A Study of the Relevance of the Dividend Irrelevance

A quantitative study on the relationship between dividend policy and firm value for US listed firms from a financial management perspective

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Abstract
In this study, we examine the relation between firms' existing dividend policy and their current firm value for US listed firm during 2015-2019. The relation is investigated using regressions on the enterprise value against the payout ratio and the payout mix (the proportion of cash dividends to share repurchases), and a set of control variables. Overall, we find that firm value is related to the dividend policy for US firms during the period. The results suggest that there is a positive relation between paying dividends and firm value for both value and growth companies, but the impact is substantially larger for value companies. However, given that dividends are paid, the firm value is negatively related to increasing payout ratios for growth companies. In contrast, we find no relation between firm value and the payout ratio for value companies, given that dividends are paid. Lastly, we find no evidence for a relation between firm value and the distribution form of dividends for growth companies, while we for value companies find a significantly positive relation between firm value and the payout mix (the proportion of cash dividends to share repurchases). We believe that our findings provide important insight to corporate leaders managing the dividend policy of firms.

Key words: Financial Management, Dividend Policy, Valuation, Company Characteristics

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1. Introduction

Is it possible for corporate managers to select an optimal dividend policy to maximize shareholder value? Under the assumptions of perfect markets, firm values are independent from the dividend policy (Miller and Modigliani, 1961). However, the real world is not perfect, and therefore firm value may relate to the dividend policy in some situations. The question has been extensively researched but is still relevant to ask. The business climate has changed considerably over the past years, and so has the dividend policy environment. For example, during the past two decades repurchasing shares as a mean to distribute dividends to investors has surged in usage and has become the main form to distribute dividends in the US. Share repurchases are largely concentrated in the technology sector, and technology companies are increasingly dominating the US stock market[1][2]. Meanwhile, share repurchases has become a subject of intense political debate. Firms are criticized for diminishing investments for share repurchases, and thus destroying firm value as well as social value[3][4]. Historically, maximizing shareholder value has been the main priority for financial management, but today the importance of other stakeholders' interest in the firm has increased as well. Therefore, the increased importance of social responsibility may have affected the market's perspective regarding the level of payouts distributed to shareholders. Consequently, it is reasonable to assume that both the dividend policy environment and the potential relation to firm value may have changed over the past years and since most of the key literature on the topic was published. Moreover, with the increased level of digitalization in the financial markets and heightened speed of information sharing, it is reasonable to believe that some market frictions may have become less important in the dividend setting process for firms compared to when other studies were conducted. In summary, we believe that it is interesting to provide an up-to-date study on the relation between firms' dividend policy and firm valuation. Our research question is thus:

Are firm values independent from firms' existing dividend policy? If so, when, and how?

A "dividend policy" is per se an abstract concept but consists mainly of two managerial decisions: a) how much dividends that should be returned to the shareholders, and b) if the dividends should be distributed through cash or by repurchasing shares. In our study, we therefore approximate the "dividend policy" of firms using two observable measures: the payout ratio (the total payout as a percentage of last year's net income) and the payout mix (cash dividends as a percentage of the total payout of the year). We will examine our research question by conducting an empirical study on the US public market during 2015 to 2019. The selected period of study allows us to analyze the relationship between dividend policy and firm value in a contemporary context. We limit the study to 2015 to increase the focus on more recent years but excludes 2020 as the year was highly impacted by the COVID-19 crisis and following restrictions and regulations. Our study split the analysis between two separate groups, growth companies and value companies.

[1] "Stock buybacks surge to likely record highs, but a tax from Congress poses a threat". CNBC, Oct. 27, 2021.
[2] "Big Tech's Domination of Business Reaches New Heights". The New York Times, Aug. 19, 2020.
[3] "Record Stock Buybacks Draw Fire From Democratic Presidential Hopefuls". The Wall Street Journal, Feb. 4, 2019.
[4] "Should Congress or the SEC 'Do Something' About Stock Buybacks?". Business Law Today, Mar. 20, 2021

Overall, we find that firm value is related to the dividend policy for US firms during 2015-2019. Firm values seem to be positively related to paying dividends for both value and growth companies, but the impact is substantially larger for value companies. However, given that dividends are paid, the firm value is negatively related to increasing payout ratios for growth companies. In contrast, we find no relation between firm value and the payout ratio for value companies, given that dividends are paid. Lastly, we find no evidence for a relation between firm value and the form of distribution for growth companies, while we find a significantly positive relation between firm value and the payout mix (increasing the proportion of cash dividends to share repurchases for value companies). Overall, our results indicate that Miller and Modigliani's (1961) conclusion about dividend irrelevance seems rather uncertain, which implies that market imperfections may be relevant to the dividend setting process and firm value. Our results suggests that an "optimal dividend policy" exist for companies in relation to value, but also that the optimal dividend policy is different for growth and value companies. As the relation between firm value and different dividend policy measures are different for value and growth companies, different market inefficiencies seem thus to be more or less important for the two types of companies in the dividend setting process.

Much of the existing quantitative research on the relation between firm value and dividend policy have applied event studies (Al-Najjar and Kilincarslan, 2019). Several event studies have for example focused on the effect of dividend announcements or dividend payments on a firm's share price. Some event studies have focused on how specific macroeconomic decisions has affected dividend polies of firms and valuation. This study contributes to the existing body of research on dividend policy in four main ways. First, we add to the existing research by providing up-to-date empirical results on how the existing dividend policy of firms, measured as the payout ratio and payout mix, relates to the current enterprise value for listed firms in the US during 2015-2019. Second, we connect our results to established theories and earlier empirical evidence, and therefore adds a piece to the so-called dividend puzzle. For example, the separation between growth and value companies provides additional insights about how the dividend policy may relate to firm value for different types of company characteristics. Third, our study provides valuable insight for corporate managers. To estimate dividend policy, we look simultaneously at the existing payout ratio and payout mix of firms, of which both are controlled by the management. As we study the relation between the dividend policy and firm value, we are thus indirectly studying how decisions made by corporate leaders regarding the dividend policy are related firm values. Fourth, this study focuses on how the existing payout ratio and payout mix of a company relates to the current company value, which provides an alternative way to analyze the relationship between dividend policy and valuation compared to existing theories.

The remaining parts of the thesis is structured as follows: Section 2 describes and evaluates the previous literature within the dividend policy research field. Section 3 describes the development of our hypotheses. In Section 4 the regression methodology applied in this study is explained and motivated. In Section 5 we present descriptive statistics and our regression results. We also present a comparison between the statistically tested regression results and the indicative assumptions. In Section 6 the results are discussed and analyzed. Lastly, in Section 7 we summarize and conclude our findings and implications.

2. Theoretical background

In this section, we will present the key themes of research made within the area of dividend policy. Researchers generally use two main approaches when studying dividend policy; statistical analysis of secondary published financial data or survey methodology to gather primary data from financial managers and other actors (Baker and Weigand, 2014). Our main theoretical framework is the dividend irrelevance theorem by Miller & Modigliani (1961) and various key theories that opposes or complements their theorem. Both approaches will be presented in this literature review will create a more comprehensive view of the dividend policy area of research. The dividend policy literature consists of a vast number of theories and hypotheses for paying dividends. These are sometimes similar or complementing to each other which will be discussed in this section as well.

2.1 Dividend irrelevance

A fundamental question to both investors and corporate managers is whether the firm's value is affected by the firm's payout policy. According to the influential paper by Miller & Modigliani (1961), hereafter called MM, dividends are irrelevant for firm valuation, the "MM dividend irrelevance theorem". Under the assumption of an ideal economy, characterized by perfect capital markets, rational behavior and perfect certainty, the authors showed that a firm value results from corporate investment decisions and is independent from the dividend policy of the firm. The meaning of the assumptions behind an ideal economy or are described as the following:

- *Perfect capital markets*. No market participant is sufficiently large to substantially impact the current share price. All market participants have equal and costless access to information about the current share price and all other relevant share characteristic. Additionally, brokerage fees, transfer taxes, and other transaction costs do not incur, and tax differences do not exist.

- *Rational behavior*. Investors always prefer more wealth over less wealth and are indifferent between if wealth increase takes the form of cash (dividend income) or as an increase in the market value of their investment (capital gain).

- *Perfect certainty*. Investors are completely assured on future investment programs and future profits for all firms. Therefore, the authors do not distinguish between stocks and bonds as sources of funds but instead proceeds as there only was one type of financial instrument which they refer to as shares of stock.

Given the assumptions described, MM derived the following expression:

$$V_t = \frac{1}{1 + r_t}(NI_t - I_t + V_{t+1})$$

Where:

$V_t =$ the valye of the firm at period t

$NI_t =$ the net income for period t

$I_t =$ the investment for period t

r_t = the required rate of return for period t

From the expression, two important insights are evidenced. First, dividends do not appear directly as a factor in the equation expressing the current value of a firm. Second, all variables that are expressed in the equation are independent from dividends, either by the nature of the variable or by the underlying assumptions. Thus, the current value of the firm must be independent of the current dividend decision. Instead, the firm value is determined by the earning power of the firm's asset and its investment policy, and not how the earnings are distributed. Thus, there is no optimal dividend policy that maximizes the value of the firm in an ideal economy, rather an optimal investment policy. Given a firm's investment policy, MM argues that an increase in dividends must always reduce the terminal value of existing shares by the same amount so that dividend policy changes only alter the distribution of the total return between dividends and capital gains. Given this conclusion, MM derived that the current value of the firm must be unaffected by future dividend decisions as well.

Share repurchases as such was ignored in the paper by MM (1961), probably because the distribution method was rare at the time when the paper was written. However, it is important to mention that share repurchases as a form of dividend is consistent with the dividend irrelevance theorem [Allen and Michaely (2003), Brav et al. (2005)]. Managers make share repurchase decisions after investment decisions, which is the only determinant of firm valuation.

Empirical evidence has been found to support the MM dividend irrelevance theorem in a study by Black and Scholes (1974). Reassuring the assumption of a perfect market, Black and Scholes investigates to see whether dividend policies are relevant and have impact on company value. They created a portfolio of 25 common stock listed on the New York Stock Exchange to examine the relationship between dividend yields and stock returns. The result of the study did not prove that there were any differences between dividend yield and stock returns. Hence, it looked like dividend policy did not impact valuation and therefore was in line with the MM dividend irrelevance theorem. This classical study was mainly examining dividend yield, whereas we are examining the dividend ratio and dividend mix as a proxy for dividend policy.

The framework developed by MM has formed a base for subsequent research on dividends and dividend policy. Despite the seemingly straight forward logic of the dividend irrelevance theorem, the general perception is that both corporate managers and investors still seem to care about dividends. Later literature has tried to resolve this matter and the research area has been named the "dividend puzzle" due to the contradicting results. An important insight from the framework developed by MM is that it identifies conditions when dividend policy can impact firm value, which is when any of the underlying assumptions of an ideal economy, characterized by effective capital markets, rational behavior, and perfect certainty, is abandoned. In reality, markets are seldom perfect, and investors sometimes behave irrationally. The literature on dividends policies typically mentions several different types of imperfections that causes the dividend irrelevance to fail. In the following section, the most prominent theories will be explained more in detail.

2.2 Theories regarding dividend policy relevance

2.2.1 Gordon's discounted dividend model

Before the influential paper by Miller and Modigliani (1961) was published, the most common view among both academics and practitioners was that dividends were considered as an important determinant of firm value. This view was based on the discounted dividend model by Williams (1938) [Allen and Michaely (2003), Baker and Weigand (2014)]:

$$V_0 = \sum_{t-1}^{\infty} \frac{D_t}{(1 - r_t)^t}$$

Where:

$V_0 =$ the value of the firm in the beginning of the period t

$D_t =$ the amount of dividends paid at the end of the period t

$r_t =$ the required rate of return for period t

Based on the same idea, Gordon (1959) developed a valuation model as the discounted value of growing dividends in perpetuity:

$$V_0 = \frac{D_t}{r - g} \qquad g = \frac{NI_t - D_t}{B}$$

Where:

$V_0 =$ the value of the firm in the beginning of the period t

$D_t =$ the amount of dividends paid at the end of the period t

$NI_t =$ the net income for period t

$B_t =$ the book value of common stock for period t

$g =$ the expected growth of dividend

$r_t =$ the required rate of return for period t

Gordon (1959) claimed that the uncertainty of future dividend payments increases with time, thus the required rate of return, r_t, would increase with a higher retention of earnings and levels of investment. Therefore, Gordon (1959) argues that a higher required rate of return would dwarf the probable effect of larger future dividend payments as a result of increased investments. The reasoning behind this theory is based on what is called "the bird-in-the-hand theory" that will be discussed below.

2.2.2 The bird-in-the-hand theory

The bird in hand theory is one of the older theories regarding the relevance of dividend policy. The bird in hand theory indicates that paying dividends is associated with lower risk, as expressed by Lintner (1956) and Gordon (1959). The theory indicates that investors prefer dividend payments today rather than the possibility of higher capital gains in the future. This implies that companies paying higher dividends or have a smoother dividend policy will have a higher firm value because dividends are perceived safer than the more uncertain future return on investments from retained earnings. Lintner (1956) finds in his classical survey study, where

managers from 28 companies were interviewed, that due to the bird-in-the-hand logic managers targets a long-term payout ratio when determining dividend policy, that dividends are sticky, connected to long-term sustainable earnings and paid by mature companies smoothed from year to year. These findings have implications for signal effects that can be connected to asymmetric information among investors and companies.

