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Can the ”Puppies of the Euro Stoxx” beat the European market?

A study of high yielding European stocks during the years 2001 - 2010

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Abstract

This thesis examines if the investment strategy "Puppies of the Dow" is a working strategy applied to a European market setting during the years 2001-2010. The purpose was to determine whether the strategy could be successfully replicated in a different market with conditions differing from the once underlying the Dow Jones Industrial Average that the investment strategy originates from. By replicating the base methodology of the "Puppies of the Dow" and use the same method as previous research, this study over all proves that the investment strategy was a success applied to the European market between 2001 and 2010.

KEYWORDS: THE DOGS OF THE DOW, INVESTMENT STRATEGY, HIGH DIVIDEND YIELDING STOCKS

Abbreviations (ticker names) for portfolio members throughout the thesis

Ticker	Name
MT NA Equity	ARCELORMITTAL
IBE SQ Equity	IBERDROLA SA
DG FP Equity	VINCI SA
BAS GY Equity	BASF SE
SGO FP Equity	COMPAGNIE DE SAINT-GOBAIN
ENEL IM Equity	ENEL SPA
ENI IM Equity	ENI SPA
INGA NA Equity	ING GROEP NV-CVA
ACA FP Equity	CREDIT AGRICOLE SA
TIT IM Equity	TELECOM ITALIA SPA
UNA NA Equity	UNILEVER NV-CVA
GLE FP Equity	SOCIETE GENERALE
BNP FP Equity	BNP PARIBAS
ISP IM Equity	INTESA SANPAOLO
DTE GY Equity	DEUTSCHE TELEKOM AG-REG
FTE FP Equity	FRANCE TELECOM SA
UCG IM Equity	UNICREDIT SPA
SAN SQ Equity	BANCO SANTANDER SA
REP SQ Equity	REPSOL YPF SA

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2 Introduction

2.1 Background

Michael O´Haggins is the Author of the world known book "Beating the Dow". This book explains in detail how to invest in high dividend yielding stocks and beat the market by simply doing the opposite of what everyone else does. The Dow Jones business and financial newspaper called Barron´s, popularized the term Dogs of the Dow" (DoD[1]) and today it is a term that almost everyone with interest in finance recognizes[2].

Before O´Haggins book came out on the market, analyst John Slatter was the first one suggesting this investment strategy in an article in The Wall Street Journal. Mr. Slatter meant that you can find out of favor stocks by looking at the dividend yield. If it is high it is usually a sign that the price of the stock has gone down while the dividends still remain at the same level. Blue-chip stocks like those that are members of the Dow Jones Industrial Average (DJIA) often rise rapidly after being out of favor when investors taste changes.[3].

Today the strategy exists in many different versions. The most popular ones are:

1. The Top 10 portfolio, the "Dogs of the Dow" (DoD).
2. The Top 5, the "Puppies of the Dow" (PoD).
3. And the Top 1, Penultimate Profit Prospect (PPP).

In 2010 the DoD strategy outperformed the Dow Jones Industrial Average (DJIA[4]) with a gain of 20,5 percent[5]. Investors and traders are always seeking to find that one strategy that doesn't consist with the hypothesis of efficient capital markets, but could a simple strategy like the DoD really work?

According to the efficient market hypothesis the strategy should not work. This is a well known phenomenon and has been dominating the academic literature since the 1960s. In finance this means that the price of a financial asset reflects all information that is available for everyone who can buy the security[6]. Indirectly this means that you should not be able to generate excess returns by using a specific strategy when investing in the stock market.

[1] The strategy will be referred to as the DoD throughout the thesis.
[2] O´Haggins (2000)
[3] Dorfman, J. R. (1988)
[4] This abbreviation for the Dow Jones Industrial Average will be used throughout the thesis.
[5] www.dogsofthedow.com
[6] Elthon and Gruber (2009, Ch. 19)

2.2 Purpose

The purpose of this study is to examine whether investors could have beaten the European market (Euro Stoxx 50[7]) by using the "Puppies of the Dow" strategy during the years of 2001 - 2010.

2.3 Limitations

In this thesis the limitations have been thoughtfully selected but will still have an effect on the precision of the result of the study.

The stock picking has been limited to the members of the SX5E, which also will be used as the benchmark for the study. To assume that the SX5E reflects the European market as a whole could be a problem but since the DoD strategy is based on a blue chip-index[8], the DJIA, this will replicate the study in the best way according to the author[9] .

For simplicity, transaction costs and taxes are excluded which could be a source for inaccuracy of the final result.

The dividends have been re-investing in the same equity that generated them. This will be done by using the "total return index" which will be generated by Bloomberg´s terminal[10].

To calculate the risk free interest rate an average of the 10 year German Government bonds has been calculated for every year examined.

2.4 Disposition

This thesis starts off with an introduction to the background of the PoD strategy followed by the limitations of the study and previous research. Section two will go through the theory that will be applied to the dataset including the efficient market hypothesis, risk and different types of returns. Section three will go through the data and methodology including the assumptions that has been made throughout the thesis. Section four will then give the results that have been generated and an analysis of them, followed by a number of statistical tests for significance. Finally, the thesis will end with a conclusion in section five.

[7] The ticker name of the Euro Stoxx 50, SX5E will be used throughout the thesis.
[8] A full definition of what a blue-chip index is can be found in section 3.4 *Selection of index*
[9] Bloomberg terminal (SX5E, command: DES)
[10] A complete definition of the total return index can be found under section 3.6.2 *Measuring Results – Dividend re-investment*

2.5 Previous research

The DoD strategy, in all of its forms, has fascinated the researchers of the 21st century and has been examined on markets all over the world with varying results. This section will go through a couple of them.

Stocks with high dividend yields have shown positive returns in the North American stock market. McQueen *et al*. conducted a study where the top 15 dividend yielding stocks was compared to the top 5 dividend yielding stocks during the period 1945 – 1995. The result that was generated by the study was that the top 5 outperformed the top 15 with an average annual return of 8 percent per year compared to a loss of 1,28 percent for the top 15[11].

A study of the British stock market was made by Sue Visscher and Greg Filbeck between March 1984 and February 1994 and was published in The European Journal of Finance. The results of this study was notvery successful as the annual result for the DoD was 9,48% while the FT-SE 100[12] index generated a return of 11,48 annually[13].

Furthermore there was a study made on the Latin American market during the time period 1994-1999 by André L.C & Da Silva. The study was limited to the stock markets of Argentina, Brazil, Colombia, Mexico, Peru and Venezuela. This study also examined if the strategy is seasonal by using 2 dates per year for observation. The results from this study varied and all countries besides Brazil showed a positive result, thus without any significance to it[14].

Visscher and Filbeck also made a study on the Canadian market. This was conducted by using stocks from the Toronto stock exchange (TSE 300) and the Toronto 35 index. The study showed similar results for the strategy on both indices and was a success with significant higher Sharpe and Treynor´s ratios than the two benchmarks[15].

To find out if the DoD strategy can be replicated into different market settings Eemeli Rinne and Sami Vähämaa made a study over the period 1988-2008. The result of this study was that the DoD outperformed the index with an annual abnormal return of 4,5 percent and appeared especially good in market downturns[16].

Tthe PoD strategy has also been replicated on the Nordic stock market in a master thesis written by Jokob Dahlstedt and Oscar Engellau. They combined the OMX Stockholm 30 Index, the OMX Copenhagen 20 Index and the OMX Helsinki 25 Index into one "Nordic index". The strategy did not show any significant abnormal returns after adjusting for a number of key aspects, but generated high returns on an absolute basis[17].

This thesis will examine the "Puppies of the Dow" strategy on the European market and as far as the author of this thesis is aware of, this has never been done before.

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[11] McQueen, et al. (1997)
[12] "Footsie" the 100 most highly capitalized UK companies listed on the London Stock exchange.
[13] Filbeck & Visscher (1997)
[14] André & Da Silva (2001)
[15] Filbeck & Visscher (2003)
[16] Rinne &Vähämaa (2011)
[17] Dahlstedt and Engellau (2011)

3 Theory

3.1 The "Puppies of the Dow" strategy

The "Puppies of the Dow" strategy is one of many versions of the "Dogs of the Dow" strategy. This strategy is based on value investing and takes advantage of stocks that are currently out of favor and can be bought at bargain prices. The PoD strategy consists of the five highest dividend yielding stocks, with the lowest prices out of the top 10 dividend yielding equity's [18], in this case from the SX5E.

3.2 The Efficient Market Hypothesis

The wish to beat the market has been attracting investors and traders throughout time. But according to the efficient market hypothesis this is not possible because of the great number of market participants that are constantly evaluating the market. When buying and selling securities, prices rapidly adjust whenever there is new information available. There are three forms of efficient markets according to Fama[19];

Weak-form efficiency is when all historical data is built-in in current prices. This means that technical analysis can not be used to predict future price movements i.e. price changes are only influenced by randomness which leads us to the next form of efficiency.

Semi strong-form efficiency is when all public information is reflected in current stock prices i.e. nobody can make a buck from reading the news. In this form of efficiency only investors with inside information about financial statements, dividend payment or else of that nature can make abnormal returns. Thus this is strictly illegal.

Strong-form efficiency means that all available information is reflected in the current price, which would also mean that the capital market is extremely intelligent and unbiased. Not even insiders could make abnormal returns in this type of market setting.

3.3 Diversification

Diversification means that investors are holding different kinds of securities in his portfolio to minimize the risk and optimize the return on investment. Diversification is a technique that reduces unsystematic risk in a portfolio. To be able to diversify the assets in the portfolio should not be perfectly correlated, since the diversification will then lose its purpose[20].

[18] O´Haggins, Michael (2000)
[19] Elton, Edvin J. et al (2009, Ch. 17)
[20] Investopedia

3.4 Risk

3.4.1 Standard Deviation

The standard deviation of an equity's return is a measure of the spread around the mean return. The standard deviation can be generated by taking the square root of the variance. The definition can be seen in formula 2.1 below[21];

Formula 3.1 Standard deviation

$$\sigma_i = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(R_i - \bar{R}_\iota)^2}$$

Where;

n = Number of time periods

R_i = Return during period *i*

$\bar{R}_\iota$ = Average return during period *i*

3.4.2 Beta

Beta measures the sensitivity of a stock's price, due to changes in its benchmark. The beta is the percentage change in the price of an equity given a one percent change in its benchmark index, and is defined as below in formula 2.2[22];

Formula 3.2 Beta avlue

$$\beta_i = \frac{cov_{R_i,Rm}}{\sigma^2_{Rm}}$$

Where;

$cov_{R_i,Rm}$ = The covariance between the equity return and the market return.

σ^2_{Rm} = The variance of the market return

To get the beta for a whole portfolio you simply multiply the weights of the portfolio with every equity's beta[23].

Beta is a historical measure that compares a portfolios performance to the market performance (index) and is often measured over a 36 month period. The market represents a beta of 1. This means that if a portfolio has a beta of 1,10, it will be 10% better off in a positive market setting

[21] Benninga, Simon (2009 Pg. 241)
[22] Benninga, Simon (2009 Pg.318)
[23] Bloomberg terminals explanation of beta

but 10% worse off in a negative market setting. Equally, a portfolio beta of 0,90 means a 10% worse performance in a positive market setting, but a 10% better performance in a negative[24].

