The Value of Dividends
- The effect of dividend exposure on stock returns

Master’s Thesis 15 credits
Department of Business Studies
Uppsala University
Spring Semester of 2019
Date of Submission: 2019-06-05

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Abstract

This paper aims to examine if firms listed on Nasdaq Stockholm with dividend exposure yield higher risk-adjusted returns than firms without dividend exposure. Using a data set consisting of observations between 2000-2017 we test the difference in mean risk-adjusted return, measured by the Sharpe ratio, between securities with different levels of dividend exposure. We divide our sample into portfolios, categorized in the first stage independently of investment style, size and book-to-market ratio, and in the second stage on dividend exposure, that are regrouped annually. We measure the performance in terms of the geometric mean monthly returns, the risk as standard deviation of returns and the risk-adjusted performance measured with the Sharpe ratio. Following our empirical study, we find indications of a value effect in the Swedish capital market and draw upon three main conclusions. First, for all but one portfolio, the risk decreases with an increased degree of dividend exposure. Second, securities with high-dividend exposure tend to yield higher risk-adjusted returns relative to securities with no-dividend exposure. Third, the effect of dividend exposure on risk-adjusted performance appears to be most significant on mid firms and growth firms.

Keywords: Dividend investing, Value effect, Size effect, Risk-adjusted performance, Dividend yield, Stock returns
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1. Introduction

When investing in the stock market, the main goal should be to create a portfolio that is promising the highest expected return for any given degree of risk (Sharpe, 1966). According to established theories in the financial field, like the efficient market hypothesis and capital asset pricing model, investment strategies cannot generate an excess risk-adjusted return (Högholm and Prather, 2005). Despite this, several investment strategies have emerged relying on whether to invest in small firms, value firms or investing in firms that pay high dividends, all to accomplish superior returns over the market (Banz, 1981; Fama and French, 1998; Conover, Jensen, and Simpson, 2016). In addition to the academic research have several books, directed to private investors promoting dividend investing strategies, also been published over the years (e.g., Siegel, 2014; Lichtenfeld, 2015; Hernhagen, 2016), making this topic highly relevant for both researchers and investors.

Whether to invest in small- or big firms depend on one's investment strategy, time-horizon, or risk appetite. When comparing investments in small- and big firms several studies presented have differences in risk-adjusted returns, talking about a size effect, where small firms, on average, tend to outperform big firms (e.g., Banz, 1981; Fama and French 1992). One possible explanation for the size effect is information herding surrounding small firms, that small firms provide less information than big firms to the market, but once information becomes available, this leads to stock-price over-, or under reactions (Arnott and Hsu, 2006). However, even though small firms tend to outperform big firms, on average returns, they might also be riskier than big firms since small firms tend to have covariant returns (Fama and French, 1996), and big firms are more likely to pay dividends which lowers the volatility of returns (Fama and French, 2001; Clemens, 2013).

Other common investment strategies that have been well documented over the years are different growth- and value investing strategies, as to whether invest in value- or growth stocks (e.g., Fama and French, 1992; Lakonishok, Schleifer and Vishny 1994; Fama and French, 1998). The overall results tend to support a value effect, that value strategies yield higher returns than the market (Fama and French, 1992; Capaul, Rowley and Sharpe, 1993; Fama and French, 1998; Conover, Jensen and Simpson, 2016). Previous research suggested increased risk and survival ship bias as possible explanations to this phenomenon (Lakonishok, Schleifer and Vishny 1994; Fama and French, 1996), but no coherent explanation has been given to why this is the case. The lack of consensus may also be due to the differences in defining value stocks between studies, like for instance book-to-market, earnings-to-price or cash flow to price (Lakonishok, Schleifer and Vishny, 1994; Fama and French, 1998). There may also be differences in dividends between value and growth stocks, where value
stocks tend to have higher dividend yield than growth stocks (Conover, Jensen and Simpson, 2016). This has given rise to investment strategies based on dividend yield where investors target those securities with the highest dividend yield in an attempt to beat the market. The empirical evidence of dividend yield strategies is, however, mixed, with evidence suggesting both that the strategy will outperform the market and not (Hirschey, 2000; Rinne and Vähämaa, 2011).

Based on Miller and Modigliani (1961) we should know that a company's dividend policy is irrelevant for the value of the company, and hence, holding all else equal, it should also be irrelevant for the returns for the investor. This would mean that if a company has available investment opportunities that will yield a return that exceeds the risk for the investment, that investment would be more beneficial for the investor than receiving dividends. Keeping funds within the firm also creates possibilities for further growth and to fund valuable projects that might otherwise have been put off (Dittmar, 2008). Another benefit of holding cash reserves is to use these funds for harsher times, either to fund acquisitions or to maintain a stable operation and avoid financial distress (ibid.). However, this reinvestment is also associated with a risk of not yielding a higher return and, therefore, are dividends a safer alternative to avoid that risk and a way for the investor to realize wealth for consumption today, without being forced to sell a portion of the shares (Bhattacharya, 1979). One could, therefore, argue that an investment in dividend-paying securities is safer since the returns are continuously realized from that investment and investors can for themselves decide if they want to reinvest the cash or use it for consumption. Dividend yields have also shown to be a good predictor of future stock returns making the investor's estimates more accurate (Campbell and Shiller, 1988). Due to strong signalling effects, firms are generally reluctant to reduce dividends. This implies that holding a dividend paying stock could be a method to receive regular cash payments, and with evidence showing higher volatility in non-dividend paying stocks further motivates dividend-paying stocks as a safer investment (Pástor and Veronesi, 2003; Rinne and Vähämaa, 2011).

Moreover, the wealth increase of capital gain versus dividends might both be taxed and mentally accounted for differently by the investor (Barberis and Huang, 2001; Becker, Ivkoviz and Weissbenner, 2011), leading to a preferential gap between dividend and non-dividend paying stocks between different investor clienteles. Although these different investment alternatives seem to bear different levels of risk is it not clear which alternative, when controlling for risk, that actually yields the highest return. Given this, one could say that whether one invest in non-dividend paying stocks or dividend-paying stocks depend on one's risk appetite.
Numerous studies on investment strategies have been conducted in larger economies, like the U.S. and U.K. (see, e.g., Banz, 1981; Hirschey 2000; Conover, Jensen, and Simpson, 2016), and studies on smaller markets are sparse. Although, in smaller markets are there indications of differences between Scandinavian stocks and the rest of Europe, where value stocks are not yielding a superior return compared to growth stocks (Li-Chueh, 2016). These results are also supported by studies in Sweden that examine the excess return of high-dividend paying stocks compared to the market (Högholm and Prather, 2005). A common explanation to why investors prefer dividends or not is the taxation of dividends (Fan, Titman, and Twite, 2012). However, for individual investors in Sweden are there no differences in taxation of capital gains and dividends, and the results are, therefore, not directly applicable in a Swedish context. Furthermore, for Swedish private investors has a new investment account become available that do not tax the transaction itself, but rather apply a standard tax rate on the total wealth on the investment account. This implies that holding different securities because of taxation difference is not applicable for Swedish individual investors, making the field of investment strategies in a Swedish context even more interesting. Additionally, there are strong links between dividends and big firms, as well as value firms, and given that it appears to be smaller firms listed today than before (Banz, 1981; Fama and French, 1998; Fama and French, 2001), further enhances the actuality of the study. The purpose of this study is to contribute to fill this research gap and examine the relationship between dividend exposure and risk-adjusted performance of companies listed on Nasdaq Stockholm. More specific, we aim to examine if firms listed on Nasdaq Stockholm with dividend exposure yield higher risk-adjusted returns than firms without dividend exposure.

To test this and isolate the dividend effect of the risk-adjusted performance we follow the method of Conover, Jensen, and Simpson (2016) and construct portfolios in two-stages, where we first categorize our sample based on size- and book-to-market and then add dividend exposure as a second factor. Using a data set consisting of observations between 2000-2017 we test the difference in mean risk-adjusted return, measured by the Sharpe ratio, between securities with no-, low-, and high-dividend exposure. Moreover, we also test the difference in absolute returns measured by the geometric mean of monthly returns. As a measure for the risk, we use the standard deviation of returns, which is tested with a f-test to establish statistical significance. We find that the risk in general decreases with an increased degree of dividend exposure. Furthermore, securities with high-dividend exposure tend to both have higher risk-adjusted returns and higher absolute returns. When comparing the portfolios among each other, we find that the effect of dividend exposure appears to be largest on mid- and growth firms.
The paper proceeds as follows. Section 2 presents the theoretical framework with a theoretical base and earlier empirical findings, and we finish the section by developing our hypotheses. Section 3 presents the methodology where we present our data, measurements, and statistical tests. In section 4, we present the results from our empirical research along with interpretations of the results and robustness checks. In section 5, we discuss the results and reason for a possible explanation for the results. The paper ends with conclusions, limitations and recommendations for future studies.

2. Theoretical Framework

In the following section, we present the theoretical framework for our study. First, we present a theoretical base, and empirical findings of investment strategies, relevant for this study. We end the section by developing the paper’s hypotheses.

2.1. Market performance and risk

Two fundamental aspects of finance are how the risk should be measured and what economic forces that determine the price of risk (Campbell, 1996). Hence, to be able to measure the risk-adjusted performance of securities are we going to start this section with defining the incurred parts, namely risk and performance. We define performance as the total relative change in wealth for holding a security at the end of a given period. It implies that we take both the capital gain and the dividends into consideration since they combined constitutes the change in wealth for the investor.

Risk can be divided into systematic and unsystematic risk, where the former is diversifiable and firm-specific, and the latter is the risk that an investor takes when being exposed to financial markets in general, which is also called market risk (Bodie, Kane and Marcus, 2018). The diversification of risk is done by constructing a portfolio that includes assets that have negative covariance and hence spreading the overall risk of a downfall in returns. A risk-free asset is by Bodie, Kane, and Marcus (2018) defined as an asset with a certain rate of return, hence, risk can conversely be defined as the uncertainty of receiving the expected return of an investment. Since there always is a risk of not receiving any rate of return is there no asset that is per definition risk-free. However, government bonds are as close to a risk-free asset as one could come since it pays a fixed rate of interest and has an exceptionally low default risk (ibid.). The price of risk implies that there is a risk-return trade-off, and with the price being the demanded return of an investor, the trade-off also implies that a riskier asset should yield a higher expected return. If a risk-free asset would yield a higher return than a risky one, it implies that there is an opportunity of arbitrage and a well-functioning capital market would
correct the mispricing until the expected return of the security is in aligned with the amount of risk (ibid.).

