Beating the market through dividend yields - Dogs of the Dow in the Swedish context

Master’s Thesis 30 credits
Department of Business Studies
Uppsala University
Spring Semester of 2016
Date of Submission: 2016-05-27

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Abstract

This paper investigates whether the Dogs of the Dow (or “Dow Dogs”) investment strategy is applicable to the Swedish stock market during the period 1996-2015. The strategy uses dividend yield as a way to identify undervalued stocks. Likely explanations to the strategy’s performance are contrasted between the Overreaction Hypothesis from the field of behavioral finance and the Efficient Market Hypothesis (EMH) from financial economics. The paper follows the original method formed by John Slatter, but is however extended by adding adjustments for risk, transaction costs and taxes to reflect a more realistic market setting. Our empirical findings suggest that the Dow Dogs strategy barely beats the market by 0.02 Sharpe ratio unit points. The strategy’s performance may be rather unimpressive, but it is interesting to acknowledge that the portfolio performed best during the market’s worst downturns. To conclude, our results lack statistical significance and we cannot reject the null hypothesis of no abnormal returns.

Keywords: Dogs of the Dow strategy, dividend investing, overreaction hypothesis, efficient market hypothesis, investment strategy, portfolio management.
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1. Introduction

Investors’ desire of beating the market has existed since the introduction of capital markets. Many investing strategies have since been introduced to the general public with varying popularity. The “Dogs of the Dow” is considered one of the most popular stock-picking strategies that has received much attention from practitioners, academics and financial press. The main advantage with the strategy lay in its simplicity; it does not require any fundamental or technical analysis. The strategy also forces investors to practice discipline in their investing, holding their positions in temporary downturns instead of liquidating or buying in too high in bull markets that they are later forced to sell as the market turns bear.

The Dogs of the Dow first appeared in The Wall Street Journal during the late 1980s. The founder of the strategy, John Slatter, at the time worked as an analyst with an investment firm in the New York area. Slatter found that the 10 highest dividend-yielding stocks listed on the Dow Jones Industrial Average Index (DJIA) outperformed the overall DJIA for the examined years; 1973 through 1988. Support for the strategy was acknowledged as it was popularized in investment books during the early 1990s by O’Higgins & Downes (1991) and Knowles And Petty (1992). The cornerstone of the strategy is to build a portfolio of stocks with the highest dividend yields from a given index. The strategy aims to identify temporarily undervalued large cap stocks. The stocks are valued by their dividends, which are assumed to remain, even though the stock price might fluctuate during business cycles. The 10 highest dividend-yielding stocks on the DJIA index from the portfolio with equal weightings at the last trading day of the calendar year. The portfolio is then held until the last trading day of the following calendar year, updated and rebalanced on an annual basis.

Like any other stock-picking strategy, it assumes market inefficiency. These strategies are in direct contradiction to the Efficient Market Hypothesis (EMH), stating that beating the market through trading strategies is impossible. Under this theory, all available information is reflected in the current stock price and markets are thereby referred to as efficient. An investor's ability to beat the market is seen as luck, instead successive price changes are explained by the random walk hypothesis (Fama, 1970). If markets truly are efficient, any portfolio strategy would be futile. The assumption of an efficient market received heavy criticism during the breakout of the financial crisis of 2007-08. Regulators of financial markets, such as Martin Wheatley, CEO of the Consumer Protection and Markets Authority, along with Adair turner, chairman of the Financial Services Authority, started questioning the reliance on rational investor behavior. Various researchers also scrutinize the EMH for being
disconnected from reality. (Cohen, 2012) The stock prices ability to fully reflect all available information is questioned by Gilson & Kraakman (1984). They argue that the high costs of; obtaining, processing and verifying the legitimacy of information limits the markets efficiency. For every market participant to acquire, understand and validate all relevant information in order to value each security is practically impossible. De Bondt and Thaler (1985) present findings from the field of behavioral finance, shedding an opportunistic view on portfolio strategies by exploiting the market inefficiency. According to their research, there is a psychological effect to unexpected and dramatic news events that causes investors to overreact.

The ability of the Dogs of the Dow strategy to capitalize on these events is debated. Slatter, along with his followers, believes that the strategy is able to identify stocks that have been subject to an overreaction through the dividend yields. Mark Hirschey (2000) however, finds that the strategy does not outperform the DJIA during the studied period 1961 through 1998. Research conducted with stocks listed outside the United States and the DJIA also question strategy’s ability to produce abnormal returns, where some studies prove the strategy successful and other deem its efforts inefficient (see, for example, O’Higgins & Downs, 1991; Knowles & Petty, 1992; McQueen et al., 1997; Filbeck and Visscher, 1997; Domian et al. 1998; Hirschey, 2000; Da Silva, 2001; Visscher & Filbeck, 2003; Ap Gwilym et al., 2005 and Rinne & Vähämäa, 2011).

With the varying results proclaimed by previous research, the strategy’s efficiency does seem to be contextual and the ability to replicate successful results in a different market is far from certain. The use of dividends as a predictor for stock returns has been studied previously with various methods. However, there is to our knowledge no prior research that has studied the performance of the Dogs of the Dow in a Swedish context, which is the aim of this study. This insight contributes to a better understanding of; (I) dividends predictability for future returns and (II) the Dogs of the Dow’s ability to produce abnormal returns through business cycles.

The remainder of the paper proceeds as follows. Section 2 covers related literature on the Dogs of the Dow investment strategy. Section 3 presents findings from prior research. Section 4 defines the data and presents the method and models used to test the performance of the Dogs of the Dow strategy. Section 5 presents the results on the performance evaluation of the strategy on the Swedish stock market. The paper ends with concluding remarks in section 6.
1. Does the Market Overreact?

Investment decisions are based on information presented in various forms, but the central question arise of what the appropriate reaction to information actually is. Research conducted in the area mainly explores two explanations. The supporters for the EMH ground their studies on Baye's rule, assuming that investor decisions are based on computing probabilities. However, contradicting research is presented from the field of behavioral finance, questioning investors’ rational decision-making. Kahneman and Tversky (1982) critically discuss Baye’s rule, claiming that investors behavior do not always rely on statistics, but rather simple heuristic shortcuts.

