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HIGH DIVIDEND YIELD AS INVESTMENT STRATEGY

AN EMPERICAL STUDY OF THE NORDIC OMX STOCK EXCHANGES

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ABSTRACT
The aim of this thesis is to investigate whether an investment strategy, Dogs of the Dow, is applicable to the Nordic Region. The strategy uses dividend yield as a signaling effect to produce excess returns. Using the same methodology as previous research, in terms of construction and risk adjustments, we find some support for the strategy. However, we continue our research by expanding the CAPM model to account for size and value risk. We also claim that high dividend yielding stocks have a tax based disadvantage compared to other stocks. Eventually, we conclude that while the strategy produces high returns on an absolute basis we can ultimately not reject the null hypothesis of no abnormal returns. Interesting to acknowledge is that our thesis differs from previous research, taking on far more extensive risk adjustment methodology.

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1. Introduction

The desire to outperform the markets has attracted investors throughout time. One of the many strategies put forward is the "Dogs of the Dow", first proposed by John Slatter (1988) in an article published in The Wall Street Journal during the late 1980's. The strategy was later baptised by Knowles and Petty (1992) and O'Higgins and Downes (1992) who wrote books supporting the strategy. The keystone of this tactic is to buy stocks with high dividend yields, thus stocks which are paying a high dividend in relation to their stock price. The initial findings, based on the high dividend yielding stocks picked from the 30 Dow Industrials in the period 1978-88, found that these significantly outperformed the Dow Jones Industrial Average (DJIA) during the observed 10-year period. In later years this strategy has been tested in Latin America (André L.C. Da Silva, 2001) and Canada (Visscher and Filbeck, 2003) giving rather encouraging results.

In the early 1990's this strategy was studied by several major brokerage firms, among them Merrill Lynch, Prudential Securities and Dean Witter which all produced further empirical evidence supporting the phenomenon. Encouraged by the optimistic findings several of these investment banks, including Merrill Lynch, sponsored a unit investment trust (UIT) called the "Defined Asset Fund Selected Ten Portfolio" which brought the strategy to the market. In a UIT prospect produced by Prudential Securities in 1993 the strategy was shown to have produced a 16.06%[1] average annual return compared to 10.91% for the DJIA (Dale L. Domain et al., 1998).

The aim of this paper is manifold. Firstly, we present prior research followed by section three which describes our data set and methodology. Section four presents our results and implements various risk adjustment approaches. In order to investigate the "Dogs of the Dow" in practice we do a "mini case" in cooperation with Handelsbanken Capital Markets, presented in section five. In section six we aim to further explain our results by implementing taxes and transaction effects. Furthermore, we examine whether a particular financial psychology phenomena can help explain our findings. Finally, we present our conclusions in section seven.

[1] Assuming total returns were reinvested and without adjustments for taxes and transaction costs.

2. Prior Research

Johan Slatter, the initial founder of the "Dogs of the Dow", and his strategy has attracted the attention of researchers during the beginning of the 21st century. The "Dogs of the Dow" strategy has been tested in Latin America and Canada, both studies with similar results. André L.C. Da Silva's (2001) results suggest that the "Dogs of the Dow" strategy could add some value on an absolute and risk adjusted basis when applied to a number of Latin American Stock Markets.[2] The same results where obtained by Visscher and Filbeck (2003) as they applied the strategy on the Toronto 35 which consists of Canada's largest corporations from a number of different industries. In terms of risk adjustment both these studies used the Treynor and the Sharpe ratio to adjust for holding an undiversified portfolio.

Domain, Louton and Mossman (1998) examined connections among past performance, dividend yields and future returns during 1964 through 1997. Their underlying hypothesis was that of a market overreaction behaviour, such that investors "overreact" to surprises extends to the way stock prices are determined. The portfolio was constructed in line with the "Dogs of the Dow" strategy, using S&P 500 as benchmark index. Their results demonstrate that systematic nonzero residual return behaviour in the twelve-month period after portfolio construction is associated with systematic residual returns in the twelve month preformation period, proving the market overreaction hypothesis.

Research on the UK market has been conducted and published by Ap Gwilym, Seaton and Thomas (2003) where they found that stocks with high dividend yield outperform the FT 30, FTSE 100 and FTSE 250. However, when adjusting for excess risk and transaction costs the strategy did not prove superior.

There has also been extensive research conducted to establish whether dividend yields can be a predictor for future stock returns. Rozeff (1984) found that the ratio of dividend yield to the short-term interest rate helps explains future stock performance, thus rejecting the random walk hypothesis of stock prices. Similarly, Fama and French (1988) show that dividend yield helps predict multiple year returns when analyzing the New York Stock Exchange. More contributions have been published supporting the phenomenon of dividend yield as a good proxy for future returns. However, contradictory Goetzmann and Jorion's (1993) paper "Testing the Predictive

[2] Except for Brazil where the "Dogs of the Dow" strategy did not produce excess returns.

Power of Dividend Yields" tests the null hypothesis of no forecasting ability. The U.S. market and U.K market is analyzed over a 121-year time period. The authors could not reject the null hypothesis, hence concluding that there is no strong evidence supporting dividend yields as a stock return predictor.

3. Data & Methodology

In this section we go through the actual steps of the "Dogs of the Dow" strategy, describe the data set and explain the different statistical tests used when testing the results applied to the Nordic markets.

3.1 Fundamental methodology

The "Dogs of the Dow" strategy has been tested using several different versions, i.e. applying the strategy to different dividend criteria and samples. We choose to apply the most frequent and popular method, whereby we select the ten highest dividend yielding stocks from a large cap index. The strategy will be applied and executed for a combined Nordic index as follows;

Step 1: Construct an equally weighted portfolio consisting of the ten stocks yielding the highest dividend on 31st December, selected from a combined Nordic index.

Step 2: Hold the portfolio for one year. On the anniversary date, calculate the total return including all dividends, cash distributions, share repurchase and closing value of the stocks. Thereafter, rebalance the portfolio so that once again it is equally weighted, holding 10% in each. Those stocks that no longer fulfil the top ten dividend yield criteria will be replaced.

Step 3: Repeat the process each year.

The strategy is straightforward and the basic results should be simple to intuitively interpret. However, from a portfolio theory standpoint we can not end here. The consequence of holding a less diversified portfolio generally means greater risk and we make the reasonable assumption of

risk averse investors.[3] Therefore, in order to properly evaluate our results the strategy's performance ought to be risk adjusted.

For sake of simplicity, we initially disregard all tax effects and transaction costs. One can also argue that since our benchmarks are indices, which by definition disregards the above mentioned effects, this seems like the most pragmatic choice. Nevertheless, in the later sections this assumption is relieved to study any potential effects.

3.2 Data Set

OMX Group is by far the leading operator of securities exchange in the Nordic region. OMX owns the Stockholm, Copenhagen and Helsinki stock exchange, which are our underlying exchanges. More precisely, we will study the OMXS30, OMXC20 and OMXH25 indices which constitute the most actively traded stocks on the Stockholm, Copenhagen and Helsinki Exchange, respectively. The three indices will be aggregated to illustrate a theoretical Nordic index, whereby we can rank and select the top ten Nordic dividend yielding stocks. The reason for performing the "Dogs of the Dow" on a Nordic level is based on an assumption that each Nordic market, standalone, is to small to effectively test the investment strategy. We fear that the turnover of companies included in the "Dogs of the Dow" portfolio would be too low, hence, solved by increasing the data from which stocks are selected. Also, certain industries such as banks and insurance companies have historically high dividend yields. Therefore, by increasing the data and creating a larger theoretical Nordic index we are confident that we are creating more dynamic portfolios with higher turnover in terms of companies included year by year.

To avoid survival bias, account for mergers and other skewing effects we have used historical constituent lists over the examined period[4] provided by the OMX Group. In other words we have researched which companies were forming each of the three indices, each year. This work alone involves 1050 company observations.

