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The Dividend Effect

A study of the OMXS30

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Summary

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Key words: “Dogs of the Dow”, Dividend effect, dividend yield, Sharpe ratio, Spearman’s rank correlation coefficient.

Purpose: The purpose is to investigate whether there are differences in returns on stocks having a high or low dividend yield, respectively. The object of the study is the OMXS30 index and the time period spans from October 1986 to April 2010. If there is a statistically significant correlation, we intend to examine potential explanations for this.

Method: The method is quantitative in its nature and the approach is inductive. With the Spearman’s rank correlation coefficient the correlation and total return on invested capital is examined.

Theoretical perspectives: Fundamental financial theory claims that payout policy should not affect the performance of stocks. However, researchers have found that there is a correlation between high dividend yield and stock performance.

Empirical foundation: The data used is the returns on stocks from the OMXS30 during the time period studied.

Conclusions: It is observed that the high-dividend yield strategy greatly outperforms the OMXS30. The conclusion is statistically significant at the 95 % level.

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1 Introduction and purpose

In this chapter, the *raison d'être* of this essay is presented or in other words; why we chose to write it. The following section contains an introduction to the subject dealt with in the investigation. Thereafter, the framework of the study, e.g. to whom it is addressed, what delimitations it carries and so forth, is put forward.

1.1 Introduction

The basic idea of an investment, from a financial point of view, is the attempt to receive more *value* than what was initially invested. Value is always subjective; one piece of item does not have the same value to different persons. This is also a fundamental part of a transaction, an object must be valued differently by two individuals, why else would they engage in an exchange? A currency's *raison d'être* is that it is valuable to everyone and more importantly; it is as close to an objective value as possible. This, in its turn, gives money superior liquidity in relationship to other value bearers since you are able to convert it to whatever you desire with ease. It is with this in mind one must address the question about value and return on invested capital. It has importance since the only difference between cash held by the company and by the owner directly is liquidity. From this perspective it is evident that, for example, stockholders will prefer an immediate distribution of funds since cash is the most liquid asset and gives its holder the best position in a market where consumption takes place. If cash is distributed from the company to the owner, it shifts to a higher level of liquidity, leading to an increase in value.¹

¹ How illiquidity destroys value is shown by Damodaran, A. in "Marketability and Value: Measuring the Illiquidity Discount", *NYU Working Paper Series*, 2005. This cost is of course larger for private companies than listed. However small the difference may be, stocks are not entirely equivalent in value to cash.

Why then, one might wonder, are not all excessive funds distributed? This is one of many examples of questions about the relationship between dividends and the retainment of cash that are yet to be answered by economic research. Studies have not been able to give a final answer to the questions of under what conditions it is optimal to pay dividends and how much should be distributed. To at least partially sort out this matter would not only help investors to maximize the return of their investments but also give clear guidelines, helpful to companies when deciding whether to pay dividends.

In fundamental financial theory the simple answer is that investors are indifferent pertaining to dividends, since it suggests that in a perfect capital market, it is irrelevant whether a company distributes cash today or retains it. The decrease in value of the company is perfectly offset by the increase in wealth of owner. In this paper we are discussing questions relating to the issue of whether to distribute funds or to retain excessive cash in a real market, i.e. an *imperfect* market.

Value investing is basically an investment strategy picking securities that from a certain aspect seem underpriced. The criteria used can vary but the most central from our perspective is to apply value investing based on dividend yields.² The essence is that an investor should try to pick stocks (or other securities) that are traded below their inherent value. In other words, there is a notion of a discrepancy between market value and intrinsic (or fair) value of e.g. a stock. The *intrinsic value* is defined as the value that is justified by concrete facts.³ It is however not necessary to know the exact value, only that it is more or less than what the security is trading on. The theory was developed by Benjamin Graham & David Dodd in 1934 in their famous and highly regarded *Security Analysis*.⁴ The concepts of value investing are profoundly integrated with 21st century trading and

² Graham, B. and Dodd, D., *Security Analysis - Principles and Techniques*, McGraw-Hill, New York 1940, p. 567 (regarding certain posts on the balance sheet) and p. 401 (regarding the income statement).

³ *Ibid.*, p. 20.

⁴ Graham, B. and Dodd, D., *Security Analysis*, McGraw-Hill, New York 1934.

investments. Its core element is the possibility to outsmart the market, as the market value is thought to not always reflect available information.

Value investing will not have to render (even if performed perfectly) the same portfolio by two different investors, it is not that homogenous. Instead a large amount of different strategies can be derived as a result of a mindset based on a value investing thought. Thus, it is not possible to determine whether value investing is successful. There are however individuals using value investing that have had tremendous success, Warren Buffet being one example.⁵

The value investing strategy of importance to this essay is one where the dividend yield is used to determine if there is a discrepancy between the market and the intrinsic value of a security. If there is a statistically significant correlation between dividend yields and returns on invested capital, it implies a discrepancy between market value and intrinsic value. If this would be the case, this study will verify the basic notion of Graham and Dodd's theory and show that a value investing strategy based on dividend yields can render excessive returns.

This essay has its background in the recent financial crisis and the behaviour of the stock market during this turmoil. In popular press, there is a notion that companies having a high dividend yield outperform their opposites during downturns. This would contradict the M&M-proposition stating that capital structures do not affect shareholder value *per se*.⁶ If this were true, it would be of immense importance to investors, giving them a possibility to gain protection from value decreases in downturns, i.e. lowering the beta only in bear markets. This means that picked stocks would have an average beta in bull markets while maintaining a beta close to zero in bear markets, implying a lower correlation to the market. There are also investors claiming

⁵ There are people advocating that Buffet is not a value investor (see e.g. Altucher, J., Warren "Buffet is Going to Waste", *Wall Street Journal*, February 24th 2010).

⁶ See e.g. McClure, B., "Dividend Yield for the Downturn", *Investopedia* 2010, or Kishnani, D., "Dividend Yields Can Help Beat a Downturn", *Sify* 2010.

that stocks having a high dividend yield not only have a lower beta but also a higher alpha, meaning that stocks will deliver a higher return than their level of risk would suggest. In 1991, Michael O'Higgins popularized an investment strategy based on the notion that the stock price fluctuates with the business cycle of a company, whilst the dividend stays rather unaltered.⁷ This leads to the conclusion that dividends are a better estimate of companies' values and that dividend yields therefore are a good indicator of whether the stock is under- or over-valued. "Dogs of the Dow", as this strategy is known, has had a huge impact on the investment industry. Its influence can for example be observed in its use by investment funds, and by the promotion it is given in popular investment literature. This is not surprising considering the theoretical appeal the theory has, and how it empirically has been supported in later studies, see chapter 3. Due to its importance, *Dogs of the Dow* has rendered much further research on whether it is possible to foresee stock behavior based solely on dividend yield. This essay should be seen as a contribution to the research within this particular field.

1.2 Purpose

The purpose of this essay is to investigate whether there are differences in returns on capital invested in stocks having a high or low dividend yield, respectively. There will also be a discussion concerning under which conditions this potential correlation is the highest. If there is a statistically significant correlation, we intend to examine potential explanations for this.

1.3 Outline

In chapter 2 fundamental economic theories with regard to capital structure and pay-out policy will be presented. The focus will be on optimal capital structure in a perfect market and what imperfections that may affect a company's decision to distribute funds. Chapter 3 presents previous

⁷ O'Higgins, M., *Beating the Dow*, Harper Perennial, New York 1992.

research on the subject of the correlation between dividend yield and total return to equity will be discussed thoroughly. In chapter 4 the data used in the investigation will be comprehensive described. Chapter 5 portrays the method used, being the Spearman's Correlation Formula on what time frame the investigation is conducted and so forth. Chapter 6 accounts for the results attained in the study and can be considered our very own contribution to research on pay-out policies. In this chapter we conclude whether there are any empirical evidence of a correlation between high dividend yields and high returns. In the next following section, chapter 7, we will conduct an analysis of our results, by scrutinizing them in a theoretical and practical manner. Finally, the thesis will be concisely concluded and suitable topics for future research will be suggested.

1.4 Delimitations

The investigation is limited to the companies of OMX30 during the period of 1986-2009. We have chosen to focus solely on large Swedish corporations, mainly due to the importance of accurate and easy accessible information. Also, we believe there is a smaller asymmetry in information between insiders and outsiders when it comes to large corporations, minimizing the signalling effect of dividends and share repurchases. For a large corporation, the transaction cost of paying dividends as a fraction of total value is smaller. In an investigation where only larger corporations are examined, one must not consider transaction costs to the same extent.

The limitation of the empiric studies to the Swedish market is due to the fact that the investigation primarily is to be read and used by Swedish students and practitioners. However, the method to be presented can easily be applied to a much greater number of corporations in an unlimited amount of markets. Lastly, the time period is chosen based on the purpose of this essay being an investigation on the correlation during different conditions, we wanted to include at least one period of extreme bull market and one of deep recession. With this timeframe, we get two of each.

1.5 Audience

This essay can be of value to undergraduate students of primarily finance and investors and practitioners within this field. Even though focused on the Swedish market, the conclusions are globally applicable. This is especially true with regard to market places with characteristics similar to the Swedish stock market.

2 Theory

This section will account for and describe theories and concepts, of which an understanding is essential for a full comprehension of the study. The focal point lies on fundamental theories on capital structure, as well as on how these reflect on the total return to shareholders.

2.1 John Burr Williams

When John Burr Williams published his path breaking work *The Theory of Investment Value* in 1938 he sparked the evolution of the modern theory of corporate finance.⁸ Previous research had focused on the randomness of the pricing of assets whereas Burr launched the notion of a security's intrinsic value based on its future performance. The process of pricing was formalized by using a discounted cash flow valuation. The impact on the contemporary academic research in finance was immense.

2.2 The Modigliani - Miller Propositions

Concerning the question of capital structure Franco Modigliani and Merton Miller stated that in a perfect market the choice of capital structure is irrelevant with regard to the value of the firm.⁹ This theorem is called M & M Proposition I.¹⁰ Consequently M & M Proposition II states that if a firm increases the level of leverage investors will demand a premium to compensate for the added risk.¹¹ Both propositions rely on three underlying

⁸ Burr, Williams, J., *Theory of Investment Value*, 1938.

⁹ Modigliani, M. & Miller, M., "Cost of Capital, Corporation Finance and the Theory of Investment", *American Economic Review*, Vol. 48, No 3., 1958, pp. 261-297.

¹⁰ Proposition I is mathematically formulated as $V_L = V_U$ where V_L is the value of the firm with leverage and V_U is the value of the firm without leverage

¹¹ Proposition II is formulated as $r_E = r_0 + \frac{D}{E}(r_0 - r_D)$ where r_E is the cost of equity, r_0 is the cost of capital for an all equity firm, r_D is the cost of debt and $\frac{D}{E}$ is the debt-to-equity ratio.

assumptions; no taxes exist, investors face no transactions costs and all investors can borrow at the same cost. Given these propositions, the only value-enhancing activity a firm can engage in is positive NPV-projects. A rational investor can, according to the theorems, replicate the exact level of preferred dividend via selling the stock in the corresponding portion. Conversely, if the investor doesn't prefer receiving dividend he can use the proceeds from the dividend payment to purchase new shares in the company. The situation is exactly the same regarding the investor's preference for leverage; he can add leverage to his own portfolio in accordance with his preference for added risk. Therefore, the capital structure is irrelevant for value of the firm in a perfect capital market.

However, with the introduction of taxes the capital structure *is* relevant for the value of the firm due to the deductibility of the interest payment.¹² The tax deductibility creates an interest tax shield which increases the value of the firm as opposed to the dividend payment which is not deductible.¹³

The fundamental implication of the Modigliani & Miller theorems is not their ability to explain the capital structure of different companies, but to highlight the importance of the assumptions they are based on. With the presence of taxes, transactions costs and differentiated borrowing costs the theorems can help to explain why companies still add leverage to their balance sheets. Moreover, in their assumptions, the theorems exclude a number of key aspects of financial markets; financial distress costs, agency costs of debt as well as agency benefits of debt and asymmetric information. Combined together, these factors create a trade-off between the increased value due to higher leverage and the decreased value due to excessive leverage. Pertaining to this trade-off theory, there are numerous other

¹² Modigliani, M. & Miller, M., "Corporate Income Taxes and the Cost of Capital: A Correction", *American Economic Review*, Vol. 53, No 3, 1963 pp. 433-443. This holds at least up to when the firm's EBIT is greater than the interest payments on the debt.

