015 to 2021, which includes the worldwide pandemic phase (Covid-19). To test the herding behavior in this study, we use two different measures. First, Christie and Huang (1995) (CH) liner model, where our findings revealed no proof of herding during periods of extreme market conditions, and second, Chang et al. (2000) (CCK) nonlinear model, which likewise found no proof of herding during periods of bull and bear markets in Ireland. The findings suggest that empirical herding measurements are sensitive to the approach taken to data collection.

Submission of Thesis and Dissertation

National College of Ireland
Research Students Declaration Form
(Thesis/Author Declaration Form)

Name: Raghavendra Prasad Bangalore Nagendra

Student Number: x20252102

Degree for which thesis is submitted: Master of Science in Finance

Title of Thesis: "AN INVESTIGATIVE STUDY ON HERDING BEHAVIOR IN THE IRISH STOCK MARKET"

Date: 17/08/2022

Material submitted for award

A. I declare that this work submitted has been composed by myself.

B. I declare that all verbatim extracts contained in the thesis have been distinguished by quotation marks and the sources of information specifically acknowledged.

C. I agree to my thesis being deposited in the NCI Library online open access repository NORMA.

D. *Either* *I declare that no material contained in the thesis has been used in any other submission for an academic award.
Or *I declare that the following material contained in the thesis formed part of a submission for the award of
Master of Science in Finance
(State the award and the awarding body and list the material below)

Signature of Research Student: Raghavendra Prasad Bangalore Nagendra

Date: 17/08/2022
Submission of Thesis to Norma Smurfit Library, National College of Ireland

Student name: Raghavendra Prasad Bangalore Nagendra

Student number: x20252102

School: National College of Ireland

Course: Master of Science in Finance

Degree: Master of Science in Finance

Title: "AN INVESTIGATIVE STUDY ON HERDING BEHAVIOR IN THE IRISH STOCK MARKET"

An electronic copy of your thesis will be lodged in the Norma Smurfit Library and will be available for consultation. This electronic copy will be accessible in NORMA norma.ncirl.ie the National College of Ireland's Institutional Repository. In accordance with normal academic library practice all theses lodged in the National College of Ireland Institutional Repository (NORMA) are made available on open access.

 I agree to an electronic copy of my thesis being available for consultation within the library. I also agree to an electronic copy of my thesis being made publicly available on the National College of Ireland's Institutional Repository NORMA.

Signature of Candidate: **Raghavendra Prasad Bangalore Nagendra**

For completion by the School:

The aforementioned thesis was received by

Date:

This signed form must be appended to all copies of your thesis submitted to your school.

ACKNOWLDGEMENT

Table of Contents

List of Tables

List of Figures

ABBREVIATIONS

EMH – Efficient Market Hypothesis

CAPM - Capital Asset Pricing Model

HB – Herd Behavior

EMH - Efficient Market Hypothesis

CH - Christie and Huang (1995) Model

CCK – Chang, Cheng, and Khorana, (2000) Model

LSV - Lakonishok, Shleifer, & Vishny, (1992) Model

CSSD - Cross-Sectional Standard Deviation

CSAD – Cross- Sectional Absolute Deviation

CHAPTER 1 – INTRODUCTION AND BACKGROUND

1.0 INTRODUCTION

The Irish Stock Market, also known as Euronext Dublin, in times of financial crisis, investors, brokers, or decision-makers often avoid losses and take irrational actions. Investors, brokers, and significant players manipulate the market moods. Investors suffer from knowledge asymmetry despite market regulation. Abnormal information is visible during market shifts. Panic arises. Panic causes the market to surge to excessive levels. Due to herding, the market rises and falls. When investors expect clusters to shift significantly, the market herds.

This study examines 'market-wide' herding, extreme markets, bull and bear periods, and distress in the Irish stock market. The Irish Stock Exchange (Euronext Dublin) is the Proxima for Irish Stock Market because it has the most capitalization. The study includes ISEQ 20 index data from Euronext Dublin from December 31, 2014 to December 31, 2021, which covers global pandemic covid-19.

Highlighted that actual investors comply to "rational" financial assumptions. Traditional ideas claim that investors are calculative utility maximizing robots. Investors are sentiment-driven and prone to cognitive errors. Errors cause market anomalies, which affect stock markets. Thus, the necessity to understand anomalies and human judgment flaws became the predecessor of behavioural finance.

1.1 STRUCTURE OF THE STUDY

There are six chapters in the thesis. The first chapter introduces the subject's background and outlines the justification for carrying out the current investigation. The second chapter analyses the Literature Review, studies on herding behavior in developed, developing, and Irish contexts and identifies research needs. After that, we move on to Chapter 3, where we examine and detail our research questions, objectives, hypothesis, methods, data, and variables. In the fourth chapter, the results of the analysis and the empirical research findings are presented. The Sixth Chapter provides a brief analysis of the results and an in-depth discussion of the research in relation to the literature review. The thesis is wrapped up in the last chapter by conclusion of the findings and suggested directions for additional research.

1.2 BACKGROUND TO STUDY

Since 1960, stock market researchers have been active. One can discover numerous schools of thought, disciplines, and subdisciplines to study money and investments in the past, present, and future. Modern finance has produced many ground-breaking studies on stock returns. Markowitz's Asset Pricing Theory (1952) and CAPM, Capital Asset Pricing Model (1960s) were quantitative models for quantifying unsystematic risk. Sharpe (1964), and Lintner (1965), studied and introduced portfolio theory. Efficient Market Hypothesis (EMH) studied by Fama's (1965), the Modigliani-Miller (1988) approach for option pricing in investment decisions, Kahneman's (1973) introduction of 'behavioural in late 70's finance' led to key advancements. These techniques and theories improve market knowledge. All these theories helped investors assess and control asset return and risk and build appropriate tools.

The discussion on investments begins with Markowitz's (1952) single-period model for portfolio selection, which assumes that investment risk may be assessed by the portfolio's return variance (or standard deviation). Markowitz's portfolio selection approach helps investors draw the efficient frontier of risky assets and select an optimal mix of risky funds. This model did not include asset risk-return relationships.

The Capital Asset Pricing Model (CAPM), created by Sharpe (1964), Lintner (1965) extends Markowitz's portfolio theory and is used for security valuation, risk analysis, cost of capital estimation, and portfolio performance evaluation. This model's appeal lies in its simplicity and capacity to quantify risk and projected return of market assets.

The expected return on any asset is a positive linear function of its beta, a measurement of risk that describes the asset's expected return cross section. In the late 1970s, many questioned this idea and beta's capacity to explain asset returns. Influence of various additional characteristics and anomalies on predicting asset return and explaining market efficiency was examined.

Stock market studies gained steam in the 1950s. Fama's (1965) studies on price discovery opened the way for Efficient Market Hypothesis (EMH). EMH and market abnormalities dominated financial study for 30 years.

The Efficient Market Hypothesis states that if any new information that enters the marketplace immediately affects share price. However, traders are not guaranteed a profit from using market knowledge, as technological and fundamental research can also result in lower returns. However, conventional consensus theory holds that an individual's judgments are solely based

on quantitative calculations and fundamental data. According to these theories, investors behave rationally and the theoretical value can be calculated from the underlying value (Sharpe, 1964; Fama, 1970; Lintner, 1965). The Capital Asset Pricing Model (CAPM), which assumes a linear relationship between risk and return, is one of the examples of asset pricing model that is based on Market efficiency. Different abnormalities appeared in the 1980s that Efficiency theory was unable to explain using Capital asset pricing models like the CAPM (Schwert, 2003).

Contrary to what the traditional theories claim, the financial market also has psychological components. Traders are not always logical, and this has been noticed in reality. Investors in the real market behave in accordance with their beliefs, which they continuously re-evaluate considering new facts in the financial market. Contrary to conventional financial theories, which promote a comparative link between risk and return, investors in real markets anticipated higher yields with lower risks. These unpredictability and stability in investors' investment behavior are not properly explained by financial theories. Thus, psychologists have shifted to the behavioral elements of investment decision making to examine the workings of the real markets and to better comprehend the method by which beliefs and irrational behavior of investors are continuously updated. It is asserted that abnormalities often fade over time. Shiller (2003) noted that humans are not always logical and the market may not be efficient. Nevertheless, some abnormalities, such as momentum, remain, posing a significant barrier to EMH. Therefore, behavioral finance is a developing and crucial field of study that clarifies the confusion in investor behavior.

The 200-year-old Irish Stock Market is a good place to investigate exogenous and endogenous price creation factors. Several research indicate the Irish Stock Market's efficiency. EMH focused on macro concerns. Microstructure such as interest rate effect, tick pricing movement, and volatility were examined to understand the problem. The study could not presume investor bias. Therefore, the current trend is toward recognizing these behavioral biases. Since little is known about market behavior, this thesis examines the Irish Market's "herding behavior."

1.3 BEHAVIORAL FINANCE

According to theoretical and empirical studies, the efficient market hypothesis (EMH), rational asset pricing models, and other traditional financial theories all looked impressive in forecasting and explaining specific occurrences to estimate the predicted value of an asset. Nevertheless, as time goes on, scholars in finance and economics have begun to investigate abnormalities and behavioral biases that have not been covered in the traditional finance concepts that have been around for a while. Although these theories offer some idealized scenarios, the actual world proved to be a very complex environment where investors exhibited unpredictable behavior.

A concept with additional value, behavioral finance aims to complement conventional theories of finance by incorporating behavioral considerations into the decision-making of traders. Conventional and Behavioral finance theories focus on how investors make decisions. It examines the processes by which market players make investment decisions and how those decisions are affected by various heuristics and behavioral biases along the process.

A study of the investor's rationality and the cognitive processes which is involved in financial investment decisions which are made by the investors, particularly in the investment decisions of capital market, has been the focus of behavioral finance (Fromlet, 2001).

The behavior of investors can be caused by price changes which are not influenced by new information but are caused by the collective phenomena. As a result, researchers are looking for hypothetical explanations and experimental evidence for a variety of behavioral finance phenomena, including herd behavior. (Shefrin 2000, Thaler 1991).

Classical economic theory's ideas of logical investors and market efficiency have been put to the test by behavioral finance research. (Sewell, 2010) Behavioral finance is a study of how psychological influences the conduct of finance experts and how this impact markets.

Investors make illogical decisions when given the option between greed and fear. The fundamental idea behind behavioral finance is how actual individuals actually make decisions and how certain differences, that traditional financial theories overlooked, make other people unique (Barberis and Richard Thaler, 2003). Numerous studies (e.g., Asiri, 2008; Compton, Johnson, and Kunkel, 2006), have interpreted literary abnormalities, which include various market biases. The identified irrationalities have been classified in various ways in the research, and these irrationalities either affect directly or indirectly the decision-making process of

traders and lead them to make poor decisions. Psychological biases identified are – Representativeness, Overconfidence, Over optimism, Aversion of ambiguity, Anchoring, Regret and Risk Aversion and Herd Behavior. Investors' desire to copy other people's behavior is by far the most prevalent irrationality. This behavior is known as "herding."

1.4 SIGNIFICANCE OF CAPITAL MARKET BEHAVIORAL FINANCE

In world markets, sentiment-driven stock market movements are prevalent. Behavioral finance has only been introduced and discussed in the previous three to four decades, and study only began around the turn of the century.

Behavioral finance has shown for two decades that equilibrium rational choice models fail to explain real economic behavior (Barberis and Thaler, 2003). They explored several stock market concerns and argued that extreme volatility and market crashes are typically caused by investor emotions and thoughts.

Miller (1977) emphasized that until arbitrage opportunities are comprehensive, increasing dispersion of opinion will result in higher equilibrium market rates. Behavioural finance saves neo-classical finance by answering numerous issues that questioned the theories of finance and advises combining the two to solve market problems. Financial markets have higher arbitrage opportunities than other markets, and behavioral variables may be considered to be less essential. However, Mullainathan and Thaler (2000) showed that even arbitrage constraints cause anomalies that decision psychology helps explain. Since saving for retirement takes complicated calculations and motivation, behavioral components are fundamental to any descriptive theory. All this indicates the relevance and usefulness of behavioural finance in investment. Various researches in decision science, cognitive and evolutionary psychology show modern finance is problematic.

1.5 HERDING BEHAVIOR

In recent decades, behavioural finance has competed with conventional finance. Behavioral finance considers psychological and behavioral factors in investing decisions, while classical finance concentrates on rational reasoning. Behavioural finance focuses on people' information-gathering and use. (Shusha and Touny, 2016).

Understanding market investors' investing behavior and how it affects value of the stock has been a major focus of academic scholars as well as practitioners throughout these years. For portfolio managers, advisors, brokers, shareholders, and academics, analysing the investor behavior of financial players is becoming a major concern. Investors and fund managers may work in teams to make decisions about the purchase and sale of market assets on the stock market. Herding, which refers to the tendency to copy others, illustrates the process when market players deal simultaneously in a similar way and their behavior gathers to the common ground. To make a collection of animals move collectively is how the Cambridge Dictionary defines the word "herd." Similar behavior, or "herding," is that when investors imitate and adhere to the behavior of other investors (Devenow and Welch, 1996). It could result in many investors acting in a similar manner at the same time (Nofsinger and Sias, 1999). When market players violate their own judgment and trade in the reverse way of the past trade, (Avery and Zemsky, 1998) consider this to be herding behavior. There are different measures to detect herding behavior.

