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Rasmus Hakala

The Role of Institutional Investors in the Momentum Effect in Stock Returns

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Author:	Rasmus Hakala		
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ABSTRACT:

The objective of this bachelor's thesis is to examine the effect of institutional ownership and institutional trading on the strength and persistence of the momentum effect in stock returns. Another objective of this bachelor's thesis is to determine whether momentum trading occurs among institutional investors. The purpose is also to examine whether there are significant differences between different types of institutions in their attitude toward momentum and momentum-based investing. At the same time, my purpose is to determine whether institutional investors succeed in arbitraging the momentum effect away from the market. In my thesis, I also examine the reasons that may possibly limit institutions' ability to exploit arbitrage opportunities. In my thesis, I find that momentum as a phenomenon has been widely documented across both different time periods and different geographical areas. The thesis also shows that although momentum-based investing occurs among institutional investors, the differences between different types of institutions are significant. The clearest evidence of momentum investing has been observed among mutual funds. The research shows that institutional trading in the direction of momentum may have a strengthening effect on both its strength and persistence. In addition, I find in my thesis that institutional investors do not fully succeed in arbitraging momentum away from stock markets. The research literature provides evidence that there are numerous factors limiting arbitrage opportunities. In my thesis, I present, among others, price impact factors and factors related to portfolio managers' career development as significant limits.

KEYWORDS: Institutional investors, Momentum effect, Limits to arbitrage

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TIIVISTELMÄ:

Tämän kandidityön tavoitteena on tutkia institutionaalisen omistuksen ja kaupankäynnin vaikutusta momentum-ilmion vahvuuteen ja pysyvyyteen osaketuotoissa. Toinen tavoite tälle kandidityölle on selvittää, esiintyykö momentum-kaupankäyntiä institutionaalisten sijoittajien keskuudessa. Tarkoituksena on myös perehtyä, onko erilaisten instituutiotyyppien välillä merkittäviä eroja suhtautumisessa momentumiin ja sen suuntaisesti sijoittamiseen. Samalla tarkoitukseni on selvittää, onnistuvatko institutionaaliset sijoittajat arbitroimaan momentum-ilmiotä pois markkinoilta. Tutkielmassani lisäksi perehdyn niihin syihin, jotka mahdollisesti voivat rajoittaa instituutioiden mahdollisuuksia hyödyntää arbitrointimahdollisuuksia. Tutkielmassani havaitsin, että momentum on ilmiönä laajasti dokumentoitu niin eri ajanjaksoina kuin eri maantieteellisillä alueillakin. Tutkielmassani käy lisäksi ilmi, että vaikka momentumin suuntaista sijoittamista esiintyy institutionaalisten sijoittajien keskuudessa, on erot eri instituutiotyyppien välillä merkittäviä. Selvimpiä näyttöjä momentum-sijoittamisesta on havaittu sijoitusrahastojen keskuudessa. Tutkimus osoittaa, että momentumin suuntaisella institutionaalisella kaupankäynnillä voi olla sen vahvuutta ja pysyvyyttä vahvistava vaikutus. Lisäksi havaitsen tutkielmassani, etteivät institutionaaliset sijoittajat täysin onnistu arbitroimaan momentumia pois osakemarkkinoilta. Tutkimuskirjallisuus antaa näyttöä sille, että arbitraasimahdollisuuksia rajoittavia tekijöitä on lukuisia. Tutkielmassani merkittäviksi rajoitteiksi esitän muun muassa price impact -tekijöitä sekä salkunhoitajien urakehitykseen liittyviä tekijöitä.

AVAINSANAT: Institutionaaliset sijoittajat, momentum-ilmio, arbitraasirajoitteet

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1 Introduction

The momentum phenomenon is one of the most researched and well-known market anomalies in the world (Asness et al., 2014). The basic principle of the momentum phenomenon is that stocks that have performed well in the past continue, on average, to perform well also over the intermediate horizon (Jegadeesh & Titman, 1993). According to momentum, correspondingly, stocks that have performed weakly in the past continue to perform weakly also over the intermediate horizon (Jegadeesh & Titman, 1993). Although momentum significantly challenges Fama's Efficient Market Hypothesis (EMH), its existence has been widely documented (Jegadeesh & Titman, 1993; Rouwenhorst, 1998). According to EMH, information appearing in efficient markets would be reflected immediately in stock prices, and past returns should not affect future returns (Fama, 1970). Contrary to this assumption, the momentum phenomenon gives indications that stocks' past returns may predict future returns (Jegadeesh & Titman, 1993). For several decades, researchers have tried to explain the abnormal returns caused by momentum with different theories and models. However, the research literature has not found a consensus on the main causes of momentum returns (Fama & French, 1996; Jegadeesh & Titman, 2023).

Although many well-known articles studying momentum focus on the U.S. stock market, the phenomenon does not occur only in the United States. Momentum has been documented in numerous countries and in their markets around the world and across different continents (Rouwenhorst, 1998; Barroso & Santa-Clara, 2015). For example, Rouwenhorst (1998) presents broad evidence of momentum in European stock markets. Although this thesis focuses on momentum in stock returns, momentum has also been observed more broadly between different industries. Moskowitz and Grinblatt (1999) call this the industry momentum phenomenon.

The opportunities of households and private investors to invest in stocks and other investment instruments have been visible as growth in investment activity during recent decades (U.S. Securities and Exchange Commission, n.d.). At the same time, the

importance of institutional investors in stock markets has also grown significantly. They have become significant owners in large listed companies partly because they manage and invest assets on behalf of households and other private investors, for example through mutual funds and other investment vehicles (Bebchuk et al., 2017). Because institutions are significant owners and manage assets on behalf of many investors, it is important to understand the factors that affect their trading behaviour. It is easy for a retail investor to think that the portfolio manager of an institutional investor would automatically be more capable and better informed than an ordinary private investor (Nofsinger & Sias, 1999; Li et al., 2017). Because portfolio managers make investment decisions on behalf of other people, it is important to understand portfolio managers' behavioural patterns and to identify situations in which a portfolio manager might not act rationally after all (Chevalier & Ellison, 1999; Scharfstein & Stein, 1990).

EMH assumes that investors act rationally (Fama, 1970). Because institutional investors are large, professional, and better informed than retail investors in stock markets, it is natural to think that through their own actions they could increase market efficiency (Nofsinger & Sias, 1999; Li et al., 2017). Contrary to this assumption, previous research literature suggests that institutional investors do not always act rationally, nor do they always act as purely arbitraging actors in stock markets (Shleifer & Vishny, 1997; Chevalier & Ellison, 1999). The irrational modes of behaviour shown in the research literature on the actions of institutional investors include, among others, positive feedback trading, herding, and momentum trading (Nofsinger & Sias, 1999; Badrinath & Wahal, 2002). The research problem arises from the observation that it is not self-evident whether the effect of institutional investors on the momentum effect is maintaining, strengthening, or weakening.

1.1 Purpose of the study

The purpose of this study is to conduct a literature review on studies that examine how institutional ownership and institutional trading relate to the strength and persistence of the momentum effect in stock returns. This is the fundamental question of the study,

and it is complemented by two hypotheses whose purpose is to deepen and specify the direction of the study. The thesis is a literature review, and it does not present empirical research or analysis. In this thesis, I limit the topic to the occurrence of the momentum phenomenon in stock markets and stock returns. The focus is on the trading styles and trading habits of institutional investors, which is why retail investors receive only limited attention.

Based on the above, the research question of this thesis is the following:

How do institutional ownership and institutional trading relate to the strength and persistence of the momentum effect in stock returns?

The research question is divided into two parts, the first of which focuses on how institutional investors can affect the strength of the momentum effect through their own actions. The second part of the question focuses on what kind of effect these institutions have on the persistence of the momentum effect. The purpose of the second part of the question is to examine why the momentum phenomenon remains in the market despite the presence of professional and well-informed actors in the market.

Institutional investors make investment orders with large sums on average (Nofsinger & Sias, 1999; Cai & Zheng, 2004). If they tend to invest according to momentum, meaning to buy past winner stocks and sell past loser stocks, their investment behaviour may strengthen already existing momentum. Because previous research gives indications of momentum trading practiced by institutions, there is reason to assume that their actions also influence the occurrence of the momentum phenomenon (Grinblatt et al., 1995; Badrinath & Wahal, 2002). The purpose of H1 is to examine both the possible occurrence of momentum trading among institutional investors and whether such trading may have a strengthening effect on the momentum phenomenon.

H1: Momentum trading occurs among institutional investors and tends to reinforce the momentum effect in stock returns

Institutional investors are generally better informed and educated than households and private investors (Nofsinger & Sias, 1999; Li et al., 2017). Based on these assumptions, it is natural to think that institutional investors are more likely than private investors to act rationally in stock markets. If the investment behaviour of institutional investors is rational, one could assume that they would be able to at least partly arbitrage momentum away from stock markets. However, arbitrage opportunities cannot be considered self-evident, because in real markets there are many different limits to arbitrage factors that make the implementation of arbitrage less attractive (Shleifer & Vishny, 1997; Korajczyk & Sadka, 2004). Such factors include, among others, price impact, transaction costs, career concerns, and liquidity constraints (Chevalier & Ellison, 1999; Lesmond et al., 2004). Because momentum still occurs widely in different markets, this suggests that institutional investors do not fully succeed in arbitraging it away (Rouwenhorst, 1998; Barroso & Santa-Clara, 2015). It is important to understand more deeply the constraints that may prevent or restrain institutional investors from fully arbitraging momentum away.

H2: Institutional investors do not fully arbitrage momentum away.

1.2 Structure of the thesis

The rest of the thesis is organized as follows. Chapter 2 presents the theoretical background by explaining the momentum phenomenon and examining empirical evidence as well as the most central explanations for the existence of the momentum phenomenon. Chapter 3 presents an overview of institutional investors as a group. The chapter also discusses their investment behaviour and their continuously growing importance in stock markets. The purpose of Chapter 4 is to bring together the theory provided by Chapters 2 and 3 and to discuss it from the perspective of the research question and the hypotheses. Chapter 5 summarizes the conclusions and discusses the limitations of the thesis, practical implications, and possible future research topics.

2 The Momentum Effect in Financial Markets

2.1 Definition and Measurement of Momentum

Momentum is one of the most researched anomalies in stock markets and one of the most used anomalies in investment strategies (Asness et al., 2014). Momentum refers to the phenomenon in which stocks that have performed well in the past continue to outperform stocks that have performed weakly in the past over the intermediate horizon (Jegadeesh & Titman, 1993). Jegadeesh and Titman presented in 1993 that by buying stocks that have performed well earlier and selling stocks that have performed weakly earlier, it is possible to achieve positive returns over a 3–12 month period (1993). According to the semi-strong form of the Efficient Market Hypothesis, or EMH, all public information should immediately be reflected in stock prices (Fama, 1970). Based on Fama's hypothesis, previous price development should not affect a stock's future returns. Momentum, however, challenges this assumption because, in the phenomenon, past returns appear to predict future returns.