¹³ Therefore Proposition I (with taxes) is $V_L = V_U + T_c D$ where T_c is the tax rate and D is the value of debt. Consequently Proposition II (with taxes) is $r_E = r_D + \frac{D}{E}(r_D - r_D)(1 - T_c)$ where T_c is the corporate tax rate. The value of the firm increases with the present value of the interest tax shield.

occurrences to observe. The free cash flow hypothesis states that a firm with free cash flows is more likely to use these cash flows for wasteful purposes, not benefitting the shareholders. At the same time management might feel tempted to initiate a wave of mergers and acquisitions in order to create a corporate empire or enrich themselves at the expense of the owners. On the other hand, the owners of an overleveraged company might have distorted incentives to either take on too risky projects or under-invest in positive NPV-projects. Research has shown that companies only exploit half of the potential tax benefit of debt, indicating that management might be considering high levels of debt to be too risky.¹⁴

2.3 Payout Policy

If a firm invests in positive NPV-projects the value of the firm will rise due to the value created. This value can either be retained or paid out. If the value is retained it can be invested in new projects or be held as cash reserves in anticipation for future needs. If the value is paid out the firm can either pay a dividend or repurchase shares. This distinction and the importance of the payout policy is paramount to our investigation of the performance of shares with high and low dividend yields. As described above, in a perfect capital market á Modigliani and Miller the dividend yield should not be relevant to the performance of a particular stock.

During the fifties Graham and Dodd formulated the previously established and well-considered idea that an investor prefers to receive dividend rather than the company retaining the cash.¹⁵ This idea is popularly referred to as the “bird in the hand”-theory. Because investors have a preference for stocks with a high dividend yield, the theory forecasted that such shares would have a higher price, reflecting a greater demand compared to stocks with a low dividend yield. However, Modigliani & Miller challenged this view and concluded, with the assumption of a perfect capital market where securities

¹⁴ Graham, J., “How Big Are the Tax Benefits of Debt?”, *Journal of Finance*, Vol. 55, No. 5, 2000, pp 1901-1941.

¹⁵ Graham, B. & Dodd, D., *Security Analysis - Principles and Techniques*, 1940.

are fairly priced, that the individual investor replicate and generate a homemade dividend by selling shares at any time.¹⁶ This view completely contradicts that of proponents of the “bird in the hand”-theory.

In 1956 John Lintner made a great contribution to the understanding of how dividends affect the performance of a stock.¹⁷ Lintner mainly concluded that the market puts a premium on companies that can maintain a certain level of dividend payments, thereby formulating the smoothing theory of dividends. Naturally, the focus lies on the continuity of the dividends and not the actual level. The main driver behind the level of the dividend is the earnings of the firm.

In 1974 Fischer Black and Myron Scholes investigated whether the dividend yield and/or dividend policy affected the stock price both in a world with and without taxes.¹⁸ They couldn't find a robust conclusion which implies that the explanation provided by Modigliani & Miller holds.

In a later paper Fischer Black discusses what factors might lead corporations to pay dividends despite their tax-disadvantages for the individual investor.¹⁹ This is known as the clientele effect; certain companies are attractive because potential investors may be tax exempt and therefore prefer a high dividend yield. Conversely, other companies may be attractive because the returns can be realized as capital gains and thereby taxed at a lower rate. Other advantages such as deduction of losses on other stocks may also be relevant. An important factor also worth mentioning is the fact that return on investment is taxed twice, first inside the company at the corporate tax rate (t_c) and then at the investor at either the return on equity

¹⁶ Modigliani, M. & Miller, M., “Dividend Policy, Growth and the Valuation of Shares”, *Journal of Business*, Vol. 34, No. 4, 1961, pp. 411-433.

¹⁷ Lintner, J., “Distribution of Incomes of Corporations among Dividends, Retained Earnings and Taxes”, *American Economic Review*, Vol. 46, No. 2, 1956, pp. 97-113.

¹⁸ Black, F. & Scholes, M., “The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns”, *Journal of Financial Economics*, Vol. 1, No. 1, 1974 pp. 1-22.

¹⁹ Black, F., “The Dividend Puzzle”, *Journal of Portfolio Management*, Vol. 2, No. 2, 1976, pp. 5-8.

investment tax rate (t_e) or at the capital gains tax rate (t_g). Combining these tax rates together, the effective tax rate ($t_e^* = (1 - t_c) * (1 - t_e)$) for the equity investor can be very substantial.²⁰ Black also discusses that from the shareholder's point of view, paying dividends can be an inexpensive control mechanism of agency costs vis-à-vis the management. Other factors that might affect are transaction costs and the importance of signaling. A company not paying dividends might signal that it has many attractive investment opportunities and therefore is using all of the free cash flows to finance new positive NPV-projects. But, at the same time, raised dividends can signal that the company is confident about the future and expects earnings to grow. This is why Black called these seemingly contradicting arguments the dividend puzzle.

In 2001 Eugene F. Fama and Kenneth R. French found that the number of companies paying dividend between 1978 and 1999 had fallen dramatically.²¹ The authors conclude two things. Firstly, characteristics of firms on the stock exchanges have changed from value stocks with high dividend yields to high-growth firms with low or no dividend at all. Secondly, even after adjusting for these changes in firm characteristics, firms were less likely to pay a dividend. The authors mention a few explanations to these developments and one is that the management prefer capital gains in order to enhance the value of their own stock options, which are a part of their compensation policy. In accordance with their findings, firms paying high dividends were generally large and mature companies with good earnings and few new profitable investment opportunities.

As described above, both the position that dividend policy doesn't matter and that it does matter can be justified according to research in predicting the future performance of a stock. This could indicate that there is a possible strategy to achieve a higher risk-adjusted return on investment (positive

²⁰ For example, in Sweden the effective tax rate on corporate earnings for an equity investor is $t_e^* = (1 - 26,3\%) * (1 - 30\%) = 51,59\%$.

²¹ Fama, E. & French, K., "Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay?", *Journal of Financial Economics*, Vol. 60, 2001, pp. 3-43.

alphas) if executed properly. However, if properly identified, this strategy will not be possible to maintain over a prolonged period because of a phenomenon called investor learning. This potential strategy would exploit a market imperfection but as soon as more investors discover this possibility the market will adjust and the investment opportunity would disappear.

2.4 Efficient market hypothesis

The notion of the market being efficient, meaning that securities are always priced correctly with regards to the available amount of information, has been widely debated in the field of finance for decades. The discussion is at the heart of many of the concepts of financial theories because some theories claim to exploit market inefficiencies thereby invalidating the efficient market hypothesis. It has been proposed that the market can be efficient in three different ways, each relating to the pricing based on available information.²² In its weak form, the market reflects all historical, publicly available information. In its semi-strong form the market reflects all publicly available information and is thus immediately correcting the price of a security, for example when in the case of a stock split the future dividend payments are reflected in the price of a split share. In the strong form of market efficiency the market reflects all publicly available information as well as insider information, for example information obtained by corporate insiders. In his article, Fama concludes that empirical evidence can be found in support of the weak and semi-strong form and sometimes even for strong efficiency.²³

²² Fama, E., "Efficient Capital Markets: A Review of Theory and Empirical Work", *The Journal of Finance*, Vol. 25, No. 2, 1969, pp. 383-417.

²³ *Ibid.*, pp. 415-417.

3 Previous research

This section will present and delve into previous research conducted on the relationship between dividend yields and stock performance. The aims, data sets and results of each previous study will be recollectd in concise detail.

Beating the Dow – O’Higgins (1991)

The theory known as Dogs of the Dow was, as mentioned in the introduction, popularized by Michael O’Higgins in 1991 in the book *Beating the Dow*. It suggests that value stocks with low prices (and low expectations) outperform growth stocks.²⁴ The theory/strategy has its origin in the article “Study of Industrial Averages Finds Stocks With High Dividends Are Big Winners” written by John Slatter and published in the Wall Street Journal in 1988.²⁵ In this article, Slatter showed that the 10 companies having the highest dividend yield on the Dow Jones Industrial Average (DJIA) showed an excessive return compared to index of 7,59% per year. A few years later O’Higgins published the above mentioned “Beating the Dow” where he studied the market from 1973 to 1989 finding that “his” portfolio, picking 10 dogs on a once-a-year basis had an average yearly return on 17,9 % while the Dow Jones had 11,1 % return. Later studies have shown similar results, for example Harvey C Knowles III and Damon H. Petty's *The Dividend Investor*²⁶ and popular science such as David and Tom Gardner's *The Motley Fool Investment Guide*²⁷. Theories relating to the “Dogs of the Dow” have also been criticized harshly. One

²⁴ These low expectations on value stocks are claimed to be, on the basis of psychology, due to investor’s overreaction to both good and bad news. See DeBondt, W. F. M. and Thaler, R. H., “Does the Stock Market Overreact?”, *Journal of Finance* 40, pp. 793-805.

²⁵ Dorfman, J. R., “Study of Industrial Averages Finds Stocks With High Dividends Are Big Winners”, *The Wall Street Journal*, August 11, 1988, p. 29.

²⁶ Knowles, H. C. III and D. H. Petty, *The Dividend Investor*, Probus Publishing, Chicago 1992.

²⁷ Gardner D. and T. Gardner, 1996, *The Motley Fool Investment Guide*, Simon & Schuster, New York, New York.

example is Mark Hirshey who claim that most of the eye catching results of studies on the subject are nothing more than data errors.²⁸ Hirshey compares well known studies said to be proving the efficiency of the strategy and finds that different studies uses different figures for the same time period. For example, O'Higgins found that DJIA had a return of -12,71 % during 1977 while Slatter claimed a return of 2,4 % for the same year.

“Does the “Dow-10 Investment Strategy” Beat the Dow Statistically and Economically?” – McQueen, Shields, Thorley (1997)

The study used data from the years between 1946 and 1995 to analyze a strategy consisting of investing in a portfolio of the ten stocks with the highest dividend yield found among the constituents of the Dow Jones Industrial Average. The portfolio was reweighted equally among the ten selected stocks every year. The Dow-10 delivered average annual returns of 16.77% compared to the 13.71% of the full index. The strategy did however come with a higher average annual volatility than the index; 19.10% versus 16.64%. Calculations showed that the Dow-10 portfolio could be altered to have a 16.64% volatility with a 15.23% performance. Thus, increased risk endowed the strategy with 1.54 percentage points out of the 3.06 percentage point outperformance, leaving a risk-adjusted difference between the Dow-10 and the full index of 1.52 percentage points. Factoring in transaction costs diminished the annual compounded advantage of the Dow-10 further to 0.95 percentage points, while taxes removed the last over performance. Even though the economic results do not exhibit an advantage over buy-and-hold, statistically the strategy performed better than the Dow 64% of the time. Between 1972 and 1984 the statistical advantage was even higher, with the strategy performing better 12 out of 13 years. The authors were skeptical of the investing strategy delivering any excess returns in the future as “investor learning” would drive up the prices of value stocks and eliminate any remaining premiums.

²⁸ Hirshey, M., “The ‘Dogs of the Dow’ Myth,” *Financial Review*, Vol. 35, No. 2, 2000, pp. 1-16.

“Dividend Yield Strategies in the British Stock Market” – Filbeck, Visscher (1997)

The study encompassed data from March 1984 to March 1994, on companies listed on the Financial Times Stock Exchange 100 Index. Every year an equally weighted portfolio was reweighted with the current ten highest dividend yielding constituent companies. It was observed that the top ten portfolio outperformed the market only four out of ten years, while the FTSE-100 performed better five years, and one year was a tie. Three of the dividend portfolio’s four dominating years occurred in the first four years. Looking at risk adjusted returns, the dividend portfolio fared slightly better, exhibiting superior Sharpe and Treynor ratios six out of ten years.²⁹ The authors concluded that the top ten strategy was not effective in Britain between 1984 and 1994. They explain the discrepancy between results for British markets and US markets by the fact that the Dow Jones Industrial Average consists of only thirty stocks, while the FTSE-100 is a much broader index with constituents from more varied types of industries. In addition to this the Dow Jones is price weighted while the FTSE-100 is value weighted. Since high dividend yield stocks more often than not are relatively low priced, their appreciation in value would not to any greater extent contribute to the increase in value of Dow Jones. In Britain on the other hand, quite a few of the high dividend yield companies were relatively highly priced, as well as their further appreciation would increase the index value to a greater extent, diminishing any difference in performance between stocks and index.

“The Rise and Fall of the “Dogs of the Dow”” – Domian, Louton, Mossman (1998)

The authors used data from 1964 to 1997 to first of all investigate whether high yield stocks are underperformers, or “losers”, in the time period up

²⁹ The Treynor ratio is the return per unit of market risk. $T = (R_i - R_f) / \beta$.

until their inclusion in the high yield portfolio. The excess returns delivered after the construction of the portfolio could in that case be explained by an overreaction effect, where heavily sold stocks rebound, and would mean that the outperformance of those stocks would not be due to a high yield effect. Secondly, the authors wanted to determine whether the performance of a portfolio consisting of high dividend yield stocks would be consistent over the entire sample period, 1964-1997.