When Markowitz (1952) presented the minimum-variance frontier, which graphically shows the highest expected return given a certain amount of risk, the risk was measured as the standard deviation of returns. As a development to Markowitz (1952), Sharpe (1964) presented a model that later where to be called the capital asset pricing model using the volatility of returns relative to a market portfolio. A greater dispersion from the mean, or a higher sensitivity to fluctuations relative to the market, increase the probability for an investor of getting a lot more than their expected return. However, it also incurs a probability of not getting their invested funds in return, and, hence, the risk and return are correlated, and there is a risk-return trade-off to consider in an investment decision. Given this definition of risk, an investor that could predict the market should, in general hold a high-risk asset when the market is in an up going trend and vice versa. To maximize the return of an investment, a rational investor should attempt to find the efficient portfolio, i.e., the portfolio that offers the highest expected return for any given degree of risk (Sharpe, 1966). Hence, the trade-off between risk and return is central to the measurement of investment performance.

2.2. Empirical findings of security performance

If the assumptions of capital asset pricing model and efficient market hypothesis hold, the only way for an investor to increase their returns is by adding additional risk. Concerning this belief, Fama and French (1996) argue that the so-called market anomalies related to value- and size effects are not anomalies but rather a different exposure to risk.

2.2.1. Value effect

An investor in growth stocks is more interested in the growth potential of a company while a value investor would see a dividend payment as important when investing in value firms (Conover, Jensen and Simpson, 2016). As the difference between the book value and market valuation increases, the degree of risk increases. Hence, the riskier situation should give rise to a higher demand for returns. However, the empirical evidence shows that the growth stocks are underperforming the value stocks (Zhang, 2005). In good times, growth firms invest more and face higher adjustments costs to take advantage of favourable economic conditions (ibid.). One idea why value strategies produce higher returns is that they bet against what Lakonishok, Schleifer, and Vishny (1994) call naive strategies, where the market overreacts to stocks that have performed well or bad, leading to either over- or under-priced stocks. Another explanation to this is that value companies, with high book-to-market ratios, tend to be of higher fundamental risk and that their higher average returns are simply a
compensation to investors for bearing that risk (Lakonishok, Schleifer and Vishny, 1994). How studies explicitly define a value or growth companies differs, but the overall criteria are that a value company's stock price is low relative to its earnings, dividends, book value of asset or other measures of value (ibid.).

2.2.2. Size effect
Studies that have examined investment styles and different types of portfolios have found that smaller firms on average have higher risk-adjusted returns than larger firms (Banz, 1981; Fama and French, 1992). This reversed the relationship between firm size and the risk-adjusted return is referred to as the size effect (Banz, 1981). Fama and French (1992), investigate the interactions among size, earnings to price, leverage, and book-to-market equity. The idea is that since all these variables are different ways of extracting information about risk and expected returns, some of which might be redundant in capturing the same dimensions of risk. For instance, small firms tend, to a larger extent, to covary, which increases the risk that is not captured in traditional asset pricing models (Fama and French 1996). The goal then is to reduce these variables to a few and thus allow for a parsimonious model for explaining average stock returns. At this juncture, there are two winners in the process of adding and eliminating variables in the literature, where only size and book-to-market are significant factors (ibid.).

Although these studies present coherent results are there no stated theoretical foundation for such an effect, and it does not show if the factor size is just a proxy for one or more unknown factors that are correlated with size (Banz, 1981; Fama and French, 1992). However, an indeed intuitively compelling conjecture that could explain the size effect is that insufficient information available about a subset of securities will lead to investors being reluctant to holding these securities due to uncertainty about the true parameters of the return distribution (Klein and Bawa, 1977). Since it is likely that the information generated and available in the market is related to firm size, investors might not desire to hold on to stocks of small firms. Thus, many investors will automatically avoid holding these stocks, which will give an upper advantage for those investors holding information from a trustworthy source.

2.3. Dividend Theory and Dividend Investing
Excess cash in a firm can be of great value if there, for instance, are profitable investment opportunities available for the firm to utilize. But, it may also create tension between the owners and the managers in the firm, due to sloppy cash management and overinvestments or to derive personal benefits that are not in the best interest for the investors in the long run (Li and Lie, 2006; Dittmar, 2008). The risk for these types of agency problems is mitigated by paying out the excess cash to
shareholders (Dittmar 2008), which results in a realising effect of the return for the investor. Dividends are also seen as a long-term commitment, which has led to a strong signalling effect from the firm to the market when initiate or changing the dividends.

However, value for an investor comes from the total increase of wealth, which consists of both capital gains and dividends. This implies that the dividends received today are equal to the discounted value of future cash flows (Miller and Modigliani, 1961). Hence, the value and returns of a security are, in a perfect capital market, independent from the dividend policy (ibid.). Since dividend paying firms are generally profitable firms with low growth opportunities (Fama and French, 2001), the result of realized return for the shareholder today is potentially a trade-off where an investor gives up future returns. However, other empirical findings suggest that the payout policy does affect the valuation of the firm (DeAngelo and DeAngelo, 2006; Karpavičius and Yu, 2018).

Furthermore, it has also been shown that dividend-paying stocks, on average, yield a higher return to the investors as well (Barberis and Huang, 2001). The premium valuation of dividend premium stocks might be due to personal biases like mental accounting but also to more fundamental reasons like taxation rules or transaction costs. This has resulted in a discussion of a clientele effect within dividend investing which implies that investors in high-dividend-paying firms are investors that use the dividends for consumption (Graham and Kumar, 2006; Becker, Ivkovic and Weissbenner, 2011). If the dividend payouts are not going to be used in consumption, there are suggestions that it would be better to let the investment accumulate within the firm, due to not disturb their wealth accumulation by either personal bias or fundamental costs. This leads to that investors with a long investment horizon, e.g., younger people with continuous income streams, in theory, would prefer to invest in a non-dividend paying company (Miller and Modigliani, 1961).

Dividend yield strategies have been well documented over the years where several studies have tested whether dividend yield could predict future expected returns, and the results presented have been mixed. Fama and French (1988) found evidence supporting a positive relationship, and studies on the US market have shown that investments in firms with a high-dividend yield earn abnormal returns (Clemens, 2013). Other studies have presented no or only limited evidence supporting this strategy (Black and Scholes, 1974; Goetzmann and Jorion, 1993 and Brzeszczynski et al., 2008). Brzeszczynski et al. (2008) results show that portfolios of high-dividend yield stocks have not consistently outperformed the market over the analysed period, but has an average annual rate of return of more than four times the return of the market index. These findings are consistent with
earlier research, where dividend investing strategies outperform the market over the long-run (Clemens, 2013).

2.4. Hypothesis Development
To test whether there is a difference in returns with respect to the dividend exposure, we are forming two categories of hypotheses based on the investment styles size and value-growth. The hypotheses are formed to exclude the value and size effects that prior studies have found (e.g., Banz, 1981; Fama and French 1992; Lakonishok, Schleifer and Vishny 1994; Fama and French, 1998) and that might affect our results.

Clemens (2013) states that the payout of continuous cash flows from dividend-paying securities, in general, lowers the risk relative to the market, linking dividend investing to a low volatility strategy. Furthermore, the inflexibility of dividends results in a signalling effect for the firm's estimation of future earnings and cash flows when changing the dividend level. If a firm pays out dividends, the investor instantly realizes some return of the invested funds, making it possible for oneself to choose whether to invest in another security or use the capital for consumption. Hence, it is possible for a dividend investor to use the capital to re-weight its portfolio without any individually related transaction costs and then optimize their total portfolio. Therefore, should investments in dividend-paying stocks lower the risk for an investor.

When dividends are paid out from a firm to an investor, there is a transfer in wealth that lowers both the equity and the cash reserves in the firm. This action gives the firm less cash to use in their operations and less cash that will yield a return for the investors. Hence, if holding the return ratio equal, the return, measured in monetary units, in the following year will be smaller if the firm has paid out dividends. On the other hand, in practice, it would most likely not be possible to hold the return ratio equal, and there is a risk that management will invest in projects that do not yield sufficient return in relation to the demands of the investors. Hence, the total return will decrease and, holding all else equal, the return for the investor will decrease. However, particular for small- and growth firms that have profitable investment opportunities available, it may be beneficial to let the company accumulate the gains within the firm. This would lead to more efficient capital management that lower the overall costs and gives the firm opportunities to grow the operations.
2.4.1. Size Hypotheses
Smaller firms are in general riskier than bigger firms, which might be an explanation to that small firms tend to outperform big firms. Fama and French (2001) argue that an increased portion of smaller firms listed on the US stock markets might be a reason that a declining number of firms pay a dividend in the latter years. Therefore, big firms are usually associated with a mature phase, with steady cash flow streams and few profitable investment opportunities available, leading to that big firms also are usually associated with paying out excess cash as dividends. In contrast, pay-outs of excess cash for a small firm probably do more harm than good, since small firms need to a larger extent reinvest the cash in its operations to grow the business, leading to that dividend payments might reduce the overall return for small firms. It is, therefore, not unlikely that no-dividend paying small firms, on average, yield a higher return than dividend-paying small firms. However, as dividend payments are associated with lowering the risk for the investor, the risk-adjusted return may still be higher for the small firms that pay dividends. We predict that both small firms and big firms on average would yield a higher risk-adjusted performance if they paid dividends. Hence, we follow the findings of Conover, Jensen, and Simpson (2016) and our first hypotheses are, therefore:

H1a: Small firms with dividend exposure have significantly higher risk-adjusted performance than small firms without dividend exposure

H1b: Big firms with dividend exposure have significantly higher risk-adjusted performance than large firms without dividend exposure

2.4.2. Value-Growth Hypotheses
The dividend yield has been one way to define value firms in previous research (Conover, Jensen and Simpson, 2016). Since we measure value firms based on the book-to-market ratio, and not the dividend yield, it gives us the opportunity to test if there are any differences in the risk-adjusted performance between value firms that pay and do not pay dividends. The reason why value firms would outperform growth firms may be due to that value firms earlier have been in a downfall leading to that their securities are viewed as undervalued. Hence, if the trend is turned around, the undervalued security will move towards its fair price and therefore, yield an excess return.

