# Overreaction Effect in Nordic Stock Markets

**- A Quantitative Analysis of a Contrarian Investment Strategy -**

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*I have already made up my mind, don't confuse me with facts*
**Philip A. Fisher**

*Most people get interested in stocks when everyone else is. The time to get interested is when no one else is*

**Warren Buffet**

# Contents

# Introduction

This thesis will examine the presence of the overreaction effect in Nordic Stock Markets during the period from 1995 to 2017. We will inspect whether a zero-portfolio containing a short position in the best performing stocks and a long position in the worst performing stocks will manage to outperform the market in subsequent periods. This study is largely based on the research of De Bondt and Thaler (1985), who found that recent losers outperformed recent winners by 24,6% over a 36 months' period. The 1985-paper by De Bondt and Thaler acted as evidence against the entrenched efficient market hypothesis (EMH), and gave rise to the overreaction hypothesis (OH).

The theory of the overreaction phenomenon is widely discussed and debated with varying conclusions and findings depending on investigated market, test-period and methodology (e.g. Brown & Warner (1985) in the US and Antoniou & Galariotis (2006) in the UK). Despite this, the exploration in the Nordic markets have been limited.

This preliminary report proceeds with the following structure: Section 2 elucidate the emergence of behavioral finance, and how this perspective contrasts the efficient market hypotheses. Section 3 contains an in-depth review of previous literature on the overreaction hypothesis, including both empirical findings and critical views from other researchers on the field. Section 4 reviews descriptive data statistics, followed by our methodology approach in section 5. Lastly, section 6 outline our progression plan.

# Theory

## 2.1 Efficient Market Hypothesis

The EMH achieved an immensely important role as one of the most seminal edifice of neoclassical economics in the 1960s, and has been an integral part of financial theory ever since. The father of EMH, Eugene Fama (1970) identified three levels of market efficiency. However, as the strongest form of efficiency imply insider information, which is outside the scope of this paper, it will not be discussed further. The weakest form of EMH confines itself to entail historical price information on the security, thereby invoking the assumption that such information already is reflected in the market price of the security. Thus, no market participant would be able to generate abnormal returns by simply utilizing historical price information.

The semi-strong form of the EMH posits that all relevant and publicly available information is quickly absorbed and reflected in the market price, implying that investors are incapable of earning excess returns relative to the market portfolio without utilizing insider information.

The EMH is fundamentally dependent upon three arguments, which rely on gradually punier assumptions. First, all investors are presumed to be rational decision makers, whom value securities coherently. Second, should irrational investors partake in the market, the following noise is explicitly random – and therefore cancel each other out. Thirdly, if these irrational investors trade similarly, rational arbitrageurs eradicate their influence on market prices (Shleifer, 2000). Despite of the broad acknowledgement of the EMH, the theory has received progressively increased criticism. The last years' success of quantitative trading algorithms, such as high frequency trading, has proved to increase market efficiency; implying that the markets in fact were not truly efficient (Virgilio, 2015); (Haferkorn, 2017).

## 2.2 Behavioral Finance

Behavioral Finance (BF) is a term that emerged into public consciousness in the mid 1990s, and is a blunt contradiction to the well-established and vastly argued assumptions underlying the EMH. Being a relatively new field, BF seeks to enrich standard economic models by studying how psychology influence investors and their decisions. Research within this field has led to several Nobel prizes; the latest given to Richard Thaler in 2017 for his contributions to behavioral economics.

### 2.2.1 Development

Robert Shiller (1981), one of the founding fathers and profound influencers of BF, was one of the first researchers to challenge the foothold of the EMH. The assumption made in his initial research was that dividends are the fundamental driver of stock prices; stock prices are equal to the present value of future real dividends, discounted by a constant real discount rate (Shiller, 1981). Shiller found that stock prices are far too volatile to be justified by subsequent changes in dividends, implying violations of the EMH. Shiller interpreted this unfounded variability as an irrational aspect of market participants' decision making. The pursuit for explaining this irrationality became the birth of BF.

Unlike classical economics, BF invoke research from the social sciences. Amongst the most influential, Daniel Kahneman and Amos Tversky impacted BF immensely through their research on how psychological and cognitive factors affect decision making. Kahneman and Tversky's (1979) "Prospect Theory" offer possible explanations to many puzzles in the field of finance. Arguably most prominent, the researchers found that investors value gains and losses non-linearly; a loss of value constitute a greater sense of pain compared to the experienced joy created by an equivalent gain. Despite holding a doctorate in psychology, not economics, Kahneman received the Nobel Prize in Economics in 2002 for his contributions to behavioral economics.