It is observed that during the entire sample period an annually reweighted, equally weighted portfolio of the ten highest dividend yielding stocks found among the constituents of the Dow Jones Industrial Average, outperforms the S&P 500 by 4.76 percentage units after the construction of the portfolio. It is also discovered that in the twelve months prior to the construction of the portfolio, the same stocks underperformed the S&P 500 by 3.67 percentage units. Low dividend yield stocks were found to have outperformed the S&P 500 by 7.81 percentage units prior to portfolio formation, and underperformed by a mere 0.52 percentage units in the twelve months following portfolio construction. These results are consistent with those of De Bondt and Thaler, further pointing towards the fact that the market outperformance by high dividend yield stocks is due to an overreaction effect. Concerning the second research objective, the data was divided into a pre 1987 crash group, and a post 1987 crash group. In the 1964 to 1986 sub period, it was observed that in the twelve months following the portfolio formation, high yield stocks outperformed the S&P 500 by 5.11 percentage units, while low dividend yield stocks underperformed by 3.21 percentage units. In the twelve months prior to portfolio formation high yielders underperformed by 4.67 percentage units, while low yielders outperformed by 6.16 percentage units. In the post 1987 crash time period, it was found that in the twelve months following portfolio formation, high dividend yield stocks underperformed the market by 1.13 percentage units, while low dividend yielders underperformed by 2.78 percentage units. In the twelve months prior to portfolio construction high yielders as well as low yielders outperformed the market by 2.75 percentage

units and 1.06 percentage units respectively. These results indicate that the strategy no longer delivers any excess returns. The authors explain this by “investor learning”, the fact that strategy premiums disappear as profitable methods become commonly known.

“Empirical Tests of the Dogs of the Dow Strategy in Latin American Stock Markets” – Da Silva (2001)

The author studied the performances of three variations to the Dogs of the Dow strategy in the financial markets of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela using data from January 1994 to December 1999. The study compared the performance of the relevant national index to the performances of four different annually reweighted, equally weighted when applicable, portfolios consisting of: a) the top yielding stock, b) the second top yielding stock, c) the top five yielding stocks, and d) the top ten yielding stocks. The author created two time frames for the portfolios, tested side by side, in order to analyze whether the strategies had a seasonal bias. One time frame involved the creation of the portfolios on the first trading day of January, the other on the first trading day of July. Concerning the January portfolios, for every country except Brazil, all four Dogs of the Dow strategies delivered raw returns superior to those of the national indices. Even though these returns were more variable than those of the applicable indices in every country except Brazil, the Sharpe ratios of the strategies indicated that they delivered excess risk adjusted returns for every country except Brazil. The excess returns of all strategies for all countries except Brazil were able to cover both transaction costs and tax penalties and still come out ahead. When it came to the July portfolios, results were somewhat mixed, even though the Dogs of the Dow strategies outperformed domestic indices most of the time. The drawback of the study was that no results were statistically significant at the 5% level. The author thus concluded that even though the results provided ample evidence supporting the notion that following a Dogs of the Dow strategy could provide excess returns, there was no statistical evidence supporting the idea.

“Dividend-Yield Strategies in the Canadian Stock Market” – Visscher, Filbeck (2003)

Visscher and Filbeck studied yearly data from July 1987 through July 1997 to investigate the performance of the ten companies with the highest yearly dividend yield, relative to the performance of the Toronto 35 Index, from which the companies were selected, and the broader Toronto Stock Exchange 300 Composite Index. A top ten portfolio was created by investing C\$ 10'000 in each stock in 1987, and then reweighting the portfolio every year to reflect the current highest yielders, which was done by once again investing C\$10'000 in every selected company. The performance of the *Canadian Dogs* – portfolio encompasses both the appreciation of the stocks and dividends. Throughout the ten year period investments were made in twenty one different stocks, of which four were permanent members of the top ten list. The high dividend-yield strategy outperformed the Toronto 35 Index eight out of ten years, while underperforming twice with a mere 2.8 and 3.6 percentage units. The strategy delivered average compounded annual returns over the ten year period of 15.11% compared to the 8.98% of the Toronto 35 buy-and-hold strategy. During the outperforming eight years the strategy exhibited both higher Sharpe and Treynor Ratios, i.e. risk adjusted returns, than both the Toronto 35 and 300 indices.

“Dividend-Driven Trading Strategies: Evidence from the Warsaw Stock Exchange” – Brzeszczyński, Gajdka (2007)

Using data from the years 1991 until 2004, the authors investigated whether portfolios created using dividend strategies could outperform the Warsaw Stock Exchange. From 1994 and onwards the ten stocks which had experienced the highest growths in their dividend yields, as well as fulfilled certain criteria regarding market capitalization, were included in annually reweighted portfolios. The study concluded that throughout the ten-year

period the best results were achieved with a dividend yield strategy which only included companies with large capitalizations. The strategy delivered an average annual compounded return of 48.7%, while the benchmark index delivered only 12.11%. The strategy also delivered superior risk adjusted returns six out of ten years. The authors concluded that even though the dividend yield strategies had performed better than their benchmark for the most part, they had not done so systematically every year, making a indisputable conclusion impossible.

“Dividend Yield Strategy in the British Stock Market 1994-2007” – Brzezczynski, Archibald, Gajdka (2008)

The study uses data from 1994 to 2007 to determine whether a portfolio of high dividend yield stocks outperforms the FTSE 100 index. The paper is a continuation of Filbeck’s and Visscher’s study of the time period 1984 to 1994. The authors compare the performance of an annually reweighted portfolio of the ten stocks, listed on the FTSE 100, with the highest dividend yield. It is observed that the portfolios outperformed the index seven out of thirteen single year periods, and seven out of nine five year periods. Seen over the whole span of the study’s data period the top ten portfolios delivered an average annual return of 28.23%, compared to FTSE 100 index’s 6.69%. Furthermore the top ten portfolios achieved Sharpe ratios which were superior to those of the benchmark ten out of thirteen single year periods, and seven out of nine five year periods. The authors concluded that the investigation demonstrated the ability of high dividend yield portfolios to beat the market between 1994 and 2007, though not a consistent ability.

4 Data

This section portrays the data collected for the analysis carried out in the study. It informs the reader pertaining to how the data was collected, the time span of the data collection, the size of samples, as well modifications carried out for the sake of the study. Finally, this section describes shortcoming of the data in the shape of survivorship bias, and the inability to account for stock repurchases.

4.1 Data set

The data set used consists of closing prices, both daily and for the 1st of every month, as well as dividend yields for the 1st of every month, for the constituent companies of the OMXS30 between October 1st 1986 and 1st of May 2010. Daily closing prices were necessary in order to be able to calculate the volatility of the stocks, while monthly prices were used to compute the monthly ranks. The data collection, of 283 months in total, was carried out using Datastream Advance, which was instructed to include dividend payments in the figures. Datastream Advance must to a very high extent be considered a reliable source, producing data that is accurate and reflecting reality.

While the composition of the index has varied over the past 28 years, we utilized data for companies which have been included in the index since the introduction of the index, i.e. September 30th 1986. As both Atlas Copco's A-class and B-class shares were included in the index, one had to be eliminated from the data sample as the dividend for both types naturally is the same. Pragmatically, the share type with the longest data history, i.e. the share type which had been included in the OMXS30 the longest, was selected, being the A-class. Thus the final data sample consists solely of 29 out of the index's 30 shares.

The following list shows how many of the final 29 constituents, of April 2010, that were included in the index since 1982, and thus were included in the data set during the indicated time periods. The data observations thus began in October 1986 with closing prices for twelve out of the final 29 companies.

From	To	Number of stocks
October 1986	August 1989	12
September 1989	July 1991	13
August 1991	May 1993	14
June 1993	November 1994	15
December 1994	June 1995	16
July 1995	March 1996	17
April 1996	May 1996	18
June 1996	September 1997	20
October 1997	December 1997	21
January 1998	April 1999	22
May 1999	June 1999	24
July 1999	June 2000	25
July 2000	September 2001	26
October 2001	May 2002	27
June 2002	June 2007	28
July 2007	April 2010	29

The reason as to why data which begins in the present and goes back to 1986 has been utilized, instead of data for each specific year, is the limitation of the data source, Datastream Advance. Naturally it would have been more satisfying, not to mention statistically more profound, to use data consisting of closing prices of the index's constituents for every year.

4.2 The market return

A measure for the performance of the market portfolio is needed, in order to calculate the Sharpe ratio, as well as to be able to objectively evaluate the proficiency of the reweighting strategy. As the data set consists of

constituents of the OMXS30 stock index, the choice of this index as the study's market portfolio when calculating the Sharpe ratio, and as the benchmark when comparing the investment strategy, was obvious. The OMXS30 consists of the 30 stocks listed on the Stockholm Stock Exchange with the highest turnover volumes. Consequently, constituent equities are weighted according to their trading volumes. The composition and weighting of the index is revised on the first trading days of January and July every year.

Since January 4th of 2010, the composition and weights of the OMXS30 are the following.

Name of listed company	Weight	Name of listed company	Weight
ABB	2,94%	Nokia	0,29%
Alfa Laval	1,73%	Sandvik	4,24%
Assa Abloy B	1,98%	SCA B	2,38%
Atlas Copco A	3,66%	Scania B	1,53%
Atlas Copco B	1,51%	SEB A	3,98%
Aztra Zeneca	3,72%	Securitas A	1,01%
Boliden	1,04%	SHB A	5,17%
Electrolux B	2,08%	SKA B	2,01%
Ericsson B	8,22%	SKF B	2,10%
Getinge B	1,26%	SSAB A	1,22%
Hennes & Mauritz B	12,02%	Swedbank A	2,76%
Investor B	2,51%	Swedish Match A	1,63%
Lundin Petroleum	0,75%	Tele2 B	1,89%
Modern Times Group B	0,85%	TeliaSonera	9,64%
Nordea Bank	12,19%	Volvo B	3,69%

4.3 The risk free return

In order to calculate the Sharpe ratio for the constituent companies a measure for the risk free return was needed. For this purpose, the monthly average of the Swedish equivalent of a 1-month treasury bill, the *30-dagars statskuldsväxel*, is used. The data, encompassing the time period of October

1986 to May 2010, was collected from a database provided by the Swedish central bank, *Riksbanken*.

4.4 Survivorship bias

When research is conducted on historical data which consists only of observations belonging to assets or securities, which still exist at the end of the data sample period, it is said that the analysis suffers from survivorship bias. It means that the data sample can be incorrectly biased towards those securities which have performed the best. After all, they still exist, meaning that their financial performance cannot have been too bad.³⁰

In this study only the stocks which still existed and are included in the OMXS30 index at the end of the data period, i.e. April 2010, are included. This implies that the stocks which have performed the very worst and disappeared from the index, possibly due to bankruptcy, are ignored. Some of these could possibly have had very high dividend yields, and since they are no longer included in the OMXS30, they possibly had dismal returns as well. The data used in this study is thus deficient in that there exists some survivorship bias, which might lead us to draw false conclusions from the results.

However, survivorship bias goes both ways. It is quite possible that companies which have enjoyed excellent financial growth, and which possibly had very high dividend yields, have been taken over by other companies for exactly those reasons. Survivorship bias thus means that a data sample can consist of companies which neither have performed so bad that they have gone out of business, nor performed so excellently that they were taken over. Either way, results might not fully reflect reality, which might diminish the practical value of any study.

³⁰ Elton et al, *Modern Portfolio Theory and Investment Analysis*, Wiley, Chichester 2006. p. 428.

4.5 Stock repurchases

Due to the fact that the payout policy of a company consists of both dividends and stock repurchases we have to take this into account when conducting our study. As concluded in the introduction our purpose is solely to measure the effect of the dividend yield and not the payout yield, thereby including stock repurchases. The study is thus only concentrating on the dividend yield, excluding the effect of stock repurchases. It can be noted that according to the Swedish Company Act a company is only allowed to own up to ten percent of the total amount of outstanding shares. Along with this, companies have to fulfill certain conditions or else the repurchase is null and void.³¹ Therefore stock repurchases have an effect on the stock price, however not included in the scope of this study. A company buying back stock increases the market price of the shares, *ceteris paribus*, and consequently the dividend yield will be lower compared to before the stock repurchase.

³¹ See the Swedish Company Act, 19:4-5 and 19:15.

5 Methodology

The section carefully renders and describes the method by which the results of the study were attained. Beginning with a brief statement on the general approach of the study, the section continues with clarifications of return measurements, as well as concepts such as the Sharpe ratio, Spearman's rank correlation coefficient and statistical testing. Next, detailed accounts are given of the exact methods used to compare stock returns as well as Sharpe ratios with dividend yields. Subsequently the reweighting of the stock portfolios and their comparison to the performance of the benchmark index are explained. This extensive description of our method is conducted in order to make replication possible.³²

5.1 Approach

We approach the matter from an empirical point of view, where our empirical findings form the base from which we draw conclusions and present results relating to the purpose of the thesis.³³ We chose this inductive approach to research in order to ensure a completely unbiased selection of subjects to study.³⁴ Thus, the presentation of theory in chapter 2 is supposed to provide an introduction to the subject and give material to the upcoming conclusion, not to form a hypothesis to test. This must not be confused with a hypothesis test, which is a part of how the material is statistically computed. This hypothesis is chosen in order to perform a statistical operation and is to be separated from the hypothesis of the essay at large.