Herding behavior has been defined differently by different authors. (Banerjee, 1992) characterized herding as whoever following what everyone else does, despite the fact that their own personal information indicates that they are doing something completely different and wrong. (Christie and Huang, 1995; Rook, 2006) describes when people follow the group's choice even though they believe it to be incorrect, the situation is known as herding. According to Bikhchandani and Sharma (2001), if traders are aware of and motivated by the activities of others, they might be viewed as being a herd. He claims that a trader is herding if the knowledge of many other players purchasing a thing influences the investor's decision to purchase the product rather than refrain from purchasing it.

Hwang and Salmon (2004) Herding occur when traders copy the judgments of other people or market movements instead of following their own opinions and data. Herding behavior of investors, described as the desire to gather on the same part of the market, is a risk to the

sustainability and efficiency of financial markets Hirshleifer and Teoh (2003); Hwang and Salmon (2004).

Shiller (2005) defines Herding as investment uncertainty that misprices economic realities. Sias (2004) defines herding as a group of traders following one another through or out of the same stocks over time. Prior researchers noticed reasonable and irrational crowd behavior. Irrational herding is when traders disregard their own research and facts to adhere to market consensus, even if they disagree (Christie & Huang, 1995).

Investors herd rationally to defend their image. Brokers, dealers, and analysers use it. "They are motivated to boost their performance and image by rejecting their own analyses and copying another player's judgments" (Devenow & Welch, 1996; Cote & Goodstein, 1999).

Learning model by Scharfstein and Stein (1990). Successful managers get informative investing signals, whereas foolish ones get noisy ones. In their approach, institutions may ignore private knowledge and follow others due to reputational concerns.

Shleifer and Summer (1990) distinguish between rational and irrational traders. Arbitrageurs capitalize on trends to boost market demand. This causes prices to rise above fundamentals, attracting irrational traders. They gain when prices are high and close the trade. Arbitrageurs' short-term activity causes a bubble economy. Trading horizons affect asset values and herd behavior, according to Froot, Scharfstein and Stein (1992). Short-term traders may follow others to gather knowledge. Traders who hunt for indications from better-informed market players may benefit from copying the activities of other investors and neglecting their own personal data and information.

Lux (1995) explained herding in two ways. In the first concept, investors get information from many other group members' behaviors, similar to Banerjee (1992) and Bikhchandani et al (1992). Using anthropological conversation analysis, he analyses information transfer across groups. Shiller (2003) notes the informational cascade model's general application due to varied viewpoints and information. More individuals will believe and spread information if it is disseminated by a credible person.

Christie and Huang (CH) (1995) created the ground-breaking empirical measure to identify herding in individual return around the market. They contend that investors' private beliefs are suppressed in favour of the market consensus when herding occurs. They contend that when people herd in the market, the asset's return dispersion often is low compared to the market.

According to them, herding is most likely to happen when there are significant market fluctuations. During periods of extreme herding behavior, the mean daily stock return will not deviate too much from the overall mean daily market return. Due to the varied market sensitivities of particular assets when investors follow each other, rational asset pricing models' forecast of a rise in return dispersion towards the market return will no longer hold. Herding and rational asset pricing models thus yield opposing results. CH computed the cross-sectional standard deviation to quantify herding behavior using cross-sectional standard deviation of daily returns (CSSD).

The CH approach of detecting herd behavior has certain drawbacks because it primarily concentrated on improving the correlation between stock price dispersion and market performance. First off, the approach only accounts for extreme returns and overlooks the typical market return. Second, the extreme market movement hypothesis is also arbitrary. Third, rational asset pricing models assume a linear relationship between return dispersion and market return.

Chang, Cheng, and Khorana, 2000. (CCK) (2000) modified CH's model using return dispersion (1995). They say people herd in extreme and average markets. CCK (2000) said the asset's return dispersion and market return may be nonlinear and rising or decreasing. CCK (2000) uses cross-sectional absolute deviation to capture these elements. CCK (2000) is the most extensively used herding model.

Herding is the deliberate imitation of other agents' decisions after observing them. Herding is a natural habit that protects animals from predators. Economic and financial agents increasingly embrace herding. (Radalj & McAleer, 1993) Herding is convergent social behavior that aligns the thoughts or behaviors of a group (herd) via local interaction and without centralized coordination. (Raafat et al, 2009)

Various studies used CSSD and CSAD to examine market-wide herding (Mnif et al., 2019). Some studies show that instability and crises trigger herding trading behavior, which was prevalent during the global financial crisis (GFC) and in times of bubbles (BenMabrouk & Litimi, 2018; BenSada, 2017; Litimi et al., 2016). Foreign investors herd more than domestic investors, according to Bowe and Domuta (2004). Literature on how pandemics affect herding behavior is limited, especially for Covid-19 (Goodell, 2020). Chang et al. (2020) examines the effects of the GFC, SARS, and Covid-19 on energy stock markets using CSSD and CSAD. They conclude that herding behavior exists in stock markets because investors are more

sensitive to losses after the GFC. Investors panicked during SARS and Covid-19 and sold assets unwisely. Espinosa-Méndez and Arias (2021) use Cross-Section Standard Deviation to show that Covid-19 affects herding in European capital markets (CSSD)

1.6 HERDING CAUSES

Several reasons cause investors to herd. Some examples:

- **Imperfect information**: Oftentimes, a favorable investment indication from one trader makes other investors think their information is incorrect. Investors imitate the behavior to gain entire knowledge.

- **Reputational Concerns:** Investors may be wary of making trading decisions on their own, due to concerns about their image, and hence choose to follow collective trading decisions of a group instead of making decisions on their own.

- **Compensation structures**: Investor concentrates on improving both principal and value and relates it to index achievement. (Maug and Naik, 1996) After observing the benchmark's movements, the agent's optimal investment strategy gets closer towards the benchmarks.

Herding discusses how investors imitate others' trading patterns. This can be due to the cascade effect of knowledge, as traders overlook their own data and consider someone else'. These consequences create price changes and volatility by deviating assets from their basic price.

1.7 TYPES OF HERDING

- Herding with intention: Herding with intention entails copying other market players, which results in identical buying or selling of similar stocks independent of past opinions or knowledge sets. According to Morris and Shin (1999) and Persaud (2000)**,** this kind of herding may result in asset values that do not represent fundamental knowledge, increased volatility, and economic instability, which has the potential to trigger or at least contribute to bubbles and collapses on financial markets.

- Unintentional or spurious herding: According to Hirschleifer et al. (1994), Unintentional herding is primarily driven by fundamentals and emerges because organizations may investigate the same considerations and receive cross -

correlation private information, leading them to reach similar findings regarding individual stocks. This is mainly because of fund managers incentives and experts share a comparable academic background and relevant skills, and they evaluate the information similarly (Griffin et al., 2003).

As the economy changes and becomes more unstable, individuals' financial decision-making is dynamic. Both return and risk affect financial decisions. Every investor looks for high-return, low-risk securities. Behavioral finance is an emerging field, and academics are looking for connections in investor behavior and stock market movements that traditional finance missed.

1.8 STUDY-SPECIFIC HERDING BEHAVIOR

Herding behavior is studied in two ways. The first method is called "Market-wide Herding Behavior," and it uses cross-sectional return dispersion to detect herding. According to Henker et al. (2006), studying market-wide herding ignores individual investor behavior. Instead, it emphasized market-wide herding, which focuses on market trends or set of data. If market-wide herding behavior is evident, share prices cluster around the marker return, and investors ignore their own knowledge.

Second, Analysing herding behavior from an individual perspective in mutual fund selection, analyst recommendations, and trading behavior with professional management. Identifying herding behavior in any other way leads to market consensus. After analysing the two techniques, market broad approach concentrates on stock price dispersion quantitatively and other approach focused on herding behavior characteristics.

In this research, herding behavior is examined in the financial market using models established by Christie, & Huang, 1995 (Cross Sectional Standard Deviation technique) and Chang, Cheng, & Khorana, 2000 (Cross Sectional Absolute Deviation approach). These techniques quantify financial market herding based on return dispersions. These methods also examine market stock prices and neglect other data for assessing herding behavior. Herding behavior may be described by stock market returns, where all shares trade in the same direction. Bikhchandani & Sharma (2000) note that these strategies look for a certain kind of Herding behavior and do not address other mimicry market behavior.

Using diverse methodologies to analyse herding behavior empirically benefited practitioners and investors in the market. Hwang & Salmon (2001) gave instances. The market-wide

methodology requires sensitive stock price information to analyse herding behavior, while other methods require individual investor buying and selling data. Most previous studies used the same approach and data, however this one fills a gap in the literature.

1.9 FINANCIAL CRISIS

2007's global financial crisis began in August in the USA. Uncertain market conditions and tectonic banking and financial crises put the world financial and economic markets in crisis. First a banking crisis, then a financial crisis, then a real economy disaster. The interconnected global financial crisis escalated and expanded around the global economy, including developed, emerging, and underdeveloped nations, by the end of 2008. "Ireland suffered economically from these effects." Lehman Brothers, a large investment bank, triggered the 2008 global financial crisis. Ireland was one of the earliest Eurozone countries to enter recession after the Great Recession began in 2008. According to Regling and Watson (2010), Ireland's economic crisis had worldwide influenced but was also "homemade." The crisis caught the 'Celtic Tiger' off surprise and destroyed Ireland's economic success. In the two decades from 1987 to 2007, the Irish economy almost doubled its workforce from 1.1 million to 2.1 million, which along with efficiency increases delivered exceptional economic growth averaging 6.3% per year. Irish banks abandoned the foundations of banking by lending money as a sale and diminishing the risk they took, attaining similar ends. Customers operating in herds and seeking home loans without enough information threw the Irish economy into disarray. Ignoring the non-psychological causes of the Irish Banking Crisis, the "home-made" tragedy was caused by the herding behavior of banks, customers, media, and policymakers. This incident followed the Great Recession and preceded the European Debt Crisis, worsening the situation when half the world was struggling financially. To save people's money, the government bailed out the banks, causing a debt problem for itself. (Honohan, 2008).

As the global financial crisis unfolded, international financial institutions withdrew funds to offset market losses, causing a liquidity crisis in Irish capital markets. This slowed company activity, caused unemployment, and slowed Irish economic growth.

Global Pandemic Covid-19 Crisis

At the start of 2020, the global spread of the novel Covid-19 disease, first diagnosed in China the year before, sparked a global health emergency and strained the health systems of many

impacted countries. The World Health Organization categorized the disease as a pandemic on March 11, 2020 (WHO, 2020). It struck most countries in the world, prompting governments to respond in varying degrees, finding a balance between saving lives, and permitting economic activity. In context with Ireland, the Irish domestic demand fell by 15% (Gov.ie) and unemployment rate increased, causing slowdown in Irish economy. Common tactics include closing educational and work facilities, social separation, travel limitations, and stimulus packages. The coronavirus crisis is projected to cause a business cycle recession and a worldwide financial catastrophe, while numerous possibilities are being explored as the epidemic is still active. (Ferreruela, and Mallor, 2021.) (Bouri, Demirer, Gupta, and Nel, 2021).

1.10 METHOD AND SCOPE OF STUDY

Traditional finance theory says markets are efficient and investors make rational decisions to maximize profits. "Rationality is investors' objectivity in using market information to make financial decisions." Behavioral finance contends that markets are not efficient; investors can make irrational decisions. Investors do not make reasonable decisions to maximize returns quickly. The rational model does not include all about price movements, and investor psychological bias affects decision making and price changes. They realized behavioral finance is significant and its effects on investor investing decisions are important. To detect herding in our study, we use Cross Sectional Standard Deviation (CSSD) model by Christie and Huang (CH) (1995) and Cross-Sectional Absolute Deviation (CSAD) model by Chang, Cheng, and Khorana (2000) (CCK). The study covers the Irish Stock Exchange (Euronext Dublin) from December 2014 to December 2021 comprising of ISEQ 20 index. The paper provides a detailed context for herding.

1.11 OVERVIEW OF THE ISSUE

Herding conduct is related to the investor's mindset toward investment decision-making, according to behavioral finance research. It is hard to tell if an investor should reveal confidential information before imitating others' decisions (Teng & Liu, 2014). When an investment choice depends on common information, herding tendency exists.

In a worldwide financial crisis, all investors try to escape. Herding diminishes the benefits of portfolio diversification. Herding conduct can potentially misprice financial items. Fair asset value disclosure reduces market efficiency and may undermine market fundamentals. Mispricing may lead to unsatisfactory market conclusions.