The beta values of this study measures the relation between the PoD portfolios and the market for the individual years examined over the yield of 10 year German Government bonds, compared to the variance of the return of the SX5E over the same period of time.

3.5 Abnormal return

Abnormal return (AR) is the difference between the return of a portfolio and the return of the market. The definition can be seen below in formula 2.3[25];

Formula 3.3 Abnormal return

$$AR = R_p - R_m$$

Where;

R_p = The return of the portfolio

R_m = The return of the mark

Note that the abnormal return is calculated before any risk adjustments

3.6 Holding period return

Holding Period Return (HPR) measures what an investment has generated over a certain period of time. By starting out at an investment of 100% and then multiply the returns with each other a cumulative effect will be achieved. The definition can be seen below in formula 2.4[26];

Formula 3.4 Holding period return

$$HPR = (1 + R_1) * (1 + R_2) *.....* (1 + R_T)$$

Where:

R_1 = The total return of period 1

R_2 = The total return of period 2

R_T = The total return of the last period examined

[24] Morningstar dictionary
[25] Benninga (2009 Pg. 374) Note that in Benninga the expected returns are used instead of market returns. Since the actual historical returns are available the AR will be calculated by replacing the expected return with R_m.
[26] Elton, Edvin J. *et al* (2009, Pg. 36)

4 Data and Methodology

4.1 Fundamental methodology

The DoD exists in many different versions. This thesis examines the version where the top 5 dividend yielding companies with the lowest prices has been chosen to create a portfolio for the coming year. This strategy is often referred to as the "Puppies of the Dow". The strategy will be conducted on the Euro Stoxx 50 as follows[27];

Step 1: Construct an equally weighted portfolio with the five highest dividend yielding stocks, **with the lowest prices out of the top 10** on the 31st of December. Further these stocks will be combined for the coming year's portfolio.

Step 2: Hold the portfolio for one year. On the 31st of December that year, calculate the total return by looking at the value the stock was bought for and the value that it is now worth after re-invested dividends in the stock that generated them.

Step 3: Rebalance the portfolio by using the same method as in Step 1.

Repeat these steps every year.

4.2 Data collection and analysis

All the data in this study will be collected from a Bloomberg terminal and analyzed in excel. Bloomberg is one of the world's most well known and used data base for transparent financial news, information and data which makes this source very reliable[28]. Bloomberg has an excel function that has been used to get dividend yields, last prices, annual dividends per share as well as the 10 year German government bond rates. A very valuable measure that also will be used is the "total return index "[29], also provided by Bloomberg´s.

[27] O´Haggins (2000)
[28] Bloomberg terminal
[29] This measure will be explained further in section Measuring results

4.3 Risk free interest rate

The risk free interest rate that will be used for calculations is an annual average of the yield of ten year German Government bonds. In Table 3.1 below the yields for the period examined can be seen.

Table 4.1 - 10 year German Government Bonds (Yearly average)

Date	Yield (%)
2001	4,851
2002	4,998
2003	4,204
2004	4,292
2005	3,683
2006	3,309
2007	3,948
2008	4,307
2009	2,951
2010	3,387

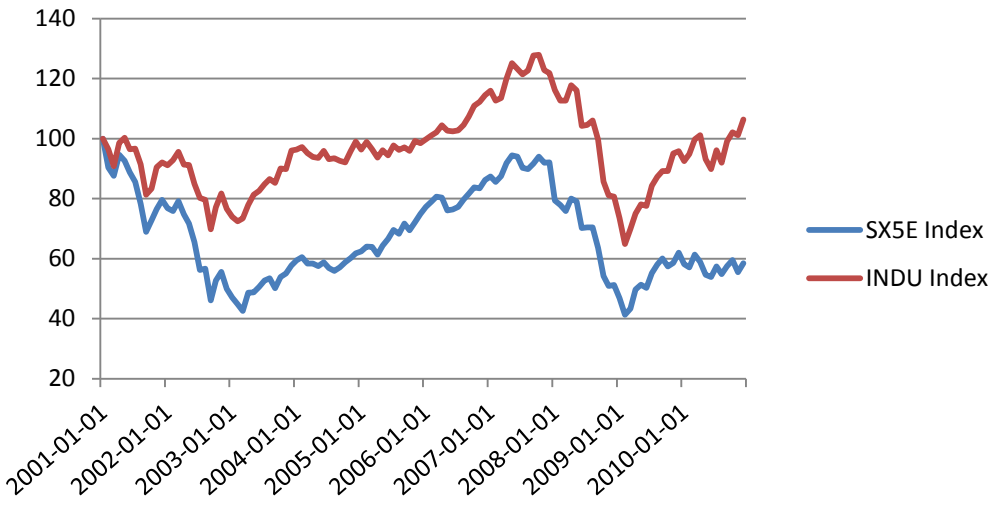
4.4 Selection of index

The benchmark index of this study is the SX5E (Price) Index. This index is a free-float capitalization weighted index that consists of 50 European blue-chip stocks from countries that are members of the European Monetary Union. The index started to run on the 31st of December 1991 with a base value of 1000[30].

The benchmark index has been chosen because of the similarities to the North American index DJIA, which is also a blue-chip index but with only 30 members. As mentioned before this is also the index that the DoD is based on. The United States can also be compared to Europe as both are developed and industrialized regions. As can be seen in Graph 3.1 the two indices have been co varying strongly between 2001 and 2010.

[30] Bloomberg, Eurostoxx 50

Graph 4.1 Last prices for Euro Stoxx 50 (SX5E Index) and Dow Jones Industrial Average (INDU)



The graph shows last prices for 2001-01-01 – 2010-12-31 and has a base value of 100 per 2001-01-01.

A blue-chip index is an index who´s stocks are very stable, nationally recognized and not very volatile. A blue-chip stock is something an investor would use for low risk and steady growth in his portfolio[31].

Because of the similarities of these two markets the great results that have been generated with the DoD in North America should be able to replicate in an European market setting.

4.5 Comprehensive methodology

4.5.1 Construction of portfolios – Highly dividend yielding stocks

The 31st of December every year, the dividend yield for the 50 stocks on the SX5E have been filtered from highest to lowest in excel.

The dividend yield is a measure of how much a company pays out in dividends each year relative to its share price. The definition is shown in Formula 3.1 below[32].

Formula 4.1 Dividend Yield

$$Dividend\ Yield = \frac{Annual\ dividends\ per\ share}{Price\ per\ share}$$

Stocks with high dividend yield can be seen as undervalued by the market, i.e. “dogs” and can be used to beat the market the coming year according to the strategy[33].

[31] Blue-chip index -Investopedia
[32] Dividend Yield - Investopedia
[33] O´Haggins (2000)

4.5.2 Measuring Results – Dividend re-investment

To be able to express the value of the PoD portfolios as well as the SX5E portfolios after re-investing the dividends in the same stock that generated them the "total return index"[34] has been used. This measure is provided by Bloomberg´s and is defined as follows;

"Historically, this is the total return index from the provided start date to the provided end date. Applicable periodicity values are daily, monthly, quarterly, semi-annually and annually. Gross dividends are used."

The total return index considers cash distributions and dividends and reinvests them back into the stock[35]. This shows a realistic value of the portfolio and is essential to use in this study where re-investment is one of the main points.

Benninga explains the process of re-investment of dividends as follows[36];

To calculate the value of a stock after dividend re-investment the new shares purchased at the end of the year is calculated by;

Formula 4.2 New shares purchased

$$New\ shares\ purchased\ at\ the\ end\ of\ year\ = \frac{Dividend\ per\ share}{Share\ price\ at\ end\ year}$$

To get the value of the shares at the end of the investment year the number of shares at the end of the year[37] is multiplied by the share price of the end of the year;

Formula 4.3 Value of shares at end of year

$$Value\ of\ shares\ at\ end\ of\ year = number\ of\ shares\ at\ end\ of\ year * Share\ price\ at\ end\ year$$

This value is than put in relation to the beginning investment and the continuously compounded total return is calculated by;

Formula 4.4

$$Continuously\ compounded\ return = ln\left[\frac{End\ investment\ year\ value}{Beginning\ investment}\right]$$

This measure shows the total performance of a stock over a specified period of time, assuming that dividends are re-invested in the stock that has paid out the dividends. This is also what the PoD strategy advocates.

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[34] This is a measure that has been used in similar studies, for example in Jokob Dahlstedt and Oscar Engellau´s master thesis High dividend yield as investment strategy (2006)
[35] Nasdaq
[36] Benninga (2008, Ch. 8)
[37] New shares purchased at end of year + initial shares

In this study the total returns of both the SX5E and the PoD portfolios will refer to historical total returns that have been generated by re-investing dividends.

4.5.3 Risk Adjustments Components

To keep a portfolio of only five equities, instead of one consisting of a whole index of 50 equities is of course a much more risky and less diversified investment. The PoD portfolio will contain a high level of company specific risk. Considering the assumption of risk aversive investors who requires return for bearing risk the returns have to be risk adjusted by using the measures Sharpe and Treynor´s ratio in comparing the returns of the PoD portfolios to the SX5E portfolios.

The variance of the PoD portfolio of each year is calculated by the formula below[38]:

Formula 4.5

$$\sigma^2{}_{Portfolio_t} = \sum_{n=1}^{N} w_{t,j}^2 \, \sigma^2{}_{t,j} + \sum_{n=1}^{N} 2 * cov(r_{t,k}, r_{t,j})$$

Where:

$w_{t,j}$ = Portfolio weight of stock j during beginning of year t

$\sigma_{t,j}$ = Standard error of stock j during year t

$r_{t,k}$ = Gross return for stock k during year t

$r_{t,j}$ = Gross return for stock j during year t

cov(rt,k, rt, j) = Covariance between monthly total returns of stock k and j, during year i.

To get the standard deviation of the portfolio, take the square root out of above expression of the variance.

[38] Westerlund (2005)

4.5.3.1 The Sharpe ratio

The Sharpe ratio measures the risk adjusted performance of a portfolio by subtracting the risk free rate of return, in this case the rate of 10 year German Government bonds, from the total return of the portfolio relative to its standard deviation i.e. the Sharpe ratio represents excess return per unit of total risk. This measure is appropriate to use when looking at less diversified portfolios which includes a high level of company specific risk. This shows if the return on investment has been generated by a smart investment strategy or if it is all do to taking on a higher level of risk. A high Sharpe ratio shows a good risk-adjusted performance[39].

Formula 4.3 Sharpe ratio

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

where:

r_{pt}= Total return of portfolio i in year t.

r_{ft} = The risk free interest rate at year t (German Government bonds).

σ_{pt}= Standard deviation of portfolio i at year t.

4.5.3.2 Treynor´s ratio

Treynor´s ratio is a measure used in compatibility with the Capital Asset Pricing Model (CAPM). This ratio calculates the risk-adjusted return relative to the beta of the portfolio i.e. the systematic risk. Treynor´s ratio only rewards bearing systematic risk and is a good measure for well diversified portfolios. The beta is the correlation coefficient between the PoD portfolio and the Sx5E and is measured over the 12 month holding period[40].