³² See Bryman, A. and Bell, E., *Business Research Methods*, Oxford University Press, New York 2007, p. 41.

³³ For a description of this process see, Bryman, A. and Bell, E., *Business Research Methods*, Oxford University Press, New York 2007, p. 10.

³⁴ *Ibid.*, p. 11-15.

5.2 Method

The method used is quantitative, meaning that we are conducting a study where data is summoned, processed and presented statistically in order to answer our enquiry. This was a natural order since we want to investigate a large number of companies because this lowers the margin of error and therefore gives our research higher scientific value.³⁵ This method will also make it possible to replicate the research and compare it to other findings. There are no potent arguments that can be put forward in favour of using a qualitative method relating to the subject of this essay.

The study's analytical component consists of three parts. First the raw returns of the constituents were ranked against their dividend yields. Secondly, the Sharpe ratios of the constituent stocks were ranked against their dividend yields, and thirdly the return of a portfolio reweighting strategy was compared to that of the benchmark index, i.e. the OMXS30.

5.3 Computing returns

The returns of the OMXS30 index, as well as that of the constituent equities, has been computed by using arithmetic returns.

$$\text{Arithmetic return} = \frac{P_{t+1} - P_t}{P_t}$$

Where P_{t+1} is the price at time $t+1$, and P_t is the price at time t , i.e. the initial price. The price data collected has been modified to include dividend payments, the prices therefore represent the total return to investors.

There is a discrepancy in value between increases in stock value and the pay-out of funds, due to the differences in liquidity. Despite this, financial

³⁵ A high level of reliability therefore fulfils the demand of replicability, see. Bryman, A. and Bell, E., *Business Research Methods*, Oxford University Press, New York 2007, p. 10.

theory defines total return to shareholder as an increase in stock value in addition to dividends paid (including share repurchases). This definition can only be true if the stock is as liquid as cash, something that seldom is true. Even though this is an unjustified simplification, we will work with the same definition. We are able to do so owing to the fact that we chose to work with heavily traded corporations that have highly liquid stocks.

5.4 Transaction costs

Transaction costs differ greatly depending on the party conducting the trades. While institutional investors and professional traders might face extremely low transaction costs, the same cannot be said about retail investors. Furthermore, since the beginning of this study the transaction costs for equities in Sweden have changed quite significantly. The establishment of online brokers since the late 1990s have in particular exerted a downward pressure on fees. As the transaction costs for market participants differ, as well as they have varied over the span of the study, the authors have decided to not take transaction costs into account in their investigation. Pertaining to the returns of the reweighed portfolios, the reader may simply deduct his estimated transaction costs from the yearly returns in order to attain more practically applicable figures.

5.5 Taxes

A fair test of the performance of a portfolio must account for taxes. When comparing to portfolios (in this OMX30 and a stock picking strategy of the 10 stocks having the highest dividend yield) what is relevant is to compare how the taxation alters between these two strategies, i.e. the difference. Comparing the two portfolios, the discrepancy lays in *when* tax is paid. Dividends are taxed when paid out and value increase when the increase is realized. Due to time-value, investors would normally prefer to pay taxes later and therefore would favor low dividend yields. Further, an investor can time the realization in a tax efficient way. On the other hand it is possible to

sell and buy-back stock to avoid dividends (and the taxation). This would trigger tax on any value increase but could under some conditions be a more favorable strategy. In addition, capital gains can be settled with losses avoiding tax altogether. Another problem is altering tax regulation throughout time, which would force us to investigate how the area has been regulated during the whole time period. Due to too many unknown factors we have chosen not to include taxes in our investigation. This must be accounted for when discussing the conclusions, but one must also remember that tax effect lays solely in time value of taxes paid in.

5.6 The Sharpe ratio

The Sharpe ratio, also called the Sharpe measure, gives a security's excess return, i.e. the return beyond the risk free rate, for each unit of risk taken on, given by the volatility of the security.³⁶ Thus it is sometimes referred to as a reward-to-variability or alternatively reward-to-volatility measure.³⁷

$$\text{Sharpe ratio} = \frac{R_i - R_f}{\sigma_i}$$

Where R_i is the return of the security i , R_f is the risk free return, and σ_i is the volatility of security i .

The Sharpe ratio is the slope of the capital allocation line. The security with the highest Sharpe ratio is to be found on the point on the efficient frontier which is tangent to capital allocation line. This stock is considered the most efficient security as it yields the most return per measure of risk taken on.³⁸

Usually when applying the Sharpe measure one speaks of portfolios, where the portfolio with the highest Sharpe ratio is the tangency portfolio and thus

³⁶ Elton et al, *Modern Portfolio Theory and Investment Analysis*, Wiley, Chichester 2006. p. 640-641.

³⁷ Berk, J. and DeMarzo, P., *Corporate Finance*, Springer, Boston 2007, pp. 347-348.

³⁸ *Ibid*, pp. 347-348.

the most efficient portfolio. The measure can however also be applied to single securities, which has been the case in this study.

5.7 Spearman's rank correlation coefficient

Spearman's formula measures, as the name suggests, the correlation between two factors, or as the paper in which it was first developed poses it; "The proof and the measurement of association between two things".³⁹ Spearman developed a formula that at large is based on the *Pearson product-moment correlation coefficient* but aimed at the association between two ranks.⁴⁰ The formula renders a correlation coefficient (ρ) of -1 to +1, where -1 implies perfect negative correlation, and +1 implies perfect positive correlation.

$$\text{Spearman's } \rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

Where d_i is the difference between the ranks of two observations, and n is the number of observations.

5.8 The statistical evaluation of the rankings

The next step in the analysis is to perform a statistical test in order to find out whether the correlations between stock returns, alternatively Sharpe ratios, and the dividend yields, are statistically significant. This is done by carrying out a two tailed hypothesis test for the significance levels of 5% and 10%.

³⁹ Spearman, C., "The Proof and Measurement of Association Between Two Things", *American Journal of Psychology*, Vol. 15, No. 1, 1904, pp. 72–101.

⁴⁰ First developed by Galton, see Rodgers, J. L. and Nicewander, W. A., "Thirteen Ways to Look at the Correlation Coefficient", *The American Statistician*, Vol. 42, No. 1, 1988, pp.59–66. See also Bryman and Bell, *Business Research Methods*, Oxford University Press, New York 2007, p. 364.

$$Z - value = \frac{X - \mu}{\sigma/\sqrt{n}}$$

Our value for X is the average of all Spearman's rank correlation coefficients throughout the time period of the study. μ is given a value of zero as the null hypothesis is that the correlation, i.e. the correlation coefficient, should be zero. σ denotes the standard deviation of the values of which X is the average, i.e. the monthly computations of Spearman's rank correlation coefficients. n is the total number of monthly computations of the rank correlation coefficient.

Our null hypothesis is that there is no significant correlation between stock returns, respectively Sharpe ratios for stocks, and the dividend yield of stocks. For the 5% significance level, if the computed value for Z , our critical value, is either less than or larger than -1.96 and +1.96 respectively, we will reject the null hypothesis. We can then conclude that there exists a statistically significant correlation. On the other hand, if the critical value were somewhere between -1.96 and +1.96, the null hypothesis would be accepted, and the existence of a statistically significant correlation would be dismissed. For the 10% significance level the region of rejection is -2.33 to +2.33 instead.

5.8.1 Ranking of stock returns and dividend yields

The monthly returns of the constituent stocks were calculated using the monthly closing price data, recorded on the 1st of every month. As the data collected spanned from the 1st of October 1986 to the 1st of May 2010, the first stock returns were computed for the month of October of 1986, using the prices on the 1st of October and the 1st of November 1986, and the very last stock returns were calculated for April 2010. Every stock which was

included in the OMXS30 index on the 1st of May 2010 was assigned a number between 1 and 29, as 29 different stocks were included in the study at this point in time. This digit, which is the same for the recipient stock throughout the study, is given since Spearman's is based on the difference between values assigned to observations which are given the same rank. This issue will be discussed further in section 6.3. Finally, the monthly returns were ranked according to their size; largest down to smallest.

Dividend yields for all the constituents were also collected for the 1st of every month since the 1st of October 1986. Naturally, the stocks kept the number which had been assigned to them for the previous performance ranking. As was done for the monthly returns, stocks were then ranked on a monthly basis according to the size of their respective dividend yields.

The final step of this part of the analysis is to apply Spearman's rank correlation coefficient onto the monthly ranks of the stock performances and the stock's dividend yields in order to attain a measure of their correlation for every month. Concerning the method used when applying Spearman's formula, it must be recalled that the purpose of this study is to determine whether dividend yields can give an indication of the stock's return. That is, whether dividend yields have a certain predictive power concerning future stock returns. Therefore, the ranks which are to be compared using Spearman's rank correlation coefficient are the returns of month t , and the dividend yields of month $t-1$. The rationale behind this is obviously that we want to resolve whether the stocks which have the highest dividend yields coming into the month, will deliver excess returns during the month.

5.8.2 Ranking of Sharpe ratios and dividend yields

Conducting an analysis of the dividend effect solely using the raw performance of the constituent equities, and not giving their risk-reward profiles a second thought, would severely hamper the academic worth of

this study. Therefore a second analysis was conducted, encompassing the Sharpe measures of the stocks.

In order to calculate a Sharpe ratio on a monthly basis for all the constituent stocks, data on the risk free rate and on the volatility of the stocks was required. A monthly average of the Swedish 30-day treasury bill was gathered for every month since October 1986. It was considered that a beginning of month or an end of month notation for the risk free rate was unsatisfying as it might have varied throughout the month. Thus a monthly average was considered the best choice.

Concerning the volatilities of the equities, these were collected by computing the standard deviation of their daily values over periods of one month, usually around 20 trading days. The monthly volatilities were then adjusted to reflect monthly volatilities on a yearly basis.

$$\text{Monthly } \sigma \text{ on a yearly basis} = \frac{\sigma_{\text{monthly}}}{\sqrt{1/12}}$$

Where σ_{monthly} is the monthly volatility of the security.

The next step is to perform a monthly ranking of every stock according to the value of its Sharpe ratio. This rank is then compared, using Spearman's rank correlation coefficient, to the monthly dividend yield rank of each constituent stock, yielding a correlation coefficient for every month.

5.8.3 Reweighted portfolios

This part of the analysis is performed simply to observe whether high dividend yield stocks deliver superior performance in comparison to the market as a whole.

On the 1st of January every year a portfolio consisting of the ten constituent stocks with the highest dividend yield is created. Every stock is given an equal weight, which is 10%. The analysis begins on January 1st of 1987 as the OMXS30 index was instigated in September of 1986, and we wish to look at the performance for full years.

The rationale for including data from 1987 onwards, even though the data sample might have limited worth due to its small size the first years, is that it would be difficult to find any other starting date which can be rationally justified. Naturally the results would carry more weight if the data sample consisted of for example 25 stocks of which 10 were selected. Yet, how would that cutoff point, beyond which the results are of more value, be justified? Would the results not carry the same weight if the sample consisted of for instance 20 stocks? Therefore we have decided to reweight the portfolios from the very beginning, and give the reader the benefit of the doubt, concerning his or hers ability to draw conclusions concerning the credence of the results for the first years.

At the end of every year the return of the top ten portfolio was compared to the return of the benchmark index, the OMXS30. Furthermore, the returns were compared at the end of the sample's time period, meaning on May 1st 2010, in order to scrutinize which strategy, either a dividend yield strategy or a buy and hold strategy involving the index, delivered the highest returns.

6 Results

This chapter presents the results attained in the quantitative part of the thesis. Firstly, the computations concerning the correlations between stock returns and dividends as well as Sharpe ratios and dividends are accounted for. Lastly the results for a reweighted portfolio strategy are given.

6.1 Dividend yields and stock returns

Initially stock returns of month m , and the dividend yields of month $m-1$ are highly correlated. This correlation begins to trail off around 1995, and around 2002 the correlation begins to fluctuate around a mean of zero. Occasionally, however, the correlation coefficient will spike and reach relatively high (negative) values between 0.5 (-0.3) and 0.6 (-0.4).