Apart from the aforesaid issues, herding behavior in the stock market is worth exploring. Herding behavior causes market inefficiency and volatility. Thus, herding behavior is vital to emerging markets and developed economies like Ireland (due to unforeseen financial crisis). Literature on Irish stock market herding behavior shows different interpretations (Belgacem, Lahiani, 2013) (Mobarek, Mollah, and Keasey, 2014) (Bouri, Demirer, Gupta, and Nel, 2021), and only few studies have been done to explore it. Herding behavior on the Irish Stock Exchange is rarely studied.

CHAPTER 2 – LITERATURE REVIEW

2.0 INTRODUCTION

Cognitive processes guide behavior. Since individuals make up a big portion of the stock market, their learning affects price volatility. Information diffusion influences market price asymmetry. Informed investors ride the market, while uneducated ones lose. Price movement prompts introspection; individual behavior affects market movement. Odean (1999) found that marketers often refer to behavioral bias.

Kahneman and Trivosky founded Behaviour Finance (1971). Scholars divided Stock Market behavior into EMH and Bias. These chapters strive to synthesize behavioural finance literature, specifically herding bias.

In contrast to standard theories, empirical researchers established ways to detect herding behavior by clusters of investor decisions in a market or with various groups of investors. This phenomenon's rationality is disputed. Some authors suggest that investor herding is irrational and caused by the herding instinct. This makes measuring the herding effect difficult. The other approach suggests that herding can be rational if investors intentionally imitate each other. The authors argue that rationality and emotion are important in decision-making and that psychological factors can optimize investor behavior. Given the many variables that can sustain investment in a stock at a given time, it is hard to distinguish one form of herding from another. Following is the study's review

Stein and Scharfstein (1990) researched herd behavior and investment. Determine what causes investing herding. Occasionally Managers often copy others' investment judgments. neglecting private investment Although inefficient, Managers can rationalize it from a social standpoint. Concerned about labour market reputations and firm decisions.

Banerjee (1997) analyzed a sequential choice model in which each decision maker looks at prior decisions to make her own. She does this because other decision-makers may have vital information for her. She shows that optimum individuals will choose choice rules characterized by herd behavior, i.e., imitating what others do rather than using their information. Then she presented the inefficient equilibrium.

2.1 INSTITUTIONAL HERDING

Lakonishok, Shleifer, & Vishny (1992) pioneered the LSV (1992) paradigm for testing institutional herd behavior. Herding conduct (buying and selling) and positive feedback trading (purchasing previous winnings and selling past losses) were used to measure institution management. The study employed 769 US tax-exempt equity portfolios managed by 341 managers from 1985 to 1989. LSV found that the institutional manager's actions do not affect stock prices. Managers herd less in huge stocks than tiny stocks. The study found that supervisors do not use positive or negative feedback.

Grinblatt et al. (1995) studied US mutual funds to see if investors adopt momentum strategy. 274 mutual funds from 1974 to 1984 were studied using LSV. They report momentum, not herding. Wermer (1999) used the LSV model to measure quarterly mutual fund herding (1975-1994). Mutual fund managers are not herding. Grinblatt et al. 1995 found the opposite.

Wermers (1999) used the Lakonishok, Shleifer, & Vishny, 1992 method to study mutual fund managers' herding behavior. The study found little herding in small-stock trades. LSV technique was utilized in domestic and overseas research to investigate fund managers' herding behavior with domestic and foreign investors.

Nofsinger and Sias (1999) found a favorable link between institutional ownership and returns. This may be due to institutional trading feedback. Institutional investors herded. Choe et al. (1999) studied the 1996-97 Korean stock market. They claimed positive feedback trading and foreign investor herding before the financial crisis. Low herding throughout the crisis did not disrupt the Korean stock market.

Iihara et al. (2001) studied herding behavior of individual, institutional, and overseas Tokyo Stock Exchange investors. The study's results match Noisfinger and Sias's (1999). This shows that Japanese investors use positive feedback trading tactics, causing herding. Labao and Serra (2002) studied Portuguese mutual funds' herding behavior from 1998-2000 using LSV's model (1992). They show Portuguese fund managers' herding tendencies. Herding is five times stronger than institutional investors in the US and UK. Medium-cap funds herd more than large and small capital funds.

Sias (2004) tested whether institutional investors mimic trades. Momentum trading exhibited modest herding. They say institutional investors do not influence stock prices away from fundamentals. Wylie (2005) studied UK mutual fund investors using LSV on a sample of 268

funds (1986 to 1993). The analysis found modest herding among industry-aggregated small and large stocks. Kim and Nofsinger (2005) investigated the Japanese stock market from 1975 to 2001. They found Japan had less herding than the US due to its economy and regulatory framework.

Walter and Weber (2006) investigate German mutual funds between 1998 and 2002 to analyze herding on stock prices. German fund advisors/managers' herding and positive feedback trading. Frey, Herbst, and Walter (2014) investigated German mutual fund advisors using Walter and Weber's (2006) data set. They selected the Generalized Linear Model (GLM), which allows them to directly analyze several variables and overcome previous herding limits. They found that managers follow research analysts' buy/sell recommendations. Short-sale limits effect trading decisions but not fund managers' herding.

Herd behavior in the Japanese banking industry was examined by Uchida and Nakagawa (2007), who looked at data from 1975 to 2000. The paper documents herding. Gutierrez and Kelley (2008) used the LSV metric to evaluate herding among US institutional investors from 1980 to 2005. Herding hurts returns, while sell-side herding can stabilize stock prices. By applying the research techniques developed by Wermer (1999) and Sias (2004), Choi and Sias (2009) discovered significant herding in US mutual funds driven by industry component.

Jeon and Moffett (2010) evaluated the herding behavior of institutional investors from abroad in the Korean market using firm characteristics like beta-proxy for risk premium, size-the log price of revenues, the market to book proportion, payout ratio, leverage, an estimate for cash flow, and 6 primary foreign holdings. According to a study, international investors favour companies with abnormal returns and foreign ownership changes. Size and exchange rate volatility effect institutional investors' herding.

Patro (2012) used Lakonishok, Shleifer, & Vishny's technique to study herding in the mutual fund business. The study found herding in the Indian Mutual Fund Industry when investors bought rather than sold funds. Large-cap stocks herded more than small-cap stocks.

2.2 INDIVIDUAL HERDING BEHAVIOR (CROSS-SECTIONAL RETURNS)

Christie and Huang (CH) (1995) introduced another method to quantify market-wide herding using stock return cross-sectional standard deviation (CSSD). They compared market portfolio return to cross-sectional stock return dispersion. Low dispersion suggests herding. Extreme market swings would increase herding, they say. They adapted CAPM. The model's negative squared market return coefficient suggests herding. It means stock and market returns are inversely connected. This contradicts rational asset pricing models, which explain a rise in return dispersion relative to market return amid strong price swings or market stress. During dramatic market moves, people suppress their ideas and follow the consensus. CH (1995) tested this model using NYSE daily and monthly data from 1962-1988. Daily and monthly statistics showed no herding during extreme market situations. Herding behavior may be more widespread in a declining market, according to the study. Low dispersion of returns may not suggest herd behavior because of a lack of new information. Other reasons outside market consensus can create investor herding.

The work of CH was expanded upon by Chang, Cheng, and Khorana (2000) (CCK). The model uses absolute mean deviation (Cross Sectional Absolute Deviation, CSAD), not cross-sectional SD (CSSD). This model's nonlinear relationship between stock return dispersion and a market portfolio shows herding. In both the CH and CCK models, investors hide their own viewpoint during periods of extreme return or significant market volatility. Individual asset returns cluster around the market return. Extreme market conditions will boost herding. They conducted herding in international markets in the US, Hong Kong, Japan, South Korea, and Taiwan. Using 1963-1997 data. In the US and Hong Kong, they report no significant herding but mild evidence in Japan. South Korea and Taiwan show herding behavior. Herding varies by stock size, since large and small market capitalization equities show no herding tendency.

Hwang and Salmon (2004) employed cross-sectional variation in factor sensitivity (betas) of securities to measure herding. Based on this approach, they worked on opposite results of Christie and Huang (1995) where they found the contrary in US and South Korean stock markets. From 1993 to 2002, herding was prevalent in the US and South Korea stock markets, contributing to mispricing of equities.

Caparrelli et al. (2004) measured herding in the Italian stock market from 1988-2001 using the three primary models (CH, CCK, and HS). Their results confirmed the CH model's (1995)

prediction that herding occurs in stressed markets. The CCK model (2000) found increased nonlinearity in upper market and small cap companies of the Italian stock market.

Guo and Shih (2008) studied HB in Taiwanese high-technological stocks from 1996 to 2000. The study examined high-tech and conventional investors' herding behavior using Christie and Huang's (CH) methodologies (1995). High-tech industries herded more than traditional businesses amid extreme market swings. Herding was worse in up markets.

Amirat and Bouri (2009) studied individual investors' herding behavior in Toronto using S&P/TSX60 data from 2000 to 2006. LSV (1992), (HS) (2004), (CH) (1995), (CCK) (2000) models were used to measure herding behavior. First two models found herding behavior, whereas the other two found none.

Chiang, Zheng, and Dazhi (2010) studied 18 nations' herding behavior from 1988 to 2009. Advanced markets include Australia, France, Germany, Hong Kong, Japan, the UK, and the US; Latin American markets include Argentina, Brazil, Chile, and Mexico; Asian markets include China, Indonesia, Malaysia, Singapore, South Korea, Taiwan, and Thailand. Herding behavior was examined using CSSD and CSAD. Herding behavior was found in advanced stock markets except the US. All countries except the US and Latin America showed low herding behavior. During rising markets, herding asymmetry was more pronounced in Asian markets, but all global markets showed herding during the financial crisis.

Demirer, Kutan, and Chen (2010) analysed herding behavior in Taiwan's market from 1995 to 2006 using firm-level data from 689 enterprises in 18 industries. CSSD, CSAD, and HS models detected herding. The linear model shows no investor herding over the research period, although the Electronics Sector did. Nonlinear model aids herding. It shows nonlinear effects and supports herding in all investigated industries. State space-based models support non-linear results. The results support Taiwan stock market herding.

Economou, Kostakis, and Philippas (2011) explored herding in extreme market conditions using Spanish, Italian, Portuguese, and Greek stock market data. Examine asymmetric herding behavior related to return volatility, trade volume, and market returns. They also studied herd behavior during the 2008 financial crisis. They studied 1998-2008. The study indicated substantial herding in rising stock markets. They detected herding in the Portuguese stock market during downturns, but not in Spain During the 2008 global financial crisis, only the Portuguese stock market showed 'herding,' while the Spanish and Italian markets showed 'anti-herding.' During the Global Financial Crisis, Greek investors behaved rationally.

Chen (2013) studied 69 developed (23), emerging (20), and frontier (26) markets. The study studied ten years of data from 1999 to 2009 to measure individual herding and used HS, CCK, and CH models. The study found herding in practically all economies. This contradicts CKK and Chiang and Zheng, 2010. According to the study, industrialized economy exhibits the herding effect more clearly due to rapid information dissemination. Some countries experience herding in both up and down trends, and market participants crowd for negative news (down market) rather than positive news (up market).

Ouarda, Bouri and Bernard (2013) analysed the European market during the 2007-2008 global financial crisis and the Asian crisis. Christie and Huang (1995) and Chang et al. (2000) used 1998-2010 data. All industries except consumer goods showed herding tendency in both bull and bear markets. Due to interconnection and contagion, herding occurred during the 2007-2008 financial crisis, especially in the finance and technology sectors.

Gebka and Wohar (2013) studied 32 countries and used CCK (2000) model. They used daily closing index values from 1998-2012 and found no foreign herding on national indices. Positive return dispersion, or negative herding, was detected. It is against market consensus. Localized herding, investor overconfidence, and flight to quality can cause this. First to explain negative herding are Gebka and Wohar (2013). They also analyzed sectors and found herding in basic materials, consumer services, and oil and gas.

Ahsan and Sarkar (2013) studied investor herd behavior in Dhaka from 2005-2011. Using CH (1995) and CCK (2000). The analysis shows no herding at the Dhaka stock exchange. It indicates investors make reasonable decisions using their own information. Tao et al. (2015) studied mutual fund herding using LSV and FHW. All quarterly mutual fund transactions in the Chinese stock market were sampled. Chinese stock markets have more herding than developed economies.

Ganesh, Naresh, and Thiyagarajan (2016) studied Indian industry herding. From April 2005 through March 2015, the study used CSSD and CSAD to detect herding. The study used CSAD to detect herding in extreme market situations across the complete sample data frame. The CSSD model identified no herding behavior in the Indian market during the research period. Using the same strategy, the study aimed to detect herding tendency for shorter periods, quarter by quarter for each financial year within the sample period. Most industries lack herding behavior. Metal industries herded amid a growing market trend from 1st Jan 2015 to 31st Mar 2015, as did manufacturing sectors from 1st Jan 2011 to 31st Jan 2011. Later, the study used

CSAD to evaluate herding behavior. Except for 2009-10, the analysis showed no industry herding in the Indian stock market. In most cases, the study found herding in the third quarter due to the December effect. The study concluded with a small sample size, except for a short period when the Indian market was away from industrial herding.