Formula 4.4 Treynor´s ratio

$$Treynor = \frac{(r_{pt} - r_{rft})}{\beta_{pt}}$$

where:

r_{pt}= Total return of portfolio i in year t.

r_{rft} = The risk free interest rate at tear t (German Government bonds).

β_{pt}= The annual average beta of portfolio i at year t i.e. the portfolios market risk.

[39] Sharpe ratio
[40] Treynor (1965)

4.6 Statistical tests

To see if there is any statistical support to the result, a significance test can be generated. There are different types of tests that can be used under different circumstances i.e. in different population and sample settings. One of the assumptions made in this thesis is that the returns of the stocks are normally distributed and because of that we can generate a hypothesis test using the t-statistic as measure if significance.

5 steps of a hypothesis test[41];

1. Specify the null- and alternative hypotheses that are going to be examined.
2. Specify the test-statistic and its probability distribution under the null hypothesis.
3. Specify the significance level (α) and the critical values of the test.
4. Calculate the value of the test-statistic.
5. Compare the value of the test-statistic and the critical value to be able to formulate a conclusion.

4.6.1 T-test

For statistical support, whether the PoD is a working strategy or not, a one tailed t-test with significance level of 95 percent will be conducted.

To get the t-statistic a number of calculations have to be made. To find the mean return for the sample formula 3.6 is used[42];

Formula 4.5 Mean Return

$$\bar{R} = \frac{r_1 + r_2 \ldots + r_n}{n}$$

Where:

$\bar{R}$ = Mean return of sample

$r_1 + r_2 \ldots + r_n$ = Return during period 1,2 … and n.

n = number of observations

[41] Westerlund (2005)
[42] Westerlund (2005)

To calculate the standard deviation of the sample, s[43] has to be determined by using formula 2.1. To get the t-statistic for the sample formula 3.6 is used[44];

Formula 4.6 T-statistic

$$T = \frac{(R - \mu)}{s/\sqrt{n}}$$

Where:

R = Total return

μ = expected return

s = standard deviation of sample

n = number of observations

Since the purpose of the study is to see whether it is possible to generate abnormal returns the test will be conducted to test if there is a significant difference in the portfolios historical total return during the 10 year period examined.

The hypothesis that will be tested is:

$$H_0: Return\ PoD = Return\ SX5E$$

$$H_1: Return\ PoD > Return\ SX5E$$

If the t-statistic is bigger than the critical value the null hypothesis will be discarded. The t-statistic can then be used to find the p-value. If the p-value is less than the significance level the null hypothesis is discarded[45].

The test will be generated in excel.

4.6.2 Wilcoxon Signed Rank test

For statistical support to the evaluation of Sharpe and Treynor´s ratio a Wilcoxon Signed Rank test will be conducted. This test is used because of few observations that are not normally distributed.

This test will analyze whether there is a significant difference between the Sharpe and Treynor of the PoD portfolios and the SX5E to determine if the risk adjusted PoD portfolio outperforms the benchmark.

[43] S = The standard deviation of a sample
[44] Westerlund (2005)
[45] Wahlgren & Körner (2006)

The hypotheses that will be tested are:

$$H_0: Sharpe\ PoD = Sharpe\ SX5E$$

$$H_1: Sharpe\ PoD > Sharpe\ SX5E$$

These have been tested by a method that add in information about the level of differences between matched pairs based on ranks. This test will be executed in excel.

The test gives you a W-statistic that needs to be compared to a critical value that can be found in a table over critical values for Wilcoxon signed rank tests[46]. In order to discard the alternative hypothesis the W statistic needs to be less than the critical value. The W statistic is the smaller of the sums of the difference between the positive and negative ranks.

The test will be made in the exact same way for the difference in Treynor´s ratio.

4.7 Assumptions

- Dividends are being re-invested in the same stocks that generated them. This will be considered by using the "total return index" that calculates this value. Furthermore this measure will be used on both the PoD portfolios and the SX5E portfolios to make sure that the two portfolios are being compared on equal grounds.
- Risk aversive investors i.e. the investors want to be paid when taking on more risk.
- The assumption that the returns of the PoD portfolios and the SX5E are normally distributed will be made[47].

[46] Will be referred to in section 4 – Result and Analysis
[47] This is an assumption that is made only for simplicity.

5 Results and Analysis

This section will go through the results that have been obtained by applying the PoD on the SX5E. The results for the whole period examined will be presented first, starting with risk measures and results followed by HPR and risk adjustments. Furthermore the performance of the portfolios will be presented year by year. There after a number of statistical tests will be generated on the results to see if there is a significant difference between investing in the PoD and the SX5E portfolios. All the results will also be analyzed in this section.

5.1 Risk measures

5.1.1 Return and Standard deviation

In table 4.1 below the historical total return and the standard deviation is shown. These values are not adjusted for risk. Looking at the averages of the ten years that has been examined, there is quite a difference between the strategies. The PoD has a higher return in eight out of ten years but also a slightly higher standard deviation. A portfolio that is more diversified should be less volatile i.e. the index should have a lower standard deviation in theory[48].

Table 5.1 Return and Standard deviation[49]

	Return PoD	Std. Error PoD	Return SX5E	Std. Error SX5E
2001	**-0,10%**	14,60%	-20,56%	22,13%
2002	**-4,42%**	14,96%	-44,14%	30,81%
2003	**33,17%**	22,28%	17,59%	21,74%
2004	**53,29%**	13,71%	9,66%	9,64%
2005	**30,83%**	15,84%	22,49%	12,36%
2006	**18,42%**	15,60%	17,34%	9,13%
2007	**14,48%**	17,73%	9,86%	8,33%
2008	-70,14%	31,03%	-54,15%	22,95%
2009	**27,75%**	31,50%	23,79%	27,18%
2010	-6,36%	22,44%	-1,84%	19,93%
Average:	**9,69%**	**19,97%**	**-2,00%**	**18,42%**

The standard deviation is an annual average based on the monthly standard deviations from each year of the study.

[48] See section 2.3 Diversification.
[49] The method to calculate the returns and the standard deviations has been replicated from Benninga (2008, Ch. 18)

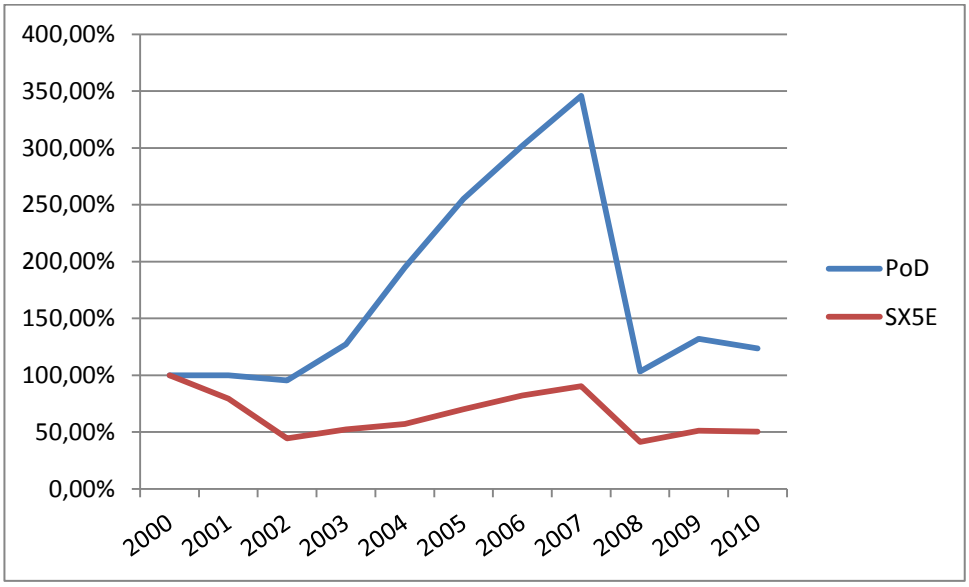
5.2 Holding Period Return (HPR)

The HPR for the PoD and the SX5E on the days of observation[50] is illustrated in table 4.1and graph 4.1 below. It shows the accumulated return with an initial investment of 100 percent.

Table 5.2 Holding Period Return of the PoD and The SX5E portfolios

HPR		
	PoD	SX5E
2000	100,00%	100,00%
2001	99,90%	79,44%
2002	95,48%	44,37%
2003	127,15%	52,18%
2004	194,91%	57,22%
2005	255,01%	70,09%
2006	301,98%	82,24%
2007	345,70%	90,35%
2008	103,24%	41,42%
2009	131,89%	51,28%
2010	123,50%	50,33%

Graph 5.1 Holding Period Return of the PoD and The SX5E portfolios



The graph shows the HPR for the period examined. 2000-12-31 it starts with an investment of 100 percent.

The accumulated result of an initial investment of 100 percent can be seen in the chart above. The PoD had great results until the financial crises started in 2007 when it really plunged. Still, the strategy has a better holding period return than the benchmark throughout the whole period examined.

[50] The observation dates are the last day of every year examined.

5.3 Abnormal Return

The PoD portfolio showed abnormal returns in eight years out of ten years which can be seen in table 4.2 below. Note that this is before adjusting for risk.

Table 5.3 Abnormal Return

	Abnormal return
2001	**0,204555**
2002	**0,397192**
2003	**0,155779**
2004	**0,436338**
2005	**0,083458**
2006	**0,010806**
2007	**0,04621**
2008	-0,15983
2009	**0,03959**
2010	-0,0452

5.4 Risk adjustments

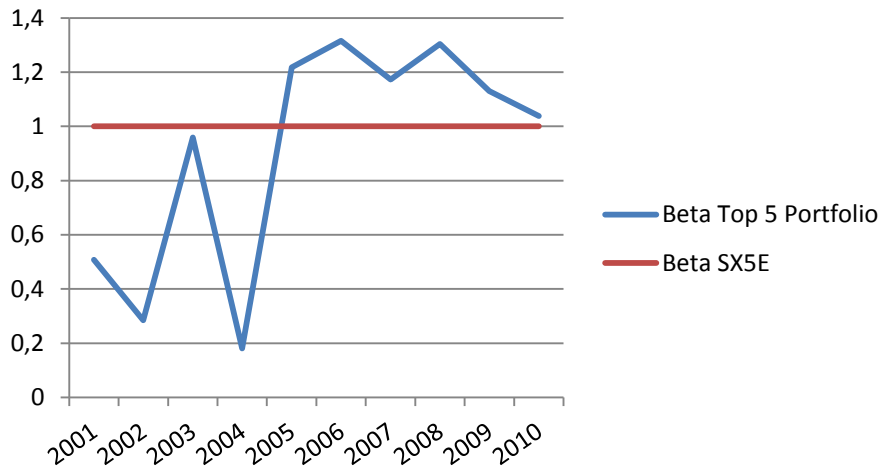
What is interesting in the table below is which one of the investment alternatives that have the highest Sharpe and Treynor´s ratios. The PoD portfolios performed higher Sharpe ratios in seven years out of ten and higher Treynor´s ratios in eight years out of ten. This proves that the PoD strategy outperforms the index also when systematic and company specific risk is taken into account.