### 2.2.2 The Overreaction Hypothesis

The overreaction hypothesis (OH) originates from the research of De Bondt and Thaler (1985), which is the main source of inspiration for this thesis. De Bondt and Thaler found that investors in the US stock market systematically overreacted to unexpected news. This consistent overreaction was interpreted as evidence for weak-form inefficiency in the US stock market. Ultimately, the OH states that "*extreme movements in stock prices will be followed by subsequent price movements in the opposite direction"* (De Bondt & Thaler, 1985). Due to the initial controversy of the implications of their research, De Bondt and Thaler were labeled as outcasts by fellow researchers. Regardless, behavioral finance has become more accepted; to the extent that large mutual funds specialize in exploiting behavioral patterns in the market.

Proponents of the OH deem the overreactions to be a consequence of human foibles when processing information, and making decision based on this decision making. Shefrin (2002) argue that the *representativeness* heuristic is one of the most important principles affecting financial decisions. The heuristic proclaims that the majority of individuals disregard prior probabilities and neglects base rate frequencies, and is therefore a contradiction to Bayes' theorem (Kahneman & Tversky, 1974). Bayes' theorem (1763) states that investors process information rationally and therefore review their predictions correctly by applying conditional probability to account for prior and current information. By violating the law of Bayes' and conforming to the representativeness heuristic, investors become exaggeratedly pessimistic about past losers and excessively optimistic about past winners. We interpret cognitive biases as an underlying assumption of the OH; by violating Bayes' law, investors make systematic errors and thus, misprice securities. Then, investors cannot be deemed rational and the OH is a direct contradiction to the assumption of rationality, underlying the semi-strong EMH.

Following the logic above, investors' systematic errors lead to an inevitable mispricing of securities in the market; security prices become prone to deviate from their fundamental, true value as new information is available. Specifically, past losers become undervalued, whilst past winners are overvalued. Per the OH, this mispricing is not permanent, and will be followed by a subsequent price movement in the opposite direction. When this correction occurs, the loser stocks outperform the market while the winner stocks underperform which investors possibly can capitalize on (Shefrin, 2002). The reversal of the exaggerated price movements serve as evidence versus both the weak-form and semi-strong EMH.

## 2.3 Research Questions and Hypotheses

**RQ1: Can an investment strategy based on buying losers and selling winners will yield statistically significant returns?**

We want to test if there is possible to earn significant abnormal returns by constructing a zero-portfolio consisting of a long position in prior loser stocks, and a short position in prior winner stocks.

**H0** = $AR^{losers} = AR^{winners}$ | **HA**= $AR^{losers} > AR^{winners}$

**RQ2: Does the contrarian investment strategy yield abnormal returns across Nordic Markets, i.e. is the strategy transferable across the Nordics?**

This research question is based on the assumption that all investors are prone to conform to cognitive biases, such as the representativeness heuristic. That is, if overreactions are caused by human foibles in decision making, we expect to identify such evidence in all Nordic markets.

**RQ3: Does the contrarian investment strategy yield abnormal returns regardless of the industry it is applied to?**

Following the logic from RQ2, we expect to find irrational investors, possibly causing an overreaction, regardless of the industry we are investigating.

# Literature Review

In this section, we will present and discuss literature we consider to be of utmost importance for this paper. Additionally, we discuss the relevance and contribution of our research in relation to the progressively accepted field of BF.

## 3.1 Fundamentals

The overreaction hypothesis was first presented by Beaver and Landsman (1981) who observed the possibility to receive abnormal returns by using a "contrarian strategy"[1]. However, De Bondt and Thaler (1985) are known as the first to actually form the hypothesis. They documented the phenomenon of winners and losers in a 36-month period tend to reverse their performance over the next 36-month period. More specifically, they showed that loser portfolios outperformed winner portfolios with remarkably 24,6% and interpreted the results as a violation of the weak form efficiency by Fama (1970) which at the time (and to some extent still is) was considered one of the theoretical cornerstones in finance. The violation of the EMH evolves as the reversal of overshooting stocks should be predictable from past return data alone (De Bondt & Thaler, 1985). These arguments are supported by several other empirical studies; Brown & Warner (1988) Poterba and Summers (1988), Pennegill and Jordan (1990), Chopra (1992) and Antoniou & Galariotis (2006).

