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The Return of the Finnish Dogs: An Updated Evidence of the Dogs of the Dow Investment Strategy in Finland

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ABSTRACT:
This master's thesis examines the applicability and performance of the Dogs of the Dow (DoD) investment strategy in the Finnish stock market between the years 2003 and 2023. The primary objective of the study is to determine whether the DoD strategy outperforms its benchmark index OMXHCAPGI in both absolute and risk-adjusted terms. In addition, the aim is to investigate whether the portfolio produces abnormal returns using the Fama-French three-factor and five-factor models. Additional tests in the study consider the impact of taxation and transaction costs on returns. The thesis extends the findings of previous studies by considering recent economic events, such as the Covid-19 pandemic, the war in Ukraine, rising interest rates and inflationary pressures.

The thesis is based on relevant financial theories, including efficient market theory and portfolio theory. The data used in the thesis, implemented with a quantitative method, has been collected from the historical data of the Nasdaq Helsinki stock exchange. The performance of the Dogs of the Dow strategy, which invests in high-dividend-yielding stocks, is analyzed using the Sharpe ratio, the Treynor index, the Modigliani-squared measure and the Fama-French three-factor model, with annual and monthly accuracy. Additionally, this thesis introduces the use of Fama-French five-factor model in the Finnish context in accounting for abnormal returns.

The results show that the Dogs of the Dow strategy outperforms its benchmark index OMXHCAPGI over the period under review. However, after risk adjustments, the results suffer from a lack of statistical significance, and the DoD portfolio no longer outperforms its benchmark. The DoD portfolio seems to produce abnormal returns when measured using the three-factor model, but the abnormal returns disappear when adjusted with the five-factor model. The additional tests show that the strategy has been particularly successful during periods of stock market downturns, thus supporting previous studies. High-dividend-yielding stocks provide stability in declining markets. After taking into account the impact of transaction costs and taxation, the returns of the strategy remain positive, although inconsistent in terms of statistical significance. Overall, the results are fairly consistent with previous literature.

The thesis expands previous research on the topic by providing updated results on the effectiveness of the Dogs of the Dow strategy in Finland. The results are of practical use to investors looking for a systematic, simple and relatively passive investment strategy. The DoD strategy is particularly suitable for private investors investing through an equity savings account.

KEYWORDS: financial markets, investment in shares, stocks, investments, dividends, Dogs of the Dow, value investing

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TIIVISTELMÄ:
Tämä pro gradu -tutkielma tarkastelee Dogs of the Dow (DoD) -sijoitusstrategian soveltuvuutta ja suoriutumista Suomen osakemarkkinoilla alkaen vuodesta 2003 ja päättyen vuoteen 2023. Tutkielman ensisijaisena tavoitteena on selvittää, päihittääkö DoD-strategia vertailuindeksinsä OMXHCAPGI:n tuoton sekä absoluuttisesti, että riskikorjattuna. Lisäksi tavoitteena on tutkia Fama-Frenchin kolmifaktori- ja viisifaktorimalleilla tuottaako portfolio ylituottoa. Tutkielman lisätestit ottavat huomioon myös verotuksen ja transaktiokulujen vaikutuksen tuottoihin. Tutkielma laajentaa aikaisempien tutkimuksien löydöksiä ottamalla huomioon viimeisimmät talouden tapahtumat, kuten Covid-19 pandemian, Ukrainan sodan, nousevat korot sekä inflaatiopaineet.

Tutkielma pohjautuu aiheelle relevantteihin rahoitusteorioihin, käsittäen muun muassa teorian tehokkaista markkinoista sekä portfolioteorian. Kvantitatiivisella menetelmällä toteutetussa tutkielmassa käytetty data on kerätty Nasdaq Helsinki -osakepörssin historiallisesta datasta. Korkean osinkotuoton omaaviin osakkeisiin sijoittavan Dogs of the Dow -strategian suoriutumista analysoidaan muun muassa Sharpen luvun, Treynor-indeksin, Modigliani-squared-mittarin ja Fama-Frenchin kolmifaktori-mallin kautta, vuosi- ja kuukausitarkkuudella. Lisäksi tutkielma esittelee Fama-Frenchin viisifaktori-mallin käytön suomalaisessa kontekstissa ylituoton määrittämiseen.

Tulokset osoittavat, että Dogs of the Dow -strategia ylittää vertailuindeksinsä OMXHCAPGI:n tuoton tarkastelujaksolla. Riskikorjausten jälkeen tulokset kärsivät kuitenkin tilastollisen merkitsevyyden puutteesta, eikä DoD-portfolion voida enää todeta päihittävän vertailuindeksiään. DoD-portfolio vaikuttaa tuottavan ylituottoa kolmifaktori-mallilla mitattuna, mutta ylituotto katoaa viisifaktori-mallilla korjattuna. Lisätestit osoittavat, että strategia on menestynyt erityisesti osakemarkkinoiden laskukausina, mikä tukee aiempia tutkimuksia. Korkean osinkotuoton omaavat osakkeet tarjoavat vakautta laskevilla markkinoilla. Kaupankäyntikulujen ja verotuksen vaikutuksen huomioimisen jälkeen strategian tuotot säilyvät positiivisina, joskin tilastollisen merkitsevyyden kannalta ristiriitaisina. Tulokset ovat kokonaisuudessaan melko linjassa aiemman kirjallisuuden kanssa.

Tutkielma laajentaa aikaisempaa tutkimusta aiheesta tarjoamalla tuoreita tuloksia Dogs of the Dow -strategian toimivuudesta Suomessa. Tuloksista on käytännön hyötyä sijoittajille, jotka etsivät systemaattista, yksinkertaista ja suhteellisen passiivista sijoitusstrategiaa. DoD-strategia sopii erityisesti osakesäästötilin kautta sijoittaville yksityissijoittajille.

AVAINSANAT: rahoitusmarkkinat, osakesijoittaminen, osakkeet, sijoitukset, osingot, Dogs of the Dow, arvosijoittaminen

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1 Introduction

Throughout history, investors have sought to maximize their profits by investing their excess funds in the stock market. However, some investors are not satisfied with just the average stock market return but rather aim to beat the market and achieve abnormal returns. According to arguably one of the most famous theories in financial theory, the Efficient Market Hypothesis by Eugene Fama (1970), beating the market should not be possible in the long run. According to the EMH, all relevant information is already included in stock prices, and predicting stock prices using an investment strategy should therefore not be possible. Even if an investor were to find a strategy that produces abnormal returns, it should not remain profitable for long, but prices should quickly correct themselves to the right level as investors utilize the profitable strategy. This is how efficient stock markets work.

However, not all investors support the Efficient Market Hypothesis, and investors and academics are constantly trying to find investment strategies that could allow them to achieve abnormal returns. One such well-known investment strategy is Dogs of the Dow (DoD), which was originally introduced by John Slatter in a 1988 article in the *Wall Street Journal* (Dorfman, 1988). Originating from the United States stock market, this strategy proposes a straightforward yet intriguing approach to stock selection, emphasizing high dividend yield as a key indicator of potential future performance. The strategy is basically very simple; at the beginning of the year, a portfolio of 10 stocks is formed from the ten highest dividend-yielding stocks within the Dow Jones Industrial Average (DJIA) index. These stocks are called "dogs", hence the name of strategy.

Dogs of the Dow is a value-oriented contrarian investment strategy. High dividend yields are often considered to be an indicator of unpopularity, and according to the contrarian investment strategy, investing in out-of-favor and undervalued stocks can enable market beating and outperforming (Bodie et al., 2023). The father of the value investing strategy is Benjamin Graham (Rea, 1977; Bodie et al., 2023), who developed several financial ratios and critical values for assessing undervalued stocks that are still in use today (see

e.g. Graham & Dodd, 1951). A value stock is typically a stock with a high dividend yield and low price-to-earnings and price-to-book ratios (Filbeck & Visscher, 2003). Several studies have concluded that stocks with such characteristics tend to perform better than average (Basu, 1977; Lakonishok et al., 1994). The stocks used in the Dogs of the Dow strategy often meet the criteria for both value investing and contrarian investing, making DoD inherently a value-oriented strategy.

Slatter studied the returns of the Dogs of the Dow strategy between 1972 and 1987 and using the strategy, he indeed was able to beat the benchmark index DJIA by 7.6% on an annual basis (Dorfman, 1988). Investment books by O'Higgins and Downes (1991) and Knowles and Petty (1992), published a little later, further increased the recognition and popularity of the strategy among both institutional investors and private investors. Because the Dogs of the Dow strategy has garnered significant interest and debate, a number of studies dealing with the performance of the Dogs of the Dow strategy have since been published, especially within the context of North and South American stock markets (McQueen et al., 1997; Domian et al., 1998; Hirschey, 2000; Da Silva, 2001; Visscher & Filbeck, 2003; Filbeck et al., 2017; Lin, 2017). Studies have also been published in Australia and Asia (Alles & Sheng, 2008; Chong & Luk, 2010; Wang et al., 2011; Tissayakorn et al., 2013; Pandey, 2017; Ghouse et al., 2018) and in Europe (Filbeck & Visscher, 1997; Ap Gwilym et al., 2005; Rinne & Vähämaa, 2011).

Several studies have concluded that by utilizing the Dogs of the Dow strategy, an investor can beat the average market return. On the other hand, the results are also overshadowed by negative results and risk-adjusting, taxation and transaction costs, which reduce returns. Some of the studies have also not been statistically significant and have therefore not been able to prove the superiority of the Dogs of the Dow strategy. Therefore, full consensus on the effectiveness of the Dogs of the Dow has yet to be achieved.

The study by Rinne and Vähämaa (2011) is so far the only paper that has published academic research results of Dogs of the Dow investment strategy from Finland, in addition

to a few masters' degree theses. The Finnish stock market is an interesting research target due to its small size, as the market consists of rather small number of listed firms (Davydov et al., 2016). Finland is also a fairly remote market, which increases the chance for the periphery syndrome to appear. Leivo and Pätäri (2011) explain that periphery syndrome describes a phenomenon occurring during market stress, where institutional investors first withdraw money from the most distant stock exchanges rather than from domestic markets. On the other hand, Silvasti et al. (2020) state that Nordic countries, such as Finland, have been offering a stable political and low credit risk environment, which attracts foreign investors. Furthermore, the Finnish stock market, named Nasdaq Helsinki, is known for relatively high volatility and low liquidity, and for firms that consists of relatively few growth companies, but instead, for many large dividends paying companies (Westrén-Doll, 2024). This brings an interesting aspect to the thesis and creates an ideal opportunity to study the Dogs of the Dow strategy in the Finnish stock exchange.

Despite its small size and remote location, the Finnish stock market has actually historically produced quite good returns for investors (Heikkilä, 2022). The Helsinki Stock Exchange's general index OMXH has actually produced a better total return since the turn of the millennium than, for example, the Euro Stoxx 50 index, which consists of large European companies (Nikula, 2023). In the 2020s, the Finnish stock market, like other stock exchanges, has experienced a variety of events. The Covid-19 crisis, the war in Ukraine and rising interest rates have all affected stock returns (Angervuo, 2022). The last few years have been rather weak for Finnish stocks (Nikula, 2023).

1.1 Purpose of the thesis and research gap

This thesis aims to explore the applicability and performance of the Dogs of the Dow strategy within the Finnish stock market between the years 2003 and 2023. Further, the aim is to find answers to the following research questions:

Q_1: How does the Dogs of the Dow strategy perform in the Finnish stock market compared to the benchmark index?

Q_2: Does the Dogs of the Dow strategy produce abnormal returns when the performance of the DoD portfolio is tested with Fama-French's three-factor and five-factor models?

The earlier study from Finland by Rinne and Vähämaa (2011) served as the motivator for this thesis, which this research now aims to continue with a more recent review period and broader risk-adjusting by utilizing the Fama-French five-factor model alongside the previously used three-factor model. Rinne and Vähämaa (2011) found that the DoD strategy performs particularly well in periods when the trend of stock prices in the stock market is downward. Thus, the contribution of this thesis is to examine the performance of the strategy during the crises of recent years, such as during the global Covid-19 pandemic or during the war in Ukraine, both of which affected the Finnish stock exchange. The rise in interest rates and the acceleration of inflation in recent years have also contributed to the weakening of the returns on shares on the Finnish stock exchange. Therefore, special attention is being paid to the returns of the 2020s and to the years when the market return has been negative.

Such recent research on the Dogs of the Dow strategy as this study is, has not yet been done on the Finnish stock market, which increases the academic significance of the research. Specifically, it appears that no significant academic research has been published on the Dogs of the Dow investment strategy for a few years, even on a global scale, the most recent publication cited in this paper being Ghouse et al. (2018). This paper aims to fill this research gap by providing fresh information on the DoD using data from the most recent years. Furthermore, this study holds practical implications for investors seeking to optimize their investment portfolios in the Finnish market. By offering new, fresh information about the performance of the DoD strategy in the Finnish stock market, especially through the weaker periods of recent years, investors get support for investment decision-making and possibly motivation to use the Dogs of the Dow strategy,

which, due to its simple structure, is also suitable for a more passive or novice type of investor.

1.2 Hypothesis development

Previous studies have achieved both positive and negative results when comparing the performance of the Dogs of the Dow strategy to the benchmark index. Most of the studies have used the DJIA index as the benchmark index, as was originally done by Slatter (Dorfman, 1988). In studies conducted outside the United States, the benchmark index is often the general index of the local stock exchange. In this study, the benchmark index is the OMXHCAPGI index, which is a weight-limited index of the general index of the Nasdaq Helsinki Stock Exchange. The weight of individual stocks in the index is limited to a maximum of 10% of the total market value of the index. In addition, the index is a gross index (GI), which means that it also considers the dividend yield from shares when evaluating the return. The aim of this study is to determine how the Dogs of the Dow investment strategy performs on the Finnish stock market when compared to the benchmark index. Therefore, the first hypothesis of the study is:

H_1 = The returns of the Dogs of the Dow portfolio outperform the annual returns of the OMXHCAPGI index.