BenSaïda, Jlassi, and Litimi (2015) studied whether trade volume supported herding in the US market. The study used a modified herding strategy in CSSD and CSAD models. The study found a significant link between return dispersion and trading volume. Adding trading volume to current models (CSSD & CSAD) did not enhance herding in US markets. VAR and Granger causality methods were used to analyze the relationship between trading volume and herding. Analysis shows that last two days' trading volume correlates to actual and past return dispersion for both markets. Trading volume can cause herding and vice versa, the study found. The study also analyzed herding in the US market during the 2007 global financial crisis. During the global financial crisis, trading volume increased herding.

Galariotis et al. (2015) studied herding in France, Germany, Japan, and the US. They used CCK's daily data from 2000-2015. (2000). All five markets showed no herding. They also studied how liquidity situations affect herding. All markets except Germany show herding during high liquidity periods.

Galariotis et al. (2016) updated CH (1995) and CCK (2000) to measure logical and irrational HB through differences in CSAD. CH (1995) and CCK (2000) cannot separate spurious (rational) and irrational herding. Fama and French (1993) and Carhart (1997)'s factors were used. CSAD variation explains rational herding on fundamental causes, and t explains irrational herding. This study develops a measure of rational and irrational herding. In the US, fundamental and non-fundamental reasons generated herding, but in the UK, basic factors caused it.

Bekiros et al. (2017) studied US investor herding. They used DJIA and S&P100 stock prices from 2000-2015 and CCK's methodologies (2000). They found that market mood proxied by VIX increases investor herding.

(BenMabrouk & Litimi, 2018) This paper contributes to the cross-markets correlation debate by extending herding tests between the stock and oil markets. We study sector-level herding during oil market extremes. They also investigate cross-herding between the two markets, including oil price volatility and investor sentiment. They use a modified cross-section absolute deviation (CSAD) model to infer oil market impact on industry herding. The database includes

20

daily samples of U.S. stocks from 2000 to 2017. All sectors show no industry herding. The results suggest sector herding is more pronounced during oil market downturns than upturns. Oil market volatility and investor sentiment reduce industry herding. Our findings suggest herding is linked to oil market information. Investors use this information as trading signals, affecting their behavior. When investors fear the market, they make independent decisions based on their own information.

Chang, McAleer, & Wang, (2020) This paper investigates herding in renewable energy using daily closing prices in renewable and fossil fuel energy stock returns in the USA, Europe, and Asia for March 24, 2000–May 29, 2020, which covers the Global Financial Crisis (GFC) (2007–2009) and SARS (2003). COVID-19 pandemic (2019–2020) with CSAD approach. The paper shows that, for low extreme oil returns, investors are more likely to herd; for SARS and COVID-19, herding is more likely during extremely high oil returns after the GFC; and also herding is more likely during periods of extremely low oil returns during coronavirus crises.

(Aslam, Ferreira, Ali, Kauser, 2021) With the spread of Covid-19, investors' expectations and the structure of global financial intermediation changed in 2020. This paper studies these dynamics by quantifying the self-similarity intensity of six Asian and European stock markets. MFDFA is applied to 15-min intraday trade prices from Jan-2020 to Dec-2020. The empirical results confirm that Covid-19 had a significant impact on the stock markets studied.

Méndez and Arias (2021) This report analyses whether COVID-19 affected European herding. Using a sample from the stock exchanges of France (Paris), Germany (Frankfurt), Italy (Milan), the UK (London), and Spain (Madrid), we found evidence that COVID-19 pandemic increased herding behavior in Europe's capital markets.

2.3 IN CONTEXT WITH IRELAND HERDING BEHAVIOR

(Belgacem, Lahiani, 2013) This article examines investor herding around US macroeconomic pronouncements in 18 European nations. They discover evidence that deliberate herding behavior intensity lowers after accounting for US macroeconomic news using daily data from February 3, 2000 to July 31, 2011. They use Christie & Huang (1995) (CSSD) and Chang et al. (2000) (CSAD) model to detect herding. France, Switzerland, and Portugal significantly herd, while Greece does so accidentally. Investors in the first three countries also cluster around US macroeconomic news, showing a false herding habit. Findings reveal that investors in Belgium, Finland, and Ireland make reasonable investment decisions in their home markets but exhibit herding behavior around US announcements, especially in Finland and Ireland.

(Mobarek, Mollah, and Keasey, 2014) This study examines the herd behavior of European markets during the Global Financial Crisis (GFC) and Eurozone Crisis (EZC), encompassing continental, Nordic, and PIIGS (Portugal, Ireland, Italy, Greece, and Spain) markets. According to a comparative country-by-country analysis of herd behavior among European nations, herding is only during crises and in regimes of very extreme market conditions. Herding is not detected in Europe during normal times. During asymmetric market conditions and times of crises, we notice strong herding coefficients, but these vary among country groups. The study also concludes that there are widespread herding tendencies in Europe and that these forces are closely associated among markets of the same kind. They examine country-specific herding behavior for the years 2001 to 2012 in European liquid constituent indexes. They use CCK (2000) (CSAD) model and also employ Chiang and Zheng's (2010) extended model for robustness assessment. They implemented the model in developed markets and added market return along with absolute and squared market return to reduce misspecification error. Ireland and Greece have higher average of CSAD, and detect herding behavior during financial crisis.

(Bouri, Demirer, Gupta, and Nel, 2021) This study aims to explore how the recent new coronavirus outbreak affected investor herding in global stock markets. They study pandemic-induced market uncertainty and herding behavior in 49 worldwide stock markets using a newspaper-based index for the period from January 2019 to 10 August 2020. They analyse whether pandemic-induced uncertainty drives directional similarities across global stock markets that cannot be explained by classic asset pricing models. They use CCK (2000) Model with time varying approach for regression equation to detect herding behavior in emerging markets and European PIIGS (Portugal, Ireland, Italy, Greece, and Spain) market. The findings

say during Covid-19 crisis there is significant herding present compare to pre-covid periods. This shows herding depends on the economy's progress. Our findings link the recent new coronavirus pandemic to investor behavior in financial markets, underlining the importance of catastrophic risks like COVID-19 as a possible driver of financial market behavior.

2.4 RESEARCH GAP

Concerning the study that has been done in the topic thus far, there is not a lot of clarity. Ireland studies' findings were different from one study to the next (e.g., Mobarek at el, 2014 and Belgacem, Lahiani, 2013). The focus goal is to discover the answers to the question, "Does herding behavior exist in the Irish stock market?" because it sheds some light on the research. Understanding the financial dynamics under significant regulatory reforms can help one better understand the herding behavior observed in Irish stock markets at the phases of financial crises.

Social, behavioral, and cognitive aspects affect investors' decisions, according to behavioural finance theories. Investors' decisions might be sensible or irrational and typically reflect their behavioral or cognitive viewpoints. The study is relevant since earlier research implies that herding grows with group size, which reduces market efficiency and diversity advantage. Financial policymakers, investors, and wealth managers must comprehend herding behavior to cope with market fluctuations and make proper judgments. Herding is associated with abrupt market movements, so knowing about it might help investors manage their portfolios. A detailed view of the market and investor sentiments helps in evaluation and decision-making. Identifying emergence, comprehending the existence, and knowing the determinants of herd behavior in the stock market helps an investor formulate decisions, develop self-discipline, and influence others' behaviors.

Herding behavior is frequently used in emerging markets, and there are not many studies that focus on developed markets. For example, the research for Ireland in Mobarek at el, (2014) and Belgacem, Lahiani, (2013) is based on countries across Europe; there have not been any previous studies on Ireland as a separate nation to identify herd behavior. Due to the interconnectedness of the markets, European nations face significant risk during a financial crisis. For example, Global Financial Crisis of 2008, which ultimately caused the Eurozone Crisis, Ireland is one of the most impacted nations. Since different research indicated varied

outcomes in developed, emerging economies, domestic and international investors must examine and verify this behavior before making decisions.

In order to avoid conflicts with the 2007–2009 global financial crisis and the European sovereign debt crisis (2010–2012)., we chose the sample period of 6 years from December 31, 2014–December 31, 2021 which includes Global Pandemic period. Our study solely examines the Irish Stock Market's herd behavior, which helps investors, regulators, and policymakers in making rational investment decisions. The study examines the 6-year daily prices of equities listed on the Irish Stock Exchange (ISEQ-20 Index, the 20 largest Irish listed companies by market capitalization and trading turnover serve as the national benchmark for the Irish economy.) to examine herding behavior. To analyse the data the present study used Cross Sectional Standard Deviation (CSSD), in this method the study evaluated the cross-sectional return dispersion of individual stocks with the market portfolio return and Cross-Sectional Absolute Deviation (CSAD) which is the extended version of CSSD with nonlinear approach for measuring regression for rising and declining markets. It compares two herding measurement methods. This lets us compare results and see if different methods produce different results. The present study aims to fill the above gaps.

2.5 CONCULSION

This chapter presents theoretical foundation and a comprehensive literature analysis on behavioural finance biases, focusing on herding and panic behavior in financial markets. Mutual imitation in financial markets leads to action convergence. Herding is market irregularity. This subject has a lot of relevance for both academics and practitioners due to its broad implications.

CHAPTER 3 – RESEARCH DATA AND METHODOLOGY

3.0 INTRODUCTION

Foreign and domestic investors have driven Irish's stock market boom in recent decades. Stock market investing is a difficult process including numerous aspects. Social, psychological, cognitive, and emotional variables are included. Traditional finance theories emphasize rational, unbiased investors and market efficiency. According to portfolio theory, risk-averse investors arrange their portfolios to maximize expected return on an acceptable amount of systematic risk. The efficient market theory says that stock prices reflect all available information about stocks at any one time. Behavioral finance challenges established theories with theoretical and empirical data and explains anomalies and behavioural biases that cause asset price fluctuations and market instability and inefficiencies.

The methods used to carry out the study is described in the chapter. The study's need and applicability are discussed, its goals are set, its objectives are supported by hypotheses, and its methodology for testing those hypotheses is described, including the study's scope and limitations.

3.1 RESEARCH QUESTION

Below questions are designed to help us learn more about the dynamics at play in the Irish stock market when investors follow the crowd.

- Is there any evidence of herding behavior in Irish Stock Market?
- Does herding exists in extreme (Upper and Lower) market conditions?
- Does herding exists in rising and declining market?

3.2 OBJECTIVES OF THE STUDY

To address the research question, we established a few objectives to investigate evidence of herding behavior in the Irish stock market.

- To investigate herding behavior in Irish Stock Market.
- To investigate herding in extreme market conditions.
- To investigate herding in increasing and decreasing market conditions.

3.3 HYPOTHESIS

Related to objectives, hypothesis is formed.

- H_1: Herding exists in Irish Stock Exchange.
- H_2: Herding present in extreme upper and lower tails.
- H_3: Herding present in bull and bear markets.

3.4 LIMITATIONS

- In this study, we applied herding behavior to the entire market using data from different sources. Primary sources of data from individual investors in the Irish stock market may provide for a more accurate depiction of herding behavior.
- Only Christie and Huang (CH) (1995) and Chang, Cheng, and Khorana (2000) (CCK) approach was employed to examine herding behavior. One can also employ modern methods to learn about the market's collective behavior. It is possible that a deeper comprehension could result from just comparing various approaches.
- The herding behavior is better understood with additional variables such as volatility, trading volume, which were not included in the current investigation.
- Research is conducted using daily market prices. Time frequencies of data which is not considered in this study, such as intraday, weekly, and monthly data, may impact the findings.

3.5 RESEARCH METHODOLOGY

Researchers analyse data to develop a narrative and gain insights. The data analysis procedure makes sense since it reduces enormous chunks of data. There are 3 types of data analysis in research, Qualitative data (having words and descriptions), Quantitative data (deals with numerical figures), Categorical data (presented in groups). (LeCompte, and Schensul, 2012.) This study mostly employs a quantitative methodology. Market information for the ISEQ 20 index from December 31, 2014, to December 31, 2021, had been obtained for the quantitative method. Regression analysis is used, specifically, to examine the market data utilizing statistics. By estimating OLS regressions, market-wide herding is ascertained. Thus, a quantitative approach allows for a deeper comprehension of investor behavior and the ability

to determine whether or not herd behavior persists in the Irish stock market. Additionally, the outcomes of this study are contrasted with secondary data from earlier investigations. The approaches and approach have been thoroughly detailed in the chapter's later portion.

3.6 DATA DESCRIPTION

The dataset used in this study is collected from secondary source Yahoo Finance. The study is conducted based on a sample of ISEQ 20 Index (consisting of the 20 largest Irish listed firms by market capitalization and trading turnover, it has been used as a measure of Ireland's economic performance for decades), individual companies and the market as a whole are included. In order to avoid conflicts with the 2007–2009 global financial crisis and the European sovereign debt crisis (2010–2012), we chose the sample period of 6 years from December 31, 2014–December 31, 2021 which includes Global Pandemic period. According to Vieira and Pereirab, (2015) missing values are substituted with the last price created.

