Value investing and the interpretation of performance and risk

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Abstract:

Historically, value investing strategies have been generally accepted by scholars to generate returns significantly above the market. However, if the risk-adjusted returns of these strategies are above the market remains an intense debate. This study examines and interprets what drives the performance of O'shaugnessy's Trending Value strategy in the Nordic region between January 2007 and September 2023. The results indicate that the strategy generates positive and significant alpha when adjusting for risk through the Fama and French three-factor model. We also find somewhat conclusive evidence that these results do not appear to be a consequence of time varying risk as the returns above the market are stable over time and not correlated to the performance of the market. These results provide support for markets not being entirely efficient, but are not extensive enough for a definite conclusion.

Keywords:

Value Investing, Efficient Market Hypothesis, Behavioural Finance, Investor Biases, Time Varying Risk

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1. Introduction

Whether or not it is possible to beat the market over time has been heavily debated. Pure economists would argue that outperforming the market is impossible, and that under the Efficient Market Hypothesis, stock prices reflect all available information in an unbiased fashion (Basu 1977). The other side of the debate is based on behavioural finance and the irrationality of investors. Scholars have found psychological biases among investors and argue that they are systematic, thus motivating that markets are not completely efficient and that stocks are mispriced (De Bondt and Thaler, 1985).

Theoretical frameworks such as the Capital Asset Pricing Model and the Fama-French Three-Factor Model take risk factors into account to determine an expected return relative to the overall risk of an investment. Investments with actual returns above or below the expected return are considered abnormal and generate alpha, which is the difference between the risk adjusted expected return and the actual return (Jensen 1968). The common goal amongst rational investors is to maximise risk-adjusted returns and to do so, various investing strategies have been implemented and interpreted over the years.

Investing in so-called value stocks has been a popular strategy amongst individuals, large corporations, and experts within the field of finance. Value investing implies buying stocks with a low price relative to the intrinsic value of the company. A substantial body of literary work, including Basu (1977), Chan et. al (1991), Graham and Dodd (1934), Dreman (1977), and Rosenberg et al. (1985), all argue that value stocks outperform the market. Over time, several ways of deriving these value stocks have been introduced. According to Lakonishok et al. 1997, most previous research promotes simple strategies that are constructed through the use of single accounting based metrics. Other studies suggest a more complex approach, sometimes including more than one metric.

Whether it is in fact possible to increase returns without being exposed to a higher degree of risk is a divisive question. In theory, under the Efficient Market Hypothesis, generating returns above the market without taking on additional risk is impossible. Even though some scholars agree that it is possible to outperform the market through value investing, the reasons behind these returns are much more controversial and not something where all scholars see eye to eye. Some studies, including Fama and French (1992) and Merton (1973), argue that value stocks are fundamentally riskier than other sets of stocks and that investors can thus expect higher returns in return for taking on that extra risk. Other studies instead explain the returns as a result of individual investor behaviour. Lakonishok et al (1994) argues for the latter as they suggest that the reason behind the superior returns lies in the irrational behaviour of investors, which leads to a mispriced market and undervalued stocks.

Various strategies derived from the concept of value investing have been developed and put to the test. James O'shaughnessy, an American investor and fund manager, developed a more complex value strategy, which he claims outperforms the market (O'shaugnessy 2011). The strategy, referred to as the Trending Value strategy, was applied on the North American stock markets and were found to generate raw returns significantly above the market. If the strategy works in other markets and if it generates positive alpha remains to be answered.

In this article, we examine if O'shaugnessy's Trending Value strategy can identify value stocks in the Nordic region that outperforms the market. We do this by regressing the returns generated by the strategy on the Fama and French (1993) three-factor model to determine the

possibility of yielding positive alpha. We also offer intuition behind these returns, as we study the fundamental risk of our portfolios by combining the methods of Lakonishok et al. (1994) and Zhang & Petkova (2005) to assess their performance in different economical states of the world. Using the Fama and French three-factor model, we find that our Trending Value portfolio outperformed the market between January 2007 to September 2023 in the Nordic region. When assessing the time varying risk, we also find that the abnormal returns are not necessarily a consequence of higher risk. Instead, a possible interpretation of the evidence is that investor biases lay the ground for market inefficiencies as the behaviour of irrational investors leads to undervalued and mispriced stocks.

This study reviews theoretical literature within the Efficient Market Hypothesis and Behavioural Finance. After a discussion of the relevant theories and frameworks, two questions are tested. First, we examine if it is possible to identify undervalued stocks that generate positive alpha through the use of James O'shaugnessy's Trending Value strategy. This is tested through the use of the Fama and French three-factor model. Subsequently, the time varying risk of the Trending Value portfolios is examined and results are assessed to determine if the abnormal returns are due to model shortcomings or an inefficient market. A substantial body of preceding studies have tested the performance of various value strategies, looking at different geographical markets and time horizons. Davis (1994) studied value investing strategies in the U.S between 1931 and 1960, Capaul et. al. (1993) did the same in France, United Kingdom, Germany, and Switzerland, and Chan et. al. (1991) looked at value investing in Japan. As far as our knowledge goes, there are no previous studies that test the performance and analyse the risk of the Trending Value strategy (O'shaugnessy, 2011) in the Nordic markets. The Nordic stock markets provide an interesting perspective as they contain a set of both large and small companies across a broad range of industries. The Nordic stock markets are also characterised by highly developed economies with stable market conditions that allow for reliable analysis over time. Our results are considered to be of interest to private and institutional investors that implement similar strategies in practice. The thesis also contributes as an analysis of the accuracy of pricing theories in the Nordic region.

Our findings can be summarized as follows: We find that stocks with higher intrinsic value relative to its implied market value yields abnormal returns in the Nordic markets during the period January 2007 to September 2023. Further, we find no evidence that these stocks entail additional risk, as we find that the Trending Value portfolio outperforms the market in all four economical states of the world. Additionally, we find that the magnitude of the superior returns of our value portfolio, in relation to the market portfolio, obtain the largest value when the market is in an economic downturn. Our findings thus indicate a lack of support for the underlying assumptions of the Efficient Market Hypothesis in the Nordic markets. While we do find a lack of support for the Efficient Market Hypothesis, we cannot fully reject it. However, we do find it likely that alternative factors, possibly within the field of behavioural finance, have caused the market inefficiencies suggested by the findings.

2. Theoretical Background

This section presents the most relevant literature for the purpose of this study and concerns the Efficient Market Hypothesis, Behavioural Finance and Value Investing.

2.1 Efficient Market Hypothesis

The Efficient Market Hypothesis entails that while stock returns may vary among individual stocks, these returns are always proportional to the risk associated with each stock. Under the Efficient Market Hypothesis, investors can expect higher returns when exposed to higher risk, since there is a strong and positive correlation between the two. According to the Efficient Market Hypothesis, stocks are fairly priced, leaving no possibility for achieving abnormal returns over time as the market adjusts when new information arises. Consequently, arbitrage opportunities related to stock market investing are eradicated since no stocks generate higher risk adjusted return without it being reflected in the price.

The base of the Efficient Market Hypothesis lies in the notion that each stock price fully reflects all available information. In efficient capital markets, all investors are assumed to be rational, meaning that all information is considered and interpreted equally across investors and used to undertake investments with the highest return accepted under their individual risk tolerance (Fama 1970). Fama also considers the random walk theory to be an integral assumption of the Efficient Market Hypothesis. The random walk theory suggests that successive returns are random, identically distributed and independent of each other. The reasoning is that past and new information is immediately incorporated into a stock's price, eliminating arbitrage opportunities. Under the random walk theory, stock performance is random and lacks a clear pattern, thus prohibiting accurate predictions of returns.

The Efficient Market Hypothesis provides a foundation for many models and frameworks such as the Capital Asset Pricing Model (CAPM), introduced by Sharpe (1964), Lintner (1965) and Black (1972). The model estimates expected returns of an individual stock in relation to the implied risk of that stock. The CAPM is built on the relationship of a stock's beta, a variable that captures a stock's systematic risk, and the equity risk premium, the excess market return. In a market equilibrium, the CAPM suggests that the value-weighted market portfolio is the most efficient portfolio possible with respect to maximising the ratio between expected returns and volatility, also known as the Sharpe ratio. This implication, highlighted by Fama (1976) and Roll (1977), means that there is no portfolio with higher risk adjusted returns than the market portfolio. This in turn implies that beta, the slope generated by regressing a security's return on the market return, is the only risk factor necessary to explain the expected return of that security.

2.1.1 Fama and French three-factor model

The Fama and French three factor model was developed by Eugene Fama and Kenneth French (1993) as an extension to the CAPM. The rationale behind the model is that risk is multidimensional, rendering the CAPM insufficient to capture total risk as it only considers a single variable beta. Average returns are correlated to the cross section of average returns, and more variables are needed to account for this (Fama and French, 1992). The arguments of Fama and French (1992) were further supported by previous research including Banz (1981), who found empirical support for the effect of size, in terms of market capitalization, on stock performance. The size effect thus questions the validity of the CAPM, as it provides an argument for the insufficiency of the market risk premium as the sole explanatory variable. (Banz, 1981). Additionally, Stattman (1980) and Rosenberg et al. (1985) examined the relationship of a stock's return and its Book-to-Market equity and found that U.S stocks with a higher Book-to-Market equity yields higher return and vice versa.