Several previous studies have raised concerns about how the results of the DoD strategy compare to benchmark index when they are risk-adjusted. In this thesis, the risk-adjusted DoD-portfolio returns will be compared to OMXHCAPGI. The second hypothesis of the thesis is tested using Modigliani-squared adjusted return and Sharpe ratio and Treynor index as risk-adjustment measures. The second hypothesis of the study is:

H_2 = The returns of the Dogs of the Dow portfolio outperform the annual returns of the OMXHCAPGI index, even after risk-adjustment.

In addition to the above-mentioned risk-adjustment methods, the performance of the DoD portfolio built following the Dogs of the Dow strategy is measured using the Fama-French three-factor and five-factor models. The use of the three-factor model to adjust abnormal returns is quite common among investment strategy studies, and it is utilized in some of the previous DoD studies too. Instead, abnormal returns adjusted by the five-factor model have not yet been examined in any previous DoD study, so this thesis is the first to do so. Rather than comparing to a single benchmark index, the Fama-French models compare the potential abnormal return of the portfolio to a theoretical benchmark composed of multiple risk factors. Therefore, the study presents one additional hypothesis, which is:

H_3: The Dogs of the Dow portfolio generates abnormal returns, after adjusting with Fama-French's three-factor and five-factor models.

Previous studies have highlighted the performance of the Dogs of the Dow strategy, especially during stock market downturns. Therefore, as an additional test, it is examined how the DoD portfolio has performed in the downturn years of the 2003-2023 time period when compared to the benchmark index. In addition, previous studies have paid attention to the impact of transaction costs and taxes on the portfolio's performance. As a second additional test, the impact of transaction costs and taxes on the absolute returns of the DoD portfolio is evaluated. Furthermore, it is compared whether DoD still outperforms the benchmark index in absolute returns after taking these factors into account.

1.3 Structure of the thesis

This thesis consists of a theoretical and an empirical part. The purpose of the theoretical part is to present the financial theories and previous literature relevant to the Dogs of the Dow strategy. The purpose of the empirical part is to examine the performance of the Dogs of the Dow strategy in the Finnish stock exchange.

The first chapter contains the introduction of the thesis and presents the research questions and hypotheses. Chapter two presents the theoretical background relevant to the thesis as well as some of the most common and well-known models for estimating stock returns. Chapter three discusses the dividend policy in general and the importance of dividends for investors. The fourth chapter reviews the previous literature on the Dogs of the Dow strategy and their results.

The fifth chapter presents the data used in the thesis, the methodology of the thesis and the measures used to review the results. The sixth chapter discusses the results of empirical research and the returns of the Dogs of the Dow strategy on the Finnish Helsinki Stock Exchange during the period 2003-2023. Finally, the seventh chapter summarizes and concludes the study, and presents suggestions for further research.

2 Theoretical background

This chapter provides an overview of the theoretical background relevant to the thesis. The chapter introduces one of the most famous theories in finance, the Efficient Market Hypothesis, which has defined the understanding of financial markets for decades. The following subsections then discuss more theories on forming efficient portfolios and estimating stock returns. Finally, a brief overview of De Bondt and Thaler's (1985) theory of the Winner-loser effect follows, which is also an essential theory in terms of explaining the returns of the Dogs of the Dow strategy.

2.1 Market efficiency

In the financial market, the provider of finance and the one in need of finance meet. In the financial system, funds flow from the surplus sector, typically from households to the deficit sector which typically consists of businesses (Knüpfer & Puttonen, 2018). Sometimes the funds are transferred through financial intermediaries, such as banks. In any case, the provider of finance, i.e. the investor, wants to maximize the return on their funds and the recipient of finance, i.e. the company, wants financing at the lowest possible cost. The importance of the financial market is to allocate funds as efficiently as possible between the surplus and deficit sectors. The financial market also transmits information, improves liquidity and enables the diversification of risks. The financial market therefore plays a central role in the functioning of society (Knüpfer & Puttonen, 2018).

The concept of efficient markets is a cornerstone of financial theory. For markets to be theoretically efficient, financial markets must meet four generally accepted criteria: (Martikainen & Martikainen, 2009)

1. There is no friction in the market. There are no taxes, transaction costs, or restrictive regulations in the market. All investments are divisible.

2. Product and securities markets are perfectly competitive. All manufacturers produce their commodities at the lowest possible cost, and in securities markets, stocks are traded at the market price. Everyone has access to the market.
3. Markets are informationally efficient. Information is free and everyone has access to information simultaneously.
4. All investors act rationally. Investors maximize their own benefits and seek the highest financial return.

However, in practice the market never acts efficiently. For example, taxes and transaction costs always exist, and investors do not always act rationally (Lepikkö 2020), which weakens market efficiency. This opens up the possibility for anomalies to occur, as anomalies are inconsistent with efficient markets. Understanding of market efficiency is necessary when studying the Dogs of the Dow strategy. In the next chapter, the random walk theory and Fama's (1970) famous Efficient Market Hypothesis will be presented and discussed.

2.1.1 Random Walk theory

The Random Walk theory states that stock prices move randomly and unpredictably, and that future stock prices cannot be predicted by looking at past price movements, trading volumes, or historical returns. The theory is over a hundred years old, having been originally developed by Bachelier (1901). However, Kendall (1953) popularized the theory when he studied weekly changes in British industrial share prices and spot prices for cotton and wheat. He was surprised to find that prices move randomly and are just as likely to rise as fall on a given day, regardless of past performance. Perhaps the best-known researcher of the Random Walk theory is Burton Malkiel (1973), who argues in his book that timing or beating the stock market by using fundamental or technical analysis is a waste of time.

The Random Walk theory is closely related to the theory of efficient markets, as both of them argue that stock prices cannot be predicted because they already contain all

current information (Bodie et al, 2023). If stock prices could be predicted reliably, it would indicate that all possible information has not yet been reflected in stock prices, and thus the market would not be efficient. In an efficient market, no investor can achieve excessive returns with any investment strategy or style because of the unpredictability (Knüpfer & Puttonen, 2018). The unpredictability of stock prices is one of the cornerstones of the Efficient Market Hypothesis.

2.1.2 The Efficient Market Hypothesis

"A market in which prices always "fully reflect" available information is called efficient", is a direct quote from Eugene F. Fama in his paper "Efficient capital markets: A review of theory and empirical work" (1970). The basic point of the theory is that all public and relevant information will reflect in stock prices immediately, because of the large number of investors and because all the public information is available to everyone (Knüpfer & Puttonen, 2018). The strength of efficient markets can be separated into three different levels (Fama, 1970).

In the weak form efficiency, the prices of stocks already reflect the information of historical prices, volumes, and returns (Fama, 1970). Thus, it is impossible for investors to get excess returns with any kind of analysis, as the stock markets do not have a memory nor does history tend to repeat itself, according to Fama. Because it is impossible to forecast the upcoming prices, the prices follow a "random walk" (Knüpfer & Puttonen, 2018). Today's price does not give any clue about tomorrow's price, according to Knüpfer and Puttonen. They continue that the price of stock will only change when new information is given, and new information must be unpredictable, otherwise it would not be new. Weak form efficiency is a restricted version of the semi-strong form efficiency (Park & Irwin, 2007).

In the semi-strong form efficiency, the prices of stocks reflect all the information available publicly, including the history of prices (Fama, 1970; Park & Irwin, 2007). Public

information covers for example financial statements, analyst reports, quality of management, patents held, earnings forecasts, accounting practices and business cycle reports of the company (Bodie et al., 2023; Knüpfer & Puttonen, 2018). Therefore, fundamental analysis is unnecessary, as all the fundamental information is already reflected in the price of the stock. Semi-strong form efficiency is a restricted version of the strong form efficiency (Park & Irwin, 2007).

In the strongest version of efficient markets, all historical, all public, and all private information are reflected in the price of the stocks (Fama, 1970). Private information means all the information that only the insiders of a company have access to. A practical example is given by Knüpfer and Puttonen (2018): The information contained in the decisions of company board meetings is reflected in prices as soon as the decision is made, not until after the decision is announced. Bodie et al. (2023) mention that the strongest version of efficient markets is somewhat extreme, as insiders, such as corporate officers, directors, and relatives of insiders, are expected to have access to information well before the public release. However, they note that insider trading is heavily regulated and monitored, and trading on information supplied by insiders is considered a violation of the law (Bodie et al., 2023).

Bodie et al. (2023) point out that all versions of the Efficient Market Hypothesis have one thing in common: They all assert that prices should reflect available information. The theory does not expect investors to be superhuman or that prices should always be right, and sometimes, in retrospect, stock prices actually turn out to be too high or too low. According to Bodie et al. (2023), the EMH asserts only that at a given point in time, using current information, it is not possible to be certain whether current stock prices are too high or too low, or in which direction prices will move. Thus, prices can be said to follow a random walk model.

2.2 Modern Portfolio Theory

Return and risk are often thought to go hand in hand. Investors build portfolios that consist of different investment instruments, stocks and assets with different levels of risk and return expectations. It is said that a rational investor strives to achieve the highest possible return on his investment. It is even more apt to say that a rational investor strives to achieve the highest possible return on their investment with the lowest possible risk.

Markowitz (1952) introduced a theory that is still strongly accepted today about reducing portfolio risk through stock picking. The core idea of modern portfolio theory is that diversification can reduce portfolio risk ultimately leading to finding an optimal portfolio which achieves maximum return with minimal risk. In order to understand the concept of modern portfolio theory, it is necessary to first define some basic elements of portfolio return and risk. The portfolio return is obtained by adding up the returns of individual investments and weighting them by the weight of the investments in the portfolio (Knüpfer & Puttonen, 2018):

$$E(R_p) = \sum_{t=1}^{n} w_i E(R_i) \qquad (1)$$

where: $E(R_p)$ = expected return on portfolio
$E(R_i)$ = expected return on asset i
w_i = relative weight of asset i in the portfolio
n = number of assets in the portfolio

In finance, risk often refers to the probability that the actual return will differ from the expected return. In the context of finance, variance is a measure of dispersion that describes how far the actual return is from the expected return. The standard deviation of the return is obtained by calculating the square root of the variance of the return. The standard deviation of the return is called volatility, and it measures the dispersion of the

returns of the investment in question around the expected return (Knüpfer & Puttonen, 2018; Brealey et al., 2023).

Calculating the variance of a portfolio is not as easy as calculating the return on a portfolio, because the variance of a portfolio is not equal to a weighted average of individual variances as it is when it comes to calculating the returns (Bodie et al., 2023). This is because with diversification, the risk of a portfolio is no longer equal to the weighted average of the risks of individual stocks. Instead, in order to calculate the variance of a portfolio, investors are required to find the covariance, which describes the measure of the dependence between two variables, i.e. the degree to which the stocks move together (Brealey et al., 2023). The variance of a portfolio is the weighted sum of variance and covariance terms and can be calculated using the following formula:

$$var(R_p) = \sigma^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \sigma_{ij} \quad (2)$$

where: σ_{ij} = covariance between securities i and j

The standard deviation of portfolio returns, i.e. portfolio volatility, can be calculated using the following formula (Brealey et al., 2023):

$$std(R_p) = \sigma = \sqrt{\sigma^2} \quad (3)$$

According to Markowitz's (1952) modern portfolio theory, portfolio risk can be reduced by diversifying the assets which the portfolio consists of. However, diversification does not work indefinitely, and it is not possible for an investor to reduce risk all the way to zero. This is because the total risk of a portfolio consists of the sum of two different types of risk, specific risk and systematic risk. By diversifying, an investor can only influence the specific risk (Brealey et al., 2023).

Specific risk is also known as idiosyncratic risk, residual risk, unique risk, unsystematic risk, and diversifiable risk (Brealey et al., 2023). As the name suggests, specific risk describes the part of risk that is specific to a stock or industry, i.e., a diversifiable risk. For example, an oil company and an e-commerce company are exposed to different types of events. An increase in the price of oil would likely not affect the operations of an e-commerce company, and network disruptions would not have the same impact on the operations of an oil company. An investor can reduce their exposure to these risks by diversifying their assets across stocks in different industries (Bodie et al., 2023; Brealey et al., 2023).

Systematic risk, or undiversifiable risk, is another type of risk. As its name suggests, this part of the risk cannot be diversified away by stock or industry-specific choices, but is always present (Brealey et al., 2023). Such risks include major macroeconomic events, such as a downturn in the economy, or global crises, such as the financial crisis or the Covid-19 pandemic. The investor is not able to diversify away these risks, no matter what the number of stocks in the portfolio is. Therefore, a rational investor focuses their stock choices on reducing only specific risk.

Figure 1 depicts the efficient frontier of portfolios. Markowitz (1952) calls the stock portfolios on the red curve efficient portfolios and the curve itself the efficient frontier. Although only some of the portfolios (G, A and P) are marked in the figure, the curve actually consists of numerous portfolios with different contents. The figure highlights a few essential features. Portfolio G is the global minimum-variance portfolio, i.e. the lowest possible efficient portfolio. Portfolios above portfolio G are efficient and those below are inefficient, as the portfolios above offer higher returns with the same standard deviation (Bodie et al., 2023).