Although Jegadeesh and Titman focused in their 1993 study on the U.S. market, momentum has also been documented in other markets. Momentum is also not limited only to stock markets, but it has been observed in numerous other markets, such as currency and commodity markets (Barroso & Santa-Clara, 2015). Momentum behaviour is also observed between different industries. This is called industry momentum (Moskowitz & Grinblatt, 1999). Moskowitz and Grinblatt (1999) present an abnormal-return-producing industry momentum strategy in which winner and loser portfolios are created from different industries instead of individual stocks. Despite this, the academic community has not reached a consensus on the reasons that produce this market inefficiency. Some researchers see momentum as a clear sign of market inefficiency, while other researchers see the reason for momentum returns, for example, as risk compensation (Jegadeesh & Titman, 2001a).

Momentum is used through many different strategies. However, they are connected by the basic principle in which the portfolio is created by ranking the stocks of a selected market at a certain point in time from the best-performing to the weakest-performing stocks. Of these, the stocks belonging to the highest decile are winners and those belonging to the lowest decile are losers (Jegadeesh & Titman, 2023). In the strategy, winner stocks are bought and loser stocks are sold short. It has been documented that momentum works best with 3–12 month holding periods (Jegadeesh & Titman, 1993). During the first month after the portfolio formation period, a short-term reversal effect has been observed, which means an opposite development in the stock price compared with what it had been during the previous months. Thus, stocks that have produced good returns during the past year produce negative returns and stocks that had fallen earlier rise during the first month (Jegadeesh, 1990). Because of this, the month preceding the review period is often left out. This is also how Jegadeesh and Titman acted when ranking stocks based on their returns from $t-12$ to $t-2$ (2023). The purpose is to take into account everything from the period of the previous year except the previous month. Typically, the strategy is implemented so that a new portfolio is created every month and it is held for 3–12 months depending on the choice.

In simple terms, the returns of a portfolio based on a momentum strategy are measured by calculating the difference between the returns of the bought winner stocks and the short-sold stocks (Jegadeesh & Titman, 1993). In other words, the return of the portfolio is positive as long as the winner stocks produce more than the loser stocks during the holding period.

2.2 Empirical Evidence on Momentum

Although Jegadeesh and Titman were the first to call the influence of past returns on future returns over a short period momentum, the phenomenon had already been examined earlier, although from a slightly different perspective (Jegadeesh & Titman, 1993; Bondt & Thaler, 1985). Researchers who are critical of momentum as a phenomenon accuse the researchers defending it of data mining. However, its existence is

documented in numerous markets around the world, except for a few Asian countries (Jegadeesh & Titman, 2023). In his study, Rouwenhorst (1998) provides evidence from Europe that strengthens the idea that the 1993 finding by Jegadeesh and Titman from the U.S. market is not only a coincidence. Rouwenhorst (1998) shows that momentum behaves in European markets in a significantly similar way to how Jegadeesh and Titman present it as working in the U.S. market. Between 1980 and 1995, stocks in 12 different European countries show that past winners outperform past losers by an average of about 1 percent per month (Rouwenhorst, 1998). Also in Europe, traditional risk factors, such as firm size and the market factor, correlate negatively with momentum (Rouwenhorst, 1998). Although momentum appears more strongly in the stocks of smaller firms, it is found in stocks of firms of all size classes (Rouwenhorst, 1998).

Barroso and Santa-Clara (2015) provide evidence in their article of the existence of momentum over a period of more than eighty years. They state that between 1927 and 2011, momentum produced a monthly abnormal return of 1.75 percent after controlling for the Fama-French factors. These three Fama-French factors for the stock market are market factor, Small Minus Big (SMB), and High Minus Low (HML), and their purpose is to explain the average returns of stocks (Fama & French, 1993). Market factor describes the return above the risk-free rate, or the risk premium obtained from the stock market. SMB represents the difference between the returns of small firms and large firms. HML represents the difference between the returns of firms with a high book-to-market value and firms with a low book-to-market value (Fama & French, 1996).

2.3 Possible Explanations for Momentum

Although momentum is a widely recognized and accepted phenomenon, researchers have still not reached agreement on the reasons for the existence of momentum. Jegadeesh and Titman divide the different hypotheses for the reasons behind the existence of momentum into three different categories, which are data mining, risk premium, and behavioral reasons (2023). Momentum as a phenomenon itself challenges EMH, but hypotheses relying on data mining and risk premium try to explain it in a way compatible

with EMH, while behavioral hypotheses are in conflict with EMH (Jegadeesh & Titman, 2023).

Harvey, who defends the hypothesis based on data mining, argues that journals publishing scientific articles want to publish as successful and significant studies as possible (Harvey, 2017). According to Harvey (2017), this is likely to increase data mining among researchers. Harvey (2017) argues that finance researchers are guilty of p-hacking, meaning manipulating data so that the p-value measuring statistical significance would be favorable for the study. As an example of p-hacking, Harvey uses the fact that only few studies in which the t-value describing the statistical significance of the results is below two are published. He sees the reason as being that researchers want to publish only results and studies that are useful for themselves (Harvey, 2017).

2.3.1 Risk-Based Explanations

Sharpe (1964) introduces the capital asset pricing model (CAPM), in which the expected return of a stock is determined by the risk-free rate, the expected return of the market, and the stock's beta coefficient. The model assumes that the investor acts rationally and therefore diversifies away firm-specific risk from the portfolio, leaving only the beta coefficient representing market risk (Sharpe, 1964). Fama and French (1996) state in their article that CAPM does not explain stock returns sufficiently. According to Fama and French (1996), different firm characteristics, such as its size, earnings/price, previous sales growth, and both long- and short-term past returns, are connected to the average future returns of stocks. These characteristics are also visible in Fama-French's three risk factors explaining stock prices (Fama & French, 1996).

Fama and French (1996) define anomalies as situations in which CAPM is unable to explain the average returns of stocks. The three-risk-factor model succeeds in explaining returns from portfolios that have been constructed, for example, according to the sizes of the firms included in them and the book-to-market ratio (Fama & French, 1996). In addition, the model successfully explains the longer-term return reversal presented by

De Bondt and Thaler in 1985 (Fama & French, 1996). Although several researchers see momentum as compensation for risk, the Fama-French risk factors nevertheless fail in explaining these returns (Fama & French, 1996; Jegadeesh & Titman, 2001). Grundy and Martin (2001) state that factor models can explain 95 percent of the variation in returns of winner and loser stocks. However, they state that these models fail in explaining the average returns of either winners or losers (Grundy et al., 2001).

If markets are efficient, an investor should receive a higher return from stocks with higher risk (Jegadeesh & Titman, 2023). Thus, if the continuous better returns of winner stocks over loser stocks in the momentum phenomenon were a risk premium, winner stocks should be riskier than loser stocks (Jegadeesh & Titman, 2023). Jegadeesh and Titman (1993) nevertheless state in their first study on momentum that CAPM cannot explain momentum because the betas of winner stocks are lower than the betas of loser stocks. Grundy and Martin (2001) report that both size betas and value betas are lower for winner stocks than for losers. They state that they observed that a stock's beta relative to a well-performing factor affects whether the stock ultimately belongs to winners or losers (Grundy & Martin, 2001). Thus, the larger a stock's beta is relative to a well-performing factor, for example the size factor, the more likely the stock is to belong to winners (Grundy & Martin, 2001).

2.3.2 Behavioral Explanations

Efficient Market Hypothesis assumes that investors are rational (Fama, 1970). Researchers nevertheless present numerous different behavioral explanations that point against it for the occurrence and continuation of momentum (Hong et al., 2000). Most commonly, behavioral explanations focus either on investors' overreaction or underreaction to news coming from the market (Hong et al., 2000). Barberis et al. write that the evidence appears to show underreaction in securities prices over a 1–12-month time window (Barberis et al., 1998). A similar time window, namely 3–12 months, is documented to be the period during which momentum returns are realized (Jegadeesh & Titman, 1993). Bernard shows that the stocks whose standardized unexpected earnings (SUE),

meaning the surprise produced by the announced earnings, belonged to the highest decile, still produced significant returns 60 trading days after the announcement compared with stocks with weak earnings (1992). SUE therefore means the difference between forecasted and actual earnings so that the difference is scaled by the historical standard deviation of the firm's earnings (Bernard, 1992). In other words, the price increase caused by good news happens slowly over approximately a one-year horizon, even though according to EMH prices should adjust to the news immediately after its publication (Barberis et al., 1998; Fama, 1970).

Barberis et al. (1998) define overreaction visible in securities prices as a situation in which the average returns following several consecutive good news items are lower than the average returns following several consecutive bad news items. In a situation of this kind, good news that has continued for a long time has made investors so overoptimistic about the stock's future positive development that prices have escaped to unrealistically high levels (Barberis et al., 1998). Eventually even good news does not meet investors' expectations, at which point returns start to moderate (Barberis et al., 1998). De Bondt and Thaler (1985) show that overreaction appears in securities prices especially over a longer horizon, when good news one after another has raised the price too high, which causes prices to return. Overreaction is documented by De Bondt and Thaler's (1985) observation that over a longer period, stocks previously identified as losers outperform past winner stocks. Loser stocks have produced more than 20 percent more than winner stocks 36 months after the creation of the winner and loser portfolios (De Bondt & Thaler, 1985).

The rationality assumed by Fama (1970) in the Efficient Market Hypothesis means that investors are expected to base their investment decisions on fundamental information, such as financial statements. Against such rational behaviour stand noise traders, who do not follow analysts' investment recommendations based on a firm's financial situation but instead prefer to trust their own information acquisition (De Long et al., 1990). So-called noise traders behave irrationally, for example because they do not have access

to inside information (De Long et al., 1990). De Long et al. (1990) write that in such a situation investors take irrelevant noises like rumours as information that would supposedly be useful. According to De Long et al. (1990), they therefore end up incorrectly believing the information they receive about a stock's future development to be significant and useful.

Luo et al. (2021) strengthen the observations of earlier studies that investors end up overestimating their own knowledge and skills, which ultimately leads to overreaction in changes in stock prices. Luo et al. (2021) also present additional evidence for the idea that investors who overestimate their own knowledge and skills simultaneously underestimate the ability of other investors and public information (Daniel et al., 1998). Daniel et al. (1998) present a psychological model of investor behaviour that is mainly based on overconfidence and self-attribution bias. Daniel et al. (1998) also start in their study from the idea that the investor regards their own abilities with too much confidence. Because investors believe so strongly in their own abilities, they end up connecting events that confirm the correctness of their investment decisions to their ability, while ignoring events that are unfavorable to themselves as mere sabotage or noise (Daniel et al., 1998).

