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The Impact of Loss Aversion Bias on Herding Behavior of Young Swedish Retail Investors

A Behavioral Perspective on Young Swedish Retail Investors' Decision Making in the Stock Market

Bachelor Thesis in Business Administration

Title: The Impact of Loss Aversion Bias on Herding Behavior of Young Swedish Retail Investors
Authors: Alizada, Zekria and Clarin, Oscar, Group 50
Tutor: Oskar Eng
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Abstract

Background: Kahneman and Tversky (1974, 1979 & 1992) argue that individuals are bound to numerous behavioral biases that may lead to the emergence of different irrational behaviors. This is often observed with even a higher degree among participants of financial and stock markets as agents such as investors are frequently exposed to significant level of risk and uncertainty (Kahneman, 2013; Kahneman, Knetsch & Thaler, 1991; Kahneman & Tversky, 1974, 1979, 1992). Also, empirical studies indicate that a significant level of herding exists among investors when they are exposed to a high degree of risk and uncertainty such as those in financial crises (Galariotis, Rong & Spyrou, 2014; Litimi, 2017; Hott, 2009).

Purpose: the main purpose of this thesis is to explore if the loss aversion bias has a significant causal impact on forming herding behavior among young Swedish retail investors.

Method: an online analytical questionnaire including eight questions has been conducted to collect primary data, with 77 Swedish retail investors under the age of 35 participating in the study. Furthermore, a multiple regression analysis has been implemented to analyze and interpret the data.

Conclusion: it can be concluded that there is not a significant correlation between the degree of loss aversion and the degree of herding behavior within the sample group of young Swedish retail investors. Hence, loss aversion bias cannot be considered as one of the major contributors of herding within the target population.

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1. Introduction

This chapter aims to provide a short introduction of the psychological studies on the impact of social pressure on individuals' decision-making process and its relevance to the field of finance. Also, a short introduction of the concepts of herding and loss aversion as well as the major premises of traditional and behavioral finance are included.

Solomon Asch conducted an experiment in 1952 indicating that social pressure on individual judgement is very powerful and that individuals are not as independent as one might think (Asch, 1952). Later, Deutsch and Gerard concluded that the result of Asch experiment was largely due to the individual's belief that other people's decisions just could not be faulty (Deutsch & Gerard, 1955). Moreover, results of these experiments led to further investigation by other researchers regarding human behavior and decision-making process, and specifically for this paper their possible impact of such human behavior on financial markets such as stock markets. By reviewing the most-influential existing literature on the topic of humans' behavior and decision-making process, one may state that loss aversion and herding behavior are two important elements that, together with other elements, are often observed among individuals.

Relating to this thesis, herding behavior within financial/stock markets can be defined as investors' financial decision making and actions that are not based upon profound or fundamental analysis of available information, but rather an imitation of other investors' decisions and actions. This can specifically occur in case of decision making under risk and uncertainty within the financial markets (Shiller, 2016). Another psychological aspect that has been observed and integrated into the financial research field is the fact that individuals immensely dislike the emotional and psychological pain caused by losing. In other words, individuals are prone to avoid losing something, both in a financial and non-financial setting, as a loss can involve a much stronger negative emotional and psychological effect on individuals than the positive emotional and psychological effect that gaining something can bring, individuals can therefore be loss averse (Thaler & Sustain, 2009).

Furthermore, by perusing the existing body of knowledge, it can be claimed that the underlying assumptions and theories within the field of finance are rather based upon the Efficient Market Hypothesis which is formed by the studies of various scholars such as Markowitz (1952), Sharpe and Fama (1963), and Fama (1970). However, it can be argued that the underlying assumptions of the efficient market hypothesis mostly neglect the emotional and psychological aspects such

as those mentioned above, that may affect investors' financial decision making (Thaler, 2016). Consequently, this has led to development of a new field of finance, called behavioral finance aiming to include the psychological factors, something that the authors of this thesis find fascinating to further explore. Therefore, the authors of this paper briefly restate and evaluate the dominating assumptions and theories within the field of finance, but mostly take a behavioral finance approach to conduct their research and to address their research question.

2. Problem and Purpose

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This chapter includes the process behind research problem identification and research question formulation for this thesis. It also includes the differences between this thesis and existing empirical studies on the topic of study as well as its contribution to the existing literature.

A review of current empirical studies within behavioral finance (e.g., Verma, Baklaci & Soydemir, 2008; Hott, 2009; Chiang & Zheng, 2010; Venezia, Nashikkar & Shapira, 2011; Dhaene, Linders, Schoutens & Vyncke, 2012; Galariotis, Rong & Spyrou, 2014; Cipriani & Guarino, 2014; Mobarek, Mollah & Keasey, 2014; Duxbury, 2015; Dang & Lin, 2016; Galariotis et al., 2016; Lee, 2017; Li, Guo & Park, 2017; Bohl, Branger & Trede, 2017; Bekiros, Jlassi, Lucey, Naoui, & Salah Uddin, 2017; Zheng, Li & Chiang, 2017; Igual & Santamaria, 2017; Litimi, 2017) indicate that many of these studies have mostly aimed to address the question of whether investors' behavior within financial or stock markets can be considered as rational or irrational, or to examining if investors exhibit systematic herding behavior. However, relatively less empirical studies have been conducted to examine if there is any relationship between this herding behavior and different behavioral biases studied by scholar such as Kahneman and Tversky (1974, 1979).

To add, to our knowledge, the studies conducted by Swedish researchers such as Ohlson (2010) regarding herding in the Swedish stock market mostly focus on the same aspects as the ones in the previous empirical studies (i.e., to examine if herding behavior is observed among investors in the Swedish stock market). In other words, it can be claimed that such empirical studies neither focus on specific reasons behind this herding behavior of investors nor they make attempts to examine the possibility of an existing relationship between the herding behavior of a specific group of investors such as young retail investors and behavioral biases such as loss aversion. Here, a retail investor can be defined *as "a member of the public who makes investments, not a*

large organization or business that makes investments" (Cambridge Dictionary, 2018). Therefore, the main purpose of this thesis is to address this unexplored area. More specifically, this will be done by focusing on the two aspects of loss aversion and herding behavior and by investigating a possible relationship or correlation between these two within a specific investment group (i.e., young Swedish retail investors). Consequently, the following research question is formulated to address the research problem:

"Is there any significant correlation between loss aversion and herding behavior of young Swedish retail investors?"

Our thesis study differs from the existing literature in the following ways: i) it does not take the approach of the existing empirical studies as its main purpose is not to test whether general herding behavior is observed within one or more stock markets, but to test if a possible causal relationship (i.e., correlation) exists between the two variables of loss aversion and herding behavior, ii) it does not include all the Swedish investors as its target population, but rather focuses on a specific group of investors called young Swedish retail investors, iii) it does not employ the cross-sectional absolute deviation model prevalent among existing empirical studies to analyze the data, but rather employs a multiple regression analysis as a data analysis method that is more suitable for this thesis. By addressing the research question, this paper may contribute to the existing body of knowledge by providing partial explanation of why herding behavior can be observed among young Swedish retail investors as well as opening the path for further research regarding the possible interaction between different behavioral biases and their effect(s) on individuals' investment decisions.

3. Literature Study and Frame of Reference

This chapter provides a review of the existing literature and major theoretical framework relevant the topic of this thesis. Consequently, a funnel approach is taken in which at first the traditional finance section briefly introduces the reader to the fundamental assumptions within the traditional finance field. Later, the behavioral finance, prospect theory, and herding behavior theory sections provide a review of the most relevant literatures that mostly oppose the underlying assumptions mentioned in the previous section. Furthermore, these opposing literatures have been evaluated and mostly referred to by the authors to build a theoretical foundation to address the research question. Finally, the hypothesis formulation process and visualization of a model of financial herding behavior are followed.

Considering the research question mentioned in the previous chapter, a five-step searching process is followed by the authors to identify and select the most relevant existing literature. This searching process includes the following steps; 1) choosing a topic based on the authors' interest as well as its relevancy to the field of business and finance (i.e. loss aversion and herding within the Swedish stock market), 2) defining the scope/timeframe of the literature (i.e. 1950-2018), 3) using Google Scholar and Primo as the main online data bases for academic journals and Jönköping University library for physical books, due to their academic credibility and full student accessibility, 4) formulating key searching terms (e.g., *Loss Aversion, Prospect Theory, Financial Herding, Loss Aversion and Herding in Stock Market, Loss Aversion and Herding in Swedish Stock Market, Human Biases, Emotional Biases, Emotional Biases and Stock Market, Behavioral Finance, Psychology in Finance*) and employing Boolean operators (i.e. AND, and OR), and 5) setting criteria such as the credibility of the journals, literature being peer-reviewed, number of citation, and credibility of the authors and the influence of their research on the topic.

Consequently, over fifty peer-reviewed academic journal articles and numerous books written by major scholars within the relevant fields are selected and reviewed, enabling the authors of this paper to gain a better insight on the topic. Based on this review, it can be stated that the existing body of knowledge covers different aspects including, but not limited to, background on traditional finance and efficient market hypothesis, expected utility theory, psychological studies on human decision making under risk, behavioral finance, prospect theory, and herding theory and its implications on stock markets. To add, it can be argued that perusing of the mentioned

aspects is a relatively intricate task. Therefore, a conceptual or thematic approach is taken in which each aspect is individually explored.

3.1 Traditional Finance

The development of traditional finance starts with Harry Markowitz (1952) and his well-known article "*Portfolio Selection*". Markowitz's presents for the first time a model that gives a detailed definition of risk and return. The mean-variance model Markowitz presented is constructed in a way that investors should apply when trading on the financial markets and thus moving away from economics (Miller, 1999). The Efficient Market Hypothesis (EMH) is a concept that was researched and developed by Eugene Fama. It states that there is no universal rule based on either previous or current information that can enable the investors to gain abnormal returns (Shleifer, 2000). The Random Walk theory is one of the main concepts within the EMH which is based on two different assumptions. Firstly, price fluctuations are independent random variables and the second assumption is the changes conform to some probability distribution (Fama, 1963). The theory states that stock prices reflect all the information available in the market, hence, all new information entering the market will instantly get incorporated into the stock price. Since the new information is unpredictable, it is either positive, negative or not relevant to the specific security. This creates a "random walk" for the asset markets and the possibility of abnormal return is not possible to achieve consistently in the long-run (Shiller, 2016).

The critique against the EMH regarding the rationality of individuals in the financial market created three different alterations of the EMH, the first one is that the financial markets are rational and that securities are accurately valued based on the assumption that the market participants are rational. The second alteration makes assumption that not all market participants are rational, however, it is argued that the activity of the irrational individuals does not affect the market due to neutralizing impact of the trading activity by such irrational individuals. The third alteration also includes irrational individuals in the market, the argument for a continued market efficiency is that the rational arbitrageurs participating in the market will eliminate the influence of the irrational participants on the market prices of financial securities such as stocks (Shleifer, 2000).

3.1.1 Expected Utility Theory

It is argued that the expected utility theory (EUT) has been taken by economists as the main model of decision making under risk for several decades, with the model being adopted in a dual role meaning that it is considered as both normative (i.e., offering explanation of how people should make decisions under risk) and descriptive (i.e., explaining how people make decisions under risk in real life) (Kahneman, 2013; Kahneman & Tversky, 1992; Barberis, Huang & Santos, 2001; Thaler, 2016). It is believed that the initial assumptions of the EUT are based upon the works of

Daniel Bernoulli in 1738, with risk aversion being as one of the key assumptions (Kahneman, 2013; Thaler, 2016). His observations indicated risk aversion and tendency of most people to avoid the worst outcomes (Kahneman, 2013).