1.1 Evidence from Behavioral Finance

Kahneman and Tversky (1982) argue that investors make irrational decisions due to the lack of processing time and or resources to review all information available. Mental shortcuts known as heuristics are instead used in the decision making process. This mental shortcut is what Kahneman and Tversky (1982) call the representative heuristic, which violates the Baye’s principle of statistical predictability. J. M. Keynes (1936, p. 98) presents one of the first observations on market overreaction: “.. day-to-day fluctuations in the profits of examining investments, which are obviously of an ephemeral and no-significant character, tend to have an altogether excessive, and even an absurd, influence on the market”. Based on the work of Kahneman and Tversky (1982), Arrow (1982) concludes two important findings; the excess volatility of security prices and the so-called price earnings ratio anomaly. The excess volatility is extensively researched by Shiller (1979), concluding that dividends are not volatile enough to determine rational price observations. Kleidon (1981) complements Shiller’s findings with support for the overreaction hypothesis through finding strong correlation between stock price movements and the following year’s change in earnings. He thereby suggests that investors base their investment decision on short-run economic developments.

The price earnings (P/E) ratio anomaly observes larger risk-adjusted returns for stocks with very low P/E ratios than stocks with very high P/E ratios. Basu (1977) explains the anomaly based on investor overreaction, referring his findings as the “price-ratio” hypothesis. Companies with very low P/E’s are recognized as temporarily “undervalued” as a direct result of investors irrational behavior. The opposite is true for equity of companies with very high P/E’s, where investors are predicted to be too optimistic towards new information that
inflates the stock price to an “overvalued” level. Davis et al. (2000) conclude that the overreaction hypothesis applies to firms with other weak fundamentals, where companies with low price-book ratios and lower historical sales growth tend to produce higher rates of return and create value premiums.

De Bondt and Thaler’s (1985) first attempt to empirically test the predictive ability of the overreaction hypothesis is done by forming extreme “winner” and “losers” portfolios, where the stocks are selected from their past returns on the New York Stock Exchange (NYSE). They refer to it as the “winner-loser” effect. Their results are consistent with the overreaction hypothesis. With data ranging from 1926 through 1982, the loser portfolios consisting of 35 stocks outperform the market by an average of 19.6 percent three years after forming the portfolio. Interestingly, their research finds asymmetry in the overreaction effect, as the winner portfolio underperforms the market by about 5 percent. The average residual between the extreme portfolios cumulative return is measured at 24.6 percent.

1.2 Evidence from Financial Economists

Financial economists criticize theories from the behavioral science, arguing that it is more rational to assume that investors use historical data in decision making (Sandroni, 2005). Pricing models rely on the fact that investors act rational and maximize utility given the risk and potential profits from each decision. According to the EMH, investors who do not predict market movements perform worse and are thereby driven out of the market, unable to influence its movements (DeLong et al., 1990; Alchian, 1950; Sandroni, 2005). If this is true, the fluctuations of stock prices should not be considered as anomalies, but rather something the current models cannot yet explain.

A common argument among financial economists is that overreactions simply reflect a response to change in risk. Vermaelen and Verstringe (1986) and Chan (1986, 1987) provide some substance to this argument, stating that the decrease in stock prices results in a higher debt-equity ratio and risk as measured by CAPM betas. However, De Bondt and Thaler’s (1987) provide empirical findings that the overreaction cannot solely be attributed to change in risk according to CAPM betas. More specifically they show that the additional risk of the loser portfolio, as measured by CAPM betas is insufficient to explain overperformance. De Bondt and Thaler (1987) argue that the winner-loser effect is not primarily a small firm effect, where small firms tend to outperform larger companies. They show that the losers still outperform the winner portfolio after taking the value of the company's assets into
consideration. Fama and French (1992) and Davis et al. (2000), however, find that the higher return on value stocks is simply a compensation for additional risk. When taking size related factors such as market capitalization, book values and past sales growth into account, they claim that most of the abnormal returns can be explained by these factors.

1.3 Can Dividend Yields Predict Returns?

Value investors share the common belief of behavioral economists, that the market is assumed to overreact to new information. Overreactions lead to opportunities where the value investor can acquire stocks traded below intrinsic value. When estimating the correct price of a stock, the current assigned price is usually compared to an average price-to-book, earnings ratio or dividend yield. The predictiveness of these measures is debated and many financial economists argue that they simply reflect an efficient market where the price is adjusted according to risk.

Dividends are widely used to value stocks, where dividend valuation models such as the Gordon Growth Model (1962) is used to determine intrinsic values. The value of the stock is assumed to be the sum of the future dividends, discounted back to present value. For these models to be valid, the dividends have to grow at a constant rate, which usually does not reflect reality. Some evidence is, however, found in favor of dividends predictive power. Through regression analysis Fama and French (1988) find that dividends explain less than 5 percent of the monthly and quarterly returns, but can often explain more than 25 percent of the variation of stock returns on a two to four-year horizon. They argue that the discrepancy of the predictive power between the time periods relate to the expected earnings discounted into the dividend yield ratio. The long-term variance of expected returns, as measured by the dividend yield ratio, grows more relative to the time horizon. Furthermore, they add that dividend yield is a noisy proxy for expected returns, since it also reflects the expected dividend growth. Different expectations about future growth of dividends decrease the comparability of the dividend yields between different companies and time periods.

Contrasting to the findings of Fama and French (1988), Goetzman and Jorion (1993) find no statistically significant evidence indicating dividends ability to forecast stock returns. They argue that the method of previous studies fails to recognize the bias arising from a lagged dependent variable. In their study they conclude that the returns follow the random walk hypothesis, meaning random fluctuations. The followers of the EMH take a simpler explanation to the presumed lack of predictive power. They argue that dividend yields are
simply a reflection of other variables, such as interest rates and other market conditions. Their view is that high discount rates and expected return determines the stock price and vice versa, resulting in different dividend yields (Fama & French, 1988). Rozeff (1984) presents some evidence in favor of this, finding that dividend yield to the short-term interest rate explain a significant part of the stock returns.

2. Prior Research

In this chapter we summarize prior research of the Dow Dog strategy and their findings. We also discuss the differences in their methods and the potential effects of their results. We begin by presenting evidence in favor of the Dow Dogs. The following section discusses the findings of research taking a more skeptical approach towards the Dow Dog’s ability to beat the market. Lastly, we present research on markets outside the United States. Table 1 presents a brief overview of all previous research covered in this paper.