Dividend yields[5] have been extracted from DataStream[6] thereafter ranked accordingly to select the top ten dividend yielding stocks each year. From this point and on, we refer to this yearly

[3] Hence, investors require higher returns for taking on more risk.
[4] Between 1992 and 2005.
[5] The dividend yield expresses the dividend per share as a percentage of the share price.
[6] Thompson Financials' DataStream.

rebalanced portfolio as the "Top10 Portfolio". Annual total returns for each of the current "Top10" stocks have also been extracted from DataStream.

The compensation for bearing risk is the required return in excess of the risk free rate.[7] The 10-year government bond will represent the risk free rate of return, in accordance with prior research. The interest rates have been collected from the Swedish Riksbank, Danish Nationalbanken and Bank of Finland, thereafter weighted to form an average Nordic 10-year government bond. The theoretical 10-year government bond for the Nordic region has been weighted with the market capitalisation of each countries OMX index. Detailed explanation of the weighting will be covered in a later section[8].

During the examined time period the Nordic region has experienced a steady decrease in the risk free interest rate. This is especially noticeable in the early nineties when the monetary policy went through changes creating independent "national banks". Presented below are the historical interest rates for each country as well as the weighted Nordic Interest rate.

Figure 1. Yields on 10-year government bonds

	Denmark	Sweden	Finland	Weighted
1992	8,99%	10,05%	12,05%	9,98%
1993	7,28%	8,52%	8,57%	8,09%
1994	7,85%	9,58%	9,07%	9,01%
1995	8,27%	10,28%	8,79%	9,34%
1996	7,19%	8,04%	7,02%	7,59%
1997	6,26%	6,61%	5,93%	6,38%
1998	5,03%	5,00%	4,78%	4,95%
1999	4,94%	4,99%	4,73%	4,89%
2000	5,66%	5,36%	5,47%	5,43%
2001	5,09%	5,10%	5,05%	5,08%
2002	5,05%	5,29%	4,97%	5,15%
2003	4,31%	4,63%	4,13%	4,38%
2004	4,30%	4,41%	4,12%	4,29%
2005	3,40%	3,37%	3,35%	3,37%

Source: Nationalbanken (DK), Riksbanken (SWE), Bank of Finland (FI).

[7] Assuming the Capital Asset Pricing Model.
[8] Section 3.3.2 Weighting the Benchmark.

3.3 Comprehensive methodology

3.3.1 Forming Portfolios and Measuring Results

Having identified the top ten dividend yielding stocks, i.e. the stocks forming our portfolio, we need a measure of their individual total performance during the holding period. We use the measurement "total return index"[9] provided by DataStream and defined in the figure below;

$$RI_t = RI_{t-1} * \frac{PI_t}{PI_{t-1}} * \left(1 + \frac{DY_t}{100} * \frac{1}{N}\right)$$

where:
RI_t = Gross return index day t
RI_{t-1} = Gross return index previous day
PI_t = Price index day t
PI_{t-1} = Price index previous day
DY_t = Yearly dividend yield expressed in as a percentage figure
N = Number of days per year, same as number of trading days.

This illustrate a theoretical growth in value of a stock held over a specified period, assuming that dividends are re-invested to purchase additional units of the same equity at the closing price applicable on the ex-dividend date. All data is extracted from and adjusted by DataStream, as described above. The total gross returns are measured on a yearly basis and weighted by one 10^{th} each forming our Top10 Portfolio return.

3.3.2 Weighting the Benchmark

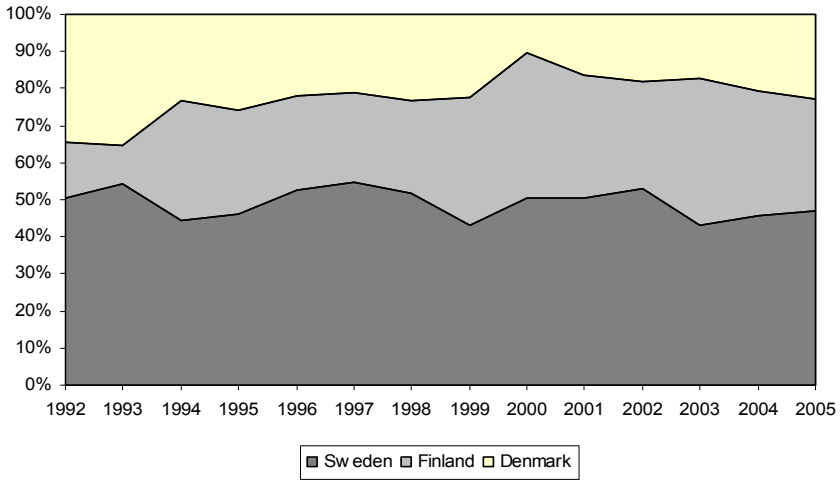
The benchmark has been constructed using the same three OMX Nordic indices mentioned throughout the thesis.[10] Our intention has been to create a benchmark which would mimic a theoretical OMX Nordic index. Hence, we want an index containing all companies from OMXS30, OMXH25 and OMXC20, resulting in 75 companies. The theoretical Nordic index is each year weighted according to the market capitalization of the underlying OMX indices. Explicitly, we extract the market capitalization for each company 31st December each year, for each index.[11] After adjusting the market capitalizations for currency differences we obtain the

[9] Note that this is simply an indexation of each stocks performance. Thus, it should not be confused with any other index used in this thesis.
[10] OMXS30, OMXH25 and OMXC20
[11] In order to avoid survival bias historical constituent lists have been used. These have been collected from the respective country's OMX Group office.

total market value[12] of each Nordic index in SEK. This approach enabled us to build an index capturing the volatility and returns of the most traded Nordic companies, while still paying respect to market values. Throughout the thesis this weighted theoretical OMX Nordic index will be used as the benchmark index, referred to as the "Nordic75 Index". The calculated adjusted country weights for each year are presented in figure 2 below;

Figure 2. Weights of each country's OMX index used to create the Nordic75 Index

	Sweden	Finland	Denmark
1992	50%	15%	35%
1993	54%	10%	35%
1994	44%	32%	23%
1995	46%	28%	26%
1996	52%	26%	22%
1997	55%	24%	21%
1998	52%	25%	23%
1999	43%	34%	22%
2000	50%	39%	10%
2001	50%	33%	16%
2002	53%	29%	18%
2003	43%	40%	17%
2004	46%	33%	21%
2005	47%	30%	23%



Note: For sake of simplicity the presented weights has been round to integers, causing the weights in the table to occasionally sum to only 99%. Naturally the exact figures have been used in all subsequent calculations.

3.3.3 Currency Adjustments

Since both the benchmark Nordic75 Index and the Top10 Portfolio consist of stocks originating from different countries they will be subject to currency changes. To adjust for this matter all returns have been translated to SEK. The difference between translating and not translating the returns into one uniform currency has no significant effect on the final joint returns.[13]

[12] Due to minor limitation in data availability in the early years of our sample period, we have been forced to substitute a few companies' market values. This has been done by using an average of the company's respective country OMX index. In other words, the average of the index without the missing observations is multiplied with the number of companies which should make up the index. The purpose of this adjustment is to get as close as possible to a true market valuation for each country index.

[13] We have done test calculations without adjusting the returns and the differences are fairly small. However, the correct approach is to adjust the returns hence we adjust.