Bernoulli emphasized on the concept of utility or happiness and argued that an increase in financial wealth leads to an increase in people's happiness or utility, but at a decreasing rate (Thaler, 2016). However, he argued that a same amount of money has the same utility for two people, regardless of their initial wealth (Kahneman, 2013). In his work in 1944 the Mathematician John von Neumann relied on this initial idea of diminishing marginal utility offered by Bernoulli to create a formal and normative theory of decision making under risk called the expected utility theory (Kahneman, 2013; Thaler, 2016).

Additionally, it is argued that optimization by people or economic agents is the core premise of economic theory (Thaler, 2016). In other words, the EUT predicts that only the best choice offered among many choices is chosen by individuals. For instance, a family chooses the best good or service that it can afford among all the goods and services that it could buy while staying unbiased and basing such decisions of consumption on rational expectations (Thaler, 2016). This constrained optimization prediction of the EUT together with the premise of equilibrium in which prices of goods, services, and financial assets freely fluctuate to equalize supply and demand within competitive markets all shape the workhorse or foundation of economic theory (Thaler, 2016)

To add, Barberis et al, (2001) argue that the underlying assumptions and standard framework of thinking regarding the aggregate behavior of investors within the stock market has also been built upon models and theories that include the EUT as their foundation, leading to a consumption-based approach of thinking. Here, the consumption-based approach means that investors value stocks as financial assets based on the future consumption utility such stocks may offer (e.g., future cash flow and dividends) (Barberis et al., 2001). However, Thaler and Rabin (2001) argue that although the EUT captures some of the aspects behind decision making process under risk at large stakes, it mostly fails to provide an accurate or plausible prediction of decision making when stakes are rather moderate or small. This is argued to be due to the model's assumption regarding the derivation of risk taking attitude toward both moderate-scale and large-scale risks from the same utility-of-wealth function (Thaler & Rabin, 2001).

3.2 Behavioral Finance

As emphasized by Keynes in his book *The General Theory of Employment, Interest and Money*, it can be claimed that an individuals' decision-making process is strongly influenced by his or her emotions and intuitions, specifically within financial markets (Thaler, 2016). However, it is observed that such important aspect is mostly neglected by economists as they implement models and theories based on the assumption that people can fully control the impact of emotions and intuition on their decision-making process. In other words, in their models, economists have replaced Homo Sapiens with fully rational economic and financial agents with well-defined preferences and rational decisions called Homo Economicus or Econs (Thaler, 2016; Kahneman et al., 1991). Yet, in their work *"The Cross-Section of Expected Stock Returns"*, Fama and French (1992) acknowledge the existence of market anomalies in the financial markets between 1963 to 1990, contradicting some of the major assumptions of the rational economic agent theory.

Furthermore, Kahneman and Tversky (1974, 1979 & 1992) examine individuals' decision-making process in laboratory settings and their findings illustrate that individuals possess significant cognitive and emotional biases that may consequently affect them and lead to their irrational behavior while making decisions, especially when they face risk or uncertainty. Again, these studies illustrate patters of human behavior which contradict the underlying assumptions of the rational economic agent theory and the prevailing efficient market hypothesis; *"these patterns of human behavior are not the result of extreme human ignorance, but rather of the character of human intelligence, reflecting its limitations as well as its strengths. Investors are striving to do the right thing, but they have limited abilities and certain natural modes of behavior that decide their actions when an unambiguous prescription for action is lacking"* (Shiller, 2016, p. 166).

To expand, these psychological studies on human decision making shed light on a mechanism of decision making which distinguishes between two systems of thinking called System One or the Automatic System that is believed to be instinctive and rapid, and System Two or the Reflective System that is more deliberate or self-conscious (Kahneman, 2013; Thaler & Sunstein, 2009). The existence and characteristics of each of these systems can partially explain the observed decision-making limitations and irrationality of individuals within different context such as financial decision making (Kahneman, 2013; Thaler & Sunstein, 2009).

To add, papers by scholars such as Kahneman and Tversky (1974, 1979, 1992) have been successful to illustrate investors' systematic violation of predictions made by the prevalent models and theories such as the rational economic agent or expected utility theory as well as efficient market hypothesis, the major models of decision making within traditional economics and finance (Barberis, 2013). Additionally, a review of existing empirical studies on factors affecting the decision making of investors confirm the significant impact of emotions and intuition on financial

decision making by individuals as well as indicating that financial decisions are rarely made without the influence of factors such family background, emotions, beliefs, individuals' perception of risk and loss, gender, optimism, and cultural distance (Ávila, Oliveira, Ávila & Malaquias, 2016).

Furthermore, it can be stated that these findings are in line with Benjamin Graham's ideas in his books the Security Analysis and the Intelligent Investor regarding the significance of human psychology and emotions on the decision-making process of individuals within economics and financial markets (Hagstrom, 1999; Thaler, 2016). Hence, a large stream of anomalies violating the EMH as well as influential studies conducted by scholars such as Kahneman and Tversky have all contributed to the emergence and development of the fields of behavioral economics and behavioral finance (Igual & Santamaria, 2017). To expand, behavioral finance aims to address market inefficiencies and the limitations of the prevalent theories such as EMH through offering of alternative paradigm that acknowledge individuals' biases and partial irrationality, and it incorporates existing psychological theories to create more realistic theories and models on relevant aspects such as individuals' decision making process within economics and financial markets (Daniel & Titman, 1999; Hagstrom, 1999; Pompian, 2012; Shleifer, 2000).

According to Shleifer (2000), behavioral finance perspective includes major theoretical challenges to the EMH, the dominating theory within the traditional finance field. These include, but are not limited to, the assumption that financial markets are efficient in the sense that market prices represent the underlying or intrinsic value of the financial asset, the assumption that the majority of individuals or investors act as rational economic or financial agents basing their decisions on profound analysis of available information, the assumption that uninformed market participant pursue passive investment strategies, the assumption that investors' deviation from optimal economic rationality is random rather than been systematic, and finally the assumption that any effect of irrational decision making of a minority of market participants is neutralized by rational arbitrageurs' moves (Shleifer, 2000).

Behavioral finance can be divided into two major fields of Behavioral Finance Micro (BFMI) which explores individual investors' behaviors and biases, and Behavioral Finance Macro (BFMA) which examines existing anomalies that violate the EMH (Pompian, 2012). On the other hand, Igual and Santamaria (2017) state that behavioral finance lacks a unified theoretical body, hence, they offer a conceptual map of the field based on a review and synthesis of the existing body of knowledge (Appendix 1). This conceptual map offers an intuitive illustration of the psychological framework for irrational investor behavior based on the major studies within the field. This framework organizes the existing literature into three major aspects of Unconventional Preferences leading to the creation of Prospect Theory and exploration of loss aversion

(Kahneman & Tversky, 1979, 1992), Biased Beliefs leading to the creation of Representativeness Heuristic theory (Kahneman & Tversky, 1974), and the Social Interaction aspect leading to the creation of Herding Behavior theory (Prechter, 2001). Each of these aspects and theories have their own sub-categories, including models built upon the work of various scholars. Finally, a list of observed financial anomalies violating the major assumptions of traditional finance and EMH are included in the conceptual map (Igual & Santamaria, 2017). Considering the purpose of this paper and simplicity of this conceptual map, it is employed as a guideline by the authors of this paper to better review the existing body of knowledge in behavioral finance, with an emphasize on prospect and herding behavior theories to address the research question.

3.2.1   Prospect Theory

In their work *Prospect Theory: An Analysis of Decision under Risk*, Kahneman and Tversky (1979) challenge the expected utility theory as a descriptive model of decision making under risk which is based on rules or axioms of rationality. Also, in their paper *Advances in Prospect Theory*, Kahneman and Tversky (1992) challenges two major underlying arguments of the economic theory: the first argument being that the only survivors within a competitive environment are those with rational behavior, and the second argument being that any attempt to abandon the concept of rationality within economic theory can cause chaos. According to EUT and prevalent assumptions among economists, individuals are considered as rational and self-interest economic agents called Econs who have stable tastes and make economic or financial decisions based on fully rational evaluation of the possible outcomes (Kahneman, 2013; Kahneman & Tversky, 1979; Thaler, 2016).

To expand, Kahneman and Tversky (1979, 1992) argue that one of the major limitations of the EUT is the assumption that individuals gain the same utility from a similar amount of financial wealth regardless of their initial wealth (i.e., lack of a reference point). For example, EUT predicts that two people with current wealth of five million dollars each have the same utility or are equally happy even though one of them had one million dollars yesterday while the other one had nine million dollars, yet, this prediction does not illustrate the reality of this case as person A with initial wealth of one million dollars does feel happier now after accumulating four extra millions than person B who has lost four millions since yesterday (Kahneman, 2013). Retrospectively, Kahneman (2013) and Kahneman and Tversky (1979, 1992) acknowledge partial implications of EUT in scenarios such as the one for person A, while arguing that this theory of decision making does not provide any plausible explanation regarding the utility for person B. In addition to the risk aversion aspect, they argue that people often seek risk in scenarios in which a certain loss is present (Kahneman & Tversky, 1979).

Considering all these limitations of EUT, Kahneman and Tversky (1979) develop a new model called prospect theory (PT), as an alternative model that offers a more realistic exploration of decision making process under risk. In their studies, Kahneman and Tversky (1979, 1992) illustrate that major assumptions and predictions of EUT are systematically violated by participants in a series of experiments in laboratory settings, consequently, leading to formation of PT as a new model of decision making under risk (Barberis, 2013). To add, PT can be perceived as an opposing model to theories and models such as the EMH, thus, leading to further studies on the influence of irrational behavior, emotions, beliefs, and human biases on investment (Ávila et al., 2016).

Thaler and Sunstein (2009) and Barberis (2013) agree with the mentioned arguments against EUT and claim that PT's main premise is not to be normative model, but rather a descriptive model on how individuals really make decisions in economic and financial contexts. Later, Kahneman and Tversky (1992) offer a developed model of prospect theory, called, the cumulative prospect theory (CPT) by maintaining the original assumptions of PT and employing cumulative decision weights and adding several extensions. As illustrated in figure 1, it is argued that PT is derived from EUT, yet it fundamentally differs from EUT as it is aimed to be purely descriptive rather than normative (Kahneman, 2013). The major assumptions and predictions of PT are built upon four elements: *"1) reference dependence, 2) loss aversion, 3) diminishing sensitivity, and 4) probability weighting"* where *"people derive utility from gains and losses, measured relative to some reference point, rather than from absolute levels of wealth"* (Barberis, 2013, p. 175).

Prospect theory includes two phases within the decision-making process: the editing/framing phase which includes preliminary analysis of available choices or prospects and construction of any contingencies or outcomes that may be relevant, and the evaluation phase in which a choice or prospect with highest gain or value is selected (Kahneman & Tversky, 1992). According to PT, individuals are influenced by the certainty effect, making them underweight outcomes that are probable and obtain those that come with certainty (Kahneman & Tversky, 1979). Also, it is stated that the major concept behind PT is that *"the carriers of value are changes in wealth and welfare, rather than final states"* (Kahneman & Tversky, 1979, p. 277). Another major assumption of PT is that the pain of losing a certain amount of money is perceived to be greater than the pleasure of gaining the same amount (Kahneman & Tversky, 1979).