To calculate the cross-sectional stock returns, daily closing prices (Chang, McAleer, & Wang, 2020) of the listed companies on ISEQ 20 Index for 6 years has been obtained, this time frame can be viewed as being extremely important for research because it witnessed the world economy's major boom and fall due to covid-19. The daily sample date consists of 1779 observations. Following (Aslam, Ferreira, Ali, Kauser, 2021) the individual daily stock returns listed on ISEQ 20 Index and the market returns are calculated as

$$R_{it} = LN (P_{it} / P_{i (t -1)}) *100$$

Where R_{it} is the stock returns on day t, LN is usual natural logarithm, P_{it} is the closing price of the stock on day t, $P_{i (t -1)}$ is the closing price of the stock on the previous day.

3.7 METHODOLOGY

Several ways of evaluating herding in stock markets have been proposed in previous empirical studies.

Herding approaches focus on grouping decisions, according to Bikhchandani and Sharma (2001). It does not recognize the link between purposeful and spurious herding and the empirical design employed to test for herding. They say it is hard to analyze and quantify the true elements of herding.

Lakonishok et al. (1992) defined herding as the average tendency of a group of investors to trade on particular equities at the same time. It sought correlation in trade patterns, which need not imply herding. His method was criticized for ignoring the amount of stock exchanged while focusing on investors and for failing to uncover Intertemporal trading patterns (Bikhchandani and Sharma, 2001).

After that, a growing body of studies investigated herding in stock markets utilizing market return dispersion during big price fluctuations (Christie and Hawang, 1995; Chang, Cheng, and Khorana 2000; Tan et al., 2008).

Christie and Hawang (1995) argued that during periods of market pressure, stock returns cluster, showing a co-movement of share prices regardless of their fundamental characteristics. In times of market stress, investors tend to conceal their own convictions and join the herd. Cross-sectional return dispersion is minimal when investors herd.

Hwang and Salmon (2004) studied cross-sectional factor sensitivity variability. Their herding measure pertains to market beta dispersion. This research is based on dispersion-based herding metrics and an alternative proposed by Chang et al. (2000).

3.8 PRIOR HERDING MODELS

Christie and Hawang (1995) and Chang et al. pioneered market-wide herding detection (2000). Christie and Hawang (1995) recommend using dispersion to quantify investor herds' market influence. It evaluates individual returns' proximity to market returns. Below zero limits dispersal. Individual profits vs market returns increase dispersion. Market-wide herding indicates less dispersion. Dispersal is measured by cross-sectional standard deviation (CSSD). The authors also argue that amid major market movements, people are more likely to follow

the market. This means investors will only consider market performance. Individual returns will not differ much from market returns. This implies CSSD will be lower than usual. In rational asset pricing models, dispersion increases during major market moves.

Cross-sectional absolute deviation is also measured (CSAD). Chang et al. (2000) modify CH's (1995) approach to detect market-wide herding. CH (1995) assume rational asset pricing models predict more dispersion during market stress. Also, rational asset pricing models imply a linear relationship between asset dispersion and market performance. Thus, dispersal increases with market return. The authors employ CSAD, based on the conditional CAPM, to measure dispersal. Herd behavior in the market implies a decrease in dispersal and a non-linear relationship between dispersal and market return. This means dispersal will be less than proportional to market return. Chang et al. (2000) can detect herding in normal market conditions, unlike CH (1995).

3.9 METHODS FOR MEASURING HERDING BEHAVIOR

Researchers struggle to examine herding in financial markets. Since herd behavior describes investor behavior, it is difficult to identify just examining stock trading patterns. Herd behavior and trade are difficult to distinguish. In most earlier studies, researchers used cross-sectional stock return dispersion to identify herding in financial markets by analysing stock trading. (Christie and Huang (1995), Chang et al. (2000), Gleason et al. (2003).

Investors may pick up trading tips from one another in times of market volatility, crisis, and other extreme events. As a result, herding may lead to a reduction in the cross-sectional variation of stocks. In this study we adopt two measures to test the herding behavior in ISEQ 20 Index. First, Christie and Huang (1995) (CH) and second, Chang et al. (2000) (CCK) suggest utilizing stock daily returns to identify herding.

Christie and Huang (1995) (CH) say market state affects how market participants invest. In times of stability, rational asset pricing models suggest, returns will rise along with stock prices. During uncertain price movements, people hide their personal thoughts and focus on general market behavior. Under these conditions, share prices should cluster around the market value. They claim that herding, or extreme returns on portfolio risk, will increase under bad market situations.

Adopting the Christie and Huang (1995)'s Cross Sectional Standard Deviation (CSSD) measure on return's dispersion which defines the herding variable as the similarity between stock returns and overall market returns. The stock returns should therefore not deviate significantly from the mean market in the case of herding. To calculate CSSD we use the following equation –

$$\text{CSSDt} = \sqrt{\frac{\sum_{t}^{n}(R_{it}-R_{m,t})^2}{N_t-1}} \qquad (1)$$

Where N is the total number of stocks in the index sample, R_{it} is daily individual stock returns on day t, R_{mt} is the overall market returns for daily data t.

According to Christie and Huang (1995) during instances of substantial average price movements or market stress, rational asset pricing models and herd behavior diverge most. Because individual securities' susceptibility to market return varies, rational asset pricing models predict increasing dispersion under market stress. Individual return herding reduces dispersion. To distinguish the degree of dispersion, in the extreme tails of market return distributions and evaluated whether it differed considerably from the average dispersion. The following regression was used:

$$\text{CSSD}_t = \alpha + \beta^L D_t^L + \beta^U D_t^U + \varepsilon_t \qquad (2)$$

CSSD is Cross sectional standard deviation at time t, β^L and β^U are the coefficients of D_t^L and D_t^U, D_t^L is a dummy variable where the value of market returns lies in extreme lower tail markets return on dispersion and D_t^U is where the value of market returns lies in extreme upper tail markets return on dispersion.

According to the model, if herding happens when market returns are in the extreme lower tail of the return dispersion then β^L will be negative and if herding happens when market returns are in the extreme upper tail of the return dispersion then β^U will be negative. According to this hypothesis, if herding happens, investors will take similar actions, resulting in smaller return dispersion. (Christie and Huang, 1995)

CSSD has limitations, such as not accounting for asymmetric returns distributions and outliers. Second, alternative approach by Chang et al. (2000) modified the CSSD measure and propose the Cross-sectional Absolute deviation (CSAD) measure as a proxy for herding. Herd behavior can occur under regular market circumstances as well, however the CH theory neglected this reality, therefore to correct this issue CCK model is used where it helps to identify the nonlinear

relationship between the overall stock return and the single returns on equity in order to understand the irregular herding behavior that occurs in various market situation. Single equities return should not deviate and should follow the broader market returns when there is herding. CSAD Equation –

$$\text{CSAD}_t = \frac{1}{N} \sum_{i=1}^{N} [R_{i,t} - R_{m,t}] \qquad (3)$$

Where N is the total number of stocks in the index sample, $R_{i,t}$ is daily absolute individual stock returns on day t, $R_{m,t}$ is the overall absolute market returns for daily data t.

When markets crowd, stock returns should converge towards the average market trend, not deviate. $[R_{m,t}]^2$ captures the nonlinear link between CSAD and market returns. As dispersion and market returns have a negative relationship, y_2 should be negative when herding occurs (see Chang et al., 2000).

$$\text{CSAD}_t = \alpha + y_1 [R_{m,t}] + y_2 [R_{m,t}]^2 + \varepsilon \qquad (4)$$

CSAD is a measure of return distribution, $R_{m,t}$ is daily absolute market returns at time t. $[R_{m,t}]^2$ is squared returns of daily absolute market returns. The fact that y_2 has a negative substantial value demonstrates that traders on the Irish stock market exhibit herding behavior.

Finally, the Chang et al. (2000) model is expanded to two distinct market situations, i.e., rising market conditions or a bull market and declining market conditions or a bear market, to explore the asymmetric herd behavior patterns in bull markets and bear markets the regression equation as follows:

$$\text{CSAD}_{\text{UP}} = \alpha + y_1 [R_{m,t\ UP}] + y_2 [R_{m,t\ UP}]^2 + \varepsilon \qquad (5)$$

$$\text{CSAD}_{\text{down}} = \alpha + y_1 [R_{m,t\ down}] + y_2 [R_{m,t\ down}]^2 + \varepsilon \qquad (6)$$

Where CSAD$_{\text{UP}}$ and CSAD$_{\text{down}}$ are cross sectional absolute deviation of daily increasing in bull market (UP) and decreasing bear market (DOWN) $R_{m,t\ UP}$ and $R_{m,t\ down}$ is daily market returns at time t. $[R_{m,t\ UP}]^2 and [R_{m,t\ down}]^2$ is absolute squared returns of daily market returns. If the market returns more than 0 then it is bull market (Up) and if the market returns are lesser than 0 then it is bear market (Down). Herd is detected when y_2 has a negative substantial value.

CHAPTER 4 – FINDINGS AND ANALYSIS

4.0 INTRODUCTION

The information from the ISEQ 20 index was utilized from 2015 to 2021. The daily closing value % returns for the ISEQ 20 index have been computed. The most recent price created is used to fill in the missing numbers. The percentage return on this stock has been calculated using the daily closing price. Since closing prices reflect the market's behavior for the entire day, they are typically used to spot panic and herding. Data for the specified time period was taken from the Yahoo Finance website. The investigation then employs the tested methodology described by Christie and Huang (1995) and Chang et al (2000). This model is built using a regression analysis to determine how market stress affects each individual's return dispersion.

4.1 DESCRIPTIVE STATISTICS

Table 1 shows the summary descriptive statistics for Market Return (Rm,t), CSSD, CSAD, and market returns during bull and bear markets for the sample of 6 years (2015 to 2021). The sample period's mean market return $(R_{m,t})$ is 0.000304619, with a maximum of 0.075157129 and a minimum of -0.107758681. Standard deviation of ISEQ 20 Index stock market return is 0.012532326, The more spread out the data, market returns have the higher the standard deviation. CSSD having the higher averaged mean value of 0.019240688 compare to CSAD with a maximum and minimum of 0.112904394 to 0.004408486 and even with Standard Deviation of CSSD is higher than CSAD of 0.009960303. CSAD mean is 0.013850621 with maximum of 0.082177419 and minimum of 0.001695151 and standard deviation is 0.006799752. Bull market mean is 0.004436092 with maximum of 0.075157129 and minimum of 0 and standard deviation is 0.007177039. Bear market mean is -0.004131473 with maximum of 0 and minimum of -0.107758681 and standard deviation is 0.008299005. Considering all Standard deviation which is high can be caused by market volatility or uncertainty.

"Kurtosis" was used to determine sample distribution in the study period. If the sample's Kurtosis value is 3, the distribution is normal. Less than or more than "three" implies a non-normal sample.

Our summary statistics of Kurtosis which shows in the table 1 is higher than 3 in all the variables showing the samples are not normally distributed. According to authors we still can

conduct analysis when a dependent variable is not normally distributed, large-sample linear regression is nevertheless statistically valid. The study shows adequate sample sizes greater or less than 3000 for linear regression even if normality is broken. (Li, Wong, Lamoureux, and Wong, 2012), (Yao et al., 2014).

Vieira and Pereirab, (2015) Kurtosis measures return distribution. Since the value is always positive, the distribution is leptokurtic, meaning some sample values are distant from the average. This means more positive and negative returns than average. Leptokurtic tails are thick. This distribution likely characterizes economic and financial time series (Peters, 1996). According to this writer, one of the most typical causes for these tails is that the information is clustered, not linear. As information is leptokurtic, so are returns. Several empirical finance research have revealed that daily, weekly, and monthly returns on financial assets do not follow a normal distribution.

"Skewness measures a variable's symmetry. If a variable's responses are skewed, the distribution is skewed. Kurtosis measures whether the distribution is too peaked (narrow and centered)." When both skewness and kurtosis are zero, reactions are considered normal. A number larger than +1 or less than -1 indicates a skewed distribution. The distribution is too peaked if kurtosis is bigger than +1. A kurtosis below –1 indicates a flat distribution. Non-normal distributions display excessive skewness and/or kurtosis. Hair et al (2017).

It assesses a sample's probability distribution's symmetry. Near zero skewness scores suggest normality. If skewness values are larger than zero, the sample distribution is skewed to the right; otherwise, it is skewed to the left. From Table 1 it is clear that the Rmt values of the observed daily samples show the negative Skewness of -1.096375712 and Rmt during bear market shows -5.112809553 skewed, which means both the variable are skewed to left and, in the rest, all the skewness values are more than zero indicating that the distribution of the data is skewed to right. The study's sample distribution is therefore not normal.