The bird-in-the-hand theory is clearly contradicting to the MM dividend irrelevance theorem (1961). MM (1961) state that it is the riskiness of a company's cash flows that determines how risky the company is, and not how the company decides how to distribute excess cash. Thus, under the assumption of perfect and frictionless markets, investors ought to disregard the timing of dividend distribution and only value firms based on their investment policy. However, the-bird-in-the-hand reasoning is based on the market friction that slumps the assumption of rational behavior of investors which could make dividends affect the firm value.

2.2.3 Catering theory

According to Baker and Wurgler (2004), managers cater to investors' demand for dividends when setting the firm's dividend policy. This is called the catering theory. In practice, this imply that firms pay dividends when investors prefer dividend-paying companies and withhold dividends when investors prefer non-dividend-paying companies. They test their prediction by constructing four stock-based measures of investor demand for dividend payers. By each measure nonpayers initiate dividends when demand is high and by some measure's payers omit dividends when demand is low. Baker and Wurgler concludes that dividends are highly relevant to share value, but in different directions in different times. Furthermore, it is apparent that managers recognize and cater to shifts in investor demand for dividend payers. In the literature review by De Rooij and Renneborg (2009) it is sated that although the empirical results regarding the catering theory are not conclusive, the theory can explain dividend initiations better than dividend omissions. It is also concluded in the review that individual firm characteristics should be integrated with investors' sentiment to better explain dividend policy. In summary, Baker and Wurgler (2004) test a catering view of dividend policy that relaxes the market efficiency assumptions by the MM dividend irrelevance theory and adds to the research field of behavioral finance.

2.2.4 Asymmetric information and signaling theory

A major market imperfection is information asymmetry, which is the basis of the signaling theory. The MM theorem assumes that the information available is the same for investors and insiders, but managers might have relevant information about the company that the investors do not have. Baker and Weigand (2014) defines signaling theory as how companies can, through an increase or decrease in dividend payouts, convey if the firm is facing strong or weak prospects. This implies that investors can ascertain information of a company's future earnings through the signal of dividend announcements, regarding both the stability and the changes in dividends. Changes in dividend payouts signal changes in prospects and in turn changes in future earnings. Baker et al. (2011) discover that managers believe that dividend payouts convey information to investors which in turn supports the signaling models in theory. Signaling appears to have the strongest support among the main market imperfections (taxes, asymmetric information, and agency cost) for US companies according to Baker et al. (2011).

In a study by Kasetner and Liu (1998), their findings showed that on average the stock price response was positively and significantly related to the size of the dividend payment when measuring dividend changes through announcements. Additionally, they found that the market perceived dividend payments as an important source of information about the performance of the company. In two subsequent papers by DeAngelo et al (1994; 1995) signaling was concluded to be empirically insignificant. However, Benartzi et al (1997) furthered the research to investigate the implications of dividend signaling. The paper focused on whether changes in dividends had information content about future earnings. They found a positive correlation between increasing dividends in year zero and increases in earnings in year one but no subsequent earnings growth. Additionally, they did not find that the size of the dividend increases to predict future earnings.

The main implication of signaling theory is that it assumes the presence of asymmetric information and therefore investors can gain information about the company's future earnings through the stability or changes in dividends announcements. From a financial management perspective, signaling theory implies that managers should be prepared for market reactions to the company share price when changing dividend policy.

2.2.5 Tax preference theory

MM dividend irrelevance theorem assumes that there is no difference between dividends and capital gains regarding taxes. In reality this is not true, and taxes serve as a key market imperfection. Tax rate on dividends and capital gains have been and still is different in many countries, thus taxes may influence dividend policy and company value. According to the tax preference explanation, here concluded by Baker and Weigard (2014), investors should want retention of cash rather than distribution of cash since the tax rate is often higher on dividends than on long-term capital gains under US tax law. Hence, different dividend policies may result in in a tax-induced clientele effect and the implications are that prior the equalization of the tax rate on dividend and capital gains, companies should have a low dividend ratio to maximize their valuation. However, there is only limited evidence that supports the tax-induced clientele effects and results are inconclusive both if it's tested through examining the ex-dividend date price drop or through a capital asset pricing model with an additional premium based on dividend yield tested by Brennan (1970).

Multiple studies point out the vagueness of tax clientele effects. According to Farre-Mensa et al. (2014), Brav et al. (2008) and DeAngelo et al. (2008) taxes are relatively less important for dividend policy based on studies on dividend tax cuts. Baker et. al (2011) sums up in their survey study of US and non-US companies, that the results are highly variable depending on the time period and the country. Kalay and Michaely (2000) propose that the inability for researchers to explain the link between changes in tax laws to changes in dividend policy indicates that there is a more complex theory regarding tax effects that remain unknown. Lastly, Denis and Setpanyan (2009) conclude that taxes do not seem like a first-order determinant of dividend policies, which questions the theories of dividend policy that focus on tax-based clienteles.

In conclusion, the research regarding dividend tax preference theory has not produced any clear indications of whether the changes in taxes affect changes in dividend policy and changes in

value. However, the tax preference theory is connected to catering theory in that sense that dividend policy should be based on the assumptions managers draw about the investors' preferences. For example, it could be assumed in the light of this study, that according to tax preference theory companies with low dividend ratios are preferred by investors and therefore valued higher. However, since tax preference is thoroughly researched but has not resulted in any clear results, we will not focus on tax differences in our study.

2.2.6 Agency theory

The last market imperfection to be presented in this paper is agency costs. The MM dividend irrelevance theorem states in the assumptions that there is no conflict between managers and shareholders, which may not be true all the time. Agency cost related to paying dividends is defined by Baker and Weigard (2014) as a tool to mitigate the overinvestment problem through reducing the agency costs of free cash flows. Paying cash dividends could indicate that managers of companies with less growth opportunities are attentive of the risks with overinvestments. Companies that pay out cash that could have been used to finance new investments need to access the capital markets more often than non-payers. Access to the capital markets involves increased scrutiny by markets which adds value as investors can monitor the managers investment decisions more closely.

The empirical evidence regarding agency cost theory and dividends are mixed as to whether dividends can reduce agency costs or not. Despite this, Megginson (1996) states that agency cost is the most common economic model for explaining dividend payouts and Allen and Michaely (2003) states that dividends and repurchases are implied to be paid to reduce overinvestment by managers, which is an argument with agency cost nature. Farre-Mensa et al. (2014) concludes that of all the classical reasons connected to market imperfections (taxes, information asymmetry, agency costs), evidence is strongest to support agency considerations regarding dividends and value.

2.2.7 The pecking order theory

The pecking order theory was developed by Myers (1984) and is an order of priority between companies' sources of financing. It is based on the hypothesis that the cost of financing increases with the level of asymmetric information. The financing pecking order is stated as follows:

1. Firms prefer internal financing.

2. Firms adapt their target dividend payout ratio to their investment opportunities. These changes in payout ratios are gradual since dividends are considered sticky, i.e., companies want to avoid sudden changes in dividends.

3. If the free cash flow from the year is not enough to finance investments, cash and cash equivalents are prioritized for financing before reducing dividends.

4. If external financing is needed companies start with the safest security first, primarily loans from credit institutions, secondly hybrid securities such as convertible bonds then as a last resort equity.

The second point in the pecking order implies that companies with many investment opportunities should have lower dividend payout ratios than companies with fewer investment opportunities. This is in line with the life-cycle theory discussed by DeAngelo, Deangelo and Stulz (2006) which states that companies with many investment opportunities will invest more and therefore increase its profitability and growth rates. Accordingly, companies with low dividend payout ratios should experience higher earnings growth. The reasoning behind the pecking order theory is similar to the MM dividend irrelevance theorem that states that the investment policy is the determinant of company value, and the dividend policy is the secondary effect.

2.2.8 Life cycle theory

The life-cycle theory of dividends indicates that a company's ability to generate cash will catch up with and overrun its ability to find profitable investment opportunities as the company matures (Baker and Weigand, 2014). According to the life-cycle theory, an optimal dividend policy is therefore set depending on the relationship between the firm's return on equity and cost of capital, which is determined by the company's stage in its life cycle. This theory is in clear contrast to the signaling theory of dividends that anticipates that a company pays dividends to signal to the market that growth and profitability have increased. Bulan and Subramanian (2009) concludes in their literature review that overall empirical evidence supports the life-cycle theory of dividends when it comes to the inclination of dividend payments and life-cycle characteristics. The life-cycle theory is a complement to the MM dividend irrelevance theorem as it states that a company adjusts their dividend ratio to their current growth stage, i.e., their investment policy, which is stated as the driving factor for company value in the MM dividend irrelevance theorem. The life-cycle theory emphasizes that the investment policy differs depending on what growth stage the company is in which could be seen as a complement to the MM dividend irrelevance theorem and the pecking order theory.

2.3 Theories regarding the forms of distribution (the payout mix)

Another part of the dividend policy is to set the proportion of cash dividends versus share repurchases (the payout mix). When firms repurchase their shares, the shares are either retired or accounted as part of the firm's treasury stock. The area of literature regarding the role of share repurchases as a form of payout has grown as the distribution form has become increasingly popular. An important milestone in the research regarding share repurchases was the enactment of Rule 10b-18 in the US in 1982, which had positive and significant effects on firms' share repurchase intensity and was the starting point for a gradual substitution of cash dividends for share repurchases (Grullon and Michaely, 2002).

Under the assumption of perfect markets, distributing cash to shareholders in the form of either share repurchases or cash dividends are perfect substitutes. According to the MM dividend irrelevance theorem, share repurchase is only a way to distribute cash and do not impact value. However, evidence shows that companies to a large extent have been substituting cash dividends for share repurchases, and prior literature points towards several advantages behind this change in payout mix.

2.3.1 Flexibility

The financial flexibility of share repurchases is a common explanation behind the increased usage of the distribution method. Jagannathan, et al (2000) studied US firms and concluded that share repurchases provided a complementary role to cash dividends for firms to distribute short-term cash flows. While cash dividends were seen to increase smoothly over time, share repurchases were more volatile and pro-cyclical. Additionally, firms with higher operating cash flows were more likely to increase cash dividends, whereas firms with higher non-operating cash flows and higher standard deviation of cash flows are more likely to increase share repurchases. The results indicate that cash dividends are paid out of "permanent" or "sustainable" cash flows while share repurchases are paid out of "temporary" cash flows. The results indicate that firms repurchase shares as a form of distribution due to the inherent flexibility.

A similar study by Zeng and Luk (2020) on shares in the S&P Composite 1500 between 1994 and 2018 confirms the results and conclusions made by Jagannathan, et al (2000). Share repurchases followed the economic cycle with increased or decreased activity with the market's swings. Additionally, Grullon and Michaely (2002) found that the market response surrounding the announcement of a decrease in dividends had a significantly less negative impact on share price for repurchasing firms compared to non-repurchasing firms. The results indicate that it is easier to be more financially flexible with share repurchases, facilitated by the stance of investors.

The above empirical literature based on financial data is confirmed by data from financial managers. Brav et al. (2005) conducted a survey with 384 financial managers and an additional 23 in-dept interviews. Managers in the study stated that due to their flexibility, repurchases has grown more important relative to dividends. The flexibility allows managers to adapt their payout ratio to the exiting investment opportunities, to offset stock option dilution or to return capital to investors with better timing.

According to Jensen (1986), share repurchase reduce agency costs as excess cash are distributed to shareholders. However, Oswald and Young (2008) argue that share repurchases represent a double-edged sword: the flexibility of share repurchases compared to more sticky cash dividends can be effective to distribute excess cash due to varying and unplanned strong performance, but the inherent payout flexibility also offers managers increased discretion to forego payouts and waste surplus cash.

2.3.2 Signaling for undervaluation

Earlier literature such as Akerlof (1970) and Leland and Pyle (1977) suggest that stock repurchases serves as signals for undervaluation to investors. Undervaluation could be a problem for companies that need to access the capital markets for financing of investment projects, as undervalued companies must borrow at a higher cost of capital. With this background, share repurchases can convey information to investors with the argument that "good firms", i.e., firms that actually are undervalued, could use share repurchases to signal their true value, and that would be too costly for a "bad firm" to imitate. The reasoning behind this is when companies repurchase expensive shares, the stake of the non-selling shareholders

is diluted. Therefore, if the managers interest is aligned with the long-term investors only "good firms" would repurchase shares in equilibrium.

Ikenberry, Lakonishok and Vermaelen (1995) found that the average initial market response of an open-market share repurchase announcement was 3.5% between 1980 to 1990. However, repurchasing firms had average abnormal returns of 12.1% given a buy-and-hold strategy over a four-year period following the announcement. The delayed market reaction was consistent with the hypothesis that the market underreacted to the undervaluation signals conveyed by the share repurchase announcement. Further, as the drift was more significant for "value" stocks. Thus, undervaluation was more likely to explain the motivation to repurchases shares by "value" stocks, while other motives may explain why "growth" stocks repurchase stocks. Several studies, such as Chan, Ikenberry and Lee (2004), confirm this view and show that undervaluation is the primary motivation for managers to repurchase shares. Nevertheless, as share repurchases has become the dominant and regular form of payout in the US, the signaling effects have probably declined.