3.3.4 Risk Adjustments Components

Given our assumption of risk averse investors, i.e. investors require return for bearing risk, we need to adjust for some kind of risk factor. Initially, we can worry about holding a less diversified portfolio with characteristics that might lead to a high correlation among the companies. This would result in a lower diversification effect compared to holding more companies. The variance of the Top10 Portfolio during year *i* is;

$$\sigma^2_{Portfolio,t} = \sum_{n=1}^{N} w^2_{t,j}\sigma^2_{t,j} + \sum_{n=1}^{N} 2 \times \text{cov}(r_{t,k}, r_{t,j})$$

where;
w_{ij} = Portfolio weight of stock j during beginning of year t
σ_{tj} = Standard deviation of stock j during year t
r_{tk} = Gross return for stock k during year t
r_{tj} = Gross return for stock j during year t
$\text{cov}(r_{t,k}, r_{t,j})$ = Covariance between monthly total returns of stock k and j, during year i.

During each 12 month holding period volatility is also measured for the Nordic75 Index.

To compare the Top10 Portfolios against the benchmark Nordic75 Index we use two common risk adjustment measures, Sharpe and Treynor. Sharpe represents excess return ($r_{p,t} - r_{f,t}$)[14] per unit of total risk ($\sigma_{p,t}$)[15], which is the appropriate tool for comparing less diversified portfolios that contain more company specific risk. Treynor ratio uses systematic risk, measured by beta ($\beta_{p,t}$)[16], which disregards any company specific risk and only rewards bearing systematic risk, hence appropriate for well diversified portfolios. Beta is the "correlation coefficient" between the Top10 Portfolio and the Nordic75 Index estimated over each of the 12 month holding periods. The explicit formulas for the Sharpe and Treynor measurements are presented below;

$$Sharpe = \frac{(r_{pt} - r_{ft})}{\sigma_{pt}} \qquad Treynor = \frac{(r_{pt} - r_{ft})}{\beta_{pt}}$$

[14] $r_{p,t}$ represents the total return for the Top10 Portfolio in year t.
$r_{f,t}$ represents the risk free interest rate (10 year government bonds) for year t.
[15] $\sigma_{p,t}$ represents the standard deviation of the Top10 Portfolio in year t.
[16] $\beta_{p,t}$ represents the beta of the Top10 Portfolio in year t. Based on monthly total returns and estimated over the 12 month holding period.

3.4 Statistical tests

3.4.1 Wilcoxon Signed Rank Test - Assessment of Sharpe & Treynor

In order to add statistical support to our evaluation of whether the Top10 Portfolio or the Nordic75 Index has the highest Sharpe, we turn to a nonparametric rank test. The reason for using this type of test is that we have few observations[17]. We are testing whether there are significant differences in the Sharpe and Treynor when comparing the Top10 Portfolio against the Nordic75 Index. Explicitly we test if there is statistical support of the risk adjusted Top10 Portfolio outperforming the Nordic75 on an aggregated level.

We have decided to apply the Wilcoxon Signed Rank Test to test the difference in Sharpe between the Top10 Portfolio and the Nordic75 Index over the whole sample period. Explicitly we test;

$$H_0: \ Sharpe_{Top10} = Sharpe_{Nordic75}$$

$$H_1: \ Sharpe_{Top10} \neq Sharpe_{Nordic75}$$

This test provides a method to incorporate information about the magnitude of the differences between matched pairs.[18] Moreover, the Wilcoxon Signed Rank Test is a distribution-free test, with low demands on the sample size. Like the name suggests, it is based on ranks.

We calculate the difference in the Sharpe between the Top10 Portfolio and the Nordic75 Index each year. Next, we rank these differences in ascending order and assign the rank 1, 2, 3… etc to each of the observations. The sums of the ranks corresponding to positive and negative differences are calculated and the smaller of these sums is the Wilcoxon Signed Rank Statistic T;

$$T = min(T_+ , T_-)$$

Where;

T_+ = the sum of positive ranks

T_- = the sum of negative ranks

The exact same procedure is then repeated to test the difference in Treynor. It should be noted that when the sample size is small[19], one might suspected that the test becomes less powerful.

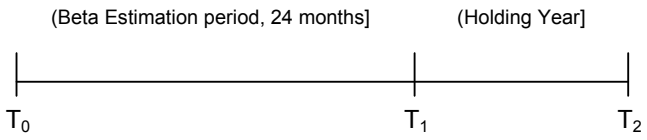
[17] N=14 since we are testing the Winner/Loser table in figure 6 (presented in section 4.2; Performance).

[18] In our case each year presents a matched pair, comparing the Top10 Portfolio's Sharpe with the Nordic75 Index's.

3.4.2 Statistical Test for Abnormal Returns – Assessment of the Top10 Portfolio

The difference between the actual return and the required rate of return is called the abnormal return. In our case; the abnormal return is the actual ex post return of the Top10 Portfolio over the holding year minus the estimated required return. We chose to assume the CAPM, whereby we can obtain the risk attributed return using beta, given an efficient market. This approach is commonly referred to as a market model, which uses a stable linear relationship between market return and security return. We perform the statistical test for a ten year holding period, hence testing if our strategy yields abnormal returns when holding ten years. Throughout the thesis we have studied the period 1992-2005, however the data for the early years limit the estimation of beta coefficients. The reason is that we need data prior to evaluating the first yearly Top10 Portfolio. Moreover, the abnormal returns' sensitivity to assumptions regarding beta estimations leads us to only test a period that includes all data for the needed parameters. The beta coefficient is estimated using an estimation window of 24 monthly observed returns prior to the 12 month holding period. The method is also described in figure 3 below;

Figure 3. Beta estimation period in relation to holding time



T_0 is 24 months prior to investing in the Top10 Portfolio and T_1 is the end of estimation and start of observation of potential abnormal return. Between T_0 and T_1 we calculate the logged first differences for the portfolio consisting of the "future" Top10 stocks and for the Nordic75 Index. The reason for using logged returns instead of plain returns during the beta estimation period is to eliminate skewness.[20] Thereafter, we apply the ordinary least square (OLS), which is a consistent procedure for obtaining the market model, modelled as;

[19] In our case n=14, which could be considered fairly small. However, this test can be performed on even smaller sample.

[20] To further explain this phenomena consider the following example: The initial price of a stock is 10. The stock moves up 50% and thereafter down 70%, ending at a price of 4.5. If we flip the movements to up 70% and thereafter down 50% we get a different share price, 8.5. Hence, plain returns could skew our beta estimation. However, using

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

where:

β_i = Beta coefficient for Top10 Portfolio *i* against Nordic75 Index.

μ_i = Top10 Portfolio average logged excess return (r_i-r_f) during the 24 months estimation window.

μ_m = Nordic75 average logged excess return (r_m-r_f) during the 24 months estimation window.

$R_{i\tau}$ = Logged excess return (r_i-r_f) on Top10 Portfolio *i* year τ.

$R_{m\tau}$ = Logged excess return (r_m-r_f) on Top10 Portfolio *m* year τ.

With the disturbance variance;

$$\hat{\sigma}^2_{\varepsilon_i} = \frac{1}{L_1 - 2}\sum_{\tau=T_0+1}^{T_1}(r_{i\tau} - (r_f + \beta_i R_{m\tau}))^2$$

where;

L_1 = Length of Beta estimation period in months.

For each Top10 Portfolio the abnormal return is;

$$AR_{i\tau} = r_{i\tau} - r_f - \beta_i R_{m\tau}$$

Where $AR_{i\tau}$, $r_{i\tau}$ and ($r_{i\tau}$-r_f-$\beta_i R_{m\tau}$) are the abnormal, actual and estimated portfolio return, respectively. The abnormal return is calculated for each Top10 portfolio.

Thereafter we calculate the average of the yearly abnormal returns, referred to as the sample average aggregated abnormal return;

$$\overline{AR}_\tau = \frac{1}{N}\sum_{i=1}^{N} AR_{i\tau}$$

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logged returns we eliminate the "switched order affect". Before choosing this methodology we also estimated the beta using plain returns and the difference between the two methods proved to be very small. After consulting with a former colleague, Puneet Singh, at Bear Stearns' Quant Team in London we chose the logged methodology. Moreover, in the holding period plain returns have been used in line with CAPM theory.