## 3.2 Data Frequency

Naturally, not all empirical research on the OH are identical in design. The major differences among academic papers are primarily related to the length of assumed overreactions. That is, the length of the estimation window used to identify winner and loser stocks. Additionally, the holding period of stocks within the portfolios have been wide-ranging. Furthermore, former research also differs with respect to frequency of observed data. Ammann and Kessler (2009) use daily returns on stocks, Gutierrez and Kelley (2008) and Wang & Power (2006) use weekly returns, while some researchers follow the original study by using monthly returns, such as Benou and Richie (2003). As we can see from former studies,

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[1] *Contrarian investing is a type of investment strategy distinguished by buying and selling against the grain of investor sentiment during a specific time.*

there has been a rising trend of applying higher frequency data the last couple of years. Regardless, we acknowledge De Bondt and Thaler's (1985) concerns with respect to liquidity noise in high frequency data-sets, whereas lower frequency data-sets have a lower degree of noise. Based on discussions of pros and cons in former research, we have decided to utilize weekly data in our study.

## 3.3 Transferability

We expect to observe evidence of overreactions across both borders and industries, given that the overreaction is a consequence of cognitive biases. This is anchored in the external validity of the representativeness bias coined by Kahneman & Tversky (1974). Specifically, we assume all investors being prone to conform to the representativeness bias, thereby violating the law of Bayes' when predicting future probabilities. Thus, we assume that all investors, regardless of market and industry to have the same probability of violating Bayes' law. If a market experience irrational investors, statistically significant evidence of overreaction is expected to occur, and ultimately considered transferable across markets.

There has been conducted several studies on the overreaction hypothesis across borders, although the U.S market is by far the most researched. However, we have found that the studies vary immensely in terms of applied methodology, underlying assumptions and specification. This affects the identified implications of the overreaction hypothesis, and has therefore entailed a variety of findings; both confirmation and contradictions of the presence of overreactions. Consequentially, the results are rarely comparable across boarders due to the abovementioned differences.

## 3.4 Critique

Despite its success, the OH has received a vast amount of critique from several researchers on the field. One of the first to critique De Bondt and Thaler's findings was Chan (1988), who argued that the profitability of contrarian investment strategies cannot be taken as conclusive evidence against the EMH as there is no accounting for change in risk in the profitability calculations. Because risk is not constant, he argued that by not adjusting for change in risk, they find loser portfolios to be less risky than winner portfolios, and thereby explain the abnormal return as a simple compensation for higher risk.

Zarowin (1990), yet another critic, claimed the abnormal returns to origin from the difference in size, rather than overreactions by investors. Thus, he suggested that by forming and comparing winners and losers with the same size, all abnormal returns would be exterminated. However, Chopra et. al. (1992) reconfirm the original findings from De Bondt and Thaler after correcting for both market risk and size effect. Yet, they found that the majority of abnormal returns transpire in the month of January, with no immediate satisfactory explanation.

Rozeff and Kinney Jr. (1976) reported the phenomenon of high January-returns to be tax-related, as investors seek to realize losses by selling their losers before the next tax-year. The incentive to sell creates a negative price pressure prior to the new year, before returning to equilibrium levels in January, resulting in abnormally high returns for prior losers (Jones, Pearce, & Wilson, 1987). This theory could help to explain the high abnormal returns in January.

De Bondt and Thaler have also received critique for the methodology used to calculate abnormal returns. Conrad and Kaul (1993) questioned the use of cumulative returns for portfolio profits. They argued that by adding returns for each period together, the arbitrage portfolio will have an upward drift unrelated to market overreaction. Hence, yielding misinterpreted evidence for the OH.

This critique is further supported by Dissanaike (1994) and Loughran and Ritter (1996) who argue that returns calculated in the test period will not equal the realized returns by the investor, and therefore not give any empirical meaning. As a consequence, wrong stocks may be ranked as winners and losers, generating incorrect portfolios for the period investigated. To prevent this bias, Dissanaike (1994) suggest to use either the rebalancing method, or the buy-and-hold method. These methods are beneficial as they involve lower transaction costs and are less exposed to liquidity problems compared to the cumulative arithmetic method.

Lastly, Fama and French (1996) claimed that the three-factor model can capture the reversal of returns documented by De Bondt and Thaler (1985). This empirical evidence suggests that prior-return-based portfolios should own certain types of characteristics that reflect their future prospects. Henceforth, the abnormal returns from the contrarian strategy should be explained by the differences in the characteristics between the loser and the winner.