In fact, the S&P 500 Buyback Index, which consists of 100 companies with the highest buyback ratios in the S&P 500, had a tilt towards value companies before 2003, but has obtained a balance between growth and value stocks since 2003 (Zeng and Luk, 2020). The increase of Information Technology stocks in the S&P 500 Buyback Index is mentioned as an important explanation to why the S&P 500 Buyback Index outperformed the S&P 500 in both up and down months from 2000 through 2019. Except from the value tilt until 2003, the S&P 500 Buyback Index have a small-cap tilt. When the analysis was extended to the S&P MidCap 400 and the S&P SmallCap 600 markets in the US as well, the small-cap bias became less significant, but the indices still outperformed their benchmarks from 2000 through 2019. Thus, signaling for undervaluation as a motivation for share repurchases may have become less important as the form to distribute dividends has become more common.

2.4 Empirical research regarding company characteristics

2.4.1 The forms of dividend distribution (the payout mix)

Historically, the payout mix has differed between cyclical sectors (e.g., Financial, Consumer Discretionary and Information Technology) and defensive sectors (e.g., Utilities, Communication Services, and Consumer Staples). In the US, more cyclical sectors have historically had higher share of repurchases in their payout mix while more defensive sectors have been more likely to pay more cash dividends (Zeng and Luk, 2020). Grullon and Michaely (2002) study on US firms found that especially young firms have a higher tendency to distribute cash through share repurchases. These findings on repurchasing firm characteristics are consistent with Jagannathan, et al (2000) conclusions that cash dividends are paid out of "permanent" or "sustainable" cash flows while share repurchases are paid out of "temporary" cash flows.

2.4.2 The level of dividend payments (the payout ratio)

Various empiric research has shown that factors such as company characteristics and market characteristics influence dividend payout ratio. Denis and Setpanyan (2009) finds studies showing empirical determinants for dividend payments among companies in North America.

These studies document that dividends payout ratios are connected to company characteristics such as size, profitability, growth opportunities, firm maturity, regulation leverage, insider stock holdings and institutional stock holdings. Fama and French (2001) find that the three most prominent characteristics for companies to pay dividends are profitability, investment opportunities and size. Companies that are more prone to pay dividends are larger, more profitable and with fewer investments relative to earnings. In the literature review by Baker et al. (2002) the key company characteristics that are identified are profitability, investment opportunities, size, availability of cash and anticipated future earnings and cash flows.

2.4.3 Summary

The above empirical studies about the payout mix and the payout ratio have identified various company characteristics that could influence how both the payout mix and the payout ratio are designed for a company. To study the possible connection between valuation and dividend policy it is therefore relevant to control for these characteristics to see if there are any differences between the companies' valuation based on their dividend policy rather than other factors.

3. Hypothesis development

To answer our research question – "Are firm values independent from firms' existing dividend policy? If so, when, and how?" – we run regressions on firm value against the payout ratio and the payout mix. A set of control variables are included in the regressions to capture company, industry and time-specific factors that may impact firm value and the payout policy. Four hypotheses are used as a base for our regression analysis.

The development of the hypotheses is based on previous discourse regarding the relation between dividend policy and firm value, but we also incorporate indicative assumptions from section 3.3. Section 3.3 contains figures with histograms displaying the median EV/EBITDA multiple for different payout groups, which provide indicative assumptions regarding the relation between firm value and dividend policy for the formulation of our hypotheses. Thus, the indicative assumptions made from the histograms contributes with an overview, but do not represent the main results of our thesis. The main results of the study are the regressions results that are statistically tested and also controlled for several factors.

3.1 Measuring dividend policy

A dividend policy is per se an abstract concept but consists mainly of two key decisions for managers: a) how much dividends that should be returned to shareholders, and b) if the dividends should be distributed as cash or by repurchasing shares. Therefore, we estimate the dividend policy of firms using two observable measures: the payout ratio and the payout mix (the proportion of cash dividends to share repurchases).

The payout ratio is calculated as the sum of cash dividends and share repurchases (total payout) in one fiscal year (*t*) divided by the net income of the last fiscal year (*t-1*):

$$payout\ ratio_t = \frac{cash\ dividends_t + share\ repurchases_t}{net\ income_{t-1}} = \frac{total\ payout_t}{net\ income_{t-1}}$$

The payout mix is calculated as cash dividends divided by total the payout of the firm (the sum of cash dividends and share repurchases) in one fiscal year (*t*):

$$payout\ mix_t = \frac{cash\ dividends_t}{cash\ dividends_t + share\ repurchases_t} = \frac{cash\ dividends_t}{total\ payout_t}$$

The payout mix equals zero if a firm distributes 100% of its dividends by repurchasing share, and one if firm distributes 100% of its dividends in the form of cash. The payout mix in not relevant for firms that do not distribute dividends.

3.2 Data

The sample period covers 5 years, ranging from 2015 to 2019. The sample consists of listed US companies, both currently active and inactive companies. Thus, our study is not affected by a survival bias as our sample include companies that today may be either bankrupt or non-operating due to other reasons. Our sample is a combination of cross-sectional firm specific data and time-series data and is thus a panel data. The data is derived from Compustat.

Several exclusions and limitations are made to the data to improve the ability to analyze our results and to make fair conclusions. Financial companies and Real Estate Investment Trust (REITs) are excluded from the sample due to different accounting praxis, valuation techniques and legal dividend requirements. The Real Estate sector in our sample include only companies within "Real Estate Management & Development". Next, we exclude all observations without available data to calculate any of the variables in our study. We further exclude observations with a payout ratio over 250%, as we consider the payout ratio for these observations to be an inadequate measure to use, analyze and to compare with other firms. A payout ratio above 100% implies that a firm distributes more cash to shareholders than what the firm earned, which generally raises questions about how sustainable the payout level is or if investments are limited or overlooked by the company. However, the net income is an outcome of accrual accounting to measure performance and may not necessarily represent firms' ability to pay. For example, the net income could be temporary hit by big one-off items and non-cash items such as depreciations. Very high payout ratios may thus be a result of exceptionally low earnings and not necessarily high dividend payments. Thus, we exclude observations with a payout ratio exceeding 250% as we consider the payout measure to be inadequate to use for very high levels. Lastly, observations with negative net income are excluded to avoid the presence of negative payout ratios. Thus, our study is based on companies with a net income above zero and is therefore bias towards profitable companies.

The final sample consists of 8,934 observations and 2,957 unique companies. In total, 7,153 observations have a payout ratio larger than zero and 1,781 observations paid zero dividends. Table 1 below split all observations based on sector. Consumer Discretionary, Industrials, and Information technology are the largest sectors and represent together almost 60% of the total sample. The average number of observations per firm is 3.02, which implies that a firm has on average data for approximately three out of the total five years of study coverage.

Table 1.

Allocation of observations across sectors (2-digit GIC sector)

Sectors	Number of observations	Share of total
Communication Services	604	6.8%
Consumer Discretionary	1,673	18.7%
Consumer Staples	639	7.2%
Energy	543	6.1%
Health Care	1,013	11.3%
Industrials	1,956	21.9%
Information Technology	1,521	17.0%
Materials	781	8.7%
Real Estate	134	1.5%
Utilities	70	0.8%
Total	8,934	100.0%

3.3 Indicative assumptions from histograms

To guide us in the development of the hypotheses for the regression analysis, we make indicative assumptions for the relation between the dividend policy and firm value. The figures in this section contain histograms illustrating the median EV/EBITDA multiple for serval groups of companies representing different intervals of payout ratios and payout mixes. The median EV/EBITDA multiple is used to proxy the firm value for the different groups and

therefore provide indicative assumptions of the relation between firm value and dividend policy. The EV/EBITDA multiple is selected over other enterprise earnings multiples as EBITDA is consider as the best proxy of cash flow and therefore one of the most consistent and comparable multiples (Koller et al., 2020). The calculation of the multiple is based on the reported EBITDA (earnings before interest, taxes, depreciation, and amortization) for one fiscal year and the enterprise value (market value of equity plus net debt) at the end of the same fiscal year. Since three out of four quarterly results could have been published at the valuation date (the end of the fiscal year), the multiple is more "historical" rather than "forward-looking". We display the median EV/EBITDA multiple and not the average multiple for each group, as the median compared the average better curtail the impact of potentially distorted multiples as well as potentially negative multiples.

Figure 1 below indicate that firm value is not affected by the payout ratio. Figure 2 indicate some variation in value for different payout mix groups, but the variation is small and rather arbitrary. Thus, the MM dividend irrelevance theorem may hold for our sample of listed US companies, which suggest that market imperfections and inefficiencies are insignificant or offsetting in the dividend setting process.

The general idea behind using multiples for asset valuation is that similar assets should sell for similar prices. It is thus preferable to compare similar companies when doing a comparable analysis of companies using multiples. Therefore, we split the sample between value and growth companies. Growth and value companies have inherently different risk and growth profiles, leading to differences in valuation. See section 4.4.2.1 for the how categorize between value and growth companies.

According to the life cycle and the pecking order theories, companies with many available investment opportunities should have relatively low payout ratios. When a company has many available investment opportunities, the expected growth would be higher. Therefore, a historical EV/EBITDA multiple should be higher since the enterprise value, based on future higher cash flows, is compared to the current EBITDA. Accordingly, companies that pay little or no dividends may have higher earnings multiples. This pattern is not evident in Figure 1 when looking at the full sample but is evident in Figure 3 when only looking at growth companies. In fact, companies that do not pay dividends in fact have a higher value than growth companies that pay dividends. Likewise, the group consisting of companies that distribute over 0% to 25% of net income as dividends seems to have a higher value compared to groups with higher payout ratios. For growth companies, Figure 4 suggests that companies distributing 100% of dividends in the form of share repurchase have a higher value than companies with other proportions of cash dividends and share repurchases. Overall, firm value seems to relate to the dividend policy for growth companies, which implies that market imperfections may be relevant to the dividend setting process and firm value.

Figures 6 and 7 indicate that the value is rather similar for different payout ratio groups as well as payout mix groups for value companies. However, the non-dividend paying value companies seem to have a lower value compared to value companies that do pay dividends. Thus, the dividend policy seems to relate for value companies, but in other ways compared to growth companies. This suggests that that different market imperfections may be relevant in the dividend setting process for value companies compared to growth companies.

Figure 1.

Total sample

Median EV/EBITDA by payout ratio group.
(Total payout* as % of the net income of last year)

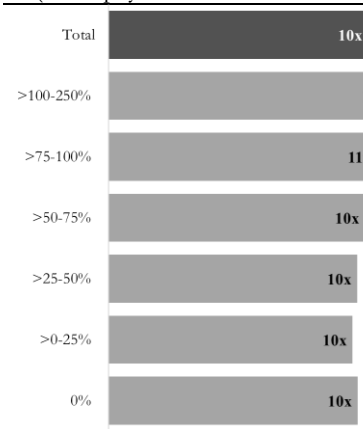
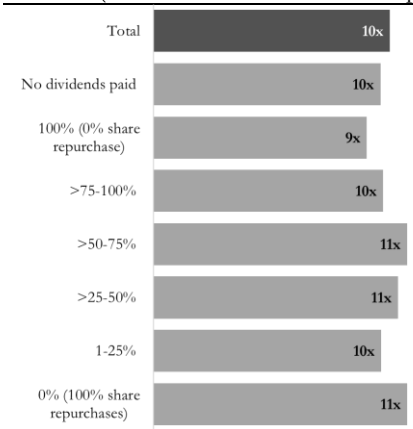


Figure 2.

Total sample

Median EV/EBITDA by payout mix group.
(Cash dividends as % of total payout*)



See Tables 1b and 2b in the appendix for the allocation of observations.

Figure 3.

Growth companies

Median EV/EBITDA by payout ratio group.
(Total payout* as % of the net income of last year)

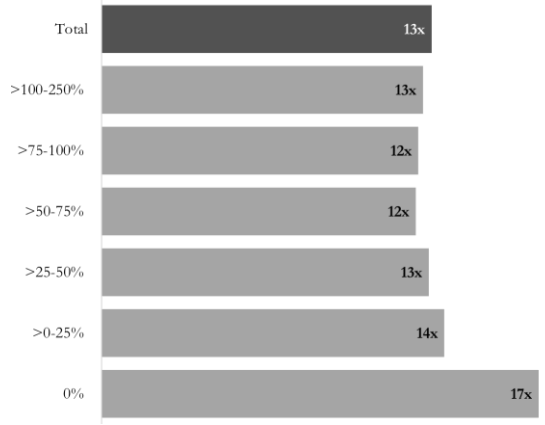
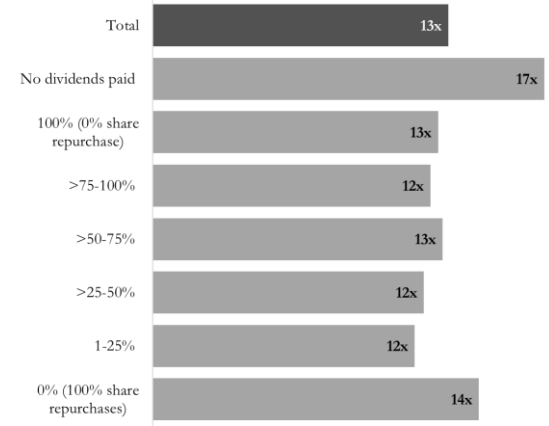


Figure 4.

Growth companies

Median EV/EBITDA by payout mix group.
(Cash dividends as % of total payout*)



See Figure 3b and 4b in the appendix for the allocation of observations.