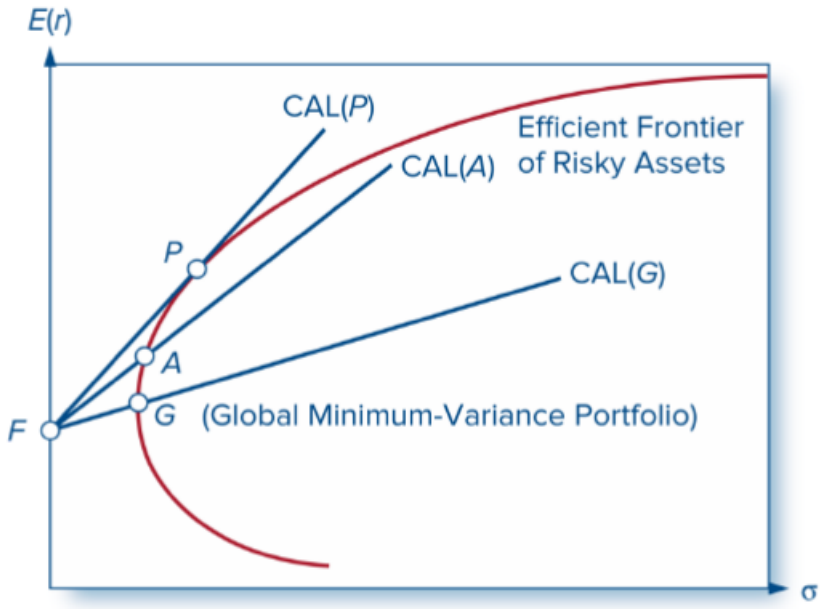

Figure 1. Efficient frontier (Bodie et al., 2023).

The y-axis of Figure 1 represents the expected return and the x-axis represents the standard deviation. Point F on the y-axis represents the risk-free asset return available to the investor, such as the return on treasury bills. When a straight line is drawn from a risk-free asset to any efficient front portfolio, a Capital Allocation Line (CAL) is formed, such as CAL(A) in the figure. Capital allocation line A represents all those portfolios that consist of combinations of equity portfolio A and risk-free assets. The more an investor allocates assets to equity portfolios instead of risk-free assets, the higher the expected return and vice versa. On the other hand, the standard deviation, or volatility, or risk, also increases in the same proportion.

The capital allocation line with the highest Sharpe ratio, or steepest slope, produces the best return relative to risk. Therefore, a line is connected from the risk-free asset to the efficient front portfolio that forms the steepest slope. Thus, portfolio P can be found at the efficient frontier, which is located at the point where CAL is just on the edge of the red curve. The CAL generated by the portfolio P, is the one tangent to the efficient frontier (Brealey et al., 2023; Bodie et al., 2023). Therefore, portfolio P is the optimal risky portfolio. Capital allocation line CAL(P), being the tangent of efficient frontier, presents

all feasible risk-return combinations of risk-free and risky assets. All rational investors find themselves on this CAL(P) line, although at different points depending on their risk preferences (Brealey et al., 2023). Harry Markowitz was awarded the 1990 Nobel Prize in Economics for his Markowitz model, also known as the efficient frontier of risky assets (Bodie et al., 2023).

2.3 Models for determining expected returns

As shown by portfolio theory, risk and return go hand in hand. In order for an investor to achieve a higher return, he must also expose himself to an increase in risk. That is a cornerstone of financial theory. With the help of modern portfolio theory and the efficient frontier, an investor can theoretically find an efficient portfolio, provided that the market is efficient. However, estimating an efficient portfolio can be challenging in practice, which is why models have been developed to predict the required return on investments in practice. This chapter presents a few of the most common and well-known models for estimating expected returns.

2.3.1 Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) is one of the most well-known models in finance for estimating expected returns. The CAPM is based on Markowitz's portfolio theory and was developed and popularized by William Sharpe (1964), John Lintner (1965), and Jan Mossin (1966). The CAPM is a relatively simple model that states that the expected return of any security or portfolio is the risk-free return plus its beta multiplied by a risk premium (Brealey et al., 2023). According to the Capital Asset Pricing Model, the required return on an investment is determined by the following formula:

$$E(r_i) = r_f + \beta_i[E(r_m) - r_f] \quad (4)$$

where: $E(r_m)$ = expected market return

β_i = beta coefficient of security i

r_f = risk-free rate of return

The CAPM consists of two parts. The first part is the risk-free rate, which is compensation for waiting, i.e. the time value of money. The treasury bill rate is often used as the risk-free rate (Bodie et al., 2023). The second part is the risk premium, which is compensation for the risk taken by the investor. The risk premium used in the CAPM is the risk premium of the market portfolio, which is the expected return of the market portfolio minus the risk-free return. The risk premium of an individual security is obtained by multiplying the risk premium of the market portfolio by the beta of the individual stock (Bodie et al., 2023, Knüpfer & Puttonen, 2018).

A true market portfolio consists of all the world's risky assets, such as stocks, bonds, commodities, real estate and even non-tradeable assets such as private equity. In practice, there is no index that measures the value of all risky assets, so investors have to use a proxy, an approximation, for the market portfolio (Brealey et al., 2023). The market portfolio used often depends on the investor himself; an American investor would use a domestic index, such as the S&P500 index, and a Japanese investor would use the Nikkei 225 index as a market proxy (Brealey et al., 2023). The beta coefficient, which describes systematic, undiversifiable risk, is exactly 1 for the market portfolio.

As stated, beta describes systematic risk, as the beta of an individual stock measures the stock's sensitivity to changes in the market portfolio. A stock that behaves in line with the market portfolio has a beta of 1, as does the market portfolio, and a risk-free investment has a beta of zero. A stock with a beta below 1 is called defensive, and a stock with a beta above 1 is described as aggressive (Knüpfer & Puttonen, 2018). The formula for calculating beta is as follows:

$$\beta_i = \frac{\sigma_{im}}{\sigma_m^2} \quad (5)$$

where: σ_m^2 = market variance

If the beta of one stock is 0.60, this means in practice that when the market portfolio increases by one percent, this individual stock increases by an average of 0.60% (Knüpfer & Puttonen, 2018). The portfolio beta works in the same way and is the weighted average beta of the stocks in the portfolio (Brealey et al., 2023). Correspondingly, beta can be used to interpret the risk premium of an individual asset or portfolio. If the portfolio beta is 0.5, then its risk premium is half the risk premium of the market portfolio, and if the beta is 2, the risk premium is twice as high as that of the market portfolio (Brealey et al., 2023).

The basic idea of the Capital Asset Pricing Model is that the risk premium of an individual stock or portfolio is directly proportional to its beta (Brealey et al., 2023). In addition, the expected return of an individual stock or portfolio is the sum of the risk-free return and the risk premium. This directly proportional relationship is graphically illustrated by the Security Market Line (SML) in Figure 2 (Bodie et al., 2023).

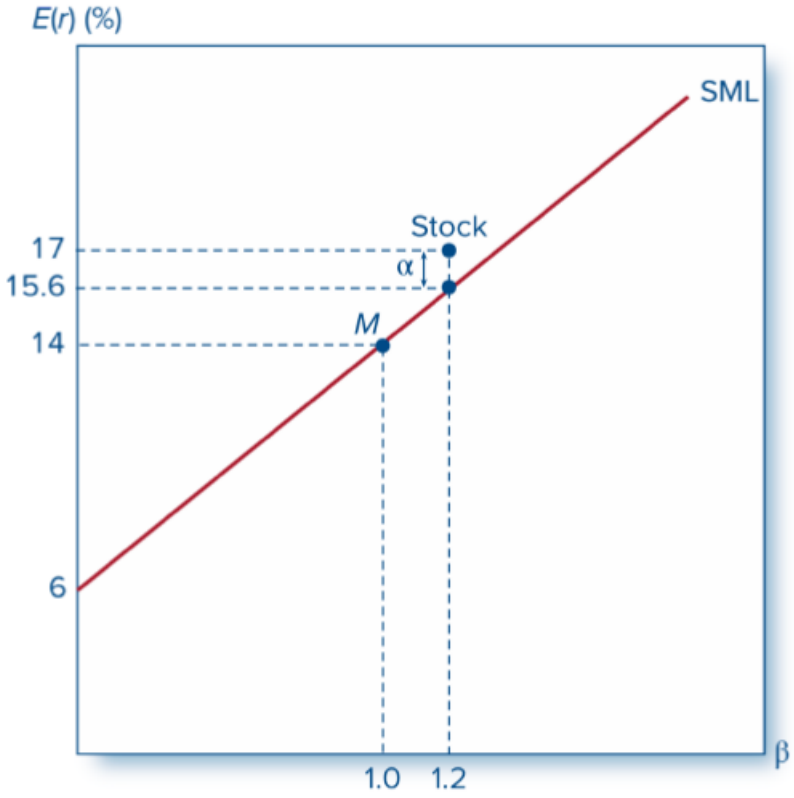

Figure 2. Security Market Line (Bodie et al., 2023).

In Figure 2, the risk-free return is 6% and beta is zero, the expected return of the market portfolio is 14% and beta is 1, and the beta of the stock is 1.2. Therefore, the CAPM estimates the expected return of the stock to be 15.6%, as depicted by the SML. If the stock is "fairly priced", it will fall exactly on the SML. Overpriced stocks will fall below the SML and underpriced stocks will fall above the SML. In Figure 2, investors expect the stock to yield 17%, which would place it above the SML. This difference is called the stock's alpha, which is denoted by α (Bodie et al., 2023). Overall, according to the CAPM, all stocks should eventually be on the SML, because if the stock is above the SML, offering an excess return, investors will buy the stock, raising its price and lowering its expected return, until it meets the SML. Then the stock offers an appropriate return for their beta (Brealey et al., 2023).

The Security Market Line should not be confused with the Capital Market Line. Although both have expected returns on the vertical axis, the SML has market risk β on the

horizontal axis whereas the CML has total risk. The Capital Market Line applies only to efficient portfolios while the Security Market Line applies to all stocks and portfolios, whether they are efficient or not (Brealey et al., 2023). Thus, the Capital Asset Pricing Model can be used to price all individual securities, which is one reason for its continued popularity today.

Although the CAPM is undeniably a popular and rather simple model for estimating the expected return of a single stock, asset, or portfolio, it has its own limitations. CAPM makes several assumptions, which Brealey et al. (2023) have listed:

1. Investors choose their portfolios based on expected return and risk measured by variance of return
2. All investors have the same estimates of the mean returns, variances, and co-variances of all assets
3. There are no frictions in markets such as taxes, transaction costs or restrictions on short sales
4. Investors are price takers and cannot influence prices
5. The supply of all assets is fixed

In practice, however, these assumptions do not hold. In addition, the choice of the risk-free rate, the length of the period in calculating beta, and the effect of low trading on betas affect the reliability and usability of the Capital Asset Pricing Model (Knüpfer & Puttonen, 2018). The market portfolio does not actually consist of all the assets in the world, because such an index simply does not exist, but investors have to use a market proxy (Brealey et al., 2023). The CAPM is widely used in finance due to its ease and simplicity, and it does give some indication of expected returns, although it is not completely valid in the real world. Therefore, other theories have been developed to measure risk and return.

2.3.2 Arbitrage Pricing Theory

Another widely known method for predicting stock returns is the Arbitrage Pricing Theory (APT) developed by Stephen Ross (1976). Like the Capital Asset Pricing Model, the APT also assumes that the risk of an individual stock consists of two components, the first of which is the company-specific risk, which can be diversified away and therefore has no impact on the risk premium (Brealey et al., 2023). The second component of risk, i.e. systematic risk, consists of macroeconomic factors and cannot be diversified away. Unlike the CAPM, which assumes that systematic risk consists of a stock's exposure to the market portfolio, the APT does not specify what the macroeconomic factors of systematic risk are. These factors can be direct, such as unexpected changes in oil prices, or indirect, such as business cycle risks (Brealey et al., 2023). Different factors are discussed in more detail in the next section.

In Arbitrage Pricing Theory, a stock's return depends on how sensitive it is to a certain factor. The APT formula is quite simple and several factors can be added, which is why it is appealing to investors:

$$R_i = E(R_i) + \beta_1 R_{factor\,1} + \beta_2 R_{factor\,2} + \beta_3 R_{factor\,3} + \cdots + \varepsilon_i \qquad (6)$$

where: ε_i = unsystematic risk of asset i

A well-diversified portfolio that is not exposed to macroeconomic factors is risk-free, means that all its b's in the formula would be zero and the return should correspond to the risk-free return. If the return were higher, the investor would have the opportunity to exploit arbitrage and make a risk-free profit by borrowing and then buying the portfolio. Correspondingly, if the return on the portfolio were lower, the investor could achieve a risk-free return by selling the portfolio and investing the funds at the risk-free interest rate (Brealey et al., 2023). The name of the theory related to arbitrage, Arbitrage Pricing Theory, originates from this statement. Arbitrage is corrected when investors act accordingly and prices and returns return to equilibrium. The phenomenon is called the

Law of One Price, according to which two assets that are equivalent in all economically relevant respect should have the same price (Bodie et al., 2023).

The Asset Pricing Model has a few features that make it appealing to investors. Unlike the CAPM, the APT does not require all investors to be mean-variance optimizers. Instead, the APT relies on the assumption that rational markets make arbitrage impossible (Bodie et al., 2023). While in the CAPM investors are forced to use a market portfolio, with the APT there is no risk that the market proxy turns out to be poor. On the other hand, the CAPM clearly defines the underlying factor, i.e. the market portfolio, which the APT does not do (Brealey et al., 2023). However, both theories have in common that risk is divided into systematic risk and firm-specific risk (Bodie et al., 2023).

2.3.3 Three-Factor and Five-Factor models

Several different multifactor models have been developed based on Arbitrage Pricing Theory. Probably the best known of them is the Three-Factor Model by Fama and French (1992), which, as its name suggests, consists of three factors. These factors are the Market factor, the Size factor and the Book-to-market factor. According to Fama and French (1992), based on these three factors, expected returns can be estimated using the formula:

$$r_i - r_f = \alpha_i + \beta_1\left(r_m - r_f\right) + \beta_2(SMB) + \beta_3(HML) + \varepsilon \qquad (7)$$

where:

r_f	= risk-free rate of return
r_m	= market return
α_i	= intercept of the regression
$\beta_{1,2,3}$	= factor coefficients
SMB	= size premium (small minus big)
HML	= value premium (high minus low)
ε	= error term

Market factor is simply the market return minus the risk-free return. Size factor is the difference in returns between a portfolio of small stocks and a portfolio of large stocks, also known as small minus big (SMB). Book-to-market factor is the returns of high book-to-market portfolios minus the returns of low book-to-market portfolios, also known as high minus low (HML). SMB and HML are not risk factors in themselves, but they are more proxies for hard-to-measure fundamental variables (Bodie et al., 2023). For example, according to Fama and French (1992), small firms are more sensitive to changes in business conditions and thus describe sensitivity to macroeconomic events. Intercept of the regression, α_i, is also known as the alpha, which describes the excess or abnormal return of the regression.