Table 5.4 Risk adjustments for the PoD and The SX5E portfolios

	PoD Portfolios			SX5E Index		Difference	
Portfolio Year	Sharpe	Beta	Treynor	Sharpe	Treynor	Sharpe	Treynor
2001	-0,339	0,507	-0,098	-1,148	-0,254	**0,809**	**0,156**
2002	-0,620	0,285	-0,325	-1,590	-0,490	**0,971**	**0,164**
2003	1,271	0,959	0,295	0,586	0,127	**0,685**	**0,168**
2004	3,535	0,181	2,679	0,499	0,048	**3,036**	**2,630**
2005	1,640	1,218	0,213	1,427	0,176	**0,214**	**0,037**
2006	0,870	1,316	0,103	1,368	0,125	-0,498	-0,022
2007	0,543	1,173	0,082	0,601	0,050	-0,058	**0,032**
2008	-2,417	1,303	-0,575	-2,572	-0,590	**0,155**	**0,015**
2009	0,727	1,130	0,203	0,697	0,189	**0,030**	**0,013**
2010	-0,500	1,038	-0,108	-0,336	-0,067	-0,164	-0,041
Average:	0,471	0,911	0,247	-0,047	-0,068	0,518	0,315

When looking at the beta values we can see that they have been varying a lot from year to year. Table 4.2 below illustrates how much[51].

Graph 5.2 Yearly beta value for the PoD and The SX5E portfolios



The beta value is low for the PoD portfolios between 2001 and 2004, which implies that the PoD portfolios are moving less than the benchmark SX5E. 2001-2002 was really bad years for the SX5E which makes it a good thing for the PoD portfolios to have low beta values. Between 2004 and 2007 the performance of the SX5E is relatively good and with a high beta, the PoD portfolio generates returns that are remarkably well compared to the index. The beta is going down during 2008 – 2010, but not below one. This is showed by worse returns for the PoD in 2008 and 2010 and a slightly higher return in 2009.

[51] The beta of the SX5E is 1 since it is considered the benchmark.

Portfolio performance year by year

The results of the PoD portfolios will now be presented year by year from 2001 – 2010. The ticker name of the companies will be used throughout this section[52]. All the graphs have been indexed and have a base of 100 on the start day of every portfolio year.

5.4.1 Portfolio performance 2001

The portfolio of 2001 consisted of MT NA, IBE SQ, DG FP, BAS GY and SGO FP. The price development over the year that the portfolio was held is shown in the graph 4.3 below[53].

Graph 5.3 Price development 2001

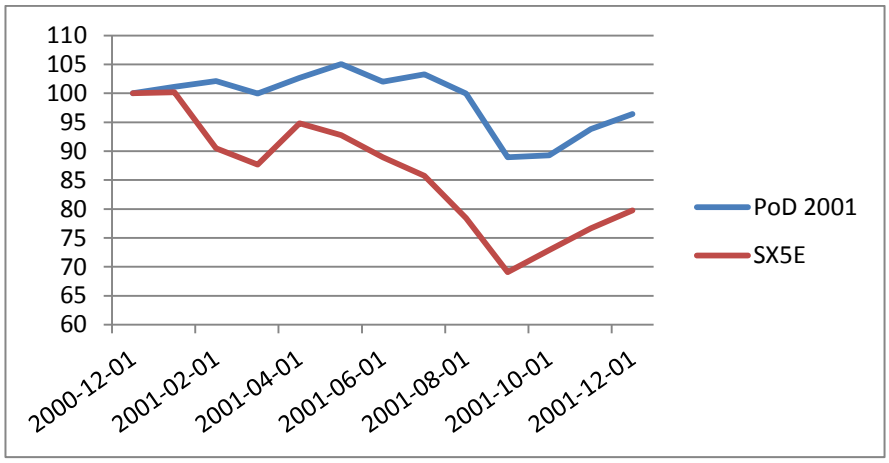


Table 4.5 shows the return, variance and standard deviation of the PoD and the SX5E of the examined year.

Table 5.5 Performance 2001

	SX5E	PoD
Total annual return:	-20,56%	-0,10%
Variance p.m.	0,41%	0,18%
Variance p.a.	4,90%	2,13%
Standard deviation p.m.	6,39%	4,21%
Standard deviation p.a.	22,13%	14,60%

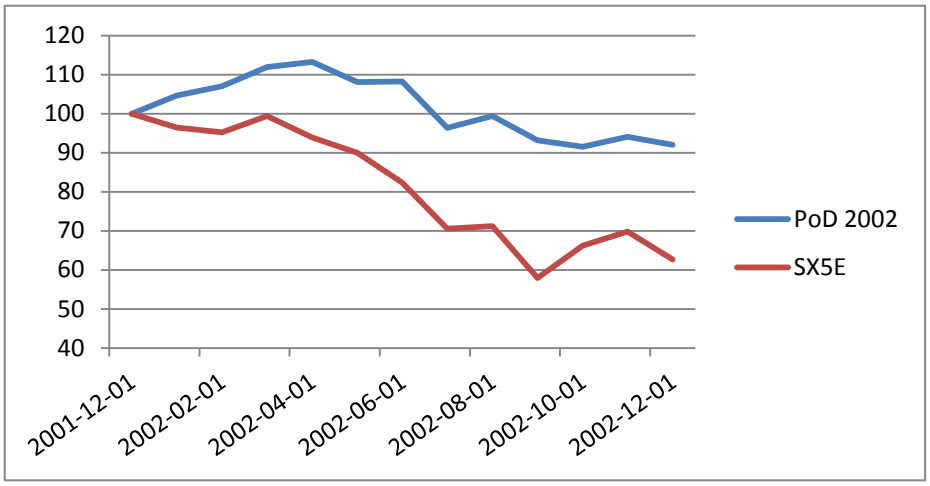
What can be seen is that the SX5E has a total annual return of -20,56 percent while the PoD lost next to nothing in value during the year it was held. An unexpected result is that the standard deviation of the benchmark is much higher than for the less diversified PoD portfolio. As mentioned before the standard deviation of a well diversified portfolio should in theory be lower than for a portfolio containing only five equities.

[52] See table after abstract for full names
[53] Note that the graph is showing the price development of the two strategies while the total annual return is calculated considering the value after re-investing dividends.

5.4.2 Portfolio performance 2002

Three of the equity's from the 2001 portfolio have been discarded and the 2002 PoD portfolio consisted of MT NA, IBE SQ, ENEL IM, ENI IM, and DG FP. The price development of this portfolio year was again negative, thus much less for the PoD portfolio than for the benchmark.

Graph 5.4 Price development 2002



It can be seen in the table below that the SX5E once and again has a much higher standard deviation than the PoD portfolio. The SX5E lost as much as 44,14 percent during this year, compared to a loss of only 4,42 percent for the PoD portfolio.

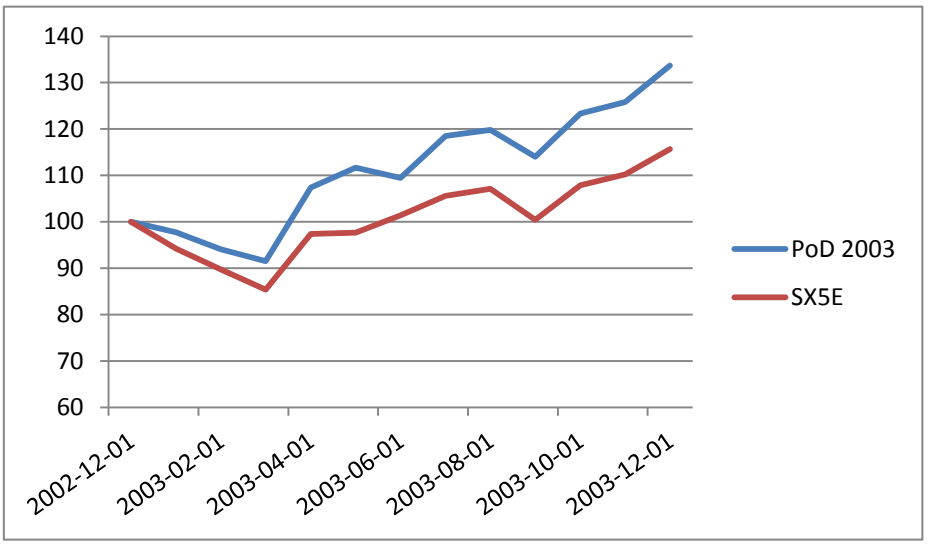
Table 5.6 Performance 2002

	SX5E	PoD
Total annual return:	-44,14%	-4,42%
Variance p.m.	0,79%	0,19%
Variance p.a.	9,49%	2,24%
Standard deviation p.m.	8,89%	4,32%
Standard deviation p.a.	30,81%	14,96%

5.4.3 Portfolio performance 2003

The portfolio of 2003 consists of MT NA, IBE SQ, ENEL IM, INGA NA and ACA FP. This means that two securities have been exchanged at the rebalancing. During this year the price has gone in a positive direction and the PoD portfolios has gained 33,17 percent compared to 17,59 percent for the benchmark.

Graph 5.5 Price development 2003



This year the standard deviation of the returns is almost exactly the same for both the PoD and the SX5E. As can be seen above in the graph the price development for both portfolios has followed the same trend. This can be explained by a PoD beta value of 0,959 for this year.

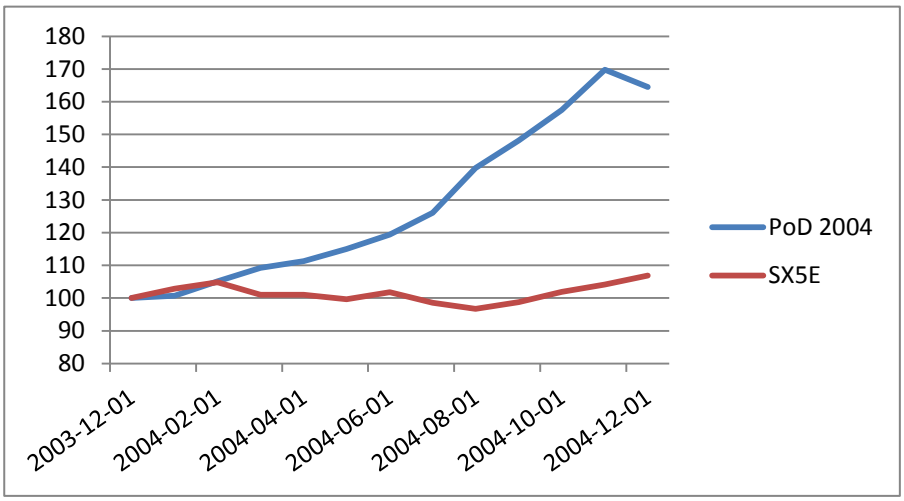
Table 5.7 Performance 2003

	SX5E	PoD
Total annual return:	17,59%	33,17%
Variance p.m.	0,39%	0,41%
Variance p.a.	4,73%	4,97%
Standard deviation p.m.	6,28%	6,43%
Standard deviation p.a.	21,74%	22,28%

5.4.4 Portfolio performance 2004

For portfolio year 2004 the rebalancing involved replacing IBE SQ and ACA FP with TIT IM and ANI IM. This year the PoD completely outperformed the benchmark with a total annual return of 53,29 percent compared to 9,66 percent for the benchmark. This is the best year out of all ten years for the PoD portfolio.