2.1 Support for the Dow Dogs

The first studies following Slatter's strategy confirm the claims for abnormal returns and give it more traction in the investment community. O’Higgins and Downes (1991) study show an average annual abnormal return of 6.18 percent from the Dow Dog strategy between the years 1973-1991. Abnormal returns are also shown in the study of Knowles and Petty (1992), who use a longer sample period of 1957 through 1990 and find an average annual abnormal return of 3.8 percent.

Following their research, Both O’Higgins and Downes (1991) and Knowles and Petty (1992) has contributed towards popularizing the strategy further by publishing investment books, where an investment guide accompanied their results on how to replicate the strategy. The investment books merely present the benefit of value investing in general without any explanations of the theoretical foundations behind such strategies. Domian et al. (1998) are the first who attempts to explain the overperformance of the Dow Dog strategy. The authors attribute the strategy's overperformance to the market overreaction hypothesis.

Domain et al. (1998) confirm the results of prior studies with an overperformance of 4.76 percent relative to the market. However, the performance of the strategy varies during the sample period, where their Dow Dogs portfolio underperform relative to the market after the financial crash in 1987. A possible explanation given by McQueen et al. (1997) is the concept of investor learning, where market anomalies may disappear, as the information
becomes widely known. Another possible explanation from Domian et al. (1998) is that the strategy may no longer be able to select true dogs. The dividend yield of the stocks selected after 1989 does not seem to be an accurate indicator of performance and thereby no room is given to exploit temporary overreactions. With such information at hand, the sample period from 1989 through 1995 is rather short and cannot be seen as proof for the failure of the strategy.

Domain et al. (1998), along with O’Higgins & Downes (1991) and Knowles & Petty (1992) present superior results in performance without risk adjustments. Following the method of De Bondt and Thaler (1987), Domian et al. (1998) argue that the winner-loser effect should not be seen as a change in risk, since investors risk taking cannot be measured accurately by measuring volatility through CAPM betas. De Bondt and Thaler (1987) also find that the winner-loser effect is not primarily related to the small cap effect, where overreactions tend to be greater among small firms. This is consistent with the results of Domian et al (1998), since all stocks included in the DJIA index are large cap companies.

2.2 Skepticism towards the Dow Dogs

Though several studies show the Dow Dog strategy to be successful, critics dismiss the methods as flawed and disconnected from the real world. The study by McQueen et al. (1997) reflects more realistic circumstances in the implementation of the Dow Dog strategy by accounting for transaction costs and taxes. McQueen’s research show that abnormal returns diminish after these adjustments. His research is often referred to by sceptics of the strategy.

The first explanation presented by the believers comes from the overreaction hypothesis, where the temporary overreactions are exploited. Hirschey (2000) claims to debunk such findings by opposing De Bondt and Thaler (1985, 1987), arguing that the value effect is another manifestation of the small cap effect. He states that the Dow Dogs cannot be affected by overreaction, since all stocks consist of large cap companies “that are generally associated with low risk. This means that the Dow Dogs cannot have excessively low valuations and would not be subject to any overreactions. According to Hirschey, it is incorrect to assume that superior performance by the Dow Dogs can be explained by the well-known value effect.
Critics also point out that risk associated with the Dow Dog strategy is not measured accurately enough. Domian et al. (1998) findings on the overperformance of the Dow Dogs is consistent with the overreaction hypothesis. Their results show regular and persistent patterns of abnormal return, denoting that traditional asset pricing models such as the Capital-Asset Pricing Model and Arbitrage Pricing Theory may be inaccurate. Applications of these traditional theories may underestimate the firm specific risk associated with value stocks. Davis et al. (2000) argue that superior rates of return is a reflection of greater risk that value stocks are associated with, rejecting any value effect anomaly. In other words, additional risk associated with value stocks are rewarded with higher average returns.

Many of the hypotheses to why the Dow Dogs are able to show abnormal returns in some studies stem from the collection and sampling of data. McQueen et al. (1997) show that the returns of the Dow Dogs exhibit a high variance and only overperform in 32 of the 50 years they study. Similar observations are made by Hirschey (2000), who along with McQueen et al. (1997) show that most of the overperformance is tied to the period post the 1970s financial crash. This could indicate that the perceived overperformance itself is a statistical oddity. Furthermore, Hirshey (2000) reveal that Slatter simply uses erroneous data in at least one instance. He also points out that previous studies use an arithmetic average for the annual returns, usually resulting in better performance compared to the use of geometric average when studying a volatile portfolio. This is due to the limitation of -100 percent downfall, while the upside is unlimited. If a portfolio’s value increases by 100 percent, but then decreases by 50 percent, the arithmetic average is still 25 percent even though no profit is made.

Another potential cause for differing results when analyzing investment strategies is the possibility of data snooping, as first pointed out by Merton (1987). The simplest explanation could be that researchers, who are testing different strategies at roughly the same time period, would eventually find a strategy that works. Hirschey (2000) believes that the effect of this could be amplified by the fact that statistically significant findings are more often published, while all other are discarded, leading to questionable robustness checks. When new research is based on patterns from prior studies, claimed to be regularities, an obvious risk for biases becomes apparent. The significance of the results from prior research are mostly evaluated by t-tests, assuming a normal distribution. Hirschey (2000) points out that 5 percent of the inconsequential variables have significant impact over large data samples, arguing that the robustness of prior research is doubtful.
2.3 International Findings

Research conducted outside the US (see, for example, Filbeck and Visscher, 1997; Da Silva, 2001; Visscher & Filbeck, 2003; Ap Gwilym et al., 2005 and Rinne & Vähämää, 2011) shows differing results and various conclusions. One of the first markets to receive attention from researchers was the United Kingdom. Filbeck and Visscher (1997) found that the Dow Dogs only outperform the market in 4 out of 14 years, both before and after risk adjustments, when benchmarked against the FTSE100 index. However, when Gwilym et al. (2005) selected the Dogs from the FT30, (an index that is considered to be similar to the DJIA) they show superior performance relative the market on an average basis between 1980-2001, after considering adjustments for transaction costs.