According to Brealey et al. (2023), the Fama-French Three-Factor Model is not as widely used among investors as the CAPM for predicting a company's cost of equity, as it is more laborious in practice and the calculation of the three required betas is more challenging in practice than in the CAPM. However, according to them, the Fama-French model is a popular way to measure an investor's performance against an index. Although the model is more complex than the CAPM, it has been further refined. Carhart (1997) has developed a four-factor model, and Fama and French (2015) developed an even more extensive Five-Factor Model. In their updated version, in addition to the three previous factors, the profitability factor RMW, robust minus weak, and the investment factor CMA, conservative minus aggressive, are added to the formula (Bodie et al., 2023):

$$r_i - r_f = \alpha_i + \beta_1\left(r_m - r_f\right) + \beta_2(SMB) + \beta_3(HML) + \beta_4(RMW) + \beta_5(CMA) + \varepsilon \quad (8)$$

where:
r_f = risk-free rate of return
r_m = market return
α_i = intercept of the regression
$\beta_{1,2,3,4,5}$ = factor coefficients
SMB = size premium (small minus big)

HML = value premium (high minus low)

RMW = profitability premium (robust minus weak)

CMA = investment conservatism premium (conservative minus aggressive)

ε = error term

Profitability premium (RMW) and investment conservatism premium (CMA) are not factors in themselves, just as neither SMA nor HML are, but they act as proxies for hard-to-measure fundamental variables. In their 2018 paper, Fama and French introduced one more factor, the momentum factor WML (winner minus loser), creating a six-factor model. The use of different Fama-French models is common especially in the latest investment strategy studies. Therefore, in the empirical part of the thesis, the Fama-French 3-factor model (FF3) and the Fama-French 5-factor model (FF5) are used for adjusting of abnormal returns.

2.4 Winner-loser effect

De Bondt and Thaler (1985) examined the market overreaction hypothesis and the winner-loser effect in their paper. Behavioral finance and psychological tests suggest that investors overreact to unexpected and dramatic news, which affects stock prices. Their research supports the notion that the stock market overreacts to relevant news (Bodie et al., 2023). Stocks that have performed well in recent periods tend to underperform the rest of the market in following periods, and stocks that have performed poorly in the past tend to outperform the market (De Bondt & Thaler, 1985; Chopra et al., 1992).

Stocks can be divided into “winners” and “losers” based on investment performance, which is where the theory gets its name. The phenomenon where winners fade back and losers rebound is called the “reversal effect,” which occurs when market overreaction is recognized and investment performance is reversed (Bodie et al., 2023). This phenomenon confirms that a contrarian investment strategy, which invests in recent losers and

avoids recent winners, should be profitable (Bodie et al., 2023). Domian et al. (1998) and Rinne and Vähämaa (2011) both conclude that the profitability of the Dogs of the Dow strategy is precisely due to this Winner-loser effect. In the Dogs of the Dow strategy, targeted stocks are often overlooked or undervalued, i.e. losers.

3 Dividend policy

Dividend policy refers to a company's way of paying shareholders a share of the company's profit for the financial year (Knüpfer & Puttonen, 2018). Traditionally, dividends have been distributed in Finland once a year, typically in the spring when the financial statements are published. In the United States in particular, some companies distribute dividends in several smaller installments throughout the financial year. The significance of dividends for investors is a controversial topic and the popularity of dividends among investors varies. According to Miller and Modigliani (1961), dividend policy should not be relevant to shareholder value, because when dividends are removed from a share, the market value of the share typically decreases by the same amount (Knüpfer & Puttonen, 2018). However, according to Tuominen (2024), between 2008 and 2023 it has taken an average of only 27 days for the share price of shares on the Helsinki Stock Exchange to rise by the dividend dip. According to Tuominen (2024), Finnish investors prefer dividends and on average share prices on the Helsinki Stock Exchange have risen the most precisely in the spring, around the time of general meetings and dividend proposals. It can therefore be stated that dividend policy is important for investors, at least in the Finnish context.

Dividends primarily serve as information for investors. If a company changes its dividend policy by reducing the dividend, it may indicate that the company's financial situation is deteriorating. Increasing the dividend, in turn, indicates to investors that the company is making good profits and that the company's management believes that it will continue in the future too (Brealey et al., 2023). On the other hand, if a company pays out most of its profits as dividends, it often indicates that the company does not have sufficiently good investment targets. In this case, the company gives investors the opportunity to seek a better return on dividends elsewhere. From the company's perspective, distributing excess cash increases the return on equity (Knüpfer & Puttonen, 2018). Typically, growth stocks use profits for investments, while value stocks distribute profits to shareholders (Brealey et al., 2023).

In many countries, dividend income is taxed more heavily than capital gains, which can affect investors' attitudes towards dividend income (Knüpfer & Puttonen, 2018). In Finland, 15% of dividend income is tax-free and the investor pays capital income tax of 30-34% on 85% of the share (Vero.fi, 2025). In addition, investors have the option of buying dividend-paying shares in an equity savings account, in which case taxes are only paid when the assets are realized. This enables efficient reinvestment of dividends and the exploitation of the interest-on-interest phenomenon. However, it has been studied that low-income households and older investors in particular use dividends for consumption instead of reinvestment (Baker & Weigand, 2015; Knüpfer & Puttonen, 2018). One can also argue that an investor can make dividend income available for consumption by simply selling shares and receiving capital gain. However, for small investors, selling small amounts of shares may prove to be unpleasant due to relatively high transaction costs (Knüpfer & Puttonen, 2018).

Knüpfer and Puttonen (2018) state that companies pay dividends because investors simply like dividends. This argument is also supported by the “bird-in-the-hand theory” popularized by Lintner (1962) and Gordon (1963). According to the theory, investors consider a dollar's worth of dividend yield in hand to be preferable to a dollar's worth of potential appreciation in the future (Lintner, 1962; Gordon, 1963). The theory gets its name from the old saying “a bird in the hand is worth two in the bush”. Dividend income represents a stable cash flow for investors, but if a company invests its cash instead of distributing dividends, uncertainty factors increase from the investors’ perspective and the future value of the stock is uncertain (Baker & Weigand, 2015).

Over the past decades, another method of distributing cash to investors has emerged alongside the distribution of dividends, which is share repurchases (Knüpfer and Puttonen, 2018; Brealey et al., 2023). Share repurchases have been even more popular than dividend payments in the 2000s. A company can announce that it will buy back shares either at the market price or at a premium if the company sees the stock as undervalued (Brealey et al., 2023). This often indicates to investors that the company's management

believes that the share price should be higher than the current situation. Comment and Jarrell (1991) found in their study that a company's announcement of a share repurchases resulted in an average 2% abnormal price increase. According to Knüpfer and Puttonen (2018), share repurchases are effectively a transfer of funds from the company to investors and are therefore considered an alternative to dividend payments. A company can use repurchased shares, for example, as consideration in acquisitions or distribute them to management as an incentive. It is also common for a company to improve its capital structure by canceling the purchased shares, which leads to an increase in the ownership of the remaining shares (Knüpfer & Puttonen, 2018). It is noteworthy that the traditional Dogs of the Dow strategy does not take into account share buybacks when constructing a portfolio, although in this study some of the stocks in the DoD portfolio engage in share buybacks in addition to dividend payments.

4 Review of previous literature

The Dogs of the Dow strategy introduced by John Slatter in 1988 (Dorfman, 1988) has been of interest to both investors and academics for almost 40 years. Slatter achieved a 7.6% higher annual return compared to the DJIA index between 1972 and 1987 with a portfolio compiled from the ten highest dividend paying stocks. Investment writers O'Higgins and Downes (1991) tested Slatter's strategy between 1973 and 1991 and achieved an average excess return of 6.2%. In their book, Knowles and Petty (1992) extended the observation period to the years 1957-1990 and recorded an average annual return of 14.2%, while the DJIA index returned 10.4%. They also refined the original 10-stock DoD strategy into an alternative version consisting of only five stocks, Dow-5, recording average annual returns of 15.4% with this strategy (Knowles & Petty, 1992).

McQueen et al. (1997) were the first academics to publish a paper on the Dogs of the Dow strategy, almost 10 years after Slatter first introduced it (Rinne & Vähämaa, 2011). They study the performance of the strategy for 50 years from 1946 to 1995 and overperformed the DJIA index, generating an average annual excess return of 3%. Whereas McQueen et al. (1997) were the first academics to confirm that the strategy outperformed the DJIA index, they were also the first to raise widely known concerns about the Dogs of the Dow strategy. An investor using the strategy has higher transaction costs than an index investor, because the DoD portfolio must be rebalanced annually. In addition, tax costs are higher, as dividends are taxed, while unrealized capital growth is not. Furthermore, the Dogs of the Dow portfolio is riskier than the index, due to less diversification. When the higher risk level and higher transaction and tax costs are considered, the results achieved with the strategy are not economically significant (McQueen et al., 1997).

In the same year with McQueen et al., a paper examining the Dogs of the Dow strategy outside the US market was published for the first time, when Filbeck and Visscher (1997) studied the performance of DoD in the United Kingdom. However, the results for the years 1985-1994 are not very promising as the DoD strategy, after risk-adjustment,

performed better than the reference index FTSE-100 in only four out of ten years. Thus, Filbeck and Visscher (1997) conclude that the strategy does not work very effectively in Great Britain. Domian et al. (1998) examine the strategy's performance against the S&P500 index from 1964 to 1997 and report that the DoD portfolio outperformed the index by an average of 4.8% annually. However, their aim was to investigate the reason why the DoD strategy has previously performed better than benchmarks. The findings by Domian et al. (1998) show that stocks in the Dogs of the Dow portfolio are so-called "losers" before they are selected for the portfolio, thus referring to De Bondt and Thaler's (1985) market overreaction hypothesis and the winners-losers effect.

Among previous studies, the greatest criticism of the Dogs of the Dow strategy has been presented by Hirschey (2000), according to whom the outperformance of the DoD strategy is a myth caused by data problems and insufficient adjustment for risk and transaction and tax costs. He studies the performance of the DoD strategy in the years 1961-1998 and finds that the strategy beats the DJIA index by 1.8% annually, but after transaction costs and taxes, the returns are in line with the DJIA index. Consequently, there is no robust evidence of the strategy's profitability (Hirschey, 2000). Da Silva (2001) studies the DoD strategy in several Latin American countries in the period 1994-1999 and achieves positive results in many countries, but the results are not statistically significant. It may be due to the data problems mentioned by Hirschey (2000), as the period investigated is only 6 years long and thus the sample is relatively small.

Filbeck and Visscher (2003) examine the performance of the Dogs of the Dow strategy in the Canadian stock market, comparing the DoD portfolio to the Toronto-35 and TSE-300 indexes. They achieve an average of 6.6% better annual returns with the strategy and the returns are also sufficient to cover transaction and tax costs. Moreover, the Sharpe ratio and the Treynor index suggest that the DoD strategy produces higher risk-adjusted returns than the Toronto-35 (Filbeck & Visscher, 2003). Ap Gwilym et al. (2005) re-examine the Dogs of the Dow strategy in the UK, after Filbeck and Visscher (1997). However, the results are in line with Filbeck and Visscher's (1997) research, the DoD

strategy produces slightly higher annual returns than benchmarks, but the excess returns disappear when transaction costs and risk-adjusting are considered (Ap Gwilym et al., 2005).

Alles and Sheng (2008) study the strategy in the Australian context for 7 years between 2000 and 2006 and report positive excess returns on average even after transaction costs, although the results weakened towards the end of the data period. Chong and Luk (2010) compare the performance of two portfolios formed based on the Dogs of the Dow strategy in the Hong Kong stock market from 1992 to 2007. For the first portfolio, they select the 10 best dividend-paying stocks from the Hong Kong Stock Exchange. For the second portfolio, they select the 5 best dividend-paying stocks from the Hang Seng Index. These stocks are so-called constituent stocks or "blue-chip stocks", which have a large market cap, dependable earnings and excellent reputation (Chen, 2024). The portfolio formed from blue-chip stocks produce an average annual return of about 8% during the study period, while the overall annualized returns of the first portfolio are -1.28%. Therefore, Chong and Luk (2010) conclude that their results agree with that of McQueen et al. (1997). However, they do not take risk factors or transaction costs into account in their own study, unlike McQueen et al do.

The only academic study that discusses the Dogs of the Dow strategy in the Finnish context is the study by Rinne and Vähämaa (2011). They examine the performance of the DoD strategy on the Finnish stock market in the years 1988-2008 and report that the strategy outperforms the market index OMX Helsinki CAP by an average of 4.5% annually. Furthermore, the returns of the DoD portfolio are also higher than the benchmark index after risk adjustments, although possibly not high enough anymore after transaction and tax costs (Rinne & Vähämaa, 2011). In their research, they test whether the results of the DoD strategy are due to the winner-loser effect presented by De Bondt and Thaler (1985) and conclude the same results as Domian et al. (1998), that the results can largely be explained by the winner-loser effect. However, it is noteworthy in the study of Rinne and Vähämaa (2011) that the DoD strategy performed particularly well during stock

market downturns. This will provide an interesting starting point for this thesis considering the state of the Finnish stock market in recent years.