Figure 1 Expected Utility (EU) versus Prospect Theory (PT)
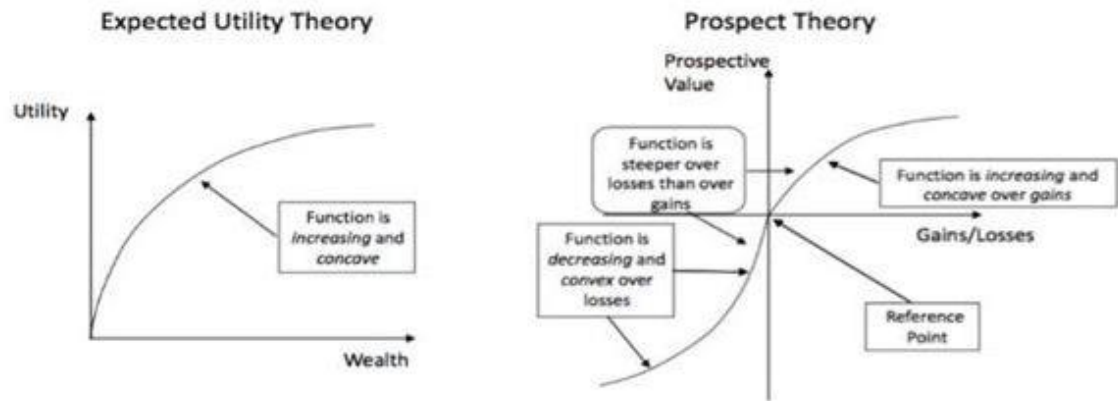
Source: (Parravicini, 2016)

Furthermore, Kahneman and Tversky (1979) offer an alternative to the utility function of EUT, called the hypothetical value function with a S shape: *"The value function is (i) defined on deviation from the reference point; (ii) generally concave for gains and commonly convex for losses; (iii) steeper for losses than for gains"* (Kahneman & Tversky, 1979, p. 279). Studies show that individuals dislike losses and the automatic decision-making system or system one within everyone can make them very emotional due to losses or, in other words, *"losing something makes you twice as miserable as gaining the same thing makes you happy"* (Thaler & Sunstein, 2009, p. 33). By including loss aversion as one of the key elements, it is claimed that PT can better explain scenarios of decision making under risk with small or moderate stakes (Thaler & Rabin, 2001). Additionally, loss aversion is perceived as one of the major emotional biases emerged from human intuition and impulse and the influence of feelings and emotions on reasoning and decision-making process of individuals (Pompian, 2012).

It is also believed that models such as EUT that neglect loss aversion often provide misleading predictions that include unrealistic symmetry observed in the world, it is believed that loss aversion is closely related to other psychological phenomena such as the endowment effect and status quo bias (Kahneman et al., 1991). Endowment effect can be defined as individuals' strong tendency to demand more to give up an object than they themselves would be willing to pay to possess the same item, while the status quo bias refers to individuals' strong preference toward maintaining their current state than making changes (Kahneman et al., 1991).

Built upon the previous findings and the underlying assumptions of PT, Thaler and Johnson's (1990) studies on the decision-making behavior of individuals in gambling illustrate the tendency of people to be risk seeking after prior gains and more loss averse after prior loss (the House Money Effect). Additionally, Thaler and Benartzi's (1995) studies on the behavior of investors exhibit their reluctance to invest in stocks in comparison to other financial assets such as bonds

due to their loss aversion or perception of loss and gain in the stock market, even if they can obtain significant equity premium or the excess return investing in stock market can provide compared to financial assets such as bond over the long run. Scholars such as Barberis et al., (2001) build their studies on investors' behavior within stock markets upon the findings by Thaler and Johnson (1990) and Thaler and Benartzi (1995) and their findings indicate that the investors derive utility from both consumptions of cash flows/dividends and the short-term fluctuations of their stock portfolio or financial wealth. Their findings also illustrate that the investors are loss averse over fluctuations in their stock investments, with prior investment performance strongly affecting the degree of loss aversion. Based on these findings, they propose a departing from the consumption-based models such as EUT and EMH, while emphasizing on the financial wealth fluctuation aspect. They also conclude that investors tend to be less risk or loss averse in a run-up or bull market and more risk or loss averse in a falling or bear stock market (Barberis et al., 2001).

Finally, Koszegi and Rabin (2007) and Barberis (2013) state that the derivation of utility from gains and losses based on a comparison of different prospects or outcomes to a reference point or status quo is the central idea of PT. So are loss aversion, a diminishing sensitivity to prospect changes regarding the reference point, and probability weighting of the prospects. Further, empirical studies indicate the significant influence of the environment and prior outcomes on modest-scale risk attitudes and loss aversion (Koszegi & Rabin, 2007). However, even though PT can be taken as the best available descriptive model of decision making under risk with significant insights, it still encounters some limitations. For example, PT is considered as a more complicated theory compared to EUT and EMH with assumptions or predictions that need to be tailored for economic or financial applications. Another limitation is the relative broad guideline provided by scholars such as Kahneman and Tversky on how to identify and evaluate gains and losses as carriers of utility (Barberis, 2013; Koszegi & Rabin, 2007). Hence, Koszegi and Rabin (2007) and Barberis (2013) argue that the question at hand is not to abandon models and theories such as EUT in favor of PT, but to incorporate both EUT and PT to generate theories and models that could provide a more realistic picture of decision making under risk in real world.

3.2.2 Herding Behavior Theory

Individuals are influenced by major social changes and it effects the economy, political environment and the financial markets alike. The phenomenon is widespread within our species and often starts with a small social nudge. Seeing the actors in a movie smile increases the likelihood for the individual to smile as well. Herding is a trait that has moved us forward through evolution, however, it also creates misconceptions that needs to be addressed (Thaler & Sustain, 2009). Herd behavior stems from the logic of following others where the individual has difficulty in determining the right course of action due to lack of knowledge or the belief that others know

better. It is a trait of the human that has prevailed through evolution as a survival mechanism that should increase the probability of survival (Prechter, 2001). However, even though there are times where herd behavior can assist the individual, the financial markets may not necessarily be one of them (Prechter, 2001).

Literature regarding herd behavior is extensive and has become one of the major fields within behavioral finance. Banerjee (1992) introduced a model on herding where decision can after certain point be only decided based on other previous individuals' actions. Prechter and Parker (2007) introduces the concept of the Law of Patterned Herding (LPH) into finance. LPH is a socionomic theory that states that social systems that are built on homogenous agents and these agents are uncertain about other agents' assessment regarding survival and success. This in turn creates the social mood of herding, a collective social action. As the valuation of financial assets are very complex there is an amount of uncertainty in the market. Prechter and Parker (2007) also make the comparison between economic goods and financial assets. Economic goods have an intrinsic value that is more identifiable compared to financial assets that are not. Utilitarian goods and investments should be treated differently since the future value of the investment good is uncertain. Thus, investment goods are more prone to be exposed to herding behavior.

Information cascades is a phenomenon that is argued to be one of main causes of herding behavior with individuals being prone to take decisions hastily without much information to support their own decision (Shiller, 2016). Bikhchandani, Hirshleifer and Welch (1992) proposes the model of information cascades that attempts to explain short-run fluctuations and conformities that can occur in the market. Short-run fluctuation refers to trends, booms and crashes, whereas conformities refer to imitating attitudes, beliefs and behavior of others. The phenomenon occurs when the individual without regard of his or her own information bases its decision on previous actions of others. The individual will in these cases only consider the information given by prior decisions that are observed. Information cascades can either have positive or negative implications, meaning that the individuals can either adopt or reject the proposed information.

To illustrate this in a more practical example, imagine there are two restaurants at the same location. One individual is in the interest of dining, the only information available to decide is the exterior of the restaurant since the restaurants also are currently empty. However, the next individual who is deciding on which of the two restaurants to enter has now additional information in form of another person dining in one of them. The second customer's decision to follow the first customer creates a herding externality (Banerjee 1992). This decision creates a spiral that may increase the possibility that every one of the possible customers end up dinning at the same restaurant even though the other restaurant could have provided a better service. This would be a

case of a positive information cascade where the information given is adopted by individuals (Shiller, 2016).

There are two different social influences, peer pressure and information. The latter concerns the fact that when a large crowd of people conduct specific action or believes certain things, it leads to the crowd influencing the individual's decision making through its behavior. Peer pressure is referring to the fact that individuals care about what others think about them. Believing this creates an urge for the individual to follow the group to avoid unwanted attention (Thaler & Sustain, 2009). Another distinction to be made is the difference between firm specific herding that is related to the individual security and macro herding that is linked to the overall market. The latter describes if the investor sentiment of the market is either bullish or bearish. The firm specific herding refers to the level of concentration of either buy and sell activity (Venezia et al., 2011). The evidence of herding in the financial markets is perceived to be strong. It is found to be a factor in both institutional and professional environments, as well as, with retail investors. Venezia et al., (2011) describes in their article the factors of compensation schemes and reputation as one of the main drivers behind herding. The retail investor, however, is more based on information discrepancies and the belief that other participants in the market are better informed. The higher level of uncertain information the investor has the more likely they are to imitate others (Fernández et al., 2011).

In an experiment conducted by Salganik, Dodds and Watts (2006) on herding individuals are tested by giving them a list of music produced by relatively unknown artists. The participants were split in to two groups, one independent and one group that would be provided with additional information of songs download statistic. The participants were then asked to rank the songs on preference. The results being that popular songs are more popular in the group with songs download statistic than the group without the extra information on past downloads.

In their article, Fernández et al., (2011) describe that a cognitive profile can help identifying reasons that may reduce or increase individuals' impulse to herd. Three biases are identified that also find empirical support in the study. Overconfidence bias is a factor that reduces herding as the individuals overestimate their own knowledge or ability to perform. The more overconfident an individual becomes, the less likely he or she is to herd since others' decisions are not valued as highly as one's own, informational cascades are therefore ignored (Daniel & Titman, 1999). Furthermore, Self-Attribution bias or hindsight bias as it is sometimes referred to, is created when individuals' decisions are based on past information and actions, the individual is not concerned about other external agents' actions and does therefore not contribute to herding but rather reduces it (Fernández et al., 2011). Additionally, another bias called the illusion of control is created when individuals take decisions based on chance or believe that a game of chance is a game of skill.

Illusion of control bias increases the level of herding when it is presented (Kahneman & Riepe, 1998).

Rational herding can occur in the form of arbitrageurs taking advantage of irrational participants where they are able to capitalize on the irrational activity by creating pseudo-signals. Hence, the arbitrageurs profit from the irrational market instead of bringing the price of the security back to where the fundamental values support it (Dang & Lin, 2016). Rational agents can participate in herding behavior of other in the market by acknowledging the decision and judgement of other participants. However, even though the individual is rational in his or her decision the herd like behavior that is occurring still creates irrationality in the market (Shiller, 2016). The irrational behavior of market participants can influence the market where fundamental values of a stock is altered due to different feedback effects. The participants with different level of understanding of the market do not completely understand the behavior of each other creating additional alterations in market (Hirshleifer et al., 2006).