2.3.3 Limits to Information Processing

EMH assumes that information is reflected in stock prices immediately after its publication. If only a small group of investors examines published financial information, this may slow down the incorporation of information into stock prices, which can strengthen the momentum effect. The rational investors required by efficient markets should make their investment decisions based on rationally justified and reliable information (Fama, 1970). Loughran and McDonald (2017) discuss in their study investors' ways of acquiring information to support stock valuation and the investment decisions made through it. The study focuses on U.S. investors and companies and their reports. Loughran and McDonald (2017) argue that the best source for investors to support decision-making is companies' annual reports, which are published on EDGAR, or the Electronic Data Gathering

and Retrieval website, maintained by the U.S. Securities and Exchange Commission. In their study, they present evidence that especially retail investors become familiar with listed companies' reports downloadable from EDGAR only very little (Loughran & McDonald, 2017). According to the study, on the publication day of a 10-K report, meaning the official annual report of a U.S. listed company, and on the following day, reports were downloaded by people on average only 28.4 times between March 2003 and March 2012 (Loughran & McDonald, 2017).

EDGAR is not the only source of company financial information available to investors, and therefore EDGAR download numbers alone do not reveal the full picture of how many investors use information from annual reports (Loughran & McDonald, 2017). Loughran and McDonald (2017) state that websites used by many as information sources, such as Bloomberg and Yahoo Finance, offer data based on annual reports, but in a considerably simplified and shorter form. Although the average number of report downloads is small even among all investors, the low number of downloads is emphasized among small investors (Loughran & McDonald, 2017).

Miller (2010) defines small investors based on trade amounts. The amount of a trade executed by a small investor is at most 5,000 dollars, or if the stock price is above 50 dollars the trade contains at most 100 shares (Miller, 2010). Miller (2010) shows in his study how more complex and more difficult-to-interpret official annual reports of listed companies, or 10-K reports, reduce the trading volume of those companies' stocks. Miller (2010) states that the complexity or difficulty of 10-K reports actually has no significance for large investors' investment decisions. The decreased trading volume therefore arises solely from the reduced trading of small investors in these stocks (Miller, 2010). Miller (2010) shows lower consensus in small investors' buying decisions when firms' annual reports are complex. This indicates that when reports are too difficult to interpret, small investors can no longer interpret them rationally and clearly, in which case their interpretations begin to differ significantly from one another (Miller, 2010). This finding

suggests that not all investors efficiently use the information available to them, which may slow down the reflection of information in prices.

2.3.4 Limits to Arbitrage

Arbitrage is a significant phenomenon in finance, and it has been shown that the textbook explanation of arbitrage does not so much correspond to realistic arbitrage taking place in real markets (Shleifer & Vishny, 1997). Hugonnier (2012) defines arbitrage simply as a situation in which an investor simultaneously has the possibility to buy and sell at two different prices two securities or portfolios producing the same cash flow. Pontiff (2006), in turn, summarizes arbitrage as follows: "Arbitrage is the transaction where a rational agent tries to profit from mispricing." Pontiff (2006) adds that the costs present in markets prevent the full arbitraging away of inefficient prices created by investors acting irrationally. Like Shleifer and Vishny, Hugonnier (2012) also shows that despite the textbook explanation, the basic principles of arbitrage constantly experience violations. These basic principles include, for example, that the implementation of arbitrage should not require capital from the investor, and in addition the action should not contain risk (Shleifer & Vishny, 1997).

Pontiff (2006) writes that the connection between market inefficiency and the costs caused by arbitrage, especially idiosyncratic risk, is a generally misunderstood topic. This is because finance theory emphasizes the possibility of diversifying away idiosyncratic, or firm-specific, risk (Pontiff, 2006). Although in the case of the CAP model the possibility of diversifying idiosyncratic risk is justified, in the case of arbitrage firm-specific risk is always present (Pontiff, 2006). Pontiff (2006) sees as a broader problem in the research field the limited focus of researchers on idiosyncratic risk as one of the most important limits to arbitrage factors. For example, Schwert (2002) goes through different arbitrage costs in his anomaly study but does not focus at all on firm-specific risk.

Arbitrage has a significant connection to the Efficient Market Hypothesis, because its task would be to keep markets efficient by returning the prices of corresponding

products traded in different markets to uniformity (Fama, 1970; Shleifer & Vishny, 1997). However, in the case of both EMH and arbitrage, theory assumes things that nevertheless do not actually occur in real markets (Fama, 1970; Shleifer & Vishny, 1997).

3 Institutional Investors in Financial Markets

3.1 The Growing Role of Institutional Investors

Berle and Means state in their 1932 book that there had been a significant broadening in the number of shareholders in companies' ownership bases. They state that the dispersion of ownership seems to be a natural and inevitable part of the corporate system at the time (Berle & Means, 1932). The study shows that the dispersion in ownership shares is most significant in the largest companies of all (Berle & Means, 1932). In their book, they use as evidence and as an example of the dispersion of the ownership base one of the largest U.S. railroad companies of the time, Pennsylvania Railroad, where the share of the largest single owner in 1929 was less than one percent, while at the same time the combined ownership of the 20 largest owners was also only 2.7 percent (Berle & Means, 1932).

Although Berle and Means claim that significant dispersion taking place in the ownership bases of large companies is inevitable, current information shows otherwise (Bebchuk et al., 2017). The most significant reason for this opposite change is the increase in the ownership shares of institutional investors widely in public limited companies. With the growth of institutional ownership, the changes in the ownership relationships of public companies have been enormous. Compared with the level of the late 1920s described by Berle and Means and their prediction of the future inevitable direction, ownership structures have become considerably more concentrated. Bebchuk et al. (2017) show that while institutional owners owned 6.1 percent of companies' share capital in 1950, in 2016 they already owned 63 percent of companies' share capital. In 2016, among the 20 largest companies in the United States, in each case the 20 largest institutional investors owned more than one quarter of the company (Bebchuk et al., 2017). Bebchuk et al. (2017) show that among these 20 largest companies, the average ownership share of the five largest shareholders is 20.8 percent. The concentration of decision-making caused by institutional investors is also strengthened by the observation that, on average,

the number of votes used in general meetings deciding the board members of the 20 largest companies was 68.7 percent of all votes (Bebchuk et al., 2017).

It is nevertheless good to note that at the same time as the rise of institutional ownership, the share of retail investors has also increased significantly. According to statistics from the U.S. Securities and Exchange Commission, between 1989 and 2022 the share of households investing in stocks or bonds rose from 33.33 percent to 58.1 percent (n.d.). The growth in the number of retail investors may also for its part have influenced the growth of institutional ownership. This is because many retail investors invest their assets not only in individual stocks but also through different alternatives offered by institutional asset managers, such as equity funds (Bebchuk et al., 2017).

The information on the significant growth of institutional ownership over the years raises the question of what kind of effect these professional actors have on market efficiency and functioning, as well as on the formation of stock prices. To consider this question, it is important to understand that the term “institutional investor” is a broad concept that includes numerous different actors. Institutional investors can be categorized in different ways. The SEC, meaning the U.S. securities market authority, requires ownership reports on 13F forms from all U.S. institutions managing more than 100 million dollars in assets (Cai & Zheng, 2004). Typically, based on 13F forms, institutions are divided into five different categories, which are banks, insurance companies, investment companies, meaning mutual funds, investment advisory firms, and others (Cai & Zheng, 2004). DePamphilis (2010) also adds, as their own category, among others pension investors and sovereign wealth funds.

These presented categories include investors that differ significantly in their investor profiles. What connects them, however, is that they collect and invest other people's assets and, when necessary, borrow money to finance different purchases from securities all the way to large corporate or real estate acquisitions (DePamphilis, 2010). Of institutional investors, insurance companies and pension funds are by nature the most risk-

averse (DePamphilis, 2010). In addition to risk aversion, the cautious investment style of these investors is explained by the strict regulation directed at them. DePamphilis (2010) also mentions mutual funds as risk-averse, but it is good to note that different mutual funds can differ greatly from one another. Whereas insurance companies make returns, in addition to insurance premiums, by investing these insurance premiums, mutual funds, in turn, invest the assets of private investors and smaller actors. The purpose of the profit sought for investments therefore differs significantly for these institutional investors, which is why the ways of tolerating risk also differ (DePamphilis, 2010).

Of institutional investors, DePamphilis (2010) describes hedge funds as the most risk-tolerant and the most active market actors, differing from mutual funds, for example, in the liquidity of investments and in their strategies. For an ordinary investor, hedge funds are more difficult and more expensive to access than mutual funds, and their purpose is to collect as large profits as possible with the assets of their investors who do not avoid risk (DePamphilis, 2010).

As significant trading parties, there is reason to focus on the share of institutional investors in the formation of stock prices and thereby on their share in the realization and strengthening of the momentum anomaly. In their 2004 study, Cai and Zheng write that institutional investors cover more than 50 percent of all trading in the U.S. stock market. The momentum phenomenon strengthens when investors act in accordance with it, meaning by continuing to buy stocks that have performed well earlier and selling those that have performed poorly (Barberis et al., 1998). Cai and Zheng (2004) show in their study that institutional investors follow an investment strategy in which they buy stocks that have performed well earlier and currently, and conversely sell poorly performing stocks. This observation is likely to strengthen the idea that institutional investors possibly have even a significant role in the realization of momentum returns.

3.2 Institutional Trading Behaviour

As has been stated earlier, the significance of institutional investors in stock markets has increased significantly over the decades. Between 1980 and 1996, the market ownership share of the hundred largest institutional investors rose from 19 percent to 37.1 percent. At the same time, already in 1996, when all institutional investors were included, more than half of the market was under their control (Gompers & Metrick, 2001). Previous research evidence shows investors strengthening each other's decisions and following past stock returns (Hong et al., 2000). Also, behind institutional investors as portfolio managers are people who, in simplified terms, invest like an ordinary retail investor, but with significantly larger sums. This may imply that their actions also influence stock markets and stock prices.

Managers working at institutional investors could be assumed to be better informed and educated than an ordinary retail investor, and therefore rational. Based on Fama's (1970) rationality assumption, stock prices would continuously reflect available information. If the portfolio managers of institutional investors acted rationally, their actions would have a significant effect on maintaining market efficiency because of the large sums invested. However, different market inefficiencies, of which one of the most significant, the momentum anomaly, as discussed in this text, significantly challenges this (Jegadeesh & Titman, 1993). Momentum should therefore not appear in the markets if the investors acting there made decisions rationally based on available fundamental information.

Research literature has succeeded in showing numerous explanations for the lack of rational investment behaviour especially from the perspective of institutional investors. Because portfolio managers are also human decision-makers, they may be exposed to similar behavioural biases as other investors. Such phenomena studied in the field of behavioural finance include, for example, investors' underreaction to news obtained from the market, which ultimately leads to the strengthening of the momentum phenomenon (Barberis et al., 1998). If portfolio managers did not widely underreact at least

to some extent to news coming from stock markets in the same way as retail investors, the phenomenon described by Barberis et al. would not appear as strongly (Barberis et al., 1998). Another phenomenon explaining inefficiency is herding, which is observed among both retail investors and institutional investors, although with small differences (Li et al., 2017). Li et al. (2017) show that despite widely available information and know-how, institutional investors also have a tendency to follow other investors when making investment decisions instead of basing their decisions on a rational analysis grounded in their own financial information about the company.