Figure 1 – CSSD, CSAD and MARKET RETURNS
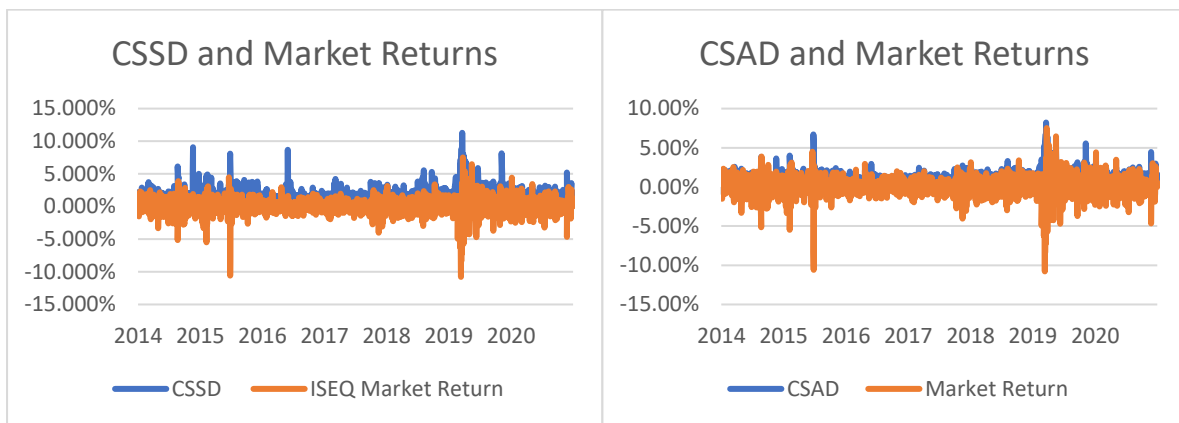
Figure 1 represents that there is a variation between how two herding measures move with Market returns.

				Rm,t During Bull Market	Rm,t During Bear Market
Table 1					
Descriptive Statistics for the Entire Study Period					
Observations	**Rm,t**	**CSSD**	**CSAD**	**Rm,t During Bull Market**	**Rm,t During Bear Market**
Mean	0.000304619	0.019240688	0.013850621	0.004436092	-0.004131473
Minimum	-0.107758681	0.004408486	0.001695151	0	-0.107758681
Maximum	0.075157129	0.112904394	0.082177419	0.075157129	0
SD	0.012532326	0.009960303	0.006799752	0.007177039	0.008299005
Kurtosis	11.01650609	18.08669451	19.92545653	13.53966773	43.0201996
Skewness	-1.096375712	3.286199103	3.387960605	2.86623573	-5.112809553
Note: Standard Deviation (SD), Index Market returns (Rmt)					

4.2 ANALYSIS OF HERDING BEHAVIOR IN IRISH STOCK MARKET

First, we employ the technique suggested by (Christie and Huang, 1995) to identify the presence of herds using the regression equation (2). The results for our hypothesis H_1: Herding exists in Irish Stock Exchange and H_2: Herding present in extreme upper and lower tails are tested by this.

Table 2 shows daily market level and market phase regression results. It explains the extreme lower and upper market results. Furthermore, 1%, and 5% criteria are specified as the extreme limits, respectively, to signify market stress. According to this theory, herding is more prevalent at times of extreme price movements.

Equation (2) used two extreme market movement criteria. This study suggests that dispersion across the index during significant market downturns is more uniform than during abnormally strong price upswings. The strength of these results in favour of rational asset pricing shows few follow the Pied Piper as he rallies investors around market or industry returns. (Patterson and Sharma, 2007).

Cross-sectional standard deviation of returns is a natural measure of herd behavior, but it can be sensitive to outliers. For robustness, we reproduced the market return distribution's top tail. The concept of an extraordinary market return is arbitrary. Table 2 shows overall regression estimates.

The results from both Panel A and Panel B do not support herd formation during major market return changes. Regressions have positive and significant coefficients. All coefficients are positive, showing that stock return dispersion increases during price movements.

Table 2: Regression Results for Herding Behavior			
Results of CH model			
CSSD$_t = \alpha + \beta^L D_t^L + \beta^U D_t^U + \varepsilon_t$			
Panel A: Extremely Low/High Market Returns at 1%			
Variables	*Coefficients*	*t Stat*	*Standard Error*
Intercept (α)	0.018632524*	86.91106689*	0.000214386*
Upper Tail 1% (D_t^U)	0.029513339*	13.52207188*	0.002182605
Lower Tail 1% (D_t^L)	0.034129216*	15.63691961*	0.002182605*
R Square	0.192477315*		
Adjusted R square	0.191567943*		
F-Statistics	211.6595098*		

Panel B: Extremely Low/High Market Returns at 5%			
Variables	*Coefficients*	*t Stat*	*Standard Error*
Intercept (α)	0.01783795*	79.1480516*	0.000225374*
Upper Tail 5% (D_t^U)	0.015663317*	15.94889756*	0.000982094*
Lower Tail 5% (D_t^L)	0.012375682*	12.60132105*	0.000982094*
R Square	0.181220735*		
Adjusted R square	0.180298687*		
F-Statistics	196.541388*		
* Indicates 95% significance.			

Second, we employ the technique suggested by Chang, Cheng, and Khorana (CCK) (2000) to identify the presence of herds using the regression equation (4). The results for our hypothesis H$_1$: Herding exists in Irish Stock Exchange can be tested.

CSAD is a measure of return distribution, The fact that in equation (4) y_2 has a negative substantial value demonstrates that traders on the Irish stock market exhibit herding behavior.

The CH model only works under normal conditions. To evaluate robustness, regression Equation (4) is applied using the CCK model (Table 3). Positive intercept and absolute values show that Irish stock market participants do not show any herding.

Table 3: Regression Results for Herding Behavior			
Results of CKK model			
$\text{CSAD}_t = \alpha + y_1[R_{m,t}] + y_2[R_{m,t}]^2 + \varepsilon$			
Variables	*Coefficients*	*t Stat*	*Standard Error*
Intercept (α)	0.009806254*	50.20170833*	0.000195337*
ABS Returns $y_1[R_{m,t}]$	0.446134159*	18.56582714*	0.024029856*
ABS Squared Returns $y_2[R_{m,t}]^2$	1.328862759*	3.295630128*	0.403219629*
R Square	0.470097119*		
Adjusted R square	0.469201508*		
F-Statistics	524.8901357*		
* Indicates 95% significance.			

At last, the Chang, Cheng, and Khorana (2000) model is extended to account for two unique market situations: a bull market and a bear market. Bull market (Up) if the market's return is greater than zero, and a bear market (Down) if it is less than zero. When y_2 coefficients have a highly significant negative value, it indicates the presence of a herd.

The results for our hypothesis H3: Herding present in bull and bear markets can be tested.

Results of daily regression analyses on aggregate market level and market phases are detailed in Table 4 (Panel A and B). It similarly clarifies the outcomes in both a rising and falling market. The presence or absence of herding behavior can be deduced from the significance of the negative values of the coefficients y_2. In both the rising and declining phases, the values of y_2 are positive and statistically significant at the 5% level. It is established through the analysis that the market return is directly proportional to the CSAD in all market movements, as measured by daily observations. The reason for this is that the rational market reflects the varying beliefs of investors through the varied reactions of individual securities to the market return. (Yao, 2014).

<table>
<tr><td colspan="4">Table 4: Regression Results for Herding Behavior</td></tr>
<tr><td colspan="4">Panel A: Results of CCK model for Bull Market</td></tr>
<tr><td colspan="4">$$\text{CSAD}_{UP} = \alpha + y_1[R_{m,t\ UP}] + y_2[R_{m,t\ UP}]^2 + \varepsilon$$</td></tr>
</table>

Variables	*Coefficients*	*t Stat*	*Standard Error*
Intercept (α)	0.009687123	54.74948151	0.000176935
Bull Market $y_1[R_{m,t\ UP}]$	0.923618976	23.22464697	0.039768914
Bull Squared $y_2[R_{m,t\ UP}]^2$	2.931680963	3.383895465	0.866362745
R Square	0.470271999		
Adjusted R square	0.469376684		
F-Statistics	525.2587472		

<table>
<tr><td colspan="4">Panel B: Results of CKK model for Bear Market</td></tr>
<tr><td colspan="4">$$\text{CSAD}_{down} = \alpha + y_1[R_{m,t\ down}] + y_2[R_{m,t\ down}]^2 + \varepsilon$$</td></tr>
</table>

Variables	*Coefficients*	*t Stat*	*Standard Error*
Intercept (α)	0.009581436*	53.26944688*	0.000179867*
Bear Market $y_1[R_{m,t\ down}]$	-0.97883461*	-26.1827994*	0.037384643*
Bear Squared $y_2[R_{m,t\ down}]^2$	0.712506266*	1.74015632*	0.409449575*
R Square	0.467762652*		
Adjusted R square	0.466863096*		
F-Statistics	519.9927632*		

Note: $R_{m,t\ down}$ (dummy series of 0) and $R_{m,t\ UP}$ (dummy series of 1)

4.3 SUMMARY OF FINDINGS

This chapter experimentally studied herding behavior in the Irish stock market using ISEQ 20 Index data. The study used a static measure Christie and Hawang (1995) and Chang et al (2000). By employing the first metric, the study measured market-wide extreme up-and-down herding behavior. The second method measured bull and bear market herding. This study used stock and market returns, CSSD, and CSAD. The study found no herding behavior in both market-wide and bull-bear phases, so all the null hypotheses were rejected because the beta coefficients were positive and statistically significant.

CHAPTER 5 – EMPIRICAL RESULTS AND DISCUSSION

5.0 INTRODUCTION

Complexity, unpredictability, insufficient and asymmetric information, in developed and developing markets, made investing harder and generated several behavioral difficulties. Liberalization and investment setting convolution made investment environment tight and investment decisions difficult. Behavioral finance illustrates that market behavior can affect the price of an item. Researchers and practitioners in developed and developing markets are interested in the link between asset mispricing and behavioral difficulties. Mixed results have no consensus. Herding behavior in the stock market is one of the most significant but rarely discussed areas of behavioral finance. It has the capacity to seriously impact the market, misprice assets, and cause market inefficiencies.

This chapter analyses the empirical analysis's conclusions on herding behavior in the Irish Stock Market. This study examined market-wide (extreme movements) and bull / bear stage herd behavior in the Irish stock market from 2015 to 2021. The analyses found no herding behavior on the Irish Stock Market (Euronext Dublin), utilizing 6 years of daily ISEQ 20 Index data from December 2014 to December 2021. The study analysed herding using CH and CCK model. The first method measured market-wide (extreme movements) herding behavior during the whole study period. The second way measured bull / bear phase herding behavior. This analysis used stock, market returns, CSSD, and CSAD.

5.1 RESULTS OF THE STUDY

The herding behavior of the Irish Stock Market has been examined during the entire study period, which covers global pandemic era also from 2015 to 2021, The analysis is based on a sample of ISEQ 20 Index (which measures Ireland's economic success by market capitalization and trading turnover) using the methods of CH and CKK during the times of market stress. The researcher observed no evidence of herding behavior during the market-state study. Daily returns were used to capture short-term herding behavior in the Irish stock market. The analysis did not find brief herding movements in the Irish Stock Market by utilizing Cross Sectional Standard Deviation or Cross-Sectional Absolute Deviation measurements.

Christie and Huang (1995) and Chang et al. (2000) suggest utilizing stock daily returns to identify herding. CH argues market state affects how market participants invest. In times of

stability, rational asset pricing models suggest, returns will climb along with stock prices. During uncertain price movements, people hide their personal thoughts and focus on general market behavior. Under these conditions, share prices should cluster around the market value. They claim that herding, or extreme portfolio risk returns, will increase in bad market situations.

We first employed CH model to detect herding. According to this model, when implementing the regression equation (2) if herding occurs when market returns are in the extreme lower tail of the return dispersion, then β^L will be negative, and if herding occurs when market returns are in the extreme upper tail of the return dispersion, then β^U will also be negative. This is because the model predicts that these two scenarios will both result in herding. If one accepts this theory, it predicts that when herding occurs, investors will behave in a manner that is similar to one another, which will result in a narrower range of possible returns. 1%, and 5% criteria are set as the extreme limits, From the table 2 of regression results both from Panel A and Panel B, all coefficients are all positives with statistically significant of 5%, CSSD in 1% extreme market is 0.018632524 and t-stats 86.91106689 and for 5% extreme markets CSSD is 0.01783795 and t-stats is 79.1480516, with Lower Tail 1% (D_t^L) is 0.034129216 and Upper Tail 1% (D_t^U) is 0.029513339 and for Lower Tail 5% (D_t^L) is 0.012375682 and Upper Tail 5% (D_t^U) is 0.015663317 also we can see t-stats are very far and higher than the coefficients and standard error, stating that how significant a difference is in comparison to the whole range of your sample data. More value of t-stats magnitude gives the evidence of rejecting null hypothesis.