Herd behavior in the financial markets occurs when the investors disregard all or part of their own private information or belief regarding a security to instead follow other market participants. According to a study by Galariotis et al., (2014) on herding behavior in the UK and American market, no herding is observed within these markets during normal market conditions, however, herding is observed during the dotcom and the global financial crisis. On the other hand, a more comprehensive study by Litimi (2017) of the French stock market and different industry sectors provides significant evidence of herding in the whole market during these crises period. Also, the study identifies five industry sectors, such as telecom, oil and financial securities, where herding is occurring regardless of market conditions. Herding is identified as one of the reasons for price bubbles as the action of imitation of market participants create a positive feedback effect that hikes prices without fundamental basis. When investors realize that the market is based on inaccurate or false information the "bubble bursts" (Hott, 2009). To add, Chiang and Zheng (2010) conclude that herding behavior is often more prevalent within emerging markets in comparison to developed markets, due to information asymmetries.

3.3 Hypothesis Formulation

As already mentioned in the problem and purpose section, a review of current empirical studies within behavioral finance on the subject of financial herding behavior (e.g., Verma et al., 2008; Hott, 2009; Chiang & Zheng, 2010; Venezia et al., 2011; Dhaene et al., 2012; Galariotis et al., 2014; Cipriani & Guarino, 2014; Mobarek et al, 2014; Duxbury, 2015; Dang & Lin, 2016; Galariotis et al., 2016; Lee, 2017; Li, Guo & Park, 2017; Bohl et al., 2017; Bekiros et al., 2017; Zheng et al., 2017; Igual & Santamaria, 2017; Litimi, 2017) indicate that none of these studies

examine if there is any causal relationship between loss aversion or other behavioral biases studied by scholar such as Kahneman and Tversky (1974, 1979) and investors' herding behavior.

Also, it can be stated that studies conducted by Swedish researchers such as Ohlson (2010) do follow the same approach as the mentioned empirical studies (i.e., investigating if herding behavior is observed in the Swedish stock market). Hence, it can be claimed that a probable causal relationship between young Swedish retail investors' loss aversion and the degree of their herding behavior has been remained as relatively unexplored, hence, leading to the formation of the following research question: *"Is there any significant correlation between loss aversion and herding behavior of young Swedish retail investors?"* Here, herding behavior is taken as the dependent variable, loss aversion as the primary independent variable, and age, education years, annual income, and city of residence population as the secondary independent variables. Furthermore, the following hypothesis is formulated:

Hypothesis 1

X_1. *There is a significant positive correlation between young Swedish retail investors' degree of loss aversion and their degree of herding behavior.*

X_0. *There is not a significant positive correlation between young Swedish retail investors' degree of loss aversion and their degree of herding behavior.*

Figure 2 A Conceptual Model of Financial Herding Behavior
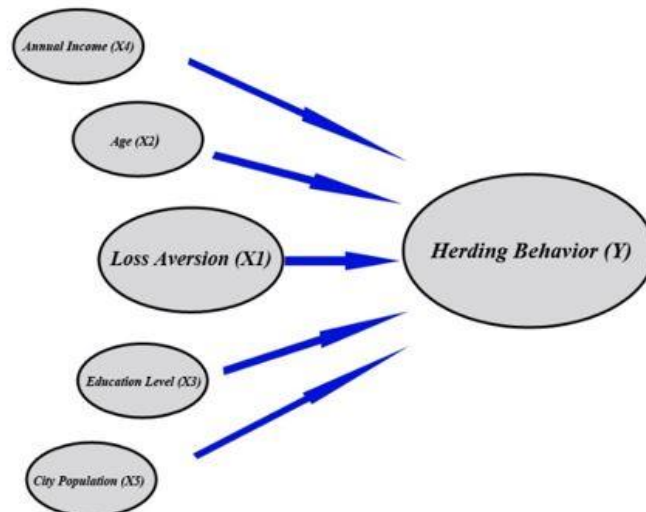
4. Methodology

This chapter provides an overview of the major research paradigm followed in this thesis, description of the target population and sample group, an exploration of the methods of data collection and data analysis, and the main assumptions undertaken by the authors while designing and conducting the research.

4.1 Research Paradigm

A research paradigm can be defined as "a philosophical framework that guides how scientific research should be conducted" (Collis & Hussey, 2014, p. 43). Considering this definition, it is stated that research methodologies are often based upon one of the two major paradigms: positivism and interpretivism. Positivism is a research paradigm that is mostly built upon realism philosophy i.e., including the assumption of singularity and objectivity, and involving a deductive perspective to offer explanatory theories regarding the subject of study (Collis & Hussey, 2014). Here, a deductive perspective may include the implementation of existing theories to create hypotheses that can be tested through quantitative methods of data collection and analysis (Research Methodology, 2018). The other paradigm is interpretivism which incorporates subjectivity as a critical element throughout the research process as well as involving an inductive perspective to offer interpretative understanding of the subject of study (Collis & Hussey, 2014). Contrary to deductive reasoning, inductive reasoning often includes a bottom-up approach in which general conclusions or theories are made based on the exploration of hypotheses formulated from identified patterns within specific observations (Trochim, 2006).

Consequently, positivism is chosen as the major methodological paradigm in this thesis due to following reasons. First, unlike interpretivism, positivism has a top-bottom approach meaning that it involves reference to existing theoretical framework to create hypotheses that later can be tested through studying of observations. Hence, it can be stated that positivism fits with this thesis as the authors' main objective is not to create new theories, but rather referring to existing theories as guidelines while testing if a causal correlation exists between different variables.

Second, positivism enables the authors to use the existing body of knowledge to formulate hypotheses that can be quantitatively tested to offer explanations "establishing causal relationships between the variables by establishing causal laws and linking them to a deductive or integrated theory" (Collis & Hussey, 2014, p. 44). Again, unlike interpretivism, positivism may better fit this study as the formulated research question and hypothesis both aim to address a

causal relationship or correlation between two major variables: loss aversion as the independent variable and herding behavior as the dependent variable. Also, although the existing theoretical framework on loss aversion and herding behavior is referred to by the authors as a major guideline, positivism or deductive approach may enable the authors to employ findings and possible causal relationships between mentioned variables to integrate existing theories, thus, contributing to the existing body of knowledge through an integrated theory of loss aversion and herding behavior.

Finally, positivism is perceived to be more objective than other paradigms such as relativism, with the findings of a study having more generalizability (ReviseSociology, 2015). To expand, investigation of a probable relationship between the two mentioned variables may involve the effect of some other independent variables that can simultaneously have causal relationships with herding behavior as the dependent variable. Not including other relevant independent variables that can significantly influence a dependent variable may follow the formation of fallible causal relationship or biased conclusions (Månsson, 2016). Therefore, implementation of quantitative methods of data collection and analysis can enable the authors to incorporate some of these applicable independent variable, hence, adjusting the findings to these relevant factors or partially controlling their impacts on the final outcomes.

4.2 Target Population and Sample Group

It should be acknowledged that authors have faced several challenges such as lack of time and financial resources to collect a full set of data on the whole population of Swedish investors. These challenges have resulted in a narrower target population that would enable the authors to conduct a more reliable research. Consequently, the target population of this study only includes young Swedish retail investors in the stock market i.e., individuals with Swedish nationality or Swedish residency who are between the ages of 18 to 35 and currently have stock investments. To elaborate, the authors of this thesis have their own subjective definition of youngness because there is no official definition of who can be considered as young. Additionally, there is no public data on exact number and personal information of individuals within the target population. Therefore, this makes it impossible to conduct a standardized random sampling to choose the sample group for the study. Consequently, the sample group consists of volunteer participants within authors' social network as well as respondents' social networks (snow-balling method).

4.3 Method of Data Collection

Although there are several methods of data collection within positivism paradigm, such as interviews and critical incident techniques (Collis & Hussey, 2014), online analytical questionnaire is selected by the authors as the major method to collect primary data for this thesis.

This choice of data collection method is based upon suitability of analytical questionnaires for determining relationships between different variables that are derived from deliberate study of existing theoretical framework (Collis & Hussey, 2014) as well as the convenience to collect data from a relatively larger and more diversified sample group with sample members spread all over Sweden.

Initially, volunteers are asked if they have Swedish citizenship or currently live in Sweden and if they currently have any stock investments. If their responses to these questions are positive, they can proceed with the online questionnaire. The questionnaire itself consists of eight closed questions meaning requiring the respondents to choose one of the predetermined choices as their answers for each question. Also, the questionnaire is created on the free online platform Google Forms and is distributed on authors' online social networks such as Facebook due to the convenience these platforms offer to reach a relatively large and diversified sample group regardless of locations or regions in which respondents may live.

The major purpose behind questions one to four is to collect data on factors that may possibly relate to or influence herding behavior as the dependent variable. These factors are age, annual income, education level, and population within the city of residence. To add, all these factors are taken as control/secondary independent variables by the authors, but only the data on respondents between the ages of 18-35 are used for further analysis and interpretation to address the research question. The major purpose behind questions five to eight is to collect data on loss aversion as the primary independent variable and herding behavior as the dependent variable. Questions five to eight are either borrowed or inspired from studies conducted by different scholars, such as Kahneman et al., (1991), Kahneman and Tversky (1979), Thaler and Johnson (1990), Thaler and Rabin (2001), and Beckman et al., (2011). Below are the questions included in the questionnaire:

Q1. Your age

    a. *18-25*
    b. *25-35*
    c. *35-45*
    d. *Above 45*

. Q2. Your education levels

    a. *High school or lower*
    b. *Bachelor's degree or equivalent*
    c. *Master's degree*
    d. *PhD*

Q3. Your annual income

    a. *SEK 0-200,000*

    b. *SEK 200-400,000*

    c. *Above SEK 400,000*

Q4. Which option does apply to you?

    a. *Living in a small city with a population of less than 100 thousand people*

    b. *Living in a medium size city with a population of 100 to 500 thousand people*

    c. *Living in a big city with a population of 500 thousand people or more*

Note regarding questions 6-9

A scale of 1 to 5: 1=strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=strongly agree

Q5. I would rather choose the option of "gaining SEK 30,000 for certain" than the option of "an 80 % chance to gain SEK 40,000 and a 20% chance to gain nothing."

(Strongly disagree) 1, 2, 3, 4, 5 (strongly agree)

Q6. I would rather choose the option of an "80% chance to lose SEK 40,000 and a 20% chance to lose nothing" than the option of "losing SEK 30,000 for certain."

(Strongly disagree) 1, 2, 3, 4, 5 (strongly agree)

Q7. There are two new companies on the stock market with essentially the same products and services. You know that company A is more popular among investors than company B. You would also invest in company A rather than investing in company B.

(Strongly disagree) 1, 2, 3, 4, 5 (strongly agree)

Q8. There are concerns about the overall condition of the economy in the following months and most investors are selling their stocks on the stock markets. Considering this, I would also sell whole or part of my stock investments in this situation.