To capture this multidimensionality of risk, Fama and French (1993) identified two additional factors that they included in their model, hence the name Fama and French three-factor model. Specifically, they argued that small stocks, on average, outperform large stocks and that companies with a higher Book-to-Market ratio, referred to as value stocks, on average, outperform companies with a lower Book-to-Market ratio, referred to as growth stocks. Thus, the two additional factors were the small-minus-big (SMB) and the high-minus-low (HML) factors. These two factors were used to create portfolios that mimic the risk in terms of size and value.

Fama and French (1993) found that the size effect and the effect of a stock's Book-to-Market equity captures strong common variation in returns. Through testing the model containing all the three factors, the market risk premium from the CAPM as well as the two additional risk capturing factors, the results indicated that the variables hold a highly significant explanatory power over firm specific returns (Fama and French, 1993). This outcome suggests that the two additional factors effectively better account for variation in average return across stocks.

2.2 Behavioural Finance and Investor Biases

Although a substantial amount of literary work agrees with the underlying assumptions of the Efficient market Hypothesis, there are those who argue otherwise. The assumptions of an efficient capital market imply that each stock price fully reflects all available information in an unbiased manner, leading to unbiased valuations (Basu 1977). An opposing view to the Efficient Market Hypothesis is to view asset pricing through the lens of behavioural finance. Instead of all information being considered and assessed rationally by investors, behavioural finance does not assume that investors are rational. The argument is that investors are prone to certain systematic irrational prejudices or beliefs that in many cases are subconscious. Irrationality originates from psychological factors that interfere with rationality and causes irrational behaviour even though investors aim to and think they are acting rationally.

Investors have a tendency to favour stocks that are familiar to them, including well-known, strongly branded, and large companies. Lakonishok, Sheifler, and Vishny (LSV, 1994) argue that investors buy large and well-known stocks because they are perceived to be "safe" and "good" investments, regardless of their price. Due to this familiarity bias, some stocks are preferred without a rational reason, implying that some stocks are being overlooked. Another bias among investors is known as the disposition effect, which stems from investors' inclination to sell stocks that have performed well and keep those that have performed worse (Shefrin and Statman, 1985). Investors refrain from realising their losses and selling the stocks that have lost money. Instead the stocks are kept with the hope of them rebounding and yielding higher returns in the future.

According to the expected utility theory, first introduced by the mathematician and physicist Daniel Bernoulli, each outcome of a decision gives rise to a particular degree of utility, which is not a linear function of money. The idea behind the theory is that people do not get double the amount of utility just because the amount of money doubles (Kahneman and Tversky, 1982). Decisions are a result of a utility function, not equal across the population, indicating what yields the highest utility, which is expected to be maximised. If the utility from a decision is not a linear function of monetary gains, a rational risk-reward perspective is not

applied. This reasoning contradicts the underlying assumptions of the Efficient Market Hypothesis, which claims that all investors are rational and share a common goal to maximise risk adjusted returns. With regards to changes in wealth, people's view of the outcome is limited and utility is identified as gains and losses relative to a neutral point, varying between individuals (Kahneman and Tversky, 1982). As a result, choices are inconsistent among investors since objective outcomes are interpreted differently.

Individuals differ in their risk aversion, meaning that one can be more or less prone to risky investments. However, an underlying assumption of the Efficient Market Hypothesis is that the risk entails greater expected return, thus implying that risky investments are undertaken first when the return is sufficient to make up for that risk. Conversely, psychological studies indicate that irrationality occurs when faced with the choice of a sure loss or a gamble for better future returns. Even when the gamble implies a large probability for an even greater loss than the alternative, and a lower expected return, a majority of people are inclined to choose that option (Kahneman and Tversky ,1982). From an investor rationality perspective, this implies that investors forgo the optimal choice with regards to risk-adjusted returns.

Another relevant investor bias is the market overreaction hypothesis, which suggests that in response to unexpected and significant news, the market reacts too strongly, resulting in excessive price movements. The hypothesis was introduced as Kahneman and Tversky (1982) conducted a psychology study and found support that dramatic events tend to cause an overreaction among people. This hypothesis was then implemented on the stock market by De Bondt and Thaler (1985) who found that a contrarian investment strategy yields substantial abnormal returns. The contrarian investment strategy uses this market overreaction to identify undervalued stocks. The idea is that because the market overreacts to poor news and often sells "losers", the worst performing stocks, they become undervalued and should instead be bought. The "winners", on the other hand, become overvalued and should be sold short.

From a behavioural finance perspective, the consequence of these investor biases is a mispriced stock market. Since biases are argued to be systematic, the effects of them are aggregated, resulting in some stocks being overpriced relative to their fundamental value, and others being underpriced. While there is substantial evidence supporting the statements of the Efficient Market Hypothesis, its applicability in the real world is questionable. Opposers of the Efficient Market Hypothesis believe that investor biases pave the way for strategies that can identify undervalued stocks, and examines whether it in fact is possible to earn greater return through one of those strategies (Basu, 1977).

2.2.1 Value Investing

Value investing as a concept is a direct consequence of investor biases and has since its emergence in the 1920s gotten a lot of scholarly attention around the world, including Basu (1977), Fama and French (1992, 1993, 2012), and Rosenberg et al (1984). Basu (1977) studied the effect of Price-to-Earnings ratio on stock performance and found that stocks with a low Price-to-Earnings ratio on average performed better than stocks with a high Price-to-Earnings. This would imply that prices do not reflect all available information and that specific strategies can outperform the market. Basu argued that the Efficient Market Hypothesis fails to take investor biases into account and that these biases cause certain stocks to generate a higher risk-adjusted return. In Europe, Japan, North America and Asia Pacific a positive correlation was found between Book-to-Market equity and stock performance as a

positive HML factor was recognised (Fama and French, 2012). Rosenberg et al. (1984) found similar results, further questioning the validity of the underlying assumptions of the Efficient Market Hypothesis.

The aim of value investing strategies is to capture undervalued stocks that have a high intrinsic value relative to its market value. Previous studies have tested different strategies in pursuit of capturing the intrinsic value of a stock, but it is not entirely agreed upon which approach that best identifies undervalued stocks. Most previous research uses simple value strategies based on ratios such as Book-to-Market, Earnings-to-Price and Cash-to-Price ratios (Lakonishok et al., 1997). Other studies have argued that it is better to use a more complex approach that includes several variables. One strategy that has attracted a lot of attention is the Trending Value strategy introduced by O'shaugnessy (2011), which includes several factors, designed to derive undervalued stocks.

Although most previous research argues that value stocks do in fact outperform the market, the reasoning behind these returns is much more controversial and not something that scholars agree upon. Fama and French (1992) argued that the higher returns from investing in value stocks is a result of higher risk and that a more sophisticated pricing model is necessary to capture this risk. This means that investors buying value stocks are exposed to a higher degree of risk and thus higher returns is a consequence of taking on that extra risk. On the other hand, Amihud and Mendelson (1986) contradict the Efficient Market hypothesis and suggest that the higher returns of value stocks is a result of market frictions. Zhang & Petkova (2005) take the middle road and argue that value stocks are more risky than what pricing models indicate as they are subject to time varying risk, but when that is accounted for, abnormal returns are still deemed to be present, albeit smaller.

An alternative view to Fama and French (1992) can also be found in the study by LSV (1994). LSV examined a contrarian investment strategy, separating glamour stocks (stocks that are selected by individual investors because they have performed good and are believed to keep doing so) and value stocks (stocks that are believed to be underpriced relative to their intrinsic value). The risk of the two sets of stocks was assessed by looking at their performance during different economic states of the world, in combination with an analysis of the stocks' betas and standard deviations, to try and explain their performance. LSV (1994) found that investors, both private and institutional, are more prone to buying so-called glamour stocks than value stocks, causing them to be overvalued. Potential reasons for this behaviour expand on the effect of investor biases on market inefficiencies. First, the familiarity bias influences investors to favour well-known companies and undertake investments without sufficient prior research regarding price or performance of comparable companies. Investors also strive to maximise return in as little time as possible, motivating a preference for glamour stocks rather than value stocks (LSV, 1994).

Three key findings regarding the performance of value investing strategies are presented. First, (LSV, 1994) found that investing in value stocks generated greater returns than investing in glamour stocks during the period April 1968 to April 1990. Second, a likely reason for the superior performance of their value portfolio might be that the performance of glamour stocks' was overestimated by investors. Third, value stocks performed better in both good and bad states implying that they do not seem to be fundamentally riskier than glamour stocks. The conclusion from these findings were that psychological biases cause investors to overestimate and overpay for certain stocks while disregarding others. When investors favour

glamour stocks, value stocks become overlooked and undervalued and opportunities for value strategies to exploit investor behaviours are created (LSV, 1994). A mispriced market due to investor behaviours, instead of greater risk, is presented as the reason that value strategies generate abnormal returns relative to glamour strategies. Further discussion with regards to how the value premium can have persisted for so long even though the results of the strategies is available to investors provided the reason that investors might lack the knowledge and capacity to act in accordance with the stock selection and analysis processes that are required in order to pursue a value strategy (LSV, 1994).