Alongside various behavioural finance explanations, there are also other phenomena that concern institutional investors. One such phenomenon is the agency problem, in which the agendas of the portfolio manager and the firm managing the mutual fund are in conflict (Chevalier & Ellison, 1997). This raises the question of why portfolio managers who are well informed and invest large sums fail in arbitraging market inefficiencies away. There are situations in which the portfolio manager would theoretically have the possibility to arbitrage a market inefficiency, but factors independent of him prevent it. In this case, it is a question of the limits to arbitrage phenomenon, in which, for example, the too high cost of implementing the arbitrage can get in the way (Shleifer & Vishny, 1997).

In the following sections, I examine more closely the essential factors mentioned above that have an influence on the investment behaviour of portfolio managers of institutional investors. These include, among others, herding, agency problem, and limits to arbitrage. In section 3.2.1, I discuss herding and positive feedback trading especially as phenomena. In section 3.2.2, I focus more deeply on the root causes behind the behaviour of institutional investors.

3.2.1 Herding and Positive Feedback Trading

Efficient markets require rational decision-making from investors to be realized. This means that investors would base their decisions on companies' financial statements and other reliable information (Fama, 1970). Instead of decisions based on one's own

company analysis, people have a tendency in their investment behaviour to lean on other investors (Li et al., 2017). The phenomenon in which investors tend to follow other investors in their investment decisions is called herding. Nofsinger and Sias (1999) briefly explain herding as a phenomenon in which a group of investors makes same-direction investment decisions during a certain period. Despite a significant amount of research literature, researchers have different research directions when studying herding behaviour (Nofsinger & Sias, 1999).

Whereas one research direction focuses on retail investors and their market sentiment and trend-following type of herding behaviour, another research direction focuses on institutional herding (Nofsinger & Sias, 1999). Li et al. (2017) write that herding behaviour is observed among both retail investors and institutional investors. However, there are many differences in the herding behaviour of retail investors and portfolio managers (Li et al., 2017). In addition, Wang (1993) argues that when asymmetric information prevails, more strongly informed investors, such as portfolio managers, end up choosing different investment strategies than investors relying on weaker information. Compared with portfolio managers, individual investors are significantly less informed and less educated than portfolio managers (Nofsinger & Sias, 1999). Li et al. (2017) write in support of the view of retail investors' rather weak knowledge and familiarity with the investment objects. They add that retail investors are more easily inclined than portfolio managers toward irrational investment behaviour, such as different psychological biases (Li et al., 2017).

Li et al. (2017) write that retail investors are generally more sensitive than institutional investors to different deviations. Market sentiment, meaning investors' general mood in the market and attitude toward future market development, affects retail investors' behaviour more than portfolio managers' behaviour. In addition, retail investors are more vulnerable to sudden attention-grabbing events, such as market shocks and even large changes in stock prices following them. When information is asymmetric, it is not distributed evenly to all investors, but for example retail investors have fewer tools and less

information available when making investment decisions. The smaller amount of available information may possibly make investors seek even more noisy information instead of real information when they think it is relevant (Shleifer & Summers, 1990).

Less informed investors may drift into seeking information from trend-chasing “popular models” (Li et al., 2017). Shleifer and Summers (1990) give as an example investors' tendency to follow different market gurus and forecasters, whose opinions and statements have a significant influence on less informed investors when they make decisions about investment sums and targets. In a situation where information is asymmetric, it may even be rationally sensible for less informed parties to behave as price chasers (Wang, 1993). Wang (1993) writes that price chasers behave so that they buy stocks when their prices rise and conversely sell them when prices fall.

The investment behaviour of both well-informed portfolio managers of institutional investors and less informed retail investors can influence stock prices and price development. For example, Wang (1993) argues that investors in the market who make investment decisions under imperfect information increase the risk premiums of stocks. When a larger share of investors is less informed, stock prices in the market at the same time reflect less rational information related to the fundamentals of stocks (Wang, 1993). Whereas in efficient markets stock prices should continuously reflect symmetric information related to the fundamentals of stocks, in this situation prices are at least partly based on asymmetric noise information. This is likely to increase uncertainty about the future development of stocks especially from the perspective of poorly informed investors, which makes them demand higher premiums so that they dare to invest in stocks (Wang, 1993). In addition to higher risk premiums, noise traders making investment decisions based on irrelevant information also cause higher volatility in stock markets (De Long et al., 1990). De Long et al. (1990) suggest that less informed investors, through their investment behaviour, significantly reduce the attractiveness of arbitrage by making it riskier. When arbitrage is riskier, it is also less likely to occur. This leads to an increase in stock market volatility (De Long et al., 1990). De Long et al. (1990) write that

the combination of the low attractiveness of arbitrage and noise trading can cause a significant difference between the market prices of stocks and their fundamental values.

Herding practiced by institutional investors affects the state of stability of stock markets, but researchers have different views on the direction of the effect. Wang (1990) writes that herding by institutional investors may destabilize markets. Nofsinger and Sias (1999) state that the general view in the research literature is that institutional herding would destabilize markets. They nevertheless state that a change in stock prices caused by institutional herding is not always market destabilization (Lakonishok et al., 1992). Lakonishok et al. (1992) use as an example for their claim the market-typical situation in which portfolio managers are better informed than retail investors. It is rational that these better-informed professional portfolio managers want to herd toward underpriced stocks and, conversely, to end ownership in overpriced stocks (Lakonishok et al., 1992). Dasgupta et al. (2011) write that extensive research evidence shows that herding institutional investors succeed in positively predicting short-term stock returns, while it predicts long-term returns negatively. This suggests that institutional herding stabilizes the markets in the short term but destabilizes them in the long term (Dasgupta et al., 2011).

When studying the significance of institutional herding for markets, it is important to be able to define a way to measure this significance. Nofsinger and Sias (1999) define the relative significance of herding based on the relationship between institutional ownership changes and returns during the herding period or correspondingly based on the negative value of changes in individual investors' ownership. They therefore define institutional herding as either more important or less important than herding practiced by retail investors based on whether there is a positive or negative connection between changes in institutional ownership and stock returns measured during the same period (1999). This means that a positive connection between stock returns measured during the same period and changes in institutional ownership is visible, for example, in a situation in which the herding behaviour practiced by institutional investors affects stock prices more than the herding behaviour practiced by retail investors (Nofsinger & Sias,

1999). Nofsinger and Sias (1999) write that such a situation occurs, for example, when institutional investors practice herding more than retail investors.

It is not, however, self-evident that the greater effect of institutional investors on stock prices would result only from greater activity in terms of herding behaviour. Even if retail investors and portfolio managers were equally active herding investors, the greater effect of portfolio managers' trading on stock prices may also result, for example, from larger amounts in buy and sell orders (Nofsinger & Sias, 1999). Despite the uncertainty of the root causes, evidence of the effects of institutional trading on stock prices exists. Nofsinger and Sias present a strong connection between changes in institutional ownership and returns (Nofsinger & Sias, 1999). Firms that belonged to the decile in which institutional ownership increases the most achieve 18.38 percent abnormal returns, whereas firms among which institutional ownership decreases the most produced - 13.12 percent abnormal returns (Nofsinger & Sias, 1999). The difference in returns between these extreme deciles is therefore more than 30 percentage points, which can be considered a very significant return difference.

In addition to herding, another much-studied phenomenon among investors with research evidence is positive feedback trading (Nofsinger & Sias, 1999). Whereas in herding investors follow other investors and make investment decisions based on their decisions, in positive feedback trading investors follow the development of stock prices. De Long et al. (1990) summarize the phenomenon simply by saying that in positive feedback trading investors buy stocks whose prices are rising and sell stocks whose prices are falling. Although the phenomenon is real, researchers disagree somewhat about its prevalence especially among institutional investors. For example, Lakonishok et al. (1992) state that clear evidence of positive feedback trading practiced by institutional investors cannot be found. An exception, however, was the stocks of small firms, where portfolio managers are seen as acting according to the positive feedback phenomenon (Lakonishok et al., 1992). Lakonishok et al. (1992) nevertheless specify that because trading is concentrated especially in larger firms, the exception visible in small stocks

does not significantly affect the outcome of the study. On the other hand, Grinblatt et al. claim in their article that the evidence supports mutual funds, counted as institutional investors, behaving in a way that buys rising stocks and sells falling stocks. Grinblatt et al. (1995) present in their article that the tendency of individual funds to buy stocks that have previously performed well is strongly correlated with the fund's success.

Despite the general view being that rational speculators would stabilize markets, this is not always true (De Long et al., 1990). The stabilizing effect of rational speculators is justified by the fact that these investors trade against less informed and less rational investors and thereby move stock prices toward their fundamental values (De Long et al., 1990). De Long et al. (1990) write that although rational speculation is generally thought to stabilize markets, investors practicing positive feedback trading have weakened the stabilizing effect. They show that when parties investing according to positive feedback trading are active in the market, rational speculation conversely causes market destabilization (De Long et al., 1990). The reason in this situation for the destabilization caused by rational speculation is that the price increase caused by their stock buy order based on correct positive news makes feedback traders also buy the stock in question. This then raises the stock price even further. Because rational speculators know this course of events, they buy even more of the stock immediately after the positive news arrives, which pushes the stock price without justification even further away from the stock's fundamental value (De Long et al., 1990). In summary, it can be said that although part of the increase in the stock price is justified and rational, a significant part of it nevertheless comes from the active buying of the stock by feedback traders.

Although it is true that institutional investors are, in principle, better informed and educated than retail investors, based on the articles reviewed above it can be stated that they are nevertheless exposed at least to some extent to the same behavioural patterns as individual investors. However, a significant difference between these investors may be the reasons for practicing herding or positive feedback trading, for example. Because institutional investors are such significant factors in the market as owners and in terms

of investment sums, it is also important to understand the reasons behind these modes of behaviour.

3.2.2 Institutional Incentives and Career Concerns

Because institutional investors invest other people's money and portfolio managers are paid employees, they may face situations in which rational investor behaviour that strengthens efficient markets is not, after all, the best alternative from the perspective of the investing portfolio manager himself. Scharfstein and Stein (1990) describe that in certain situations managers have a tendency to ignore private rational information and instead follow other managers in their actions. Although traditional economic theory is based on the idea that investors' decisions would be based on rational information reflecting rational expectations directed at stocks, researchers representing another line present that investment decisions also involve group psychology (Scharfstein & Stein, 1990).