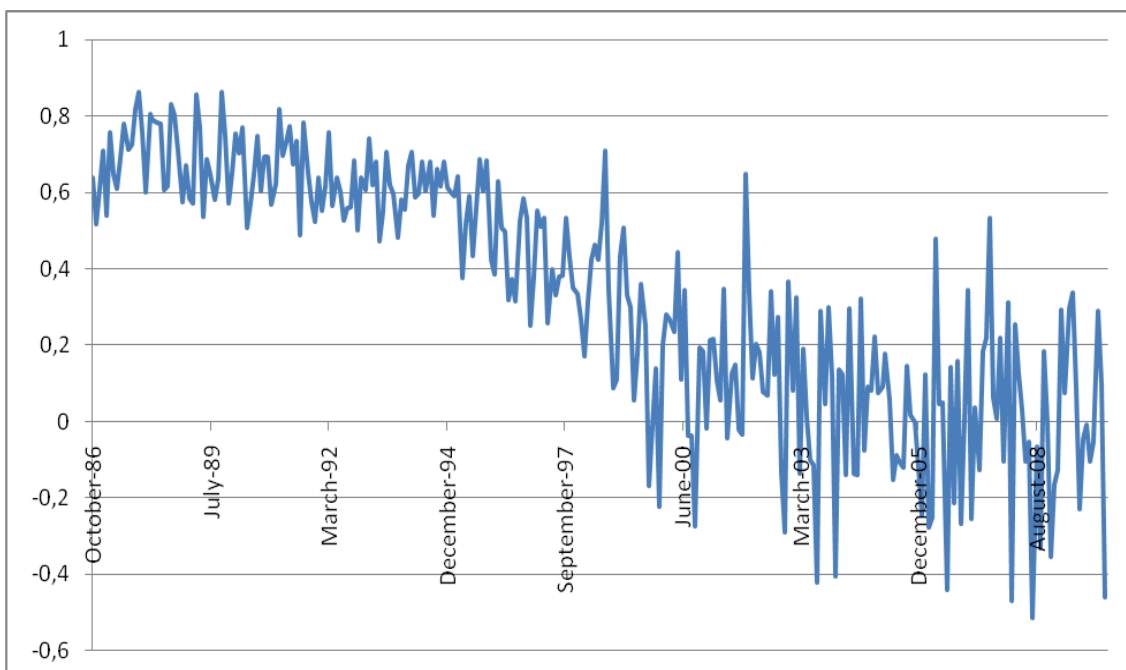


Figure 7.1: Spearman's rank correlation coefficient for dividend yields and stock return between October 1986 and April 2010.

$$Z - value = \frac{X - \mu}{\sigma/\sqrt{n}}$$

Average value for Spearman's rank correlation coefficient	0,3343905029
Standard deviation of correlation coefficient observations	0,3256966880
Number of observations	283

$$Z - value = \frac{0,3343905029 - 0}{0,3256966880/\sqrt{283}} = 17,2717$$

H₀ = No correlation between dividend yields and Sharpe ratios

H₁ = Correlation between dividend yields and Sharpe ratios

The Z-value is 17.2717, which is greater 1.96, we therefore reject the null hypothesis. It is concluded that there is a positive correlation between dividend yields and stock returns between October 1986 and April 2010.

6.1.1 The dotcom bubble and onwards

The correlation coefficient between dividend yields and portfolio performance fluctuates quite a bit between January 1999 and April 2010, the standard deviation is 22.56%. It does however maintain a positive average throughout the period, possibly due to extended periods with correlation figures beyond both 0.2, even reaching 0.4 and 0.6 at times.

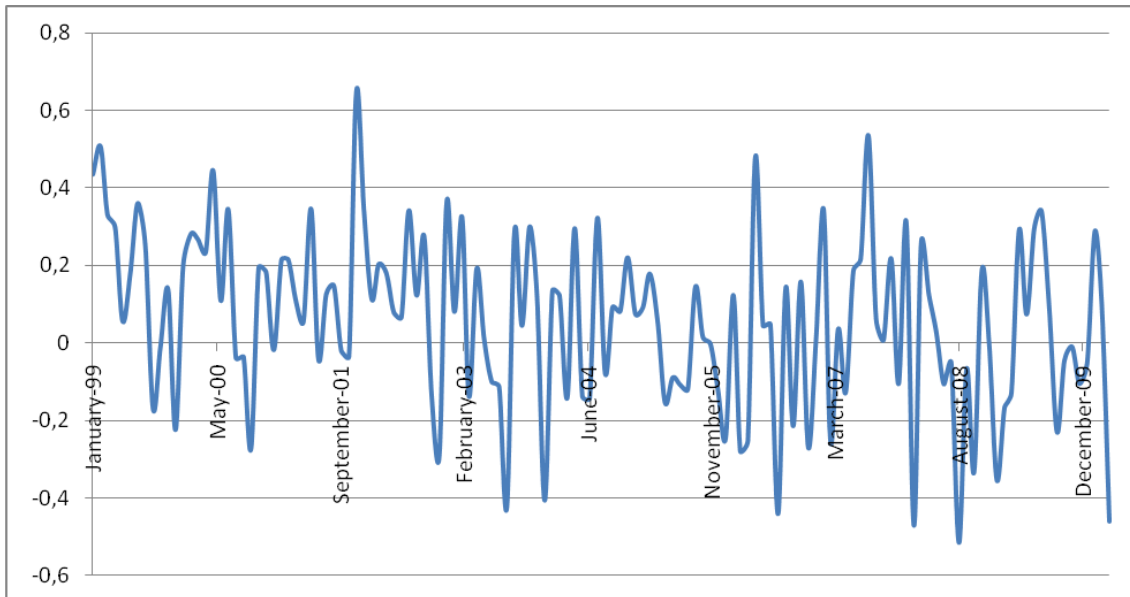


Figure 7.1.1: Spearman's rank correlation coefficient for dividend yields and Sharpe ratios between January 1999 and April 2010.

Average value for Spearman's rank correlation coefficient	0,0598775717
Standard deviation of correlation coefficient observations	0,2255850286
Number of observations	136

$$Z - value = \frac{0,0598775717 - 0}{0,2255850286/\sqrt{136}} = 3,0955$$

H_0 = No correlation between dividend yields and Sharpe ratios

H_1 = Correlation between dividend yields and Sharpe ratios

The Z-value is 3.0955, which is greater than 1.96. We therefore reject the null hypothesis, and conclude that there exists a statistically significant correlation between dividend yield and stock performance in the time period between January 1999 and April 2010.

6.2 Dividend yields and Sharpe ratios

The correlation coefficient between dividend yields and Sharpe ratios was very high initially, between 1986 and 1995, at times reaching beyond 0.8. It does however begin to diminish significantly from 1998 and onwards, and finally begins to fluctuate close to zero in 2000.

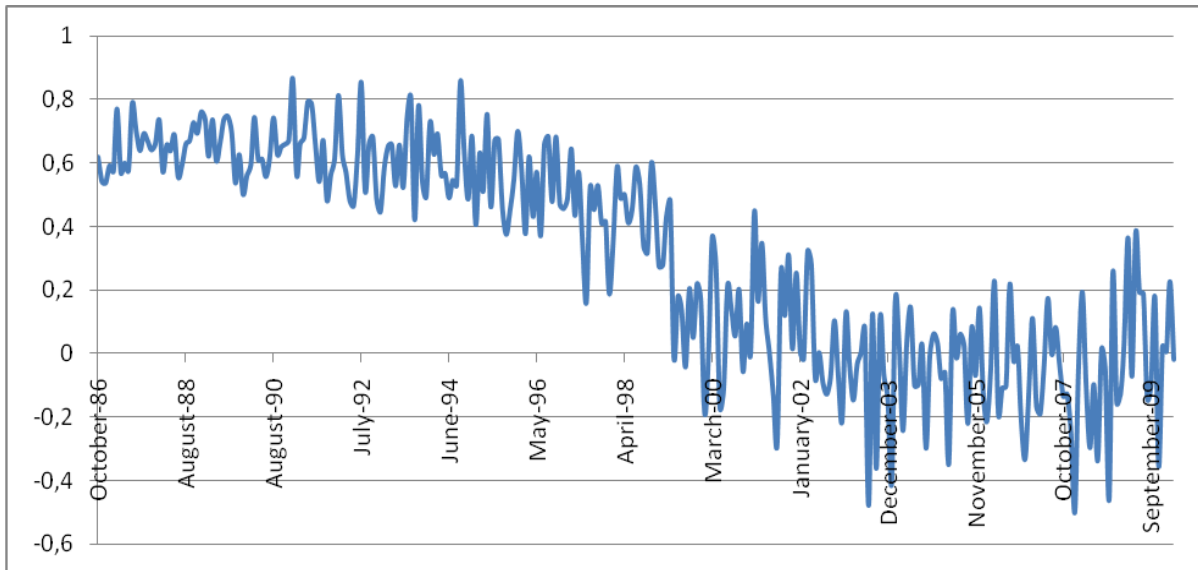


Figure 7.2: Spearman's rank correlation coefficient for dividend yields and Sharpe ratios between October 1986 and April 2010.

$$Z - value = \frac{X - \mu}{\sigma/\sqrt{n}}$$

Average value for Spearman's rank correlation coefficient	0,307723372
Standard deviation of correlation coefficient observations	0,335370224
Number of observations	283

$$Z - value = \frac{0,307723372 - 0}{0,335370224/\sqrt{283}} = 15,4358$$

H_0 = No correlation between dividend yields and Sharpe ratios

H_1 = Correlation between dividend yields and Sharpe ratios

The Z-value is 15.0560, which is well above 1.96. This leads us to reject the null hypothesis, meaning that we conclude that there is a correlation between dividend yields and Sharpe ratios in the time period between October 1986 and April 2010.

6.1.2 The dotcom bubble and onwards

From January 1999 and onwards the correlation between dividend yields and stock performance began to falter significantly. The average correlation

coefficient between January 1999 and April 2010 is 0,003806868, i.e. there is on average no correlation.

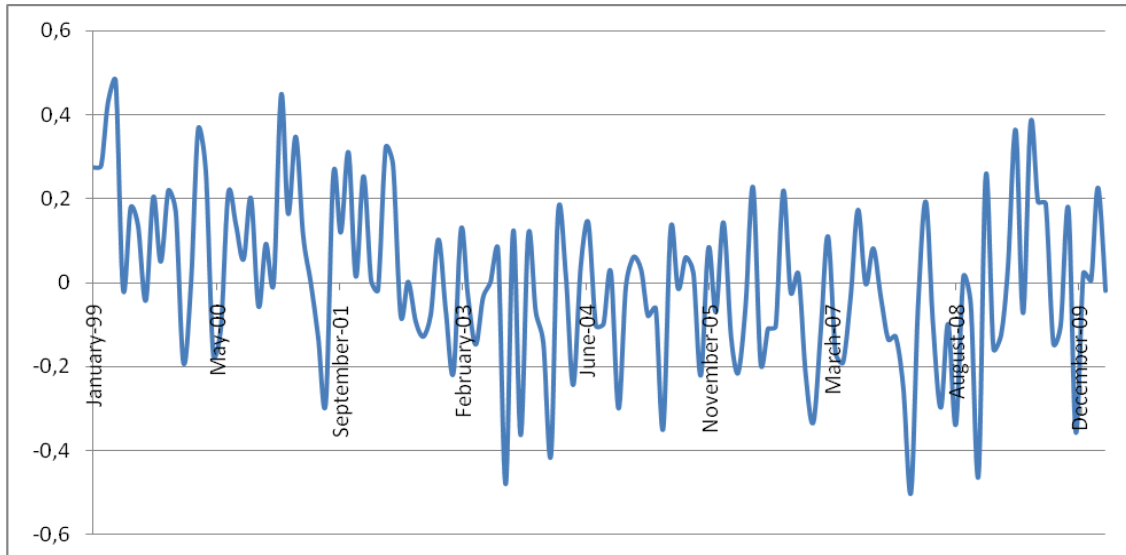


Figure 7.2.1: Spearman's rank correlation coefficient for dividend yields and Sharpe ratios between January 1999 and April 2010.

Average value for Spearman's rank correlation coefficient	0,003806868
Standard deviation of correlation coefficient observations	0,196806264
Number of observations	136

$$Z - value = \frac{0,003806868 - 0}{0,196806264/\sqrt{136}} = 0,2256$$

H_0 = No correlation between dividend yields and Sharpe ratios

H_1 = Correlation between dividend yields and Sharpe ratios

As our Z-value falls well within the region between -1.96 and 1.96, we fail to reject the null hypothesis. That is, we conclude that there is no correlation between dividend yields and Sharpe ratios in the period between January 1999 and April 2010.

6.3 Reweighted portfolios vs. OMXS30

The dividend yield strategy, consisting of reweighting portfolios on the 1st of January every year, has delivered superior returns to a buy and hold strategy involving the OMXS30 index 15 out of 23 full years. The OMXS30 yielded an average yearly return of 13.37%, not including the first four months of 2010. The reweighting strategy on the other hand delivered 22.8% on a yearly basis, which is 9.51 percentage points more than the buy and hold return.