Wang et al. (2011) test the strategy in the Chinese stock market between 1994 and 2009 and they also report higher portfolio excess returns compared to the benchmark, even after transaction cost reductions. Tissayakorn et al. (2013) also report on the Thai stock market from 1995-2012 that the DoD strategy outperforms market indices, although their results are not statistically significant. In addition, Qiu et al. report positive results regarding the performance of the Dogs of the Dow strategy from both Hong Kong (Qiu et al., 2012) and Japan (Qiu et al., 2013). Therefore, it can be concluded that by following the Dogs of the Dow strategy, profits can be achieved in the Asian market.

An example of a slightly more recent study focusing on the performance of the Dogs of the Dow strategy is study by Lin (2017), where he examines the performance of different DoD variations in the US market. In addition to the traditional Dow-10 portfolio, he also studies the returns of a five-share DoD portfolio and a small-company portfolio, the so-called “Small dogs” portfolio, and after empirical analysis reports that all three portfolios beat the DJIA index in the years 1996-2016. Risk-adjusted returns are also superior compared to the DJIA index (Lin, 2017). It is interesting that Pandey (2017) also studies the performance of DoD-10, DoD-5 and Small dogs portfolios in his own paper, but in the Indian stock market. In his paper, the time series is November 2006 – November 2016 and the performance of the portfolios is compared to the local Sensex index. After risk-adjusting, the traditional ten-stock Dogs of the Dow portfolio and the Small dogs portfolio outperform the Sensex index. On the other hand, the DoD-5 portfolio loses to the benchmark index both on an absolute basis and a risk-adjusted basis. The results are therefore partly in line with Lin (2017), but Pandey (2017) states that his results are not statistically significant.

In the 2020s, there has been little academic research published on the Dogs of the Dow strategy, apart from a few master's theses. The most recent academic research on the

DoD strategy is a paper by Ghouse et al. (2018) once more from Asian markets, where they examine the performance of the DoD strategy on the stock exchanges of Malaysia, Thailand, China and Indonesia. In addition to the DoD portfolio, they also tested a five-stock portfolio called the Puppies of the Dow portfolio. Their results show that both the DoD and PoD portfolios outperformed their respective market returns from 2000 to 2014, with the PoD portfolio even slightly outperforming DoD. The portfolios performed particularly well in the Malaysian and Thai stock markets during the crises of 2002, 2008 and 2011. Although the strategies generate higher abnormal returns, the results of Ghouse et al. (2018) are not statistically significant. Therefore, they conclude that the effectiveness of these two strategies remains inconclusive.

A review of previous studies in Table 1 shows that Dogs of the Dow and various strategies refined from it have produced positive returns in different periods around the world on different stock exchanges. However, the good and excellent results achieved are often weakened by risk-adjusting, transaction costs and taxation. Despite promising results, some studies are not statistically significant, which casts doubt on the effectiveness of the Dogs of the Dow strategy. Despite all the studies, a full consensus on the effectiveness of the strategy has not necessarily yet been achieved, and the strategy still has plenty of skeptics. Nevertheless, Dogs of the Dow is an interesting strategy that can offer investors the opportunity to achieve abnormal returns.

Table 1. Summary of the previous DoD literature.

Author(s)	Market	Sample period	DoD (%)	Market index (%)	Market-adjusted return (%)
Slatter (Dorfman 1988)	US	1972-1988	18,39	10,80	7,59
O'Higgins & Downes (1991)	US	1973-1991	16,61	10,43	6,18
Knowles & Petty (1992)	US	1957-1990	14,20	10,40	3,80
McQueen et al. (1997)	US	1946-1995	16,77	13,71	3,06
Filbeck & Visscher (1997)	UK	1985-1994	9,48	11,58	-2,10
Domian et al. (1998)	US	1964-1997	-	-	4,76
Hirschey (2000)	US	1961-1998	14,16	12,39	1,77
Da Silva (2001)	Argentina	1994-1999	2,32	1,66	0,66
	Brazil	1994-1999	4,64	8,90	-4,26
	Chile	1994-1999	4,30	1,21	3,09
	Colombia	1994-1999	-0,83	-1,39	0,56
	Mexico	1994-1999	2,91	2,22	0,69
	Peru	1994-1999	2,70	2,49	0,21
	Venezuela	1994-1999	4,30	3,05	1,25
Visscher & Filbeck (2003)	Canada	1988-1997	16,57	9,95	6,62
Ap Gwilym et al. (2005)	UK	1980-2001	20,64	18,53	2,11
Alles & Sheng (2008)	Australia	2000-2006	18,47	12,37	6,10
Chong & Luk (2010)	Hong Kong	1992-2007	-1,28	17,05	-18,33
Rinne & Vähämaa (2011)	Finland	1988-2008	15,50	11,00	4,50
Wang et al. (2011)	China	1994-2009	25,74	12,50	13,24
Qiu et al. (2012)	Hong Kong	2001-2011	-	-	-
Qiu et al. (2013)	Japan	1981-2010	-	-	-
Tissayakorn et al. (2013)	Thailand	1995-2012	23,68	3,32	20,36
Lin (2017)	US	1996-2016	8,06	7,3	0,76
Pandey (2017)	India	2006-2016	20,1	12,2	7,90
Ghouse et al. (2018)	Malaysia	2000-2014	2,64	1,1	1,54
	Thailand	2000-2014	3,98	2,16	1,82
	China	2000-2014	5,59	3,29	2,30
	Indonesia	2000-2014	5,74	3,15	2,59

As can be seen from Table 1, there has been no significant academic research published on the Dogs of the Dow investment strategy for many years. This paper aims to fill this research gap by providing fresh information on the DoD using data from the most recent years. Furthermore, it can be seen from the table that relatively few studies have been conducted on European stock exchanges and more on the United States and Asian stock exchanges. Therefore, this thesis contributes to this research gap as well, expanding on previous literature.

5 Data and methodology

The data for this study consists of stocks listed on the Nasdaq Helsinki stock exchange. Nasdaq Helsinki is a Finnish stock exchange that consists of 141 listed stocks (December 2024). Indices that describe the general development of the stock exchange include for example the price indices OMXH25 and OMXHCAP, and the gross indices OMXH25GI and OMXHCAPGI. In addition to price development, the gross index also takes into account the dividends paid. Therefore, the gross index is often considered to be a fuller measure of a market's performance than a price index (Nasdaq, n.d.) A Capped index (CAP) is an index in which the weight of individual stocks is limited to a certain number. The weights of individual stocks in the OMXHCAP and OMXHCAPGI indices are capped at 10 percent. OMXH25 and OMXH25GI consist of the 25 most traded stocks on the Nasdaq Helsinki stock exchange.

5.1 Data description

The data for the study has been collected from several sources from 2003 to 2023, the most significant data source being the University of Vaasa's own databases. The risk-free interest rate used in the study is the Finnish government's 10-year bond rate. The Dogs of the Dow investment strategy implemented in the study involves testing a total of 35 different stocks listed on the Nasdaq Helsinki stock exchange. Table 2 shows the presence of each stock in a given year. Energy company Fortum Oyj was included in the DoD-10 portfolio for 15 out of 21 years, making it the most frequently held stock in the portfolio.

Table 2. Yearly stock presence.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
KESKO	X	X	X	X								X	X	X	X	X	X				X
KONE	X								X			X								X	X
METSÄ BOARD	X	X	X																		
NELES	X	X				X	X				X	X		X	X		X		X		
NORDEA	X					X	X	X					X	X	X	X	X	X	X	X	X
ORION	X	X	X	X				X	X	X	X	X	X			X	X			X	
OUTOKUMPU	X			X		X	X										X	X			
POHJOLA GROUP	X	X	X																		
SAMPO	X	X	X			X		X	X	X				X	X	X	X	X	X	X	
TIETOEVRY	X			X	X				X					X	X	X		X	X		X
AMER SPORTS		X		X																	
STORA ENSO		X	X	X	X	X					X										
UPM-KYMMENE		X	X	X	X	X		X	X	X	X	X					X		X	X	
UPONOR		X	X			X	X														
ELCOTEQ			X																		
WÄRTSILÄ			X	X	X		X	X		X								X	X		
RAUTARUUKKI				X	X	X	X	X		X	X										
SANOMA				X	X	X	X	X	X	X	X										
ELISA					X					X	X	X	X		X	X			X	X	
FORTUM					X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
NESTE					X			X													
POHJOLA PANKKI					X				X												
YIT						X	X					X	X								
RAMIRENT							X														
KONECRANES								X		X				X				X			
NOKIA									X	X	X				X	X		X			
TELIA									X		X	X	X	X	X	X	X	X	X	X	X
KEMIRA												X	X	X					X	X	
NOKIAN RENKAAT													X	X	X	X	X	X		X	X
METSO CORP													X								
SSAB																					X
TOKMANNI																					X
VALMET																					X

Notes: The table reports the 10 stocks included in the DoD-10 portfolio in each given year. “X” indicates that the given stock is included in the portfolio in the given year.

Originally, stock for the Dogs of the Dow strategy were selected from the Dow Jones Industrial Average index, which consists of 30 actively traded stocks (Dorfman, 1988). In order to follow the original DoD strategy as closely as possible, the stocks are selected in this study from the OMXH25 index, which consists of the 25 most actively traded stocks on Nasdaq Helsinki. The earlier study by Rinne and Vähämaa (2011) also uses the OMXH25 index for stock picking purposes. The OMXHCAPGI index will be used as the benchmark index for the study. Since the weight of individual stocks in the index is limited to 10% of the total market value of the index, it is more suitable as a benchmark than the OMXH25 index, avoiding the excessive influence of certain large stocks on price development (Rinne & Vähämaa, 2011). In the early 2000s, Nokia represented a significant part of the total market value of the Helsinki Stock Exchange, so by using a limited index, Nokia's impact on the results of the study can be considered moderate (Nikula,

2023). The gross index (GI) that takes dividend income into account is used as the benchmark index, ensuring that the comparison between the DoD strategy and the benchmark index is as fair as possible.

The time period of the study includes several periods of growth and decline on the Helsinki Stock Exchange. The first years of the time period were a period of growth on the Helsinki Stock Exchange until the financial crisis of 2008. The financial crisis was followed by a short rise, which was interrupted by the European debt crisis of 2011 (Heikkilä, 2022). The 2010s have been mainly upward, with the exception of 2018. In the 2020s, the Helsinki Stock Exchange has been shaken by the global corona crisis, Russia's war in Ukraine and the rise in interest rates (Angervuo, 2022). The peak was experienced in the autumn of 2021, after which the Helsinki Stock Exchange has fallen and stagnated, and investors are feverishly waiting for the start of a new rise (Tuominen, 2024). According to Angervuo (2022), when the corona crisis began, shares fell more than expected, but on the other hand, share prices quickly returned to their previous level and even to a higher level than before the pandemic began. The war in Ukraine was expected to cause a mass exodus of foreign investors from the Helsinki Stock Exchange, but according to Angervuo, the fears did not materialize. In any case, the Helsinki Stock Exchange has experienced many ups and downs over the past 20 years, which creates an interesting background for this study.

5.2 Research methodology

The Dogs of the Dow portfolio under review is built according to the standard procedure as proposed by Slatter. Building a portfolio consists of three guidelines, which are similar to those in Rinne and Vähämaa's (2011) paper:

1. On the last trading day of the year, the dividend per share during the ongoing year divided by the current stock price is calculated for each share in the OMXH25 index. After this, an equally weighted portfolio is formed from the ten stocks with

the highest dividend yield. Therefore, the weight of each stock in the portfolio is 10%.

2. The portfolio is held for one year. On the anniversary, the value of the portfolio is checked, including the dividends received, and the portfolio is rebalanced so that each stock's share is 10% again. If there have been changes among the top 10 stocks that paid the highest dividend in the OMXH25 index, those that have fallen are dropped from the portfolio and replaced with stocks that have risen to the top ten.

3. This process is repeated every anniversary.

The time series data used in this thesis consists of the monthly and annual closing prices of individual stocks and the OMXHCAPGI index. All dividends paid by portfolio stocks are reinvested in the stock from which the dividend was received, when calculating the annual return of the portfolio. If a stock included in the portfolio leaves the stock market due to a company acquisition, the money allocated to it is invested at the risk-free rate until the end of the year.

5.3 Performance measures

This chapter introduces the methods developed to measure portfolio performance. According to portfolio theory, the performance of a portfolio is influenced by its risk, which can be controlled by diversification. In the Dogs of the Dow strategy, the portfolio consists of only 10 stocks, so the portfolio is quite concentrated in terms of diversification. Therefore, it is essential to measure the portfolio's performance, especially after risk adjustments, to determine whether the portfolio's potential excess return is simply compensation for higher risk or if the strategy actually produces abnormal return. These presented measures are common and well-established ways of measuring portfolio

performance and they will also be used in this study to measure the performance of the Dogs of the Dow portfolio.