Keynes (1936) writes in his work how the long-term investor is the one who, through his actions, most promotes the general interest. At the same time, however, these professionally long-term investors are those who are perceived as reckless and whose actions become the target of criticism from committees and boards managing the funds of institutional investors (Keynes, 1936). Keynes (1936) writes how the successes of such an investor are put down only to recklessness, but in the case of failure the reception is merciless. This may create for an individual portfolio manager a situation in which following colleagues may feel like an easier and safer alternative. Keynes (1936) writes that conventional wisdom says that failing conventionally is a better alternative for reputation than succeeding unconventionally.

Fama (1980) is among the first researchers to raise in his article the question of whether career concerns affect the behaviour of portfolio managers. Already before career concerns, researchers had spoken about different incentive problems faced especially by managers of investment firms who are not owners themselves. This idea is strengthened

by Chevalier and Ellison (1999) with their article, which focuses specifically on portfolio managers' career development. To study portfolio managers' investment behaviour and career development, Chevalier and Ellison (1999) divide them into those portfolio managers who have succeeded either in keeping their position or rising to a higher position, and those who have lost their job or fallen to a lower position. Especially in the case of young portfolio managers, Chevalier and Ellison (1999) observe situations that may tempt them to change their investment behaviour. They claim that in the case of young portfolio managers the dismissal threshold is significantly lower (Chevalier & Ellison, 1999). Especially for young portfolio managers, the risk of being dismissed decreases significantly when they perform well in a situation in which the portfolios of other colleagues produce negative abnormal returns (Chevalier & Ellison, 1999). It is therefore possible to assume that young portfolio managers' interest in keeping high unsystematic risk in their portfolios is relatively low. This idea and the probability of herding are strengthened by the observation that in the case of young portfolio managers the probability of being dismissed increases when the amount of unsystematic risk in the portfolio he manages, or the weightings between different industries, differ from other funds (Chevalier & Ellison, 1999).

Whereas part of the herding behaviour caused by the career concerns phenomenon may be psychology, the agency problem has a significant role in possible irrational investment behavior caused by career concerns (Fama, 1980). In the case of institutional investors, the agency problem can appear in several different ways, and agency relationships can exist both between portfolio managers and private investors investing in the fund and between portfolio managers and their employers. The traditional way to define the agency problem is to think of it as a contract in which a principal or principals hire another party, the agent, as their employee to handle some matter on their behalf (Jensen & Meckling, 1976). Jensen and Meckling (1976) write that an agency relationship includes transferring some kind of decision-making mandate to the agent. If we assume both the principal and the agent to act rationally by maximizing their own interest, it is justified

to think that at times the agent's actions may conflict with the principal's interest (Jensen & Meckling, 1976).

A central part of the agency problem is that the agent and the principal often have different interests and goals. They are also subject to different risks. These are also visible in delegated portfolio management (Stracca, 2006). Whereas the investor acting as principal wants to maximize return but has poor tolerance for risk, the portfolio manager, as agent, may be willing to take quite a lot of risk because the money in question is not his own (Stracca, 2006). The agent's ability to take risk can also be affected by the pressures and fear of reputational harm when the portfolio return is weaker than what the principal expected. Agency contracts between the investor and the portfolio manager are usually relatively short, such as one year in length. Goldman and Sleazak (2003) write that this contract period is in principle a significantly shorter period than the investor's actual investment horizon. Regardless of the length of the investment horizon, the portfolio manager's ability is often judged based on performance over a very short period, which probably does not encourage the portfolio manager to use all the private information he may hold, but instead to turn more easily toward herding behaviour (Goldman & Sleazak, 2003).

The return of firms managing mutual funds is usually based on the percentage share they take of the invested wealth (Chevalier & Ellison, 1997). Chevalier and Ellison (1997) write that a fee received as a percentage share is likely to tempt firms and portfolio managers to maximize the amount of assets under management at any cost. Earlier studies have proven a clear correlation between the historical return of mutual funds and the amount of money coming from private investors (Chevalier & Ellison, 1997). Investors are therefore more likely to choose a fund that has historically produced well than one that has produced poorly. This observation is strengthened by Brown et al. (1996) in their article, in which they write how several financial publications, such as Forbes and Barron's, annually rank different mutual funds in order based on the development of their returns. The most important rankings are always compiled toward the end of the

calendar year and they measure the return development of the past year (Brown et al., 1996). Brown et al. (1996) write in their article how the mutual funds that have received the best placements based on relative returns later receive a proportionally larger share of investors' money flows.

Brown et al. (1996) compare mutual fund companies and portfolio managers competing for money flows from private investors to competitors playing in a tournament, who measure themselves against one another. Brown et al. (1996) justify their tournament comparison by the fact that the fees received by portfolio managers and firms offering mutual funds depend on their success compared with other actors in the same field, just like in a golf competition. Whereas well-performing mutual funds collect investors' money flows and at the same time receive more return from fees, money flows out of poorly performing funds, which leads to decreasing returns for these funds (Brown et al., 1996). To maximize the amount of fees, mutual funds therefore aim for better relative annual returns than their competitors (Brown et al., 1996). Brown et al. (1996) write how a significant incentive to raise the risk level of the portfolio arises for poorly performing mutual funds.

The short evaluation period of private investors investing in funds can lead to a situation in which the only way for the portfolio manager to avoid a decrease in fees is to ensure better returns for his fund for the rest of the year. Whereas funds that have produced poorly at the beginning of the year receive an incentive to increase portfolio risk in order to improve returns, funds that have produced well may develop an incentive to moderate the risk level so that the annual return and attractiveness in the eyes of clients would not weaken (Brown et al., 1996). Brown et al. (1996) suggest in their article their hypothesis about incentives to increase or moderate risk to be true. They arrive at a clear result that by the middle of the year, poorly performing funds increase their portfolio risk more than well-performing funds (Brown et al., 1996).

Although it is often assumed that when evaluating portfolio managers, the use of benchmarks, meaning comparison indices or portfolios, would be a good thing for the clients of portfolio managers, the situation may nevertheless be different (Admati & Pfleiderer, 1997). Admati and Pfleiderer (1997) write how compensation based on benchmarks is a poor way to eliminate poorly informed portfolio managers. The use of benchmarks has also been proven to possibly weaken the probability that the portfolio manager would make the portfolio that is most optimal from the investor's point of view (Admati & Pfleiderer, 1997). Maug and Naik (1995) share the same view of the possible irrationality caused by the benchmark and the risk of making the portfolio manager form a fund that is suboptimal from the investor's point of view. In a situation where the portfolio managers of funds are compared with benchmark portfolios or indices, they have a significant tendency to modify their portfolios to correspond to other funds (Maug & Naik, 1995). Because the performance of funds is evaluated by comparing them with others, and a bad investment reduces the money flows directed by investors to the fund and thereby the portfolio manager's fee, it may be safer for them not to take significant risks, even if they saw the possibility of good profits. This idea is supported by the research result of Maug and Naik (1995), which shows that portfolio managers ignore their superior information and prefer to imitate their colleagues.

Maug and Naik (1995) claim that the herding behaviour of portfolio managers arises precisely because their compensation is based on relative performance. Although herding behaviour and ignoring one's own superior information are generally seen as irrational investment behaviour, Maug and Naik show portfolio managers acting completely rationally when they imitate the portfolio allocation decisions of funds comparable to them (1995). Although the relative compensation method is justified by distinguishing the quality of portfolio managers and creating differences, at worst it may lead to a situation in which portfolio managers end up acquiring the same information and allocating the investable assets like their colleagues (Maug & Naik, 1995). In this case, private individual investing in funds suffers from agency costs when portfolio managers no longer have incentives to strive toward maximized risk-adjusted returns.

4 The role of Institutional Investors in Momentum

This chapter connects the literature on momentum with the literature on institutional investors. The purpose of this chapter is to examine whether institutional trading reinforces momentum and why institutional investors may fail to arbitrage momentum away from the market. The chapter also examines differences across different institutional investor types.

4.1 Evidence that Institutional Trading Reinforces Momentum

Institutional investors making monetarily significant buy and sell orders are likely reinforcers of momentum if these institutional investors act like momentum traders, meaning they buy past winner stocks and sell past loser stocks (Grinblatt et al., 1995). In the research literature, there is broad evidence that institutional investors, such as portfolio managers of mutual funds, tend to make orders in accordance with momentum (Badri-nath & Wahal, 2002). Grinblatt et al. (1995) find in their study that of the 155 mutual funds they examine, 119, or about 77 percent, buy winner stocks and sell losers. Alti et al. (2012) state that in portfolio managers' momentum trading, the buying of stocks that have previously performed well is especially emphasized.

Although buying a single winner stock or selling a loser stock does not make an investor a momentum trader, Grinblatt et al. (1995) confirm that the momentum behaviour of several of the institutional investors they examined was regular and continuous. The study also shows that in the momentum behaviour of institutional investors, the most significant role is played by buying past winners rather than selling past loser stocks (Grinblatt et al., 1995). Grinblatt et al. (1995) examined 155 mutual funds in their study over ten years, from 1975 to 1984. The research results of Grinblatt et al. (1995) show that the more actively a mutual fund acted as a momentum trader during the first half of the review period, the more likely it was to continue this behaviour in the next review period as well. This can be considered an indication that for many institutional investors, buying winner stocks and selling loser stocks is regular and significant.

The research results also confirm that portfolio managers investing according to a momentum strategy are found especially in riskier funds seeking high and aggressive growth (Grinblatt et al., 1995). The significance of momentum strategies is strengthened by the result that the portfolio managers of the best-performing funds were precisely those who most followed a momentum strategy in their buy and sell decisions (Grinblatt et al., 1995). Badrinath and Wahal (2002), who examined institutional investors more broadly, strengthen in their observations the claim that momentum investing is emphasized especially among institutional investors that tolerate more risk, unlike among pension funds and banks, for example. Sensitivity to past returns was emphasized precisely among mutual funds and investment advisors, meaning the two most significant active asset-management actors (Badrinath & Wahal, 2002).

Badrinath and Wahal (2002) emphasize how investment strategies vary significantly between different institutional investors. They consider notable differences in strategy to be one reason why not all studies have found evidence of significant momentum trading by institutions (Badrinath & Wahal, 2002). Whereas mutual funds with an investment style seeking aggressive growth and not avoiding risk appear to act as momentum investors, value investors seeking steadier and lower risk returns act as contrarian traders (Badrinath & Wahal, 2002). Contrarian investors, as their name suggests, act in the opposite way compared with a momentum investor. They therefore buy past losers and sell past winners (Badrinath & Wahal, 2002). Badrinath and Wahal (2002) write that in the results of some studies, momentum trading does not stand out because institutions investing in the opposite way cancel out its signs. Research results of this kind therefore easily, somewhat accidentally, leave unnoticed the observation that significant institutional investors use momentum in their decisions.

Jegadeesh and Titman (1993) show that stocks that have performed well during the previous 3–12 months continue to perform well during the next 3–12 months, and correspondingly stocks that have performed poorly during the same periods continue to

perform poorly. However, the study by Grinblatt et al. (1995) provides evidence that for portfolio managers, returns from the previous quarter were more significant than returns realized over a longer period. This observation suggests that institutional momentum investors are sensitive especially to recent price changes in stocks.