2.2.2 James O'shaugnessy's Trending Value strategy

James O'shaugnessy is an American investor who has produced various literary works related to finance and quantitative investing. In this study, we use the Trending Value strategy, introduced by James O'shaugnessy's in his book: *What Works on Wall Street, Fourth Edition: The Classic Guide to the Best-Performing Investment Strategies of All Time* (2011).

The Trending Value strategy is built on a relative valuation factor, the Value Composite One, as well as a variable designed to capture the effect of past performance. The composite combines several metrics and creates a more complex factor, designed to assess the intrinsic value of an individual stock. Before the release of his book, O'shaughnessy examined possible metrics to capture the intrinsic value of a firm, without successfully identifying a sole one. Instead, O'shaugnessy came up with the idea to build a master value composite, the Value Composite One.

The set of factors in the Value Composite One is a mix of accounting metrics, referred to as "pure play" value factors (O'shaugnessy, 2011). The factors in the composite include the Price-to-Book, Price-to-Earnings, Price-to-Sales, EBITDA/EV, and Price-to-Cash Flow ratio. For each combined group of factors, individual stocks were sorted into percentiles and given a score between 1-100 based on their ranking. The ranking system was the same for each type of ratio and the scores are in the end summed up and used to construct a portfolio with the top ranked 50 or 25 individual stocks.

O'shaughnessy examined the returns of the Value Composite One portfolio between January 1st, 1964 and December 31st 2009. Two portfolios were constructed based on two groups of stocks; the All Stock Universe (stocks with a market capitalization above 200 USD million) and the Large Stock Universe (stocks with a market capitalization above the dataset average). For the All Stock Universe, O'shaughnessy found that investing in the first decile (selecting the top 10% stocks based on their ranking) of the Value Composite One on December 31, 1963, yielded an average annual return over the period of 19,09%. These results were superior to the market portfolio, which on average yielded 13,26% annually during the same time period. For the Large Stock Universe, O'shaughnessy's found that investing in the first decile of the Value Composite One on December 31, 1963, yielded an average return of 15,04% annually compared to the market portfolio of large stocks that generated an average annual return of 11,72% during the same period. The Value Composite One is used to derive the most undervalued companies in the market. The Value Composite One was extended to Value Composite Two by adding shareholder yield to the set of metrics examined. The Trending Value strategy uses the composite and, amongst those undervalued companies, selects the stocks with the largest price development during the previous six months in order to capture companies that are trending upward. For the Value Composite Two applied alone

on the All Stock Universe, the average annual return was 19.00% and the Trending Value return was 23.04% annually.

2.2.3 Criticism against value investing

Since value investing is not a specific strategy, but a category of strategies for selecting undervalued stocks, criticism can be specific to a certain strategy or generally directed toward the overall concept of the strategy. The criticism toward value investing can have two starting points. Either, the basis of the criticism is that markets are efficient, which entails that generating alpha over a longer period of time is impossible. The other point of view is that markets are not entirely efficient, but neither is value investing as a method for generating abnormal returns.

Chan (1988) considers the contrarian investment strategy, which consists of buying losers and short selling winners. The market overreaction hypothesis forms the base of the strategy, implying that the market overreacts to news, causing winners to tend to be overvalued and losers undervalued. The study, on the other hand, argued that risk is not properly accounted for as betas for poor performing stocks increase. Thus, the conclusion that the contrarian investment strategy identifies riskier stocks and that abnormal returns generated are economically insignificant is made (Chan 1988). This contradicts the findings presented by De Bondt and Thaler (1985). Ball and Kothari (1989) extended this criticism by finding further results implying that contrarian investment strategies generate riskier stocks. Analysing CAPM estimations of returns suggested that the negative serial correlation in returns is a result of shifts in relative risk (Ball and Kothari, 1989). This is in line with the findings of Chan (1988), but Ball and Kothari (1989) documented even larger shifts in relative risk.

Another perspective on criticism against value investing is presented by Maloney and Moskowitz (2020) who look at relative absolute returns for basic value and growth stocks (sorted solely on Book-to-Market ratio). The results indicate that since the Global Financial Crisis (2007-2008), the performance of value stocks relative to growth stocks has decreased, and from 2017 to early 2020, value stocks were, on average, outperformed by growth stocks. In order to examine the cause, the connection between this development of value stocks' performance and the decreasing interest rates and the flattening yield curve was examined. However, the results were inconsistent and the conclusion was that the relationship between the value premium and the interest rate environment is complex (Maloney and Moskowitz, 2020).

2.3 Efficient Market Hypothesis vs behavioural finance

The Efficient Market Hypothesis and behavioural finance fundamentally contradict each other and both of them cannot coexist in practice. Elements of each can exist in parallel, but if markets completely are efficient, there can be no mispricing due to investor biases and if assets are mispriced, markets are not efficient. What applies to reality is heavily debated, and new studies and evidence supporting the two sides are continuously introduced. A basic assumption required for investor biases to have an effect on market efficiency is that the biases are systematic and investors collectively act irrationally. Efficient Market Hypothesis

supporters dismiss the effects of investor biases as they argue that the biases are not systematic and on the aggregate, they cancel out, making the market efficient.

By default, practitioners of value investing strategies oppose the Efficient Market Hypothesis as they believe they can generate sustainable alpha, which scholars also have found empirical evidence for. From the perspective of the Efficient Market Hypothesis, the response to these studies and results is either that the pricing models used to estimate the abnormal returns are insufficient in their ability to capture risk, or that the methodology used is biassed.

The argument that the model is insufficient can have two focal points. Either not all risk factors are accounted for, which leads to the model suggesting abnormal returns when there in fact are none. An example of this is the Fama and French Three Factor Model (Fama and French 1993), being developed from the Capital Asset Pricing Model because CAPM was deemed to not capture all risk factors. The other argument for the insufficiency of the pricing models used is that pricing models do not consider risk levels over time and that risk is not static, which is what is implied with constant betas. Evidence for this is presented by Ball and Kothari (1989) who find that when using contrarian investment strategies, i.e. buying stocks that have performed poorly and shorting stocks that have performed well, betas for the poor performing stocks increased and betas for well performing stocks decreased. The contrarian investment strategy is based on the market overreaction hypothesis and has been shown to produce abnormal returns, but when taking time-varying risk into consideration, returns were statistically insignificant at the 5% significance level (Ball and Kothari, 1989).

3. Data

The period examined in this essay is January 2007 to September 2023, hence, we have gathered data corresponding to these dates for stocks listed in Sweden, Norway, Denmark, Finland, and Iceland. However, as this study includes a momentum factor based on stocks 6 months past performance, data points as far back as July 2006 are included in the dataset. A 15 year time horizon is used with the purpose of examining time varying risk for stocks in different economic states of the world. As this time span includes both the Global Financial Crisis (2007-2008) and th COVID-19 pandemic, it enables a more thorough analysis of time varying risk.

The data collected for each individual stock is gathered using Capital IQ and includes; Market Capitalization, Price, Price-to-Book ratio, Price-to-Sales ratio, Price-to-Cash ratio, Price-to-Earnings ratio, EV/EBITDA ratio and the components of those that require inversion. The stock price from Capital IQ is adjusted for stock splits and reflects the most recent available price. If any of the dates corresponds to a non-trading day, the stock price will reflect the last price of the most recent trading day. Basic EPS (net income less preferred dividend and other adjustments divided by weighted average basic shares outstanding) is used to compute the Price-to-Earnings ratio for each stock. Following the methodology of O'shaughnessy (2011), cash flow from operations is used to compute each stock's Price-to-Cash ratio. Stock returns are calculated as the one-month stock price development. Capital IQ is also used for each country's Interbank Offered Rate where the one-month STIBOR, CIBOR, REIBOR, NIBOR, and EURIBOR are gathered.[1] The interest rates are then value weighted for each period based on the total capitalization of that country relative

[1] Finland adopted the euro as currency 1999 and we thus use the EURIBOR as one of the Interbank Offered Rates in our dataset.

to the total market capitalization of all countries. Capital IQ lacks data on the nordic interbank offered rates before 2010. Thus, the rates for the dates before 2010 that are included in our time period are gathered from a statistical data base in each country.

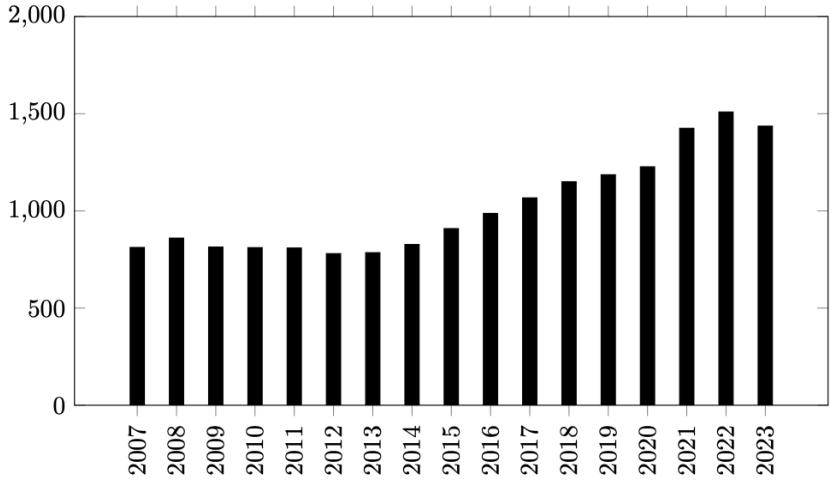
These types of data samples might, according to Banz (1981) and Breen (1986), be subject to the ex-post selection bias and look ahead bias. Ex post selection bias often arises due to the exclusion of non surviving companies, also referred to as the survivorship bias (O'shaugnessy, 2011). To decrease the negative effects of ex post selection biases, the dataset constructed includes both presently listed companies and those that have been delisted due to mergers, bankruptcy or other reasons, at any point during our time period. A merged file is generated containing all companies (listed as well as delisted), taken from Wharton Research Data Services (WRDS), as well as the relevant monthly data points for those companies, taken from S&P Global Market Intelligence Data (Capital IQ). Trailing multiples are used to address the issues of look ahead bias by relying on already known data and not on forecasts or expected value. Thus, the information used to construct the portfolios reflects information that is available on the date of the stock selection.