Time period	Return of OMXS30	Return of reweighted portfolios	Excess return of reweighted portfolio in percentage units
1987	-16,67%	-10,55%	6,12%
1988	45,19%	51,39%	6,19%
1989	36,56%	33,79%	-2,76%
1990	-27,89%	-30,10%	-2,21%
1991	11,01%	27,32%	16,31%
1992	7,64%	-4,61%	-12,25%
1993	55,65%	160,24%	104,59%
1994	2,69%	11,67%	8,98%
1995	17,71%	6,98%	-10,72%
1996	38,85%	45,80%	6,95%
1997	27,79%	29,85%	2,05%
1998	16,94%	-10,52%	-27,47%
1999	72,79%	55,04%	-17,74%
2000	-12,85%	4,14%	16,99%
2001	-19,85%	12,03%	31,88%
2002	-41,74%	-21,86%	19,88%
2003	29,01%	33,12%	4,11%
2004	17,52%	16,94%	-0,58%
2005	28,84%	40,91%	12,08%
2006	19,09%	24,38%	5,29%
2007	-5,74%	-2,21%	3,53%
2008	-38,75%	-45,65%	-6,89%
2009	43,69%	98,12%	54,43%
2010 so far	10,73%	9,07%	-1,66%
Average	13,37%	22,88%	9,51%
Average incl. 2010	13,26%	22,30%	9,05%

Table 7.3a: Yearly returns of the OMXS30 and the dividend strategy.

Concerning the sub periods shown in Table 7.3b, the dividend yield strategy outperforms the buy and hold strategy in all but one five-year period; 1995-2000. The return over the whole period, i.e. January 1987 to April 2010, for the OMXS30 was 835.22%, while the dividend strategy delivered a remarkable 2753.32%, which is 2753.32 percentage points better. Not for a single period did the reweighting portfolios experience negative value growth.

Time period	Return of OMXS30	Return of reweighted portfolios	Excess return of reweighted portfolio in percentage units
1987-1989	65,22%	81,18%	15,96%
1990-1994	37,73%	146,74%	109,01%
1995-1999	322,04%	180,98%	-141,05%
2000-2004	-38,29%	41,92%	80,21%
2005-2009	27,28%	84,56%	57,28%
1987 - 2010	735,22%	3488,54%	2753,32%
Average for 5-year subperiods	87,19%	113,55%	26,36%

Table 7.3b: Period returns of the OMXS30 and the dividend strategy.

The astounding performance of the dividend yield strategy is made even more lucid when looking at the value growth of 1'000 Swedish kronor between January 1987 and April 2010. The value of the reweighted portfolio was not less than that of the index portfolio a single year.

Time period	Value of 1000 kronor invested in the OMXS30 in January 1987	Value of 1000 kronor invested in the dividend strategy in January 1987
1987	833,33 kr	894,53 kr
1988	1 209,94 kr	1 354,20 kr
1989	1 652,24 kr	1 811,80 kr
1990	1 191,39 kr	1 266,49 kr
1991	1 322,56 kr	1 612,54 kr
1992	1 423,60 kr	1 538,25 kr
1993	2 215,88 kr	4 003,19 kr
1994	2 275,56 kr	4 470,42 kr
1995	2 678,48 kr	4 782,63 kr
1996	3 719,13 kr	6 973,15 kr
1997	4 752,81 kr	9 054,44 kr
1998	5 558,01 kr	8 101,52 kr
1999	9 603,66 kr	12 560,99 kr
2000	8 369,87 kr	13 080,79 kr
2001	6 708,59 kr	14 655,02 kr
2002	3 908,70 kr	11 451,84 kr
2003	5 042,72 kr	15 244,73 kr
2004	5 926,14 kr	17 826,72 kr
2005	7 635,05 kr	25 120,10 kr
2006	9 092,33 kr	31 243,45 kr
2007	8 570,61 kr	30 553,27 kr
2008	5 249,09 kr	16 606,61 kr
2009	7 542,56 kr	32 900,73 kr
2010 so far	8 352,20 kr	35 885,36 kr

Table 7.3c: Yearly returns of the OMXS30 and the dividend strategy, in Swedish kronor.

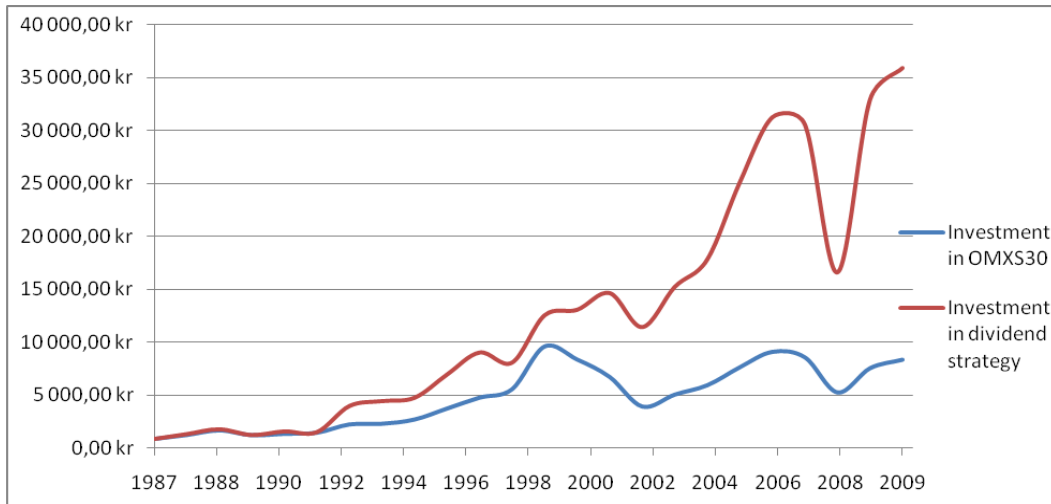


Figure 7.3d: The value of 1'000 kronor, invested in January 1987 in either the OMXS30 index or the dividend yield strategy, over the time period January 1987 and April 2010.

Table 7.3d lists the portfolio values which would have been had if 1000 Swedish kronor were invested at the beginning of each of the six time periods listed. Except for the period 1995-1999, the value of the reweighting portfolios would have developed significantly better than an index portfolio.

Time period	Worth of 1000 kr invested in OMXS30	Worth of 1000 kr invested in dividend strategy
1987-1989	1 652,24 kr	1 811,80 kr
1990-1994	1 377,25 kr	2 467,39 kr
1995-1999	4 220,35 kr	2 809,80 kr
2000-2004	617,07 kr	1 419,21 kr
2005-2009	1 272,76 kr	1 845,59 kr
1987 - 2010	8 352,20 kr	35 885,36 kr

Table 7.3d: Period returns of the OMXS30 and the dividend strategy, in Swedish kronor.

7 Analysis

This section will construe the results of the study, and provide possible explanations and reasons for the observed outcomes. First, a general analysis will be conducted of the results. The results will then be comparatively evaluated with the results of previous research on the subject, after which they will be contrasted with the efficient market hypothesis. Finally, the results for a certain time period during which the markets were remarkably volatile will be scrutinized.

7.1 Analysis of results

7.1.1 Dividend yields and stock returns

There is an unmistakably statistically significant correlation between dividend yields and stock returns. This relationship was at its strongest between October 1986 and circa 1994, after which the correlation coefficient has been steadily declining in magnitude. After 1995 the correlation was clearly getting weaker, which can be argued is due to the information technology craze which began around that time. The new IT companies which were taken public did not have the most reliable cash flows among the listed companies. Thus, they seldom paid any dividends, even though their share prices rose significantly. More traditional corporations, such as the manufacturing companies which are quite abundant in the OMXS30, did not experience the same phenomenal rise in their stock prices, yet they often paid out regular dividends, as well as they often raised them over the years.

Even though the dotcom bubble weakened the correlation somewhat, it has since still maintained a statistically significant magnitude. As stock performance must be considered a gauge of a company's financial success,

the existence of a statistically significant correlation between performance and dividends indicates that dividends are a sign of a well run and successful business. As stock prices are set by supply and demand, it also suggests that dividend yields matter to investors, and is a factor that is taken into account when possible stock purchases and investments are evaluated.

7.1.2 Dividend yields and Sharpe ratios

For the full time period 1987-2010 there was a statistically significant correlation, on the 5 % level, between dividend yields and Sharpe ratios. This implies that dividend yields of stocks are related to their risk adjusted performance. As higher dividend yields imply higher Sharpe ratios, stocks paying higher dividends should generally offer investors more reward for the risk they are taking on. There are plausible explanations to this phenomenon. The ability to pay dividends, especially relatively higher dividends, naturally originates in the financial strength of a company. Important factors are primarily profitability and cash flows, as a company in order to be able to pay regular dividends needs to be profitable as well as it has to have favorable cash flows. Any other combination will indisputably, sooner or later, render the company unable to pay any dividends. Companies with stable and reliable profitability and steady cash flows are generally mature corporations with commonly consistent financial performances. Consistency and reliability can be considered the antidotes to risk. If the fluctuations, volatilities if you will, of a company's profits and cash flows are diminished, this should reflect on its market valuation. The movements in its share price should logically become calmer, which would improve the company's Sharpe ratio, given of course, that the share price rises.

For the time period from January 1999 to April 2010, there is no evidence of a statistically significant correlation, at the 5 % level, between dividend yields and Sharpe ratios. The vanishing of this relationship can instinctively be considered quite strange, after all, the years after the dotcom bubble up until the financial crisis of 2007- 2008 were characterized by solid growth

and steadily rising shares prices. There are however some rational explanations to the unusually large drop in the correlation coefficient during late 2007, as well as for the considerably higher correlation for most of 2009.

Concerning the former, when the financial crisis brought with it bear markets, stocks fell all across the board. While certain sectors such as financials were hit especially hard and frequently, all types of companies experiences deteriorating business conditions and consequently falling share prices. Even stock prices of companies which attempted to maintain a certain dividend throughout some of the crisis fell. The indiscriminate bear stock markets eliminated any existing link between dividend yield and performance, leading the correlation coefficient to turn negative and reach as low as close to -0.5.

Concerning the latter, i.e. a rising correlation coefficient during 2009, it can be said that after the stock markets bottomed out in March of 2009, value stocks seem to have outperformed the market. Something which is quite evident in the performance of the reweighted portfolio compared to the performance of the general market in 2009, shown in table 7.3a. Meaning, that when the economy appeared to free itself of the shackles of recession more rapidly than expected, the market rewarded value stocks in particular. These stocks, which generally pay out significant dividends suddenly had outlooks which were much brighter than what had been computed into their prices. This logically lead to a certain reoccurrence of the relationship between dividend yields and stock performance, observable in fluctuation of the correlation coefficient around 0.2 and 0.4.

7.1.3 Reweighted portfolios

The reweighted portfolios delivered astoundingly superior returns in comparison to the regular buy and hold strategy over the full time period, i.e. January 1987 and April 2010. Only considering full years, meaning we

exclude the first four months of 2010, the reweighing strategy yields an annual return of 22.88%, exceeding the market return by 9.51 percentage units. It is thus not surprising that the reweighted portfolios have proved to be a better investment for 15 out of 23 full years. For the other eight years, three can be considered a near miss, more specifically 1989, 1990 and 2004, during which the strategy's returns fell within 2.76 percentage units of the market's. Throughout the 23 years the value of the strategy portfolios grew by 3'488.54%, while the market rose by 735.22%.

The remarkable difference in performance can be explained by several circumstances. While the dividend strategy performed similarly to the market in the late 1980s, and even performed worse in 1989 and 1990, its returns exceed those of the OMXS30 by far in 1991 and 1993, in the latter case, by 104.59 percentage units. This leap gave the reweighted portfolio a boost enabling it to maintain its lead even though its performance was roughly equal to that of the market between 1994 and 1997, and significantly worse in 1998 and 1999. Concerning 1998, it can strike one as quite strange that the dividend portfolio would actually *lose* value in a generally bull market. A plausible explanation is that capital flowed from more traditional stock that paid dividends to the, at the time, more trendy and bull IT stocks.

Then, between 2000 and 2002 the reweighted portfolios once again vastly outperformed the market, giving them a wide lead. While the OMXS30 had lost a combined 60% of its 1999 exit value by years-end 2002, the dividend portfolios had lost merely 8.83%. From January 2003 up until the subprime crisis really hit the stock markets in 2008, the dividend yield strategy was only outperformed by the market once, and even then only by a hair, more specifically, 0.58 percentage units in 2004. By January 2008, a 1'000 Swedish kronor portfolio dedicated to the dividend strategy in 1987 would have been worth roughly 30'500 kronor, while a index oriented buy and hold portfolio would have weighed in at about 8'500 kronor.

In 2008 the financial crisis unleashed a bear market which pounded most stocks into the ground. Widespread fears of complete meltdowns in the financial sectors of the world causing a global recession, or even another depression, resulted in massive sell offs. As investors forecasted paltry demand for years to come and priced stocks accordingly, most companies saw their share prices fall dramatically. The companies included in the high dividend portfolio of 2008 were no exception. Their value fell by 45.65%, nearly 7 percentage units worse than the OMXS30. By year-end 2008, the value of the 1'000 kronor invested in 1987 was just 16'000 kronor, still twice the value of the market portfolio, however nowhere near its all time high. Yet in 2009, when markets realized their fears had been over exaggerated, the dividend portfolio nearly doubled in value, outperforming the market return by a whopping 54.43 percentage units. A tremendous comeback, once again leaving the market portfolio far behind as a new all time high was reached.