It is easy to think that the buy and sell orders executed with large sums by institutional investors would also have an effect on the price development of stocks. Nofsinger and Sias (1999) strengthen this idea in their article by explaining how the stocks that experienced the greatest growth in institutional ownership outperformed the stocks that experienced the greatest decrease in institutional ownership by as much as 31 percent per year. There is no unambiguous answer to this notable difference in returns between the stocks that experienced the greatest growth and decline in institutional ownership. The difference may be since institutional investors practice more intrayear positive feedback trading than individual investors (Nofsinger & Sias, 1999). Another possible explanation, significant for my thesis hypothesis, is that the herding behaviour of institutional investors affects stock prices more strongly than the herding behaviour of individual investors (Nofsinger & Sias, 1999).

Lakonishok et al. (1992) strengthen in their article the view that the investment behaviour of institutional investors affects stock prices. They nevertheless emphasize that the effects of institutional investors on stock markets are not automatically destabilizing (Lakonishok et al., 1992).

4.2 Why Institutional Investors Do Not Arbitrage Momentum Away

If institutional investors are better informed than ordinary individual investors, why is a market inefficiency such as momentum not arbitrated away from stock markets? As Grinblatt et al. (1995) show in their study, several institutional investors, especially mutual funds, have a tendency toward an investment style that follows momentum. In that case, it is not realistic to assume that at least all institutional investors would act as arbitrageurs, even if they are better informed than retail investors. However, an investment

strategy that follows momentum does not automatically mean that institutional investors would succeed in arbitraging abnormal momentum returns away from the market (Gallagher et al., 2014). When we know that some institutional investors practice momentum investing, it is therefore important to understand the possible reasons why momentum trading does not arbitrage the phenomenon away from the market.

In order for inefficiencies to be removed from the market through arbitrage, arbitrage should be a riskless return for investors whose acquisition does not require capital (Shleifer & Vishny, 1997). Ljungqvist and Qian (2016) write that the received wisdom is that different arbitrage constraints lead to a situation in which, for example, because of excessive risk, an investor should not short a stock he observes to be overpriced. Common factors preventing arbitrage include, for example, risk and costs caused by short selling. Lesmond et al. (2004) write that trading costs include, in addition to the difference between the bid and ask price, also other significant costs, such as taxes, applicable commissions, costs caused by short selling, and other immediacy costs. In addition to this, institutional investors may also have other factors weakening the attractiveness of arbitrage. This is precisely the phenomenon that Korajczyk and Sadka (2004) focus on in their article. As the main objective of their study, Korajczyk and Sadka (2004) try to identify possible limits to arbitrage factors that restrain investors' ability to arbitrage abnormal momentum returns away from the market. Different trading costs and the change in stock prices arising from large buy and sell orders, meaning the price impact effect, significantly weaken the profitability of certain momentum strategies (Korajczyk & Sadka, 2004).

In their study, Korajczyk and Sadka compare equal-weighted (EW) momentum and value-weighted (VW) momentum strategies. In a portfolio following an EW, or equal-weighted, strategy, each stock has an equal percentage share regardless of the firm's market value (Malladi, 2017). In a portfolio following a VW, or value-weighted, strategy, the size of the firm's market value affects its relative share of the portfolio. The larger the firm is by market value, the larger its share is in the VW portfolio (Malladi, 2017). When price

impact or transaction costs are ignored, the EW momentum strategy produces a larger abnormal return than the VW strategy (Korajczyk & Sadka, 2004). This is in line with Rouwenhorst's (1998) research result, which shows that the momentum phenomenon is strongest precisely among small firms. The same view is strengthened by the result that in EW portfolios, small firms receive a relatively larger significance in the portfolio's return than in a VW portfolio. Because of this, it is natural that momentum appearing more strongly in small firms is also visible as better total returns of the EW portfolio compared with the VW portfolio, in which the returns of larger firms have greater significance for the returns of the whole portfolio (Malladi, 2017).

The EW strategy turns out to be more profitable than the VW strategy even when different proportional costs are considered, meaning such indirect costs related to trading whose amount changes in the same proportion as the amount of the order (Korajczyk & Sadka, 2004). Korajczyk and Sadka (2004) state that proportional costs do not generally remove the significance of momentum returns. According to the results, the momentum returns of both the EW, and the VW strategy remain statistically significant (Korajczyk & Sadka, 2004).

Whereas the dent in returns caused by proportional costs is equally significant for both strategies, notable differences arise between them when non-proportional costs are considered (Korajczyk & Sadka, 2004). Unlike proportional cost, the size of non-proportional cost, as the name suggests, does not increase in the same proportion as the trade amount. The size of non-proportional cost increases relatively more than the growth of the trade amount. In that case, non-proportional costs have significance especially for institutional investors that typically make orders with large sums. One example of such costs is price impact, for which the term market impact is also used. Dempster et al. (n.d.) write that price impact means the change in a stock's price after a buy or sell order that would not have happened without this trade. As a cost, the significance of price impact is notable precisely for actors making large monetary orders, such as institutional investors. Amihud (2002) writes that price impact is more significant in small companies than

in large companies. In the case of small firms' stocks, because of their illiquidity, it is therefore more likely that large one-time orders executed by institutional investors significantly affect the stock price. Dempster et al. (n.d.) claim that for large actors, price impact affects what is the right timing and way to act with each security.

After taking into account non-proportional costs, such as price impact, the momentum returns of the EW strategy are significantly smaller than the momentum returns of the VW strategy (Korajczyk & Sadka, 2004). Korajczyk and Sadka (2004) show this in their article by using the zero-alpha break-even point and explaining with what size of investment sums the strategy's alpha, meaning abnormal return, disappears. The smaller the strategy's zero-alpha break-even point is, the weaker its scalability is. Korajczyk and Sadka (2004) show that when measured over the same period and with equally long stock holding periods, price impact causes the alpha of the EW strategy to disappear with investment sums even ten times smaller compared with the VW strategy. This means in practice that it is possible to invest significantly more money in the VW strategy presented in the study and thereby make monetarily more significant momentum returns than by following the EW strategy. Korajczyk and Sadka (2004) justify the research result by the fact that a portfolio following the EW strategy contains more poorly liquid stocks than a VW portfolio. This is one reason why EW portfolios cause significantly greater price impact than VW portfolios, which is also visible in the differences between the momentum returns achieved by these strategies. This justification is supported by findings that the momentum phenomenon is on average stronger among smaller companies and that firm size and the size of market value often affect the liquidity of the stock (Amihud, 2002; Yan & Zhang, 2009). Amihud (2002) writes that illiquidity is stronger among small companies than large companies. It is therefore natural that an EW strategy containing more small companies suffers from price impact more than a VW strategy.

Although price impact eats up a significant part of the momentum returns of the EW strategy, Korajczyk and Sadka (2004) state that transaction costs fail in fully explaining

the realization of the momentum phenomenon. The most important contribution of the article to the research question, meaning why institutional investors do not arbitrage the momentum anomaly away from stock markets, is that many momentum strategies that appear profitable and strong on paper are ultimately not scalable to sufficiently large investment sums for institutional investors (Korajczyk & Sadka, 2004). Lesmond et al. (2004) state that many momentum strategies require a relatively large number of transactions, which exposes the strategy to significant transaction costs. When momentum strategies are not scalable to sufficiently large orders, institutional investors do not have the possibility to exploit momentum returns and thereby arbitrage the phenomenon away from the market. Korajczyk and Sadka (2004) strengthen in their article the view that precisely in those stocks where momentum is strongest, the effect of price impact is most visible when large orders are made. The same view is strengthened by the result of the article by Lesmond et al. (2004) that the amount of trading costs appears to be highest in firms where momentum forms the most. Even if limits to arbitrage do not explain the ultimate reasons for the apparent profitability of momentum strategies, they can influence the existence of the momentum phenomenon. This considerably weakens the possibilities for sufficiently large orders required by arbitrage.

Limits to arbitrage are significant factors in explaining the reasons why well-informed institutional investors fail in arbitraging the momentum anomaly away from stock markets. In addition to these factors, it is important to understand possible reasons why the portfolio manager of an institutional investor may not be willing to follow a strategy that would make arbitrage possible, because it might negatively affect career advancement (Scharfstein & Stein, 1990). Such reasons include the previously mentioned career concerns, which may affect portfolio managers' decision-making so that the portfolio manager may end up acting against the private information he has received (Chevalier & Ellison, 1999). Many individual investors examine the success of portfolio managers based on short-term results, such as results from one year (Brown et al., 1996). Measured over the short term, weaker performance than other peer funds could lead to an outflow of investors' assets (Chevalier & Ellison, 1997). This, in turn, is likely to lead to a decrease

in the fees received by the portfolio manager. Brown et al. (1996) state that short evaluation horizons may make portfolio managers favor investment strategies with which it is more likely to ensure good short-term returns. This may reduce the incentive to take larger risks or larger positions in stocks, even if measured over a longer horizon it would be profitable.

4.3 Heterogeneity Across Investor Types

For the sake of clarity, this text has widely treated institutional investors as if they were one homogeneous group. This, however, is not the case in reality, but there are significant differences between institutional investors that are visible in investment horizons, risk tolerance, investment activity, and in their clients (Bushee, 1998). In his article, Bushee (1998) examines the effect of institutional ownership on managers' willingness to reduce research and development, or R&D, expenditures in order to improve their company's earnings. The article shows that, in principle, large institutional ownership reduces the probability of cutting R&D costs, which may be an indication of institutional investors' sophistication as investors (Bushee, 1998). Differences between institutional investors appear in Bushee's (1998) result, which states that the probability of cutting R&D costs increases when the investor has high portfolio turnover, emphasizes diversification, and practices momentum trading. A fast-paced investment style emphasizing short-term profits may be likely to increase managers' pressure to improve the firm's earnings, for example by cutting R&D costs. Institutional investors therefore cannot be grouped into one uniform group, but it is important to understand that there are significant differences between them. These differences are visible, for example, in the level of portfolio concentration, the average size of ownership position, and sensitivity to current earnings news (Bushee, 1998).

One factor used by Bushee (1998) to distinguish institutional investors is the PTURN factor. PTURN is a measure of the degree of portfolio turnover, meaning how actively trading takes place inside the portfolio (Bushee, 1998). Trading activity and the length of the investment horizon are therefore some of the most significant factors in distinguishing

from one another the effects of institutional investors' trading on firms (Bushee, 1998). Confirmation for the differences between institutions investing with short and long horizons is also provided by Yan and Zhang (2009) in their article. Among the most significant reasons for different investment horizons are differences in investment styles and objectives, as well as competitive pressures and informational roles (Yan & Zhang, 2009). Although both short- and long-term institutional investors favor stocks with high turnover, this preference is especially strong among short-term investors (Yan & Zhang, 2009). Yan and Zhang (2009) assume that the reason for short-term investors' desire to ensure good liquidity of stocks is their faster investment activity compared with others. Bushee (1998) shows that among the same institutional investors, both trading activity and sensitivity to firms' earnings news are emphasized. Yan and Zhang (2009), in turn, show that institutional momentum trading is concentrated precisely among institutions with a short horizon. Whereas the trading of short-term institutional investors was significantly positively connected to stocks' past returns, an equally significant connection is not found in the trading of long-term institutional investors (Yan & Zhang, 2009). When speaking about momentum investing occurring among institutional investors, it is therefore important to be able to distinguish even notable differences between different institutions.