Table 1 and Figure 1 presents an overview of the number of companies included in the sample. The initial sample consists of a total of 2315 companies, which is all the companies that are or have been listed on the Nordic markets during the time period. The sample is then reduced to 2299 companies by manually excluding 16 companies presenting incorrect numbers. A size filter is then applied to excluding companies that, at some time during the studied period, have a market capitalization of less than 50 MSEK, with the purpose of minimising incomplete and incorrect data. If a company's market capitalization is below 50 MSEK at period *t* and above 50 MSEK at period *t+1*, then that company will be included in period *t+1* but not in period *t*. This filter further reduces the sample to 2214 companies. Then, 50 companies with missing stock price data are excluded, resulting in a final sample of 2164 companies. Because the companies in the sample vary in size and because some companies have become delisted, listed, or might be missing stock price at some point in time during our 15 year period, the number of companies studied each period will be different. The largest amount of individual stocks being assessed is 1389 companies during the period 2022-08-31 and the lowest amount of individual stocks being assessed is 666 companies during the period 2007-01-31.

Table 1. Sample Filters

Criteria	**Sample Size**
Sample gathered from WRDS	2315
Less manually removed companies	2299
Less companies with Market Cap below 50 MSEK	2214
Less companies with missing data points	2164
Final Sample	**2164**

Figure 1. Total companies assessed: Year by Year



4. Method

James O'Shaughnessy's Trending Value strategy is implemented to construct the portfolios that are examined in this study (O'Shaughnessy's, 2011). Two different procedures are then used to test our hypotheses; the Fama and French three-factor model and a simple sorting procedure.

Hypotheses

Hypothesis 1:
The Trending Value strategy does not yield abnormal returns in the Nordic region according to the Fama and French three-factor model.

Hypothesis 2:
The abnormal returns come from the fact that total risk is not captured by the Fama and French three-factor model and the Trending Value strategy is outperformed by the market in bad times.

4.1 Portfolio Construction

The portfolios are constructed by combining the Value Composite One (as O'shaugnessy reported that it generates slightly higher returns than the Value Composite Two) with the trend metric to apply the Trending Value strategy (O'shaughnessy, 2011). This strategy ranks individual stocks based on value capturing metrics to assess a combined score and use that to construct the portfolios being analysed. The metrics used are Price-to-Book ratio, Price-to-Sales ratio, Price-to-Cash ratio, Price-to-Earnings ratio and EV/EBITDA ratio. Some of these metrics manage negative values incorrectly, e.g., as a stock with a negative earnings-per-share ratio will yield a lower Price-to-Earnings ratio than a stock with a positive earnings-per-share (O'shaughnessy, 2011). To account for this, the affected ratios are inverted. Table 2 presents the ratios used in this study, where Earnings-to-Price to Price-to-Earnings and Cash-to-Price to Price-to-Cash have been inverted. EV/EBITDA can also manage

negative values incorrectly, but since the sample does not contain any negative values for this ratio, the inversion would be redundant.

Table 2. Factor Overview

Variables before inversion	**Variables after inversion**
Price to cash	Cash to price
Price to book	Price to book
Price to sales	Price to sales
EV/EBITDA	EV/EBITDA
Price to earnings	Earnings to price
Six month past performance	Six month past performance

For each ratio, the individual stocks are assigned a score based on the percentile that ratio belongs to. A score of 1 implies that the company is among the top percent for that ratio. The lowest score always corresponds to the end of the ratio spectrum that exhibits characteristics of value companies. Thus, as illustrated in table 3, for the non-inverted ratios, a low ratio represents characteristics of a value stock and for the inverted ratios, the opposite applies. Stocks that are missing data points for any of the variables in the composite receive a neutral score of 50 for that particular variable. Table 3 presents the overview of the stock selection system.

Table 3. Ranking Overview

Variable	**Best Ranking**	**Worst Ranking**
Cash to price	100th Percentile	1st Percentile
Price to book	1st Percentile	100th Percentile
Price to sales	1st Percentile	100th Percentile
EV/EBITDA	1st Percentile	100th Percentile
Earnings to price	100th Percentile	1st Percentile

The scores for each ratio are then summed up and the 10 percent of companies with the lowest scores are selected. Then, the trend factor (six month past performance) is implemented (O'shaughnessy, 2011). Out of the selected 10 percent, the final Trending Value portfolios consist of the 25 stocks with the best past six month performance. This Trending Value strategy is applied to two sets of stocks based on their market capitalization (O'shaughnessy, 2011). However, as the sample size and the average market capitalization of the stocks in our sample differs from that of the sample used by O'shaughnessy, different

breakpoints are used to select the stocks included. The sets of stocks considered in this study includes: The All Stock Universe (all the stocks in our sample with a market capitalization over 50 MSEK) and the Large Stock Universe (stocks with a market capitalization above the average). This sorting method deviates from O'shaughnessy (2011), who divides the sample into one group with stocks above 200 USD million and the other with stocks above the dataset average. The sorting method is motivated by the fact that the Nordic stock market contains stocks that are generally smaller than U.S common stocks.

For the Trending Value strategy, two holding periods are assessed. One is monthly, where a new portfolio is held for one month. The other is a six month holding period, where the same portfolio is used, but each portfolio is held for six months, and the investment in the portfolio is one sixth of what is invested in the monthly portfolios, since we hold six portfolios at the same time.

4.2 Model

To test our hypothesis and examine whether or not the portfolios constructed through the Trending Value strategy yields abnormal returns, regressions of the portfolio returns are made on the Fama and French three-factor model.

Variables

The three factors in the Fama and French three-factor model are computed since we were unable to find pre-constructed factors corresponding to our specific dataset. These factors include the excess market return (rm_t - rf_t), the small-minus-big (SMB) factor, and the high-minus-low (HML) factor. The dependent variable, the excess portfolio return (r_t - rf_t), is also computed. Equation 1 presents the model we are using in our regression. We follow Jensen (1968) and express the realised return of the portfolio on the LHS as a function of the risk captured in the factors on the RHS. As we look at the two holding periods for the portfolios that are regressed on the model, all the factors included are calculated twice to reflect those periods.

$$r_t - rf_t = \alpha + \beta * (rm_t - rf_t) + \beta 2 * SMB_t + \beta 3 * HML + \varepsilon_t \quad (1)$$

Risk-free rate

Each of the five country's interbank offered rate is used as a proxy for the risk-free rate. The value-weighted interbank offered rate for all countries is then used as a proxy for the risk-free rate that is used in the calculations for the excess portfolio return and the excess market return. The reason for the value-weighting is that the interbank offered rates vary between countries, thus providing a more accurate proxy for the risk-free rate of the sample. The rates are value-weighted based on the sum of each country's stock's market capitalization, in period *t,* in relation to the sum of all the stock's market capitalization in period *t.* The rates gathered are expressed on a yearly basis and are, to fit our monthly returns, converted to monthly rates. Equation 2-5 presents the formulas used to compute the proxy for the risk-free rate, where *i* refers to a particular country.

$$rf_{t\_Yearly} = \sum((Market\ Cap_i / Total\ Market\ Cap) * Interbank\ Offered\ Rate_i)^2 \quad (2)$$

$$rf_{t\_Daily} = rf_{t\_Yearly} / 360 \quad (3)$$

$$rf_{t\_Monthly} = rf_{t\_Daily} * Number\ of\ days\ in\ month \quad (4)$$

$$rf_{t\_Monthly} = rf_t \quad (5)$$

Market return

The value-weighted monthly growth in market capitalization is used to compute the market return in our model. The growth of the market is not solely dependent on the price growth of the underlying shares that make up the market, but can also be affected by e.g. initial public offerings and delistings. We thus use the market capitalization as an indicator of market growth instead of the overall price development of the stocks included in the market. With that said, the difference between using price development and market capitalization as base for the market return resulted in a relatively small difference. The average monthly market return based on market capitalization equals 0.49%, compared to 0.41% using price development as a base. A similar difference is observed when looking at the six month holding period.

$$rm_t = (\sum Market\ Cap_{t+1} - \sum Market\ Cap_t) / \sum Market\ Cap_{t+1} \quad (6)$$

$$rm_t - rf_t = excess\ market\ return \quad (7)$$

Excess portfolio return

The return of stock *i* in period *t+1* is calculated as the closing price in period *t+1* relative to the closing price in period *t*. For the excess portfolio return, the equally weighted average return of the stocks selected through the Trending Value strategy is used. The excess portfolio return is then calculated by subtracting the risk-free rate from the portfolio return. Equation 8-10 presents the calculations for the return for stock *i* and the excess portfolio return, where r_{it} refers to the return of the stocks in our portfolio and N refers to the number of stocks in the portfolio.

$$r_{it} = (Stock\ Price_{i,t+1} - Stock\ Price_{i,t}) / Stock\ Price_{i,t+1} \quad (8)$$

$$r_t = \sum(r_{it}) / N \quad (9)$$

$$r_t - rf_t = Portfolio\ return - Risk\ free\ rate = excess\ portfolio\ return \quad (10)$$

Price-to-Book ratio

[2] *i* refers to a particular country e.g. Total Market Capitalization of Swedish companies divided by the Total Market Capitalization of the whole dataset times the Swedish Interbank Offered Rate

For calculations regarding the HML factor, Fama and French (1993) Book-to-Market ratio to sort the stocks, but the variables used in our calculations is the Price-to-Book ratio. Price-to-Book ratio is an inverted version of Book-to-Market ratio, where a high Price-to-Book equals a low Book-to-Market ratio and vice versa, which is why we invert our sorting procedure. Fama and French (1993) further removed negative Book-to-Market, but our sample does not include any companies with negative Price-to-Book values.