Portfolio performance can be measured by abnormal returns, i.e. by comparing the portfolio return to a benchmark. The simplest empirical model for measuring abnormal returns is market adjusted returns. Market adjusted abnormal return is calculated by comparing the portfolio return to the market return. If the market adjusted return is positive, it indicates that the portfolio outperforms its benchmark. In this paper, the return of the DoD portfolio will be compared to the OMXHCAPGI index. The first hypothesis of the thesis (H_1) will be tested with the portfolio's market adjusted abnormal return, which can be calculated as follows:

$$AR_{it} = R_{it} - R_{mt} \tag{9}$$

As simple as it is, market adjusted abnormal return provides an indication of how a portfolio is performing against the market. However, it does not consider the risk of the portfolio at all, for which several risk-adjusted measures have been developed. One of them is the Treynor index introduced by Jack Treynor (1965), which compares the excess return of a portfolio to the portfolio beta. The formula for the measure, which is strongly linked to the Capital Asset Pricing Model, is as follows:

$$T_p = \frac{R_p - R_f}{\beta_p} \tag{10}$$

The Sharpe ratio is one of the most common and popular risk-adjusted measures of portfolio performance. The Sharpe ratio, also known as the reward-to-volatility ratio, was first introduced by William Sharpe (1966), after whom the measurement is named. The Sharpe ratio compares the return, or risk premium, to the risk, or standard deviation (Bodie et al., 2023). It makes sense for an investor to aim to maximize the Sharpe ratio, because the higher the ratio, the higher the excess returns. The Sharpe ratio can be calculated using a rather simple formula, which is:

$$S_p = \frac{R_p - R_f}{\sigma_p} \quad (11)$$

where: σ_p = standard deviation of the portfolio return (R_p)

Based on the Sharpe ratio, Graham and Harvey (1997) and Modigliani and Modigliani (1997) developed a variant that is easier to interpret. The measure is known as M^2 or Modigliani-squared, because it was popularized by Leah Modigliani with her grandfather Franco (Bodie et al., 2023). Like the Sharpe ratio, M^2 also uses total volatility as a measure of risk, but its risk-adjustments make returns easier to interpret when compared to a benchmark index. M^2 adjusts the portfolio returns to match the risk level of the benchmark, making the comparison between the portfolio and the market portfolio fair. In practice, adjusting is done by mixing risk-free securities with the portfolio until the volatility matches the volatility of the market portfolio (Bodie et al., 2023). Modigliani-squared can be calculated using the following formula:

$$M^2 = \frac{\sigma_m}{\sigma_p}\left(R_p - R_f\right) - \left(R_m - R_f\right) \quad (12)$$

In this thesis, the Modigliani-squared adjusted return, the Sharpe ratio and the Treynor index will be used to test the second hypothesis (H_2) regarding whether the DoD portfolio outperforms its benchmark index OMXHGAPGI after risk-adjustments. Positive Modigliani-squared adjusted return would indicate that the portfolio outperforms benchmark. Similarly, if the portfolio's Sharpe ratio and Treynor index are greater than the benchmark, it would indicate outperforming after accounting for risk.

In addition to the above-mentioned measurement methods, this study uses the three-factor model and the five-factor model developed by Fama and French (1992; 2015) to measure abnormal returns. The third hypothesis of the thesis (H_3), regarding whether the portfolio produces an abnormal return, is therefore tested using the following multi-factor regressions, three-factor model (7) and five-factor model (8):

$$r_i - r_f = \alpha_i + \beta_1(r_m - r_f) + \beta_2(SMB) + \beta_3(HML) + \varepsilon \quad (7)$$

$$r_i - r_f = \alpha_i + \beta_1(r_m - r_f) + \beta_2(SMB) + \beta_3(HML) + \beta_4(RMW) + \beta_5(CMA) + \varepsilon \quad (8)$$

If the alphas of the regressions turn out to be positive and statistically significant, it could be concluded that the strategy produces abnormal returns. Testing the strategy with FF models also provides an indication of which risk factors affect the portfolio returns. The risk factors of the three-factor and five-factor models have been presented in more detail previously in section 2.3.3.

The monthly and annual data for the risk factors used in the models have been collected from Kenneth French's (2025) data library, which provides continuously updated data on the European FF3 and FF5 factors. There is no factor data available specific for the Finnish market, but the European FF factors have been previously applied in papers examining the Nordic markets (see e.g. Davydov et al., 2016; Grobys et al., 2024). Although the European FF factors do not fully correlate with the Nordic markets and even less with the Finnish markets, the promising results obtained by Grobys et al. (2024) encourage their use in this study examining the Finnish market to account for abnormal returns. However, it is noteworthy that the correlation is not perfect and thus the European FF factors only serve as a proxy.

6 Empirical results

This chapter examines the results of empirical research in the thesis. The performance of the DoD-10 portfolio, constructed according to the Dogs of the Dow strategy, is compared to the benchmark index OMXHCAPGI over the years 2003-2023. The results are then compared considering risk adjustments of the portfolio. Abnormal return of the portfolio is adjusted with Fama-French three-factor and five-factor models. Finally, additional tests are completed to test the performance of the portfolio in stock market downturns and to test the effect of taxes and transaction costs.

6.1 Performance of the Dogs of the Dow investment strategy

Figure 3 depicts the cumulative returns of the DoD-10 portfolio and the benchmark index OMXHCAPGI starting from January 2003 and ending in December 2023. The figure shows how the cumulative returns of the DoD-10 portfolio start to diverge from the benchmark index, especially since the 2010s. The reinvestment of the dividends produced by the strategy enhances the phenomenon and ultimately the DoD-10 portfolio outperforms OMXHCAPGI by a significant margin. The cumulative return of the DoD-10 portfolio over a 21-year period is an impressive 1630%, while the benchmark index's return over the same period is 648%. The figure describing the cumulative returns is quite similar to the results of Rinne and Vähämaa (2011). In their study, the DoD-10 portfolio also makes a significant difference to the benchmark index, especially in the second half of the study period, although in their study the results weaken towards the end due to the 2008 financial crisis. Similar to them, in this study, portfolio returns are most volatile in the latter years of the study period. Portfolio returns fluctuate the most in the early 2020s, which was overshadowed by several factors of uncertainty mentioned earlier in this study.

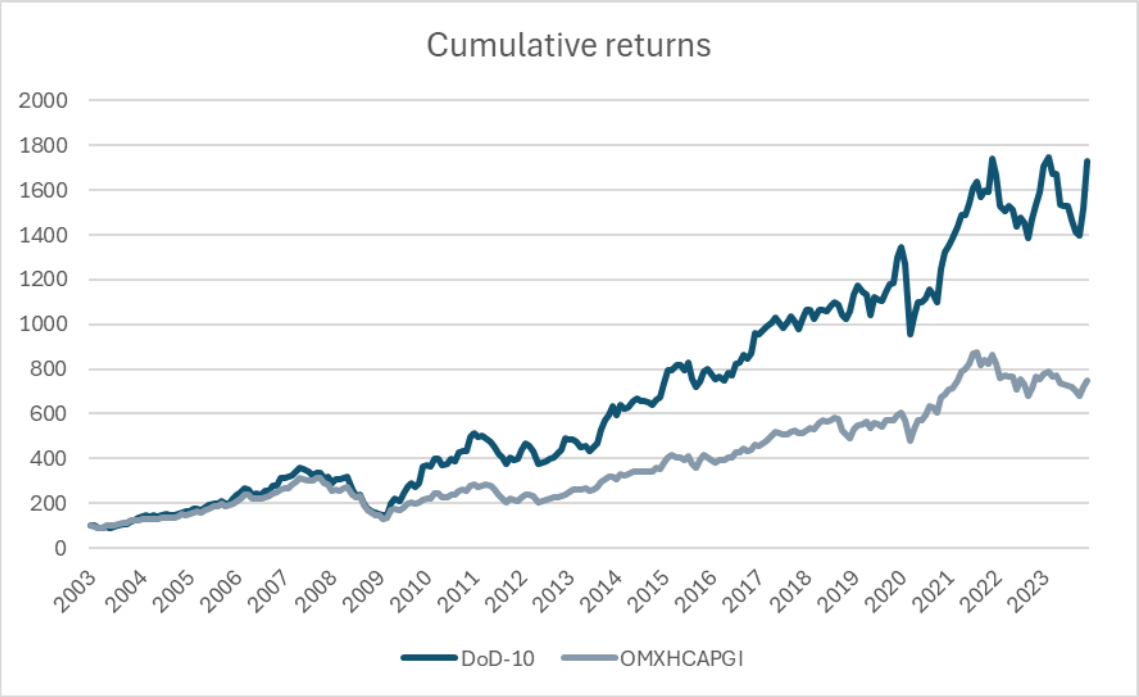

Figure 3. Cumulative returns of DoD-10 portfolio and OMXHCAPGI.

Table 3 reports the annual buy-and-hold returns of the Dogs of the Dow strategy from 2003 to 2023 compared to the benchmark index OMXHCAPGI. The mean annual return of the DoD-10 portfolio is 18.9%, while the mean annual return of the benchmark index is 12.4%, which is significantly lower. The median return for the DoD-10 portfolio is slightly higher than the mean return, at 19.6%, while the median return of the OMXHCAPGI is 15.7%. The one-year minimum return of the DoD-10 portfolio is worse than the benchmark index, but the one-year maximum return is significantly higher, as much as 132%, while the benchmark index reaches only 44.5% at best. DoD-10 outperforms OMXHCAPGI in 15 out of 21 years, while average annual outperformance is 11.33%. OMXHCAPGI outperforms DoD-10 in 6 out of 21 years, while average annual outperformance is 5.72%. The statistical significances of the means in Table 3 have been calculated using one sample t-test. The p-value indicates the statistical significance of the results, which are examined at the 10%, 5% and 1% levels respectively. Table 3 shows that the means of both DoD-10 and OMXHCAPGI returns are statistically significant. The statistical significance of the medians has been calculated using the Wilcoxon signed-rank test. The medians of the DoD-10 and benchmark index returns are also statistically

significant. These figures suggest that the Dogs of the Dow may outperform its benchmark index on absolute returns.

Table 3. Annual returns on the DoD investment strategy.

	DoD-10	OMXHCAPGI	AR(ma)	AR(M2)
2003	0,341	0,227	0,114	0,130
2004	0,229	0,214	0,015	0,025
2005	0,351	0,345	0,006	-0,061
2006	0,399	0,299	0,100	0,032
2007	0,031	0,081	-0,051	-0,051
2008	-0,514	-0,473	-0,040	0,055
2009	1,329	0,445	0,884	0,531
2010	0,364	0,298	0,066	0,014
2011	-0,192	-0,249	0,057	0,001
2012	0,221	0,155	0,067	0,012
2013	0,298	0,316	-0,019	-0,121
2014	0,060	0,106	-0,046	-0,055
2015	0,192	0,159	0,033	0,049
2016	0,196	0,133	0,063	0,013
2017	0,066	0,115	-0,050	-0,057
2018	0,037	-0,039	0,075	0,085
2019	0,227	0,204	0,022	-0,045
2020	0,018	0,157	-0,138	-0,143
2021	0,316	0,253	0,063	0,092
2022	-0,085	-0,127	0,042	0,020
2023	0,086	-0,005	0,091	0,061
Mean	0,189**	0,124**	0,064	0,028
p-value	(0,0187)	(0,0141)	(0,1509)	(0,3508)
Median	0,196***	0,157**	0,042**	0,014
p-value	(0,0049)	(0,0129)	(0,0386)	(0,4761)
Minimum	-0,514	-0,473	-0,138	-0,143
Maximum	1,329	0,445	0,884	0,531
Annualized return	0,145	0,101	0,052	0,021
No. of positive years	18	16	15	14
No. of observations	21	21	21	21
Tax and transaction cost-adjusted return	0,158**		0,033	
p-value	(0,0449)		(0,4536)	

Notes: The table reports annual returns of the DoD investment strategy. The DoD-10 returns are calculated as the equally weighted average of returns for the 10 individual stocks in the DoD-10 portfolio. AR(ma) is the market-adjusted return and AR(M2) is the Modigliani-squared adjusted return. Statistical significance is tested with one sample t-test for means and Wilcoxon signed-rank test for medians. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

As explained in chapter 5.2., the Dogs of the Dow portfolio consists of only 10 stocks at a time, each of which has a balanced weight of 10% in the portfolio. The portfolio is therefore quite concentrated, and according to portfolio theory, poor diversification leads to higher risk. The diversification of a portfolio inevitably affects its performance, since risk and return go hand in hand, as previously stated. Therefore, the portfolio returns are next evaluated after risk adjustments to determine whether the portfolio's excess return is simply compensation for the increased risk.

Table 3 shows the market-adjusted returns, which are positive for the DoD-10 portfolio. However, Rinne and Vähämaa (2011) remind that the sample size is very small, so the results should be treated with caution. The mean annual market-adjusted return is 6.4% (not statistically significant) while the median market-adjusted return is 4.2% and statistically significant. There are positive years in terms of market-adjusted return in 15 out of 21 years. Modigliani-squared is the first presented measure considering risk adjustment, which gives some indication of whether the success of the DoD strategy is only compensation for higher risk. The mean of M^2 adjusted returns is 2.8% and the median is 1.4%, which indicates that the strategy's outperformance is not due solely to increased risk. There are positive M^2 adjusted returns in 14 out of 21 years. However, both the mean and median of Modigliani-squared are statistically insignificant.

Since the sample of only 21 annual observations is quite small, the performance of the DoD-10 portfolio has also been tested on a monthly basis in this study, as did Rinne and Vähämaa (2011). To reduce small sample bias, Table 4 presents summary statistics on the monthly returns of the DoD-10 portfolio. The mean (median) monthly return of the Dogs of the Dow strategy portfolio is 1.32% (1.31%) while the mean monthly return of the benchmark index OMXHCAPGI is 0.93% (1.26%). The mean and median of both are also statistically significant. The mean (median) market-adjusted return of the monthly return is positive, 0.39% (0.14%) and the M^2-adjusted return is 0.32% (0.11%). However, Modigliani-squared adjusted return suffers from the statistical insignificance. Similar to the annual returns, the monthly returns suggest that DoD-10 portfolio outperforms

benchmark index in absolute returns. However, the annualized standard deviation is higher for the DoD-10 portfolio, 21.0%, than for the benchmark index, 17.3%. This indicates that the DoD investor's portfolio has been more volatile and therefore riskier than the OMXHCAPGI index investor. Due to the lack of statistical significance of M^2-adjusted return, it cannot be ruled out that the higher return would not just be compensation for the higher risk.

Table 4. Monthly returns on the DoD investment strategy.