Figure 5.

Value companies

Median EV/EBITDA by payout ratio group.
(Total payout* as % of the net income of last year)

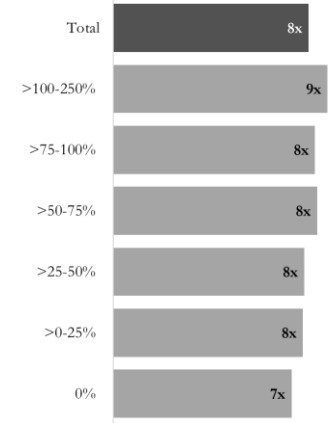
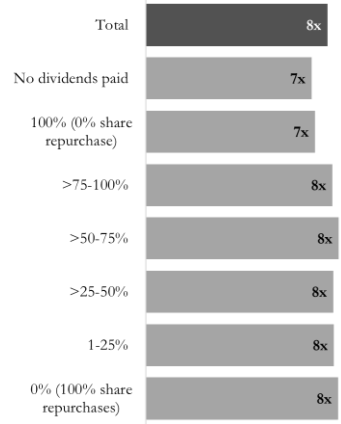


Figure 6.

Value companies

Median EV/EBITDA by payout mix group.
(Cash dividends as % of total payout*)



See Figure 5b and 6b in the appendix for the allocation of observations.

* Total payout is equals to the sum of cash dividends and share repurchases.

3.4 Development of hypotheses

The MM dividend irrelevance theorem may hold if the underlying assumptions about market efficiency are met. Our study examines the relation between firm value and dividend policy for US listed firms during 2015-2019. The answer to whether firm value is related to dividend policy is thus dependent on whether market imperfections and inefficiencies were significant and/or offsetting during the period. The indicative assumptions from the previous section, based on studying median EV/EBITDA multiple for different groups containing different intervals of payout ratios and payout mixes, suggest that firm value seems to be independent from the dividend policy. Thus, the MM dividend irrelevance theorem may hold for our sample, which suggests that imperfections and inefficiencies are insignificant or offsetting. We therefore base our first hypothesis on this indicative assumption.

Hence, first the hypothesis is the following:

(*1) The existing dividend policy, estimated by the payout ratio and the payout mix, is not related to the current company value.*

Existing theories based on market inefficiencies – the bird-in-the-hand theory, signaling theory, and the agency cost theory – connect how paying dividends mitigates agency cost, information asymmetry and provides psychological security, which adds value to investors. Further, different types of market inefficiencies may be more significant or insignificant for different types of companies. If so, the relation between dividend policy and firm value should be different as well.

In fact, the indicative assumptions made from studying Figures 3-6 in the previous section indicate that growth and value companies do have different relations between firm value and the payout ratio as well as the payout mix. For value companies, the variation in the EV/EBITDA multiple between different payout ratio groups and payout mix groups seems to be very low or non-existent. Only value companies that paid no dividends appeared to have a lower value compared to dividend paying value companies. In comparison, growth companies that do not pay dividends or pay little dividends, seem to have a higher EV/EBITDA multiple compared to other growth companies. Likewise, the group consisting of companies that distribute over 0% to 25% of net income as dividends seems to have a higher value compared to groups with higher payout ratios. Additionally, growth companies that distribute dividends only in the form of share repurchases seem to have a higher EV/EBITDA multiple than other growth companies that distribute dividends as both cash and share repurchases. Thus, the indicative assumptions suggest that different market imperfections may be relevant to the dividend setting process for value and growth companies. Therefore, it seems like the relation between dividend policy and firm value is different for the two types of companies.

We will begin to test if the relation between paying dividends or not and company value is statistically different for growth and value companies.

Hence, our second hypothesis is the following:

*(2) The relation between **paying dividends or not** and company value is different for growth and value companies.*

Subsequently, will investigate if the relation between the payout ratio and company value is statistically different for growth and value companies.

Hence, our third hypothesis is the following:

*(3) The relation between **the payout ratio** and company value is different for growth and value companies.*

Lastly, we study if the relation between the payout mix (the proportion of cash dividends to share repurchases) and company value is statistically different for growth and value companies.

Hence, our fourth and last hypothesis are the following:

*(4) The relation between **the payout mix** and company value is different for growth and value companies.*

4. Methodology

4.1 Operationalization of research question

To answer our research question, whether the dividend policy relates to firm value, we run four regressions to study the relationship between the dependent variable firm value against variables proxying the dividend policy. A set of independent variables are included in the regressions to control for company, industry and time-specific factors that may impact firm value and the payout policy. The regressions used in the study are fixed effects models to statistically control for unobserved heterogeneity. We use firm fixed effects to control for systematic differences in the payout ratio and payout mix that arise from differences across firms.

The indicative assumptions made from the histograms in section 3.3 contributed to an overview and an understanding about the data and the relation between firm value and dividend policy, which was useful in development of the hypotheses for the regressions analysis. As our hypotheses are based on these indicative assumptions, we are statistically assessing the indicative assumptions by running regressions with several control variables.

4.2 Dependent variable

The dependent variable in our study is the natural logarithm of enterprise value. With the object of displaying and comparing the "median value" for different payout groups using histograms, the EV/EBITDA multiple is suitable to use as a proxy for company value. In section 3.3, we used the historical EV/EBITDA multiples to proxy the value of firms and to guide us in the formulation of our hypotheses. However, using earnings multiples to proxy firm value inheres issues. For example, EV/EBITDA is impacted by the level of EBITDA, which may be extraordinarily low or high. If this is the case the multiple may be distorted and thus reduce the ability to compare companies. A way to reduce the existence of distorted multiples is to use forward-looking multiples. Generally, forward-looking multiples have less variation across similar companies as they are normalized for unusual items (Koller, 2020), while historical earnings figures might be extraordinarily high or low. As investors value companies based on future estimated profits (see value driver formula below) the enterprise value should be compared to forecasted earnings and not historical earnings. However, using analysts' forecast of future earnings is out of scope of this study.

Instead, we do not use the EV/EBITDA multiple or any other earnings multiple in our regressions to proxy firm value, but the enterprise value. The enterprise value is the measure of the total value of the firm, calculated as the sum of the market value and net debt (total debt minus cash). In our study, the EV is calculated using data at the end of the fiscal year for each observation. As the fiscal year of a company may differ from the calendar year and from the fiscal year of other companies, the EV could be measured at different points in time for different companies in our sample. As our data consist of a wide scale of observations with some very large firms, we take the natural logarithm of EV to normalize the dataset and to curb the effects of outliers. Thus, the dependent variable in our study is the natural logarithm of enterprise value.

According to Koller et al. (2020), the enterprise value of a firm in steady state and in efficient markets can be expressed using the value driver formula[6]:

$$Enterprise\ value = \frac{NOPAT_{t-1} * (1 - \frac{g}{ROIC})}{wacc - g}$$

Where:

$NOPLAT = net\ operating\ profit\ after\ taxes$

$g = expected\ growth$

$ROIC = expected\ return\ on\ invested\ capital$

$wacc = weighted\ averge\ cost\ of\ capital$

The formula indicates that the value of a firm is driven by the growth (*g*), return on invested capital (*ROIC*) and the average cost of capital (*WACC*). If these factors are different between companies, we would also expect different values. However, the formula could rarely be used in practice as it assumes constant growth and constant return on invested capital in eternity (Koller et al., 2020). That is, the formula assumes that steady state holds and that markets are efficient. Yet, the formula is useful as a reminder about the fundamental drivers behind firm value, which guides us to select relevant controls factors in our regressions. Our independent variables and control variables will be explained later in this section.

4.3 Independent variables

4.3.1 Independent variables in focus

The three key independent variables that we use in our regressions are two continuous variables *pr* (the payout ratio) and *pm* (the payout mix) as well as a dummy variable, *p*, which we use to indicate whether a firm do pay dividends or not or not. Together they proxy the "dividend policy" of firms in our regressions. The three variables are based on data from the end of the same fiscal year for which the enterprise value was calculated. Thus, our study analyses how the existing dividend policy relates to the current value of the firm.

4.3.1.1 The payout ratio (*pr*)

The payout ratio variable, *pr*, is calculated as the sum of cash dividends and share repurchases (total payout) in one fiscal year divided by the net income of the last fiscal year for each company in the sample:

$$payout\ ratio_t = \frac{cash\ dividends_t + share\ repurchases_t}{NI_{t-1}} = \frac{total\ payout_t}{NI_{t-1}}$$

Where *t* indicates the end of fiscal year t. Thus, the variable equals zero if a firm pays no dividends.

4.3.1.2 The payout mix (*pm*)

The payout mix variable, *pm*, is calculated as cash dividends divided by total the payout of the firm (the sum of cash dividends and share repurchases) in one fiscal year for each company in the sample:

[6] Koller et al. (2020). "Valuation: Measuring and Managing the Value of Companies", Vol 7, page 33.

$$payout\ mix_t = \frac{cash\ dividends_t}{cash\ dividends_t + share\ repurchases_t} = \frac{cash\ dividends_t}{total\ payout_t}$$

Where *t* indicates the end of fiscal year t. The variable equals zero if a firm distributes 100% of its dividends in the form of share repurchases, and one if firm distributes 100% of its dividends in the form of cash dividends. When a firm pays no dividends, the variable *pm* will be missing and the observation will be excluded from our regressions. However, to allow us to utilize the full sample of observations in our regressions, we set the variables *pm* to be equal to zero when an observation pay no dividends. To cover the difference between those that do only repurchases and those that do not pay dividends (both equaling zero for variable *pm*), we introduce an additional dummy variable, *p*.

4.3.1.3 Payout or not (*p*)

The variable *p* is a dummy variable which equals zero if the observation paid no dividend during the year and equals 1 if otherwise, (i.e., if the payout ratio is larger than zero).

4.3.2 Control variables

The control variables are included in the regressions to capture variations in firm value, but also for to capture firm characteristics that is related to the dividend policy of firms. Variables to control for key company characteristics that affects the payout ratio have been selected in line with previous empirical research about dividend policy (e.g., Denis and Setpanyan, 2009; Fama and French, 2001; Baker et al., 2002). Further, the value driver formula (Koller et al., 2020) has guided us to select relevant controls for firm value in our regressions. The factors to control for value and for the payout policy are somewhat overlapping.

All control variables are in dummy format. As a result, the variation of the control variables will be lower compared to having the control variables in continuous forms. The main benefit of having the control variables in dummy format is to increase the ability of interpretation and the readability of the regression results.

4.3.2.1 Value or growth company (*type*)

The variable *type* is a dummy variable, formed to separate between value and growth companies. The price-to-book ratio (pb) is used to separate between the two types of companies. The pb ratio is calculated as the market value of equity divided by the book value of equity at the end of the fiscal year. If an observation has a higher pb ratio than the median sample company for the corresponding calendar year, the observation receives the classification "Growth company". Otherwise, the observation receives the classification "Value company". The variable equals one if the observation is a "Value company", zero otherwise.

The variable *type* is created to answer our hypotheses regarding whether the relation between the dividend policy and firm value is different for value and growth companies. We will then use *type* as a moderator variable and to create interactions terms. We will describe the purpose of interaction terms below. However, the variable *type* is also always included in the regressions to control for differences between value and growth companies and how they theoretically would design the dividend policy. For example, the pecking order theory and the life cycle theory suggest that companies with fewer investment opportunities should have higher dividend ratios than companies with more investment opportunities. This is in line with

the life cycle theory that states that a company's dividend ratio should be adapted to its growth life cycle, which is proxied for in this study as "value" and "growth" companies.

4.3.2.2 Relative profitability of company (*profile*)

Each observation is classified as having either "High profitability" or "Low profitability" by using the metric return on average total assets (ROA). ROA is calculated as:

$$ROA_t = \frac{EBIT_t}{\left(\frac{Total\ assets_t + Total\ assets_{t-1}}{2}\right)}$$

Where *t* indicates the end of fiscal year t. If an observation has a higher ROA than the median company in the same sector (2-digit GIC sector) for the corresponding calendar year, than the observation receives the classification "High profitability". Otherwise, the observation receives the classification "Low profitability". The variable *profile* is a dummy variable that equals one if the observation has "High profitability", zero otherwise. The motivation behind this variable is based on previous empirical studies by Denis and Setpanyan (2009), Fama and French (2001) and Baker et al. (2002) that sates that profitability is one of the key company characteristics that impacts the dividend ratio. Additionally, profitability is included in the value driver formula by Koller et al. (2020) and is therefore relevant to include as a control factor in the regressions where enterprise value is the dependent variable.

4.3.2.3 Relative margin of company (*margin*)

Based on the EBITDA-margin, EBITDA divided by sales of a fiscal year, we classify each observation as either "High margin" or "Low margin". If an observation has a higher EBITDA-margin than the median company in the same sector (2-digit GIC sector) and the same corresponding year, the observation receives the classification "High margin". Otherwise, the observation receives the classification "Low margin". The variable *margin* is a dummy variable that equals one if the observation has "High margin", zero otherwise. The motivation behind including this variable is similar to what is described for the variable "profile" above.

4.3.2.4 Cash availability (*liquidity*)

We classify all observations as either having "High liquidity" or "Low liquidity" depending on the level of cash in relation to total assets at the end of last fiscal year. If an observation has a higher ratio of cash to total assets than the median company in the same sector and for the corresponding calendar year, than the observation receives the classification "High liquidity". Otherwise, the observation receives the classification "Low liquidity". The variable *liquidity* is a dummy variable that equals one if the observation has "High liquidity", zero otherwise. The motivation behind this control variable is based on a previous study by Baker et al. (2002) that states that liquidity is one of the key company characteristics that impact the dividend policy.