SMB & HML factors

For the sorting required to calculate the SMB and HML factors, we follow the same method as Fama and French (1993). Two groups are created for each period based on market capitalization; Big (B) companies that have a market capitalization above the median and Small (S) companies that have a market capitalization below the median. Then, the sample groups are divided into three groups per period based on their price-to-book ratio; the companies in the highest 30% (H), the companies in the middle 40% (M), and the companies in the lowest 30% (L). These are then inverted as described above. Equation 11-16 presents the six portfolios.

SL_t = Small companies with low Price-to-Book ratio *(11)*

SM_t = Small companies with medium Price-to-Book ratio *(12)*

SH_t = Small companies with high Price-to-Book ratio *(13)*

BL_t = Big companies with low Price-to-Book ratio *(14)*

BM_t = Big companies with medium Price-to-Book ratio *(15)*

BH_t = Big companies with high Price-to-Book ratio *(16)*

In accordance with Fama and French (1993) we calculate the monthly value-weighted returns for the six portfolios for a holding period of one year. This implies that we update our portfolio yearly and that each of the six portfolios consists of different companies throughout our time period. The SMB factor is calculated by taking the simple average return of all the small portfolios and subtracting the simple average return of all big portfolios. The HML factor is calculated by taking the simple average return of the high portfolios and subtracting the simple average return of all low portfolios. For the six month holding period, the same method is followed, but for each month, the value-weighted return is calculated as the average of the current month and the subsequent five months. Equation 17-18 presents the SMB and HML factors.

$$SMB_t = (SH_t + SM_t + SL_t) / 3 - (BH_t + BM_t + BL_t) / 3 \quad (17)$$

$$HML_t = (SL_t + BL_t) / 2 - (SH_t + BH_t) / 2^3 \quad (18)$$

[3] Since we are using Price-to-Book ratio, which is a opposite of the Book-to-Market ratio, we are using the stocks included in the “Lower” portfolios and subtracting the ones included in the “Higher” portfolios to compute the HML factor

A separate dataset is then created containing monthly factors for HML, SMB, excess market return as well as the returns for the specific portfolio constructed through the Trending Value strategy. The HML and SMB factors are specific for each period in time. These factors are then used in a multivariate time-series regression applied on the excess portfolio return.

4.3 Sorting Procedure

Our sorting method is based on LSV (1994) who approached the issue of assessing risk by examining returns in different economic states of the world. If value stocks were to perform worse than glamour stocks in bad states of the world, it could be concluded that those stocks are indeed fundamentally riskier. Thus, looking at the performance of value stocks relative to glamour stocks over time provides indications of the riskiness of the two groups (LSV, 1994).

This study follows the same methodology as LSV (1994) but also implements elements used by Zhang & Petkova (2005). A simple sorting procedure is used to evaluate the time varying risk of the portfolios by looking at the value-weighted return of the market for each month and then create four equally sized groups based on those average returns. State "Peak" represents the 25 percent of months with the highest returns, state "Expansion" represents the rest of the months above the average, state "Recession" represents the 25 percent of months below the average and state "Through" represents the 25 percent of months with the lowest returns. This enables a comparison of the portfolios with the market during different stages of economic cycles.

To continue the analysis of time varying risk, we further examine the correlation between the performance of the Trending Value strategy relative to the market in different states of the world. To do so, linear regressions are run with the dependent variables being the return of the Trending Value portfolios minus the market return, and the explanatory variable being the market return.

5. Results

In this section, we aim to answer our research questions by providing the findings of our study.

5.1 Independent Variables

Table 4 presents an overview of the independent variables used to regress the Fama and French three-factor model. The independent variables include the excess market return, the SMB factor and the HML factor, which are calculated for both the one month and the six month holding periods. The average excess market return for the one month holding period is 0.39% with a relatively high standard deviation of 4.5%. Surprisingly, the average monthly return of the SMB portfolio, which entails that the size effect in our model is -0.21% on average. The value is relatively small but still implies that a negative size effect is present in the Nordic region during the studied time period and that large companies on average outperformed small companies between January 2007 and September 2023. The HML factor is also negative and equals -0.19%, indicating an absence of a value premium in the Nordic

region during the studied time period as it implies that stocks with a lower Book-to-Market ratio, have, on average, performed better than stocks higher a lower Book-to-Market ratio during the studied time period. Our results are somewhat contrary to the findings of the recent studies who found the HML factor in Europe to be positive (see e.g. Fama and French (2012)). However, our study only covers the Nordic region and a time period that includes significant downturns, which offers a possible explanation for the differing results. Looking at the six month holding period, the HML portolio's average monthly return increases slightly, from -0.19% to -0.21%. For the SMB, the six month holding period results in a more substantial change as the average monthly returns of the portfolios decrease from -0.21% to -0.39%.

Table 4. Independent Variables

Factor	***Mean***	***Std. Dev.***	***Min***	***25th***	***Median***	***75th***	***Max***
Rm - Rf	0.0039	0.0447	-0.1659	-0.0144	0.0065	0.0301	0.1684
SMB	-0.0021	0.0283	-0.067	-0.0201	-0.0039	0.0156	0.1599
HML	-0.0019	0.0294	-0.1037	-0.0195	-0.0055	0.0152	0.1655
Rm - Rf 6M	0.0037	0.0213	-0.0722	-0.0066	0.0069	0.0163	0.0609
SMB 6M	-0.0035	0.0116	-0.0349	-0.0114	-0.0035	0.0043	0.0282
HML 6M	-0.0021	0.0169	-0.0442	-0.0117	-0.0028	0.0055	0.0675

Notes: Table 4 presents the independent variables used in our model. SMB refers to the Small minus Big factor, HML refers to the High minus Low factor, Rm-Rf refers to the excess market return factor. 6M refers to a holding period of 6 months, all else refers to a holding period of one month.

5.2 Dependent Variables

Table 5 presents an overview of the dependent variables used in our model. The dependent variables consist of statistics for the portfolios constructed through the Trending Value strategy. The average monthly return for the portfolio based on the All Stock Universe equals 1.81% which corresponds to 24% annually. Interestingly, the average monthly return for the portfolio based on Large Stocks is significantly lower, equaling 0.95% monthly, corresponding to an annual return of 12%. Looking at six month holding periods, the volatility of the portfolios decreases significantly as the standard deviation drops from 5.45% to 2.98% for the All Stock Universe and from 6.54% to 2.85% for the Large Stock Universe. For those portfolios, the average returns decrease as well but the relative decrease in standard deviation is larger than the relative decrease in average returns. Thus, the Sharpe ratios for the six month portfolios are higher than those of their one month counterparts.

Table 5. Dependent Variables

Portfolio	*Mean*	*Std. Dev.*	*Min*	*25th*	*Median*	*75th*	*Max*
All Stocks	0.0181	0.0545	-0.2784	-0.0089	0.02	0.0509	0.166
All Stocks 6M	0.0147	0.0298	-0.0641	-0.0085	0.0148	0.0356	0.1022
Large Stocks	0.0095	0.0654	-0.1798	-0.0226	0.0095	0.0436	0.2959
Large Stocks 6M	0.0061	0.0285	-0.0777	-0.0149	0.0088	0.0227	0.1158

Notes: Table 5 presents the dependent variables used in our model. All Stocks refers to the Trending Value strategy applied on the total data set. Large Stocks portfolio refers to the Trending Value strategy applied on the companies with a market capitalization above the data set average. 6M refers to a holding period of 6 months, all else refers to a holding period of one month.

5.3 Regression results

Table 6 and 7 presents the summary statistics from the regressions of the Fama and French three-factor model applied to the All Stock Universe. For both portfolios, the intercept, or alpha, is positive and highly significant, with the p-values suggesting a significance level lower than 0.1%. The alphas suggests that O'shaugnessy's Trending Value strategy generated monthly returns of 1.51% (one month holding period) and 1.37% (six month holding period) that cannot be explained by the Fama and French three-factor model. All the explanatory variables are highly significant and the estimate for the coefficients indicate that the market excess return has the largest effect on portfolio excess return, followed by the SMB and then the HML factors. The adjusted R-squared is 72.5% for the one month holding period and 78.4% for the six month holding period.