Graph 5.6 Price development 2004



The standard deviation of this year is slightly higher for the PoD because of its great return this year. The two portfolios have not followed the same trend at all this year which also can be seen by looking at the beta value that is equal to 0,181 this year.

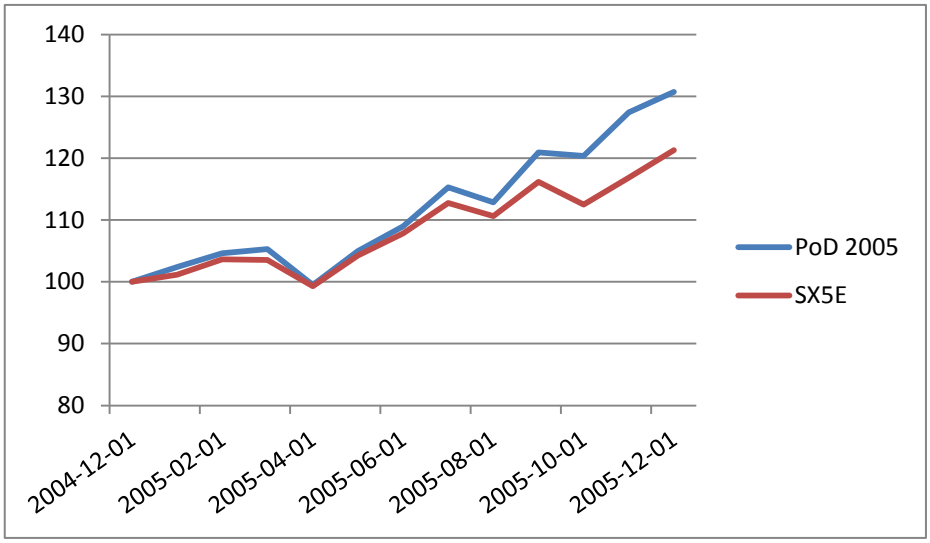
Table 5.8 Performance 2004

	SX5E	PoD
Total annual return:	9,66%	53,29%
Variance p.m.	0,08%	0,16%
Variance p.a.	0,93%	1,88%
Standard deviation p.m.	2,78%	3,96%
Standard deviation p.a.	9,64%	13,71%

5.4.5 Portfolio performance 2005

In 2005 the PoD portfolio was composed of UNA NA, ENEL IM, INGA NA, GLE FP and BNP FP. This year was a positive year for both the prices of the PoD and for the benchmark. Thus the price development for the PoD was slightly better than for the benchmark.

Graph 5.7 Price development 2005



The total annual return of the PoD portfolio is once again higher for the PoD portfolio than for the benchmark, with a gain in value of 30,83 percent, compared to 22,49 percent. The standard deviation is around the same percentage for the strategies this year but still a bit higher for the PoD portfolio. The higher total return and the higher standard deviation can be explained by a beta value of the PoD portfolio of 1,2.

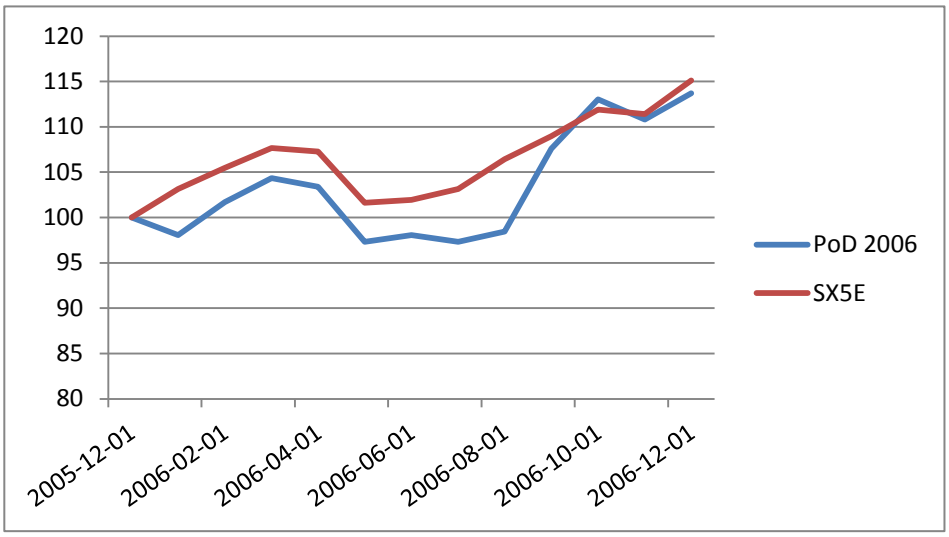
Table 5.9 Performance 2005

	SX5E	PoD
Total annual return:	22,49%	30,83%
Variance p.m.	0,13%	0,21%
Variance p.a.	1,53%	2,51%
Standard deviation p.m.	3,57%	4,57%
Standard deviation p.a.	12,36%	15,84%

5.4.6 Portfolio performance 2006

In the portfolio of 2006 ENEL IM was the only equity remaining from 2005 joined by the newcomers TIT IM, ISP IM, IBE SQ and DTE GY. This year is the first year that the SX5E has a better price development than the PoD.

Graph 5.8 Price development 2006



But even if the SX5E has a better price development this year the PoD portfolio has a better total annual return. This can happen because the dividends that are paid out are reinvested in the stock that generated them. This gives the portfolio extra value when looking at the total annual return. Looking at the table below it can be seen that the PoD portfolio has a higher standard deviation this year. The correlation coefficient between the returns of this year is 0,77, which means that the portfolios are quite correlated. This can also be seen by looking at graph 4.8 above.

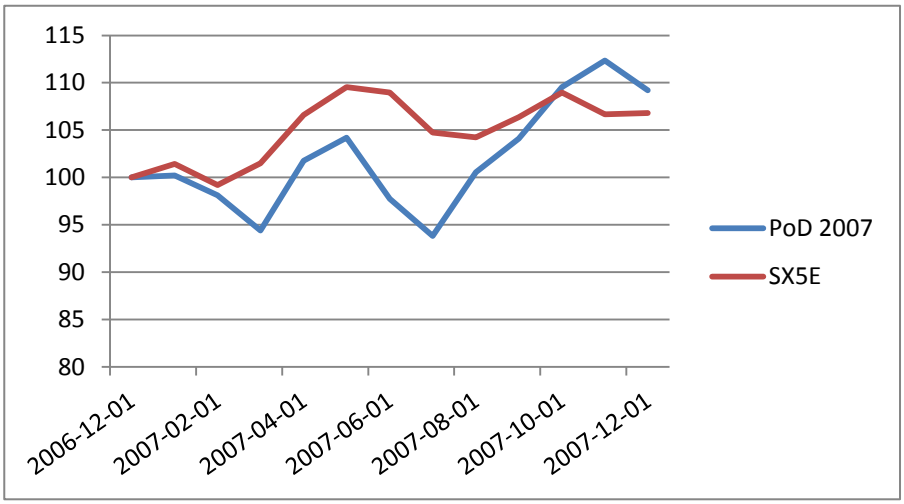
Table 5.10 Performance 2006

	SX5E	PoD
Total annual return:	17,34%	18,42%
Variance p.m.	0,07%	0,20%
Variance p.a.	0,83%	2,43%
Standard deviation p.m.	2,64%	4,50%
Standard deviation p.a.	9,13%	15,60%

5.4.7 Portfolio performance 2007

In 2007 the PoD portfolio kept TIT IM, ISP IM and ENEL IM and added DTE GY and FTE FP. This year the price development is once again better for the PoD portfolio and the strategy also outperforms the benchmark with a total annual return of 14,48 percent compared to 9,86 percent.

Graph 5.9 Price development 2007



The beta of the PoD portfolio this year is greater than 1 (1,17) and the correlation between the two portfolios is lower than before with a correlation coefficient of 0,55. The PoD portfolio also has a higher standard deviation this year.

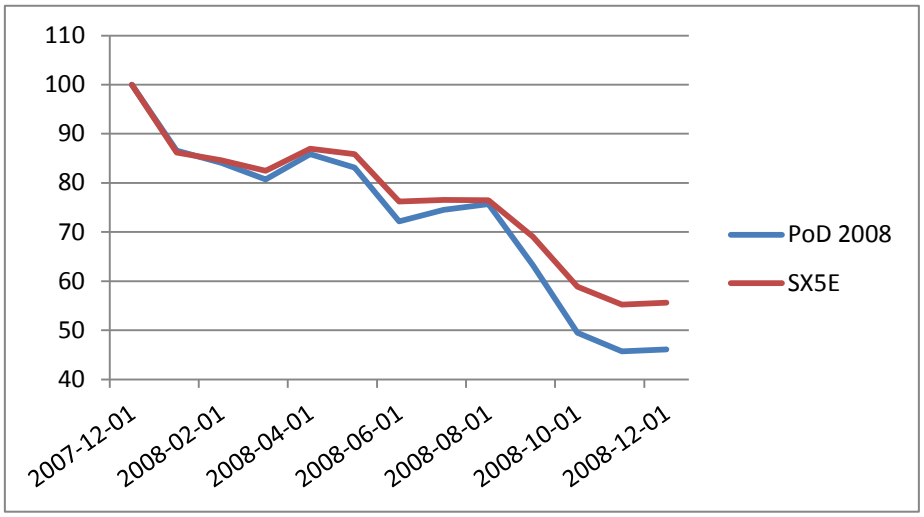
Table 5.11 Performance 2007

	SX5E	PoD
Total annual return:	9,86%	14,48%
Variance p.m.	0,06%	0,26%
Variance p.a.	0,69%	3,15%
Standard deviation p.m.	2,40%	5,12%
Standard deviation p.a.	8,33%	17,73%

5.4.8 Portfolio performance 2008

2008 the portfolio was rebalanced to the five equity's UCG IM, ISP IM, ENEL IM, DTE GY and INGA NA i.e. a change of two stocks since the year before. This was a bad year both for the SX5E and the PoD. The price depreciation of the benchmark is thus slightly less than for the PoD portfolio.

Graph 5.10 Price development 2008



Looking at the total annual return it can be seen that the PoD made a loss of 70,14 percent while the SX5E was down by "only" 54,15 percent. The portfolios were very correlated this year with a correlation coefficient of 0,96. The beta of this year is 1,3. Neither one of the investment strategies worked during the financial crises peak which was present during 2008.