## 3.5 Contribution

This paper differs from existing literature due to several reasons. Firstly, we apply stocks from Nordic countries, which has not been well explored in the subject of overreaction. Secondly, we scrutinize deviations between industries, which has received limited attention in empirical studies. Additionally, we adjust our methodology to the critique given the original paper by De Bondt and Thaler (1985). Thus, this paper analyzes return patterns and the characteristics of prior-return-based portfolios in the Nordic stock market. This implies adjusting for size effects, changing risk as well as consider seasonality anomalies.

# Data

## 4.1 Data Collection

Weekly stock returns are collected from Bloomberg by extracting total company returns adjusted for dividends, in respective stock markets. Thereafter, we collect return series for all stocks that have been listed on the exchange during the time-horizon we are investigating.  Consequently, we avoid survivorship bias in our data. The length of the data series in the respective markets is depended upon the availability of both index- as well as individual stock data. Return series are collected from the following stock indexes; Oslo Stock Exchange Benchmark Index, OMX Stockholm, OMX Copenhagen and OMX Helsinki. Sector data is collected from MSCI Nordic.

## 4.2 Descriptive Statistics

### 4.2.1 Norway

Data for the Norwegian stock market is extracted by selecting all stocks that have been listed on the Oslo Stock Exchange Benchmark Index (OSEBX). The calculations specified in the methodology section are based on return data from 1995 to 2017. The remainder of the data-set (2015-2017) is used for a pseudo-out of sample test of the strategy.

### 4.2.2 Sweden, Denmark and Finland

Data for the remaining Nordic countries are extracted by selecting all stocks that have been listed on the OMX Indexes (SAX, KAX and HEX Index). The time-span for the data is adjusted according to the data on OSEBX, in order to ensure consistency.

### 4.2.3 Nordic Sectors

Data for sector calculations is extracted by selecting all stock that have been listed on the MSCI Nordic Index. Again, time-span is matched with above-mentioned indexes to maintain consistency in our calculations.

# Methodology

To be able to investigate the presence of an overreaction effect in the Nordic countries during the period from 1995-2017 we will adapt the methodology first introduced by De Bondt and Thaler (1985). We will, however, apply certain adjustments from Dissanaike (1994) and Chopra (1992) discussed in the literature review.

## 5.1 Model Selection

To calculate abnormal risk-adjusted returns, we subtract expected returns from realized returns. The two most prominent models for estimating expected returns are Brown & Warner's (1985) *market model* and the *constant mean return model*. The market model assumes that a security's expected return can be modelled through a linear relationship with market returns. The Constant Mean Return Model on the other hand, assumes expected returns to be constant over time (Campbell & Wesley, 1993). The advantage of using the market model is that the risk is not measured up against single stocks or firm-specific risk, but rather against a diversified portfolio of stocks which is regulated by market risk.

The market model has been applied by the majority of prior studies on the field, and Brown & Warner (1985) proved that it is not advantageous to apply any other model. It is noteworthy that overreactions do not necessarily appear through a stocks extreme movements relative to the market, but rather through extreme movements relative to its historical volatility adjusted correlation with the market. Thus, we find the market model to be most appropriate for our study.

## 5.2 Return Calculations

### 5.2.1 Expected returns

The Market Model is correctly applied by running an OLS regression on weekly returns from single stocks. This is done on all historical weekly returns from the respective indexes in the investigated period.

The expected returns are estimated using intercept and beta-values to generate the expected return $E[R_{i,t}]$. Returns on stocks, were calculated like this:

$$E[R_{i,t}] = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \tag{5.1}$$

$\alpha_i$ = Intercept in estimation window (alpha)

$\beta_i$ = Slope coefficient in estimation window (beta)

$R_{m,t}$ = Market return at time t

$\varepsilon_{i,t}$ = Error term with expectation equal to zero

### 5.2.2 Realized returns

To calculate returns for market and stocks, we transformed simple returns into logarithmic returns. The reason for applying logarithmic returns is due to their additive nature, which makes them more appropriate for return measures compared to regular arithmetic calculation. Also, the application of logarithmic weekly returns will give a relatively symmetric distribution compared to percentage returns, which is characterized by right-skewed distribution (Fama E. , 1970). A symmetric distribution is preferable when the aim is to minimize estimation errors. The realized return $R_{i,t}$ is calculated using historical closing prices through the following formula:

$$R_{i,t} = ln\frac{(P_{i,t})}{(P_{i,t-1})} \tag{5.2}$$

$P_{i,t}$= Closing price for stock *i* at time *t*

$P_{i,t-1}$= Closing price for stock *i* the day before *t*

The same approach was used to calculate market return.