Table 6. Regression Summary, All Stock Universe with a one month holding period

	Estimate	*Std. Error*	*t-statistic*	*p-value*
(Intercept)	0.0151	0.0020	7.3796	0.0000
Excess Rm	1.0139	0.0475	21.3415	0.0000
SMB	0.6061	0.0745	8.1309	0.0000
HML	0.3726	0.0703	5.3008	0.0000

Notes: The "(Intercept)" factor refers to the alpha (abnormal returns after considering the factors in our model). "Excess Rm" refers to excess market return. The estimates correspond to the betas of the variables, except for the intercept which is not an independent variable.

Table 7. Regression Summary, All Stock Universe with a six month holding period

	Estimate	*Std. Error*	*t-statistic*	*p-value*
(Intercept)	0.0137	0.0011	12.4835	0.0000
Excess Rm	1.0793	0.0487	22.1646	0.0000
SMB	0.7731	0.0894	8.6491	0.0000
HML	0.5221	0.0627	8.3278	0.0000

Notes: See note for table 6.

Table 8 and 9 presents the summary statistics from the regressions of the Fama and French three-factor model applied to the Large Stock Universe. The alpha for the regressions is positive and significant at the 5% significance level, but smaller and less significant than the alpha obtained by the portfolios generated through the use of the All Stock Universe. This suggests that of the monthly returns generated, 0.44% (for the one month holding period) and 0.26% (for the six month holding period) were generated that cannot be explained by the Fama and French three-factor model. Naturally, the SMB variables are insignificant for the portfolios created from the Large Stock Universe as the sample only contains stocks classified as "big" in the SMB portfolio, but the excess market return and the HML factor are significant at the 0.1% significance level. For the one month holding period, the adjusted R-squared equals 77.7% and for the six month holding period it equals 80.3%.

Table 8. Regression Summary, Large Stock Universe with a one month holding period

	Estimate	*Std. Error*	*t-statistic*	*p-value*
(Intercept)	0.0044	0.0022	1.9828	0.0488
Excess Rm	1.2170	0.0518	23.5154	0.0000
SMB	-0.0475	0.0812	-0.5849	0.5593
HML	0.4001	0.0766	5.2247	0.0000

Notes: See note for table 6.

Table 9. Regression Summary, Large Stock Universe with a six month holding period

	Estimate	*Std. Error*	*t-statistic*	*p-value*
(Intercept)	0.0026	0.0010	2.5552	0.0114
Excess Rm	1.0919	0.0444	24.5829	0.0000
SMB	0.1134	0.0815	1.3903	0.1661
HML	0.4783	0.0572	8.3650	0.0000

Notes: See note for table 6.

We recognise a significant alpha for all the portfolios, with the alphas generated from the All Stock Universe being larger and more significant than those generated from the Large Stock Universe. Thus, for all portfolios, we reject hypothesis 1 that O'shaugnessy's Trending Value strategy does not generate abnormal returns in the Nordic region between January 2007 and September 2023 according to the Fama and French three-factor model. The adjusted R-squared is higher for the regressions made on the Large Stock Universe than the All Stock Universe, suggesting that even though the SMB factor holds insignificant explanatory power for the large stocks, the Fama and French three-factor model as a whole better explains the variations in the returns of the Large Stock portfolios. One possible reason for this is that larger stocks exhibit more homogeneity in response to factor changes. Another explanation can be that smaller stocks contain more idiosyncratic risk that is not captured by the factors included in the model. Economic theory offers a potential explanation for the higher returns generated through the Trending Value strategy, when applied to the All Stock Universe. As the All Stock Universe contains all stocks included in the Large Stock Universe as well as those excluded, investors are faced with a larger pool of possible investments. Theory then suggests that expanding the pool of investments can only benefit expected returns as the same and more opportunities are available. A wider range of stocks that can be affected by mispricing are present, which can be utilised by investors.

5.4 Time varying risk

Table 10 presents the average return of the Trending Value portfolio less the average return of the market portfolio, in each of the four economical states of the world. As the aim of this study is to assess the possibility of generating risk adjusted returns that are considered to be abnormal, this second part of the results section will focus primarily on the Trending Value portfolio generated through the All Stock Universe with a one month holding period. Since that portfolio generates the largest alpha and, as shown in table 10, provides stable returns above the market in all states of the world, it is the focal point of further analysis. Table 10 shows that the portfolio performs better than the market portfolio in all states, both with a one-month and a six month holding period. Interestingly, the Trending Value portfolio outperforms the market the most when the market is performing poorly, during state Trough. The Trending Value portfolio based on the Large Stock Universe, with a one month holding period, performs better than the market portfolio in every state but the Trough state. The returns relative to the market for portfolios with the six month holding period are similar to those of their one month counterparts.

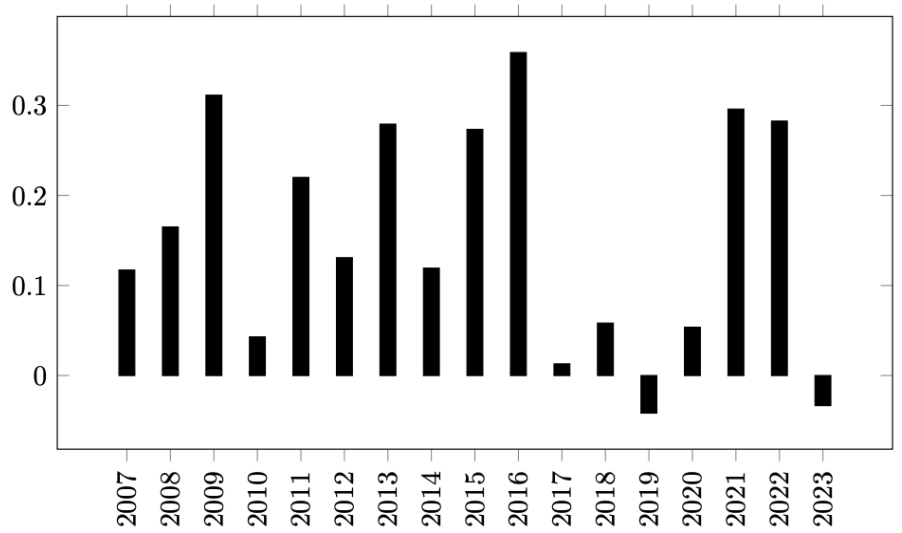
Table 10. Trending Value portfolio minus Market portfolio

State	All Stocks	Large Stocks	All Stocks 6M	Large Stocks 6M
Through	0.0176	-0.0078	0.0069	-0.0034
Recession	0.0124	0.0009	0.0141	0.001
Expansion	0.0105	0.0069	0.0117	0.0074
Peak	0.0121	0.0192	0.0119	0.0117

Notes: All Stocks and Large Stocks refers to the base of the Trending value strategy. The market portfolio is always based on the whole data set. 6M refers to a holding period of 6 months, all else refers to a holding period of one month.

Figure 2 shows the return of the Trending Value portfolio, based on the All Stock Universe, less the returns of the market portfolio. The difference in the returns are displayed on a yearly basis and represents a holding period of one month of each portfolio. The Trending Value portfolio outperforms the market portfolio in almost all years, except for the year 2019 and 2023. During the years when the market portfolio performed better, the difference between the returns was significantly lower than it was in years when the Trending Value portfolio performed better. Similarly, for the All Stock Universe with a six month holding period, the Trending Value strategy outperformed the market in 2012, 2017, 2018, 2019, and 2023 (see appendix 1.). The negative values were however larger with the six month holding period. We find the Trending Value strategy to outperform the market portfolio in years states when looking at the Large Stock Universe (see appendix 2 & 3).

Figure 2. Trending Value strategy minus the market portfolio

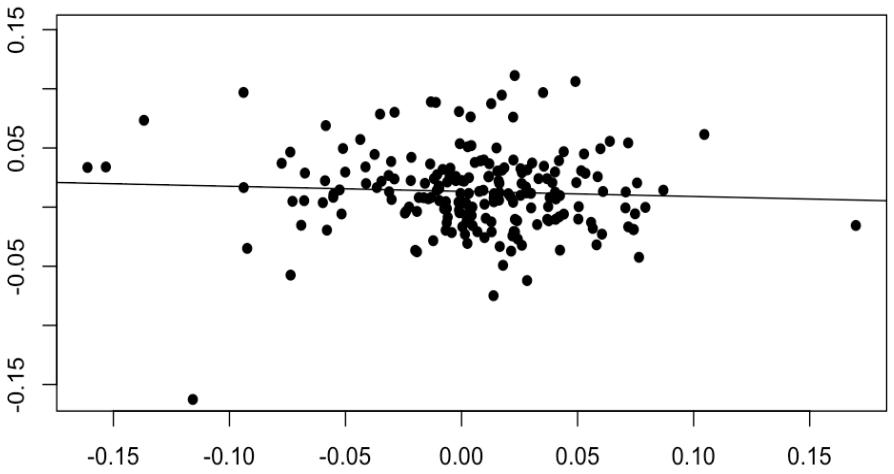


Notes: The y axis in Figure 2 shows the return of the Trending Value strategy (based on the All Stocks Universe) minus the return of the market portfolio, with a one month holding period. As indicated on the x axis, the returns are displayed on a yearly basis.