Conversely would growth firms, with a high market valuation relative to their book value, have good estimated future earnings that are priced in the security. Hence, it may be a risk that this estimation is not met and would, therefore, lead to a fall in the share price and reduce the return for the investor. However, the high valuation might come from something that cannot be captured in the book value
and, therefore, might the valuation of the security be fair and not overvalued. We predict that it would be beneficial for growth firms, primarily in a risk perspective, to have dividend exposure. Hence, our prediction is in line with the findings of Conover, Jensen, and Simpson (2016), and our second set of hypotheses are:

H2a: Growth firms with dividend exposure have significantly higher risk-adjusted performance than growth firms without dividend exposure

H2b: Value firms with dividend exposure have significantly higher risk-adjusted performance than value firms without dividend exposure

3. Methodology

In the following section, we present this study's research method. We begin with presenting the overall research method and data, followed by how we define and motivate the study’s measurements and variables. Lastly, we present the method used to conduct our study.

3.1. Overall Research Method and Data

The theoretical framework of this study is primarily based on previous research in relevant fields. We aim to strengthen the reliability of our study by thoroughly explain our measurements and the processing of the data, and base this study’s methodology on earlier research, primarily Conover, Jensen and Simpson (2016). To test the hypotheses of this study, we are using data from Swedish companies’ primary listed on Nasdaq Stockholm between 2000 and 2017. The firm-specific data and the risk-free rate is retrieved from Thomson Reuters Datastream. When measuring the performance of a firm, we are using monthly data, and given our sample of 18 years that results in 216 months of returns. When processing our data, we are excluding observations that have missing information for portfolio construction. This is due to intra year IPOs and transfers since they are not listed at the time of our portfolio construction or not report the information necessary of our criteria’s. Furthermore, some companies that lack information of our return measurement are also excluded, and we are following Fama and French (1992) and Conover, Jensen, and Simpson (2016) and exclude observations with negative book values. To compute the first year's portfolios, we are using closing data of the year before our period, leading to the exclusion of data from 1999. Following these actions for processing the data, our final data set consists of 4178 observations. A summary of our data-process is presented in Table 1.
Table 1. Data Sample

<table>
<thead>
<tr>
<th>Description</th>
<th>Number of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Sample</td>
<td>4892</td>
</tr>
<tr>
<td>Missing information for portfolio construction</td>
<td>-395</td>
</tr>
<tr>
<td>Missing information of return measurement</td>
<td>-80</td>
</tr>
<tr>
<td>Negative book values</td>
<td>-17</td>
</tr>
<tr>
<td>Observations dated 1999</td>
<td>-222</td>
</tr>
<tr>
<td><strong>Total observations after data processing</strong></td>
<td><strong>4178</strong></td>
</tr>
</tbody>
</table>

Note: Table 1 summarizes the paper's initial data sample and data processing. The sample is processed at the reported order and if one observation is ruled out on several criteria it is excluded on the criteria first in presented order.

3.2. Variables

3.2.1. Growth and Value Firms
Measuring whether a firm is a growth or a value company has been done in many ways, including price-to-earnings, dividend yield, and book-to-market ratio (Lakonishok, Schleifer and Vishny 1994). Of these measurements is book-to-market ratio the measurement that also seems to capture other different ways to measure growth firms, since firms with low book-to-market also tend to have high growth estimates in other measures (Capaul, Rowley and Sharpe, 1993). This, combined with what we want to examine, the effect of dividend exposure to the return, results in that we find the book-to-market ratio to be an appropriate way to measure whether it is a growth or value security. This is in line with, among others, Conover, Jensen, and Simpson (2016) and we, therefore, define a growth (value) security to have a low (high) ratio of the book value of equity relative to market capitalization.

3.2.2. Size
Size may be measured in different ways, for instance by total sales, book value of assets or market capitalization of the firm, of which all have benefits and drawbacks with different implications for the study (Dang, Li, Yang, 2018). Since we are interested in the stock returns and to isolate the size effect, we need to use a measurement that control for size in the stock market and the preferred measurement is then market capitalization (ibid.). Hence, we follow Fama and French (1992; 1996) and Conover, Jensen, and Simpson (2016), and measure size as the share price times the number of common shares outstanding since it is the total valuation that the market has put on the firm at that date of time.

3.2.3. Return
We measure the return of our portfolios using the monthly return index (RI) from Thomson Reuters Datastream. We follow Conover, Jensen, and Simpson (2016) and measure the return as the monthly average of return. Since the arithmetic mean due to volatility in returns often overestimates the returns
(Hirschey, 2000), we use the geometric average in first hand. But similar to Conover, Jensen, and Simpson (2016) we will also test the arithmetic mean as a robustness check of our results. The first step of our process is to compute the return of each portfolio every month using the weighted relative change in the return index from one month to another. Then we compute the geometric return and follow Alf and Grossburger (1979) by first finding the natural logarithm of the accumulated relative index change for each month. Secondly, we derive the geometric mean by finding the antilogarithm of the mean monthly returns. The return is computed for each specific security within the portfolio which then is value weighted, using that security’s portion of market capitalization relative to the total value of the portfolio. We then accumulate the returns for each portfolio and month, to derive the portfolio return for a specific month. The return index (RI) include gross dividends, which are reinvested in the specific security at the closing price applicable on the ex-dividend date, ignoring taxes and transaction costs. Equation 1 shows the computational process of our geometric mean returns, and Equation 2 elaborates the computation of the accumulated return for a portfolio each month, which is a variable that is being used in Equation 1.

\[
    r_{p,t} = \exp \left( \frac{\sum_{i=1}^{n} w_{i,t} \ln r_{i,t}}{\sum_{i=1}^{n} w_{i,t}} \right) - 1
\]  

(1)

Note: Equation 1 shows our formula for computing the geometric mean return. Where \( w \) is the weight of the monthly return and \( r \) is the accumulated return for each month which is computed following Equation 2.

\[
    r_{i,t} = \sum_{i=1}^{n} \left( \frac{P_{i,t}}{P_{i,t-1}} \right)^{w_{i}}
\]  

(2)

Note: Equation 2 shows our formula for computing the accumulated return for each month Where: \( w \) is the security weight in each portfolio, \( P_{i,t} \) is the price index of security i at time t and \( P_{i,t-1} \) is the price index of security i at time t-1

3.2.4. Risk adjusted performance

Since a rational investor should seek the portfolio that promising the highest expected return for any given degree of risk (Sharpe, 1966), the performance of the security must be risk-adjusted to be reliable. However, since the difference between portfolios still can be of economic interest, we will also solely test and report the input factors of the risk-adjusted performance measure. There are several measurements of risk-adjusted performance, including Jensen's Alpha, Treynor ratio, and Sharpe ratio (Bodie, Kane and Marcus, 2018). While Jensen's alpha measures the average return above the estimated return, given by a market model (e.g., CAPM), it is a standard measure when examining the excess return to the market. Sharpe ratio and Treynor ratio, on the other hand, measures the return given per unit of risk of the portfolio, where the difference between them is the measurement of risk (ibid.). Treynor ratio only accounts for the systematic risk, measured by beta, and is, therefore, appropriate when it is likely to assume a well-diversified portfolio. Since we cannot
determine that our portfolios will be well diversified and we test the difference in returns for different degrees of dividend exposure, we find it appropriate to use the Sharpe ratio as a measurement for risk-adjusted performance. This is in line with Conover, Jensen, and Simpson (2016) and makes it possible for us to measure the returns given a degree of variability. The Sharpe ratio measures the realized excess return of the portfolio divided with the standard deviation of returns of the portfolio. The excess return is computed as the absolute monthly return of the portfolio subtracted by the risk-free rate of the same period (Capaul, Rowley and Sharpe, 1993). To be able to match the monthly return for a specific period we use the nominal Swedish 1-month treasury bill for that month. We follow Conover, Jensen, and Simpson (2016) and measure the Sharpe ratio annually using the arithmetic mean of excess return. Since we reformat our portfolios on the first of January, and the Swedish companies are, for the most part, only pay dividends once a year, we measure the Sharpe ratio per calendar year. To annualize the Sharpe ratios, we are multiplying the monthly Sharpe ratios with the square root of twelve. Hence, our risk-adjusted performance measure is calculated by Equation 3.

\[ S_{p,t} = \frac{(r_{p,t} - r_{f,t})}{\sigma_{p,t}} \times \sqrt{12} \]  

Note: Equation 3 shows our formula for computing the annual Sharpe ratio. Where: \( r_{p,t} \) is the average return of the portfolio at time \( t \), \( r_{f,t} \) is the average risk-free rate at time \( t \) and \( \sigma_{p,t} \) is the standard deviation of returns of portfolio \( p \) at time \( t \).

3.3. Portfolio construction

Due to the value- and size effects on average stock returns, we follow Fama and French (1992) to form portfolios based on market capitalization and book-to-market ratio. Similar to Clemens (2013) and Conover, Jensen, and Simpson (2016), we are forming value-weighted portfolios that we are regrouping annually. Using data reported on the first of January each year, we form the portfolios in two separate stages. The first stage is based on book-to-market and size. We start by sorting the observations by book-to-market and sorting the 30% of the observations that have the highest book-to-market ratio to compose a value portfolio, with the lowest 30% to compose a growth portfolio and the remaining 40% compose a blend portfolio. We then independently repeat the procedure, with the original data set, sorting the observations by size, creating a small-, mid- and big portfolio.

Once the observations are sorted on investment style, we form four portfolios for each investment style based on dividend exposure. These portfolios are sorted by twelve months trailing dividend yield based on dividends paid during the previous year and the closing price at the previous year's end. We follow Conover, Jensen, and Simpson (2016) and sort the portfolios with either: no-, low-, high- or extreme-dividend exposure, where the extreme-dividend portfolio consists of the top five
percent of observations that has the highest dividend yield. We divide the remaining firms into portfolios with low-, or high-dividend exposure, with half of the firms divided into each portfolio. We are using an extreme-dividend category to be able to catch companies that might be financially distressed and have a dividend yield that may be unrealistic to carry through practically, and therefore, will we not perform statistical tests for these portfolios. However, we will, in a later stage, use different classification of the extreme-dividends as a robustness check to strengthen the reliability of our study.

3.4. Statistical methods

To determine whether the difference in return, risk, and risk-adjusted return between dividend paying and non-dividend paying securities are statistically significant, we follow Conover, Jensen, and Simpson (2016) and use a two-tailed independent sample t-tests for the return and risk-adjusted return. To test whether there are any differences in risk between the dividend exposure levels, and if its statistically significant, we are using a F-test that measures the statistical difference in the variance of the returns. Our tests rely on the null hypothesis that the mean return, standard deviation and Sharpe ratio of the portfolio of no-dividend stocks is equal to the respective measure of dividend-paying stocks for low- and high-dividend paying stocks respectively (Conover, Jensen and Simpson, 2016). Since the geometric mean is a monotonic function of the mean of the logarithms, we are performing the t-test of the absolute returns on the logarithm of the observations (Alf and Grossberger, 1979).