	DoD-10	OMXHCAPGI	AR(ma)	AR(M2)
Mean	0,0132	0,0093	0,0039	0,0032
p-value	(0,001)***	(0,004)***	(0,048)**	(0,606)
Median	0,0131	0,0126	0,0014	0,0011
p-value	(0,001)***	(0,003)***	(0,346)	(0,147)
Minimum	-0,2473	-0,1582	-0,0905	-0,0745
Maximum	0,3525	0,2659	0,1981	0,1632
Annualized standard deviation	0,2105	0,1734	0,1084	0,0892
Proportion of positive months	0,5913	0,5992	0,5119	0,5119
No. of observations	252	252	252	252

Notes: The table reports monthly returns of the DoD investment strategy. The DoD-10 returns are calculated as the equally weighted average of returns for the 10 individual stocks in the DoD-10 portfolio. AR(ma) is the market-adjusted return and AR(M2) is the Modigliani-squared adjusted return. Statistical significance is tested with one sample t-test for means and Wilcoxon signed-rank test for medians. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

Table 4 shows that out of 252 months, the DoD-10 portfolio has achieved positive returns in 149 months (59.1%), while the benchmark index has had positive returns in 151 (59.9%). Although there have been two fewer positive months, DoD-10 outperforms OMXHCAPGI in 129 out of 252 months (51.19%), while average monthly outperformance is 2.51%. Interestingly enough, the results are amazingly in line with the study by Rinne & Vähämaa (2011). In their study, the DoD-10 portfolio also had 149 positive months from 1988 to 2008, and in the months when DoD-10 outperformed the index, average monthly outperformance was about 2.6%. Therefore, it can be stated that this study supports Rinne and Vähämaa's view that the performance of the Dogs of the Dow strategy is not attributable to any month effects.

Table 3 and Table 4 suggest that the DoD portfolio following the Dogs of the Dow strategy outperforms the benchmark index in absolute returns. In addition to already discussed M^2-adjusted returns, following previous studies, the Sharpe ratio and the Treynor index are used to risk-adjust the portfolio returns next. Table 5 presents the annual Sharpe ratios of the DoD-10 portfolio and OMXHCAPGI. As can be seen from the table, DoD-10 has a higher Sharpe ratio in 13 out of 21 years, or 61.9% of the years. The Sharpe ratio compares the returns of the portfolio and the index to their standard deviation and the results are in line with abnormal returns in that DoD-10 outperforms the benchmark index. The statistical deviation of the Sharpe ratio of DoD-10 from the market Sharpe ratio has been investigated using the Ledoit-Wolf (2008) approach. The Ledoit-Wolf method has been used in previous studies to test the statistical difference between the Sharpe ratios and the market (Davydov et al., 2016; Tikkanen & Äijö, 2018). However, the t-statistic and p-values obtained from the test indicate that the difference is not statistically significant, as can be seen from the Table 5. It is noteworthy that there are only 21 observations in the sample, which weakens the result of the statistical test. Due to statistical insignificance, it can be stated that the DoD-10 portfolio does not outperform the market as measured by the Sharpe ratio.

Table 5. Sharpe ratios for the DoD investment strategy and the market index.

	DoD-10	Market	Winner
2003	1,664	0,977	DoD-10
2004	1,858	1,744	DoD-10
2005	1,985	2,465	Market
2006	2,053	1,826	DoD-10
2007	-0,103	0,273	Market
2008	-1,932	-2,167	DoD-10
2009	2,937	1,280	DoD-10
2010	1,574	1,494	DoD-10
2011	-1,515	-1,519	DoD-10
2012	0,891	0,820	DoD-10
2013	1,455	2,467	Market
2014	0,428	0,952	Market
2015	1,015	0,767	DoD-10
2016	1,292	1,177	DoD-10
2017	0,693	1,448	Market
2018	0,316	-0,344	DoD-10
2019	1,318	1,691	Market
2020	0,069	0,611	Market
2021	2,859	2,098	DoD-10
2022	-0,754	-0,865	DoD-10
2023	0,277	-0,266	DoD-10
Mean	0,875	0,806	
t-statistic	0,178		
p-value	(0,861)		
Median	1,015	0,977	
Minimum	-1,932	-2,167	
Maximum	2,937	2,467	
Average annual STD	1,272	1,245	

Notes: The table reports the Sharpe ratios for the DoD investment strategy. The Sharpe ratios are calculated as the DoD-10 portfolio return in excess of the risk-free rate divided by the standard deviation of excess returns. The DoD-10 returns are calculated as the equally weighted average of returns for the individual stocks in the DoD-10 portfolio. Market is the OMXHCAPGI index. The Ledoit-Wolf (2008) approach has been used to test the statistical difference between the Sharpe ratios of the DoD-10 and the market. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

Table 6 shows the annual Treynor indices of the DoD-10 portfolio and OMXHCAPGI and their beta coefficients for each year. The Treynor indices are in line with the Sharpe ratios in terms of DoD-10 dominating the benchmark index. The DoD-10 portfolio has a higher Treynor index in 14 out of 21 years (66.7%), which is in fact the same figure as in the previous study by Rinne and Vähämaa (2011). The Treynor index compares the returns

of the portfolio and the benchmark index to their betas. The beta of the market index is 1, the mean beta of the DoD-10 portfolio is 0.785 and the median beta is 0.874, suggesting that the systematic risk of the portfolio is almost equal to the beta of the market index. The Ledoit-Wolf (2008) approach has been used to test the statistical difference between the Treynor indices of the DoD-10 and the market. Although the results are slightly better than those for the Sharpe ratio, the obtained t-statistic and p-value show that the difference is again not statistically significant. Again, there are only 21 observations in the sample, which affect the test result of statistical significance. Since the test result is statistically insignificant, it can be interpreted that the DoD-10 portfolio does not outperform the market as measured by the Treynor index, being in line with the results shown by the Sharpe ratio and Modigliani-squared adjusted returns. From these observations, it can be further concluded that the DoD portfolio is unable to outperform the benchmark index after risk-adjustment.

Table 6. Treynor indices for the DoD investment strategy and the market index.

	DoD-10	Market	Winner	Portfolio beta
2003	0,907	0,184	DoD-10	0,329
2004	0,519	0,179	DoD-10	0,374
2005	0,994	0,313	DoD-10	0,320
2006	1,328	0,260	DoD-10	0,271
2007	-0,020	0,037	Market	0,643
2008	-0,877	-0,508	Market	0,626
2009	1,225	0,410	DoD-10	1,056
2010	0,351	0,266	DoD-10	0,946
2011	-0,278	-0,273	Market	0,775
2012	0,224	0,140	DoD-10	0,920
2013	0,292	0,295	Market	0,945
2014	0,070	0,099	Market	0,769
2015	0,233	0,151	DoD-10	0,788
2016	0,202	0,129	DoD-10	0,954
2017	0,064	0,109	Market	0,930
2018	0,036	-0,044	DoD-10	0,874
2019	0,214	0,204	DoD-10	1,060
2020	0,021	0,161	Market	1,075
2021	0,310	0,253	DoD-10	1,018
2022	-0,143	-0,158	DoD-10	0,812
2023	0,060	-0,030	DoD-10	1,001
Mean	0,273	0,104		0,785
t-statistic	1,409			
p-value	(0,174)			
Median	0,214	0,151		0,874
Minimum	-0,877	-0,508		0,271
Maximum	1,328	0,410		1,075

Notes: The table reports the Treynor index measures for the DoD investment strategy. The Treynor indices are calculated as the DoD-10 portfolio return in excess of the risk-free rate divided by the beta coefficient of the portfolio. The DoD-10 returns are calculated as the equally weighted average of returns for the individual stocks in the DoD-10 portfolio. Market is the OMXHCAPGI index. The Ledoit-Wolf (2008) approach has been used to test the statistical difference between the Treynor indices of the DoD-10 and the market. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

6.2 Fama-French adjusted abnormal returns

Finally, the focus is set on Fama-French's three-factor model and five-factor model regressions, as they offer a more modern and stronger way to adjust portfolio excess returns than Sharpe ratio and Treynor index. The five-factor model has not been used previously to adjust the returns of the Dogs of the Dow portfolio, and the three-factor model

has been used quite rarely in previous studies after all. However, it must be remembered that the FF factors used in this study are European factors, meaning they are more proxies than exact factors, and the results should therefore be treated with some caution. Since the sample of annual returns consists of only 21 observations, which inevitably affects the accuracy of the statistical significance test, only the monthly FF3 and FF5 adjusted returns are examined. Hence, the sample consists of 252 observations instead of 21, offering more reliable test results.

Table 7 presents the results of the multilinear regression for FF3 and FF5 adjusted monthly returns. Starting with the results of the FF3 model, the focus is on the statistically significant intercept coefficient. The intercept coefficient is the alpha, which represents the abnormal return of the portfolio that is not explained by the model's risk factors. As can be seen from the table, the alpha of the FF3 model is positive, thus suggesting that the DoD-10 portfolio has produced an abnormal return on a monthly basis. When examining the factor loadings of the regression of the FF3 model in Table 7, further conclusions can be made about which risk characteristics affect the DoD-10 portfolio. The statistically significant loading of the market factor indicates that the portfolio has strong market exposure, as expected. The loading of the size factor, in turn, indicates positive small-cap exposure. The loading of the value factor is also statistically significant and positive. That is rational, since Dogs of the Dow is a type of value investment strategy and hence value factor impacts the return of the portfolio.

Table 7. FF3 and FF5 regressions on a monthly basis.

	AR(FF3)	AR(FF5)
Intercept	0,0061**	0,0042
	(0,025)	(0,136)
R(m)-R(f)	0,7550***	0,7027***
	(0,000)	(0,000)
SMB	0,4662***	0,4360***
	(0,002)	(0,005)
HML	0,2058*	0,7103***
	(0,066)	(0,000)
RMW		0,7011**
		(0,010)
CMA		-0,4787*
		(0,058)
Adj. R-sqr.	0,507	0,525
F-statistic	86,9787***	56,4648***
	(0,000)	(0,000)
No. of observations	252	252

Notes: The table reports the results of multi-linear regressions of Fama-French three-factor and Fama-French five-factor models of monthly returns and the factor loadings of the models. AR(FF3) is the three-factor model and AR(FF5) is the five-factor model. R(m)-R(f) is the market return minus the risk-free rate of return, SMB is the size premium, HML is the value premium, RMW is the profitability premium and CMA is the investment conservatism premium. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

Table 7 also presents multilinear regression for the more extensive FF5 adjusted monthly returns. This is presumably the first time that the abnormal return of the Dogs of the Dow portfolio has been adjusted using the Fama-French five-factor model. The FF5 model differs from the FF3 model in that the profitability factor and investment factor are added to the regression. The market factor, size factor, and value factor are all statistically highly significant and positive, thus affecting the portfolio's abnormal return as they do with FF3. The loading of the newly added profitability factor (RMW) is also statistically significant and positive, which may indicate good future profitability of the strategy (Tikkanen & Äijö, 2018). Interestingly, the coefficient of CMA is negative, which would indicate that the DoD portfolio of the thesis is not as conservative as DoD portfolios usually tend to be.

The most significant observation in the results of the FF5 model in Table 7 is that the excess return seems to disappear when returns are adjusted with a broader five-factor model, as the alpha of the FF5 model is not statistically significant. When the high profitability factor and conservative investment factor are added to the model, the alpha disappears, since exposure to these risk factors now explains the DoD portfolio return. Although the CMA factor added to the model is statistically significant, it is the least significant of all the factors. Thus, it seems that the elimination of abnormal returns is particularly affected by the RMW factor, which is logical for DoD returns, since the DoD portfolio consists of stocks that are often generally profitable.

From the information provided by the factor loadings, it can be determined that the DoD portfolio of the thesis is a small-cap, value, and high-profitability tilt portfolio. The portfolio generates an abnormal return when adjusted with the Fama-French three-factor model, but the abnormal return disappears when the returns are adjusted with the five-factor model.

6.3 Additional tests

In addition to examining the absolute returns, risk-adjusted returns and abnormal returns of the Dogs of the Dow portfolio, the paper conducts a few additional tests to increase the robustness of the paper. The tests presented in previous studies on the portfolio's performance in market downturns and the tests on the impact of taxes and transaction costs are discussed in this section.

6.3.1 Performance of the DoD-10 portfolio in market downturns

According to Lakonishok et al. (1994), unknown risk factors of investment strategies are often manifested during market turbulence. As Rinne and Vähämaa (2011) studied the performance of the DoD-10 in stock market downturns in their own paper, this paper

also compares the performance of the DoD-10 in years when the annual return of the OMXHCAPGI has been negative.

Table 8 shows that during the sample period, the benchmark index has produced losses during the financial crisis in 2008, due to the European debt crisis in 2011, in 2018, and most recently in 2022 and 2023 as a result of rising interest rates and the war in Ukraine (Angervuo, 2022; Heikkilä, 2022). There have therefore been only five negative years in total during the sample period, so the results should be viewed with caution due to the small sample. Due to the poor statistical significance of the annual sample, only examining monthly returns is justified. The DoD-10 portfolio's mean monthly (median) return of -1.3% (-0.9%) outperformed the benchmark OMXHCAPGI's mean monthly (median) return of -1.7% (-1.2%) in years when returns were negative. Both the mean and median are also both statistically significant at the 10% level. Thus, the findings confirm the results of previous studies that the DoD portfolio performs particularly well in stock market downturns.

Table 8. Performance of the DoD investment strategy in stock market downturns.