Figure 3 provides additional information regarding the Trending Value strategy relative to the market. It shows that when the market return decreases, the difference in return between the Trending Value portfolio (generated from the All Stock Universe based on a one month holding period) and the market portfolio increases. Table 11 provides additional information regarding the correlation. It shows that there is no significant correlation between the return of the Trending Value portfolio and the market return. We do on the other hand find evidence that the portfolio does not perform worse than the market in times characterised by poor economic conditions. As the market return coefficient on the value minus market, though insignificant, is negative, the only indication of correlation between the two variables suggests that the opposite is true. When the market performs poorly, our Trending Value strategy outperforms the market even more. For two of the other three portfolios, results are similar, indicating that the correlation between the Trending Value portfolio's outperformance is insignificantly correlated to the market return (see appendix 5 & 6). The results are not as strong as for the portfolio generated from the All Stock Universe with a one month holding

period as the correlation, even though it is insignificant, is positive. However, for the portfolio generated from the Large Stock Universe based on a month holding period, the results indicate a positive correlation, significant at the 0.1% significance level (see appendix 4).

Figure 3. Correlation between Trending Value strategy minus market and the market



Notes: The y axis in Figure 3 shows the monthly return of the Trending Value strategy (based on the All Stock Universe) strategy minus the monthly market returns, with a one month holding period. The x axis shows the monthly market returns.

Table 11. Summary: Trending Value strategy minus market return regressed on market return

	Estimate	***Std. Error***	***t-statistic***	***p-value***
Intercept	0.0134	0.0024	5.4774	0.0000
Market Return	-0.0435	0.0549	-0.7925	0.4290

Notes: Table 11 shows the summary of the regression made for the slope in Figure 3. The "Intercept" refers to the return of the Trending Value strategy above the market that cannot be explained by changes in Market Return.

Our findings provide evidence that the Trending Value portfolio is not systematically outperformed by the market in certain economic states of the world, even though the portfolio generates higher returns on average. One portfolio generated is systematically outperformed by the market in states characterised by poor market returns, but for the other three, we find no evidence to support that the Trending Value strategy is outperformed by the market in times characterised by poor economic conditions. Thus, we are able to reject hypothesis 2 that the abnormal returns come from the fact that total risk is not captured by the Fama and French three-factor model and the Trending Value strategy is outperformed by the market in bad times. As the higher returns are not deemed to be a consequence of higher risk, our results cast some doubt on the underlying assumptions of the Efficient market hypothesis as the Trending Value strategy outperforms the market in both good times and bad times, yielding abnormal returns without necessarily being more risky. The implications of this is

that we instead find support for market inefficiencies in the Nordic markets during the studied time period.

6. Summary & Interpretation

We find two two propositions concerning the abnormal returns and time-varying risk of our Trending Value portfolios. First, we find that a portfolio consisting of stocks generated using the Trending Value strategy generates a positive and significant alpha between January 2007 and September 2023 in the Nordic region. This indicates that the Trending Value strategy used in this article successfully identifies stocks with a higher intrinsic value relative to its market value. Similar results were found across all of our variations of portfolios (using both the All Stock Universe and the Large Stock Universe) and holding periods (both the one month and the six month holding periods). We are thus able to reject hypothesis 1 as we conclude that the Trending Value strategy yields abnormal returns in the Nordic region, according to the Fama and French three-factor model.

Second, we can also conclude that the Trending Value strategy, based on the All Stock Universe, performs better than the market portfolio in both economic downturns and upturns, in the Nordic region between January 2007 and September 2023. For these portfolios, we find no evidence that the abnormal returns can be explained by a higher amount of risk. Even though our results in theory implies that the stocks in our Trending Value portfolio are not fundamentally riskier than the stocks in the market portfolio, we cannot fully reject that the higher returns in our results are not a consequence of higher risk, as it is necessary to consider other aspects of risk to do so. Our findings do, however, indicate that the market is not completely efficient and that a likely explanation for the value premium between January 2007 and September 2023 might originate from the theories of behavioural finance.

One possible explanation for our results is that the abnormal returns recognised in this study are driven by an inefficient market. What causes these inefficiencies is a speculative matter. We cannot confidently reject the Efficient Market Hypothesis, as additional research regarding the true risk would be necessary, but the interpretations of the findings provide support for another reality. As with all studies of this kind, the input variables used are all proxies for the true values, which are not known. Expected return can only be estimated, and arguments can be made that actual return might not be the best estimate for it, further prohibiting rejection of the Efficient Market Hypothesis. On the other hand, assuming that the proxies used are adequate, the results would imply market inefficiencies. Plausible explanations for these inefficiencies can be found in the field of behavioural finance. As investors are prone to psychological biases, stocks are valued irrationally, creating a mispriced and not entirely efficient market. For instance, that the Trending Value portfolios generated from the All Stock Universe provided more robust returns across the differing economical states of the world than those generated from the Large Stock Universe can be explained by biases. If the familiarity bias applies on the aggregate, familiar stocks, which tend to be large, are overpriced, which mitigates the underpricing effect on value stocks caused by biases such as the market overreaction hypothesis (LSV, 1994 and De Bondt and Thaler 1985). Thus, the large stocks identified by Trending Value strategy might be fairly priced, as indicated by the results from our time varying risk analysis, where we found that the correlation between the returns of the Trending Value portfolio on the Large Stock Universe above the market had a positive and significant correlation with the market performance. For smaller stocks on the other hand, both these biases cause underpricing,

suggesting that abnormal returns are a possibility, as indicated by the significant positive alpha and the insignificant, slightly negative correlation.

Another plausible factor contributing to the market inefficiencies might be the inconsistency in investors' decision making processes. Investors interpret investment outcomes differently, some yielding more utility from a fixed monetary increase than others. Additionally, some investors prefer to take a gamble on the future performance of a stock, even when the probability of failure is significant, rather than to realise their losses. Presumably, risk-averse investors only consider investments to be rational if they are expected to yield returns compensating for that risk. However, the majority of people show risk-seeking behaviour when faced with a decision to realise a loss (Kahneman and Tversky, 1982). This irrational behaviour ultimately renders the market inefficient, as these risk-seeking investors forgo the optimal choice according to the Efficient Market Hypothesis, and provides additional support for our findings.

We acknowledge various limitations with our methodology. First, our original sample includes both companies that are public today as well as companies that have been delisted due to mergers, bankruptcy or other reasons, at any point during our time period. Consequently, even if a company has become delisted without going bankrupt, the development will appear as if the price went to zero, whilst in reality, the shareholders of those companies are compensated in the event of such delistings. To take this into account, the last price development of a delisted company is excluded from the sample. However, by doing so, we disregard the effect of bankruptcy where the stock actually decreases to zero. On the other hand, this drawback is relatively insignificant for two reasons. First, the amount of companies going bankrupt in relation to the total amount of companies being delisted is small during our studied time period. Second, the biggest share of the downfall of a stock is already captured, as the months prior to the last month is included. Additionally, the returns we look at for the market and our risk factors are value-weighted, causing the effect of the last price decrease before bankruptcy to be virtually insignificant. In our article, we also acknowledge the limitation which entails that expected returns are essentially subject to estimations, and that using actual returns may not be the best fitting estimate, which further adds to the challenge of rejecting the Efficient Market Hypothesis.

7. Concluding Remarks

This paper examines and interprets the performance of the Trending Value strategy, introduced by O'shaugnessy's (2011), between January 2007 and September 2023 in the Nordic region. Using the Fama and French three-factor model, we are able to conclude that the Trending Value strategy yields abnormal returns during our studied time period. We also conclude that the stocks that make up the Trending Value portfolio are not fundamentally riskier, at least enough to explain the greater returns. Instead, we find support for market inefficiencies, driven by investor biases.

If the findings are deemed to be accurate, and continue to be so, they entail practical implications for investors. As we find evidence implying that it is possible to achieve abnormal returns through value investing, we support the statement that historical financial metrics can be used to identify undervalued companies and achieve positive alpha. The

findings also suggest that a relatively simple strategy, that can be implemented by private investors as well as institutional ones, can generate risk-adjusted returns above the market.

There are two principal ways in which the results in this article can be extended in future research. First, further, more rigorous analysis regarding the risk of the portfolios can be conducted. A more conventional and statistical approach to calculating time varying betas, and thus time varying risk, would contribute to the robustness of the findings. Second, extending the research regarding estimations and proxies of the input variables would also provide a more solid basis on which to conduct this type of study.