With the variance;

$$VAR(\overline{AR}_\tau) = \frac{1}{N^2}\sum_{i=1}^{N}\sigma_{\varepsilon i}$$

We test the following hypothesis;

H_0 = The sample average aggregated abnormal return of the Top10 Portfolio is zero i.e. no risk adjusted abnormal return compared to benchmark Nordic75 index.

H_1 = Abnormal return for the Top10 Portfolio if holding 10 years.

If assuming that the sample average aggregated abnormal return is zero (under H_0), the distribution of the sample average abnormal return becomes normally distributed;

$$\overline{AR}_\tau \sim N\left[0, \text{var}(\overline{AR}_\tau)\right]$$

Under the normal distribution we test the statistical significance using the t-test, with the null hypothesis of no abnormal return.

$$t = \frac{\overline{AR}_\tau - 0}{\text{var}(\overline{AR}_\tau)^{1/2}} \sim N[0,1]$$

A rejection of the null hypothesis would indicate that the portfolios have outperformed the benchmark index on a risk adjusted basis.

3.5 Fama French Three Factor Model

An alternative to using CAPM is to regress and estimate a multiple factor model. The rational is that there are infinite number of factors that constitute risk for companies, hence including more factors might be further descriptive and helpful as a predictor. Fama and French (1992) find that

factors describing "value" and "size" to be the most significant factors, outside of market risk, for explaining realized returns. Fama and French define two factors; Small Minus Big (SMB) and High Minus Low (HML), addressing size risk and value risk respectively.

The SMB accounts for the size premium to investors for holding companies with relatively small market capitalisation. Small cap companies can be assumed to be more sensitive to several risk factors, due to their undiversified nature and their lesser ability to withstand negative financial events. The SMB is calculated by the average return for the smallest 30% of stocks minus the average return for the largest 30%, each month. A positive SMB indicates that the small cap stocks outperform the large cap stocks, and vice versa.

The High Minus Low (HML) measures the "value premium" for investing in companies with high book-to-market, which is the reported value in accountancy terms divided by the true value trading in the market. The HML factor indicates that risk is higher for "value stock", hence adding a risk premium for value risk. The logic is that companies which are listed have reached a barrier size, otherwise an Initial Public Offering would not have been possible. Moreover, a high book-to-market suggests that the public market value has fallen. These companies posses a greater level of risk, due to being in a difficult situation. Investors may fear bankruptcy or other financial trouble, leading to a risk premium defined as HML in the Fama French Three Factor Model. By subtracting the average return for the 50% with the lowest book-to-market with those 50% with the highest, we obtain the HML measure. A positive HML in a month indicates that the "value stocks" yield higher return than the "growth stocks"[21], and vice versa.

The Fama French Three Factor Model describes the expected return on an asset as a result of its relationship to three risk factors: market risk, size risk, and value risk. The formula is stated as;

$$r_A = r_f + \beta_1 R_M + \beta_2 SMB + \beta_3 HML$$

[21] A stock which's value to a large extent is depended on expected future growth is referred to as a "growth stock". The opposite is a "value stock" which usually produces earrings already today. Moreover, a "value stock" is not expected to grow as much and as fast as a "growth stock"

Where;

B_1 = Beta coefficient for Top10 Portfolio against Nordic75 Index.
R_M= Risk premium for market portfolio i.e. excess return for holding the Nordic75 Index.
B_2 = Beta coefficient for the exposure to size risk.
B_2 = Beta coefficient for the exposure to value risk.

The Fama French Three Factor Model is applied to calculate abnormal return, replacing the CAPM market model. The same statistical procedure for obtaining and testing the abnormal return over the 10 year holding period is performed as described in section 3.4.2.

4. Results

We now turn to the results obtained when applying the "Dogs of the Dow" strategy in the Nordic region. The first part of this section deals with plain results, returns and performance of our Top10 Portfolio. Later parts of this section move to statistical verification and risk adjustment of our findings.

4.1 Top ten portfolio year by year

Figure 4 shows which companies had the highest dividend yield each year, thus forming our portfolio. Note that when implementing the "Dogs of the Dow" strategy one observes dividend yields backwards in time. Hence, if a company is indicated with X in for example 1999, that indicates that it had a high dividend yield as of 1998-12-31; thereby included in our Top10 Portfolio held during 1999. Naturally the companies noted with an "X" made up 1/10 of our initial Top10 Portfolio that particular year.

Figure 4. Top10 Portfolio Constituent Lists

COMPANY	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
ABB											x				1
AGA			x	x											2
AMER SPORTS					x			x							2
AVESTA SHEFFIELD						x									1
CELSIUS B DEAD					x										1
DANSKE BANK	x	x	x	x											4
ELCOTEQ SE														x	1
ELECTROLUX	x	x	x		x										4
ESSELTE			x												1
FABEGE														x	1
FINNLINES					x										1
FORENINGSSPARBANKEN									x	x					2
FORTUM CORP.										x	x				2
HOLMEN										x			x	x	3
HUHTAMAKI					x		x		x						3
INSTRUMENTARIUM				x											1
INVESTOR			x	x											2
KEMIRA						x	x	x							3
KESKO			x			x		x	x				x	x	6
KONE												x			1
KOP	x														1
KYMMENE					x										1
MERITA									x						1
METSO											x	x	x		3
M-REAL					x						x	x	x	x	5
NKT				x						x					2
NOKIA	x														1
ORION								x	x				x	x	4
OSTASIATISKE KOM		x													1
OUTOKUMPU											x	x			2
POHJOLA GROUP									x		x	x	x		4
RAUMA							x								1
RAUTARUUKKI	x				x	x	x	x	x						6
REALDANMARK								x	x						2
SAMPO											x	x		x	3
SANDVIK								x		x					2
SAS DANMARK						x									1
SCA			x	x		x									3
SCANIA							x								1
SEB 'A'	x	x							x	x					4
SKANDIA FORSAKRINGS		x	x												2
SKANSKA 'B'								x			x	x			3
SKF 'B'		x					x	x							3
STORA	x														1
STORA ENSO 'R'					x	x									2
SUPERFOS DEAD			x	x											2
SVENSKA HANDBKN		x													1
SYDKRAFT A			x	x											2
TALENTUM										x					1
TAMRO							x								1
TDC				x		x	x					x	x	x	6
TIETOENATOR												x			1
TRELLEBORG	x	x						x		x					4
TRYGG-HANSA				x											1
UNIDANMARK	x	x							x						3
UPM-KYMMENE					x	x	x			x			x	x	6
UPONOR													x	x	2
VALMET						x									1
WARTSILA											x	x	x		3
VOLVO	x	x								x	x				4
YIT-YHTYMA							x								1
	10	10	10	10	10	10	10	10	10	10	10	10	10	10	140
# companies remaining on list		6	3	6	0	2	3	3	3	2	2	7	5	7	
Turnover		**4**	**7**	**4**	**10**	**8**	**7**	**7**	**7**	**8**	**8**	**3**	**5**	**3**	

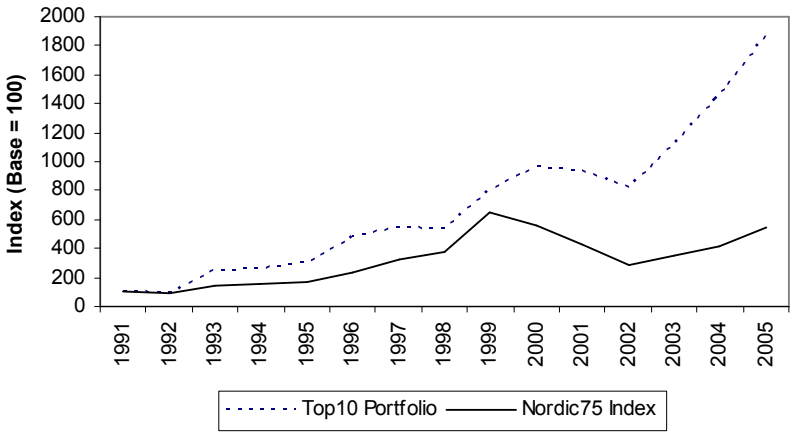
Only companies which were part of the Top10 Portfolio at least one of the years are listed in the table. Companies indicated with an X are forming the constituent list each year respectively.