Since we rely on 18 years of data, it requires that our annual Sharpe ratios are not far from normal to meet the assumptions for the t-test (Triola, 2015). Hence, we perform a normality of distribution test of the annual Sharpe ratios from our portfolios to determine if it is possible for us to move on with the t-test even though we have few observations for this part of the analysis. The results from the Shapiro-Wilk tests show that we can reject that our data would be non-normal for all portfolios except the value portfolio with low-dividend exposure. We can, therefore, proceed with our t-tests (Triola, 2015), but we recommend caution in the interpretation of the value portfolio with low-dividend exposure. Due to this, we will also perform a Wilcoxon signed-rank test on our Sharpe ratios as a robustness check. The Wilcoxon signed-rank test is a non-parametric test that does not assume a normal distribution of the variables included. The combination of a non-parametric test with a parametric test (e.g., t-test) alleviate problems associated with autocorrelation in small capital markets and enhances the robustness of the results (Högholm and Prather, 2005). Hence, we will be able to determine the differences even though the sample size for this part of the research may seem small.
3.5. Method choices that limits this study

Following our methodology choices, there are some drawbacks that we want to address. First, the variable we are using for absolute return, the total return index (RI) that is retrieved from Thomson Reuters Datastream, accounts for that dividends are reinvested into the same security at a price applicable on the ex-dividend date. Hence, it might affect the returns because the reinvested amount may vanish from reinvestment to fiscal year-end, or it may also grow rapidly. We will, therefore, get different results than if we chose a measurement that held the dividends as cash reserves (as in Högholm and Prather, 2005), or invested it into the risk-free asset (as in Rinne and Vähämäa, 2011). Second, the returns reported are gross returns where we do not consider any taxes or transaction costs in the calculation. The reason for that is that the securities should be able to move freely across portfolios in every year and that the taxation of the investor may vary between individuals. Moreover, the differences in both transaction costs and taxation can differ from the geographical domicile of the investor, the clientele of the investor and which type of account where the securities are being held. For Swedish private investors that hold their securities through a recently introduced investment account, that apply a standard tax rate of the capital holdings instead of the change in wealth, the preferences of dividends from a taxation perspective may, therefore, differ a lot among investors. Hence, we find it most accurate to present the gross returns so that the investor may compute the real effects of the returns for themselves.

Third, we only measure the difference in returns of the portfolios with dividend exposure to the portfolios with no-dividend exposure, and not a market portfolio or index. Hence, the interpretation of the given returns should only be that one portfolio has a higher return, or risk-adjusted return, compared to another portfolio in the sample. Finally, our sample consists of 4178 observations over 18 years (2000-2017), which is less than the 52 years used by Conover, Jensen, and Simpson (2016), and may have several implications. It might harm the generalisability over time. Furthermore, our initial data set only consists of securities that are primary listed to Nasdaq Stockholm, leading to that generalising the results to evaluate investment strategies in other securities is not recommended. Moreover, following our data set, we are not able to combine the investment styles and create for instance small-value portfolios or large-growth portfolios, which is the case in Conover, Jensen, and Simpson (2016). This may lead to that we, in some cases, cannot draw the same precise conclusions as we could have done with a more extensive data set.
4. Results

The following section presents the results of this study, starting with presenting descriptive statistics. The section proceeds with the results for and determination of associated hypotheses. In the end, we present interpretations and implications of the results.

4.1. Descriptive Statistics

Table 2 presents the averages for the dividend yield, market capitalization (Size), and book-to-market ratio (BE/ME), along with the sample sizes of our portfolios sorted on investment style and dividend exposure. The mean dividend yield for our full sample is 2.027%, and for low- and high, portfolios are 1.442% and 4.255% respectively. The portfolios consisting of securities with an extreme dividend yield has an average dividend yield of 8.773%, which is more than double the high-dividend exposure portfolio. The mean size follows our earlier discussion that firms tend not to pay out dividends until they have become more stable and mature. It is, therefore, not surprisingly to note that the no-dividend portfolios contain considerably smaller companies, on average than the other dividend-paying portfolios. In fact, the mean size for no-dividend paying firms is eight and nine times smaller than the firms constituting the portfolios with low- and high-dividend exposure. The mean BE/ME reflects that value companies (high BE/ME), on average, pay relatively high dividends. There is an apparent association between our two portfolio characteristics (Size and BE/ME) and dividend yield, which support the purpose of our analysis. As we are assessing the influence of dividend yield on the success of alternative investment strategies, it is crucial to control for these two characteristics.

Table 2. Descriptive Statistics.

<table>
<thead>
<tr>
<th>Dividend exposure</th>
<th>Full Sample</th>
<th>No</th>
<th>Low</th>
<th>High</th>
<th>Extreme*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean dividend yield</td>
<td>2.027%</td>
<td>0.087%</td>
<td>1.442%</td>
<td>4.255%</td>
<td>8.773%</td>
</tr>
<tr>
<td>Mean Size (MSEK)</td>
<td>13716</td>
<td>2402</td>
<td>19412</td>
<td>21614</td>
<td>14765</td>
</tr>
<tr>
<td>Mean BE/ME</td>
<td>0.675</td>
<td>0.744</td>
<td>0.574</td>
<td>0.673</td>
<td>0.872</td>
</tr>
</tbody>
</table>

Size Portfolios

<table>
<thead>
<tr>
<th>Size Portfolios</th>
<th>Small</th>
<th>Mid</th>
<th>Big</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean dividend yield</td>
<td>1257</td>
<td>1664</td>
<td>1257</td>
</tr>
<tr>
<td>Mean Size (MSEK)</td>
<td>798</td>
<td>579</td>
<td>149</td>
</tr>
<tr>
<td>Mean BE/ME</td>
<td>218</td>
<td>515</td>
<td>527</td>
</tr>
</tbody>
</table>

BE/ME Portfolios

<table>
<thead>
<tr>
<th>BE/ME Portfolios</th>
<th>Growth</th>
<th>Blend</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean dividend yield</td>
<td>1257</td>
<td>1664</td>
<td>1257</td>
</tr>
<tr>
<td>Mean Size (MSEK)</td>
<td>500</td>
<td>491</td>
<td>535</td>
</tr>
<tr>
<td>Mean BE/ME</td>
<td>359</td>
<td>559</td>
<td>342</td>
</tr>
</tbody>
</table>

Note: Table 2 reports the mean value for the dividend yield (trailing 12 months), Market capitalization (Size, reported in million SEK), and book-to-market ratio (BE/ME). The table also reports the number of observations in each portfolio. *Excluded in further analysis.
4.2. Size portfolios

Table 3 presents the results from our portfolios grouped by size and dividend yield. In Panel A, the geometric mean for monthly return is presented with associated t-tests, where the absolute returns of the portfolios increase for every degree of dividend exposure. However, of all portfolios with dividend exposure is it only the mid portfolio with high-dividend exposure that has a statistically different mean monthly return compared to the portfolios with no-dividend exposure. The portfolio with the highest mean monthly return is the mid portfolio with high-dividend exposure (1.240%), and on the contrary side, the portfolio with the lowest mean monthly return is the mid portfolio with no-dividend exposure (-0.207%). The largest difference is between these two portfolios where the difference in mean monthly return is almost 1.5 percentage points. Although the difference between portfolios with no- and high-dividend exposure is not statistically significant should it at least be considered as economically significant by some investors.

Panel B presents the difference in volatility between the portfolios, and we can see that all portfolios with dividend exposure have significantly lower volatility than the no-dividend paying portfolios and that the volatility decreases as the dividend exposure of the portfolios increases. The big portfolio with high-dividend exposure has the lowest volatility (5.322%), and the mid portfolio with no-dividend exposure has the highest volatility (9.166%).

When observing the last panel of Table 3, Panel C, we can see the return given for a specific level of volatility, i.e., risk-adjusted performance presented as the Sharpe ratio. The Sharpe ratio increases for all portfolios as the dividend exposure increases, but, the mean Sharpe ratio is only significantly different between the mid portfolios with no-, and high-dividend exposure. The mid portfolio with high-dividend exposure has the highest Sharpe ratio (1.172), which is also statistically significant, meaning that this portfolio gives the highest reward to the degree of volatility of the portfolios in our sample.
Table 3 Size and Dividend Yield Sorts

<table>
<thead>
<tr>
<th>Size Portfolio</th>
<th>Dividend Exposure</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>A. Mean monthly return</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small portfolio, mean</td>
<td>0.157%</td>
<td>0.524%</td>
<td>1.047%</td>
</tr>
<tr>
<td>t-Statistic</td>
<td>0.509</td>
<td>1.326</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, mean</td>
<td>-0.207%</td>
<td>0.775%</td>
<td>1.240%</td>
</tr>
<tr>
<td>t-Statistics</td>
<td>1.266</td>
<td>1.977**</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, mean</td>
<td>-0.153%</td>
<td>0.229%</td>
<td>1.011%</td>
</tr>
<tr>
<td>t-Statistics</td>
<td>0.481</td>
<td>1.625</td>
<td></td>
</tr>
<tr>
<td>B. Standard deviation of monthly return</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small portfolio, standard deviation</td>
<td>8.164%</td>
<td>6.766%</td>
<td>5.511%</td>
</tr>
<tr>
<td>F-statistics</td>
<td>1.456***</td>
<td>2.195***</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, standard deviation</td>
<td>9.166%</td>
<td>6.705%</td>
<td>5.381%</td>
</tr>
<tr>
<td>F-statistics</td>
<td>1.869***</td>
<td>2.902***</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, standard deviation</td>
<td>9.023%</td>
<td>7.434%</td>
<td>5.322%</td>
</tr>
<tr>
<td>F-statistics</td>
<td>1.473***</td>
<td>2.874***</td>
<td></td>
</tr>
<tr>
<td>C. Mean Sharpe Ratio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small portfolio, Sharpe Ratio</td>
<td>0.333</td>
<td>0.523</td>
<td>0.965</td>
</tr>
<tr>
<td>t-Statistics</td>
<td>0.393</td>
<td>0.254</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, Sharpe Ratio</td>
<td>0.182</td>
<td>0.729</td>
<td>1.172</td>
</tr>
<tr>
<td>t-Statistics</td>
<td>0.981</td>
<td>1.795*</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, Sharpe Ratio</td>
<td>0.280</td>
<td>0.638</td>
<td>0.993</td>
</tr>
<tr>
<td>t-Statistics</td>
<td>0.807</td>
<td>1.643</td>
<td></td>
</tr>
</tbody>
</table>