An evident difference that may affect the outcome of the studies on the UK market and the studies in the US lies in the indexes compositions. The FTSE100 index consists of 100 stocks from 31 industries where the DJIA and FT30 are considerably smaller with only 30 stocks representing 21 industries. Even after accounting for both transaction costs and taxes, Da Silva (2001) find that the Dow Dogs outperform the index in all the study’s markets except for Brazil during the sample period. The results are the same when risk adjustments are made. The time period for the study is however rather short and perhaps not enough to give an accurate evaluation of the strategy’s success. Positive results are also presented by Visscher & Filbeck (2003) in their later research on the Canadian market, and Rinne & Vähämää (2011) on the Finnish market. However, despite that the Dow Dog strategy initially beats the Finnish stock market, Rinne & Vähämää (2011) realizes the overperformance diminishes after applying taxes and transaction costs.

The applicability of the Dow Dog strategy is still an ongoing debate where the results are dependent on the markets, time periods and methods used. Support for the strategy mainly comes from the field of behavioral finance. From this perspective the overperformance of the Dow Dog strategy is accredited to irrational investor behavior, explained by the overreaction hypothesis. Financial economists are however skeptical, claiming that taxes, transaction costs and risk adjustments are necessary variables to fully evaluate the strategy’s performance. Skeptics’ instead argue for the EMH, which states that a higher return is associated with greater risk.
3. Data and Method

This chapter presents how we collect our data and our research method, along with a critical discussion around the choices we make. Aiming to achieve a high comparability with previous studies we try to deviate as little as possible in our method. We begin by presenting our data set and the method for constructing the Dow Dog portfolio. Having identified the portfolio constituents, we proceed with our performance measures of the portfolio. In the following sections we present the adjustments for risk, transaction costs and taxes. Lastly, we discuss the measuring of statistical significance and robustness testing of the research.

3.1 Data Set

Analyzing the Dogs of the Dow in a Swedish context provides an interesting perspective to analyze whether the strategy is applicable to other markets. However, differences can be observed between the DJIA and OMXS30 where the sample is extracted. This needs to be taken into consideration when interpreting the results. Both indexes consist of 30 publicly traded companies, but while OMXS30 consists of the most traded companies, the criteria for the DJIA are somewhat vague. To be included in the DJIA a company must be a large cap company and the leader of its industry. This could result in a different composition of the indexes, where certain sectors have heavier weightings.

The data range of previous Dow Dogs research that we discuss averages to about 16.5 years. To be able to accurately test variations in returns and decrease the risk of small sample bias we choose a study period of 20 years, i.e. 1995 to 2015. The sample period includes different business cycles and market conditions, which makes the analysis of the Dow Dogs’ performance even more interesting. The late nineties saw a bull market that ended with the peaked of the dot-com bubble in the year of 2000. The Stockholm Stock Exchange was heavily weighted in the IT-sector during these years, where Ericsson constituted about half of the total market capitalization. The two years following the dot-com bubble was characterized by a market recession where Ericsson lost 98 percent of its market value. However, when the trend was broken it turned into a bull market with high momentum. The trend lasted until 2007 when the financial crisis broke out and initiated a bear market that lasted for about one and a half year. After the trend bottomed, the market returned to a bull trend with steady gains each year until the end of our sample period in 2015.
The data of publicly traded Swedish firms are obtained from the Stockholm Stock Exchange (NASDAQ OMX Stockholm AB). Other data sources used in this study are obtained from the Swedish National Bank and Thomas Reuters Datastream (Datastream). Dividend yields and total return indices are extracted from Datastream. The extracted dividend yields are ranked from high to low. The ten highest yielding stocks are chosen on a yearly basis, forming what we refer to from this point and on as the “TOP10” portfolio.

From a portfolio theory perspective, an investor ought to be compensated for any risk taken in excess of the risk-free rate. The interest rate is extracted from the Swedish Riksbank. The 10-year government bond, one of the safest securities available to investors, represents the risk-free rate of return. There are both pros and cons to using a long-term interest rate. Bonds with shorter time to maturity can mitigate the country specific risk, but can also fluctuate more over a longer time period (Grinblatt & Titman, 2002). In this study, where the investment horizon is long-term and the strategy is characterized by low maintenance, we find a long-term interest rate appropriate. This is also consistent with previous research (see, for example, Rinne & Vähämäa, 2011).

3.2 Construction of the Dow Dog Portfolio

This thesis examines the most popular version of the Dow Dog investment strategy, replicating Slatter's original version, where the 10 highest yielding stocks out of the 30 stocks on the DJIA index are selected. The strategy is applied and executed on the Swedish OMXS30 index as follows:

**Step 1:** On the last trading day of the year, construct an equally weighted portfolio consisting of the 10 stocks with the highest dividend yield from the components of the OMXS30.

**Step 2:** Hold the portfolio for one year. Rebalance the portfolio on the anniversary date by calculating all dividends, share repurchases, cash distributions along with the closing values of the stocks. Stocks that no longer fulfill the criteria for the TOP10 yield bracket are replaced.

**Step 3:** Repeat the process each year.

The TOP10 Dogs portfolio is unmanaged for one year, however unforeseeable events might occur during the holding period, such as corporate buyouts or bankruptcy. In such extreme
cases, the proceeds are invested at the risk-free rate until the end of the year. The Dow Dog strategy ought to be a low cost investment and easily implemented by the average investor, which is why we chose to temporarily place any proceeds in the risk-free rate. In the situation of corporate spin-offs, i.e. a parent company decides to sell or distribute shares to create an independent firm of a division or existing business, they are recorded as if held from the time they were issued until the end of the year. Previous research does not specify how they deal with the situation where a company in the portfolio is delisted from the Stockholm Stock Exchange. Following the simplistic nature of the Dogs of the Dow strategy, we decide to invest the proceeds from delisted stocks in the risk-free rate for the rest of the holding period. This is also consistent with previous research (see, for example, Rinne & Vähämaa, 2011).

### 3.3 Portfolio Return

To be able to analyze the performance of the Dow Dog portfolio, the performance of each individual stock must first be identified. The return of each stock is measured by the total return index, assuming that all cash dividends are reinvested in the same stock when they are retained. The total return index is extracted from Datastream with the code RI.