(Strongly disagree) 1, 2, 3, 4, 5 (strongly agree)

4.4 Method of Data Analysis

Regarding the method employed to analyze the collected data in this study, an inferential statistics approach will be taken, meaning using statistical methods to analyze and interpret the primary data from the questionnaire to draw conclusion about the target population. Also, the statistical analysis of the primary data is a multivariable analysis as the collected data is related to six variables of herding behavior, loss aversion, age, education level, annual income, and population of city of residence. It can be stated that an inferential statistics approach of data analysis is

suitable for this study as it is often employed to test hypotheses regarding relationships between two or more variables using empirical data (Collis & Hussey, 2014).

More specifically, multiple regression analysis is used as the main method of data analysis in this study. To elaborate, multiple regression analysis is often used as a statistical method of quantitative data analysis if there are more than one independent variable that can be potential predictors of a dependent variable or for them to have causal relationship with the dependent variable (Månsson, 2016; Anderson, Sweeney, Williams, Freeman & Shoesmith, 2014). For this study, a probable causal relationship between loss aversion as the primary independent variable and herding behavior as the dependent variable will be tested. Yet, having loss aversion as the only independent variable may negatively affect the reliability of the findings and conclusions. Hence, respondents' age, annual income, education level, and the population of the city they currently live in are taken as secondary independent variables that could also have a causal relationship with or influence herding behavior. Consequently, this may contribute to creation of a more realistic or applicable estimated regression model for the sample group.

Following is the estimated multiple regression model that will be used to test hypothesis 1:

$$\hat{y} = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5$$

Where

$y = increase\ in\ herding\ behavior\ in\ percentage$

$x_1 = increase\ in\ loss\ aversion\ in\ percentage$

$x_2 = age\ in\ percentage$

$x_3 = annual\ income\ in\ percentage$

$x_4 = years\ of\ education\ in\ percentage$

$x_5 = population\ of\ city\ of\ residence\ in\ percentage$

Here, each estimated coefficient (i.e., b_i, *but excluding* b_0) for the independent variables x_i ($i = 1, ..., 5$) can be interpreted as the estimated linear effect on y (i.e., herding behavior) of a one-unit change in x_i after removing the estimated linear effects of the other $x_j (j \neq i)$ on both y and x_i.

Additionally, a t-test will be used to test hypothesis 1 using $t = \frac{b_i}{s_{b_i}}$ that follows a t-distribution with $n - p - 1$ degrees of freedoms. Later, the F-test will be used to test the overall significance of the multiple regression model using $F = \frac{MSR}{MSE}$ that follows an F-distribution with p degrees of

freedoms in the numerator and $n - p - 1$ degrees of freedoms in the denominator. Finally, the adjusted coefficient of determination or $adjR^2 = 1 - (1 - R^2)\frac{n-1}{n-p-1}$ will be used to examine how the coefficient of determination changes as another variable is included to the model. This adjusted coefficient of determination is derived from coefficient of determination or R^2 which is a measure of how much of the variation in the regression model that can be explained by the chosen independent variables (Månsson, 2016; Anderson et al., 2014). To add, although all the mentioned testing methods can be manually executed against the primary data, IBM SPSS Statistics software will be employed by the authors to process the primary data to both minimize any human error of data processing and address timing limitations.

4.5 Assumptions

While designing the method of data collection and analysis, three major assumptions are undertaken by the authors. These assumptions include a scenario in which respondents to the questionnaire are fully honest while responding to the questionnaire i.e., no hypothetical bias influences the responses. The second assumption being that responses to the questionnaire including hypothetical scenarios accurately reflects respondents' actions in real life scenarios. In other words, respondents are fully aware of how they would make financial decisions under risk and uncertainty in real life scenarios. Finally, the assumption that respondents would make the same decisions as those included in the hypothetical scenarios in the questionnaire regardless of the real life financial market conditions. In other words, their responses to the questionnaire would still be the same no matter what financial market conditions (e.g., market downturn or boom) they experienced.

5. Results and Empirical Findings

This chapter focuses on providing a purely descriptive presentation of the empirical results from the conducted questionnaire, while profound analysis and interpretation of these results and empirical findings are included in the analysis chapter of this paper.

To offer a more intuitive presentation of empirical findings, the following table (Table 1) includes an overview of raw data that is collected based on responses to the questionnaire.

Table 1 Raw Data

Raw Data from Responses to the Questionnaire				
Total number of observations	77			
Total number of question	8			
Questions	**Responses**			
Q1 (Age in Years)	**18-25**	**25-35**		
Frequency	53	24		
Frequency in percentage	68.8%	31.2%		
Q2 (Education Level)	**High school or lower**	**Bachelor or equivalent**	**Master or equivalent**	**PhD**
Frequency	8	55	14	0
Frequency in percentage	10.4%	71.4%	18.2%	0.0%
Q3 (Annual Income in SEK)	**0-200,000**	**200,000-400,000**	**Above 400,000**	
Frequency	56	14	7	
Frequency in percentage	72.7%	18.2%	9.1%	
Q4 (Population of City of Residence)	**Less than 100,000**	**100,000-500,000**	**More than 500,000**	
Frequency	31	26	20	
Frequency in percentage	40.3%	33.8%	26.0%	
Q5 (Loss Aversion Part 1)	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
Frequency	7	5	3	27	35
Frequency in percentage	9.1%	6.5%	3.9%	35.1%	45.5%
Q6 (Loss Aversion Part 2)	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
Frequency	10	7	10	26	24
Frequency in percentage	13.00%	9.1%	13.00%	33.8%	31.2%

Q7 (Herding Part 1)	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Frequency	8	15	21	22	11
Frequency in percentage	10.4%	19.5%	27.3%	28.6%	14.3%
Q8 (Herding Part 2)	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Frequency	9	21	21	20	6
Frequency in percentage	11.7%	27.3%	27.3%	26.0%	7.8%

Referring to the raw data (Table 1), it is observed that 77 young Swedish retail investors, who currently have investments in the stock market, have participated in the study and responded to the online questionnaire. Although all respondents are between the ages of 18 to 35 years old, responses to Q1 indicates that 53 of them are within the age group of 18-25 and 24 are in the age group of 25-35. Regarding to Q2, it is observed that the education level of the respondents is spread among three categories; High School or lower (approximately 12 years), Bachelor or equivalent (approximately 15 years), and Master or equivalent (approximately 17 years). To expand, most of the respondents are either graduated with a bachelor's degree or are currently conducting their bachelor's studies with frequency of 55 or 71.4%, Master students or equivalent with a frequency of 14 or 18.2% of the respondents, and High School or lower with a frequency of 8 or 10.4% of the respondents.

Considering responses to Q3, it is observed that the annual income is also spread among three categories with a frequency of 56 or 72.7% of respondents in the first group with an annual income of 200,000 SEK or less, and a frequency of 14 or 18.2% being in the second group with an annual income between 200,000 and 400,000 SEK. Finally, a frequency of 7 or 9.1% of the respondents are in the third group with an annual income above 400,000 SEK. Looking at the responses to Q4, it can be stated that the frequency of responses for population of city of residence are relatively even with a frequency of 31 or 40.3% of respondents living in a city with population less than 100,000, a frequency of 26 or 33.8% living in a city with population of between 100,000 to 500,000, and a frequency of 20 or 26.0% of the respondents living in a city with a population above 500,000 residents.

Q5 and Q6 measure respondents' degree of loss aversion on a scale of 1-5 where 1 is the lowest and 5 is the highest. Considering responses to Q5, they exhibit a high degree of loss aversion among respondents with a frequency of 35 or 45.5% scoring 5's and a frequency of 27 or 35.1% scoring 4's. To add, a frequency of 7 or 9.1% and 5 or 6.5% of the respondents scored 1's and 2's respectively with a frequency of 3 or 3.9% scoring a neutral score of 3. Responses to Q6 illustrate similar results where a frequency of 26 or 33.8% and a frequency of 24 or 31.2% scored 4's and

5's respectively with a frequency of 10 or 13.0% and 7 or 9.1% scoring 1's and 2's. Finally, a frequency of 10 or 13.0% have the neutral score of 3.

Furthermore, Q7 and Q8 measure respondents' degree of herding behavior on a scale of 1 to 5 where 1 is the lowest and 5 is the highest. Data from Q7 depicts a frequency of 11 or 14.3% of the respondents scoring 5's and a frequency of 22 or 28.6% scoring 4's. A frequency of 21 or 27.3% of respondents answered neutral with a frequency 8 or 10.4% and 15 or 19.5% scored 1's and 2's respectively. Finally, data for Q8 display a frequency of 20 or 26.0% of the respondents scoring 4's and a frequency of 6 or 7.8% scoring 5's, a frequency of 21 or 27.3% scoring neutral with a frequency of 21 or 27.3% scoring 2's, and a frequency of 9 or 11.7% of the respondents scoring 1's.

6. Analysis and Interpretation

The purpose of this chapter is to evaluate and analyze the empirical findings from responses to the questionnaire through processing of raw data using IBM SPSS software, and interpretation of these data based on the main arguments, theories, and empirical findings included in the theoretical framework in chapter 3.


First, table 2 and figures 2 and 3 exhibit an initial processing of raw data to generate average quantitative values for Q5 and Q6 that represent respondents' degree of loss aversion, and Q7 and Q8 that cover respondents' degree of herding behavior. This is followed by analysis and interpretation of the data represented in the table and figures. Second, the generated average values together with the other collected data are included in and processed by IBM SPSS using the multiple regression analysis tool, following the Descriptive Statistics, Model Summary, ANOVA, and Coefficients tables. These tables provide processed data that are further interpreted using measures of model fit, T-test, F-test, the critical value approach, and the P-value approach. Finally, further interpretation and analysis of the results from the statistical testing methods is provided based on the authors' both implementation of the main arguments, theories, and empirical findings within the theoretical framework, and consideration of other relevant aspects.

6.1 Descriptive Analysis

Table 2 Processed Data

Processed Data					
Average Loss Aversion	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
Frequency	5.5	6	6.5	26.5	29.5
Frequency in percentage	11.04%	7.79%	8.44%	34.42%	38.31%
Average Herding	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
Frequency	8.5	18	21	21	8.5
Frequency in percentage	11.04%	23.38%	27.27%	27.27%	11.04%

Figure 3 Average Degree of Loss Aversion
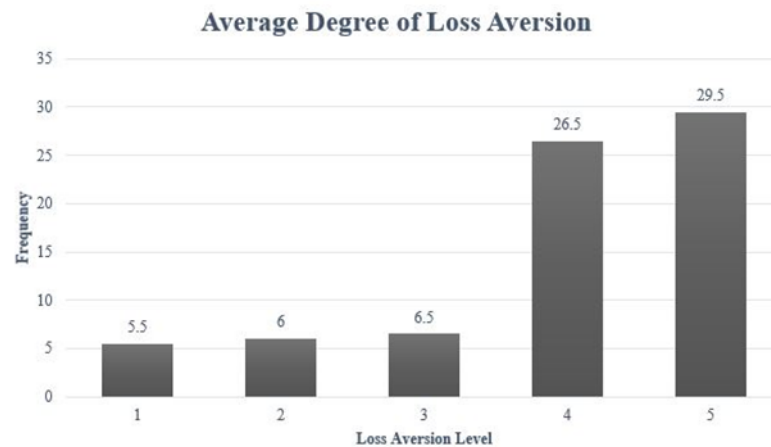
Figure 4 Average Degree of Herding Behavior
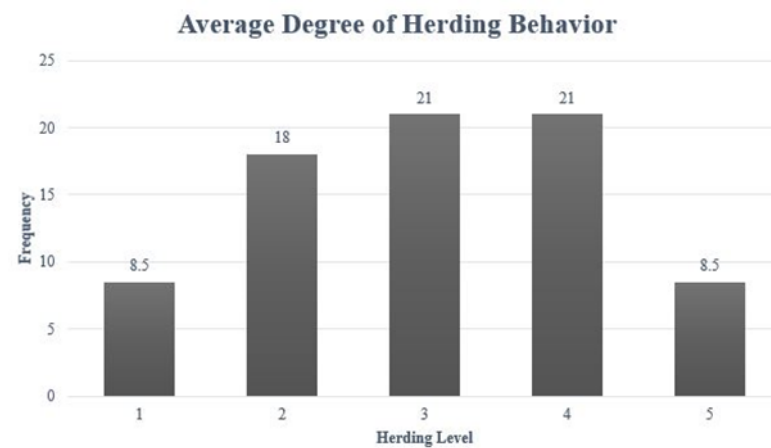
Referring to table 2 and figures 3 and 4, they include average frequencies of respondents' level of loss aversion and herding behavior. As the table and figures illustrate, the initial evaluation of collected data exhibit strong loss aversion observed among the respondents. Most respondents score either 4 or 5 for Q5 and Q6 which specifically address their financial loss aversion in a hypothetical scenario in which they are exposed to a certain financial gain and loss. This strong level of loss aversion observed among the respondents is perfectly in line with and support findings from the existing empirical studies conducted by scholars such as Kahneman and Tversky (1979, 1992), Thaler and Johnson (1990), Kahneman et al., (1991), Thaler and Rabin (2001), and Beckman et al., (2011).