The Top10 company turnover, i.e. how many of the companies that changed in the Top10 Portfolio, year by year is also presented in figure 4. Note that the turnover generally is high, with seven or more altered companies most of the years.

4.2 Performance

Figure 5. Top10 Portfolio vs. Nordic75 Index

	Top10	Nordic75
1991	100	100
1992	91	95
1993	243	147
1994	254	156
1995	305	175
1996	481	240
1997	549	320
1998	535	380
1999	802	647
2000	955	555
2001	939	427
2002	825	289
2003	1122	357
2004	1460	422
2005	1873	543



Base = 100 as of 1991-12-31

The chart above shows the Top10 Portfolio versus the Nordic75 Index plotted against time on an absolute basis. During the observation period and without adjusting for risk, the "Dogs of Dow" strategy has proven lucrative with a return of 1773% compared to 443% for the Nordic75 Index. By looking at the chart above one can easily conclude that over the whole 14 year observation period the Top10 Portfolio is continuously outperforming the Nordic75 Index on an aggregated level.

Figure 6. Top10 Portfolio and Nordic75 Index performance

	Top10 Porfolio		Nordic75 Index		10-Year T-bills
	Yearly Return	Standard Deviation	Yearly Return	Standard Deviation	Interest Rate
1992	-9,0%	40%	-4,6%	25%	9,98%
1993	166,5%	24%	54,0%	12%	8,13%
1994	4,9%	21%	6,4%	18%	8,83%
1995	19,9%	11%	11,9%	13%	9,11%
1996	57,7%	14%	37,0%	8%	7,42%
1997	14,1%	16%	33,4%	19%	6,27%
1998	-2,6%	29%	18,8%	24%	4,94%
1999	49,9%	16%	70,4%	20%	4,89%
2000	19,1%	12%	-14,3%	13%	5,50%
2001	-1,7%	23%	-23,0%	28%	5,08%
2002	-12,2%	32%	-32,4%	27%	5,11%
2003	36,1%	19%	23,6%	18%	4,36%
2004	30,2%	9%	18,1%	10%	4,28%
2005	28,3%	10%	28,7%	10%	3,37%

Since the Top10 Portfolio inception in January 1992 it has had an average 21% annual return compared to 10% for the Nordic75. The Top10 Portfolio had a fantastic year in 1993, mainly due to the recovery of SEB, which survived bankruptcy during the banking crises. The Top10 Portfolio was surpassed in the years 1997 to 1999 when the tech companies were the strong performers. Since these companies did not pay large dividends, they where not included in the Top10 Portfolio. When the technology bubble burst in 2000, the Top10 Portfolio once again performed well and produced equal or higher return compared to the Nordic 75. Included in figure 6 are also the 10-year Government T-bills, calculated as a weighted average[22] between the respective Nordic countries.

4.3 Risk adjustment

This section deals with the performance on a risk adjusted basis, which is by far more interesting than studying plain returns. Two common risk adjustment measurements are used;

- Sharpe; excess return per unit of risk.
- Treynor; excess return in relation to the non-diversifiable risk.

Naturally, a risk averse investor will always prefer a higher Sharpe investment to a lower Sharpe. The same reasoning also applies to Treynor, meaning any investor is better of with a higher quota.

Figure 7. Sharpe and Treynor Risk Adjustment

	Top10 Porfolio			Nordic75 Index		Sharpe	Treynor
	Sharpe	Beta	Treynor	Sharpe	Treynor	Winner	Winner
1992	-0,47	1,48	-0,13	-0,51	-0,15	TOP 10	TOP 10
1993	6,67	1,49	1,06	3,83	0,46	TOP 10	TOP 10
1994	-0,19	1,07	-0,04	-0,15	-0,02	Index	Index
1995	1,00	0,50	0,22	0,34	0,03	TOP 10	TOP 10
1996	3,51	0,53	0,95	3,67	0,30	Index	TOP 10
1997	0,49	0,72	0,11	1,50	0,27	Index	Index
1998	-0,26	1,06	-0,07	0,58	0,14	Index	Index
1999	2,84	0,20	2,30	3,31	0,65	Index	TOP 10
2000	1,13	-0,18	-0,77	-1,51	-0,20	TOP 10	Index
2001	-0,30	0,63	-0,11	-0,99	-0,28	TOP 10	TOP 10
2002	-0,54	0,68	-0,25	-1,35	-0,37	TOP 10	TOP 10
2003	1,69	0,90	0,35	1,06	0,19	TOP 10	TOP 10
2004	2,73	0,75	0,35	1,47	0,14	TOP 10	TOP 10
2005	2,51	0,56	0,45	2,79	0,25	Index	TOP 10

[22] The weights applied are the same weights as described in section 3.3.2 Weighting the Benchmark.

Figure 7 shows Sharpe ratios suggesting that the Top10 Portfolio achieved risk adjusted excess return in 8 out of 14 years when compared to the Nordic75 Index. When studying Treynor our Top10 Portfolio produced higher Treynor in 10 out of the 14 years. In order to find statistical support considering our two risk adjustments we turn to a simple rank test.

4.4 Applied Statistical Tests

4.4.1 Wilcoxon Signed Rank Test - Assessment of Sharpe & Treynor

In order to evaluate any long-term differences in Sharpe and Treynor between the Top10 Portfolio and the Nordic75 Index we perform a nonparametric rank test. The results of a Wilcoxon Signed Rank Test are presented in figure 8 below.

Figure 8. Results from Wilcoxon Signed Rank Test

	Difference in Sharpe	Rank (+)	Rank (-)	Difference in Treynor	Rank (+)	Rank (-)
1992	0,04	7		0,02	5	
1993	2,84	14		0,60	12	
1994	-0,04		6	-0,01		4
1995	0,66	9		0,19	10	
1996	-0,16		5	0,65	13	
1997	-1,02		1	-0,16		3
1998	-0,84		2	-0,21		2
1999	-0,47		3	1,65	14	
2000	2,64	13		-0,57		1
2001	0,69	10		0,17	8	
2002	0,812	11		0,12	6	
2003	0,636	8		0,16	7	
2004	1,26	12		0,21	11	
2005	-0,28		4	0,19	9	
Sum		**84**	**21**		**95**	**10**

We reject our null hypothesis on a 5% level of significance suggesting that the Sharpe (and Treynor) in the Top10 Portfolio differ from those in the Nordic75 Index. This supports the argument of higher risk adjusted returns for the Top10 Portfolio; the “Dogs of the Dow” strategy.

4.4.2 Statistical Test for Abnormal Returns – Top10 Portfolio

To more rigorously statistically test the "Dogs of the Dow" strategy we apply a market risk adjustment approach, using estimated Beta in accordance with the CAPM market model. The beta and the regressions standards deviation is presented in figure 9.

Figure 9. The estimated beta and alpha used in the market model, also the standard error.