As Hirschey (2000) points out, previous studies are criticized for relying on the cumulative returns when sanctioning the success of the Dow Dog strategy. Barber and Lyon (1996) explains that the cumulative return (CR) is a biased predictor of returns for a longer period, since it does not take compounding into consideration. Through their study they show that the differences of BHR and CR are predictable, where the CR tends to be biased upwards. If individual securities in the portfolio are more volatile than the market index, they show that the cumulative return is greater than the buy and hold return of the portfolio if the buy and hold return is less equal to zero. As the buy and hold return increases however, the difference approach zero and eventually turns negative.

We choose a buy-and-hold return (BHR) measurement when calculating the portfolio performance. This is also in line with previous studies (see, for example, Rinne & Vähämaa, 2011). The BHR presents the compounded returns for the whole study period from 1996 through 2015. The usage of the BHR measurement should however be used with caution. The effect of compounding through extreme events could easily distort the results to appear larger than they really are (McLean, 2012). Our studied period consists of two irregular events, namely the dot-com bubble that peaked in 2000 and the financial crisis of 2007-08. In these years, several large cap stocks’ values are reduced to a fraction of their price before the
crises. The effect of compounding through these years can potentially have a large influence over the portfolios’ returns through the whole study period.

3.4 Risk Adjustments

Given the limitations of portfolio diversification by only holding 10 stocks, firm specific events have a significant effect on the portfolio return. It is also possible that there is a high correlation between the the companies in the Dow Dog portfolio. Assuming a risk averse investor, it becomes necessary to adjust the abnormal returns for the risk taken. The returns for each individual stock are calculated through the total return index in Datastream, using natural logarithms to ensure the results being symmetric. Before applying risk adjustments to the Dow Dog portfolio we estimate its volatility, which is measured by the variance and defined as:

\[
\sigma^2_{p,t} = \sum_{n=1}^{N} 2 \times \text{cov}(r_{t,b} + r_{t,a})
\]

Where:

- \(\sigma^2_{p,t}\) = Variance of portfolio during year t
- \(w_{t,a}\) = Portfolio weight of stock a at beginning of year t
- \(\sigma_{t,a}\) = Standard deviation of stock j during year t
- \(r_{t,b}\) = Gross return for stock b during year t
- \(r_{t,a}\) = Gross return for stock a during year t
- \(\text{cov}(r_{t,b}, r_{t,a})\) = Covariance between monthly total returns of stock b and a, during year t.

The standard deviation is simply the square root of the variance. We also measure the volatility of the OMXSPI index during the holding period. The standard deviation represents the total risk, i.e. both systematic and unsystematic risk. There are however also drawbacks with the using standard deviation when measuring risk. The standard deviation is highly sensitive to outliers in the data set, which could significantly affect the value. Furthermore, measuring risk through standard deviation penalizes both positive and negative deviation of the returns, which might result in overestimating the risk. With a long-term perspective however, we argue that a higher standard deviation should be seen as a higher risk since returns should be distributed around the mean.
We use the standard deviation when calculating the Sharpe Ratio for both the market and TOP10 portfolio. The Sharpe ratio was introduced by William F. Sharpe (1994) and is often referred to as the reward-to-variability ratio. It measures the excess return after subtracting the risk-free rate for each unit of risk. Since the Sharpe ratio derives the risk measure from the standard deviation it is often preferred over the frequently used CAPM, which uses beta as a risk measure and only captures the systematic risk. Many of the prior studies use a risk measure based on the portfolio’s beta instead of the portfolio’s standard deviation (see Appendix II). This could potentially have affected their results by underestimating the portfolio’s risk. We calculate the Sharpe ratio for both the TOP10 and market portfolio on an annual basis. The Sharpe ratio risk adjusted return is expressed in unit points and is defined as:

\[
SR_{p,t} = \frac{R_{p,t} - R_{f,t}}{\sigma_{p,t}}
\]

Where:
- \(SR_{p,t}\) = Sharpe ratio of the portfolio during year \(t\)
- \(R_{p,t}\) = Return of the portfolio during year \(t\)
- \(R_{f,t}\) = Risk-free rate during year \(t\)
- \(\sigma_{p,t}\) = Standard deviation of the portfolio during year \(t\)

### 3.5 Transaction Costs

Once the values for risk adjusted return are identified, costs associated with the rebalancing of the portfolio can be subtracted. To calculate these, we compute the average annual turnover rate of the portfolio (3.89 stocks per year). We conservatively round this to an average turnover rate of 40 percent. Following the method of previous studies (see McQueen et al., 1997 and Rinne & Vähämaa, 2011), we assume 1 percent round-term transaction costs, resulting in a 0.40 percent penalty to the returns due to rebalancing of the portfolio.

To fully reflect transaction costs, we also calculate the annual penalty for the rebalancing of the dogs that are kept in the portfolio. The mean annual return of the portfolio is 14.15 percent (excluding dividends). If all stocks held in the portfolio increase by exactly that amount the portfolio would not need rebalancing. The mean annual return thereby
represents the highest possible rebalancing of the portfolio on an annual basis. We assume that the capital appreciation is distributed around the mean long-term. If half of the six retained stocks are rebalanced the minimum additional portfolio turnover rate would be 3.78 percent. We conservatively round this into an additional transaction cost penalty of 0.04 percent. Together with the transaction costs for the sale and purchase of new stocks, this results in a total penalty of 0.44 percent on the portfolio return. With the availability of index tracking mutual funds and ETFs with minimal fees, we do not subtract any transaction costs from the market portfolio returns.

3.6 Taxes

Lastly, we apply taxes to the risk adjusted returns of both the market and the TOP10 portfolio to better reflect the reality of an investor. The inclusion of taxes and transaction costs are in some studies the determining factor to whether the Dow Dogs achieves abnormal returns or not (see McQueen et al., 1997; Hirschey, 2000; Da Silva, 2001). The Swedish context could potentially be beneficial for value investors in Sweden due to the taxation model, where dividends are not taxed directly.