4.3.2.5 Sales growth (*growth*)

We classify all observations as either having "High sales growth" or "Low sales growth" depending on the growth in sales from last fiscal year. If an observation has a higher growth rate than the median company in the same size category[7] and for the corresponding calendar year, then the observation receives the classification "High sales growth". Otherwise, the observation receives the classification "Low sales growth". *Growth* is a dummy variable that

[7] Each observation in our sample is categorized as either a "large" or a "small". An observation is categorized as "large" if the market value of equity in the end of a fiscal year is larger than the median market value of equity of to the total sample for the corresponding calendar year, and small if not.

equals one if the observation has "High sales growth", zero otherwise. The motivation behind this control variable is based on the value driver formula, which expresses expected growth is a fundamental driver behind firm value (Koller et al., 2020). This variable is a complement to *type* to assess the level of growth opportunities for firms which could affect the dividend policy according to the life cycle theory and the pecking order theory of dividends.

4.3.2.6 Fixed effect estimators

In empirical financial research, unobserved heterogeneity is challenging to control for as asset prices and corporate policies usually depend on unobservable factors (Gormley and Matsa, 2014). If these unobserved factors are correlated with variables and not properly handled, a so-called "omitted variables bias" will affect the estimated parameters in the regression and prevent interpretation. The fixed effects estimators approach control for unobserved group heterogeneity. It provides an estimation that relies on the within-group variation and eliminates from all variables the within-group invariant heterogeneity that can be observed or not.

As mentioned, previous empirical studies on dividend policy have identified firm specific characteristics that influence the payout ratio as well as the payout mix for firms (see section 2.4). Additionally, previous research has shown that the payout mix and the payout ratio seem to vary over time and across sector. For example, the payout mix level has historically differed between cyclical sectors and defensive sectors in the US, where cyclical sectors have historically had higher share of repurchases in their payout mix while more defensive sectors have been more prone to pay cash dividends (Zeng and Luk, 2020). Therefore, we use firm fixed effects to control for systematic differences in the payout ratio and payout mix that arise from differences due to unobserved heterogeneities across firms over time. Given the assumption that firms stay in the same industry over our study period, firm fixed effects automatically control for sector heterogeneities. The inclusion of firm fixed effect estimators creates additional dummy variables in our regressions for each firm, which captures differences in valuation due to differences in for example sector groups across time. In our thesis, we use the FE estimator in Stata (command reghdfe) to complete the transformation. We also use Stata (command sumhdfe) to calculate the within-fixed-effect standards deviations for the variables (deHaan, 2021).

Our data consist of 720 singletons, i.e., firms that appear in the data for only one year (one observation). As singletons have no variation in variables, they have no part in estimating the regression coefficients and are automatically dropped from the fixed effects regressions. Therefore, our regressions include 8,214 observations and 2,237 unique companies.

Given our panel data with longitudinal observations for the same company, we cannot assume that data is independent. It is likely that, for any given firm in the sample, previous observations will explain the variation of future observations. To get rid of autocorrelation, we cluster the standard errors at the firm-level.

4.4 Interaction effects

In our study, we explore if the effect of the payout ratio or the payout mix on valuation varies across different values of other variables (moderator variable). In specific, we analyze whether the dividend policy's relation to firm value is different for value and growth companies in Hypothesis 2, Hypothesis 3, and Hypothesis 4. Here, the moderator variable is *type*, which equal zero for growth companies and one for value companies. We address these questions with help of interaction terms in the regression models. A moderating variable is characterized as an interaction effect, as it affects the sign and/or strength of the relation between the

dependent and independent variables. When M is our moderator variable, the regression could be expressed as following:

$$y_t = \alpha + \beta_1 x_{it} + \beta_2 M_{it} + \beta_3 x_{it} M_{it} + \varepsilon_{it}$$

The third term, $\beta_3 x_{it} M_{it}$, is the interaction between *x* and the moderator variable M. When taking the partial derivative of *y* with respect to *x*, we see that M controls the partial effect of the dividend policy:

$$\frac{\partial y_t}{\partial x_{it}} = \beta_1 + \beta_3 M_{it}$$

Therefore, a significant coefficient of the interaction term suggests that the effect of variable *x* on *y* is different at different values of *M*. If the interaction term is insignificant, there is no statistical difference in the effect of variable *x* on *y* is different at different values of *M*.

4.5 Interpretation of coefficients

In our regressions, our independent variables are in level terms while the dependent variable is the natural logarithm of enterprise value. A log-level regression with the natural logarithm of enterprise value as the dependent variable and three theoretical independent variables in level form is expressed as following:

$$\log(EV_i) = \beta_0 + \beta_1 X + \beta_2 W + \beta_3 T$$

Holding all other independent variables constant, we interpret the coefficient on variable *X* using the following expression[8]:

$$100 * \beta_1 = \frac{\%\Delta EV_i}{unit\ \Delta X_i}$$

As a result, the coefficient of $X(\beta_1)$ can be interpreted as the percentage change in Enterprise Value for a unit increase in *X*, while holding the other independent variables constant. For dummy variables a "one unit" change is intuitive. However, for continuous independent variables, for example the payout ratio (*pr*) and payout mix (*pm*), the meaning of a change-by-one-unit is not obvious. Considering the distribution of payout ratio (*pr*) and payout mix (*pm*), it is more intuitive to assess economic magnitudes of the coefficients in terms of standard deviation changes for each variable. As we run regressions with firm fixed effects, we use the within-fixed-effect standards deviation for each variable. In practice, the expression to interpret

[8] To interpret the coefficient on variable *X*, we use the differential holding all other independent variables constant. The partial derivative of the regression is equal to $d[\log EV_i] = dX_i\beta_1$, which is equal to $dEV_i/EV_i = dX_i\beta_1$. By multiplying both sides by 100 and rearranging we get the following: $100 * dEV_i/EV_i = 100 * dX_i\beta_1$ and $100 * \beta_1 = \frac{100 * dEV_i/EV_i}{dX_i} = \frac{\%\Delta EV_i}{unit\ \Delta X_i}$.

the coefficients for the continuous variables in our regressions where the natural logarithm of EV is the dependent variable are the following:

$$100 * \beta_1 * \sigma_{within\ fixed\ effects(X_i)} = \frac{\%\Delta EV_i}{\Delta X_i}$$

Thus, the within-fixed-effect standards deviation is a proxy for a "change" for a variable.

4.6 Hypothesis testing

4.6.1 Hypothesis 1

To test our first hypothesis, whether firm value is related to the existing dividend policy, we run fixed effects regressions on the natural logarithm of enterprise value against the variables *pr* (payout ratio), *pm* (payout mix), *p* (payout or not) and a set of control variables.

The regression model 1 is expressed as:

$$\ln(EV)_t = \beta_0 + \boldsymbol{\beta_1 pr_{i,t}} + \boldsymbol{\beta_2 pm_{i,t}} + \boldsymbol{\beta_3 p} + \beta_4 type_{it} + \beta_5 profile_{it} + \beta_6 margin_{it} + \beta_7 liquidity_{it} + \beta_8 growth_{it} + \eta_t + \varepsilon_{it}$$

Where:

The **focus variables** in the model are **bolded**

i: indicates observation i

t: indicates end of fiscal year t

$\ln(EV)_t$ = the natural logarithm of enterprise value

β_t = factor loadings

pr_{it} = the payout ratio

pm_{it} = the paypout mix

p_{it} = 1 if paying dividends, 0 if not paying dividends

$type_{it}$ = 1 if "Growth company", 0 if "Value company"

$profile_{it}$ = 1 if "High profitability", 0 if "Low profitability"

$margin_{it}$ = 1 if "High margins", 0 if "Low margins"

$liquidity_{it}$ = 1 if "High liquidity", 0 if "Low liquidity"

$growth_{it}$ = 1 if "High growth", 0 if "Low growth"

η_t = firm fixed effects

The null hypothesis tells that it exists no relationship between the dividend policy and valuation, which suggest that the β_1, β_2 and β_3 all should be insignificant. The alternative hypothesis expresses that it does exist a relationship between the dividend policy and valuation, which suggest that any of the coefficients β_1, β_2 and β_3 should be significant.

$$H_0: \beta_1 = \beta_2 = \beta_3 = 0 \qquad H_1: \beta_1 \neq 0 \text{ or } \beta_2 \neq 0 \text{ or } \beta_3 \neq 0$$

4.6.2 Hypothesis 2

To test our first hypothesis, whether the relationship between firm value and paying dividends or not is different for value and growth companies, we run fixed effects regressions on the natural logarithm of enterprise value against the variables *pr* (payout ratio), *pm* (payout mix), *p* (payout or not) and a set of control variables. We create an interaction term between variables *p* and *type*, called *p_type*, to analyze differences between value and growth companies. The dummy variable *p_type* equal one if the observation is a value company and pays dividends, zero otherwise.

The regression model 2 is expressed as:

$$\ln(EV)_t = \beta_0 + \beta_1 pr_{i,t} + \beta_2 pm_{i,t} + \beta_3 p + \boldsymbol{\beta_4 p_{type_{it}}} + \beta_5 type_{it} + \beta_6 profile_{it} + \beta_7 margin_{it} + \beta_8 liquidity_{it} + \beta_9 growth_{it} + \eta_t + \varepsilon_{it}$$

Where:

The **focus variable** in the model is **bolded**

i: indicates observation i

t: indicates end of fiscal year t

p_type_{it} = interaction term between variable p_{it} and $type_{it}$ which means that the variable is equal to one for "value companies" that pays dividends, otherwise zero

$\ln(EV)_t, \beta_t, pr_{i,t}, pm_{i,t}, type_{it}, profile_{it}, margin_{it}, liquidity_{it}, growth_{it}$ and η_t are defined as in Model 1.

The null hypothesis tells us that it exists a difference in the relation between firm value and paying dividends or not for value and growth companies, which suggest that the coefficient β_4 should be significant. The alternative hypothesis expresses that it does not exist a relationship between paying dividends or not and firm value, which suggest that the coefficient β_4 should be insignificant.

$$H_0: \beta_4 \neq 0 \qquad H_1: \beta_4 = 0$$

4.6.3 Hypothesis 3

To test our third hypothesis, whether the relationship between firm value and the payout ratio is different for value and growth companies, we run fixed effects regressions on the natural logarithm of enterprise value against the variables *pr* (payout ratio), *pm* (payout mix), *p* (payout or not) and a set of control variables. We create an interaction term between variables *pr* and *type*, called *pr_type*, to analyze differences between value and growth companies. The variables *pr_type* is a continuous variable equaling *pr* if the observation is a value company, zero otherwise.

The regression model 3 is expressed as:

$$\ln(EV)_t = \beta_0 + \beta_1 pr_{i,t} + \beta_2 pm_{i,t} + \beta_3 p + \boldsymbol{\beta_4 pr_{type_{it}}} + \beta_5 type_{it} + \beta_6 profile_{it} + \beta_7 margin_{it} + \beta_8 liquidity_{it} + \beta_9 growth_{it} + \eta_t + \varepsilon_{it}$$

Where:

The **focus variable** in the model is **bolded**

i: indicates observation i

t: indicates end of fiscal year t

pr_type_{it} = interaction term between variable $pr_{it}$and $type_{it}$which means that the variable is equal to pr_{it} for "value companies" ($type_{it} = 1$) and is equal to zero for "growth companies" ($type_{it} = 0$)

$\ln(EV)_t, \beta_t, pr_{i,t}, pm_{i,t}, type_{it}, profile_{it}, margin_{it}, liquidity_{it}, growth_{it}$ and η_t are defined as in Model 1.

The null hypothesis tells that the relationship between the payout ratio and valuation is different for value and growth companies, which suggest that the coefficient β_4 should be significant. The alternative hypothesis expresses that the relationship is not different for value and growth companies, which suggest that the coefficient β_4 should be insignificant.

$$H_0: \beta_4 \neq 0 \qquad H_1: \beta_4 = 0$$

4.6.4 Hypothesis 4

To test our fourth hypothesis, whether the relationship between firm value and the payout mix is different for value and growth companies, we run fixed effects regressions on the natural logarithm of enterprise value against the variables *pr* (payout ratio), *pm* (payout mix), *p* (payout or not) and a set of control variables. We create an interaction term between variables *pm* and *type*, called *pm_type,* to analyze differences between value and growth companies. The variables *pm_type* is a continuous variable equaling *pm* if the observation is a value company, zero otherwise.

The regression model 4 is expressed as:

$$\ln(EV)_t = \beta_0 + \beta_1 pr_{i,t} + \beta_2 pm_{i,t} + \beta_3 p + \boldsymbol{\beta_4 pr_{type_{it}}} + \beta_5 type_{it} + \beta_6 profile_{it} + \beta_7 margin_{it} + \beta_8 liquidity_{it} + \beta_9 growth_{it} + \eta_t + \varepsilon_{it}$$

Where:

The **focus variable** in the model is **bolded**

i: indicates observation i

t: indicates end of fiscal year t

pm_type_{it} = interaction term between variable $pm_{it}$and $type_{it}$which means that the variable is equal to pm_{it} for "value companies" ($type_{it} = 1$) and is equal to zero for "growth companies" ($type_{it} = 0$)

$\ln(EV)_t, \beta_t, pr_{i,t}, pm_{i,t}, type_{it}, profile_{it}, margin_{it}, liquidity_{it}, growth_{it}$ and η_t are defined as in Model 1.