	Beta	Std (Beta)
1996	1,21	4,6%
1997	0,84	2,4%
1998	0,70	2,5%
1999	0,82	4,0%
2000	0,85	4,6%
2001	0,27	3,9%
2002	0,50	5,9%
2003	0,76	4,5%
2004	0,65	3,8%
2005	0,76	2,2%

The estimated betas were lower than 1 for all but 1996, indicating a lower systematic risk than the benchmark index. The betas are different from those calculated for the Treynor that applies holding period beta. Notice that in this section we test the realized return for the each Top10 portfolio over the holding period, thus requiring a predetermined estimated beta. Also, the estimation window is longer, 24 months instead of 12 months. Figure 10 shows the abnormal return and standard deviation obtained each year. Also, figure 10 shows the result of the statistical test for average abnormal return over the 10 year holding period.

Figure 10. Descriptive Statistics for Top10 Portfolio's Abnormal Returns.

	Abnormal Return (AR)	Standard Deviation of AR
1996	11,8%	4,62%
1997	-17,1%	2,41%
1998	-23,7%	2,52%
1999	-14,5%	4,03%
2000	25,0%	4,57%
2001	-2,7%	3,89%
2002	-5,2%	5,91%
2003	14,6%	4,46%
2004	14,4%	3,75%
2005	3,8%	2,18%

Average(AR)	0,6%
Std(average(AR))	1,26%
t-test	0,50

The previous sections have presented staggering returns for the Top10 Portfolio when benchmarked against the Nordic75 Index. However using the CAPM model, the Top10 Portfolio produced excess return only 5 out of 10 times; "the "random 50%" The sample average aggregated abnormal return evaluates the combined ten year affect, stressing the importance of a long-term investment horizon. The portfolio has on average yielded an average abnormal return of 0.6%. The standard deviation for the sample average aggregated abnormal return is 1.26%, resulting in a t-value of 0.50. We can conclude that the null hypothesis can not be rejected on any reasonable level of significance. The 95% confidence interval for the average abnormal return ranges between minus 2,221 to 3,491%.

However, we suspect that the IT-bubble might have distorted our findings and therefore we present a five year moving average over the examined period in figure 11 below.

Figure 11. Beta Coefficients for the Fama French Three Factor Model.

Start		End	AR	Std (average(AR)	t-test
1996	-	2001	-6,6%	1,60%	-4,12
1997	-	2002	-4,2%	1,93%	-2,19
1998	-	2003	3,4%	2,07%	1,66
1999	-	2004	9,2%	2,05%	4,50
2000	-	2005	5,0%	1,88%	2,64

Since 1999 the "Dogs of the Dow" strategy has produced significant abnormal returns, when evaluating a five year period. Even though we do not claim that this is strong support for our Top10 Portfolio, one can at least argue that it might work under "normal circumstances".[23]

4.5 Fama French Three Factor Model – Beyond CAPM

The Fama French Three Factor Model is applied to capture two additional risk factors; size and value risk. By expanding the model with additional explanatory variables we aim to deepen our investigation of abnormal returns. Figure 12 summarizes the estimated beta coefficients for all explanatory variables included in the Fama French Three Factor Model.

[23] Hence, when there is not an event like the IT-bubble.

Figure 12. Beta Coefficients for the Fama French Three Factor Model.

	$Beta_{Market}$	$Beta_{SMB}$	$Beta_{HML}$
1996	1,04	0,23	1,25
1997	0,88	0,19	0,71
1998	0,77	0,11	0,33
1999	0,83	0,08	0,21
2000	0,91	0,56	0,04
2001	0,30	-0,19	0,28
2002	0,88	0,23	0,84
2003	0,95	0,12	0,52
2004	0,92	0,28	1,01
2005	0,69	0,55	-0,02

During the holding period the average SMB and HML premium varied from being positive to negative. The range for SMB is from minus 3.49% to 1.04%, where a positive SMB indicates a premium for holding small cap stocks. The SMB premium was positive for six out of ten possible years. The range for HML is between minus 1.51% to 3.05%, where a positive HML indicates a premium for holding "value stock" that is classified as having high book-to-market. During the ten year observation period the HML was positive for seven years.

Figure 13 summarizes the yearly abnormal returns and respective standard deviation, as well as the average abnormal return, which is tested using the t-test. The figures can easily be compared to that of the CAPM market model. The abnormal return using the Fama French Three Factor Model is calculated as below;

$$AR = r_A - (r_f + \beta_1 R_M + \beta_2 SMB + \beta_3 HML)$$

Where;

B_1 = Beta coefficient for Top10 Portfolio against Nordic75 Index.
R_M= Risk premium for holding the Nordic75 Index.
B_2 = Beta coefficient for the exposure to size risk.
B_2 = Beta coefficient for the exposure to value risk.

Figure 13. Descriptive Statistics for Top10 Portfolio's Abnormal Returns using Fama French 3 Factor Model.

	Abnormal Return (AR)	Standard Deviation of AR
1996	17,0%	3,32%
1997	-18,3%	1,72%
1998	-25,0%	2,38%
1999	-14,2%	3,82%
2000	23,8%	3,59%
2001	-2,2%	3,66%
2002	5,3%	4,68%
2003	11,2%	3,91%
2004	10,1%	3,18%
2005	5,3%	1,62%

Average(AR)	1,3%
Std(average(AR))	1,05%
t-test	1,24

The abnormal return using the Fama French Three Factor Model was more pronounced during the first three years and also the last compared to the CAPM. During the period 1999-2004 the Fama French Three Factor Model decreased the abnormal return. Interestingly the Fama French increased the average abnormal return which contradicted our expectations. Analyzing the entire ten year period the average abnormal return is now 1.3% compared to 0.6% for the CAPM model. The "Dogs of the Dow" strategy still does not prove to yield an abnormal return at a significance level of 5% level. The confidence interval ranges from minus 1.07% to 3.68%, not above the negative territory.

5. "Dogs of the Dow" in Practice

In order to add further depth to our analysis concerning the "Dogs of the Dow" strategy we have conducted a "mini case" in cooperation with Handelsbanken Capital Markets.[24] They have just recently issued their second structured product with very similar characteristics as the "Dogs of the Dow". Moreover, we want to show the reader that this strategy is not merely theoretically applicable, but actually exists in practice. Handelsbanken Capital Markets latest issue of this product had a collective value of SEK 500 million.

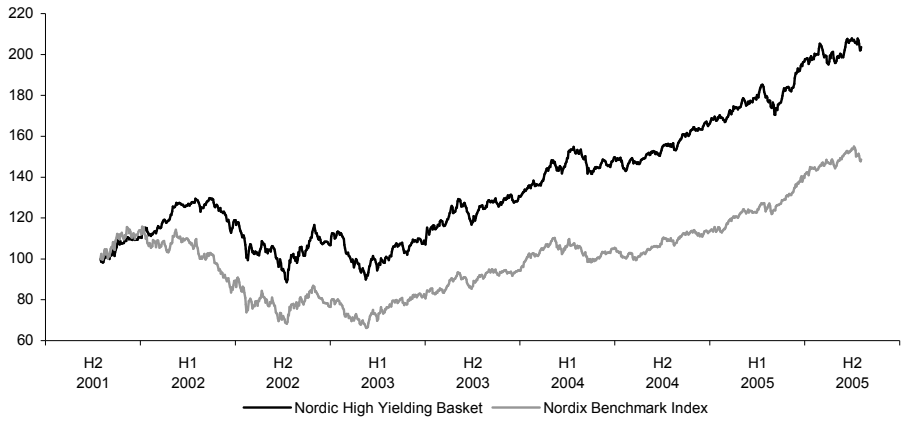
24 We would like to thank Mats Nyman, Head of Asset Allocation Research - Structured Derivatives at Handelsbanken Capital Markets, for taking the time and interest to provide us with information concerning this "mini-case".