There have been three different types of accounts available for investors during the studied period, each with a different tax model. We choose to adjust for taxes according to the tax model of the investment savings account (ISA), introduced in 2012. The differences between the ISA and the second alternative, the endowment insurance (EA), are small. The only difference between the tax model of the ISA and the EA, is that the account value that the tax is based on is reviewed quarterly for the ISA and semi-annually for the KF. These two accounts have historically been superior to the last alternative, the securities account (SA), for a buy and hold strategy. This is due to the fact that the ISA and the EA are taxed on the account value, whereas the SA applies a 30 percent tax to the realized profits.

The tax model for the ISA is based on the Swedish “statslåneränta” (SLR), a one-year weighted average of five-year government bonds. The taxes for the TOP10 portfolio are paid on an annual basis according to the following formula:

\[
T_{ISA,t} = 0.3 \times SLR_t \times \left[ \frac{(AV_{1, t} + AV_{2, t} + AV_{3, t} + AV_{4, t})}{4} + D_t \right]
\]

(3)
Where:
$T_{ISA,t}$ = tax rate on ISA at the end of year $t$
$SLR_t$ = previous year’s statslåneränta the 30th of November
$AV_{x,t}$ = account value quarter $x$ year $t$
$D_t$ = deposits during the year $t$

When the Dow Dog portfolio is adjusted for risk according to the Sharpe ratio measure along with adjustments for taxes and transaction costs, we test the following hypothesis:

$H_0$ = The sample mean abnormal return of the Dow Dog portfolio is zero compared to the benchmark OMXSPI, i.e. the Dow Dog strategy has not yielded abnormal returns after subtracting transaction costs and taxes on a 20 year sample period.

$H_1$ = The Dow Dog strategy yields positive risk adjusted returns after subtracting transaction costs and taxes if held for 20 years.

### 3.7 Statistical Testing

Relying on only 20 years’ annual returns for our analysis, a concern for the reliability of the results could be raised. Instead of resorting to conventional parametric techniques, such as $t$-tests, we choose to perform a nonparametric hypothesis test. The benefit of using a nonparametric test is that it does not assume a Gaussian distribution and mitigates problems stemming from small sample biases. To test whether our results are significant or not, we perform a Wilcoxon signed-rank test, often referred to as the Wilcoxon test. Frank Wilcoxon introduced the Wilcoxon test in 1945. It can be used to compare two related samples and whether their populations mean rank differ. The test ranks each value in the samples relative to the other and thereby takes both the differences between the samples and the magnitude of them into account. It assumes that the data is paired and from the same population. The pairs must also be chosen randomly and independently.

After calculating the annual differences in the two data sets, consisting of the TOP10 and market portfolio, we rank the differences in an ascending order. The negative and
positive differences are then separated and summed, where the sum of the negative values provides us with the T-statistic:

\[ T = \sum (T-) \]

(4)

Where;

- \( T \) = T-statistic
- \( (T-) \) = Negative ranks

We test our hypothesis at the five percent significance level. This means that there is a five percent risk that we reject the null hypothesis even though the Dow Dogs do not yield abnormal returns.

4. Results

In the following chapter we present the results obtained from the Dow Dog strategy on the Swedish stock market. We begin by presenting the constituents and performance of the TOP10 portfolio and later proceed with the outcome of our adjustments for risk, transaction costs and taxes. Lastly, we discuss the statistical significance of our findings.

4.1 TOP10 Constituents Year by Year

Table 1 presents the complete constituent list of the ten stocks selected to the Dow Dog portfolio each year of the study period. Since the stocks are purchased at the last trading day of the previous year, the table shows the highest dividend yielding stocks from the previous year. Simply put, the stocks selected for the portfolio of 1996 are the stocks with the dividend highest yield in 1995-12-31. The dividend yield for all the constituents of the OMXS30 index is obtained with the code DY in Datastream.
The constituent list only shows the companies that have been part of the TOP10 portfolio at least one year. ‘X’ denotes the companies forming the TOP10 portfolio for each year. The table also shows the turnover of the stocks in the portfolio for each year, with an average turnover for the whole study period.

It can be observed that a high proportion of the stocks are kept in the portfolio for more than one year (3.8 stocks per year are replaced on average). The years of 2002 and 2010 particularly stand out as years with high turnover, 7 out of 10 stocks in the portfolio were replaced. We have also identified 4 stocks out of the total 43 companies that stand out for being part of the TOP10 portfolio during half of the study period or more (Nordea, SCA B, SEB A, SHB A and Skanska B). Our results are in line with Fama and French (1988) who find that dividends explain less than 5 percent of the returns on a short-term basis. Other studies found a higher turnover-rate. McQueen et al. (1997) replace 4.6 stocks on average while Rinne and Vähämaa (2011) replace 4.9 stocks on average. Our portfolio’s low average turnover-rate of merely 3.8 could indicate that the Dow Dog strategy may not accurately
select undervalued dogs on a yearly basis. These results can be related to Hirschey’s (2000) skepticism for the Dow Dogs strategy, suggesting that large cap companies are not subjected by overreaction due to their association with lower risk.

4.2 Portfolio Performance

![Figure 1 & Table 2. BHR Index year 1996 - 2015](image)

<table>
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<td>100</td>
</tr>
<tr>
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</table>

The returns have been calculated using buy and hold returns of the market (OMXSPI) and the TOP10 portfolio.

Figure 1 plots the compounded returns of the TOP10 portfolio and the OMXSPI market index from 1996 through 2015 without any adjustments for risk, transaction costs or taxes. The figure clearly shows that the TOP10 portfolio outperforms the market through the whole study period, with exception to the years of 1998 to 2001. The TOP10 portfolio leaped ahead of the market at two separate, abnormal events, namely the dot-com bubble in the year 2000 and the most recent financial crisis in 2007. The gap in compounded returns widened significantly in the recovery of these two abnormal events, suggesting that the TOP10 portfolio performs exceptionally well in the recovery phase from a market recession. Without risk adjustment, the TOP10 portfolio produced an alluring return 1,495 percent compared to the market return of 812 percent. The compound annual growth rate (CAGR) for the TOP10 portfolio is 14.85 percent, compared to 11.69 percent for the market. However, the TOP10 portfolio only beats the market in 10 out of twenty years. Considering the compounding
nature of BHR, abnormal events may have distorted the actual performance of the TOP10 portfolio.