### 5.2.3 Estimation of the market model

To calculate predictors for alfa and beta, we have utilized MacKinlay's (1997) approach:

$$\hat{\beta}_i = \frac{\sum_{t=T_0}^{T_1}(R_{i,t} - \hat{\mu}_i)(R_{m,t} - \hat{\mu}_m)}{\sum_{t=T_0+1}^{T_1}(R_{m,t} - \hat{\mu}_m)^2} \tag{5.3}$$

$$\hat{\alpha}_i = \hat{\mu}_i - \hat{\beta}_i\hat{\mu}_m \tag{5.4}$$

$$\hat{\sigma}_{\varepsilon i}^2 = \frac{1}{L_1 - 2}\sum_{t=T_0+1}^{T_1}(R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i\hat{\mu}_{m,t})^2 \tag{5.5}$$

Where

$$\hat{\mu}_i = \frac{1}{L_1}\sum_{t=T_0+1}^{T_1} R_{i,t} \quad and \quad \hat{\mu}_m = \frac{1}{L_1}\sum_{t=T_0+1}^{T_1} R_{m,t} \tag{5.6}$$

$R_{i,t}$ = Return in period *t* for stock *i*

$R_{m,t}$ = Return in period *t* for market *m*

L1 = Length of estimation window

### 5.2.4 Abnormal Returns

To calculate abnormal returns, we subtract the expected return from the realized return:

$$AR_{i,t} = R_{i,t} - E[R_{i,t}] = R_{i,t} - \hat{\alpha} - \hat{\beta}_i R_{m,t} \tag{5.7}$$

$AR_{i,t}$= Abnormal return for event *i* in period *t*

$\hat{\alpha}$ = The estimated alpha-value from the market model (1) for event *i*

$\hat{\beta}_i$ = The estimated beta value in the market model (1) for event *i*

## 5.3 Portfolio formation

Subsequent to the estimation of abnormal returns, we use these to rank stocks in accordance to their abnormal movements. Hence, loser and winner portfolios are formed based on abnormal returns within a given time period.

Moreover, portfolio returns are measured as the average return of stocks that are included in winner and loser portfolios. That is, stock returns are equally weighted within each portfolio. In cases with lack of return data, it is set to zero. This supports our critique towards De Bondt and Thaler as we do not ignore the illiquidity by ignoring the trade made on the portfolio selection date. In contrast, we attribute a zero-return position to the average portfolio return. Hence, we get the following return measure for the portfolios at time t:

$$\pi_{pt} = \frac{1}{N_p} \sum_{i=1}^{N_p} R_{i,t} \tag{5.8}$$

*i* = Stock

N = Total number of stocks in portfolio

*p* = Portfolio

Thereafter, we calculate the aggregated return series for each portfolio:

$$\pi_P = \sum_{t=1}^{T} \pi_{p,t} \tag{5.9}$$

# Thesis Progression

Throughout the spring, this thesis will be in continuous focus. We have not yet succeeded to gather all data necessary for conducting the research, and we are dependent upon conferring with our supervisor to discuss some technicalities. As we engage into the field of behavioral finance, we expect that we may uncover ideas and some interesting aspects which we have not yet reviewed. These could yield a more thorough, holistic understanding which again can reinforce the impact of this thesis.

Due to evaluations and mandatory work assignments in this semester's compulsory course, we may experience some periods with heavier workloads than others; which may halt the progression of the thesis during short periods of time.

In terms of completing this thesis, we shall endeavor on handing the thesis in during the ordinary semester, to avoid any inconvenience for our supervisor.

# Bibliography


Allais, M. (1953). Le comportement de l'homme rationnel devant le risqué: critique des postulats et axioms de l'école Américaine. *Econometrica, 21*(4), 503-546.

Ammann, M., & Kessler, S. M. (2009). Intraday Characteristics of Stock Price Crashes. *Journal of Applied Financial Economics, 19*(15), 1239-1255.

Antoniou, A., & Galariotis, E. C. (2006). Short-term Contrarian Strategies in the London Stock Exchange: Are They Profitable? Which Factors Affect Them? *Journal of Business Finance, 33*(5-6), 839-867.