5.1 Handelsbanken Capital Markets' "Dogs of the Dow"

In our early research for this thesis we came across a product structured by Handelsbanken Capital Markets called "Högutdelande bolag i Norden"[25] which is a high yield equity basket. This product applies the "Dogs of the Dow" strategy on the NORDIX[26] index and produced high returns over its existence period of four years. Handelsbanken has proposed a theory for the phenomena of strong returns for the high yielding stocks, suggesting that dividend is linked to the long-term growth of companies. According to Handelsbanken Capital Markets the management has strong incentive to continue paying high dividend, hence are required to effectively run the business and to generate strong cash flow; else they will disappoint investors as they have to cut dividend.

Before launching their product Handelsbanken Capital Markets tested the strategy by simulating the hypothetical performance had it been issued in 1996, developing until 2001. The performance for the basket was 164% between January 1, 1997 and September 1, 2001, while NORDIX's performance in the same period was 87%. Also, the average volatility was less for the structured basket than the NORDIX Index, with a standard deviation of 13% compared to NORDIX Index with 30%. More importantly, the actual product launched and sold to the public has yielded strong returns. Figure 14 below shows the performance of the "Högutdelande bolag i Norden" compared to NORDIX benchmark index.

Figure 14. Handelsbanken's Nordic High Yielding Basket versus NORDIX Benchmark Index



Source: Handelsbanken Capital Markets

[25] Freely translated; "High Dividend Yielding Companies in the Nordic Region"
[26] The NORDIX Index is Handelsbanken's own index including the 200 largest stocks by market capitalization in the Nordic markets.

During the period of 17th October 2001 to 17th October 2005 the "Högutdelande bolag i Norden" had a total return of 103.5% compared to 49.8% for the NORDIX Index. The volatility was 16% and 19% for the structured basket and NORDIX Index, respectively. This leads to a Sharpe ratio of 1.57 for Handelsbanken Capital Markets' product and 0.44 for the benchmark NORDIX index. The risk adjusted results are truly strong, implying that Handelsbanken Capital Markets has effectively executed the strategy and performed strong returns for their investors.

6. Suggested explanations to Abnormal Returns

In a CAPM world we managed to show some support for our Top10 Portfolio, when evaluating a five year moving average. However, over the whole period we found no support of abnormal returns. As we moved to the more complex Fama French Three Factor Model, we found similar results to those in the CAPM setting; insignificant 1.3% abnormal returns. In this section we are aiming to explain that 1.3%. This is done by applying taxes and transaction costs. Furthermore, we take a non-statistical approach to investigate the arguably very large difference between the Top10 Portfolio aggregated return (1773%) and the Nordic75 Index (443%). This is through applying a financial psychology phenomenon referred to as the "overreaction hypothesis".

6.1 Taxes and Transaction Effects

Throughout the thesis we have ignored transaction costs with the motive that our Top10 portfolio in fact faces fairly low transaction costs; being rebalanced only once a year. However, when buying a structured product which implements the "Dogs of the Dow" strategy additional costs will occur. Using Handelsbanken Capital Markets' product[27] as a proxy, we find that the "transaction cost"[28] is 1% per year based on the current value of the derivative. We also perform a scenario analysis, where we test using lower transaction costs.

Taxes are another effect which has been ignored and could have tilted the findings. Since the Top10 Portfolio by definition is characterized by high dividend yielding stocks the investor faces

[27] Described in Section "5. Case Study"
[28] A more correct definition would probably be "rebalancing charge", since this is the price Handelsbanken Capital Markets charge for managing the structured product for the investor.

a different tax effect than an index based investor. The rationale is that the proportion of dividends in the "total return" is larger in the Top10 Portfolio than in the Nordic75 Index. Continuing this plausible reasoning, we find that an index based investor faces a more privileged tax situation and thereby becomes disadvantaged in a setting which ignores tax effects. Hence, by disregarding taxes we have indirectly benefited our Top10 Portfolio. In this section we make the assumption that dividends are taxed every year prior to being reinvested in the Top10 Portfolio.

Also, it should be mentioned that an investor normally would have to pay an "overprice" when initial buying a structured product. Continuing to use Handelsbanken Capital Markets' product as a proxy, we find that this cost in fact is 1 % of the initial value of the derivative.[29] However, we disregard this cost since it can be shown to be equal to the cost of setting up an index-based portfolio. Figure 15 summarizes the parameters needed to adjust performance for taxes and transaction costs;

Figure 15. Parameters affecting costs for transaction and taxes.

	Dividend Yield		Transaction Cost		Tax
	Top10	Nordic75	Top10	Nordic75	
1996	3,89%	2,75%	1,0%	0,3%	30%
1997	3,51%	2,14%	1,0%	0,3%	30%
1998	4,73%	2,38%	1,0%	0,3%	30%
1999	3,48%	2,30%	1,0%	0,3%	30%
2000	13,20%	2,00%	1,0%	0,3%	30%
2001	5,29%	3,07%	1,0%	0,3%	30%
2002	10,69%	3,87%	1,0%	0,3%	30%
2003	5,78%	3,94%	1,0%	0,3%	30%
2004	5,45%	2,90%	1,0%	0,3%	30%
2005	3,42%	2,69%	1,0%	0,3%	30%

As shown the Top10 Portfolio yields a higher dividend rate than the Nordic75 Index, as expected. Also included in figure 15 are the transaction costs and tax rate for dividends.

[29] When buying the structure product from Handelsbanken Capital Markets the investor pays SEK 101 and receives a derivative with an initial value of SEK 100.

Figure 16. Descriptive Statistics for Top10 Portfolio's Abnormal Returns using Fama French Three Factor Model, considering taxes and transaction cost affects.

	Abnormal Return (AR)	Standard Deviation of AR
1996	16,2%	3,32%
1997	-18,3%	1,72%
1998	-24,6%	2,38%
1999	-14,6%	3,82%
2000	23,1%	3,59%
2001	-2,1%	3,66%
2002	5,7%	4,68%
2003	10,6%	3,91%
2004	9,6%	3,18%
2005	5,0%	1,62%

Average(AR)	1,1%
Std(average(AR))	1,05%
t-test	1,02

Once again we present a descriptive statistic table (figure 16), this time including the implications of taxes and transaction costs. Due to the direct taxation of dividend, penalizing high dividend yielding stocks and implementing a transaction cost we conclude that the "Dogs of the Dow" strategy does not yield an average abnormal return over the 10 year holding period. The average abnormal return is 1.1%, but lacks statistical significance; explicitly we can not reject the null hypothesis of no excess return. The 95% confident interval ranges from minus 1.917% to 2.472%.

Handelsbanken Capital Markets has suggested that the assumed yearly transaction cost of 1% for holding the Top10 Portfolio might be overstated. According to them it could potentially be as low as 0.15%. In order to see how this would affect our findings we conducted a scenario analysis using lower transaction costs; down to 0.15%. Even though this gave slightly higher average abnormal returns, they were still statistically insignificant.

6.2 Overreaction Hypothesis

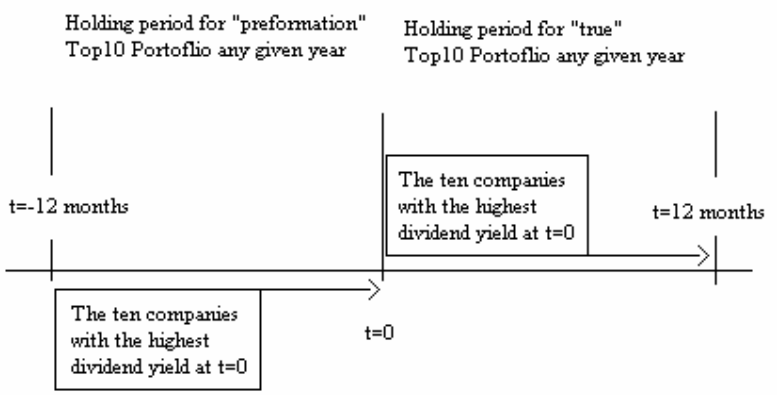
Even if we have managed to explain our "excess return" using extensive risk adjustment, accounting for taxes and transaction effects, an investor could still point at the remarkable Top10 Portfolio performance of 1773% over the 14 years holding period. The investor could argue that

there is no chance that the additional risk involved in the Top10 portfolio is not compensated; pointing at the modest 443% produced by the Nordic75 Index. In this section we examine a non statistical explanation to why we observe these amazing results.