Note: Table 3 reports the value-weighted geometric mean returns (Panel A), standard deviations (Panel B), and Sharpe ratios (Panel C) of portfolios formed on the basis of size and dividend yield. In Panels A and C, for each category of size, the results of two t-tests are reported, with the null hypothesis that the mean return (and Sharpe ratio) of the portfolio of non-dividend paying stocks is equal to the mean return (and Sharpe ratio) of the portfolio of low-, and high-dividend-paying stocks. Corresponding F-tests of the equality of the variances of the portfolios formed on the basis of dividend yield and size are reported in Panel B. Panel A and B report the mean monthly returns and standard deviation of mean monthly returns respectively. Panel C report annual arithmetic average Sharpe ratio. The portfolios are sorted based on market cap, with the lowest (largest) 30% as small (big) portfolios and the residual firms as mid portfolio. ***Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

4.2.1. Hypotheses determination

Since dividend payments are associated with lowering the risk for the investor (Clemens, 2013), we followed the results of Conover, Jensen, and Simpson (2016) leading to that our prediction where that dividend exposure would increase the risk-adjusted performance for our portfolios. From the results presented in Table 3, we can see that the mean monthly return and mean Sharpe ratio is higher for all portfolios with dividend exposure. However, since we only have statistically significant results for one of our portfolios, we cannot fully find support for our first set of hypotheses.
4.2.2. Size portfolio analysis
Overall, the evidence in Table 3 supports some findings related to size- and dividend yield portfolio. First, all size-portfolios without dividend exposure have a very low realized return, where mid- and big firms even have a negative realized return. This could be an effect that a specific dividend clientele avoiding mid- and big firms that do not offer the same growth possibilities as small firms. For example, a firm that is classified as a big firm but is not paying dividends could imply that this firm has a highly speculative valuation and, or is not profitable enough to pay dividends. Second, to decrease the risk, investors should consider adding a dividend tilt. By adding a dividend exposure, the risk monotonically drops for all portfolios for every increase in dividend exposure. The realized return and Sharpe ratio for mid firms with high-dividend exposure is not only economically significant but also statistically significant, and due to the highest Sharpe ratio in the sample, this portfolio is the best target for investors. Ignoring the mid portfolio, we capture a small size effect in the absolute returns of portfolios with dividend exposure. This is consistent with the argumentation of Fama and French (1996) as the absolute returns are higher, but the risk-adjusted returns are lower due to the increased risk of small firms.

4.3. Value-Growth Portfolios
Table 4 presents the results from the portfolios grouped by the investment style BE/ME and dividend yield. In panel A is the geometric mean monthly return presented with associated t-test, where the absolute return of the portfolios increases for every degree of dividend exposure of the portfolios. The portfolio with the highest mean monthly return is the value portfolio with high-dividend exposure (1.247%), and the portfolio with the lowest, and a negative, mean monthly return is the growth portfolio with no-dividend exposure (-0.380%). Although our results are statistically insignificant should investors consider adding dividend exposure as our results indicate that the difference in mean monthly return between growth portfolios with no- or high-dividend exposure is over 1 percentage point per month.

Panel B, in Table 4, presents the monthly differences in volatility between the portfolios. We can see that all, except for one, portfolios with dividend exposure have significantly lower volatility than portfolios with no-dividend exposure and that the volatility decrease with the degree of dividend exposure of the portfolio. The blend portfolio with high-dividend exposure has the lowest mean monthly volatility (5.761%), and the blend portfolio with no-dividend exposure has the highest mean monthly volatility (9.459%).
In panel C is the mean Sharpe ratio (mean monthly risk-adjusted return) presented and the Sharpe ratio increases with every degree of dividend exposure of the portfolio where the value portfolio with high-dividend exposure has the highest Sharpe ratio (1.085). The three portfolios with high-dividend exposure present the highest Sharpe ratio (0.806, 0.869 and 1.085) and the portfolios with no-dividends exposure has the lowest Sharpe ratio (0.092, 0.411 and 0.505). However, we do not get statistically significant results that there are any differences between the portfolios with dividend exposure and the portfolios without dividend exposure.

Table 4 BE/ME and Dividend Yield Sorts

<table>
<thead>
<tr>
<th>BE/ME Portfolio</th>
<th>Dividend Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td><strong>A. Mean monthly return</strong></td>
<td></td>
</tr>
<tr>
<td>Growth portfolio, mean return</td>
<td>-0.380%</td>
</tr>
<tr>
<td>t-Statistic</td>
<td>0.094</td>
</tr>
<tr>
<td>Blend portfolio, mean return</td>
<td>0.078%</td>
</tr>
<tr>
<td>t-Statistics</td>
<td>0.803</td>
</tr>
<tr>
<td>Value portfolio, mean return</td>
<td>0.538%</td>
</tr>
<tr>
<td>t-Statistics</td>
<td>0.942</td>
</tr>
<tr>
<td><strong>B. Standard deviation of monthly return</strong></td>
<td></td>
</tr>
<tr>
<td>Growth portfolio, standard deviation</td>
<td>8.683%</td>
</tr>
<tr>
<td>F-statistics</td>
<td>0.913</td>
</tr>
<tr>
<td>Blend portfolio, standard deviation</td>
<td>9.459%</td>
</tr>
<tr>
<td>F-statistics</td>
<td>2.453***</td>
</tr>
<tr>
<td>Value portfolio, standard deviation</td>
<td>8.091%</td>
</tr>
<tr>
<td>F-statistics</td>
<td>1.271**</td>
</tr>
<tr>
<td><strong>C. Mean Sharpe Ratio</strong></td>
<td></td>
</tr>
<tr>
<td>Growth portfolio, Sharpe Ratio</td>
<td>0.092</td>
</tr>
<tr>
<td>t-Statistics</td>
<td>0.549</td>
</tr>
<tr>
<td>Blend portfolio, Sharpe Ratio</td>
<td>0.411</td>
</tr>
<tr>
<td>t-Statistics</td>
<td>0.738</td>
</tr>
<tr>
<td>Value portfolio, Sharpe Ratio</td>
<td>0.505</td>
</tr>
<tr>
<td>t-Statistics</td>
<td>0.677</td>
</tr>
</tbody>
</table>

Note: Table 4 reports the value-weighted geometric mean returns (Panel A), standard deviations (Panel B), and Sharpe ratios (Panel C) of portfolios formed on the basis of book value of equity to market capitalization and dividend yield. In Panels A and C, for each category of BE/ME, the results of two t-tests are reported, with the null hypothesis that the mean return (and Sharpe ratio) of the portfolio of non-dividend paying stocks is equal to the mean return (and Sharpe ratio) of the portfolio of low-dividend-paying stocks. Corresponding F-tests of the equality of the variances of the portfolios formed on the basis of dividend yield and BE/ME are reported in Panel B. Panel A and B report the mean monthly returns and standard deviation of mean monthly returns respectively. Panel C report annual arithmetic average Sharpe ratio. The portfolios are sorted based on BE/ME, with the lowest (highest) 30% as growth (value) portfolios and the residual firms as a blend portfolio. ***Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.
4.3.1. Hypotheses determination
We predicted that it would be beneficial for both growth- and value firms, primarily in a risk perspective, to have dividend exposure. Looking at the results for growth- and value portfolios, we find them in the same direction as predicted in our hypotheses. However, we do not find statistically significant results for portfolios with dividend exposure have a higher Sharpe ratio than portfolios without dividend exposure. We, therefore, do not find support for our second set of hypotheses.

4.3.2. Value-Growth portfolio analysis
Although we do not find support for our second hypotheses do the result in Table 4 offers some interesting relationships between growth-, and value portfolios and dividend yield. First, investors in growth firms should consider adding a dividend exposure to their portfolios as growth firms with no-dividend exposure offer the lowest, and even a negative, return. Growth firms with no-dividend exposure are typically fast-growing companies where investors usually are speculative in their valuation and pricing of such stocks. Such investors should consider adding a dividend exposure to their portfolio to decrease the risk and increase the returns. Second, adding dividend exposure significantly reduces the risk across all portfolios, where the high-dividend portfolios offer the highest risk-adjusted return for each growth-, blend-, and value portfolio. This is consistent with the idea that dividend payments are considered to be safer than reinvestments of cash in a company. Finally, our results imply that there could be a value effect present, where value portfolios independently of dividend yield consistently report higher returns, less risk, and higher risk-adjusted return than growth firms.

4.4. Dividend Exposure Analysis
The results of our study show that dividend exposure increase the return for all firms in our period, which partly is in line with the results from, e.g. Barberis and Huang (2001), Brzesczynski et al., (2008) and Clemens (2013). Following the results of Conover, Jensen, and Simpson (2016), we expected these portfolios to yield about the same as the portfolios without dividend exposure, which makes the results a little bit surprising. In our case, the higher absolute returns are not statistically significant, but the difference is of a considerable economic significance for all portfolios with high-dividend exposure compared to the portfolios without dividend exposure. Furthermore, the results follow previous literature (see, e.g. Pástor and Veronesi, 2003; Rinne and Vähämaa, 2011; Clemens, 2013) in that adding a dividend exposure decreases the risk, in terms of the standard deviation of returns. This is evident across all portfolios and confirms the belief that dividend-paying firms is a less risky investment compared to non-dividend paying firms.
Given that it is rational to invest in the portfolio that yields the highest expected return for every degree of risk (Sharpe, 1966). Our results indicate that it would be beneficial for investors to add dividend exposure to their portfolio, to lower the risk and at the same time increase the returns leading to an increase in risk-adjusted returns of the investments. In this sense, it is contradictory to Fama and French (1996) statements regarding the risk-return trade-off. However, we cannot establish this because we only use one way of measure the risk of an investment and there might be other terms of risks incurred that are crucial to take into account before determining this relationship. We can though determine that during our research period, it would have been beneficial for investors that seek the highest return for the lowest possible fluctuations of return to add dividend exposure in their portfolios.