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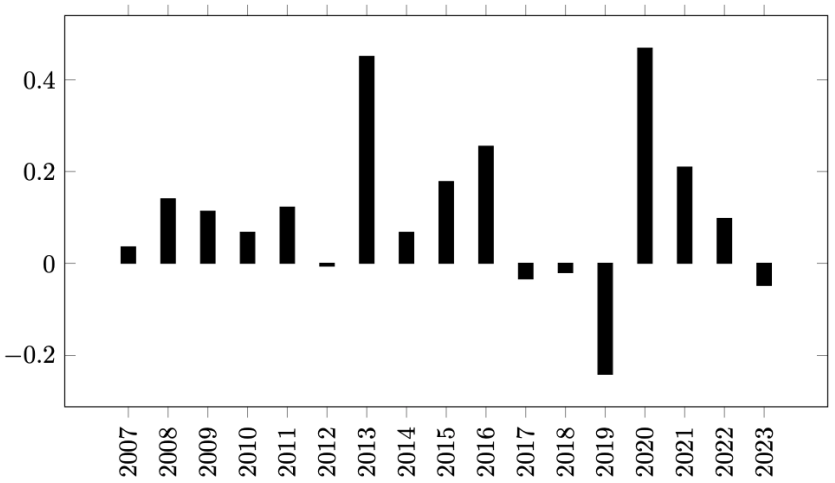
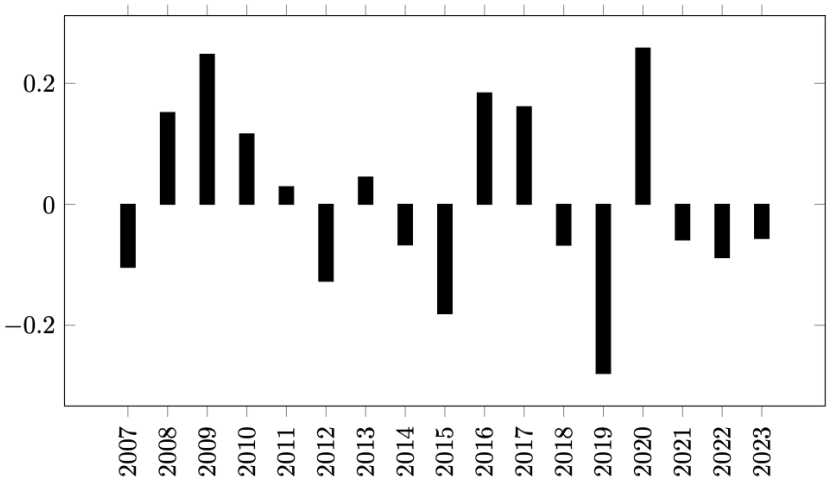
9. Appendices

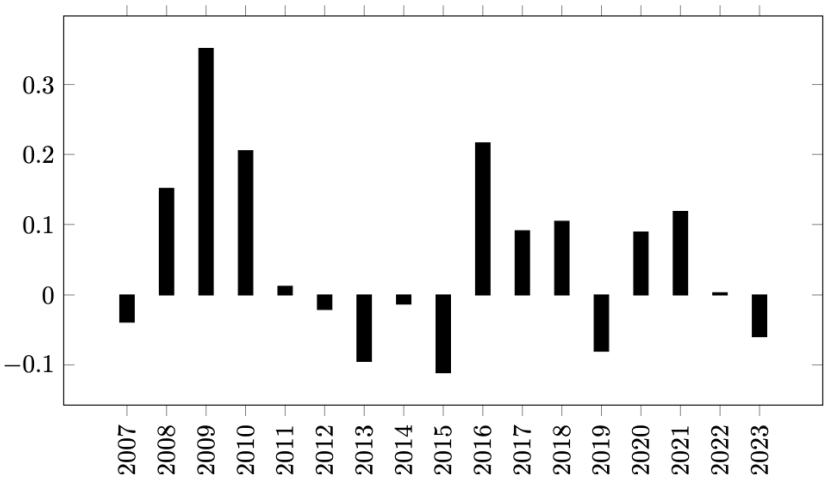
Appendix 1. Year by Year returns: Trending Value (All Stocks) minus market, six month holding period



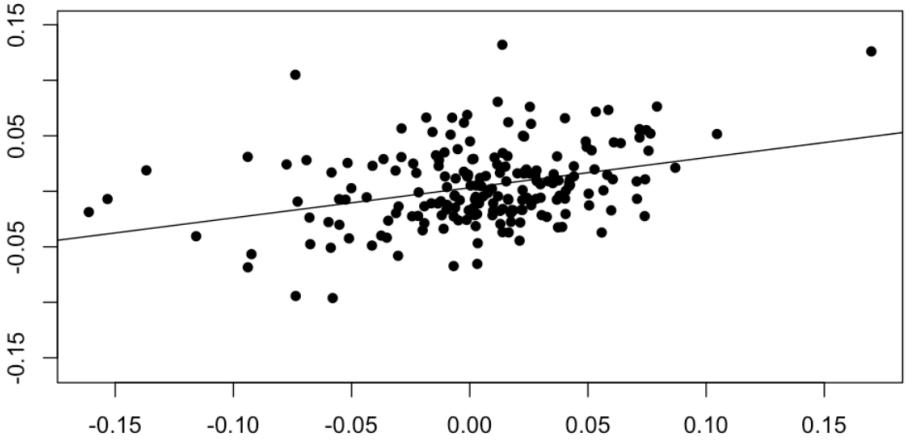
Appendix 2. Year by Year returns: Trending Value (Large Stocks) minus market, six month holding period



Appendix 3. Year by Year returns: Trending Value (Large Stocks) minus market, one month holding period



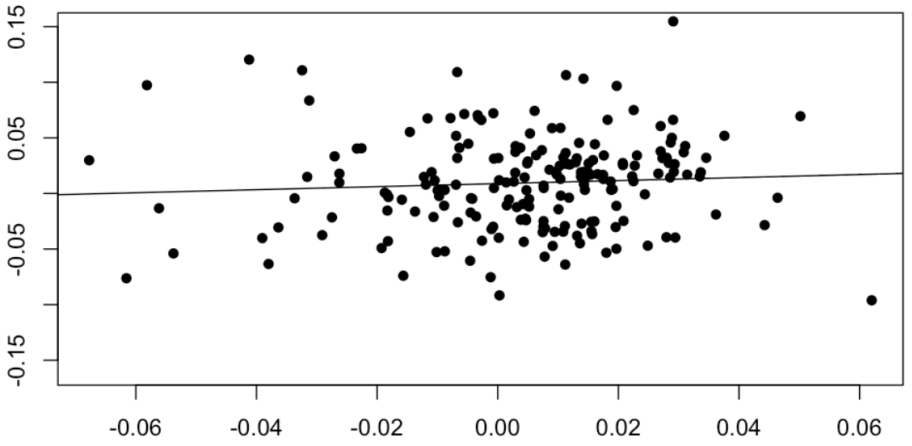
Appendix 4. Summary: Trending Value strategy (Large Stocks) minus market return regressed on market return, with a one month holding period



	Estimate	***Std. Error***	***t-statistic***	***p-value***
Intercept	0.0033	0.0024	1.3854	0.1675
Market Return	0.2718	0.0531	5.1141	0.0000

Notes: The table in Appendix 4 shows the summary of the regression made for the slope in the figure in Appendix 4. The "Intercept" refers to the return of the Trending Value strategy above the market that cannot be explained by changes in Market Return.

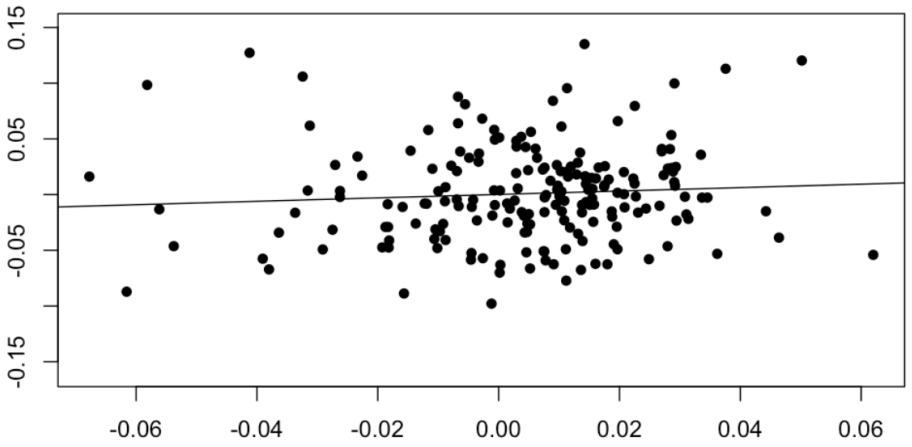
Appendix 5. Summary: Trending Value strategy (All Stocks) minus market return regressed on market return, with a six month holding period



	Estimate	*Std. Error*	*t-statistic*	*p-value*
Intercept	0.0089	0.0031	2.8872	0.0043
Market Return	0.1376	0.1464	0.9398	0.3485

Notes: The table in Appendix 5 shows the summary of the regression made for the slope in the figure Appendix 5. The "Intercept" refers to the return of the Trending Value strategy above the market that cannot be explained by changes in Market Return.

Appendix 6. Summary: Trending Value strategy (Large Stocks) minus market return regressed on market return, with a six month holding period



	Estimate	***Std. Error***	***t-statistic***	***p-value***
Intercept	0.0001	0.0032	0.0440	0.9650
Market Return	0.1539	0.1497	1.0277	0.3054

Notes: The table in Appendix 6 shows the summary of the regression made for the slope in the figure Appendix 6. The "Intercept" refers to the return of the Trending Value strategy above the market that cannot be explained by changes in Market Return.