To expand, the results of the conducted questionnaire exhibits a strong level of financial loss aversion among the respondents similar to the loss aversion described by Kahneman and Tversky's (1979, 1992) prospect theory. Referring to the underlying assumptions of PT, the collected data show that while facing financial uncertainty and risk most of the respondents would rather choose the option that bring them an absolute or certain financial gain or enable them to avoid an absolute or certain financial loss. This advocates the assumption of PT in which most of

individuals are bounded by loss aversion bias i.e., they find the pain of losing a specific amount of financial wealth much stronger than the joy of gaining the same amount (Kahneman & Tversky, 1979, 1992).

Regarding the empirical findings for Q7 and Q8 which measure respondents' herding degree, the average degree of herding behavior is more equally spread. Referring to the frequencies of average herding levels, it is realized that scores of 4, 3, and 2 are most observed, with equal frequencies been observed for scores of 1 and 5. This frequency distribution shapes a histogram for average degree of herding behavior which is slightly skewed toward stronger herding scores. Consequently, this right skewed graph may indicate that although the findings do not illustrate any strong herding pattern, they may picture the respondents' positive tendency toward financial herding in hypothetical scenarios that include financial uncertainty and risk.

In other words, the slight positive skew may relatively support herding behavior theories by scholars such as Benarjee (1992), Prechter (2001), Prechter and Parker (2007), Bikhchandani et al., (1992), Fernandez et al., (2011), and Salganik et al., (2006). Considering the real life normal financial market conditions prevailing while this research being conducted, an initial evaluation of the empirical findings may also support the empirical studies by scholars such as Galariotis et al., (2014). According to Galariotis et al., (2014), no or low degree of herding behavior is observed when market conditions are normal or there is not any significant market downturn. The shape of the average herding histogram may also support findings by Chiang and Zheng (2010) that a lower degree of herding is often observed among developed markets, Sweden in this case, in comparison to emerging markets. However, Litimi's (2017) findings indicate that herding is often observed among retail investors who have significant part of their investments in certain industry sectors such technology and telecom. Thus, his findings contradict the pattern observed in figure 4.

Therefore, the fact that respondents' portfolio allocation choices are not included in the questionnaire and its probable impact on the results must be acknowledged. Finally, an intuitive comparison of the shape of figures 3 and 4 may reveal that the frequencies within these figures do not follow a similar pattern. To elaborate, strong average degree of loss aversion observed in figure 3 do not follow a strong average degree of herding behavior in figure 4. Instead, the frequencies in figure 4 follow a pattern independent to those observed in figure 3.

6.2 Analysis and Interpretation Using IBM SPSS

Table 3 Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df2	df3	Sig. F Change
0.264a	0.070	0.004	0.8894	0.070	1.068	5	71	0.386

a. Predictors: (Constant), City Population, Age, Loss Aversion, Education Years, Annual Income

Table 4 ANOVA

Model	Sum Of Squares	df	Mean Square	F	Sig.
Regression	4.223	5	0.845	1.068	0.386b
Residual	56.160	71	0.791		
Total	60.383	76			

a. Dependent Variable: Herding

b. Predictors: (Constant), City Population, Age, Loss Aversion, Education Years, Annual Income

Table 5 Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	2.873	1.378		2.085	0.041	0.126	5.621
LossAversion	0.130	0.096	0.158	1.347	0.182	-0.062	0.322
Age	-0.016	0.253	-0.008	-0.061	0.951	-0.520	0.489
EducationYears	-0.044	0.086	-0.064	-0.512	0.61	-0.215	0.127
AnnualIncome	0.286	0.178	0.208	1.604	0.113	-0.07	0.642
CityPopulation	-0.019	0.131	-0.017	-0.147	0.883	-0.281	0.242

6.2.1 Model Summary

Referring to the data from the model summary, it is observed that the Pearson correlation coefficient or R has a value of 0.264. Generally, R can have a value between -1 and 1 where -1 shows a perfect negative correlation between two or more variables and a value of 1 indicates a perfect positive correlation. Considering the R value of 0.264, it can be stated that the estimated regression model shows a relatively weak positive correlation between the dependent variable of herding behavior and the independent variables of loss aversion, age, education years, annual income, and city population.

The R Square shows how much of the change in dependent variable Y can be explained or attributed to changes in independent variable(s) that are referred as X, with a value between 0 to 1. A value of 0 indicates that an estimated regression line does not include any estimated values that match actual values in real life scenarios. Based on the collected data for the dependent variable of herding behavior and the independent variables of loss aversion, age, education years, annual income, and city population, an R Square value of 0.07 is measured by SPSS. Consequently, if this R Square value of 0.07 is taken by the authors as the measure of model fit, it illustrates that 7% of change in herding behavior can be attributed by a change in the mentioned independent variables when the values of these independent variables are manipulated or changed. In other words, 7% of change in herding behavior can be explained by change in the independent variables. Furthermore, the Adjusted R Square is also taken as one of the measures of model fit. Here, if Adjusted R Square value of 0.004 is taken by the authors as the measure of model fit, it illustrates that about 0.4% of total variability in herding behavior is explained by the estimated regression model.

6.2.2 ANOVA

Regarding the ANOVA table, the given F value of 1.068 is calculated by division of Mean Square of Regression by Mean Square of Residual. With 5 being the numerator degree if freedom and 71 being the denominator degree of freedom, an F distribution table gives a critical value of 2.37. It is observed that the F value from the estimated regression model (1.068) is less than the critical value of 2.37. The F value does not fall in the rejection region; hence, the authors do not reject that there is not a significant positive correlation between the independent variables and the dependent variable of herding behavior.

6.2.3   Coefficients

6.2.3.1 Loss Aversion

Looking at the β value of 0.130 for loss aversion variable, the regression model illustrates that for every unit increase in loss aversion, herding behavior grows by 0.13 unit. In other words, 0.13 is the marginal effect of one unit of loss aversion on herding behavior. For every unit more of loss aversion, the model estimates herding behavior grows by 0.13 unit. To add, with 95% confidence interval or α=0.05 and a degree of freedom of 77-6=71, the T distribution table gives a critical value of 1.994. However, the measured t value 1.347 falls between -1.994 and 1.994, hence, the null hypothesis is not rejected. To add, the P value 0.182 is larger than 0.05, hence, the null hypothesis is not rejected. In other words, the authors do not reject the null hypothesis that there is not a significant positive correlation between the degree of loss aversion and the degree of herding behavior. Also, it is 95% certain that β1 value is between -0.062 and 0.322.

Figure 5 Correlation between Loss Aversion and Herding
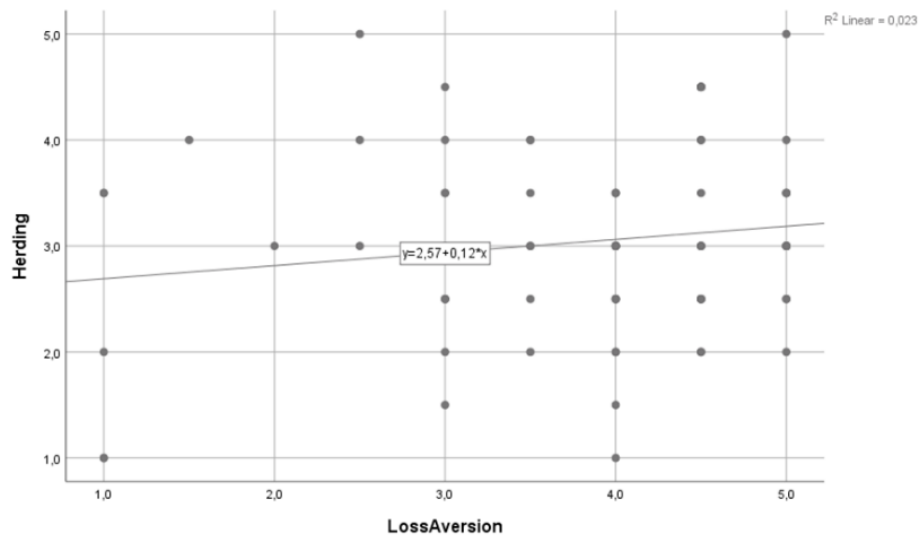
6.2.3.2 Age

Looking at the β value of -0.016 for age variable, the regression model illustrates that for every unit increase in age, herding behavior decreases by 0.016 unit. To add, with 95% confidence interval or α=0.05 and a degree of freedom of 77-6=71, the T distribution table gives a critical value of 1.994. However, the measured t value -0.061 falls between -1.994 and 1.994, hence, the null hypothesis is not rejected. To add, the P value 0.951 is larger than 0.05, hence, there is not a significant correlation between the control variable of age and the degree of herding behavior.

6.2.3.3 Education Years

Looking at the β value of -0.044 for education years' variable, the regression model illustrates that for every unit increase in education years, herding behavior decreases by 0.044 unit. To add, with 95% confidence interval or α=0.05 and a degree of freedom of 77-6=71, the T distribution table gives a critical value of 1.994. However, the measured t value -0.512 falls between -1.994 and 1.994, hence, there is not a significant correlation between the control variable of education years and the degree of herding behavior.

6.2.3.4 Annual Income

Looking at the β value of 0.286 for loss aversion variable, the regression model illustrates that for every unit increase in annual income, herding behavior grows by 0.286 unit. To add, with 95% confidence interval or α=0.05 and a degree of freedom of 77-6=71, the T distribution table gives a critical value of 1.994. However, the measured t value 1.604 falls between -1.994 and 1.994, hence, there is not a significant correlation between the control variable of annual income and the degree of herding behavior.