When closer observing the two portfolios that differ the most between high-dividend exposure and no-dividend exposure, mid-portfolio and growth-portfolio, we do on the other hand find that high-dividend exposure is not always the most beneficial for the investor from a risk-adjusted perspective. Figure 1 and Figure 2 shows the twelve-month rolling Sharpe ratio, which is computed using twelve months of data, with the calculation rolling forward one month at a time. Figure 1 show that the twelve-month rolling Sharpe ratio for growth firms sometimes during our total period is higher for the portfolios with low-, and no-dividend exposure. The same fact applies to the mid portfolios that are shown in Figure 2. The figures do, however, show that the portfolios with high-dividend exposure for most of the time within the period have a better risk-adjusted performance. Figure 1 and Figure 2 also show that the advantage of high-dividend exposure compared to no-dividend exposure increase during harsher times, like the financial crisis of 2008. It also shows that it directly after the crisis the advantage either shift (Figure 1) or drastically decreases (Figure 2). This may be due to that reserving the cash holdings within the firm creates a financial headroom to accelerate the operations directly after a crisis when firms that pay out cash are short on funds, which is discussed by Dittmar (2008) as a pro argument for holding cash within the firm.
4.5. Robustness checks

To check the robustness of our results, we perform several robustness checks. First of all, as we only have 18 years of data, and measure Sharpe ratios on an annual basis, the sample size of our t-test may be questioned. Hence, we also perform a Wilcoxon signed-rank test to test the reliability and strength of our results. The results from our additional test are presented in Table 5, and the interpretations from our earlier performed t-test are overall confirmed. The risk-adjusted performance for all investment styles is significantly higher (at least on the 10% level) on the portfolios with high-dividend exposure compared to the portfolios without dividend exposure. We can, therefore,
determine that an investment in high-dividend exposure portfolios for our research period did yield a higher risk-adjusted return, compared to investing in portfolios without dividend exposure.

Table 5. Wilcoxon signed-rank test for Size and BE/ME portfolios

<table>
<thead>
<tr>
<th>Dividend Exposure</th>
<th>A. Size Portfolio</th>
<th>B. BE/ME Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Low</td>
</tr>
<tr>
<td>Small portfolio, Z-score</td>
<td>0.849</td>
<td>2.461**</td>
</tr>
<tr>
<td>Mid portfolio, Z-score</td>
<td>2.373**</td>
<td>3.724***</td>
</tr>
<tr>
<td>Small portfolio, Z-score</td>
<td>1.023</td>
<td>2.417**</td>
</tr>
</tbody>
</table>

Note: Table 5 reports the z-score from a Wilcoxon signed-rank test for portfolios dividend on basis of Size (Panel A) and BE/ME (Panel B). The null hypothesis tested is that the mean Sharpe ratio of the portfolio with no dividend exposure is equal to the mean Sharpe ratio of the portfolio of low-, and high dividend exposure portfolios respectively. The portfolios in Panel A are sorted based on market cap, with the lowest (largest) 30% as small (big) portfolios and the residual firms as mid portfolio. The portfolios in Panel B are sorted based on BE/ME, with the lowest (highest) 30% as growth (value) portfolios and the residual firms as a blend portfolio. ***Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

Second, we followed Conover, Jensen, and Simpson (2016) and tested the results with different amounts of securities constructing the extreme-dividend portfolio. In addition to the original classification of five percent, we also tested with ten percent and without an extreme-dividend portfolio. The results are shown in Table 6 with firms categorized on size and in Table 7 with securities categorized at the book-to-market ratio, which both can be found in Appendix 1. The interpretation of the results is the same for all three classifications, with only marginal adjustments in the results, indicating that our results are robust.

Third, beginning our data set at 2000 may raise questions, due to the fluctuations in the market and which might cause that our results are depending on the starting period. Hence, we divided the portfolios into three periods consisting of 6 years in each period. The results from all periods are shown in Table 8, with firms categorized on size, and Table 9, with firms categorized on book-to-market ratio, which both can be found in Appendix 1. When observing the data within these periods we can confirm that the absolute returns for portfolios with dividend exposure, in general, are higher for all three periods. However, on two occasions, the portfolios without dividend exposure clearly perform better than portfolios with low-dividend exposure. The results are the same with the risk-adjusted performance where the portfolios with high-dividend exposure overperform the no-dividend exposure portfolios for all investment styles and all periods. Portfolios with low-dividend exposure
perform worse than no dividend portfolios on five occasions but perform better in the rest. Hence, our results are robust over time within our study period. Interesting is that the standard deviation of returns is much lower on the last period of our period, compared to the first two, for all portfolios and levels of dividend exposure indicating that the risk, in general, has decreased in recent years.

Finally, as Conover, Jensen, and Simpson (2016), we tested the results by computing the arithmetic mean of absolute returns instead of the geometric mean. The interpretation of the results is similar between the two computational procedures since the returns for the portfolios are increasing with the degree of dividend exposure. Naturally, the arithmetic mean is higher than the geometric mean and the portfolios that report a negative geometric mean return are neutral or positive. This support both that the arithmetic mean overestimate the returns and our approach of using the geometric mean.

5. Discussion

_In the following section, we discuss and express our own thoughts together with possible explanations of our results._

Consistent with Conover, Jensen, and Simpson (2016), we capture a small size effect between the small- and big portfolios when it comes to absolute returns in our sample. However, the best performing portfolios among the investment styles are consistently the mid portfolio, which is a little bit surprising and not consistent with Conover, Jensen, and Simpson (2016). These results are interesting, and we find two possible explanations that may hold, either for themselves but more likely as a combination. First, this may occur because we regroup the portfolios annually and measure size based on market capitalization. A small security that is performing well in the market will, therefore, replace a poor performing security in the mid portfolio in the following year. Hence, if the well-performing security that been moved to the mid portfolio continue to overperform the effect in the following years will be attributable to the mid portfolio. Second, the mid portfolio also capture the securities that, due to poor performance in the recent year, has been moved down in categorization from the big portfolio (largest 30%) to mid portfolios (mid 40%). The former big firm whose market value has crashed, but still has a stable operation with a relatively large portion of book value of assets and stable earnings, might become under-priced which the market is correcting in the following year. This argumentation is similar to the value effect reported in for instance Lakonishok, Schleifer and Vishny (1994), leading to that the value effect captured in the BE/ME portfolios might partly also be an explanation for the size portfolios results.
In total, there are four portfolios with a negative mean monthly return, three of them are portfolios with no-dividend exposure, and one portfolio is with low-dividend exposure. That portfolios, over a period of 18 years, would yield a negative return is somewhat surprising and makes us question the results and why this is the case. When analysing Table 8 and Table 9 in appendix 1, it is evident that the bad performance of the no-dividend portfolios is driven by the first two periods in our sample, with the second period to be the most substantial factor. In this period, we witnessed a financial crisis, which might cause the investors to leave the no-dividend paying firms for firms that paid out dividends in an attempt to realize some of their invested cash, leading to low demand for no-dividend paying firms. On the other hand, this period also captures, to some extent, the regression after the financial crisis, which was an accelerating period for no-dividend paying firms (see Figure 1).

In general, one argument for not paying dividends would be to re-invest any excess cash into the firm to grow its operations. However, if we analyse the results across all portfolios, is it evident that portfolios with no-dividend exposure have the lowest mean monthly return, highest volatility, and lowest mean Sharpe ratio. This could mean either that the management in these firms make bad investment decisions and is not capable enough to utilize their invested capital and to grow their business, or that investors value dividends payments, to receive realized return as cash, higher than re-investments in business operations. Since there is a link between high dividend yields and a value premium (Lakonishok, Schleifer and Vishny, 1994; Conover, Jensen and Simpson, 2016) we cannot ignore the fact that these results also might be a proof of a value effect in the Swedish market. Hence, the value effect may also be an explanation for the overall results in the size portfolios, since the portfolios with no-dividend portfolios outperform the other portfolios.

6. Conclusion

This paper aims to examine if firms listed on Nasdaq Stockholm with dividend exposure yield higher risk-adjusted returns than firms without dividend exposure. Following our study and the empirical analysis, we like to highlight three important conclusions. First, for all but one portfolio, the risk decreases with an increased degree of dividend exposure. Second, securities with high-dividend exposure tend to yield higher risk-adjusted returns relative to securities with no-dividend exposure. Third, the effect of dividend exposure on risk-adjusted performance appears to be most significant on mid firms and growth firms.
7. Limitations of this study

Even though this study applies a methodology that is backed up by earlier research (e.g., Conover, Jensen and Simpson, 2016; Fama and French, 1992), there are some limitations of the interpretations of the study. First of all, this study is based on past events and should not be seen as any recommendation for future investment strategies. Second, we do not consider any industry- or sector effects in this study. Hence, we are not able to make an attribution analysis to see which sector that contributes the most to that the portfolios with dividend exposure outperform the no-dividend portfolios.

8. Recommendations for future studies

The effects of dividends on the overall return for an investor is an area that is continuously debated in everyday financial conversations. However, there is a lack of research on the effects on Swedish capital markets, and the prior research on the area mostly covers Dogs of the Dow strategy. Therefore, we encourage further research to be done in the area in general to fill the gap of dividend investing, and specifically in areas that this study is limited. Therefore, a study regarding dividend investing that compares the results to the market, in another portfolio selection than picking the top ten dividend paying firms as in the case of the Dogs of the Dow strategy, is recommended. We would also recommend future research to broaden the perspective and include more aspects that might affect the returns. Perhaps there are differences between industries and other company characteristics than the investment styles that we have covered. Hence, it would be interesting with a study that examines the attribution and selection effect of dividend investing. Due to the scope of this study, we have not been able to examine this analysis, which also is the second part of Conover, Jensen, and Simpson (2016), but we would warmly recommend this as a section in a future study. Furthermore, with an increased data set, either in years or firms, it would be possible to like Conover, Jensen, and Simpson (2016) to combine the investment styles to examine the effects of dividend exposure on for instance small-value firms. Hence, we would recommend a future study to redo the Conover, Jensen, and Simpson study in total with an increased data set that for instance, cover the Scandinavian market over 50 years.
9. References


### Appendix 1: Additional robustness checks

#### Table 6: Size and Dividend Yield Sorts

<table>
<thead>
<tr>
<th>Dividend Exposure</th>
<th>Section I: 0% Extreme dividends</th>
<th>Section II: 10% Extreme dividends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Low</td>
</tr>
</tbody>
</table>

#### A. Mean monthly return

<table>
<thead>
<tr>
<th>Dividend Exposure</th>
<th>Small portfolio, mean return</th>
<th>t-Statistic</th>
<th>Mid portfolio, mean return</th>
<th>t-Statistic</th>
<th>Big portfolio, mean return</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.157%</td>
<td>0.538%</td>
<td>1.017%</td>
<td>0.157%</td>
<td>0.497%</td>
<td>1.114%</td>
</tr>
<tr>
<td></td>
<td>-0.207%</td>
<td>0.796%</td>
<td>1.222%</td>
<td>-0.207%</td>
<td>0.783%</td>
<td>1.178%</td>
</tr>
<tr>
<td></td>
<td>-0.153%</td>
<td>0.310%</td>
<td>0.934%</td>
<td>-0.153%</td>
<td>0.190%</td>
<td>0.964%</td>
</tr>
</tbody>
</table>