CH (1995) method helped us to solve the first two research questions - Is there any evidence of herding behavior in Irish Stock Market? And does herding exists in extreme (Upper and Lower) market conditions? The findings of Table 2, Panel A and Panel B do not provide evidence to support the establishment of herds in response to significant changes in market return. The coefficients of the regressions are positive and statistically significant. All of the coefficients are positive, indicating that there is an increase in the stock return dispersion during price fluctuations. As a result, the null hypothesis for H_1 and H_2 must be rejected because there was no formation of a herd.

Our findings with CH model are consistent with other studies as Amirat and Bouri (2009), Ganesh, Naresh, and Thiyagarajan (2015), Bensaida, Mouna, and Houda (2015), Demirer and Kutan (2006), Patterson and Sharma, (2007). Research on Ireland (Belgacem, Lahiani, 2013)

echoes this sentiment, claiming that investors there do not follow one another in response to sudden shifts in the market but do follow the lead of the US economy when it comes to major economic developments. This observation lends to the idea of rational asset pricing models, which state that times of heightened market volatility will result in larger degrees of dispersion due to the fact that the degree of sensitivity of individual returns will vary from that of the market return (Demirer & Kutan, 2006).

The above strategy includes specifying extreme returns. According to Demirer and Kutan (2006) CH uses 1% and 5% as thresholds to separate the daily return's top and bottom tails. In practice, investors' definitions of excessive returns may differ, and daily return requirements may change over time. Herding behavior can be seen across all market returns, but it is more visible under poor market situations, and the CH method only identifies it then.

Second, we employ CCK model to measure herding intensity in Irish market as well as bear and bull markets to investigate herding pattern abnormalities under high market fluctuations (CSAD). From the results we observed there is no indication of herding in the Irish stock market based on the results of the whole sample, which covers the period from 2015-2021. This holds true for both normal market situations and up and down-market conditions. On the other hand, it results in a substantial coefficient that is positive (i.e., the existence of negative herding).

CCK says rational asset pricing theories presume a linear link between stock returns and market returns. As the absolute value of the overall return rises, so will asset distributions. During moments of large market price changes, investors may herd. This behavior certainly aims to strengthen stock return correlation, and dispersion between returns will likely diminish or rise at a rate not proportional to market return. (BenMabrouk & Litimi, 2018). In the empirical test, a negative coefficient y_2 are compatible with herding behavior. Herd behavior can occur in normal market conditions, but CH theory ignored this. To fix this, CCK model helps find the nonlinear link between total stock return and single returns on equity to analyse irregular herding behavior. When herding occurs, single equity returns should reflect larger market returns.

According to this model, when implementing the regression equation (4) a negative coefficient y_2 indicates herding in Irish Stock Market. After conducting the robustness analysis, the regression results from the Table 3 shows CSAD coefficients are 0.009806254 and t-stats is 50.20170833. $y_1[R_{m,t}]$ is 0.446134159 and t-stats is 18.56582714. $y_2[R_{m,t}]^2$ is 1.328862759

and t-stats is 3.295630128. This indicates that the Irish stock market participants do not exhibit any herding behavior, as demonstrated by the positive intercept and positive absolute values. Because of this, we were able to solve hypothesis H_1, which required us to reject the null hypothesis, as well as the research question - Is there any evidence of herding behavior in Irish Stock Market? due to the absence of any evidence of herding behavior.

Lastly, the CCK model is extended to include two distinct market situations, namely, rising market conditions, also known as a bull market, and declining market conditions, also known as a bear market, in order to investigate the asymmetric herd behavior patterns that are present in bull markets and bear markets respectively. If the market returns more than 0, it is bull market (Up), while less than 0 is bear market (Down). When implementing nonlinear regression equation (5) and (6) a negative coefficient y_2 indicates herding in Irish Stock Market. In our results from Table 4, using 5% significance, Panel A, the bull market mainly y_2 is positive and all other coefficients are also positive where CSAD is 0.009687123 with far distributed t-stats 54.74948151. $y_1[R_{m,t\ UP}]$ is 0.923618976 and t-stats is 23.22464697. $y_2[R_{m,t\ UP}]^2$ is 2.931680963 and t-stats is 3.383895465. Panel B, the bear market, $y_1[R_{m,t\ down}]$ shows negative values, coefficient is -0.97883461 and t-stats is -26.1827994. $y_2[R_{m,t\ down}]^2$ is 0.712506266 and t-stats is 1.74015632.

According to CCK (2000), an indication of herding in the market can be inferred from a non-linear equation if the value of the parameter y_2 is significantly negative but however Since the non-linear term is not significantly negative, CSAD has not declined as the average price has risen. The above study suggests that rational asset pricing models have not been broken. Hence y_1 coefficient of bear market is not considered to be significantly negative and resulting in no herding behavior in Irish Stock Market. As a result, we reject the null hypothesis H_3 and answers third research question - Does herding exists in rising and declining market? Since no herding is detected while measuring CH and CKK methods in Irish Stock Market.

The findings that we obtained using the CKK model are in line with those of earlier investigations, such as Chang et al. (2000), (Demirer & Kutan, 2006), (Gleason et al., 2004), Kumar, Bharti (2017), (Sihombing, Sadalia, and Wibowo, 2021). In context with Ireland, according to (Belgacem, Lahiani, 2013) Ireland investors make rational decision in the domestic market. However, Mobarek, Mollah, and Keasey, (2014) and Economou et al., 2011 argues that in developed markets the presence of herding is present during financial crisis. The recent global pandemic covid-19 crisis dealt a significant blow to the world's financial markets,

and a recent study (Bouri, Demirer, Gupta, and Nel, 2021) claims that in Ireland during the times of the covid 19 crisis, significant herding was observed. However, our research did not find any evidence of significant herding in the Irish stock market as our focus was over the course of the past six years.

The findings indicate that empirical herding measurement are dependent on the method employed as well as the data that was obtained.

CHAPTER 6 – CONCLUSION

The current study used secondary data to examine investor herd behavior on the Irish stock market. Herding behavior is typically described by copying other people's behaviors. Such behavior can be found in both the personal and professional areas of life. When someone is unsure of themselves, they often model their behavior after other people. Herding occurs in the financial markets when investors unintentionally or actively copy other people's investment choices. This might result in investors receiving unusual market returns, which would increase market inefficiencies. The current study's literature evaluates herd behavior across a different time span. Herd behavior in the Irish stock market will reveal how investors make judgments and strategies. It helps us analyze Irish stock market risk and efficiency.

Herd behavior can cause extraordinary market volatility as investors follow market consensus instead of making their own financial decisions. This disrupts market balance. Because of this, it is absolutely necessary for the decision-makers to understand the phenomenon that lies behind the illogical investing behavior of market players. As a result of keeping all of these considerations in mind, the current investigation had three main focuses. The first objective of the study was to determine whether or not herding occurs in the Irish stock market and the second objective was to look into herding behavior in extremely volatile markets. The research used a sample of the ISEQ 20 index and applied a regression model developed by Christie and Huang (1995) to daily data for a period of six years, beginning in January 2015 and ending in December 2021. In contrast to the findings of earlier research on developed markets, the present investigation found no evidence of considerable herding in either the upper or lower extremes of market conditions.

However, the CH model can only be used when the conditions are considered normal. The aforementioned model cannot be implemented when there is instability in the market. In addition to this, the third objective was to look into herding in both bull and bear markets. Chang et al. (2000)'s regression model that was developed was utilized so that this constraint may be removed. The herding patterns were shown to be nonlinear as a result of the research. In the end, the research was expanded to include two stages of the market that are fundamentally opposed to one another (bull and bear markets) in order to examine the irregularity of the herding behaviors, the CCK regression used to test herding in bear and bull market and results indicated no evidence of herding in bull and bear markets. The current study concluded that there is no evidence of herding behavior on the Irish stock market as well as in

bull/bear markets and rejecting all the null hypothesis. To put it another way, investors do not follow the actions of other investors under any type of market (bull or bear) circumstance; rather, they tend to make reasonable investment decisions based on their own personal preferences.

6.0 SUGGESTIONS

- Academics can use the study's results. Ireland's herd behavior is not well-studied. Few studies have found herding in the Irish stock market. Academicians have many opportunities. They can use the study's data to examine herd behavior in different time periods and investment alternatives.

- Portfolio analysts help individuals and companies plan investments. This investigation validates established financial models. Analysts can use secondary and primary data research to offer investment recommendations. Relevant research parameters can help analysts comprehend retail investors' psychology and design optimal portfolios. Using these models, analysts can create financial strategies for investors and companies.

6.1 SCOPE FOR FURTHER RESEARCH

- Commodity and futures markets are good places to study herding behavior.
- Since the majority of the research saw herding behavior as an abnormal condition, analysing herding behavior using daily data frequency and intraday data would provide evidence in favour of the literature that has already been published.
- This study focused on Return. Considering other variables improves comprehension of financial market herding behavior. The study could be expanded to include micro market events.
- This study focused on CH and CKK approach, academics can use different measure to test herding behavior.

REFERENCES

Ahsan, A.F.M. and Sarkar, A.H., 2013. Herding in Dhaka stock exchange. *Journal of Applied Business and Economics*, *14*(2), pp.11-19.

Amirat, A. and Bouri, A., 2009. A New Measure of Herding Behavior: Derivation and Implications. *International Journal of Psychological and Behavioral Sciences*, *3*(6), pp.1287-1301.

Asiri, B., 2008. Testing weak-form efficiency in the Bahrain stock market. *International journal of emerging markets*.

Aslam, F., Ferreira, P., Ali, H. and Kauser, S., 2022. Herding behavior during the COVID-19 pandemic: A comparison between Asian and European stock markets based on intraday multifractality. *Eurasian Economic Review*, *12*(2), pp.333-359.

Avery, C. and Zemsky, P., 1998. Multidimensional uncertainty and herd behavior in financial markets. *American economic review*, pp.724-748.

Banerjee, A.V., 1992. A simple model of herd behavior. *The quarterly journal of economics*, *107*(3), pp.797-817.

Banerjee, V. (1997). A Simple Model of Herd Behaviour. The Quarterly Journal of

Barber, B.M. and Odean, T., 1999. The courage of misguided convictions. *Financial Analysts Journal*, *55*(6), pp.41-55.

Barberis, N. and Thaler, R., 2003. A survey of behavioral finance. *Handbook of the Economics of Finance*, *1*, pp.1053-1128.

Bekiros, S., Jlassi, M., Lucey, B., Naoui, K. and Uddin, G.S., 2017. Herding behavior, market sentiment and volatility: will the bubble resume? *The North American journal of economics and finance*, *42*, pp.107-131.

Belgacem, A. and Lahiani, A., 2013. Herding behavior around US macroeconomic announcements. *Journal of Applied Business Research (JABR)*, *29*(5), pp.1401-1410.

BenMabrouk, H. and Litimi, H., 2018. Cross herding between American industries and the oil market. *The North American Journal of Economics and Finance*, *45*, pp.196-205.

BenSaïda, A., 2017. Herding effect on idiosyncratic volatility in US industries. *Finance Research Letters*, *23*, pp.121-132.

BenSaïda, A., Jlassi, M. and Litimi, H., 2015. Volume–herding interaction in the American market. *American Journal of Finance and Accounting*, *4*(1), pp.50-69.

Bikhchandani, S. and Sharma, S., 2001. Herd behavior in financial markets. *IMF Staff Papers*, *2001*(002).

Bouri, E., Demirer, R., Gupta, R. and Nel, J., 2021. COVID-19 pandemic and investor herding in international stock markets. *Risks*, *9*(9), p.168.

Bowe, M. and Domuta, D., 2004. Investor herding during financial crisis: A clinical study of the Jakarta Stock Exchange. *Pacific-Basin Finance Journal*, *12*(4), pp.387-418.

Caparrelli, F., D'Arcangelis, A.M. and Cassuto, A., 2004. Herding in the Italian stock market: a case of behavioral finance. *The Journal of Behavioral Finance*, *5*(4), pp.222-230.

Carhart, M.M., 1997. On persistence in mutual fund performance. *The Journal of finance*, *52*(1), pp.57-82.

Chang, C.L., McAleer, M. and Wang, Y.A., 2020. Herding behaviour in energy stock markets during the Global Financial Crisis, SARS, and ongoing COVID-19. *Renewable and Sustainable Energy Reviews*, *134*, p.110349.

Chang, E.C., Cheng, J.W. and Khorana, A., 2000. An examination of herd behavior in equity markets: An international perspective. *Journal of Banking & Finance*, *24*(10), pp.1651-1679.

Chen, T., 2013. Do investors herd in global stock markets? *Journal of Behavioral Finance*, *14*(3), pp.230-239.

Chiang, T.C. and Zheng, D., 2010. An empirical analysis of herd behavior in global stock markets. *Journal of Banking & Finance*, *34*(8), pp.1911-1921.

Choe, H., Kho, B.C. and Stulz, R.M., 1999. Do foreign investors destabilize stock markets? The Korean experience in 1997. *Journal of Financial economics*, *54*(2), pp.227-264.

Choi, N. and Sias, R.W., 2009. Institutional industry herding. *Journal of financial economics*, *94*(3), pp.469-491.