6.2.3.5 City Population

Looking at the β value of -0.019 for the city population variable, the regression model illustrates that for every unit increase in city population, herding behavior decreases by 0.019 unit. To add, with 95% confidence interval or α=0.05 and a degree of freedom of 77-6=71, the T distribution table gives a critical value of 1.994. However, the measured t value -0.147 falls between -1.994 and 1.994, hence, there is not a significant correlation between the control variable of city of residence population and the degree of herding behavior.

6.3 Loss Aversion and Control Variables

As mentioned earlier, although the empirical findings from this research illustrate strong levels of loss aversion among the respondents, implementation of statistical testing methods such as F-test, T-test, and the P value approach indicate that the relationship between loss aversion as the main independent variable and herding behavior as the dependent variable is not statistically significant. In other words, the hypothesis that there is a significant positive correlation between loss aversion and herding behavior can be rejected. This finding may directly challenge some of the arguments made by Prechter and Parker (2007) on major causes of herding behavior in financial markets. More specifically, Prechter and Parker (2007) argue that one of the major reasons behind the herding behavior in financial markets is for investors to minimize or avoid loss when the market conditions bring significant risk and uncertainty. In other words, investors partially follow each other due to their emotional and psychological survival instincts that have gradually evolved over the history of mankind. To elaborate, loss or risk aversion may act as a

defense or survival mechanism that can help the investors to avoid losses and achieve gains. However, referring to the empirical results in this paper, such argument for existence of a causal relationship between the two variables of loss aversion and herding behavior is not approved.

Looking at table 6, the same statement can be made regarding the other independent variables that are included as control variables in the regression model. This means that no significant positive or negative correlation is observed between the independent variables of age, education years, annual income, and the city of residence population and the dependent variable of herding behavior. However, it should be acknowledged that the two age categories of 18-25 and 25-35 may not accurately represent the respondents' age variation, hence, negatively affecting the reliability of the collected data and the outcomes from the regression analysis. Same may apply to the other independent variables of education years, annual income, and city of residence population. Pre-defined choices for each of these variables in the questionnaire may not fully represent the respondents' exact status, hence, negatively affecting the reliability of the regression analysis.

6.4 Other Factors

Retrospectively, further evaluation of different factors that may have a significant relationship with Swedish retail investors' herding behavior is necessary. These factors may include the degree of asymmetric information and lack of information among the Swedish retail investors, educational background and investing experience, social factors such as peer pressure, and other behavioral and psychological biases such as overconfidence, illusion of control, and self-attribution.

Informational cascades are factor that lead to herding by transferring information to others creating a cascade as individuals spread the information onwards that is not tested within our model (Banerjee, 1992). To add, in their model Bikhchandani et al., (1992) show the relationship between herding and informational cascades where markets decisions are made based on information from previous actions made by other participants in the market. The model measures the short-run fluctuations when market conditions are not normal, i.e. bubbles, crashes or strong trends. As the regression model in this thesis disregards informational cascades, this can be one of the reasons on why the respondents do not score as high for the herding behavior as previous studies have indicated.

Also, the education aspect is one of the factors that may negatively correlate with herding as the more knowledge is available the more likely it is for the individual to make decision based on own fundamentals. The education aspect can therefore be one of the reasons that at least in the format of this study may have influenced the low herding score among the respondents. To

expand, the sample group of young retail investors in this research are not as prone to herding as those in previous empirical studies. This may be affected by the fact that almost 90% of the respondents have higher education. An argument could also be made that herding behavior is less present in a more developed financial market such as the Sweden unless the market participants are experiencing extreme market conditions such as crises as argued by Galariotis et al., (2014) in their study on the S&P 500 and the FTSE 100 indexes.

Asymmetric information can be an information factor that may emerge when some parties in the market have an information advantage, creating herding as the participants in the market try imitating the actor with the best information (Chiang & Zheng, 2010). This factor is not tested in our model and this could therefore be one of the reasons to why the model does not fully explain the causes behind herding behavior. Additionally, looking at another information factor i.e., lack of information, it may also affect herding as individuals follow others' action based on the notion that they are well-informed. This relates to peer pressure or social influence bias that is not tested in the model as the participants do not face any pressure from their peers while responding to the questionnaire or being aware of the other participants' choices compared to the experiment by Salganik et al., (2006).

However, considering the information provided in Q7 that a company of two similar ones is more popular than the other, it gives both information that others favor a specific company, but not providing any further details. Here, if the investor is prone to herding in the financial market, this should create an incentive to choose the popular company rather than an unpopular one. The two aspects of asymmetric information and lack of information are covered in Q7 by not providing considerable information except the popularity factor of the stock. This may be one of the major reasons behind why the pattern of average degree of herding behavior is still positively skewed although it is less significant that findings in the other studies. This might indicate that the respondents need more information regarding who prefers the stock or the degree of popularity.

Illusion of control bias is another behavioral bias that is not included in the regression model, but it may possibly affect or increase the degree of herding behavior of individuals and is often emerged when individuals think they believe a game of chance is a game of skill. It also creates the illusion where the individual experience an event in the market they believe that other investors in the market are affected in a similar way. When the individual who is affected by the bias interacts with others, he or she believes that the other party has made his or her decision based on relevant information precisely as the individual himself or herself would make (Kahneman & Riepe, 1998). The bias therefore contributes to herding as individuals, in this case retail investors, would interpret the decision made by other actors as decision made based on facts and sound reasoning. The retail investors could therefore imitate the decision as they believe it to

be a rational choice. The decision could be well thought out, however, there are a lot of misguided decisions in the market that the investors could blindly follow if affected by the illusion of control bias.

Another additional factor that could also influence the degree of herding behavior is the overconfidence bias. To elaborate, overconfidence bias means that individuals are certain about their knowledge and abilities to evaluate different scenarios and make decisions, hence, this bias may minimize herding behavior as argued in a study by Fernández et al., (2011). It may also be one of the biases that could negate the impact of loss aversion bias. As it can be claimed that the current stock market condition may illustrate a long bull or upside market, the overconfidence bias can be argued to have more of an impact than when there is more turbulent on the market. There is also the fact of total stock market index generating good returns, which could indicate that the retail investors might be overconfident in their ability to outperform the market. Therefore, overconfidence bias could be one additional reason behind why herding behavior is not as strong in this study compared to the others as well as the belief that returns can be achieved without taking a large level of risk.

Furthermore, the respondents' investment experience is another factor that could possibly contribute to overconfidence bias or less herding behavior. Here, the collected data do not cover the number of years each respondent has been active or held a stock investment portfolio, thus, the regression model may not represent the possible impact of this aspect on both loss aversion and degree of herding behavior among the respondents. Referring to the education level of the respondents (Table 1), it is observed that the sample group is relatively well educated, meaning there could be an overconfidence that minimizes herding and negates the impact of loss aversion. The education factor in conjunction with investment experience, market conditions and a developed market are factors that are strong herding components within our sample of young Swedish retail investors which indicates that currently herding is not so strong within the sample and loss aversion is not one of the factors that could significantly contribute to herding.

To build further on investment experience and education the self-attribution bias is yet another factor that may reduce herding. It is present when the individual investor believes that the decision they make is attributed to their individual skills (Fernández et al., 2011). Events that are in line with individuals' decision are attributed to ones' skills and knowledge, while those that are not in line are favorable are rather attributed to external agents. Therefore, individuals that are exposed to the bias are not as prone to herding unless a series of incorrect decisions lead to a change in one's decision making pattern.

7. Conclusion

The chapter includes major conclusions that are derived from analysis of the empirical findings. More specifically, the conclusions directly address the purpose of the thesis and research question.

To conclude, analysis and interpretation of the empirical findings illustrate that there is not a significant correlation between loss aversion bias and financial herding behavior within the sample group of young Swedish retail investors. Hence, loss aversion bias cannot be considered as one of the major contributors or influencers of financial herding behavior within the target population. To expand, although a strong degree of loss aversion is observed among almost all the participants within the sample group, a much lower degree of herding behavior is recorded. This finding leads to the rejection of hypothesis one. To add, it can be concluded that the analysis of empirical findings does not indicate any significant correlation between the independent variables of age, education level, annual income, and city of residence population and the dependent variable of herding behavior. Therefore, these factors cannot be taken as significant influencers of herding behavior either.

Although these conclusions illustrate that a strong or significant herding behavior is not observed within the sample group, and that loss aversion bias cannot be taken as an important behavioral factor behind financial herding behavior, they do illustrate that a very strong degree of loss aversion is prevalent within the sample group. Consequently, this finding may highlight the significance of loss aversion and its probable influence on other relevant phenomenon or market inefficiencies within financial and stock markets. Also, the conclusions made in this thesis may promote further research on other behavioral factors and biases that could possibly cause herding among parties such as retail investors in both Swedish and international markets.

8. Discussion

This chapter offers the authors' broader perspective regarding the process of conducting the thesis study. It also includes discussions regarding the implication of the empirical results and formed conclusions as well as providing suggestions on how further relevant studies may be conducted. This discussion also covers major weaknesses or limitations of the conducted research.

8.1 Theoretical Contribution

This paper aims to explore some of factors behind the intricate human behavior of herding in the context of financial markets. The attempt has been made to gain a profound insight on whether the degree of loss aversion bias of the young Swedish retail investor correlates with their degree of herding behavior when faced with decisions regarding sales or purchase of stock investments. The paper has mainly focused on a theoretical contribution to the behavioral finance field by further examining the possible attributors of herding behavior. Referring to the conclusions, the major theoretical contribution from this thesis is that the loss aversion bias should not be considered as one of the primal contributors to herding behavior. In addition, the empirical findings and conclusions do also verify the findings within the existing literature regarding individuals' attitude toward losses and gains. More specifically, this thesis further advocates the notion that individuals are strongly loss averse and would mostly the choices that could lead to a certain gain or avoiding a certain loss.

8.2 Practical Implications

Moreover, the empirical findings and major conclusions from this thesis can also have some practical implications; particularly for retail investors who wish to increase their knowledge of financial markets. To elaborate, the conclusions from this paper can help the retail investors to gain a better insight on how financial markets function from a behavioral finance perspective by providing a detailed evaluation of the major underlying assumptions and theories as well as their implication to both historical and current market conditions. Additionally, the major findings from this research can also offer an insight on how different cognitive and behavioral biases affect financial market. More specifically, offering an insight on how they may influence different phenomena such as herding, something that could be considered and applied by retail investors to make better financial decisions and, hence, gaining an advantage in the stock market. Governmental and non-governmental organizations can also gain valuable information from this

paper as the findings can contribute to better understanding of the psychological factors that could disrupt financial markets. Institutional investors such as pension funds, hedge funds, and investment banks are another group that are affected directly by retail investors and gaining awareness on their behavior may positively affect or be an important aspect of their business.

8.3 Limitations

As mentioned in the methodology chapter, a variety of assumptions have been made by the authors to conduct this research. It can be stated that these assumptions, in conjecture with the limitations of the study, might have affected the empirical findings and their analysis and interpretation. For instance, one of the major assumptions made by the authors is that there is no hypothetical bias meaning the respondents are fully honest while responding to the questionnaire. It is also assumed that the respondents are fully aware of how they would make their financial decisions in the hypothetical scenarios included in the questionnaire. Consequently, if the assumptions made in this thesis are fallacious, this can have a significant negative impact on the accuracy, reliability, and practicality of the empirical findings and major conclusions from this study.