The null hypothesis tells that the relationship between the payout mix and valuation is different for value and growth companies, which suggest that the coefficient β_4 should be significant. The alternative hypothesis expresses that the relationship is not different for value and growth companies, which suggest that the coefficient β_4 should be insignificant.

$$H_0: \beta_4 \neq 0 \qquad H_1: \beta_4 = 0$$

5. Results

5.1 Descriptive statistics of data and variables

Table 2 in appendix provides a statistical summary of important variables (payout ratio, payout mix, ROA, market capitalization, the EV/EBITDA multiple and the Price-to-Book ratio) for the full sample and split between value and growth companies. When comparing the median growth company-observation to the median value company-observation in our sample, we learn that the growth company observations tend to have a higher payout ratio, a higher market capitalization and a higher profitability compared to the value company observations. Further, the growth company observations seem to distribute a larger share of dividends in the form of share repurchases compared to value companies.

Table 3 in the appendix shows that the group with the highest representation of "high sales growth" observations is growth companies that do not pay dividends. The table also shows that the representation of growth company observations with "high sales growth" decreases as the payout ratio increases. For value companies, the representation of "high sales growth" observations are rather even across the different payout ratio groups and payout mix groups. Also, growth companies that distribute 100% of dividends in the form of share repurchase has a constantly higher representation of observations with high growth characteristics compared to any other payout mix group and are generally large companies. For value companies the pattern is less clear.

5.2 Regression results

The results from our regressions (Model 1 to 4) to answer our four hypotheses are displayed in Table 4 in the end of this section. The within-fixed-effect standard deviations and R-squared by fixed effect are reported in Table 5 in the appendix.

We also provide results from our regressions in Table 4b in appendix, where the variables *type* has changed sign for value and growth companies. That is, *type* equals one for growth companies and zero for value companies. The interaction terms therefore refer to growth companies instead of value companies in Table 4b.

5.2.1 Hypothesis 1

To test our first hypothesis, whether the dividend policy is related to firm value, we run fixed effects regressions on the natural logarithm of enterprise value against the variables *pr* (payout ratio), *pm* (payout mix), *p* (payout or not) and a set of control variables. The results are displayed under Model 1 in Table 4 below.

The estimated coefficients for *pr* (the payout ratio) and *p* (payout or not) are significant at the 1% level and the estimated coefficient *pm* (the payout mix) is significant at the 5% level. Thus, the test rejects the null hypothesis that all three variables should be insignificant, which suggests that firm value is not independent from the dividend policy. Rather, firm values seem to be positively related to the decision to pay dividends but negatively related to higher levels of payments. Also, higher levels of cash dividends instead to share repurchases seem to be positively related to firm value.

The interpretation of the coefficients for the three variables in focus are the following. A change

in the payout ratio (increasing the level of dividends), *pr*, is related to a lower enterprise value of approximately 1.8%[9]. Similarly, a change in the payout mix (increasing the proportion of cash dividends to share repurchases), *pm*, is related to a higher enterprise value of approximately 0.9%[10]. The coefficient on *p* suggests that paying dividend related to a 15.3% higher enterprise value compared to not paying dividends. The within R-squared indicate that the model explains roughly 10.2% of the variation in the dependent variable, i.e., the natural logarithm of enterprise value.

5.2.2 Hypothesis 2

To test our second hypothesis, whether the relation between pay dividends or not and company value is different for growth and value companies, we run fixed effects regressions on the natural logarithm of enterprise value against the variables *pr* (payout ratio), *pm* (payout mix), *p* (payout or not) and a set of control variables. The key variable in focus is the interaction term *p_type*. The dummy variable equal one if the observation is a value company and pays dividends, zero otherwise. Thus, the variable helps us to analyze differences between value and growth companies. The results are displayed in Model 2 in Table 4 below

The estimated coefficient for variable *p_type* is 0.108 and is significant at a 5% level. Thus, we do not reject the null hypothesis, and interpret the results that there is a difference in the relation between firm value and to pay dividends or not for growth and value companies. It is worth mentioning that similar to the results from Model 1, the coefficient on *pr* is significantly negative. However, the coefficient on *pm* is still positive but not significant.

The interpretation of the coefficient on *p_type* is that value companies that pay dividends have a 10.8% higher enterprise value compared to growth companies that pays dividends. However, the firm value for growth companies is also positively related to the decision to pay dividends, indicated by the positive and significant intercept for variable *p*. The interpretation of the coefficient on *p* is that if a growth company pays dividends the enterprise value is approximately 9.3% higher compared to not paying dividend. The total relation between firm value and paying dividends for value companies is highly significant an imply an increase of 20.1% in enterprise value (see Model 2 in Table 4b in appendix). The within R-squared indicate that the model explains roughly 10.4% of the variation in the dependent variable, i.e., the natural logarithm of enterprise value.

5.2.3 Hypothesis 3

To test our third hypothesis, whether the relationship between firm value and the payout ratio is different for value and growth companies, we run fixed effects regressions on the natural logarithm of Enterprise Value against the variables *pr* (payout ratio), *pm* (payout mix), *p* (payout or not) and a set of control variables. The main variable in focus is *pr_type* (a continuous variable equaling *pr* if the observation is a value company, zero otherwise). The results are displayed in Model 3 in Table 4 below

The estimated coefficient for variable *pr_type* is positive and highly significant at a 0.1% level. Thus, we do not reject the null hypothesis that there is a difference between growth and value companies in how firm value is related by the level of dividends. The interpretation of the

[9] The estimated coefficient, -0.0535 (Model 1, Table 4), times the within-fixed-effect standard deviation, 0.3398 (Table 5 in appendix), for variable *pr*.
[10] The estimated coefficient, 0.0580 (Model 1, Table 4), times the within-fixed-effect standard deviation, 0.1538 (Table 5 in appendix), for variable *pm*.

coefficient of *pr_type* is that the difference in enterprise value between value and growth companies for a change in the payout ratio is 3.0%[11]. Thus, a higher payout ratio is related to higher enterprise values for value companies compared to growth companies.

The intercept on variable *pr* is negative and highly significant at a 0.1% level, which means that growth companies have a negative relation between firm value and the payout ratio. The interpretation of the coefficient of *pr* is that a change in the payout level (increasing the level of dividends) is related to approximately a 3.4%[12] lower the enterprise value. The total relation between firm value and the payout level is insignificant for value companies (see variable *pr* in Model 3 in Table 4b in the appendix). The within R-squared indicate that the model explains roughly 10.6% of the variation in the dependent variable, i.e., the natural logarithm of enterprise value.

5.2.4 Hypothesis 4

To test our fourth hypothesis, whether the relationship between firm value and the payout mix is different for value and growth companies, we run fixed effects regressions on the natural logarithm of Enterprise Value against the variables *pr* (payout ratio), *pm* (payout mix), *p* (payout or not) and a set of control variables. The main variable in focus is *pm_type* (a continuous variable equaling *pm* if the observation is a growth company, zero otherwise). The results are displayed in Model 4 in Table 4 below

The estimated coefficient for variable *pm_type* is positive and significant at a 1% level. Thus, we do not reject the null hypothesis, and interpret the results that there is a difference in the relation between firm value and how dividends are distributed for growth and value companies. The interpretation of the coefficient of *pm_type* is that a change in the payout mix (increasing the proportion of cash dividends to share repurchases) for value companies is related to an enterprise value that is approximately 1.9%[13] higher compared to the same change made by growth companies. That is, the difference in firm between value and growth companies when increasing the share of cash dividends is 1.9% higher for value companies.

The intercept on variable *pm* is insignificant, which means that we see no relation between firm value and the dividend distribution method for growth companies. In total, a change in the payout mix (increasing the proportion of cash dividends to share repurchases) is related to ab increase in the enterprise value of approximately 1.7%[14] for value companies. The within R-squared indicates that the model explains roughly 10.4% of the variation in the dependent variable, i.e., the natural logarithm of enterprise value.

[11] The estimated coefficient, 0.105 (Model 3 in Table 4) times the within-fixed-effect standard deviation, 0.2816 (Table 5 in appendix), for variable *pr_type*.
[12] The estimated coefficient, -0.100 (Model 3 in Table 4), times the within-fixed-effect standard deviation. 0.3398 (Table 5 in appendix), for variable *pr*.
[13] The estimated coefficient, 0.108 (Model 4 in Table 4) times the within-fixed-effect standard deviation, 0.1729 (Table 5 in appendix), for variable *pm_type.*
[14] The estimated coefficient, 0.108 (Model 4, Table 4b in appendix) times the within-fixed-effect standard deviation, 0.1538 (Table 4b in appendix) for variable *pm*.

Table 4.

Regression on the natural logarithm of Enterprise Value using firm fixed effects.
Variable type equals one for value companies.

	Model (1)	Model (2)	Model (3)	Model (4)
Payout ratio (pr)	-0.0535***	-0.0534***	-0.100***	-0.0554***
	(-4.72)	(-4.71)	(-6.49)	(-4.88)
Payout mix (pm)	0.0580*	0.0525	0.0494	-0.0000223
	(1.99)	(1.78)	(1.70)	(-0.00)
p=1	0.153***	0.0928*	0.150***	0.150***
	(5.45)	(2.31)	(5.34)	(5.34)
p_type=1		0.108*		
		(2.18)		
pr_type			0.105***	
			(5.05)	
pm_type				0.108**
				(2.94)
type=1	-0.284***	-0.373***	-0.344***	-0.326***
	(-14.32)	(-7.39)	(-13.62)	(-12.17)
growth=1	0.106***	0.106***	0.105***	0.106***
	(10.45)	(10.42)	(10.30)	(10.45)
margin=1	0.119***	0.118***	0.117***	0.118***
	(4.88)	(4.82)	(4.80)	(4.83)
profile=1	0.0389*	0.0397*	0.0404*	0.0402*
	(2.02)	(2.07)	(2.11)	(2.10)
liquidity=1	-0.0165	-0.0164	-0.0156	-0.0163
	(-1.06)	(-1.07)	(-1.01)	(-1.06)
Constant	7.638***	7.692***	7.676***	7.663***
	(265.63)	(186.33)	(249.43)	(250.09)
Observations	8,214	8,214	8,214	8,214
R^2	0.985	0.985	0.985	0.985
Within R^2	0.102	0.104	0.106	0.104

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. *t* statistics in parentheses.

This table provides the results of four fixed effects regressions to test each of the four hypotheses in this study. The dependent variable is the natural logarithm of enterprise value. Observations consist of the full non-singleton sample. Both *pr* (payout ratio) and *pm* (payout mix) are continuous variables. All other variables are dummy variables: *p* equals one if the observation pays dividends, otherwise zero; *type* equals one if the observation is a value company, otherwise zero; *profile* equals one if the observation has a high ROA, otherwise zero; *margin* equals one if the observation has a high EBITDA-margin, otherwise zero; *liquidity* equals one if the observation is liquid, otherwise zero. The variable *p_type* is an interaction term between variable *p* and *type*, and equals one for value companies that pays dividends, otherwise zero. The variable *pr_type* is an interaction term between variable *pr* and *type*, and equals *pr* for value companies, otherwise zero. The variable *pm_type* is an interaction term between variable *pm* and *type*, and equals *pm* for value companies, otherwise zero. The regressions include firm fixed effects (equivalent to including a dummy variable for each firm), however the coefficients are not included in the table. The within R2 disregards the dummies that are introduced in the model with firm fixed effects.

5.2.5 Summary of regression results

Our results suggest that there is a relation between firm value and the dividend policy for listed firms in the US between 2015-2019 (Model 1). The firm value is positively related to paying

dividends for both value and growth companies, but the impact is substantially larger for value companies (Model 2). However, given that dividends are paid, the firm value is negatively related to increasing payout ratios for growth companies, whereas we find no relation between firm value and payout ratio for value companies (Model 3). Lastly, we find no evidence for a relation between firm value and the form of distribution for growth companies, while we find a significantly positive relation between firm value and the proportion of cash dividends to share repurchases for value companies. In general, MM's conclusion about dividend irrelevance seems rather uncertain, which implies that market imperfections may be relevant to the dividend setting process and firm value. Further, as the relation between firm value and the level of dividends as well as the form of distribution are different for growth and value companies, our results imply that different market inefficiencies may be more significant or insignificant for growth and value companies.

5.2.6 Comparison between regression results and indicative assumptions

This section compares the results from our regressions and the indicative assumptions made by studying the histograms displaying the median EV/EBITDA for different payout groups (in section 3.3). Hereafter, we call the results obtained from the regression as the "statistically tested results" and the indicative assumptions made in section 3.3 for "indicative assumptions".

5.2.6.1 Total sample

The indicative assumptions point to little variation in valuation across the different payout ratio groups as well as payout mix groups. However, the statistically tested results suggest differently. The regression results indicate that paying dividends lead to a rather substantially higher enterprise value compared to not paying dividends (approximately 15.3%). Also, both the payout ratio as well as the payout mix were related to firm value. Nevertheless, the impact on enterprise value by changing the variables is less substantial: a change in the payout ratio (an increase in the level of dividends) is related to a lower enterprise value of approximately a 1.8% and a change in the payout mix (increasing the proportion of ratio of cash dividends to share repurchases) is related to a higher enterprise value of roughly 0.9%.