Panel A: Annual	DoD-10	OMXHCAPGI	AR(ma)	AR(M2)	AR(FF3)	AR(FF5)
2008	-0,514	-0,473	-0,040	0,055	-0,070	-0,134
2011	-0,192	-0,249	0,057	0,001	0,033	-0,252
2018	0,037	-0,039	0,075	0,085	0,207	0,129
2022	-0,085	-0,127	0,042	0,020	0,133	0,003
2023	0,086	-0,005	0,091	0,061	0,037	0,016
Mean	-0,134	-0,179	0,045	0,045	0,068	-0,048
p-value	(0,279)	(0,103)	(0,120)	(0,042)**	(0,224)	(0,510)
Median	-0,085	-0,127	0,057	0,055	0,037	0,003
p-value	(0,438)	(0,063)*	(0,125)	(0,063)*	(0,313)	(0,813)
Minimum	-0,514	-0,473	-0,040	0,001	-0,070	-0,252
Maximum	0,086	-0,005	0,091	0,085	0,207	0,129
No. of positive years	2	0	4	5	4	3
No. of observations	5	5	5	5	5	5
Panel B: Monthly	DoD-10	OMXHCAPGI	AR(ma)	AR(M2)	AR(FF3)	AR(FF5)
Mean	-0,013	-0,017	0,004	-0,027	-0,001	-0,002
p-value	(0,073)*	(0,011)**	(0,310)	(0,003)***	(0,898)	(0,670)
Median	-0,009	-0,012	0,007	-0,027	0,000	-0,005
p-value	(0,088)*	(0,025)**	(0,314)	(0,001)***	(0,864)	(0,809)
Minimum	-0,179	-0,158	-0,062	-0,232	-0,121	-0,115
Maximum	0,142	0,089	0,104	0,200	0,084	0,083
Proportion of positive months	0,417	0,383	0,567	0,267	0,500	0,483
No. of observations	60	60	60	60	60	60

Notes: The table reports the annual (Panel A) and monthly (Panel B) returns for the DoD investment strategy during stock market downturns. Market downturns are defined as the years in which the return on the OMXHCAPGI index was negative (years 2008, 2011, 2018, 2022-2023). The DoD-10 returns are calculated as the equally weighted average of returns for the individual stocks in the DoD-10 portfolio. AR(ma) is the market-adjusted return, AR(M2) is the Modigliani-squared adjusted return, AR(FF3) is the Fama-French three-factor adjusted return and AR(FF5) is the Fama-French five-factor adjusted return. Statistical significance is tested with one sample t-test for means and Wilcoxon signed-rank test for medians. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

Regarding risk adjustments, it should be noted that the Sharpe ratio and the Treynor index have not been tested. Instead, abnormal returns have been adjusted with the Modigliani-squared and the previously discussed Fama-French three-factor and five-factor models. When adjusted with FF models, it appears that the DoD portfolio would not produce excess returns in a bear market, but the Modigliani-squared adjusted returns are positive and statistically significant, when compared to the benchmark index. The positive M^2 adjusted returns further suggest that the DoD portfolio outperforms the benchmark index when stock markets decline.

6.3.2 The effect of transaction costs and taxes

In the Dogs of the Dow investment strategy, the stocks in the portfolio are replaced annually if required, and the stocks remaining in the portfolio will most likely need to be rebalanced, which will lead to transaction costs. The transaction cost calculation method used in the thesis closely follows Rinne and Vähämaa's (2011) procedure, so that the results of this study are as comparable as possible to their previous study.

In this study, the impact of taxes and transaction costs is estimated using a simplified analysis, for which the portfolio's annual turnover rate must be determined. During the 2003-2023 sample period, an average of 3.85 shares had to be replaced from the portfolio, resulting in the portfolio's minimum annual turnover rate to be 38.5%. The transaction costs are estimated to be a conservative 1% round-term cost, which is also used by McQueen et al. (1997) and Rinne and Vähämaa (2011). Therefore, rebalancing the portfolio causes a 0.39% minimum performance penalty per year.

As mentioned, the weights of the stocks remaining in the portfolio will probably also need to be rebalanced. Positions in underperforming stocks will need to be increased and positions in overperforming stocks will need to be reduced. The total annual mean return of the DoD-10 portfolio is 18.9% and the total annual mean dividend yield is 6.19%. Therefore, the annual average capital appreciation of the portfolio is 12.7%. Rinne and Vähämaa (2011) state that if all stocks in the portfolio rose exactly that amount, there would be no need for rebalancing. However, in reality, this is unlikely and in the worst-case scenario, an average annual rebalancing of 12.7% of the market value of the retained DoD stocks is possible. In the long run, capital appreciation should be randomly distributed around the mean, so annual rebalancing of one half of the retained stocks would result in a minimal additional portfolio turnover rate of 3.18% (Rinne & Vähämaa, 2011). This results in additional transaction costs of 0.032% per year and a total transaction cost penalty of 0.422% due to rebalancing. It is noteworthy that Rinne and Vähämaa (2011) estimate that the annual rebalancing costs of an index-following investor are only 0.23%, almost half the costs of a DoD-10 investor.

In addition to transaction costs, income taxes and capital gains taxes also affect the returns of the Dogs of the Dow investor. In Finland, dividend income has traditionally been taxed more lightly than capital gains (Rinne & Vähämaa, 2011), which thus favors the DoD investor, since in the strategy a significant part of the total returns is based on the dividend yield received. However, the taxation of dividends in Finland has been changed several times during the years 2003-2023. At the beginning of the sample period, in 2003 and 2004, the investor still received dividend income tax-free. However, in the 2005 tax reform, 57% of dividends were taxed at 28 percent, and from 2006 to 2011, 70% of dividend income was taxed at 28 percent. Thus, the effective tax rate in those years was 19.60%. In 2012, the taxation of dividends changed again, when 70% of dividends were taxed at 30 percent. The last time dividend taxation was reformed was in 2014, when 85% of dividend income was taxed at 30%, as is still the case today (vero.fi, 2025). Thus, the effective tax rate for dividends in the last years of the sample period has been 25.50% and the average annual tax rate throughout the whole sample period is 20.50%.

The difference is significant compared to the 2011 study by Rinne and Vähämaa, where the average annual tax rate for the 1988-2008 sample period was only 3.56%. It is worth noting that in Finland, an equity savings account was introduced at the beginning of 2020, in which dividends or capital income are not taxed, but the investor only pays taxes when money is withdrawn from the equity savings account (vero.fi, 2024). However, for the sake of simplicity, this study does not consider this opportunity offered by the equity savings account for more efficient investment of dividends.

The taxation of capital gains has not been changed as often as the taxation of dividends during the sample period. In 2003 and 2004, capital gains were taxed at 29 percent, in 2005-2011 at 28 percent, and since 2012 at 30 percent up to 30,000 euros, and 34 percent for the amount above that (vero.fi, 2018). However, again for the sake of simplicity, this study assumes that the tax rate is at most 30%. Therefore, the average annual tax rate for capital gains during the sample period is 29.2%.

The overall tax penalty for the DoD-10 portfolio investor can now be calculated following the calculations of Rinne and Vähämaa (2011). During the 2003-2023 sample period, the average dividend yield was 6.19%. The average annual capital appreciation of the DoD-10 portfolio was 12.7%. Therefore, it can be stated that the DoD-10 investor would have lost an annual average of 1.27% (i.e. 20.50% x 6.19%) as income taxes and 1.43% (i.e. 38.5% x 12.7% x 29.2%) as capital gains taxes. Therefore, the average tax loss of the DoD-10 investor is a total of 2.70%. The impact of taxes combined with transaction costs results in a total penalty of 3.12% for the DoD-10 investor. Table 3 shows the average annual tax and transaction cost-adjusted return for the DoD-10 portfolio, which is 15.8% (statistically significant), and the market-adjusted return after taxes and transactions is 3.3% (not significant). Therefore, the results seem to be somewhat contradictory on whether the DoD-10 investment strategy outperforms the benchmark index OMXHCAPGI even after taxes and transaction costs.

7 Summary and conclusion

The purpose of this study was to examine the performance of the Dogs of the Dow (DoD) investment strategy in the Finnish stock market from 2003 to 2023. The primary objective of the study was to determine whether the DoD strategy outperforms the benchmark index OMXHCAGPGI, which is a weighted and dividend-adjusted Nasdaq Helsinki index. The performance was to be compared both in absolute returns and after the risk-adjustments. Fama-French's three-factor and five-factor models were to be used to adjust abnormal return of the portfolio.

The empirical findings indicate that the Dogs of the Dow strategy outperforms the OMXHCAPGI in absolute returns during the studied time period. Thus, the results being also statistically significant, the first hypothesis, “The returns of the Dogs of the Dow portfolio outperform the annual returns of the OMXHCAPGI index” can be confirmed.

The second hypothesis assumed that the returns of the Dogs of the Dow outperform the benchmark index even after risk-adjustments. In the thesis, risk-adjustments were implemented with Sharpe ratio and Treynor index. In addition to that, the portfolio returns were adjusted with Modigliani-squared. However, the empirical findings are somewhat mixed. The DoD portfolio does achieve positive and market-beating results even after risk-adjustment, but the results for the M^2-adjusted returns, Sharpe ratio, and Treynor index suffer from statistical insignificance. The risk adjustments made with these different metrics cannot fully confirm whether the strategy's higher returns are not just compensation for higher risk, due to the mentioned lack of statistical significance. Therefore, the second hypothesis cannot be fully confirmed.

Extending previous research, the third hypothesis assumed that the portfolio produces abnormal returns after adjusting with the Fama-French three-factor and five-factor models. The FF3 model suggests that the DoD portfolio produces abnormal returns and the statistically significant alpha is positive when tested with monthly returns. However, the statistical significance disappears when the returns are adjusted with the more extensive

FF5 model. In particular, the addition of the profitability factor RMW appears to cause the disappearance of abnormal returns in FF5 model. Therefore, the third hypothesis cannot be fully confirmed either.

In addition to the three hypotheses mentioned above, the study's additional tests concerned the performance of the DoD portfolio in stock market downturns, as well as the reducing effect of taxation and transaction costs on portfolio returns. The additional tests suggest that the Dogs of the Dow investment strategy is not immune to market conditions or macroeconomic factors, as the DoD strategy's return was generally negative when the market return was. However, the strategy's high-dividend stocks showed resilience during periods of economic uncertainty and, on the other hand, when stock prices fell, dividends brought cash flow to the DoD investor. The findings of the thesis align with prior studies, showing that the DoD strategy tends to perform better in certain economic conditions and investors could achieve abnormal returns by utilizing the DoD strategy, at least before the risk-adjustments. Regarding the effect of transaction costs and taxes, the study supports previous studies that returns are lower but remain positive. However, transaction costs and tax adjusted returns are also mixed when it comes to the statistical significance, further being in line with previous literature.

7.1 Contribution and practical implications

This thesis contributes to the previous literature by providing updated evidence on the performance of the Dogs of the Dow strategy, especially in the Finnish stock market. Unlike previous studies that have examined the strategy before the major economic crises of the 2020s, this thesis takes into account recent market events. The research period of the thesis includes the Covid-19 pandemic, the war in Ukraine, rising interest rates, and inflationary pressures, which have not been similarly reflected in previous studies. The study is also first to include risk-adjusting for abnormal returns with Fama-French five-factor model in the Finnish context, thus contributing to the previous study from Finland.

Furthermore, by taking into account the risk-adjustments and testing for the effect of transaction and tax costs, the study provides a more comprehensive understanding of the practical applicability of the strategy. While some of the previous studies have not taken these factors into account, this study increases the credibility of the Dogs of the Dow strategy even after risks, transaction costs and taxes, and thus contributes to the previous literature.

The results of the empirical tests hold practical implications for investors considering using the Dogs of the Dow strategy in the Finnish stock market. The strategy's performance offers investors an interesting alternative and a valid opportunity to consider the DoD strategy, but attention must be paid to the risk-adjusting of the portfolio's returns. The strategy could be particularly suitable for passive investors who seek a simple and systematic selection method and are not afraid to take an extra risk. In practice, investing according to the strategy would be most efficient through an equity savings account due to tax benefits.

7.2 Topics for further research

Although the thesis provides valuable insights into the performance of the Dogs of the Dow strategy in the Finnish stock market, it has its own limitations that should be acknowledged. The empirical tests in the study suffer from a lack of statistical significance, which is likely due to the relatively small annual observations sample. Several studies on the Dogs of the Dow strategy suffer from statistical insignificance of the results, which contributes to debate and doubts about the effectiveness of the strategy. Future studies could aim to achieve more accurate test results with a larger sample.

The study focuses exclusively on Finland, which however has a relatively small stock market. Future research could expand the applicability of the strategy to other Nordic countries or European stock markets, thereby broadening the research sample and findings.

Additionally, there has been relatively small amount of previous research on Dogs of the Dow in the Nordic countries, so it would be interesting to compare DoD's performance across different Nordic markets in the future.

OMXHCAPGI is used as a benchmark index in this thesis. Future studies could expand the scope by comparing the returns of the strategy to several different benchmarks and examine how different benchmark selections affect the relative returns of the DoD strategy. One development direction could be to examine DoD portfolios composed of companies from different industries, e.g. real-estate stocks versus financial stocks, although this would need to be implemented on a larger stock exchange than Finland. Industry-specific DoD portfolios could then be compared to industry indices as a benchmark.

One direction in which future research could be developed would be to focus on stocks that implement share buyback programs instead of paying dividends. The traditional Dogs of the Dow strategy does not take into account share buybacks when constructing a portfolio. Share buybacks have become increasingly common, especially in the United States, which would provide an interesting opportunity for research.

Relatively easy alternative modifications in future studies could be to change the used risk-adjustment methods and measures, or to focus on different variations of the Dogs of the Dow strategy, such as the performance of Small Dogs or DoD-5 variations on the Finnish stock market. After all, Dogs of the Dow is an interesting strategy that offers a wide range of options for customizing the strategy.

This thesis offers an in-depth examination of the Dogs of the Dow strategy in the Finnish stock market in the years 2003-2023. The findings suggest that Dogs of the Dow outperforms the benchmark index OMXHCAPGI at least on absolute return level and offers implications for both academic research and practical investment strategies. The results suffer from a lack of statistical significance at least at some level after accounting for risk exposure and taxes and transaction costs, which is a reminder that these real-world

limitations must be carefully considered. Ultimately, this thesis contributes to the discussion on the effectiveness of the Dogs of the Dow strategy in different markets under different market conditions and thus provides a basis for future research on the topic.

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