Therefore, acknowledging the probable limitations of this study is of enormous importance to evaluate its contribution to the existing body of knowledge and to conduct further research based upon the findings and conclusions from this paper. Firstly, sample selection method is an important factor to consider since the conducted method of sample selection and questionnaire distribution (i.e., snow-balling method) might have led to a rather biased or subjective primary data collection. Furthermore, the relatively small size of the sample group in consideration together with the mentioned sample selection method and questionnaire distribution may all have distorted the reliability of collected data to well represent the target population of young Swedish retail investors.

Another limitation of this study is that it neither considers the participants' specific knowledge and experience regarding the financial and stock markets nor it measures or controls the probable impact of the psychological environment. This means that while responding to the questionnaire the respondents' psychological and emotional state may significantly differ from those while making real-life investment decisions. This is also connected to the probable impact of current market conditions on the responses as it can alter the retail investors' aggregate psychological mood or exuberance in the stock market, something that can be different in bull contra bearish markets.

Considering the existing literature within the field of behavioral finance, it is observed that the loss aversion bias is only of the numerous cognitive, behavioral or emotional biases that can

influence individuals' financial decision making. As mentioned earlier, other biases such as the illusion of control, overconfidence, and the self-attribution may also have their probable impact on phenomena such as herding behavior in financial markets. Thus, by excluding other biases from the regression model, it might have constrained the relevancy of empirical findings to more accurately explain the possible reasons behind herding or to enable a better comparison of the impact of loss aversion on herding relative to other behavioral biases.

8.4 Suggestions for Future Studies

Regarding further empirical studies that could be conducted in continuation of this paper, they may be focused on examining herding behavior from an individual perspective in different market conditions as that could further increase the knowledge on how individuals' financial decision making may differ by alteration in overall financial and stock market condition. Also, primary data on a broader range of behavioral biases needs to be included and the sample group needs to be both larger and more randomly selected. Additionally, further research could be made to build on this papers' model by extending it to emerging markets in other to establish the impact of loss aversion in a less developed financial market. Furthermore, further research could also focus on modeling the vast literature on herding to establish an overview of the impact of different biases, the asymmetric and lack of information, and the peer-pressure perspective. This may significantly contribute to the enrichment of the existing body of knowledge on behavioral phenomena such as herding within the field of behavioral finance. Finally, as the loss aversion bias is prevalent within the sample group in this study, further research could be conducted with the main purpose of exploring the effects of loss aversion on other financial market singularities observed among young Swedish retail investors.

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10. Appendices

10.1   Appendix 1

Conceptual Map for Behavioral Finance and the Model of Irrational Investor Behavior
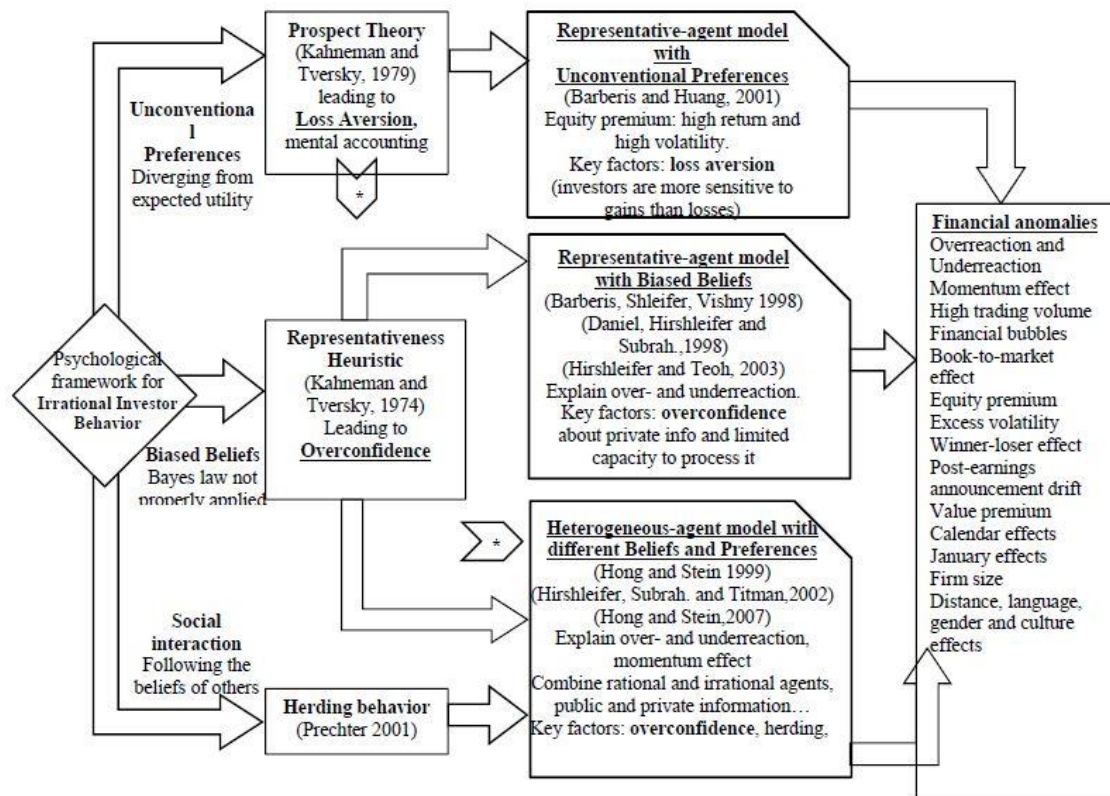
Source: (Igual & Santamaria, 2017)

10.2   Appendix 2

Original Questionnaire, Form A

Question 1: Imagine that the community is preparing for the outbreak of an unusual disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows: If Program A is adopted, 200 people will be saved. If Program B is adopted, there is a 1/3 probability that 600 people will be saved, and a 2/3 probability that no people will be saved. Do you favor program A or B? _____

Question 2: Which do you prefer:
a. an 80 percent chance to gain $4,000 and a 20 percent chance to gain nothing
b. to gain $3,000 for certain

Question 3: Which do you prefer:
a. An online subscription to the *Economist* at $59 a year.
b. A subscription to the print and Web editions of the *Economist* at $125 a year.

Question 4: A bet is played on a roulette wheel with 36 slots numbered 1 to 36.
A: If the ball drops in slots 1–28 you win $10, otherwise you win nothing.
B: If the ball drops in slots 1–3 you win $100, otherwise you win nothing.
I prefer bet _____.

Question 5: Would you take small items from work: pens, paper … if you knew you would not be caught? (Yes / No)

Question 6: There are two subjects in an economics experiment and one subject, the proposer, is given ten $1 bills. The proposer decides how much to keep and how much to offer to the other subject. The responder has the right to accept or reject. If the proposal is rejected, both subjects get nothing.
a. As the proposer, I would offer the other person _____ and keep _____.
b. As the responder, unless I get at least _____ I would reject the deal.

Question 7: An experimenter gives you, and several other subjects, 10 $1 bills and lets you decide how many to keep and how many to place in an envelope to be given randomly to subjects in another room. The envelopes are unmarked and the subjects and the experimenter will never know what you do. How many $1 bills do you keep?

Question 8: Take the last three digits of your phone number and add two hundred. Write the number down. _____ Now, when do you think Attila the Hun sacked Europe? Was it before or after that year? _____ What year is your best guess? _____

Question 9: There are two people who own goods they value at 10 but the other person values at 20. Trade would be mutually advantageous but there are no courts or police. Assume A is rational in the way economists assume; A cares only for A and lies if it results in personal gain. Assume B is trustworthy and honest but fully understands A, and A fully understands B. If the deal is that both put their items in the mail at the same time, will A, B, or neither put the item in the mail? _____

Question 10: Three homeworks are due during the class. You are allowed to set the deadlines at any time but if you miss the deadline, your grade is reduced. Do you A: set the deadline at the last day of class or B: set the deadlines spaced throughout the semester? _____

Question 11: On a flip of a fair coin you either earn $X or lose $100. How much must X be before you would take the gamble?

Question 12: There are two new energy drinks on the market with essentially the same ingredients. You know that A is selling better than B. Would you try A first or B first?

Question 13: Answer with the first thing that comes to mind. A ball and bat costs $1.10 in total. The bat costs $1 more than the ball. What does the ball cost? _____

Question 14: The experimenter gives a mug to you. A bit later the experimenter offers you the opportunity to trade the mug for a pen of equal monetary value. Do you make the trade?

Source: (Beckman et al., 2011)

10.3   Appendix 3

Original Questionnaire, Form B

Form B

Question 1: Imagine that the community is preparing for the outbreak of an unusual disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows: If Program A is adopted, 400 will die. If Program B is adopted, there is a 1/3 probability that nobody will die, and a 2/3 probability that 600 people will die.
Do you favor program A or B? _____

Question 2: Which do you prefer:
a. an 80 percent chance to lose $4,000 and a 20% chance to lose nothing.
b. to lose $3,000 for certain.

Question 3: Which do you prefer:
a. An online subscription to *The Economist* at $59 a year.
b. A print subscription to *The Economist* at $125 a year.
c. A subscription to the print and Web editions of *The Economist* at $125 a year.

Question 4: A bet is played on a roulette wheel with 36 slots numbered 1 to 36.
A: If the ball drops in slots 1–28 you win $10, otherwise you win nothing.
B: If the ball drops in slots 1–3 you win $100, otherwise you win nothing.
The smallest price for which I would sell my ticket to play A is $_____
The smallest price for which I would sell my ticket to play B is $_____

Question 5: Would you take small amounts from the petty cash at work if you knew you would not be caught? (Yes / No)

Question 6: There are two subjects in an economics experiment and one subject, the proposer, is given ten $1 bills. A computer decides how much to keep and how much to offer to the other subject. The responder has the right to accept or reject. If the proposal is rejected, both subjects get nothing.
Unless I get at least _____ I would reject the deal.

Question 7: You find ten $1 bills on the sidewalk. How many $1 bills do you keep? _____

Question 8: Take the last three digits of your phone number and add two hundred. Write the number down. _____ Now, when do you think Attila the Hun sacked Europe? Was it before or after that year? _____ What year is your best guess? _____

Question 9: There are two people who own goods they value at 10 but the other person values at 20. Trade would be mutually advantageous but there are no courts or police. Assume A is rational in the way economists assume; A cares only for A and lies if it results in personal gain. Assume B is trustworthy and honest but fully understands A, and A fully understands B. If the deal is that A puts the item in the mail first and B puts the item in the mail upon receipt of A's item, will A put the item in the mail? _____

Question 10: Three homeworks are due during the class. You are allowed to set the deadlines at any time but if you miss the deadline, your grade is reduced. Do you A: set the deadline at the last day of class or B: set the deadlines spaced throughout the semester? _____

Question 11: On a flip of a fair coin you either earn $X or lose $100. How much must X be before you would take the gamble?

Question 12: There are two new energy drinks on the market with essentially the same ingredients. You know that A is selling better than B. Would you try A first or B first?

Question 13: Answer with the first thing that comes to mind. A ball and bat costs $1.10 in total. The bat costs $1 more than the ball. What does the ball cost? _____

Question 14: The experimenter gives a pen to you. A bit later the experimenter offers you the opportunity to trade the pen for a mug of equal monetary value. Do you make the trade? _____

Source: (Beckman et al., 2011)