In brief, monthly returns have demonstrated that the Dow Dog investment strategy outperformed the market index. An explanation may be that the selected undervalued stock is not able to regress to its fundamental value on a short-term basis. In other words, the results indicate that dividends may not be an accurate indication for future returns through as explained by the overreaction hypothesis. But how come the TOP10 portfolio overperforms the market if the overreaction hypothesis is faulty? And what is the reason for the significant overperformance by the TOP10 in the recovery phase after market recession? We have investigated these questions closer in the following sections by analyzing the TOP10 portfolio during market recession.

4.3 The Dow Dogs in Market Recession

Despite the cause for the two market downturns, the dividend yield seemingly identifies Dog stocks better during market downturns. This has also been the case in some prior research (see McQueen et al., 1997 and Hirschey, 2000). When the dot-com bubble culminated in year 2000 the constituents of the TOP10 portfolio had a low exposure to the IT-sector, with companies such as Skanska (construction and development), Holmen (pulp and paper industry) and Volvo (heavy equipment). The market however, was heavily affected by the bankruptcies of companies in the IT-sector, such as Framfab, DoBeDo and Icon Medialab. With the relatively stable and well performing companies in the TOP10 portfolio, both a higher return and lower standard deviation was observed during the peak of the crisis.

When the market continued its fall in 2001, the strategy continued to select low risk stocks that had been affected by the general market downturn. Electrolux, which invested in a project together with Ericsson to develop smart homes survived the turmoil and became one of the top performers of the portfolio with a return of 31.07 percent. In this case, it could be argued that the dividend yield was a successful indicator of a short-term overreaction, where the financially strong large cap company later recovered. The other stocks of the TOP10 portfolio however, such as SKF (manufacturing) and SCA offered investors a safe haven during turbulent times, with a steady rise in profits and dividends. SKF achieved a return of 48.49 percent and SCA 48.95 percent. The excess returns during the year thereby cannot be accredited to an overreaction in the selected stocks.
The financial crisis that spread globally in the second half of 2007 initiated a bear market that lasted for more than a year. The TOP10 portfolio performed significantly worse than the market in 2008 with a negative difference of 8.86 percent. The portfolio included three out of the four largest banks in Sweden, together making up 30 percent of the portfolio. The overperformance in 2009 can largely be attributed to the continued heavy exposure to banking sector in the TOP10 portfolio, where the portfolio added the last of the four largest banks (SEB). The collapse of the financial markets affected the banks to an extent that their operations were at stake, which was also affected in the stock values. To avoid risk of failure, a government program was formed with guarantees for financial support. Two out of the four banks utilized the guarantee offer, namely Swedbank and Nordea. SEB joined the program, but chose to recapitalize capital through a rights offering to their shareholders instead. All of the banks made a strong recovery during the year, with a mean return of 70.68 percent. Rozeff (1984) finds that a significant part of the dividend yields can be explained by the short-term interest rate. The financial crisis of 2008 was followed by rapidly falling interest rates, which could have made high dividend yielding equity seem more attractive. This could be seen as evidence in favor of the EMH, where the dividend yield is simply a reflection of other variables.

However, with only two market downturns during the study period, it is also hard to draw conclusions about the strategy’s ability to capitalize on similar events in the future. Furthermore, Domian et al. (1998) found the strategy to be underperforming after the 1987 financial crisis. McQueen (1997) argues that this could be due to the concept of investor learning, which could make future overperformance of the Dow Dogs in similar events even less likely. According to the EMH the answer to the why the Dow Dogs overperform can be found in the risk-return relationship. The high returns of the TOP10 portfolio might have been the result of significantly higher level of risk. To test whether this is accurate we continue with adjusting the returns for the risk.

4.4 Risk Adjustments

In this section we analyze whether the TOP10 portfolio still outperforms the market after adjusting for risk. The TOP10 portfolio continues to produce a higher mean return than the market portfolio after risk adjustments. The strategy produces higher returns than the market on average, but does so at an increased risk level. The mean standard deviation of the TOP10 portfolio that accounts for both systematic and unsystematic risk has been estimated 1.07
percent higher than the market. This is consistent with the EMH, where the only way an investor can obtain higher returns is through purchasing riskier investments. To compensate for the higher risk profile, the return of the TOP10 portfolio needs to exceed that of the market. Before risk adjustments the portfolio only produces abnormal returns in 10 out of 20 years, but after risk adjustments overperformance can only be observed in nine years. The portfolio performance relative to that of the market shows a Sharpe ratio of -0.39 in the negative years. In the nine years that it does overperform however, the mean difference is at a higher mean value of 0.56. The mean through the whole sample period does show a reward for the additional risk taken, with a positive difference of 0.04 unit points. This is inconsistent with the EMH, where an investor should not be able to consistently increase the Sharpe ratio above that of the market.

The two years with the highest overperformance for the TOP10 portfolio are found in the years of 2001 and 2014. The Dow Dog strategy performs exceptionally well after the market recession of 2000 after adjusting for risk. This is both due to a lower standard deviation than the market (1.27 percent lower in 2001) and a significantly higher return (30.19 percent higher in 2001). The stocks selected in the portfolio have a high standard deviation on an individual basis, but covariance among the selected stocks is seemingly low. The market portfolio is significantly more diversified; it also includes many non-large cap companies that are often associated with higher volatility. A key difference in the difference in both the difference in return and volatility is can be accredited exclusion of Ericsson in the TOP10 portfolio during the dot-com bubble in the year of 2000.

Though the mean standard deviation for the portfolio is close to that of the market, the limited possibilities for diversification in the TOP10 portfolio affected the risk level more in some years than in others. A high Sharpe ratio (2.12) can also be observed in 2009 after the market downturn in 2008. In this case however, the high market adjusted returns of 67.05 percent were the reason for the overperformance of the TOP10 portfolio. The standard deviation of the TOP10 portfolio was also higher (+19.64 percent), indicating a significantly higher level of risk. It should however be noted that most of the excess risk during this year stemmed from a positive volatility, which could have made the Sharpe measure overestimate the risk. The reasons for the overperformance in 2014 are less accredited to the reduction in risk, where the standard deviation was 2.88 percent higher than that of the market. If the years following the turmoil of the dot-com bubble and the financial crisis (2001 and 2009) are excluded the TOP10 portfolio’s mean Sharpe ratio is reduced to 1.02, only 0.02 unit points higher than that of the market. This gives ground to doubters of the strategy, where the
period’s high-risk adjusted returns could be a result of abnormal events and not the strategy’s ability finding undervalued stocks.