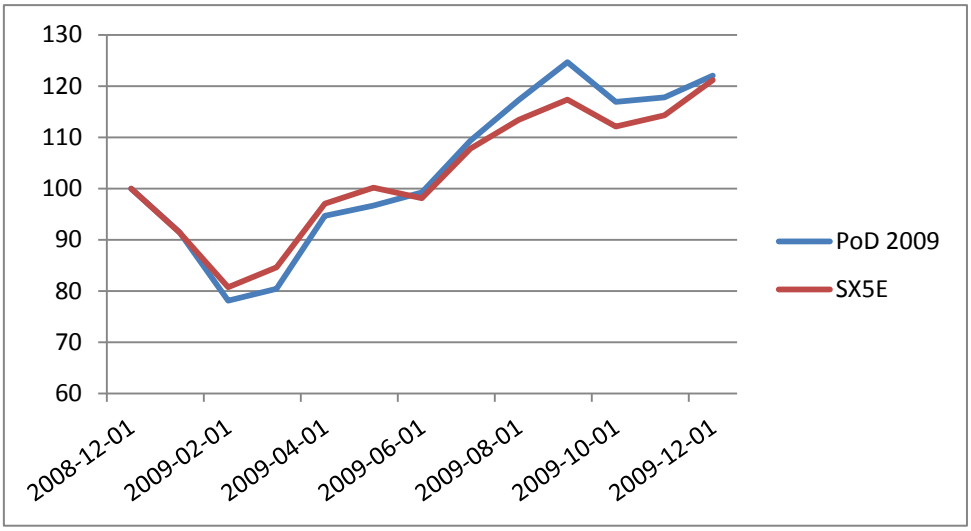
Table 5.12 Performance 2008

	SX5E	PoD
Total annual return:	-54,15%	-70,14%
Variance p.m.	0,44%	0,80%
Variance p.a.	5,26%	9,63%
Standard deviation p.m.	6,62%	8,96%
Standard deviation p.a.	22,95%	31,03%

5.4.9 Portfolio performance 2009

At the 2009 rebalancing the two equities REP SQ and SAN were added to the portfolio and ISP IM and DTE GY were discarded. This year the prices start to rise again and the development of the two portfolios are almost exactly the same. The beta of the PoD portfolio is slightly over 1 with a value of 1,13 and the correlation coefficient is 0,97. The correlation can easily be seen in the graph, with a slight overreaction of the PoD in regards to the somewhat higher beta value.

Graph 5.11 Price development 2009



The total return is higher for the PoD portfolio during 2009 with an annual total return of 27,75 percent compared to 23,79 percent for the benchmark. The standard deviation this year is higher for the PoD, thus just by approximately 4 percent.

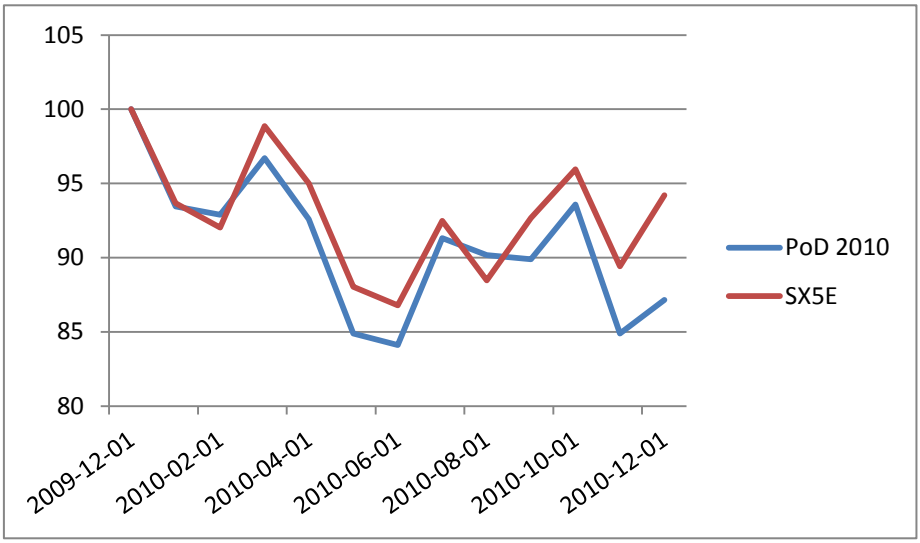
Table 5.13 Performance 2009

	SX5E	PoD
Total annual return:	23,79%	27,75%
Variance p.m.	0,62%	0,83%
Variance p.a.	7,39%	9,92%
Standard deviation p.m.	7,85%	9,09%
Standard deviation p.a.	27,18%	31,50%

5.4.10 Portfolio performance 2010

For the last year of this study the portfolio consisted of the constantly recurring ENEL IM but also DTE GY, SAN SQ, FTE FP and ENI IM. This year was a quite volatile year for both of the portfolios with a strong correlation coefficient of 0,92 and a beta of 1,03.

Graph 5.12 Price development 2010



This last year of the period examined the PoD makes a loss of 6,36 percent compared to a loss of 1,84 percent for the benchmark. This is the second year that the PoD portfolio performs worse than the benchmark. Worth noting is that the PoD portfolio only performance worse in negative market settings.

Table 5.14 Performance 2010

	SX5E	PoD
Total annual return:	-1,84%	-6,36%
Variance p.m.	0,33%	0,42%
Variance p.a.	3,97%	5,04%
Standard deviation p.m.	5,75%	6,48%
Standard deviation p.a.	19,93%	22,44%

5.5 Applied Statistical tests

5.5.1 T-test

To get-statistical credibility to the results a t-test was generated on the total annual returns for the whole period examined. The test is a two-tailed test with a significance level of 95 percent.

Hypotheses:

$$H_0: Ruturn\ PoD = Return\ SX5E$$

$$H_1: Ruturn\ PoD > Return\ SX5E$$

Table 5.15

t-Test: Paired Two Sample for Means
α = 5 %

	Variable 1	*Variable 2*
		-
Mean	0,096921634	0,019968163
Variance	0,113891659	0,079331383
Observations	10	10
Pearson Correlation	0,83169734	
Hypothesized Mean Difference	0	
df	9	
t Stat	1,972660634	
P(T<=t) one-tail	0,039999486	
t Critical one-tail	1,833112923	
P(T<=t) two-tail	0,079998972	
t Critical two-tail	2,262157158	

The test has a t-stat of 1,97 > the critical value of 1,83 which leads to the conclusion that the null hypothesis is discarded. There is a significant difference between the returns generated by the PoD strategy and the SX5E during the period 2001 – 2010. This result can also be generated by looking at the p-value which is equal to 0,039. If the p-value is less than the significance level i.e. it is not on the "wrong side" of the tail of the test, the null hypothesis is discarded. In this case 0,039 < 0,05, which means that the returns of the PoD strategy are higher than the ones of the SX5E on a statistically secured level of 95 percent.

5.5.2 Wilcoxon signed rank test

Below a Wilcoxon signed rank test is conducted on the differences in Sharpe between the PoD portfolios and the SX5E portfolio over the time examined. The critical value for this one tailed test, on a 95% significance level is 11[54], which is less than the W statistic of 12. This leads to a discard of the alternative hypothesis i.e. there is no significant difference between the Sharpe ratio of the PoD portfolios and the SX5E portfolio during the time period 2001 – 2010.

Table 5.16 Wilcoxon signed rank test – Sharpe ratio

W-statistic: 12 > Critical value: 11

Wilcoxon signed rank test					
Sharpe ratio	**α= 5 %**				
PoD Portfolio	SX5E Portfolio	Abslolute value of difference	Rank	Rank if Positive	Rank if negative
-0,339	3743,970	0,809	8	8	
-0,620	-1,590	0,971	9	9	
1,271	0,586	0,685	7	7	
3,535	0,499	3,036	10	10	
1,640	1,427	0,214	5	5	
0,870	1,368	0,498	6		6
0,543	0,601	0,058	2		2
-2,417	-2,572	0,155	3	3	
0,727	0,697	0,030	1	1	
-0,500	-0,336	0,164	4		4

The result of the test on Treynor´s ratio shows something else. The observed value of 9 is less than the critical value of 11, which means that the alternative hypothesis is accepted. This means that Treynor´s ratio is higher for the PoD portfolios than for the SX5E portfolios on a statistically secured level of 95 percent.

Table 5.17 Wilcoxon signed rank test – Treynor´s ratio

W-statistic: 9 < Critical value: 11

Wilcoxon signed rank test					
Treynor´s ratio	**α= 5 %**				
PoD Portfolio	SX5E Portfolio	Abslolute value of difference	Rank	Rank if Positive	Rank if negative
-0,098	-0,254	0,156	7	7	
-0,325	-0,490	0,164	8	8	
0,295	0,127	0,168	9	9	
2,679	0,048	2,630	10		
0,213	0,176	0,037	5	5	
0,103	0,125	0,022	3		3
0,082	0,050	0,032	4	4	
-0,575	-0,590	0,015	2	2	
0,203	0,189	0,013	1	1	
-0,108	-0,067	0,041	6		6

[54] See appendix 3 for table over critical values for Wilcoxon signed rank test.

6 Conclusion

This thesis examines if the investment strategy "Puppies of the Dow" is a working strategy applied to a European market setting during the years 2001-2010. The purpose was to determine whether the strategy could be successfully replicated in a different market with conditions differing from the once underlying the Dow Jones Industrial Average that the investment strategy originates from. This was made by investing an equal amount (20 percent of investment) in the five stocks of the Euro Stoxx 50 that had the highest dividend yield and the lowest price out of the top ten dividend yielding stocks. This process was conducted on the last day of every year. These stocks were then held as the PoD portfolio for the year to come.

The empirical findings suggest that the PoD strategy is a very useful strategy, especially in positive market settings. The strategy showed positive abnormal returns in eight years out of ten and 2008 and 2010 were the only years where the PoD portfolio did not outperform the benchmark. The beta value of the PoD portfolios was under one between 2001 and 2004. This can explain why the first two years (2001 and 2002) of investment did better than the benchmark even though the market was going down. The Sharpe ratio of the PoD strategy was higher than for the SX5E in seven years out of ten, which suggests that the PoD strategy is a better alternative also when looking at company specific risk. Even though this result is very interesting there was no statistical support to it (thus very close). Treynor´s ratio were higher for the PoD portfolios than for the SX5E portfolio in eight years out of ten which suggests that the strategy is also better taking systematic risk into account. This result was statistically secured.

The holding period return of the PoD portfolio was excellent up to the end of 2007 where it had generated an accumulated return of 346 percent. But then the financial crisis hit and all the accumulated capital that the strategy had generated was lost. Looking at the whole period the PoD strategy was a clear winner compared to the SX5E.

The conclusion that can be drawn by this study is that there is a significant difference in total return investing in the "Puppies of the Dow" portfolio compared to investing in the SX5E portfolio. Looking at risk adjusted return, the Sharpe ratio showed insignificant differences but it was statistically secured that the Treynor´s ratio was higher for the strategy over the period examined. Over all, the study proves that the "Puppies of the Dow" investment strategy was a success applied to the European market between 2001 and 2010.

7 Critical Discussion

Because of the ignorance of taxes in this study the results cannot be considered completely realistic. Received dividends are directly taxed for the gain and it wouldn´t be possible to invest the whole dividend in new shares of stock. But, since this thesis include re-investing dividends in both the index portfolio and the PoD the value of the result should somewhat be relevant.

Furthermore transaction costs have also been ignored for both of the portfolios. In practice the transaction costs of the PoD should be higher than for holding an index because of the rebalancing each year. Previous research has also ignored this with the argument that rebalancing once a year could be considered a sheep alternative anyway.