#### B. Standard deviation of monthly return

<table>
<thead>
<tr>
<th>Dividend Exposure</th>
<th>Small portfolio, standard deviation</th>
<th>F-statistics</th>
<th>Mid portfolio, standard deviation</th>
<th>F-statistics</th>
<th>Big portfolio, standard deviation</th>
<th>F-statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.164%</td>
<td>6.710%</td>
<td>5.730%</td>
<td>8.164%</td>
<td>6.910%</td>
<td>5.720%</td>
</tr>
<tr>
<td></td>
<td>9.166%</td>
<td>6.630%</td>
<td>5.540%</td>
<td>9.166%</td>
<td>6.820%</td>
<td>5.280%</td>
</tr>
<tr>
<td></td>
<td>9.023%</td>
<td>7.290%</td>
<td>5.400%</td>
<td>9.023%</td>
<td>7.680%</td>
<td>4.960%</td>
</tr>
</tbody>
</table>

#### C. Mean Sharpe Ratio

<table>
<thead>
<tr>
<th>Dividend Exposure</th>
<th>Small portfolio, Sharpe Ratio</th>
<th>t-Statistic</th>
<th>Mid portfolio, Sharpe Ratio</th>
<th>t-Statistic</th>
<th>Big portfolio, Sharpe Ratio</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.333</td>
<td>0.560</td>
<td>1.010</td>
<td>0.333</td>
<td>0.490</td>
<td>1.020</td>
</tr>
<tr>
<td></td>
<td>0.182</td>
<td>0.756</td>
<td>1.186</td>
<td>0.182</td>
<td>0.744</td>
<td>1.132</td>
</tr>
<tr>
<td></td>
<td>0.280</td>
<td>0.693</td>
<td>0.948</td>
<td>0.280</td>
<td>0.615</td>
<td>0.992</td>
</tr>
</tbody>
</table>

Note: Table 6 reports the value-weighted geometric mean returns (Panel A), standard deviations (Panel B), and Sharpe ratios (Panel C) of portfolios formed on the basis of book value of equity to market capitalization and dividend yield. Section I reports the values retrieved when the extreme dividend portfolio consists of 0% of the dividend paying firms, and the remaining dividend paying firms are categorized in half as having low- or high dividend exposure respectively. Section II reports the values retrieved when the extreme dividend portfolio consists of 10% of the dividend paying firms, and the remaining dividend paying firms are categorized in half as having low- or high dividend exposure respectively. In Panels A and C, for each category of Size, the results of two t-tests are reported, with the null hypothesis that the mean return (and Sharpe ratio) of the portfolio of non-dividend paying stocks is equal to the mean return (and Sharpe ratio) of the portfolio of low- and high-dividend-paying stocks. Corresponding F-tests of the equality of the variances of the portfolios formed on the basis of dividend yield and size are reported in Panel B. Panel A and B report the mean monthly returns and standard deviation of mean monthly returns respectively. Panel C reports annual arithmetic mean Sharpe ratio. The portfolios are sorted based on market capitalization, with the lowest (highest) 30% as growth (value) portfolios and the residual firms as a blend portfolio. Due to low sample sizes we are not reporting the statistics for our extreme dividend portfolios. ***Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.
Table 7 BE/ME and Dividend Yield Sorts

<table>
<thead>
<tr>
<th>BE/ME Portfolio</th>
<th>Dividend Exposure</th>
<th>Section I: 0% Extreme dividends</th>
<th>Section II: 10% Extreme dividends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>A. Mean monthly return</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth portfolio, mean return</td>
<td>-0.380%</td>
<td>-0.214%</td>
<td>0.583%</td>
</tr>
<tr>
<td>t-Statistic</td>
<td>0.194</td>
<td>1.302</td>
<td>0.034</td>
</tr>
<tr>
<td>Blend portfolio, mean return</td>
<td>0.078%</td>
<td>0.703%</td>
<td>0.807%</td>
</tr>
<tr>
<td>t-Statistic</td>
<td>0.828</td>
<td>0.968</td>
<td>0.588</td>
</tr>
<tr>
<td>Value portfolio, mean return</td>
<td>0.538%</td>
<td>1.184%</td>
<td>1.319%</td>
</tr>
<tr>
<td>t-Statistic</td>
<td>0.881</td>
<td>1.019</td>
<td>0.932</td>
</tr>
<tr>
<td>B. Standard deviation of monthly return</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth portfolio, standard deviation</td>
<td>8.683%</td>
<td>9.098%</td>
<td>6.350%</td>
</tr>
<tr>
<td>F-statistics</td>
<td>0.911</td>
<td>1.870***</td>
<td>0.935</td>
</tr>
<tr>
<td>Blend portfolio, standard deviation</td>
<td>9.459%</td>
<td>5.896%</td>
<td>5.741%</td>
</tr>
<tr>
<td>F-statistics</td>
<td>2.574***</td>
<td>2.714***</td>
<td>2.314***</td>
</tr>
<tr>
<td>Value portfolio, standard deviation</td>
<td>8.091%</td>
<td>7.134%</td>
<td>6.334%</td>
</tr>
<tr>
<td>F-statistics</td>
<td>1.286**</td>
<td>1.632***</td>
<td>1.116</td>
</tr>
<tr>
<td>C. Mean Sharpe Ratio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth portfolio, Sharpe Ratio</td>
<td>0.092</td>
<td>0.422</td>
<td>0.740</td>
</tr>
<tr>
<td>t-Statistic</td>
<td>0.701</td>
<td>1.310</td>
<td>0.466</td>
</tr>
<tr>
<td>Blend portfolio, Sharpe Ratio</td>
<td>0.411</td>
<td>0.796</td>
<td>0.865</td>
</tr>
<tr>
<td>t-Statistic</td>
<td>0.764</td>
<td>0.947</td>
<td>0.591</td>
</tr>
<tr>
<td>Value portfolio, Sharpe Ratio</td>
<td>0.505</td>
<td>0.740</td>
<td>1.178</td>
</tr>
<tr>
<td>t-Statistic</td>
<td>0.609</td>
<td>1.561</td>
<td>0.714</td>
</tr>
</tbody>
</table>

Note: Table 6 reports the value-weighted geometric mean returns (Panel A), standard deviations (Panel B), and Sharpe ratios (Panel C) of portfolios formed on the basis of book value of equity to market capitalization and dividend yield. Section I report the values retrieved when the extreme dividend portfolio consists of 0% of the dividend paying firms, and the remaining dividend paying firms are categorized in half as having low- or high dividend exposure respectively. Section II report the values retrieved when the extreme dividend portfolio consists of 10% of the dividend paying firms, and the remaining dividend paying firms are categorized in half as having low- or high dividend exposure respectively. In Panels A and C, for each category of BE/ME, the results of two t-tests are reported, with the null hypothesis that the mean return (and Sharpe ratio) of the portfolio of non-dividend paying stocks is equal to the mean return (and Sharpe ratio) of the portfolio of low-, and high-dividend-paying stocks. Corresponding F-tests of the equality of the variances of the portfolios formed on the basis of dividend yield and BE/ME are reported in Panel B. Panel A and B report the mean monthly returns and standard deviation of mean monthly returns respectively. Panel C report annual arithmetic average Sharpe ratio. The portfolios are sorted based on BE/ME, with the lowest (highest) 30% as growth (value) portfolios and the residual firms as a blend portfolio. Due to low sample sizes we are not reporting the statistics for our extreme dividend portfolios. ***Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.
### Table 8 Size and Dividend Yield Sorts