5.2.6.2 Value companies

Both the statistically tested results and the indicative assumptions imply that paying dividends is positively related to firm value. Additionally, both the statistically tested results and the indicative assumptions suggest that firm value is not related to the payout ratio, given that dividends are paid.

However, the statistically tested results evidence that firm value is positively related to the payout mix (increasing proportions of cash dividends to share repurchases), but no such pattern was described in the indicative assumptions. Nevertheless, a change in the payout mix (increasing the proportion of cash dividends to share repurchases) causes only an increase of 1.7% in the enterprise value according to the regression. Thus, the size of the relation may be too small evidence a difference in the EV/EBTDA multiples when looking at the histogram in Figure 6.

5.2.6.3 Growth companies

Both the statistically tested results and the indicative assumptions imply that the level of payout ratio is not related firm value given that dividends are paid. However, the indicative assumptions suggest that growth companies that do not pay dividends have a higher valuation in terms of EV/EBITDA compared to dividend paying growth companies. In comparison, the

statistically tested results indicates that the enterprise value is approximately 9.3% higher for dividend paying growth companies compared to growth companies that do not pay dividends. Thus, the difference between paying dividends and not is rather substantial according to the statistically tested results. Therefore, the indicative assumptions and the statistically tested results are very different in this regard.

Additionally, our statistically tested results states that there is no relationship between firm value and the payout mix for growth companies, while our indicative assumptions suggest differently. Figure 4 indicates that growth companies that only repurchase shares to distribute dividends tend to have a higher valuation in terms of EV/EBITDA than other growth companies that distribute dividends using both cash dividends and share repurchases. In other words, growth companies with high earnings multiples mainly uses share repurchases as a form of dividends over cash.

5.2.6.4 Summary of comparison

The comparison between the statistically tested results and the indicative assumptions shows both similar and contradictory results. The main four reason to why we find different results are the following:

1. We use two different proxies for values. In the regressions we use the natural logarithm of the enterprise value. In the histograms we use the median EV/EBITDA. When using EV/EBITDA multiples to proxy value, the measure will be impacted by the level of EBITDA. When EBITDA is negative and/or extraordinarily low or high, the multiple may be distorted. In contrast, the enterprise value is not impacted by any other measure.

2. In the regressions we control for factors that may impact firm value, and therefore provide additional explanatory power compared to the indicative assumptions made based on the histograms without controls applied.

3. In the regressions we regress the payout ratio and the payout mix simultaneously, while the histograms only study each variable at the time. Thus, the histogram may lose explanatory power by not looking at the combination of the two variables, i.e., the complete definition of a dividend policy.

4. The significant intercepts of variables *pr* (payout ratio) and *pm* (payout mix) in the regression models are rather small. No changes in both the payout ratio and the payout mix appear to be related to differences in the enterprise value of more than 4%. Thus, so small changes may not be captured or noticed in the EV/EBITDA analysis using histograms.

6. Discussion

6.1 Evaluation of results

6.1.1 General interpretation of results

The result from our regressions indicates some statistically significant relationships and it is important that these results are interpreted correctly. This study does not examine the casual relationship between dividend policy and firm valuation, which means that we cannot truly state that managers of a company can increase or decrease the value of the firm by deciding to pay dividends or not, by changing the level of dividends or by changing how to distribute dividends. Instead, the results indicate that companies that have a certain dividend policy tend to have a certain firm value. This is related to the purpose of this thesis, which is to study whether a there is a relation between the existing dividend policy of firms and current firm values.

Because of this, the focus of the discussion is based on the existence of statistically significant relations or not, and whether the significant relations are positive or negative. As we cannot truly state that an increase or decreasing the payout ratio or the payout mix will increase or decrease the value of a firm, less focus is therefore given to discuss the size of the relations (the intercepts) indicated by the regression. However, the size of the regression intercepts may indicate how relevant or important the significant relations are to managers.

6.1.2 Analysis of sample data

According to the pecking order theory, the level of available investment opportunities is relevant in for the design of a dividend policy. In our study, the price-to-book ratio is used to proxy the level of investment opportunities for the sample firms. “Growth” companies are observations with a relatively high market value compared to its current book values, which indicates that investors not only believe that the company has many available investment opportunities but also expect that these will be exploited by the management. In contrast, “value” companies are observations with a relatively lower ratio, which suggest that investors believe that the company has relatively less investment opportunities and expect growth to be lower as well. The pecking order theory claims that companies with many investment opportunities should have lower payout ratios than companies with fewer investment opportunities. Interestingly, the opposite was evidenced for our sample data in Table 2, where it become evident that growth companies consist of a greater ratio of companies with higher payout ratios compared to value companies.

However, Table 2 also displays that the group of growth companies represent many relatively large and profitable companies compared to the group of value companies. Thus, the growth companies in our sample could be considered as being relatively mature compared to the value companies in our sample. That is, in our sample, the observations recognized as having many investment opportunities are relatively mature compared to the observations recognized as having less investment opportunities. This may be expected, as our data reflects the surge of large growth companies in the US, partly driven by the increasing dominance of the information technology sector. According to the life cycle theory, the optimal payout ratio increases as the firm becomes more mature (DeAngelo, DeAngelo and Stulz, 2006). From this perspective, it is reasonable that the growth companies in our sample generally pays higher levels of dividends compared to value companies, as growth companies appear to be relatively “mature”. As a result, it can be concluded that the life cycle theory is superior to the pecking

order theory in explaining the levels of dividend payments for companies. That is, regardless of how many investment opportunities a company has, if a company becomes mature in the sense that the cash generating ability exceeds the capacity to undertake profitable investment opportunities, distributing higher levels of cash to shareholders seems to be a better decision[15]. From this perspective, it is not unexpected that the growth companies in our sample, consisting of relatively large and profitable companies, distribute higher levels of dividends compared to value companies.

Nevertheless, when looking within the group of growth companies, the non-dividend payers represent the highest share of "high sales growth" companies, and companies with the highest levels of payout represent the lowest share of "high sales growth" companies (Table 3 in appendix). The relative sales growth could also be seen as a proxy for measuring investment opportunities and the pattern described could thus be considered as being in line with the pecking order theory. This pattern is evident also for value companies. Therefore, we can conclude that including the control variable *growth* provides important additional explanatory value to our regressions.

6.1.3 The payout ratio

Our results suggest that there is a positive relation between firm value and paying dividends for both value and growth companies. This is in line with the reasoning behind the bird in the hand theory (Lintner, 1956; Gordon, 1959), which states that investors prefer and put higher value on receiving dividend payments today rather than the possibility of higher capital gains in the future.

However, given that dividends are paid, increasing levels of payout ratios are negatively related to firm value for growth companies. This is in opposite to what the bird-in-hand theory indicates. Specifically, the increased uncertainty of delaying dividend payments for increased investments does not lead to an increase in the required rate of return that is sufficiently high to offsets the probable positive effects of the investments. Therefore, investors in growth companies seem to favor the probability of higher returns in the future more, compared to the less risky alternative of receiving more cash today. However, the interpretation is different for value companies. According to the bird-in-hand theory, we may interpret the more positive relation between paying dividends and firm value for value companies that value investors prefer certainty and stability to a larger extent. Although, our results show that there is no significant relation between the firm value and the payout ratio for value companies, given that dividends are paid. The bird in the hand reasoning can be classified as one of the more psychological explanations regarding dividends and firm value. Another theory also connected to psychology is the catering theory by Baker and Wurgler (2004), stating that firms pay dividends when investors prefer dividend-paying companies and withhold dividends when investors prefer non-dividend-paying companies. Interestingly, our results might imply that companies could be rewarded with a higher firm value by catering to investors' demand for dividends when setting the firm's dividend policy. This statement is based on the assumption that investors in growth companies demands less dividends for the opportunity of higher growth, and that investors in value companies prefer companies to pay dividends.

Our results stating the positive relation between paying dividends and firm value appear to contradict the MM dividend irrelevance theorem, which may indicate that the market is rather

[15] It is worth noting that this statement assumes that the price-to-book ratio is a good measure to approximate investment opportunities.

inefficient and that market imperfections may be relevant to the dividend setting process. Previous research such as Baker et al. (2011) and Kasetner and Liu (1998) emphasizes information asymmetry and signaling to be important determinants for the dividend policy of firms, and therefore we believe it to be useful to interpret our findings using the signaling theory. The positive relation between paying dividends and firm value for both value and growth companies seem to be in line with the signaling theory reasoning, that cash dividends are "sticky" and therefore inhere a signal for long-term commitment to stability and profitability.

However, given that firms pay dividends, the relationship changes and is negative for growth companies and insignificant for value companies. The negative relationship found in our results for growth companies could be explained from a signaling perspective that lower dividend ratios signal confidence in being able to find and achieving investment opportunities, which would imply the possibility of increase growth and increased value. This explanation is substantiated by the pecking order theory and the discussion above, which suggests that investors in growth companies favor potential growth over dividends today. Indeed, our results suggest that firm value is positively related to holding the dividend ratio at lower levels for growth companies. Similarly, the reasoning behind the life cycle theory and the signaling theory would suggest the opposite relation between firm value and dividend ratio for value companies. Especially since increasing dividends have a strong signaling value due to its stickiness that should hold even stronger for value companies that is in a more mature stage of their life cycle. However, there is no significant relation between dividend ratio and firm value for value companies, given that dividends are paid. From the perspective of the signaling theory, an increased payout ratio for value companies is not related to additional signaling value.

According to the agency cost theory, paying dividends is a tool to reduce the agency costs of free cash flows (Baker and Weigard, 2014). Therefore, paying dividends reduces the risk of overinvestment and the increased scrutiny adds value to investors and subsequently the firm value. Thus, from the perspective of the agency cost theory, our results stating that there is a positive relation between firm value and paying dividends is expected and reasonable. Given that a value company do pay dividends, our results states that there is a no relationship between the dividend ratio and firm value for value companies. From the agency cost theory perspective, we may interpret the results that firms are not rewarded by providing increased scrutiny and less risk for overinvestments by paying higher levels of dividends. Given that a growth company do pay dividends, we evidence a negative relation between the dividend ratio and firm value. Discussing the results from the perspective of the agency cost theory, we may conclude that the risk for overinvestment may be perceived as less of a problem for growth companies. In fact, growth companies have per definition more investment opportunities that investors want the company to take advantage of.

According to the tax preference explanation, investors should prefer retention of cash rather than distribution of cash since the tax rate is often higher on dividends than on long-term capital gains under US tax law (Baker and Weigard, 2014). Our results regarding the positive relation between paying dividends and firm value is thus not in line with the reasoning behind the tax preference theory. However, given that a growth company pays dividends, the dividend ratio and firm value is negatively related. This is in line with the tax preference theory stating that investors prefer capital gains compared to dividends due to lower tax rates which increases the

value on those companies.

6.1.4 The payout mix

According to the MM dividend irrelevance theorem, firm value is independent from the dividend distribution method. Our results suggest that this is true for growth companies but not for value companies. A higher share of cash dividends is positively related to firm value for value companies.

Generally, repurchasing shares is expensive when believing that the share price is considered overvalued. Theoretically, rational managers would therefore only repurchase shares when they consider the share price to be truly undervalued. Based on this, investors should interpret share repurchases as positive signals (Akerlof, 1970; Leland and Pyle, 1977). Signaling for undervaluation has been seen as an important explanation in previous studies (Ikenberry et al., 195; Chan et al., 2004) to why value companies repurchase shares. However, our results suggest that the signaling effects from paying cash dividends is positively related to firm value for value companies. This relationship can be explained by previous studies (Zeng and Luk, 2020; Brav et al., 2005) that states that share repurchases allows for flexibility to keep cash for unexpected investment opportunities and for periods of economic instability and downturns. This line of reasoning can be supported by Jagannathan, et al (2000) that states cash dividends are mostly paid out of "permanent" or "sustainable" cash flows while share repurchases are paid out of "temporary" cash flows. Given that previous research shows that share repurchases has an inherent flexibility and is paid from temporary cash flows, one could say that it diminishes the positive signals for undervaluation stated by Akerlof, Leland and Pyle. The assumed stickiness of paying cash dividends seems to weigh higher than the potential signals for undervaluation provided by the more temporary repurchases. One explanation behind why signaling for undervaluation using share repurchases seem to have less significance in general could be because using share repurchases have become a more common form of distribution (Zeng and Luk, 2020). Our results for growth companies states a non-significant relationship which could be interpreted as that the firm value is independent from the distribution method of dividends.

Oswald and Young (2008) suggest that share repurchases represent a double-edged sword when it comes to agency costs. The flexibility of share repurchases compared to more sticky cash dividends can effectively alter the level of payout in response to unplanned strong cash performance and thus reduce agency cost, but the inherent payout flexibility also offers managers increased discretion to forego payouts and waste surplus cash. From the perspective of the agency cost theory, the positive relation between cash dividends and firm value for value companies confirms that investors reward firms with higher levels of cash dividends than share repurchases as they believe the inherent stickiness of cash dividends provide larger commitments and thus fewer potential problems with overinvestments.