When considering institutional investors' tendency toward momentum investing, the investment horizon is not the only matter to which it is important to pay attention. Badrinath and Wahal (2002) present in their article that the differences in investment behaviour among different types of institutions are significant. In their article, Badrinath and Wahal (2002) pay attention how different institution types relate to stocks' past returns. Of the institution types, institutional asset managers belonging to the investment advisors category and mutual funds reacted most sensitively to past returns, whereas, for example, the sensitivity of banks and pension funds to corresponding returns was considerably more moderate (Badrinath & Wahal, 2002). This may at the same time indicate that momentum behaviour is also most likely among institutional asset managers and mutual funds. This assessment is at least partly strengthened by the result shown by

Grinblatt et al. (1995) that 77 percent of mutual funds invest in the direction of momentum, especially by buying past winners. When considering the first hypothesis of my thesis, it can be said that momentum occurs among institutional investors. It is nevertheless extremely important to note that momentum behaviour is concentrated especially in institutions that are fast in terms of trading activity and sensitive to past returns. It is therefore too generalizing to say that momentum would occur to a significant extent among all institutional investor types.

Institutional investors therefore cannot be treated as one homogeneous group, because they are a broad group of very different actors equipped with different ways and modes of operation (Bushee, 1998; Yan & Zhang, 2009; Badrinath & Wahal, 2002). To understand the role of institutional investors in momentum investing, one must be able to recognize the many factors that form differences between them. From the perspective of the second hypothesis of my thesis, it is relevant to understand that also in the case of the arbitrage question it is not realistic to categorize institutional investors as one group. It may be more sensible to focus precisely on those institutions that have been shown to invest in the direction of momentum when one wants to consider why institutions do not arbitrage momentum away from the market.

5 Conclusion

This thesis discusses the momentum anomaly especially from the perspective of institutional investors. The purpose is to examine whether institutional investors exploit momentum returns and to identify reasons for possible momentum trading. On the other hand, the thesis also considers why some institutions do not invest according to momentum, and why even some institutional investors that on paper could want to exploit momentum returns ultimately leave it undone. As the ultimate purpose, the purpose of my thesis is to determine in what ways institutional ownership and trading affect the strength and persistence of the momentum phenomenon in stock returns, or whether they affect them at all.

The key findings of the thesis are summarized in observations of the tendency of certain institutional investors to invest in a way that follows the momentum phenomenon. Another important observation is that the differences between institutions were significant. Findings on institutions investing according to momentum are strongly concentrated on asset managers belonging to the institutional investment advisors category and on mutual funds. These two actors are connected, among other things, by their active trading style and their willingness to emphasize especially short-term returns. This is due to the way the clients of these actors measure success especially by the returns achieved during the previous year. A common feature is therefore a short investment horizon. Banks and pension funds investing with a longer horizon, in turn, are less likely to invest according to a momentum strategy. Momentum, or investing in its direction, especially buying past winners, does occur among some institutional investors. However, there is no evidence that all institutional investors as a large group would practice momentum.

The second hypothesis assumes that institutional investors do not fully arbitrage momentum away. The hypothesis receives support from studies that explain different restrictions on arbitrage (Korajczyk & Sadka, 2004; Lesmond et al., 2004). At the same time as momentum returns can be observed in the market, in many situations they are exploitable only on paper. Efficient exploitation of the momentum phenomenon would in

many situations require risk-taking and active trading from institutional investors, and precisely in these situations limits to arbitrage are emphasized (Lesmond et al., 2004). The several transactions required to follow a momentum strategy are likely to produce such high transaction costs, such as the bid-ask spread and price impact, that it is no longer profitable when risk is considered (Lesmond et al., 2004). When exploiting the momentum phenomenon is not profitable or possible for institutional investors, the opportunity to arbitrage momentum is also missed. In that case, the momentum effect also remains in the market and is unlikely to disappear from there.

However, some institutional investors may affect the strength and persistence of the momentum phenomenon appearing in stock returns. Institutional ownership and trading can affect strength in a situation where the institution invests according to momentum by buying past winners and selling past losers. Such investment behaviour following momentum has in some situations strengthened the momentum phenomenon in those stocks where it has already appeared. At the same time, the opposite of momentum investing, namely contrarian investing, may reduce the occurrence of momentum in stocks. Some institutional investors may also influence the persistence of the momentum phenomenon in stock returns. In these situations, however, the reasons for strengthening persistence may be found elsewhere than directly in the investing institutions. The persistence of the momentum in stock returns is instead strengthened in situations in which, because of different limits to arbitrage, otherwise willing institutional investors cannot exploit momentum returns. In that case, the real reasons for strengthening the persistence of the momentum phenomenon may be found in the different transaction costs in real-world stock markets. At the same time, alongside transaction costs, portfolio managers' behaviour is possibly affected by different career concerns issues, such as the fear of one's own returns weakening and the disappearance of the assets of clients who often measure the success of the portfolio manager only over the short term.

In summary, it can be stated that institutional investors do not automatically remove market inefficiencies through their own trading. In theory, there may be many situations in the market in which the momentum effect could be exploited. In reality, however, the exploitation of returns is limited by many limits to arbitrage factors, such as different transaction costs, career concerns, and price impact. Whereas EMH assumes that there are no transaction costs, institutional investors may face situations in which transaction costs reduce possible momentum returns to almost nothing. Many behavioral reasons, such as concerns related to portfolio managers' career development, may also affect their investment decisions and lead them to act against the most rational course of action. An important observation is that when studying institutional investors' behavior in relation to momentum, it is not sensible to treat them as one homogeneous group of institutions. The differences between different types of institutions, for example in terms of risk tolerance and investment horizon, are significant.

My thesis provides possibilities for several different future research topics. It could be interesting and meaningful to empirically study especially the attitudes and investment behaviour of modern actively managed mutual funds in relation to momentum. This would be important because many of the central momentum studies are several decades old. It would be meaningful to examine what possible changes have taken place in the investment strategies of mutual funds and in their attitude toward momentum during the past decades. Due to digitalization, markets have experienced significant changes during this millennium, for example in the sense that today it is considerably easier for retail investors to open their own equity savings account and start investing. In the future, it could be studied how these recent changes in markets and in the number of investors may possibly affect the strength and persistence of momentum. A future research topic could also be how different career concerns have changed over the decades while artificial intelligence and other digitalization have permanently changed investment markets. At the same time as the number of retail investors in the market has increased, the number of different investment products offered to consumers has also increased significantly. Competition between different providers of investment products has grown, and

at the same time technology has permanently changed the availability of information as well as the possibilities to evaluate and compare the performance of different portfolio managers and investment products.

References

- Admati, A. R., & Pfleiderer, P. (1997). Does It All Add Up? Benchmarks and the Compensation of Active Portfolio Managers. *Source: The Journal of Business*, 70(3), 323–350. <https://doi.org/10.1086/209721>
- Alti, A., Kaniel, R., & Yoeli, U. (2012). Why do institutional investors chase return trends? *Journal of Financial Intermediation*, 21(4), 694–721. <https://doi.org/10.1016/J.JFI.2012.05.002>
- Amihud, Y. (2002). Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets*, 5(1), 31–56. [https://doi.org/10.1016/S1386-4181\(01\)00024-6](https://doi.org/10.1016/S1386-4181(01)00024-6)
- Badrinath, S. G., & Wahal, S. (2002a). Momentum trading by institutions. *Journal of Finance*, 57(6), 2449–2478. <https://doi.org/10.1111/1540-6261.00502>
- Badrinath, S. G., & Wahal, S. (2002b). Momentum trading by institutions. *Journal of Finance*, 57(6), 2449–2478. <https://doi.org/10.1111/1540-6261.00502>
- Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics*, 49(3), 307–343. [https://doi.org/10.1016/S0304-405X\(98\)00027-0](https://doi.org/10.1016/S0304-405X(98)00027-0)
- Barroso, P., & Santa-Clara, P. (2015). Momentum has its moments. *Journal of Financial Economics*, 116(1), 111–120. <https://doi.org/10.1016/j.jfineco.2014.11.010>
- Bebchuk, L. A., Cohen, A., & Hirst, S. (2017). The Agency Problems of Institutional Investors. *Journal of Economic Perspectives*, 31(3), 89–112. <https://doi.org/10.1257/JEP.31.3.89>
- Berle, A., & Means, G. (1932). *The Modern Corporation and Private Property*. <https://dn711006.ca.archive.org/0/items/in.ernet.dli.2015.216028/2015.216028.The-Modern.pdf>
- Bernard, V. L. (Victor L. (1992). *Stock price reactions to earnings announcements : a summary of recent anomalous evidence and possible explanations*. <https://hdl.handle.net/2027.42/35405>
- Bondt, W. F. M. De, & Thaler, R. (1985). Does the Stock Market Overreact? *The Journal of Finance*, 40(3), 793. <https://doi.org/10.2307/2327804>
- Brown, K. C., Harlow, W. V., & Starks, L. T. (1996). Of tournaments and temptations: An analysis of managerial incentives in the mutual fund industry. *Journal of Finance*, 51(1), 85–110. <https://doi.org/10.1111/J.1540-6261.1996.TB05203.X>