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9 Appendix

Appenrix 1 – Top 10 Dividend yields

2001			2002		
Equity	last px	DY	Equity	last px	DY
MT NA Equity	2,5237	6,0022	MT NA Equity	1,8406	6,0022
IBE SQ Equity	3,3375	4,0749	IBE SQ Equity	3,655	4,0219
DG FP Equity	16,077	3,7786	ENEL IM Equity	5,5702	5,6971
BAS GY Equity	24,085	3,8368	ENI IM Equity	14,051	5,3377
SGO FP Equity	37,9979	3,8553	DG FP Equity	16,1629	3,8724
DAI GY Equity	44,74	7,4816	SGO FP Equity	38,4976	3,9823
BNP FP Equity	45,0835	3,6096	BNP FP Equity	48,4587	3,5821
BAYN GY Equity	52,335	3,3136	SU FP Equity	53,4545	3,6111
UL FP Equity	56,5667	3,4532	GLE FP Equity	55,3893	5,0119
GLE FP Equity	58,3416	4,7583	UL FP Equity	57,05	4,2594

2003			2004		
Equity	last px	DY	Equity	last px	DY
MT NA Equity	1,9449	6,0022	TIT IM Equity	2,35	4,4255
IBE SQ Equity	3,3375	4,5693	ENEL IM Equity	4,7513	6,679
ENEL IM Equity	4,3722	7,2581	MT NA Equity	6,7362	6,0022
INGA NA Equity	12,3936	6,0099	INGA NA Equity	14,1981	5,2461
ACA FP Equity	12,9561	5,7371	ENI IM Equity	14,96	5,0134
ENI IM Equity	15,15	4,9505	DG FP Equity	16,1138	5,3922
SGO FP Equity	25,4016	6,0622	ACA FP Equity	17,1859	4,3582
DAI GY Equity	29,35	5,1107	SGO FP Equity	35,2588	4,4447
BNP FP Equity	37,4458	4,6356	GLE FP Equity	61,6905	5,3571
GLE FP Equity	48,9118	5,6757	UL FP Equity	74,35	4,963

2005			2006		
Equity	last px	DY	Equity	last px	DY
UNA NA Equity	3,01	3,8313	TIT IM Equity	2,46	5,6911
ENEL IM Equity	6,3741	9,5422	ISP IM Equity	4,197	4,9162
INGA NA Equity	17,093	4,8068	IBE SQ Equity	5,7725	3,8328
GLE FP Equity	18,42	4,4325	ENEL IM Equity	5,8461	9,4994
BNP FP Equity	20,1546	3,7523	DTE GY Equity	14,08	5,1136
ENI IM Equity	24,2505	4,886	FTE FP Equity	20,99	4,7642
MT NA Equity	25,8156	6,0022	INGA NA Equity	22,4988	4,0273
IBE SQ Equity	40,2646	4,1074	ENI IM Equity	23,43	4,6948
UCG IM Equity	65,6123	4,8463	BNP FP Equity	65,9135	3,804
DAI GY Equity	115,8	4,2541	GLE FP Equity	91,5664	4,3311

2007			2008		
Equity	last px	DY	Equity	last px	DY
TIT IM Equity	2,29	6,1135	UCG IM Equity	4,5857	4,5783
ISP IM Equity	5,4866	6,4957	ISP IM Equity	5,0739	7,024
ENEL IM Equity	6,8889	6,27	ENEL IM Equity	7,171	6,0234
DTE GY Equity	13,84	5,1836	DTE GY Equity	15,02	5,1896
FTE FP Equity	20,95	5,7279	INGA NA Equity	20,5407	5,5327
ENI IM Equity	25,48	4,9058	ACA FP Equity	21,2879	5,2016
VIV FP Equity	29,61	4,0527	FTE FP Equity	24,62	5,2803
BAS GY Equity	36,925	4,0519	ENI IM Equity	25,05	5,1896
RWE GY Equity	83,5	4,1796	DBK GY Equity	81,575	5,0296
GLE FP Equity	114,0919	4,0435	UL FP Equity	149,92	4,6692

2009			2010		
Equity	last px	DY	Equity	last px	DY
ENEL IM Equity	3,9866	10,8347	ENEL IM Equity	4,0475	6,1767
INGA NA Equity	5,6285	10,0955	DTE GY Equity	10,29	7,5802
SAN SQ Equity	6,75	13,1061	SAN SQ Equity	11,55	5,1948
DTE GY Equity	10,75	7,2558	FTE FP Equity	17,43	8,0321
REP SQ Equity	15,1	6,9536	ENI IM Equity	17,8	5,618
ENI IM Equity	16,74	7,7658	TEF SQ Equity	19,52	5,8914
FTE FP Equity	19,96	7,014	VIV FP Equity	20,795	6,7324
BAS GY Equity	27,73	7,0321	RWE GY Equity	67,96	5,1501
RWE GY Equity	63,7	7,0644	MUV2 GY Equity	108,67	5,2912
UL FP Equity	106,5	7,0423	UL FP Equity	153,7	5,2049

Appendix 2 - Beta Values

	PoD
Portfolio Year	**Beta**
2001	0,507490873
2002	0,284928326
2003	0,959171315
2004	0,180858241
2005	1,217628338
2006	1,316177782
2007	1,172711529
2008	1,303449274
2009	1,129722466
2010	1,038020637
Average:	0,911015878

Appendix 3 – Critical values for Wilcoxon signed rank test

Critical Values for the Wilcoxon Signed-Rank Test

n = total number of + and – signs combined

	α			
n	.005 (one tail) .01 (two tails)	.01 (one tail) .02 (two tails)	.025 (one tail) .05 (two tails)	.05 (one tail) .10 (two tails)
5	*	*	*	1
6	*	*	1	2
7	*	0	2	4
8	0	2	4	6
9	2	3	6	8
10	3	5	8	11
11	5	7	11	14
12	7	10	14	17
13	10	13	17	21
14	13	16	21	26
15	16	20	25	30
16	19	24	30	36
17	23	28	35	41
18	28	33	40	47
19	32	38	46	54
20	37	43	52	60
21	43	49	59	68
22	49	56	66	75
23	55	62	73	83
24	61	69	81	92
25	68	77	90	101
26	76	85	98	110
27	84	93	107	120
28	92	102	117	130
29	100	111	127	141
30	109	120	137	152

NOTES:

1. * indicates that it is not possible to get a value in the critical region.
2. Reject the null hypothesis if the test statistic *T* is less than or equal to the critical value found in this table. Fail to reject the null hypothesis if the test statistic *T* is greater than the critical value found in the table.

Appendix 4 – Total Return Index, last price and continuous return

PoD Portfolio 2001

PoD Portfolio	TRI	last price	Continious return
2000-12-29	16,80422	16,80422	
2001-01-31	17,00814	16,99664	0,0120620
2001-02-28	17,1764	17,16352	0,0105207
2001-03-30	16,80928	16,79666	-0,0208551
2001-04-30	17,55524	17,25646	0,0441724
2001-05-31	17,9433	17,65134	0,0390302
2001-06-29	17,52192	17,14222	-0,0073590
2001-07-31	17,9727	17,35546	0,0473095
2001-08-31	17,39852	16,7937	0,0024780
2001-09-28	15,48246	14,94458	-0,0812960
2001-10-31	15,54022	15,00146	0,0390828
2001-11-30	16,34342	15,76926	0,0856778
2001-12-31	16,78682	16,20622	0,0625316

SX5E 2001

SX5E	TRI	last price	Continious return
2000-12-29	4772,595	4772,39	
2001-01-31	4782,0018	4779,9	0,0020
2001-02-28	4323,2799	4318,88	-0,1004
2001-03-30	4193,2206	4185	-0,0295
2001-04-30	4549,3235	4525,01	0,0835
2001-05-31	4489,7831	4426,24	-0,0078
2001-06-29	4317,6194	4243,91	-0,0248
2001-07-31	4166,3991	4091,38	-0,0184
2001-08-31	3819,5756	3743,97	-0,0687
2001-09-28	3363,6301	3296,66	-0,1071
2001-10-31	3550,6355	3478,63	0,0742
2001-11-30	3734,6171	3658,27	0,0710
2001-12-31	3885,6865	3806,13	0,0603

PoD Portfolio 2002

PoD Portfolio	TRI	last price	Continious return
2001-12-31	8,25594	8,25594	
2002-01-31	8,65222	8,63992	0,0468830
2002-02-28	8,84952	8,83656	0,0239699
2002-03-29	9,2563	9,24296	0,0464067
2002-04-30	9,36138	9,34784	0,0127305
2002-05-31	8,93462	8,92134	-0,0452117
2002-06-28	9,26106	8,93848	0,0373724
2002-07-31	8,26034	7,95282	-0,0788998
2002-08-30	8,52604	8,20844	0,0695984
2002-09-30	7,99042	7,69164	-0,0269196
2002-10-31	7,84638	7,55482	0,0199183
2002-11-29	8,07044	7,76746	0,0660222
2002-12-31	7,89876	7,59706	0,0167626

SX5E 2002

SX5E	TRI	last price	Continious return
2001-12-31	3885,6865	3806,13	
2002-01-31	3751,113	3670,26	-0,0146
2002-02-28	3704,5902	3624,74	0,0093
2002-03-29	3870,5013	3784,05	0,0656
2002-04-30	3670,0374	3574,23	-0,0306
2002-05-31	3555,1208	3425,79	-0,0054
2002-06-28	3263,7403	3133,39	-0,0485
2002-07-31	2801,8769	2685,79	-0,1118
2002-08-30	2834,7515	2709,29	0,0540
2002-09-30	2306,4705	2204,39	-0,1610
2002-10-31	2636,9424	2518,99	0,1792
2002-11-29	2782,0339	2656,85	0,0993
2002-12-31	2498,9748	2386,41	-0,0613

PoD Portfolio 2003

PoD Portfolio	TRI	last price	Continious return
2002-12-31	7,00086	7,00086	
2003-01-31	6,85252	6,83952	-0,0214165
2003-02-28	6,60092	6,5874	-0,0355085
2003-03-31	6,42096	6,40676	-0,0255911
2003-04-30	7,60464	7,51566	0,1714049
2003-05-30	7,90354	7,81854	0,0503219
2003-06-30	7,9281	7,66302	0,0139156
2003-07-31	8,59726	8,2942	0,1150374
2003-08-29	8,76834	8,3886	0,0555910
2003-09-30	8,33452	7,9824	-0,0064677
2003-10-31	9,01814	8,63456	0,1219990
2003-11-28	9,1915	8,80878	0,0625064
2003-12-31	9,75466	9,3578	0,1019962

SX5E 2003

SX5E	TRI	last price	Continious return
2002-12-31	2498,9748	2386,41	
2003-01-31	2357,5391	2248,17	-0,0122
2003-02-28	2245,653	2140,73	-0,0011
2003-03-31	2140,5647	2036,86	-0,0001
2003-04-30	2459,4509	2324,23	0,1885
2003-05-30	2490,6998	2330,06	0,0692
2003-06-30	2599,8835	2419,51	0,1096
2003-07-31	2712,8639	2519,79	0,1144
2003-08-29	2757,3001	2556,71	0,0901
2003-09-30	2583,841	2395,87	0,0106
2003-10-31	2778,426	2575,04	0,1481
2003-11-28	2839,0367	2630,47	0,0976
2003-12-31	2979,6725	2760,66	0,1247