Bayes, T. (1763). An Essay Towards Solving a Problem in the Doctrine of Chances. *Philosophical Transactions, 1683-1755*, 370-418.

Beaver, W. H., & Landsman, W. R. (1981). Note on the behavior of residual security returns for winner and loser portfolios. *Journal of Accounting and Economics, 3*(3), 233-241.

Benou, G., & Richie, N. (2003). The Reversal of Large Stock Price Declines: The Case of Large Firms. *Journal of Economics and Finance, 27*(1), 19-38.

Brown, K. C., & Harlow, W. V. (1988). Market Overreaction: Magnitude and Intensity. *Journal of Portfolio Management, 14*(2), 6-13.

Brown, S. J., & Warner, J. B. (1985). Using Daily Stock Returns. *Journal of Financial Economics*, 3-31.

Campbell, C., & Wesley, C. (1993). Measuring Security Price Performance Using Daily NASDAQ Returns. *Journal of Financial Economics, 33*(1), 73-92.

Chan, K. C. (1988). On the Contrarian Investment Strategy. *Journal of Business*, 147-163.

Chopra, N., Lakonishok, J., & Ritter, J. (1992). Measuring abnormal performance: Do stocks overreact? *Journal of Financial Economics, 31*(2), 235-268.

Conrad, J., & Kaul, G. (1993). Long-Term Market Overreaction or Biases in Computed Returns? *The Journal of Finance, 48*(1), 39-63.

De Bondt, W., & Thaler, R. (1985). Does the Stock Market Overreact? *The Journal of Finance, 40*(3), 793-805.

Dissanaike, G. (1994). On the Computation of Returns in Tests of the Stock Market Overreaction Hypothesis. *Journal of Bankink & Finance, 18*(6), 1083-1094.

Fama, E. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *American Finance Association*, 383-417.

Fama, E. F., & French, K. R. (1996). Multifactor Explenations of Asset Pricing Anomalies. *journal of finance, 51*(1), 55-84.

Gutierrez, R. C., & Kelley, E. K. (2008). The Long-Lasting Momentum in Weekly Returns. *Journal of Finance, 63*(1), 415-447.

Haferkorn, M. (2017). High-frequency trading and its role in fragmented markets. *The Journal of Information Technology, 32*(3), 283-296.

Jones, C., Pearce, D., & Wilson, J. (1987). Can Tax-Loss Selling Explain the January Effect? A Note. *Journal of Finance, 42*(2), 453-461.

Jones, S. L. (1989). Reaction to the Overreaction Hypothesis. *Journal of Financial Economics, 25*, 75-97.

Kahneman, D., & Tversky, A. (1974). Judgement under uncertainty: Heuristics and Biases. *Science, 185*(4157), 1124-1131.

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica, 47*(2), 263-291.

Lo, A. W. (1997). *Market Efficiency: Stock Market Behaviour in Theory and Practice* (Vol. 1). Cheltenham, UK: Edward Elgar.

Loughran, T., & Ritter, J. R. (1996). Long-Term Market Overreaction: The Effect of Low-Priced Stocks. *The Journal of Finance, 51*(5), 1959-1970.

MacKinlay, C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature, 35*(1), 13-39.

Pennegill, G. N., & Jordan, B. D. (1990). The Overreaction Hypothesis, Firm Size, and Stock Market Seasonality. *Journal of Portfolio Management, 16*(3), 60-64.

Poterba, J., & Summers, L. H. (1988). Mean Reversion in Stock Prices: Evidence and Implications. *Journal of Financial Economics, 22*(1), 27-59.

Rozeff, M. S., & Kinney, W. (1976). Capital Market Seasonality: The Case of Stock Returns. *3*(4), 379-402.

Shefrin, H. (2002). *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing.* New York: Oxford University Press.

Shiller, R. J. (1981). The Use of Volatility Measures in Assessing Market Efficiency. *The Journal of Finance, 36*(2), 291-304.

Shleifer, A. (2000). *Inefficient Markets: An Introduction to Behavioural Finance.* Oxford: Oxford University Press.

Virgilio, G. (2015). High-frequency trading and the efficient market hypothesis. *The Business and Management Review, 6*(3), 69-81.

Wang, J., M., B. B., & Power, D. M. (2006). Analysis of the Overreaction Effect in the Chinese Stock Market. 437-442.

Zarowin, P. (1990). Size, Seasonality and Stock Market Overreaction. *Journal of Financial and Quantitative Analysis, 25*(1), 113-125.