<table>
<thead>
<tr>
<th>Size Portfolio</th>
<th>Dividend Exposure</th>
<th>No</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>A. Mean monthly return</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small portfolio, mean return, Full period</td>
<td>0.157%</td>
<td>0.524%</td>
<td>1.047%</td>
<td></td>
</tr>
<tr>
<td>Small portfolio, mean return, 1\textsuperscript{st} period</td>
<td>0.661%</td>
<td>0.664%</td>
<td>1.887%</td>
<td></td>
</tr>
<tr>
<td>Small portfolio, mean return, 2\textsuperscript{nd} period</td>
<td>-1.408%</td>
<td>-0.119%</td>
<td>-0.520%</td>
<td></td>
</tr>
<tr>
<td>Small portfolio, mean return, 3\textsuperscript{rd} period</td>
<td>1.238%</td>
<td>1.030%</td>
<td>1.793%</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, mean return, Full period</td>
<td>-0.207%</td>
<td>0.775%</td>
<td>1.240%</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, mean return, 1\textsuperscript{st} period</td>
<td>-0.698%</td>
<td>0.729%</td>
<td>1.569%</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, mean return, 2\textsuperscript{nd} period</td>
<td>-0.584%</td>
<td>-0.019%</td>
<td>0.226%</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, mean return, 3\textsuperscript{rd} period</td>
<td>0.668%</td>
<td>1.624%</td>
<td>1.932%</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, mean return, Full period</td>
<td>-0.153%</td>
<td>0.229%</td>
<td>1.011%</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, mean return, 1\textsuperscript{st} period</td>
<td>-0.609%</td>
<td>-0.579%</td>
<td>1.249%</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, mean return, 2\textsuperscript{nd} period</td>
<td>-0.123%</td>
<td>0.076%</td>
<td>0.707%</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, mean return, 3\textsuperscript{rd} period</td>
<td>0.274%</td>
<td>1.200%</td>
<td>1.076%</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>B. Standard deviation of monthly return</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small portfolio, standard deviation, Full period</td>
<td>8.164%</td>
<td>6.766%</td>
<td>5.511%</td>
<td></td>
</tr>
<tr>
<td>Small portfolio, standard deviation, 1\textsuperscript{st} period</td>
<td>10.304%</td>
<td>7.459%</td>
<td>5.957%</td>
<td></td>
</tr>
<tr>
<td>Small portfolio, standard deviation, 2\textsuperscript{nd} period</td>
<td>8.270%</td>
<td>7.617%</td>
<td>6.189%</td>
<td></td>
</tr>
<tr>
<td>Small portfolio, standard deviation, 3\textsuperscript{rd} period</td>
<td>4.861%</td>
<td>4.944%</td>
<td>3.824%</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, standard deviation, Full period</td>
<td>9.166%</td>
<td>6.705%</td>
<td>5.381%</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, standard deviation, 1\textsuperscript{st} period</td>
<td>13.049%</td>
<td>7.755%</td>
<td>4.330%</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, standard deviation, 2\textsuperscript{nd} period</td>
<td>7.176%</td>
<td>7.491%</td>
<td>7.129%</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, standard deviation, 3\textsuperscript{rd} period</td>
<td>5.655%</td>
<td>4.334%</td>
<td>4.098%</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, standard deviation, Full period</td>
<td>9.023%</td>
<td>7.434%</td>
<td>5.322%</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, standard deviation, 1\textsuperscript{st} period</td>
<td>11.022%</td>
<td>10.456%</td>
<td>5.283%</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, standard deviation, 2\textsuperscript{nd} period</td>
<td>9.558%</td>
<td>6.418%</td>
<td>6.673%</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, standard deviation, 3\textsuperscript{rd} period</td>
<td>5.793%</td>
<td>3.980%</td>
<td>3.635%</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>C. Mean Sharpe Ratio</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small portfolio, Sharpe Ratio, Full period</td>
<td>0.333</td>
<td>0.523</td>
<td>0.965</td>
<td></td>
</tr>
<tr>
<td>Small portfolio, Sharpe Ratio, 1\textsuperscript{st} period</td>
<td>0.640</td>
<td>0.545</td>
<td>1.213</td>
<td></td>
</tr>
<tr>
<td>Small portfolio, Sharpe Ratio, 2\textsuperscript{nd} period</td>
<td>-0.516</td>
<td>0.188</td>
<td>-0.059</td>
<td></td>
</tr>
<tr>
<td>Small portfolio, Sharpe Ratio, 3\textsuperscript{rd} period</td>
<td>0.875</td>
<td>0.837</td>
<td>1.741</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, Sharpe Ratio, Full period</td>
<td>0.182</td>
<td>0.729</td>
<td>1.172</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, Sharpe Ratio, 1\textsuperscript{st} period</td>
<td>0.579</td>
<td>0.830</td>
<td>1.587</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, Sharpe Ratio, 2\textsuperscript{nd} period</td>
<td>-0.459</td>
<td>-0.072</td>
<td>0.220</td>
<td></td>
</tr>
<tr>
<td>Mid portfolio, Sharpe Ratio, 3\textsuperscript{rd} period</td>
<td>0.425</td>
<td>1.430</td>
<td>1.710</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, Sharpe Ratio, Full period</td>
<td>0.280</td>
<td>0.638</td>
<td>0.993</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, Sharpe Ratio, 1\textsuperscript{st} period</td>
<td>0.507</td>
<td>0.517</td>
<td>1.215</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, Sharpe Ratio, 2\textsuperscript{nd} period</td>
<td>0.088</td>
<td>0.290</td>
<td>0.538</td>
<td></td>
</tr>
<tr>
<td>Big portfolio, Sharpe Ratio, 3\textsuperscript{rd} period</td>
<td>0.245</td>
<td>1.106</td>
<td>1.227</td>
<td></td>
</tr>
</tbody>
</table>

Note: Table 8 reports the value-weighted geometric mean returns (Panel A), standard deviations (Panel B), and Sharpe ratios (Panel C) of portfolios formed on the basis of size and dividend yield. All panels are reporting four values for each portfolio, categorized in time span of the portfolio where: Full period = 2000-2017, First period = 2000-2005, Second Period = 2006-2011 and Third period 2012-2017. Panel A and B report the mean monthly returns and standard deviation of mean monthly returns respectively. Panel C report annual arithmetic average Sharpe ratio. The portfolios are sorted based on market cap, with the lowest (largest) 30% as small (big) portfolios and the residual firms as mid portfolio.
Table 9 Size and Dividend Yield Sorts

<table>
<thead>
<tr>
<th>Size Portfolio</th>
<th>Dividend Exposure</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Mean monthly return</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth portfolio, mean return, Full period</td>
<td>−0.380%</td>
<td>−0.300%</td>
<td>0.648%</td>
</tr>
<tr>
<td>Growth portfolio, mean return, 1st period</td>
<td>−0.559%</td>
<td>−1.567%</td>
<td>0.386%</td>
</tr>
<tr>
<td>Growth portfolio, mean return, 2nd period</td>
<td>−0.193%</td>
<td>−0.160%</td>
<td>0.953%</td>
</tr>
<tr>
<td>Growth portfolio, mean return, 3rd period</td>
<td>−0.387%</td>
<td>0.842%</td>
<td>0.606%</td>
</tr>
<tr>
<td>Blend portfolio, mean return, Full period</td>
<td>0.078%</td>
<td>0.689%</td>
<td>0.834%</td>
</tr>
<tr>
<td>Blend portfolio, mean return, 1st period</td>
<td>−0.330%</td>
<td>0.525%</td>
<td>1.012%</td>
</tr>
<tr>
<td>Blend portfolio, mean return, 2nd period</td>
<td>−0.761%</td>
<td>0.170%</td>
<td>0.234%</td>
</tr>
<tr>
<td>Blend portfolio, mean return, 3rd period</td>
<td>1.337%</td>
<td>1.374%</td>
<td>1.259%</td>
</tr>
<tr>
<td>Value portfolio, mean return, Full period</td>
<td>0.538%</td>
<td>1.231%</td>
<td>1.247%</td>
</tr>
<tr>
<td>Value portfolio, mean return, 1st period</td>
<td>0.169%</td>
<td>0.980%</td>
<td>1.854%</td>
</tr>
<tr>
<td>Value portfolio, mean return, 2nd period</td>
<td>−0.059%</td>
<td>0.942%</td>
<td>0.372%</td>
</tr>
<tr>
<td>Value portfolio, mean return, 3rd period</td>
<td>1.511%</td>
<td>1.772%</td>
<td>1.522%</td>
</tr>
<tr>
<td><strong>B. Standard deviation of monthly return</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth portfolio, standard deviation, Full period</td>
<td>8.683%</td>
<td>9.086%</td>
<td>6.330%</td>
</tr>
<tr>
<td>Growth portfolio, standard deviation, 1st period</td>
<td>10.702%</td>
<td>13.786%</td>
<td>8.428%</td>
</tr>
<tr>
<td>Growth portfolio, standard deviation, 2nd period</td>
<td>8.753%</td>
<td>6.378%</td>
<td>5.908%</td>
</tr>
<tr>
<td>Growth portfolio, standard deviation, 3rd period</td>
<td>6.088%</td>
<td>4.235%</td>
<td>3.907%</td>
</tr>
<tr>
<td>Blend portfolio, standard deviation, Full period</td>
<td>9.459%</td>
<td>6.039%</td>
<td>5.761%</td>
</tr>
<tr>
<td>Blend portfolio, standard deviation, 1st period</td>
<td>12.444%</td>
<td>6.792%</td>
<td>5.530%</td>
</tr>
<tr>
<td>Blend portfolio, standard deviation, 2nd period</td>
<td>9.127%</td>
<td>6.937%</td>
<td>7.468%</td>
</tr>
<tr>
<td>Blend portfolio, standard deviation, 3rd period</td>
<td>5.571%</td>
<td>3.950%</td>
<td>3.711%</td>
</tr>
<tr>
<td>Value portfolio, standard deviation, Full period</td>
<td>8.091%</td>
<td>7.177%</td>
<td>6.161%</td>
</tr>
<tr>
<td>Value portfolio, standard deviation, 1st period</td>
<td>9.223%</td>
<td>6.594%</td>
<td>6.347%</td>
</tr>
<tr>
<td>Value portfolio, standard deviation, 2nd period</td>
<td>9.167%</td>
<td>9.526%</td>
<td>7.387%</td>
</tr>
<tr>
<td>Value portfolio, standard deviation, 3rd period</td>
<td>5.307%</td>
<td>4.635%</td>
<td>4.363%</td>
</tr>
<tr>
<td><strong>C. Mean Sharpe Ratio</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth portfolio, Sharpe Ratio, Full period</td>
<td>0.092</td>
<td>0.362</td>
<td>0.806</td>
</tr>
<tr>
<td>Growth portfolio, Sharpe Ratio, 1st period</td>
<td>0.476</td>
<td>0.188</td>
<td>1.043</td>
</tr>
<tr>
<td>Growth portfolio, Sharpe Ratio, 2nd period</td>
<td>0.184</td>
<td>0.170</td>
<td>0.729</td>
</tr>
<tr>
<td>Growth portfolio, Sharpe Ratio, 3rd period</td>
<td>−0.384</td>
<td>0.727</td>
<td>0.647</td>
</tr>
<tr>
<td>Blend portfolio, Sharpe Ratio, Full period</td>
<td>0.411</td>
<td>0.783</td>
<td>0.869</td>
</tr>
<tr>
<td>Blend portfolio, Sharpe Ratio, 1st period</td>
<td>0.843</td>
<td>0.549</td>
<td>1.030</td>
</tr>
<tr>
<td>Blend portfolio, Sharpe Ratio, 2nd period</td>
<td>−0.423</td>
<td>0.549</td>
<td>0.295</td>
</tr>
<tr>
<td>Blend portfolio, Sharpe Ratio, 3rd period</td>
<td>0.815</td>
<td>1.251</td>
<td>1.281</td>
</tr>
<tr>
<td>Value portfolio, Sharpe Ratio, Full period</td>
<td>0.505</td>
<td>0.762</td>
<td>1.085</td>
</tr>
<tr>
<td>Value portfolio, Sharpe Ratio, 1st period</td>
<td>0.311</td>
<td>0.643</td>
<td>1.596</td>
</tr>
<tr>
<td>Value portfolio, Sharpe Ratio, 2nd period</td>
<td>0.028</td>
<td>0.306</td>
<td>0.288</td>
</tr>
<tr>
<td>Value portfolio, Sharpe Ratio, 3rd period</td>
<td>1.177</td>
<td>1.337</td>
<td>1.372</td>
</tr>
</tbody>
</table>

Note: Table 9 reports the value-weighted geometric mean returns (Panel A), standard deviations (Panel B), and Sharpe ratios (Panel C) of portfolios formed on the basis of book value of equity to market capitalization and dividend yield. All panels are reporting four values for each portfolio, categorized in time span of the portfolio where: Full period = 2000-2017, First period = 2000-2005, Second Period = 2006-2011 and Third period 2012-2017. Panel A and B report the mean monthly returns and standard deviation of mean monthly returns respectively. Panel C report annual arithmetic average Sharpe ratio. The portfolios are sorted based on BE/ME, with the lowest (largest) 30% as growth (value) portfolios and the residual firms as blend portfolio.