4.5 Adjustments for Transaction Costs and Taxes

In an effort to better reflect the market conditions of the Dow Dog strategy we subtract the penalty for transaction costs and taxes (presented in Table 3). When adjusting the risk adjusted returns for transaction costs and taxes the mean difference in Sharpe ratio is reduced from 0.04 to 0.01. If the extreme values of 2001 and 2009 were removed, the mean abnormal return would no longer exist. When removing these years from the sample, the mean of the TOP10 portfolio is reduced to 0.90 (0.94 for the market). This presents evidence in favor of the EMH, where an investor should not be able to beat the market systematically. This is also consistent with previous studies, where the abnormal returns have almost diminished or turned negative after adjusting for risk and transaction costs (see Da Silva, 2001; Visscher & Filbeck, 2003; Ap Gwilym et al., 2005 and Rinne & Vähämaa, 2011).

4.6 Statistical Testing

To assess our hypotheses, we statistically test the significance of our results by performing a Wilcoxon signed-rank test. Our hypothesis tests the Sharpe ratio after accounting for transaction costs and taxes, as formulated below. The results are presented in Table 3.

Transaction costs and taxes greatly reduces the excess returns of the TOP10 portfolio and with that their magnitude when the ranking is performed. Nevertheless, the test reveals a T-statistic of 107, greater than the critical value of 60. We cannot reject the null hypothesis at the 5 percent significance level. This is in line with several previous studies who have found abnormal returns, but lacked statistical significance (see, for example, Da Silva, 2001 and Domian et al., 1998). It is also consistent with the findings of Fama and French (1988) and Goetzman and Jorion (1993), who find no statistical significance for dividends predictive power on stock returns.
The table presents the Sharpe ratios of the TOP10 and the market portfolio for each year with the assigned ranks used in the Wilcoxon signed-rank test.

We have also included a table (Appendix I) summarizing the returns, standard deviations and Sharpe ratios of the TOP10 portfolio and market year by year.

5. Conclusions

In this thesis we have examined the investment strategy Dogs of the Dow in a Swedish context. We first analyzed the strategy’s performance by benchmarking it against the performance of the broader market index OMXSPI. TOP10 portfolio produced an astonishing 684 percent market adjusted return. Interestingly, the market adjusted return for the whole study period was largely dependent on the returns following the market downturns of the years of 2000 and 2008. In the year of 2009 the portfolio experienced the highest annual return of 119.56 percent, but the risk in these years was also higher.

Having assumed a risk averse investor, we adjusted the TOP10 and the market portfolio through the Sharpe ratio. We also adjusted the returns for transaction costs and taxes. This was done to better reflect realistic market conditions. These adjustments diminished most of the abnormal returns produced by the TOP10 portfolio, leaving a modest overperformance in Sharpe ratio of 0.02 unit points.
Our findings are consistent with prior research that has adjusted for risk, transaction costs and taxes, resulting in negative or diminished abnormal returns. Furthermore, the overperformance found in this study lacks statistical significance and we cannot conclude that the strategy will outperform the market in the future. Ultimately we cannot confirm that the Dogs of the Dow successfully exploit overreactions in the stock market and the EMH cannot be denounced.
References


Appendix

### Appendix I. Summary of results

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<th>Return OMXSPI</th>
<th>Return TOP10</th>
<th>Return MA</th>
<th>σ_OMXSPI</th>
<th>σ_TOP10</th>
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Number of observations: 20
Number of positive years: 14
Tax and transaction cost-adjusted return: 0.140

Appendix I presents the performance of the market and TOP10 portfolio before risk along with their standard deviation and Sharpe ratios through the sample period. The table also presents the risk-free rate of return for each year.
### Appendix II. Results and adjustments for prominent Dow Dogs researchers

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Market</th>
<th>Sample period</th>
<th>DoD return (%)</th>
<th>Market return</th>
<th>Market-adjusted</th>
<th>Adjustments for</th>
<th>Adjustments for</th>
<th>Risk adjusted</th>
<th>Overperformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slatter (Dorfman, 1988)</td>
<td>US</td>
<td>1972–1988</td>
<td>18.39</td>
<td>10.80</td>
<td>7.59</td>
<td>No</td>
<td>No</td>
<td>No</td>
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</tr>
<tr>
<td>McQueen, Filbeck and Visscher (1997)</td>
<td>US</td>
<td>1946–1995</td>
<td>16.77</td>
<td>13.71</td>
<td>3.06</td>
<td>Yes</td>
<td>No</td>
<td>S.D., Sharpe</td>
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</tr>
<tr>
<td>Domian, Louton, Hirschey (2000)</td>
<td>US</td>
<td>1964–1997</td>
<td>16.06</td>
<td>10.91</td>
<td>4.76</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Da Silva (2001)</td>
<td>Argentina</td>
<td>1994–1999</td>
<td>2.32</td>
<td>1.66</td>
<td>0.66</td>
<td>Yes</td>
<td>Yes</td>
<td>S.D., Sharpe</td>
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</tr>
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<td>Brazil</td>
<td>1994–1999</td>
<td>4.64</td>
<td>8.90</td>
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<td>Yes</td>
<td>S.D., Sharpe</td>
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<td>Chile</td>
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<td>1.21</td>
<td>3.09</td>
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<td>Colombia</td>
<td>1994–1999</td>
<td>−0.83</td>
<td>−1.39</td>
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<td>3.05</td>
<td>1.25</td>
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<td>Yes</td>
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</tr>
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<td>Finland</td>
<td>1988–2008</td>
<td>15.5</td>
<td>11</td>
<td>4.50</td>
<td>Yes</td>
<td>Yes</td>
<td>Sharpe, Treynor, Fama-french</td>
<td>No</td>
</tr>
</tbody>
</table>

Appendix II presents a selection of prominent studies of the Dogs of the Dow investment strategy on different markets and time periods. The table presents the adjustments made to the portfolio's return and whether it overperformed the market portfolio or not.