Thus, what made the dividend strategy outperform the market by such a tremendously wide margin are two factors. First of all, the dividend strategy experienced a few large leaps over the years. These pull-aways placed it in a safe pole position. This occurred in 1991, 1993 and between 2000 and 2002. Secondly, and most importantly, the dividend portfolios did not fall as much as the market in bear markets. And when they did, they rebounded immensely the following year, outperforming the market by far.

7.2 Results and previous research

The observation that high dividend yield portfolios, so called top ten portfolios, perform better than the market as a whole, is in perfect symmetry with previous research on the topic. Higgins discovered that the top ten portfolios delivered an average annual return of 17.9% while the market return was 11.1%, a difference of 6.8%.⁴¹ McQueen et al. observed an average annual return of 16.77% for high dividend portfolios during a

⁴¹ O'Higgins, M., *Beating the Dow*, Harper Perennial, New York 1992.

period when markets returned an average of 13.71%.⁴² These results are roughly in line with the yearly excess return of 9.51% delivered by the OMXS30 dividend portfolios.

Domian et al. observed that while the dividend portfolios did not outperform the market in 1989 and 1990, they did so in 1987, 1988, 1991 and 1992.⁴³ Visscher and Filbeck had similar results where the market return was superior in 1990 and 1994.⁴⁴ In the study by Brzeszczynski and Gajdka, it was detected that the buy and hold strategy outperformed the top ten portfolio in the periods 1997-1998, 1999-2000 and 2001-2002.⁴⁵ It can be concluded that once again our results are in line with previous research, as they performed worse than the market in 1989, 1990, 1992, 1995, 1998, 1999 and 2004.

7.3 Results and efficient market hypothesis

The abovementioned results are clearly inconsistent with the efficient market hypothesis. According to the hypothesis the market will correct any mispricing with regards to return versus risk making it impossible to obtain a return higher than what can be expected from a certain level of risk. As can be seen in graphs 7.2 and 7.2.1 there is a statistically significant correlation between our investment strategy and a positive risk-adjusted return. Moreover, this correlation was stronger in the first years of our study combined with a lower volatility.

⁴² McQueen, G., Shields, K. & Thorley, S. R., "Does the "Dow-10 Investment Strategy" Beat the Dow Statistically and Economically?", *Financial Analysts Journal*, Vol. 53, No. 4, 1997, p. 67.

⁴³ Domian, D. L, Louton, D.A. and Mossman, C. E., "The rise and fall of the "Dogs of the Dog"", *Financial Services Review*, Vol. 7, No. 3, 1998, p. 148.

⁴⁴ Filbeck, G. and Visscher, S., "Dividend-Yield Strategies in the Canadian Stock Market", *Financial Analysts Journal*, Vol. 59, No. 1, 2003, p. 103.

⁴⁵ Brzeszczynski, J. and Gajdka, J., "Dividend-driven trading strategies: evidence from the Warsaw Stock Exchange", *International Advances in Economic Research*, Vol. 13(3), 2007, p. 292.

From 2000 and onwards the correlation has been weaker but at the same time the volatility of the correlation has been surging. During the end of the 1990's a negative correlation can be observed. The trend is therefore clear; the power of predicting future stock performance with regard to our strategy has weakened. This indicates that the market efficiency has gradually improved but the exact reason for this development is however still unclear. A plausible explanation can consist of the investment strategy being made publicly available and therefore attracting a multitude of investors eventually leading to a correction towards market efficiency. The investment strategy was, as mentioned above, popularized by Michael O'Higgins in 1991 through the book *Beating the Dow*. It is therefore highly probable that Swedish investors were receptive to this new investment strategy, leading to trading according to it and its diminished profitability.

The increased volatility is in itself is not a sign of market inefficiency. The increase is rather an illustration of that in certain years the investment strategy can predict high risk-adjusted returns and the opposite result in other years. The long-term trend of correlation from 2000 is however still very weak indicating that the market has become more efficient in recent years.

7.4 During the crisis

As can be seen in graph 7.3, the return on our investment strategy correlated with the return of OMXS30 between 1987 and 1991. In the beginning of the 1990's Sweden experienced a crisis largely based on a property boom combined with the transition from a fixed-rate system to a floating-rate currency system.⁴⁶ International currency speculators eventually forced the Swedish Central Bank to let the Swedish Krona depreciate. This had a very positive effect on various export-driven manufacturing companies thereby raising their international competitiveness. This increase was of course reflected in a soaring stock price. Many of the companies in the OMXS30

⁴⁶ Pettersson, K., *Bankkrisen inifrån*, SNS Förlag, Stockholm 1993, p. 27.

index are export-dependent and mature and could therefore benefit strongly from the currency depreciation.

During the dotcom stock market crash beginning in 2000 the investment strategy proved surprisingly robust. OMXS30 fell broadly and was hampered by the ridiculously overvalued tech stocks. It is very important to note that the crisis was rooted in the dotcom stocks, stocks expecting to generate large amounts of future cash flows. The part of the economy with less exposure to the tech-sector was on the other hand rather unaffected by the dotcom bubble. This might provide an explanation to why the investment strategy was successful in this period when OMXS30 suffered vastly from falling stock prices.

During the recent financial crisis it is clear that both the financial economy and the real economy were severely affected by the unsustainable credit-driven growth during the 2000's. The subprime crisis revealed a deeply flawed system with overleveraging and distorted incentives. With the fall of Lehman Brothers in late 2008 the equity markets collapsed when investors fled to what was perceived as safe assets. Starting in the summer of 2007, the downturn was broad and fierce and affected all shares on the exchanges. Consequently, it is in graph 7.3 possible to observe a sharp decline in the value of our portfolio. After the launch of the stimulus packages the portfolio soon recovered and is now worth more than prior to the downturn.

8 Conclusion

This section of the thesis will present a concise overview of the results of the study as well as of the analysis conducted.

The results indicate that over the time period October 1986 to April 2010 there is a statistically significant correlation between dividend yields and stock performances. Solely considering the period from January 1999 to April 2010, there is also a statistically significant correlation. Implying that the predictive ability of dividend yields still exists for returns unadjusted for risk. It was also observed that both correlations have gotten weaker since the mid 1990s, potentially due to investor learning.

Concerning risk-adjusted returns, the thesis also investigated the correlation between dividend yields and Sharpe ratios. It was concluded that there is a statistically significant correlation between 1986 and 2010. However, for the sub period encompassing the years between 1999 and 2010, there is no statistically significant correlation between dividend yields and risk-adjusted returns. The disappearance of this relationship could possibly be chalked up to investor learning.

The study also explored whether a strategy, consisting of reweighting portfolios once every year to include the ten stocks with the highest dividend yields, would deliver excess returns beyond those of the OMXS30. The results were remarkable in that the reweighted strategy outperformed the index by 2753.32 percentage units over the time period 1987 to 2010. Studying the yearly returns, it becomes clear why the dividend strategy portfolio could achieve such a wide lead over the market portfolio. A few large outperformances during generally bull markets in the mid 1990s secured the lead, even though IT stocks provided superior market returns later that decade. Then, as the dotcom bubble burst, the dividend portfolio

did a good job at maintaining its value while the market fell. After that, during most of the 2000s, the dividend stocks yielded better returns than the market, and finally, a remarkable comeback in 2009 restored all of the 2008 value, and then some, of the dividend portfolio.

When searching for an explanation for the correlation between dividend yields and returns, as well as for the reweighted portfolios' exceptional performance, the rationale behind the "Dogs of the Dow"-strategy, popularized by Higgins, offers some insight. The shares with the highest dividend yields, i.e. those which would be included in the top ten portfolio, could quite possibly be stocks whose prices have fallen substantially over the past year. If the nominal dividend has remained roughly unaltered, a lower stock price would naturally imply a higher dividend yield. A top ten portfolio would therefore possibly invest in stocks which have recently fallen considerably in value. The "Dogs of the Dow" strategy suggests that such stocks might be oversold, i.e. that the market price has exaggerated the negative aspects of the company, and that these stocks will rebound, possibly offering excess returns. If this strategy holds, stocks with high dividend yields would offer higher returns, implying a positive correlation, which is exactly what was observed in the study.

The question which must be asked considering the weakening correlation over the past decade, is whether this trading strategy has become the subject of investor learning, and thus will not offer any excess returns in the future. Taking into consideration the exceptional performance of the reweighted portfolios during recent years, this might not be the case.

9 Suggestions for future research

This section presents ideas, topics and concepts which are considered by the authors to be fitting objects of investigation in other research projects. These ideas have either been encountered by the authors during the process of writing the thesis, and have awakened their interest, or have been considered alternative paths as well as possible continued paths, to the thesis' analysis.

This thesis has generated several interesting topics which could be investigated further. First and foremost, we suggest a replication of the ranking investigation as well as the reweighted portfolio strategy to be conducted on an index using data where all constituent stocks are included for each year. That way a larger data sample would be attained for early years, providing a more statistically secure result.

Secondly, it would be interesting to see whether the correlation between high dividend yields and performance differs between emerging and more mature markets or between small cap and large cap companies. Such an investigation would be of value primarily because it could possibly offer an explanation as to why a correlation exists or does not exist. Additionally, the reweighted portfolio strategy could also be replicated for other markets, in order to observe whether its proficiency differs regionally, possibly depending on how developed the stock market is.

Thirdly, several modifications to the reweighting strategy applied in this thesis can be investigated, and even placed in a comparative analysis to yearly reweightings. The portfolios could for example be reweighted at different time intervals, perhaps on a monthly or quarterly basis. Possibly this could improve the results as stocks which have appreciated rapidly are exchanged for more recent dogs of the index which might be able to offer larger subsequent returns. It might also be possible that returns increase as

more frequent reweighting will result in the strategy reacting quicker to lowered dividend yields as well to increased dividend yields.

It is still too early to answer whether the diminished level of correlation and the increasing volatility at the end of this study's time period are just temporary, or a permanent consequence of investor learning. Thus, the investigation carried out in this thesis could be repeated in order to observe the subsequent development of the correlation and its volatility. Once again, it might be interesting to replicate this investigation on other stock markets to observe whether the correlation and its volatility develop in the same way as in Sweden.

Concerning investor learning, it might even be possible to investigate a possible relationship between the publication of influential research on this particular trading strategy and any subsequent changes in its success rate.