- Bushee, B. J. (1998). The influence of institutional investors in myopic R&D investment behavior. *Accounting Review*, 73(3), 305.
- Cai, F., & Zheng, L. (2004). Institutional trading and stock returns. *Finance Research Letters*, 1(3), 178–189. <https://doi.org/10.1016/J.FRL.2004.06.003>
- Chevalier, J., & Ellison, G. (1997). Risk taking by mutual funds as a response to incentives. *Journal of Political Economy*, 105(6), 1167–1200. <https://doi.org/10.1086/516389>
- Chevalier, J., & Ellison, G. (1999). CAREER CONCERNS OF MUTUAL FUND MANAGERS. *Quarterly Journal of Economics*, 114(2), 389–432. <https://doi.org/10.1162/003355399556034>
- Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under- and overreactions. *Journal of Finance*, 53(6), 1839–1885. <https://doi.org/10.1111/0022-1082.00077>
- Dasgupta, A., Prat, A., & Verardo, M. (2011). The Price Impact of Institutional Herding. *Review of Financial Studies*, 24(3), 892–925. <https://doi.org/10.1093/RFS/HHQ137>
- De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise trader risk in financial markets. *Journal of Political Economy*, 98(4), 703. <https://doi.org/10.1086/261703>
- DE LONG, J. B., SHLEIFER, A., SUMMERS, L. H., & WALDMANN, R. J. (1990). Positive Feedback Investment Strategies and Destabilizing Rational Speculation. *The Journal of Finance*, 45(2), 379–395. <https://doi.org/10.1111/J.1540-6261.1990.TB03695.X>
- Dempster, M. A. H., Madan, D. B., Smith, R. H., Cont, R., Jarrow, R. A., Coqueret, G., Guida, T., & Privault, N. (n.d.). *Handbook of Price Impact Modeling Chapman & Hall/CRC Financial Mathematics Series Series Editors Recently Published Titles Machine Learning for Factor Investing: Python Version Introduction to Stochastic Finance with Market Examples, Second Edition*. Retrieved July 29, 2026, from <https://www.crcpress.com/Chapman-and-DePamphilis>
- DePamphilis, D. M. (2010). Mergers, Acquisitions, and Other Restructuring Activities: An Integrated Approach to Process, Tools, Cases, and Solutions. *Mergers, Acquisitions, and Other Restructuring Activities: An Integrated Approach to Process, Tools, Cases, and Solutions, Fifth Edition*, 1–751. <https://doi.org/10.1016/B978-0-12-374878-2.X0001-3>

- Fact, Fiction, and Momentum Investing* - ProQuest. (n.d.). Retrieved March 8, 2026, from <https://www.proquest.com/docview/1655131062?parentSessionId=UchDME6xd3II5sALyJR%2F%2FIZ6cXzESfJmTLNNA49BWOI%3D&accountid=14797&sourcetype=Scholarly%20Journals>
- Factor Momentum and the Momentum Factor on JSTOR*. (n.d.). Retrieved March 10, 2026, from <https://www-jstor-org.proxy.uwasa.fi/stable/45435157?seq=1>
- Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, 25(2), 383. <https://doi.org/10.2307/2325486>
- Fama, E. F. (1980). Agency Problems and the Theory of the Firm. *Journal of Political Economy*, 88(2), 288–307. <https://doi.org/10.1086/260866>
- Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3–56. [https://doi.org/10.1016/0304-405X\(93\)90023-5](https://doi.org/10.1016/0304-405X(93)90023-5)
- Fama, E. F., & French, K. R. (1996). Multifactor Explanations of Asset Pricing Anomalies. *The Journal of Finance*, 51(1), 55. <https://doi.org/10.2307/2329302>
- Gallagher, D. R., Looi, A., & Pinnuck, M. (2010). Are active fund managers collectors of private information or fast interpreters of public information? *Accounting and Finance*, 50(3), 635–662. <https://doi.org/10.1111/J.1467-629X.2010.00341.X>
- Goldman, E., & Slezak, S. L. (2003). Delegated Portfolio Management and Rational Prolonged Mispricing. *Journal of Finance*, 58(1), 283–311. <https://doi.org/10.1111/1540-6261.00525>
- Gompers, P. A., & Metrick, A. (2001). INSTITUTIONAL INVESTORS AND EQUITY PRICES. *Quarterly Journal of Economics*, 116(1), 229–259. <https://doi.org/10.1162/003355301556392>
- Grinblatt, M., Titman, S., & Wermers, R. (1995). Momentum Investment Strategies, Portfolio Performance, and Herding: A Study of Mutual Fund Behavior. *American Economic Review*, 85(5), 1088–1105. <https://openurl-ebsco-com.proxy.uwasa.fi/contentitem/bsu:9602051795?sid=ebsco:plink:crawler&id=ebsco:bsu:9602051795&crl=c>

- Grundy, B., Grundy, B. D., Martin, J., & Martin, J. S. (2001). Understanding the nature of the risks and the source of the rewards to momentum investing. *Review of Financial Studies*, 14(1), 29–78. <https://doi.org/10.1093/rfs/14.1.29>
- Harvey, C. R. (2017). Presidential Address: The Scientific Outlook in Financial Economics. *Journal of Finance (John Wiley & Sons, Inc.)*, 72(4), 1399–1440. <https://doi.org/10.1111/jofi.12530>
- Hong, H., Lim, T., & Stein, J. C. (2000). Bad News Travels Slowly: Size, Analyst Coverage, and the Profitability of Momentum Strategies. *Journal of Finance (Wiley-Blackwell)*, 55(1), 265–295. <https://doi.org/10.1111/0022-1082.00206>
- Hugonnier, J. (2012). Rational asset pricing bubbles and portfolio constraints. *Journal of Economic Theory*, 147(6), 2260–2302. <https://doi.org/10.1016/J.JET.2012.05.003>
- Jegadeesh, N. (1990). Evidence of Predictable Behavior of Security Returns. *The Journal of Finance*, 45(3), 881. <https://doi.org/10.2307/2328797>
- Jegadeesh, N., & Titman, S. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *The Journal of Finance*, 48(1), 65. <https://doi.org/10.2307/2328882>
- Jegadeesh, N., & Titman, S. (2001a). Profitability of momentum strategies: An evaluation of alternative explanations. *Journal of Finance*, 56(2), 699–720. <https://doi.org/10.1111/0022-1082.00342>
- Jegadeesh, N., & Titman, S. (2001b). Profitability of momentum strategies: An evaluation of alternative explanations. *Journal of Finance*, 56(2), 699–720. <https://doi.org/10.1111/0022-1082.00342>
- Jegadeesh, N., & Titman, S. (2023). Momentum: Evidence and insights 30 years later. *Pacific-Basin Finance Journal*, 82, 102202. <https://doi.org/10.1016/j.pacfin.2023.102202>
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Keynes, J. M. (1936). *The General Theory of Employment, Interest, and Money*.
- Korajczyk, R. A., & Sadka, R. (2004). Are momentum profits robust to trading costs? *Journal of Finance*, 59(3), 1039–1082. <https://doi.org/10.1111/J.1540-6261.2004.00656.X>

- Lakonishok, J., Shleifer, A., & Vishny, R. W. (1992a). The Impact of Institutional Trading on Stock Prices. *Journal of Financial Economics*, 32(1), 23–43. [https://doi.org/10.1016/0304-405x\(92\)90023-q](https://doi.org/10.1016/0304-405x(92)90023-q)
- Lakonishok, J., Shleifer, A., & Vishny, R. W. (1992b). The Impact of Institutional Trading on Stock Prices. *Journal of Financial Economics*, 32(1), 23–43. [https://doi.org/10.1016/0304-405x\(92\)90023-q](https://doi.org/10.1016/0304-405x(92)90023-q)
- Lesmond, D. A., Schill, M. J., & Zhou, C. (2004). The illusory nature of momentum profits. *Journal of Financial Economics*, 71(2), 349–380. [https://doi.org/10.1016/S0304-405X\(03\)00206-X](https://doi.org/10.1016/S0304-405X(03)00206-X)
- Li, W., Rhee, G., & Wang, S. S. (2017). Differences in herding: Individual vs. institutional investors. *Pacific-Basin Finance Journal*, 45, 174–185. <https://doi.org/10.1016/J.PACFIN.2016.11.005>
- Ljungqvist, A., & Qian, W. (2016). How constraining are limits to arbitrage? *Review of Financial Studies*, 29(8), 1975–2028. <https://doi.org/10.1093/RFS/HHW028>
- Loughran, T., & McDonald, B. (2017). The Use of EDGAR Filings by Investors. *Journal of Behavioral Finance*, 18(2), 231–248. <https://doi.org/10.1080/15427560.2017.1308945>
- Luo, J., Subrahmanyam, A., & Titman, S. (2021). Momentum and Reversals When Overconfident Investors Underestimate Their Competition. *Review of Financial Studies*, 34(1), 351–393. <https://doi.org/10.1093/rfs/hhaa016>
- Malladi, R. (2017). Equal-weighted strategy: Why it outperforms value-weighted strategies? Theory and evidence. *Journal of Asset Management*, 18, 188–208. <https://doi.org/10.1057/s41260-016-0033-4>
- Maug, E. G., & Naik, N. Y. (1995). Herding and Delegated Portfolio Management: The Impact of Relative Performance Evaluation on Asset Allocation. *SSRN Electronic Journal*. <https://doi.org/10.2139/SSRN.7362>
- Miller, B. P. (2010). The Effects of Reporting Complexity on Small and Large Investor Trading. *Accounting Review*, 85(6), 2107–2143. <https://doi.org/10.2308/ACCR.000000001>
- Moskowitz, T. J., & Grinblatt, M. (1999). Do industries explain momentum? *Journal of Finance*, 54(4), 1249–1290. <https://doi.org/10.1111/0022-1082.00146>

- Nofsinger, J. R., & Sias, R. W. (1999). Herding and Feedback Trading by Institutional and Individual Investors. *Source: The Journal of Finance*, 54(6), 2263–2295.
- Rabin, M., & Schrag, J. L. (1999). FIRST IMPRESSIONS MATTER: A MODEL OF CONFIRMATORY BIAS. *Quarterly Journal of Economics*, 114(1), 37–82. <https://doi.org/10.1162/0033553995555945>
- Rouwenhorst, K. G. (1998). International Momentum Strategies. *Journal of Finance (Wiley-Blackwell)*, 53(1), 267–284. <https://doi.org/10.1111/0022-1082.95722>
- Scharfstein, D. S., & Stein, J. C. (1990). Herd behavior and investment. *American Economic Review*, 80(3), 465. <https://openurl-ebsco-com.proxy.uwasa.fi/content-item/bsu:9706096545?sid=ebsco:plink:crawler&id=ebsco:bsu:9706096545&crl=c>
- Schwert, G. W. (2002). *Anomalies and Market Efficiency*. <https://doi.org/10.3386/W9277>
- Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *The Journal of Finance*, 19(3), 425. <https://doi.org/10.2307/2977928>
- Shleifer, A., & Summers, L. H. (1990). The Noise Trader Approach to Finance. *Journal of Economic Perspectives*, 4, 19–33.
- Shleifer, A., & Vishny, R. W. (1997). The Limits of Arbitrage. *Journal of Finance (Wiley-Blackwell)*, 52(1), 35–55. <https://doi.org/10.1111/J.1540-6261.1997.TB03807.X>
- Stracca, L. (2006). Delegated portfolio management: A survey of the theoretical literature. *Journal of Economic Surveys*, 20(5), 823–848. <https://doi.org/10.1111/J.1467-6419.2006.00271.X>
- Wang, J. (1993). A model of intertemporal asset prices under asymmetric information. *Review of Economic Studies*, 60(2), 249–282. <https://doi.org/10.2307/2298057>
- Wang, J. (1994). A Model of Competitive Stock Trading Volume. *Source: Journal of Political Economy*, 102(1), 127–168.
- Yan, X., & Zhang, Z. (2009). *Institutional Investors and Equity Returns: Are Short-Term Institutions Better Informed?* 22(2), 893–924. <https://doi.org/10.1093/rfs/hhl046>