Christie, W.G. and Huang, R.D., 1995. Following the pied piper: Do individual returns herd around the market? *Financial Analysts Journal*, *51*(4), pp.31-37.

Compton, W.S., Johnson, D.T. and Kunkel, R.A., 2006. The turn-of-the-month effect in real estate investment trusts (REITs). *Managerial Finance*.

Cote, J. and Goodstein, J., 1999. A breed apart? Security analysts and herding behavior. *Journal of Business Ethics*, *18*(3), pp.305-314.

Demirer, R., Kutan, A.M. and Chen, C.D., 2010. Do investors herd in emerging stock markets? Evidence from the Taiwanese market. *Journal of Economic Behavior & Organization*, *76*(2), pp.283-295.

Devenow, A. and Welch, I., 1996. Rational herding in financial economics. *European economic review*, *40*(3-5), pp.603-615.

Economics, 107 (3),797-817.

Economou, F., Kostakis, A. and Philippas, N., 2011. Cross-country effects in herding behaviour: Evidence from four south European markets. *Journal of International Financial Markets, Institutions and Money*, *21*(3), pp.443-460.

Espinosa-Méndez, C. and Arias, J., 2021. COVID-19 effect on herding behaviour in European capital markets. *Finance research letters*, *38*, p.101787.

Fama, E.F. and French, K.R., 1993. Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, *33*(1), pp.3-56.

Fama, E.F., 1970. Efficient capital markets: A review of theory and empirical work. *The journal of Finance*, *25*(2), pp.383-417.

Ferreruela, S. and Mallor, T., 2021. Herding in the bad times: The 2008 and COVID-19 crises. *The North American Journal of Economics and Finance*, *58*, p.101531.

Frey, S., Herbst, P. and Walter, A., 2014. Measuring mutual fund herding–a structural approach. *Journal of International Financial Markets, Institutions and Money*, *32*, pp.219-239.

Fromlet, H., 2001. Behavioral finance-theory and practical application: Systematic analysis of departures from the homo oeconomicus paradigm are essential for realistic financial research and analysis. *Business economics*, pp.63-69.

Froot, K.A., Scharfstein, D.S. and Stein, J.C., 1992. Herd on the street: Informational inefficiencies in a market with short-term speculation. *The Journal of Finance*, *47*(4), pp.1461-1484.

Galariotis, E.C., Krokida, S.I. and Spyrou, S.I., 2016. Herd behavior and equity market liquidity: Evidence from major markets. *International Review of Financial Analysis*, *48*, pp.140-149.

Galariotis, E.C., Rong, W. and Spyrou, S.I., 2015. Herding on fundamental information: A comparative study. *Journal of Banking & Finance*, *50*, pp.589-598.

Ganesh, R., Naresh, G. and Thiyagarajan, S., 2016. Industry herding behaviour in Indian stock market. *American Journal of Finance and Accounting*, *4*(3-4), pp.284-308.

Gębka, B. and Wohar, M.E., 2013. International herding: Does it differ across sectors? *Journal of International Financial Markets, Institutions and Money*, *23*, pp.55-84.

Gleason, K.C., Mathur, I. and Peterson, M.A., 2004. Analysis of intraday herding behavior among the sector ETFs. *Journal of empirical Finance*, *11*(5), pp.681-694.

Goodell, J.W., 2020. COVID-19 and finance: Agendas for future research. *Finance research letters*, *35*, p.101512.

Griffin, J.M., Harris, J.H. and Topaloglu, S., 2003. The dynamics of institutional and individual trading. *The Journal of Finance*, *58*(6), pp.2285-2320.

Grinblatt, M., Titman, S. and Wermers, R., 1995. Momentum investment strategies, portfolio performance, and herding: A study of mutual fund behavior. *The American economic review*, pp.1088-1105.

Guo, W.C. and Shih, H.T., 2008. The co-movement of stock prices, herd behaviour and high-tech mania. *Applied Financial Economics*, *18*(16), pp.1343-1350.

Gutierrez, R.C. and Kelley, E.K., 2009. Institutional herding and future stock returns. *Available at SSRN 1107523*.

Hair Jr, J.F., Sarstedt, M., Ringle, C.M. and Gudergan, S.P., 2017. *Advanced issues in partial least squares structural equation modeling*. saGe publications.

Henker, J., Henker, T. and Mitsios, A., 2006. Do investors herd intraday in Australian equities? *International Journal of Managerial Finance*.

Hirshleifer, D. and Hong Teoh, S., 2003. Herd behaviour and cascading in capital markets: A review and synthesis. *European Financial Management*, *9*(1), pp.25-66.

Hirshleifer, D., Subrahmanyam, A. and Titman, S., 1994. Security analysis and trading patterns when some investors receive information before others. *The Journal of finance*, *49*(5), pp.1665-1698.

Honohan, P., 2008. Cross-country variation in household access to financial services. *Journal of Banking & Finance*, *32*(11), pp.2493-2500.

https://finance.yahoo.com/ (Source of Data)

Hwang, S. and Salmon, M., 2001. A new measure of herding and empirical evidence. *WP01-12*.

Hwang, S. and Salmon, M., 2004. Market stress and herding. *Journal of Empirical Finance*, *11*(4), pp.585-616.

Iihara, Y., Kato, H.K. and Tokunaga, T., 2001. Investors' herding on the Tokyo stock exchange. *International Review of Finance*, *2*(1-2), pp.71-98.

Jeon, J.Q. and Moffett, C.M., 2010. Herding by foreign investors and emerging market equity returns: Evidence from Korea. *International Review of Economics & Finance*, *19*(4), pp.698-710.

Kahneman, D. and Tversky, A., 1973. On the psychology of prediction. *Psychological review*, *80*(4), p.237.

Kahneman, D., Knetsch, J.L. and Thaler, R.H., 1991. Anomalies: The endowment effect, loss aversion, and status quo bias. *Journal of Economic perspectives*, *5*(1), pp.193-206.

Kim, K.A. and Nofsinger, J.R., 2005. Institutional herding, business groups, and economic regimes: Evidence from Japan. *The Journal of Business*, *78*(1), pp.213-242.

Kumar, A., & Bharti. (2017). Herding In Indian Stock Markets: An Evidence from Information Technology Sector. IOSR Journal of Economics and Finance, 1-7.

Lakonishok, J., Shleifer, A. and Vishny, R.W., 1992. The impact of institutional trading on stock prices. *Journal of financial economics*, *32*(1), pp.23-43.

LeCompte, M.D. and Schensul, J.J., 2012. *Analysis and interpretation of ethnographic data: A mixed methods approach* (Vol. 5). Rowman Altamira.

Li, X., Wong, W., Lamoureux, E.L. and Wong, T.Y., 2012. Are linear regression techniques appropriate for analysis when the dependent (outcome) variable is not normally distributed? *Investigative ophthalmology & visual science*, *53*(6), pp.3082-3083.

Lintner, J., 1965. Security prices, risk, and maximal gains from diversification. *The journal of finance*, *20*(4), pp.587-615.

Litimi, H., BenSaïda, A. and Bouraoui, O., 2016. Herding and excessive risk in the American stock market: A sectoral analysis. *Research in International Business and Finance*, *38*, pp.6-21.

Lobao, J. and Serra, A.P., 2007. Herding behavior: Evidence from portuguese mutual funds. In *Diversification and portfolio management of mutual funds* (pp. 167-197). Palgrave Macmillan, London.

Lux, T., 1995. Herd behaviour, bubbles and crashes. *The economic journal*, *105*(431), pp.881-896.

Markowitz, H. (1952). Portfolio selection, Journal of Finance. 7(1). 77–99.

Maug, E. and Naik, N., 1996. Herding and delegated portfolio management. *London Business School Mimeo*.

Miller, E.M., 1977. Risk, uncertainty, and divergence of opinion. *The Journal of finance*, *32*(4), pp.1151-1168.

Miller, M.H., 1988. The Modigliani-Miller propositions after thirty years. *Journal of Economic perspectives*, *2*(4), pp.99-120.

Mnif, E., Salhi, B. and Jarboui, A., 2019. Herding behaviour and Islamic market efficiency assessment: case of Dow Jones and Sukuk market. *International Journal of Islamic and Middle Eastern Finance and Management*.

Mobarek, A., Mollah, S. and Keasey, K., 2014. A cross-country analysis of herd behavior in Europe. *Journal of International Financial Markets, Institutions and Money*, *32*, pp.107-127.

Morris, S. and Shin, H.S., 1999. Risk management with interdependent choice. *Oxford Review of Economic Policy*, *15*(3), pp.52-62.

Mullainathan, S. and Thaler, R.H., 2000. Behavioral economics.

Nofsinger, J.R. and Sias, R.W., 1999. Herding and feedback trading by institutional and individual investors. *The Journal of finance*, *54*(6), pp.2263-2295.

Ouarda, M., El Bouri, A. and Bernard, O., 2013. Herding behavior under markets condition: Empirical evidence on the European financial markets. *International Journal of Economics and Financial Issues*, *3*(1), pp.214-228.

Patro, A. and Kanagaraj, A., 2012. Exploring the herding behaviour in Indian mutual fund industry. *Asian Journal of Finance & Accounting*, *4*(1), pp.189-204.

Patterson, D.M. and Sharma, V., 2007. Did herding cause the stock market bubble of 1998-2001. *University of Michigan-Dearborn*.

Persaud, A., 2000. Sending the herd off the cliff edge: the disturbing interaction between herding and market-sensitive risk management practices. *The Journal of Risk Finance*.

Peters, E.E., 1996. *Chaos and order in the capital markets: a new view of cycles, prices, and market volatility*. John Wiley & Sons.

Raafat, R.M., Chater, N. and Frith, C., 2009. Corrigendum: Herding in humans:[Trends in Cognitive Sciences 13 (2009), 420-428]. *Trends in Cognitive Sciences*, *13*(12), p.504.

Radalj, M. and McAleer, M., 1993. Herding, information cascades and volatility spillovers in futures markets. *Working Paper, University of Western Australia, Perth*.

Regling, K. and Watson, M., 2010. *A preliminary report on the sources of Ireland's banking crisis* (p. 27). Dublin: Government Publications Office.

Rook, L., 2006. An economic psychological approach to herd behavior. *Journal of Economic Issues*, *40*(1), pp.75-95.

Scharfstein, D.S. and Stein, J.C., 1990. Herd behavior and investment. *The American economic review*, pp.465-479.

Schwert, G.W., 2003. Anomalies and market efficiency. *Handbook of the Economics of Finance*, *1*, pp.939-974.

Sewell, M., 2010. Behavioural finance. *University of Cambridge*, *13*.

Sharpe, W.F., 1964. Capital asset prices: A theory of market equilibrium under conditions of risk. *The journal of finance*, *19*(3), pp.425-442.

Shefrin, H. and Statman, M., 2000. Behavioral portfolio theory. *Journal of financial and quantitative analysis*, *35*(2), pp.127-151.

Shiller, R.J., 2003. From efficient markets theory to behavioral finance. *Journal of economic perspectives*, *17*(1), pp.83-104.

Shiller, R.J., 2005. Behavioral economics and institutional innovation. *Southern Economic Journal*, *72*(2), pp.269-283.

Shleifer, A. and Summers, L.H., 1990. The noise trader approach to finance. *Journal of Economic perspectives*, *4*(2), pp.19-33.

Shusha, A.A. and Touny, M.A., 2016. The attitudinal determinants of adopting the herd behavior: an applied study on the Egyptian exchange. *Journal of Finance and Investment Analysis*, *5*(1), pp.55-69.

Sias, R.W., 2004. Institutional herding. *The Review of Financial Studies*, *17*(1), pp.165-206.

Sihombing, N., Sadalia, I. and Wibowo, R.P., 2021. Analysis of herding behavior of investors in the banking industry in Indonesian stock market for February–June 2020 period. *International Journal of Research and Review*, *8*(3), pp.593-600.

Tao, Y., Liu, Y. and Peng, L., 2015, November. Do mutual funds herd Evidence from China. In *2015 International Conference on Social Science, Education Management and Sports Education* (pp. 2405-2408). Atlantis Press.

Teng, Y.P. and Liu, Y.A., 2014. The study of herding behavior among the Greater China Stock Markets during Financial Crisis. *Journal of Interdisciplinary Mathematics*, *17*(2), pp.163-197.

Vieira, E.F.S. and Pereira, M.S.V., 2015. Herding behaviour and sentiment: Evidence in a small European market. *Revista de Contabilidad*, *18*(1), pp.78-86.

Walter, A. and Moritz Weber, F., 2006. Herding in the German mutual fund industry. *European Financial Management*, *12*(3), pp.375-406.

Wermers, R., 1999. Mutual fund herding and the impact on stock prices. *the Journal of Finance*, *54*(2), pp.581-622.

Wylie, S., 2005. Fund manager herding: A test of the accuracy of empirical results using UK data. *The Journal of Business*, *78*(1), pp.381-403.

Yao, W. and Li, L., 2014. A new regression model: modal linear regression. *Scandinavian Journal of Statistics*, *41*(3), pp.656-671.