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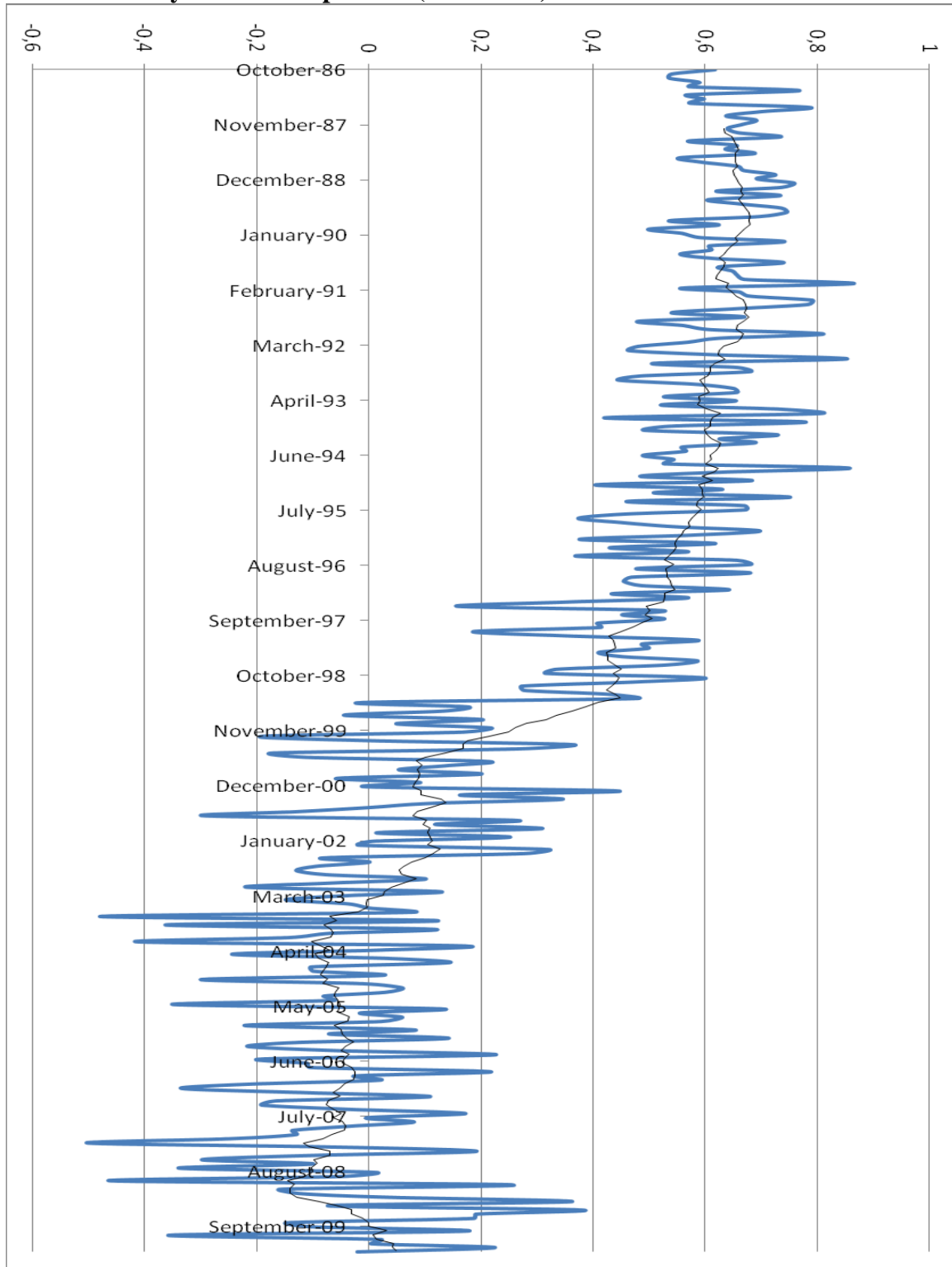
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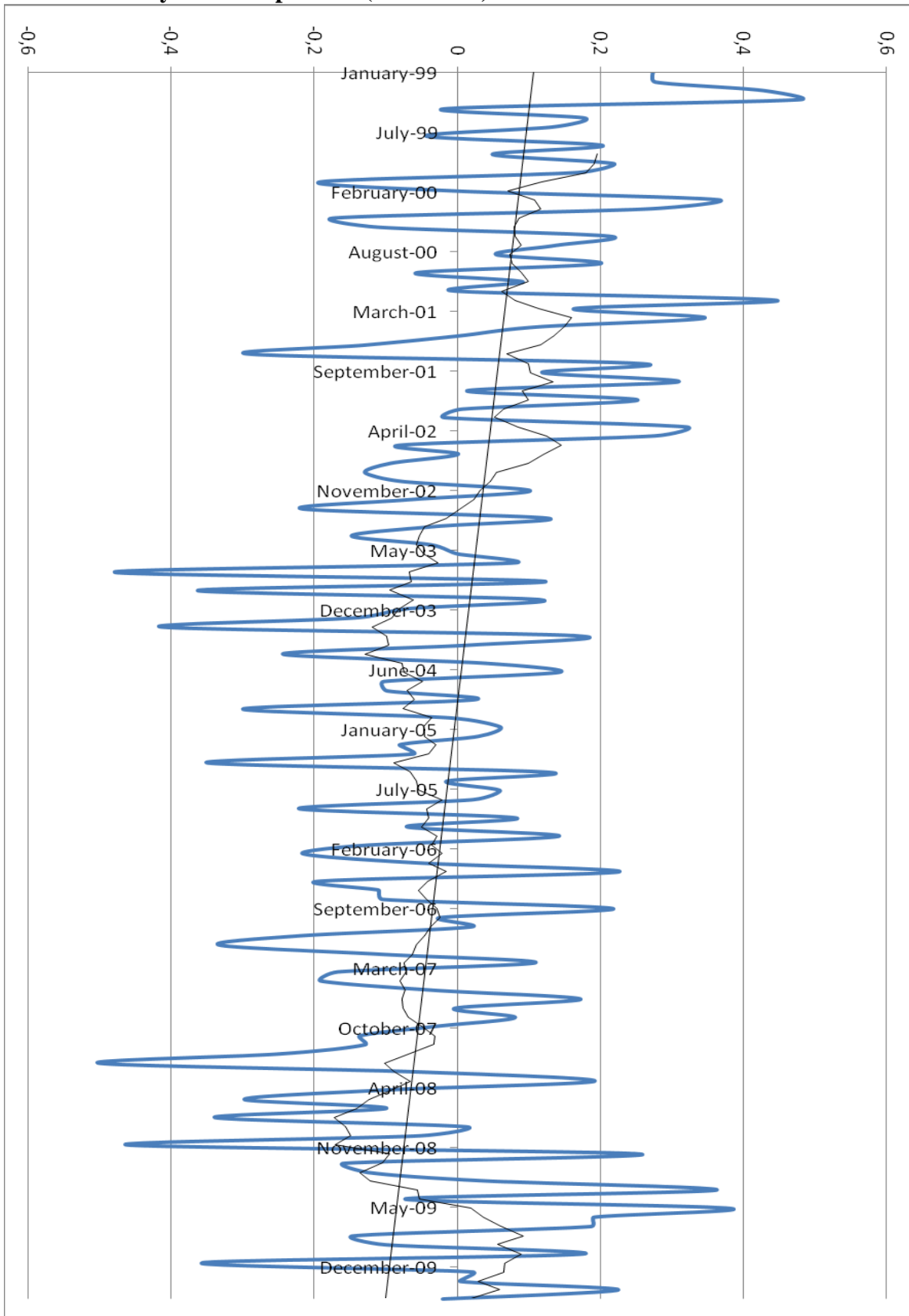
Attachments

A1 - Dividend yield vs. Sharpe ratio (1986-2010)



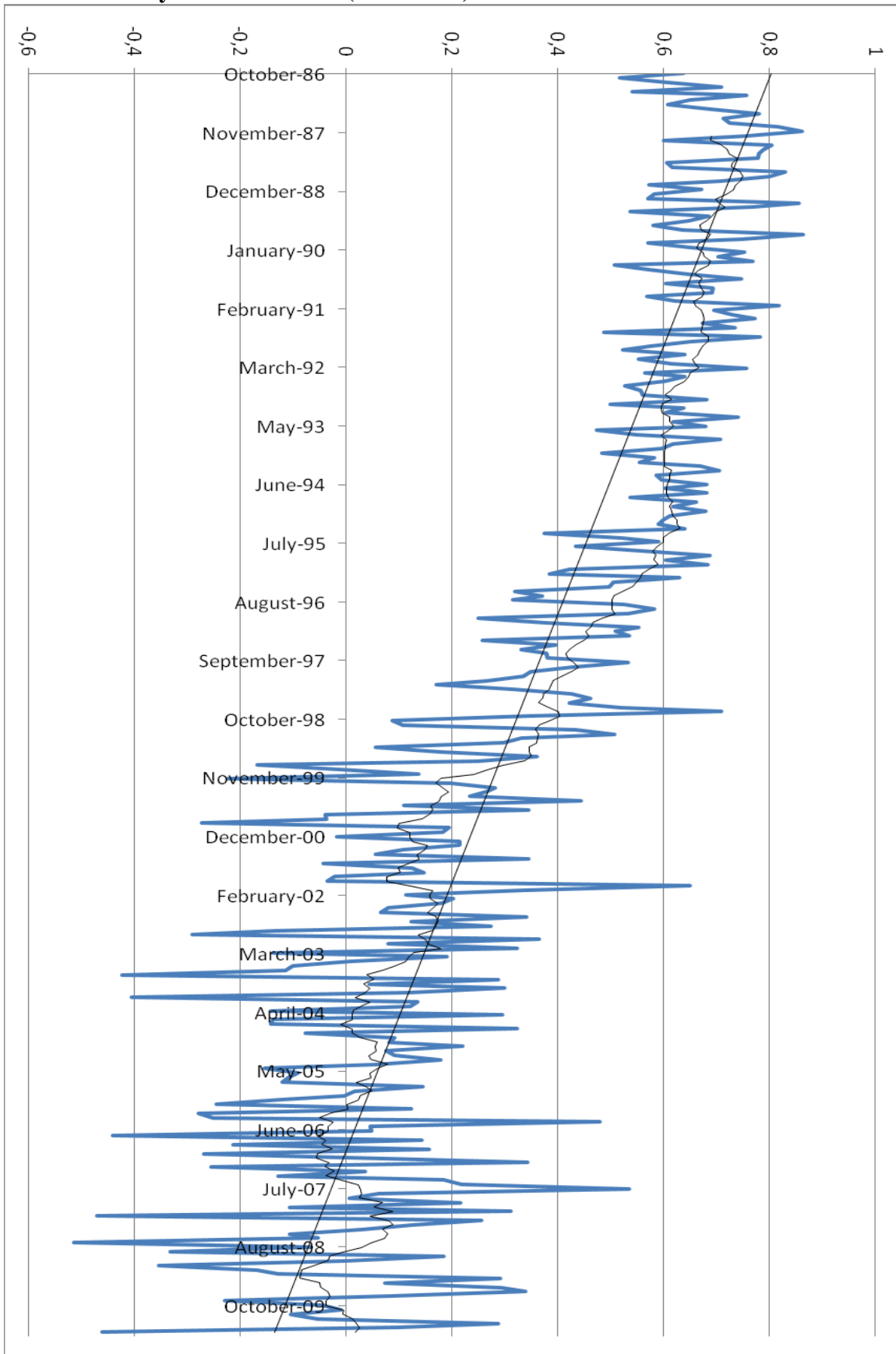
Linear trend line, and 15-observation moving average.

A2 - Dividend yield. Sharpe ratio (1999-2010)



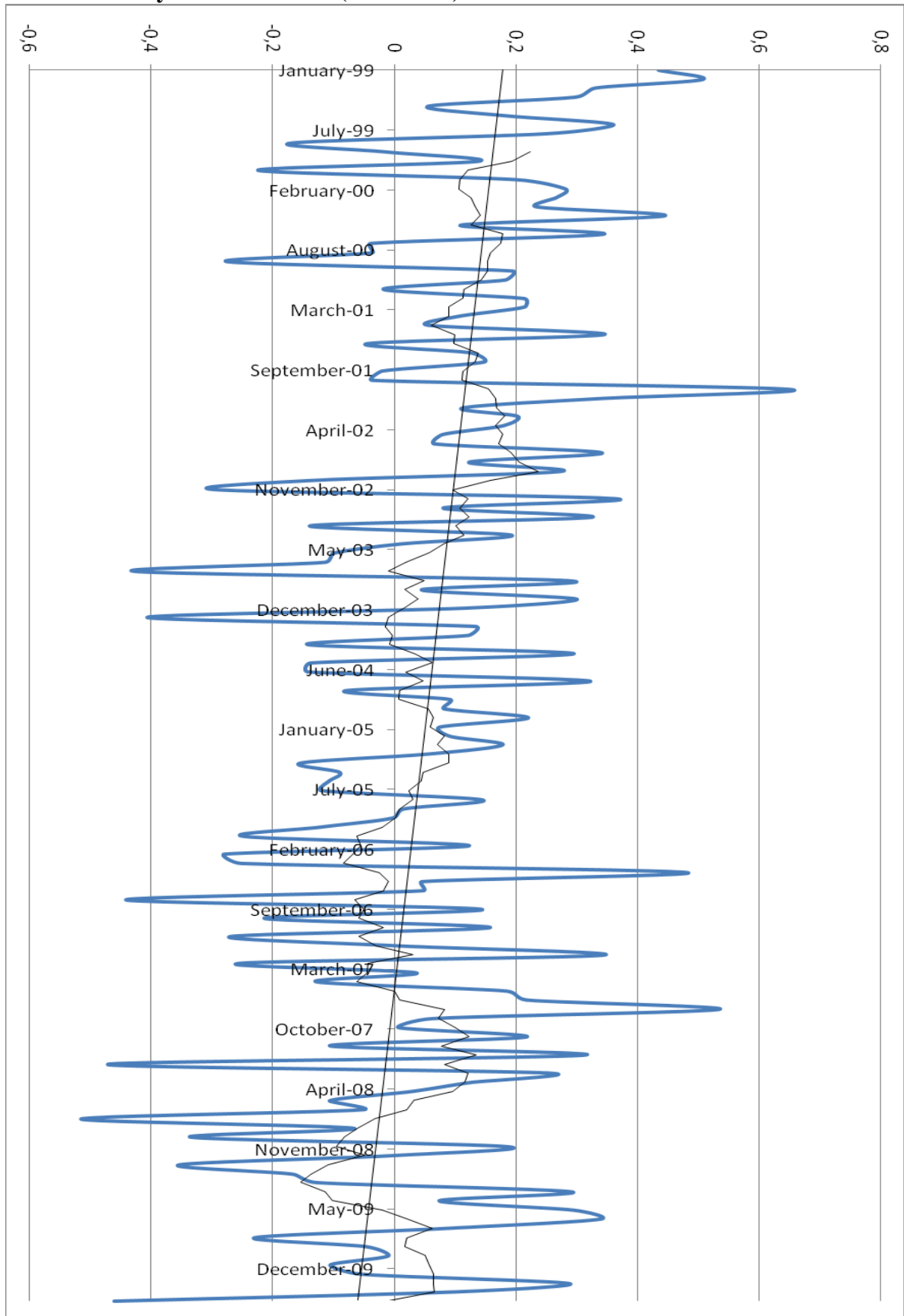
Linear trend line, and 10-observation moving average.

A3 - Dividend yields vs. returns (1986-2010)



Linear trend line, and 15-observation moving average.

A4 - Dividend yields vs. returns (1999-2010)



Linear trend line, and 10-observation moving average.