PoD Portfolio 2004

PoD Portfolio	TRI	last price	Continious return
2003-12-31	8,59912	8,59912	
2004-01-30	8,65948	8,65948	0,0069948
2004-02-27	9,0425	9,0425	0,0432810
2004-03-31	9,39212	9,39212	0,0379354
2004-04-30	9,64172	9,56648	0,0262285
2004-05-31	9,9886	9,8899	0,0431791
2004-06-30	10,5834	10,267	0,0677727
2004-07-30	11,16048	10,83848	0,0834441
2004-08-31	12,41636	12,0185	0,1359122
2004-09-30	13,15782	12,744	0,0905691
2004-10-29	13,96046	13,53948	0,0911685
2004-11-30	15,08852	14,60194	0,1083243
2004-12-31	14,65232	14,14254	0,0034443

SX5E 2004

SX5E	TRI	last price	Continious return
2003-12-31	2979,6725	2760,66	
2004-01-30	3068,424	2839,13	0,1057
2004-02-27	3127,6383	2893,18	0,0968
2004-03-31	3017,509	2787,49	0,0421
2004-04-30	3035,1315	2787,48	0,0851
2004-05-31	3026,6396	2749,62	0,0823
2004-06-30	3107,983	2811,08	0,1225
2004-07-30	3013,6384	2720,05	0,0696
2004-08-31	2964,4904	2670,79	0,0861
2004-09-30	3026,1448	2726,3	0,1249
2004-10-29	3122,4726	2811,72	0,1357
2004-11-30	3198,3189	2876,39	0,1288
2004-12-31	3281,8742	2951,01	0,1319

PoD Portfolio 2005

PoD Portfolio	TRI	last price	Continious return
2003-12-31	31,38454	31,38454	
2004-01-30	32,13676	32,13676	0,0236851
2004-02-27	32,84006	32,84006	0,0216486
2004-03-31	33,04728	33,04728	0,0062902
2004-04-30	31,31364	31,22456	-0,0538855
2004-05-31	34,09362	32,94734	0,0879053
2004-06-30	35,46194	34,20302	0,0735495
2004-07-30	37,5126	36,18026	0,0923629
2004-08-31	36,79972	35,41078	0,0169766
2004-09-30	39,43488	37,94712	0,1076344
2004-10-29	39,26052	37,78086	0,0340258
2004-11-30	41,64264	39,98808	0,0973220
2004-12-31	42,71986	41,02162	0,0660825

SX5E 2005

SX5E	TRI	last price	Continious return
2004-12-31	3281,8742	2951,01	
2005-01-31	3323,7911	2984,59	0,1190
2005-02-28	3411,6487	3058,32	0,1337
2005-03-31	3408,7594	3055,73	0,1085
2005-04-29	3299,2658	2930,1	0,0767
2005-05-31	3499,5097	3076,7	0,1776
2005-06-30	3632,6184	3181,54	0,1661
2005-07-29	3801,2075	3326,51	0,1780
2005-08-31	3738,1942	3263,78	0,1167
2005-09-30	3926,8689	3428,51	0,1850
2005-10-31	3806,2779	3320,15	0,1045
2005-11-30	3957,9647	3447,07	0,1757
2005-12-30	4109,514	3578,93	0,1758

PoD Portfolio 2006

PoD Portfolio	TRI	last price	Continious return
2005-12-30	6,47112	6,47112	
2006-01-31	6,3646	6,34624	-0,0165978
2006-02-28	6,60218	6,58144	0,0395374
2006-03-31	6,77358	6,75272	0,0287762
2006-04-28	6,78068	6,6912	0,0041320
2006-05-31	6,5279	6,29712	-0,0247079
2006-06-30	6,6545	6,34526	0,0552009
2006-07-31	6,6299	6,29858	0,0438816
2006-08-31	6,70382	6,37088	0,0623533
2006-09-29	7,32292	6,9628	0,1392715
2006-10-31	7,694	7,31434	0,0998591
2006-11-30	7,58192	7,16996	0,0359297
2006-12-29	7,77986	7,3571	0,0816383

SX5E 2006

SX5E	TRI	last price	Continious return
2005-12-30	4109,514	3578,93	
2006-01-31	4244,0613	3691,41	0,1705
2006-02-28	4340,912	3774,51	0,1621
2006-03-31	4437,5129	3853,74	0,1618
2006-04-28	4435,8142	3839,9	0,1407
2006-05-31	4263,0535	3637,17	0,1045
2006-06-30	4299,5759	3648,92	0,1673
2006-07-31	4354,5732	3691,87	0,1768
2006-08-31	4502,0627	3808,7	0,1984
2006-09-29	4609,8156	3899,41	0,1909
2006-10-31	4738,8404	4004,8	0,1950
2006-11-30	4729,9251	3987,23	0,1664
2006-12-29	4887,5324	4119,94	0,2036

PoD Portfolio 2007

PoD Portfolio	TRI	last price	Continious return
2006-12-29	9,8911	9,8911	
2007-01-31	9,91076	9,91076	0,0019857
2007-02-28	9,70372	9,70372	-0,0211117
2007-03-30	9,33592	9,33592	-0,0386400
2007-04-30	10,09566	10,06766	0,0782363
2007-05-31	10,54968	10,30718	0,0467672
2007-06-29	10,19664	9,66728	-0,0107825
2007-07-31	9,7887	9,27924	0,0124817
2007-08-31	10,4935	9,94608	0,1229764
2007-09-28	10,8618	10,29556	0,0880735
2007-10-31	11,43302	10,83666	0,1047929
2007-11-30	11,75888	11,11078	0,0816739
2007-12-31	11,43188	10,80198	0,0284901

SX5E 2007

SX5E	TRI	last price	Continious return
2006-12-29	4887,5324	4119,94	
2007-01-31	4963,0682	4178,54	0,1862
2007-02-28	4856,0008	4087,12	0,1503
2007-03-30	4970,105	4181,03	0,1956
2007-04-30	5251,4037	4392,34	0,2279
2007-05-31	5478,5212	4512,65	0,2210
2007-06-29	5468,6917	4489,77	0,1922
2007-07-31	5263,315	4315,69	0,1590
2007-08-31	5246,3013	4294,56	0,1953
2007-09-28	5352,765	4381,71	0,2203
2007-10-31	5489,4758	4489,79	0,2254
2007-11-30	5387,4188	4394,95	0,1823
2007-12-31	5393,7908	4399,72	0,2048

PoD Portfolio 2008

PoD Portfolio	TRI	last price	Continious return
2007-12-31	10,47826	10,47826	
2008-01-31	9,0748	9,0748	-0,1438013
2008-02-29	8,81228	8,81228	-0,0293551
2008-03-31	8,45934	8,45934	-0,0408750
2008-04-30	9,12054	8,99462	0,0752579
2008-05-30	9,1061	8,71074	0,0123179
2008-06-30	7,96744	7,56378	-0,0891935
2008-07-31	8,22354	7,8063	0,0836297
2008-08-29	8,47024	7,9295	0,0816277
2008-09-30	7,08028	6,62608	-0,1132765
2008-10-31	5,53998	5,1852	-0,1790225
2008-11-28	5,15164	4,7884	-0,0064933
2008-12-31	5,19624	4,83082	0,0817390

EX5E 2008

SX5E	TRI	last price	Continious return
2007-12-31	5393,7908	4399,72	
2008-01-31	4656,2721	3792,8	0,0567
2008-02-29	4574,2121	3724,5	0,1873
2008-03-31	4457,9908	3628,06	0,1798
2008-04-30	4736,1209	3825,02	0,2665
2008-05-30	4781,5412	3777,85	0,2232
2008-06-30	4250,9371	3352,81	0,1180
2008-07-31	4273,8652	3367,82	0,2427
2008-08-29	4277,7736	3365,63	0,2392
2008-09-30	3868,7445	3038,2	0,1393
2008-10-31	3301,7166	2591,76	0,0832
2008-11-28	3115,0196	2430,31	0,1839
2008-12-31	3138,3934	2447,62	0,2557

PoD Portfolio 2009

PoD Portfolio	TRI	last price	Continious return
2008-12-31	8,44302	8,44302	
2009-01-30	7,82596	7,72096	-0,0758937
2009-02-27	6,71146	6,5955	-0,1401222
2009-03-31	6,9117	6,78822	0,0468280
2009-04-30	8,1375	7,9928	0,1812943
2009-05-29	8,5275	8,16278	0,0647551
2009-06-30	8,81748	8,37544	0,0771513
2009-07-31	9,82234	9,23238	0,1593558
2009-08-31	10,5538	9,90346	0,1337691
2009-09-30	11,2025	10,52512	0,1232528
2009-10-30	10,56494	9,87336	0,0037762
2009-11-30	10,67506	9,9438	0,0780700
2009-12-31	11,1436	10,3025	0,1139161

EX5E 2009

SX5E	TRI	last price	Continious return
2008-12-31	3138,3934	2447,62	
2009-01-30	2875,3524	2236,98	0,1611
2009-02-27	2542,9072	1976,23	0,1282
2009-03-31	2666,7186	2071,13	0,2997
2009-04-30	3084,4992	2375,34	0,3983
2009-05-29	3249,3886	2451,24	0,3133
2009-06-30	3193,8683	2401,69	0,2646
2009-07-31	3511,799	2638,13	0,3800
2009-08-31	3700,2044	2775,17	0,3383
2009-09-30	3833,2379	2872,63	0,3230
2009-10-30	3664,1585	2743,5	0,2434
2009-11-30	3750,2969	2797,25	0,3126
2009-12-31	3981,4504	2964,96	0,3530

PoD Portfolio 2010

PoD Portfolio	TRI	last price	Continious return
2009-12-31	12,2235	12,2235	
2010-01-29	11,4229	11,4229	-0,0677402
2010-02-26	11,37988	11,3553	-0,0037732
2010-03-31	11,84534	11,82	0,0422499
2010-04-30	11,3419	11,3173	-0,0412892
2010-05-31	10,69788	10,3755	-0,0562869
2010-06-30	10,80728	10,2816	0,0407727
2010-07-30	11,73284	11,1613	0,1320359
2010-08-31	11,74286	11,0214	0,0507930
2010-09-30	11,80656	10,9884	0,0688165
2010-10-29	12,29674	11,4397	0,1124940
2010-11-30	11,17952	10,3772	-0,0230062
2010-12-31	11,46986	10,6516	0,1001116

SX5E 2010

SX5E	TRI	last price	Continious return
2009-12-31	3981,4504	2964,96	
2010-01-29	3732,0319	2776,83	0,2301
2010-02-26	3670,5502	2728,47	0,2790
2010-03-31	3945,6368	2931,16	0,3689
2010-04-30	3804,6302	2816,86	0,2608
2010-05-31	3606,953	2610,26	0,2472
2010-06-30	3567,2368	2573,32	0,3123
2010-07-30	3802,9478	2742,14	0,3906
2010-08-31	3644,4278	2622,95	0,2845
2010-09-30	3821,4021	2747,9	0,3763
2010-10-29	3959,6666	2844,99	0,3653
2010-11-30	3708,2025	2650,99	0,2650
2010-12-31	3908,7145	2792,82	0,3883