In naming the strategy, “Dogs of the Dow”, the baptizers imply that these stocks are in fact “dogs”, i.e. underperformers. The rationale is that high dividend yield indicates a temporary low stock price since most companies tend to have a stable absolute dividend strategy. This suggests an influence which could be traced back to financial psychology. One interesting suggestion is an overreaction hypothesis saying there is a behavioral tendency of people to overreact to surprises. This theory is then extended to the financial markets and could be seen as an explanation to the high Top10 Portfolio returns. The rationale is that a previous surprise has lowered the valuation of a stock, causing it to become a high dividend yielding stock. According to the overreaction hypothesis the market will eventually adjust for this “miswriting” and the stock’s valuation will increase to reach a “fair value”. Hence, the hypothesis suggests that the “Dogs of the Dow” strategy catches these temporarily “low” valued stocks which are expected to “bounce back” during the holding year. Therefore, they are the “Dogs” in the “Dogs of the Dow”.

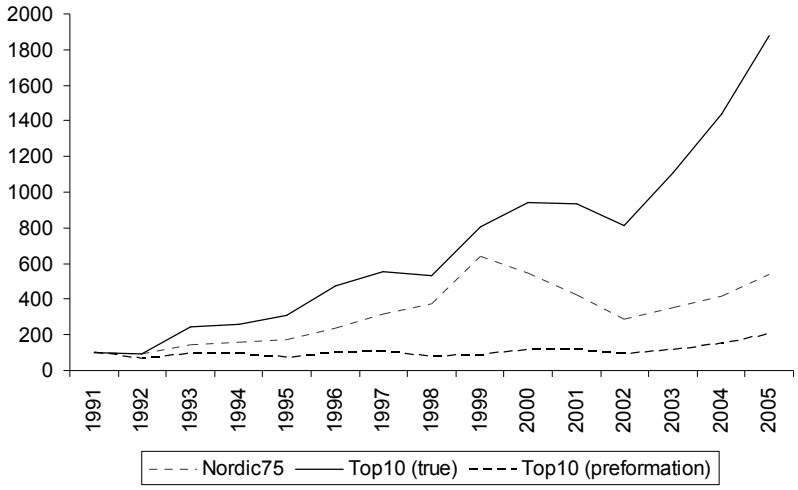
When forming our original yearly Top10 Portfolio portfolios we chose the ten companies with the highest dividend yield as of “today”, and held them for a year. To investigate the overreaction hypothesis we keep the same companies but shift the holding period to one year prior. By doing this we can study if the same companies were actually “dogs” the year prior to being part of the Top10 Portfolio. We call this the “Top10 Preformation Portfolio” The reasoning is also illustrated in figure 17 ;

Figure 17. Method used when forming the Top10 Preformation Portfolio.



Using the procedure described above we form new portfolios, the "Top10 Preformation Portfolio". If this portfolio underperforms the Nordic75 Index during the observed period, we can claim to have found indications of an overreaction. In figure 18 below we have the two Top10 portfolios and the Nordic75 plotted against time;

Figure 18. Top10 Preformation Portfolio vs. true Top10 Portfolio and Nordic75 Index.



We can see that the Top10 Preformation Portfolio is a true underperformer, underperforming the Top10 Portfolio as well as the Nordic75 Index. Therefore, we claim to have found evidence supporting our market overreaction hypothesis.

7. Conclusion

Prior research has shown that the "Dogs of the Dow" strategy is successful when applied to the US, UK, Latin American and Canadian stock markets. The success of the strategy fascinated us, and to what extent it was applicable to the Nordic region. During our observation period, 1992 to 2005, our Top10 Portfolio realized a 1773% return compared to 443% for the benchmark Nordic75 Index. The absolute returns are at first glance quite overwhelming.

In accordance with the assumption of risk averse investors and an efficient market hypothesis we set out to risk adjust the returns. The first half of the thesis replicated the methodology of previous research. The result was that the strategy had indeed outperformed the benchmark Nordic75 Index, using Sharpe and Treynor risk adjustment methodology. However, the strategy was shortly after shattered when applying the CAPM market model. The result was that there was no statistical support for the "Dogs of the Dow" strategy and its applicability to the Nordic region.

We continued and further developed the way we risk adjusted by expanding the market model to also account for "size" and "value" risk. The Fama French Three Factor Model was applied, which we thought would suit the characteristics of our portfolio, containing "value" stocks. We find that when applying the Three Factor Model the abnormal return is increased to an average abnormal return of 1.3%, still statistically insignificantly different from zero. We would have expected the Fama French Three Factor Model to decrease the average abnormal return, instead it increased. We feel that since both the results are statistically insignificant any speculation about why they differ is weak, hence we do not.

When investors receive dividend they are directly taxed for the gain, thus reinvesting 100% of dividend paid out is unrealistic. It is said that the only sure things in life are death and taxes, we agree and hence include tax in our model. Also, the transaction cost is less for holding an index portfolio compared to the Top10 portfolio. Since the fees are deducted from the investment value it ought to be included. Previous research has ignored these effects. We find that by considering these inevitable costs the result is that of no proven excess return for the Top10 Portfolio over the ten year observation period. The average abnormal return was 1.1% but not statistically significant at a 5% level.

Even though we have managed to distort the high absolute returns achieved by holding the Top10 Portfolio, we wanted to investigate whether high dividend yield was a factor of past underperformance. Explicitly, we test if the Top10 stocks were in fact previous "Dogs", as suggested by the name "Dogs of the Dow". Testing a psychological phenomenon referred to as the "overreaction hypothesis", we manage to show that the Top10 stocks are in fact prior underperformers. This implies that a high dividend yield is explained by a decrease in stock valuation rather than increased dividend paid.

To summarize, we have diluted the excess returns suggested when calculating plain returns. Either time as healed a flaw to the efficient market hypothesis or the Nordic region is efficient. The strategy did not prove successful when applied to Sweden, Denmark and Finland combined. We conclude that, after adjusting for a number of key aspects, there is no evidence of significant abnormal returns when applying the "Dogs of the Dow" strategy to the Nordic market.

References

Nyman M., Isakson M., 2004, What Works on Wall Street, *Handelsbanken Capital Markets - Equity Research.*

André L.C. Da Silva, 2001, Empirical tests of the Dogs of the Dow strategy in Latin American stock markets, *International Review of Financial Analysis*, 10, 187-199.

Visscher S., Filbeck G., 2003, Dividend-Yield Strategies in the Canadian Stock Market, *Financial Analysts Journal*, 99-106.

Domian D., Louton D., Mossman C., 1998, The rise and fall of the "Dogs of the Dow", *Financial Services Review,* 7, 145-159.

Gwilym O., Seaton J., Thomas S., 2003, Dividend Yield Investment Strategies, the Payout Ratio and Zero-Dividend Stocks, *Discussion Paper University of Wales and University of Southampton.*

Slatter J., 1988, Study of industrial averages finds stocks with high dividends are big winners, *The Wall Street Journal.*

Rozeff, M., 1984, Dividend yields are equity risk premiums, *Journal of Portfolio Management 11,* 68-75.

Fama, E., and K. French, 1988, Dividend yields and expected stock returns, *Journal of Financial Economics 22,* 3-25.

Goetzmann, W., and P. Jorion, 1993, Testing the predictive power of dividend yields, *Journal of Finance 48,* 663-679

Craig Mackinlay, 1997, Event Studies in Economics and Finance, *Journal of Economics Literature*, Vol 35, page 13-39

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