Our regression results for growth companies states that there is no statistical relationship between firm value and the form of payout. Yet, the indicative assumptions based on the histograms in section 3.3 indicate that the group of growth companies distributing 100% of dividends by share repurchases are valued higher than other groups in terms of the EV/EBITDA multiple (Figure 4). Thus, growth companies with the highest earnings multiples

are mainly uses share repurchases as a form of dividends over cash. Because of the inherent flexibility of share repurchases contra cash dividends, the riskiest companies would most likely prefer to pay higher levels of share repurchases compared to "sticky" cash dividends when distributing dividend to shareholders. Additionally, riskier growth companies generally have higher historical EV/EBITDA multiples as most of the value relates to future earnings. As a result, the seemingly strong positive relation between repurchasing shares and firm value for growth companies as illustrated in Figure 4 could be explained by the fact that the riskiest growth companies with the highest earnings multiples mainly uses share repurchases as a form to distribute dividends.

According to the tax preference theory, it is suggested that investors prefer the retention of cash rather than distribution of cash due to the lower taxes on capital gains, which regarding the payout mix means that share repurchases should be preferred. However, our results for neither value nor growth companies are in in line with this theory. Thus, the tax preference theory does not provide any additional insights to explain our findings.

6.1.5 Summary of Evaluation of Results

From the perspective of earlier literature and existing theories on the dividend policy discourse, our results on the relation between firm value and dividend policy for US firms during 2015-2019 was both expected and not expected. For both value and growth companies, high levels of dividends are not related to higher firm values, given that dividends are paid. Overall, the relations between firm value and the level of dividends as well as the form of distribution are different for growth and value companies. Indirectly, this imply that different market inefficiencies are significant and insignificant for companies with many available investment opportunities compared to companies with many available investment opportunities. For the perspective of the agency cost theory, inefficiencies due to overinvestment seem to be more relevant for value companies than for growth companies as the relation between the dividend ratio and firm value is more positive for value companies than for growth companies. Further, the positive relation between paying cash dividends compared to share repurchases indicate that value investors prefer stability over future increase in share price. In contrast, the negative relation between firm value and the payout ratio indicates that growth investors reward companies that signal confidence in finding and undertaking investment opportunities. We provide a summary of the key discuss insight in Table 6 below.

We also concluded that that regardless of how many investment opportunities a company has, if a company becomes mature in the sense that the cash generating ability exceeds the capacity to undertake profitable investment opportunities, distributing higher levels of cash to shareholders seems to be the better decision. Thus, the life cycle theory seems to be superior to the pecking order theory in explaining the levels of dividend payments for companies as it also includes the companies' capacity to generate cash as well as their investment opportunities.

Table 6.

Summary of discussion insights

Variable	Paying dividends (*p*)	Payout ratio (*pr*)	Payout mix (*pm*)
Relation to firm value[16]	Full sample: *Positive*	Full sample: *Negative*	Full sample: *Positive*
	Growth companies: *Positive*	Growth companies: *Negative*	Growth companies: *Not related*
	Value companies: *Positive*	Value companies: *Not related*	Value companies: *Positive*
Bird in the hand and Gordon's DDM	○ Results in line with theory, suggesting that investors prefer receiving cash today.	○ Results are contradicting theory for growth companies, as investors seem to prefer the opportunity of higher growth over security. ○ Results for value companies are not necessarily contradicting theory. Given that firms pay dividends investors do not value receiving higher levels of dividends.	○ Not relevant (theory focus on level of dividends).
Asymmetric information & Signaling theory	○ Results in line with theory, assuming that dividends are "sticky" and signals long term commitment to future stability and profitability.	○ Results in line with theory for growth companies. Lower payout ratios may signal confidence in available investment opportunities. ○ Results for value companies not in line with theory, but not necessarily contradicting. Increasing payout ratio do not provide additional signaling value (given that the company pays dividend)	○ The results suggest that the signaling value of repurchasing shares due to undervaluation is not as strong the signaling value of paying "sticky" cash dividends for value companies. ○ Results for growth companies not in line with theory, but not necessarily contradicting.
Agency cost theory	○ Results in line with theory, suggesting that paying dividends reduce potential risk of overinvestment. Increased scrutiny adds value to investors.	○ Results for growth companies is not necessarily contradicting theory. Investors may be more concerned about managers being able to achieve the high expected growth rather than overinvestments. ○ Results are contradicting theory for value companies. The agency cost theory suggests that increased scrutiny and less overinvestment due to higher payout ratios would be favored by value investors.	○ Results are in line for value companies. From the perspective of the agency cost theory, investors favor cash dividends over share repurchase, as cash dividends are "stickier" and reduces managers' spending power more than share repurchases. ○ Results for growth companies not in line with theory, but not necessarily contradicting.
Tax preference theory	○ Theory suggests that investors prefer the retention of cash rather than distribution of cash. Results not in line with theory.	○ Results are in line with theory for growth companies, as investors prefer the retention of cash rather than distribution of cash. ○ Results for value companies not in line with theory, but not necessarily contradicting.	○ Theory suggests that investors prefer the retention of cash (share repurchases) rather than distribution of cash (cash dividends). Results not in line with theory.

[16] Based on regression results.

6.2 Evaluation of method

6.2.1 Measuring the relation between firm value and dividend policy

Generally, it is rather difficult to measure the relation between firm value and specific corporate policies such as the dividend policy. Existing research has for example tried to capture the effect on firm value of dividend policies by looking at changes in share price given a dividend announcement and/or dividends payments for firms. Our study does not regard changes in firm value but is instead studying how the dividend policy for a specific year relates to the enterprise value at the end of the same year. We are not only comparing the firm value and dividend policy for a specific firm over the study period, but also to all other companies in the sample. Using the logarithm of enterprise value helps us to normalize the dataset and to curb the effects of outliers.

Also, this study does not examine the casual relationship between dividend policy and firm valuation. Thus, we are not able to state that managers of a company can increase or decrease the value of the firm by altering the dividend policy. However, the results indicate that companies that have a certain dividend policy tend to have a certain firm value. This sort of interpretation is relevant for the purpose of our thesis, which focus on the how the existing dividend policy relates to the current firm value.

6.2.2 Measuring firm value

In our regressions, we measure firm value using the natural logarithm of enterprise value. A potential disadvantage of is that the enterprise value for each observation is calculated at the end of the fiscal year for each observation. Thus, the enterprise value could therefore be measured at different times over a calendar year for observations, as the end of the fiscal year may vary over a calendar year for firms. As the general market valuation of firms could swing over a calendar year, valuing firms at different points in time over a year may skew the comparison between firms.

6.2.3 Measuring dividend policy

To calculate the total payout for firms, we use the sum of cash dividends and share repurchases. However, the total payout to shareholders could be defined more broadly. It is arguable that net share repurchases should be used instead of share repurchases, i.e., subtracting the number new share issues from the shares that were repurchased. However, our study focusses on what is transferred to shareholders, and not what shareholders transfer to firms. For example, Allen and Michaely (2003) suggest that the total payout should be defined as the total transfer of cash from the corporate sector to the private sector. Hence, they therefore suggest that the net cash M&A activity (where the proceeds are directed to the private sector) should be included, reasoning that the shareholders of acquired firms receive cash payments that can be viewed as a “final” dividend. Nevertheless, our study has focused on cash dividends and share repurchases, as we consider these forms of payments directly related to the long-term management of the dividend policy. In contrast, proceeds received from M&A activity is more related to the investment management of the firm.

We use the payout ratio and payout mix as proxies of a dividend policy, as the management of a dividend policy generally incorporates the decision on how much cash that should be returned to the shareholders and if that cash should be distributed through cash dividends or share repurchases. However, the payout ratio measure is calculated using the net income, which entails two issues for our paper. First, a large share of firms has a negative net income and

therefore an eloquent payout ratio cannot be defined. These observations are therefore excluded from the study. As a result, our sample only includes companies with a net income that is positive and is therefore biased towards profitable companies. Second, another drawback of the payout ratio measure is that the net income is a result of accrual accounting and sometimes a rather flawed gauge of a firm's ability to pay dividends. The net income is impacted by non-cash items and could be extraordinarily low due to large one-offs. Very high payout ratios may thus be a result of exceptionally low earnings and not necessarily high dividend payments. Our study therefore excludes observations where the payout ratio exceeds 250%, as we consider the payout measure inadequate to use at higher levels. Based on this, other cash flow metrics than net income may be a better gauge to estimate firms' ability to pay.

Additionally, instead of calculating the payout ratio as the total payout to net income for only year, it could also be based on the aggregated number of dividends over the aggregated amount of net income for several years. This could potentially limit the effect of unusually low or high earnings that may distort the payout ratio. However, it is unclear whether this would better represent the dividend policy of firms, as firms usually define their dividend policies for a year.

6.2.4 Control variables

We include control variables in our regressions to capture firm factors that, according to previous theories, influence enterprise value and dividend policy. A potential drawback in our study is that we use data for our control variables from the same fiscal year end as which the enterprise was calculated. Therefore, many of the variables were already public, as three out of four quarterly reports could potentially have been published at the end of the fiscal. As a result, we control for rather "historical" variables in our regressions. As investors value companies based on future estimated profits (see the value driver formula in section 4.3.1), the enterprise value should reasonable be compared to expected values, for example of profitability and growth, and not to historical. Thus, our regressions may thus potentially loose some power in explaining the variability of the dependent variable (enterprise value), as historical values are used instead of forward-looking values. However, using analysts' forecast of future performance is out of scope of this study. Further, the within R-squared of our regressions are rather low, suggesting that other factors that were not included in our study may have been valuable to include to improve the explanatory power of our models.

6.2.5 Fixed Effects Estimation

In our study, we use firm fixed effects. Given that fixed effects estimation depends on within-group variation to estimate coefficients, a potential issue in the fixed effects estimation is the lack of within variation in our key independent variables.

As singletons (defined in our study as firms with only one year of observation in the firm-year panel data) have no variation at all, singletons are automatically dropped from the fixed effects regressions as they have no part in estimating the regression coefficients. Our sample consist of 720 singletons. As a result, 24% of all unique firms (or fixed effects groups) are excluded from the regressions and thus the estimation. Our data consist of a rather large share of singletons when using firm fixed effect, thus an alternative fixed effect estimator could potentially have been used to be able to include more observations in our regressions. However, it is important to highlight the benefits of using firm fixed effects instead of year and industry fixed effects, for example. Firm fixed effects automatically absorb industry and time fixed effects and could therefore capture higher degrees of unobservable heterogeneity.

Another potential issue for our fixed effects regressions is that firms with no variation for our key independent variables may indirectly affect the estimated coefficient for these variables due to covariance. As displayed in Table 7 in the appendix, the non-singleton data consist of 1,041 firms (47% of all firms) with no within variation in variable pm (the payout mix) and 297 firms (13% of all firms) have no within variation in variable pr (the payout ratio). Why and when firms have no variation in variables pr and pm could partly be explained by the share of firms that do not pay dividends at all through the full study period. For these companies, the values for both pr and pm will be constantly zero. In fact, when excluding non-dividend paying firms, the non-singleton data consist of zero firms with no-within variation in pr and only 655 firms (29% of all firms) with no within variation in variable pm (see Table 8 in appendix). From this perspective, the no-within variation firms are to a large extent driven by the constantly non-dividend paying firms and the within variation firms are thus mainly dividend paying firms. The main problem of no-variation for key independent variables arises when there are differences between firms with no-within variation in the variables and firms that have within-firm variation. If this is the case, the no within-firm variation firms than can reduce the power of the tests and increase both type I (incorrectly rejecting a true null hypothesis) and type II errors (failing to reject a false null hypothesis). Therefore, we run two regressions to check if the group of companies that do not pay dividends are different from the dividend paying group. The regressions consist of the same set of control variables and firm fixed effects as the other regressions in our study, but exclude pr, pm, and p (as well as interaction terms). Regression (a) only includes dividend paying firms and regression (b) only includes non-dividend paying firms, and the results are displayed in Table 9 in the appendix. Regression b) includes any observation for where the payout ratio is equal to zero, even though the firm does pay dividend in another year. The estimated coefficients for the control variables are rather similar for regression (a) and (b) in terms of the sign of the intercept, however, the size of the coefficient is different. It is worth pointing out that the number of observations is 6,652 in regression (a) and 1,211 in regression (b). The fact that the regressions are based completely different number of observations could have implications in the estimation of coefficients. Nevertheless, the control variables are not perfectly similar for the two sets of firms, and we can therefore not be certain that two types of firms are similar. Thus, cannot with certainty exclude the risk of type I and type II errors being present in our analysis.

6.2.6 Sample bias

As mentioned, our sample consist of companies that has a net income larger than zero and is therefore biased towards profitable companies. However, is it reasonable to argue that paying dividends to shareholders are mainly relevant for companies that generate profits in the first place. Thus, basing our study on firms were paying dividends are a legitimate option is reasonable for the purpose of our study.

As discussed above, our regressions exclude singletons and therefore our regression sample only firms that had data publicly available for more than one year. The exclusion of singletons may does not result in a specific sample bias, however, the exclusion of many companies due to this reason is of course negative as it reduces the sample's comparability to the real universe of listed US firms during the period.

6.2.7 Generalizability

The possibility to extend our results beyond the sample used in this study based on US firms to other countries depends how representative US companies are in comparison to firms in other countries. The fact that tax regulation as well as other corporate regulations are different across countries, the possibility of generalizing our results may decrease. Moreover, the results in our study are based on firms belong to sectors in proportions that may not reflect the proportion of sectors in other countries, which may also lower the possibility of generalizing our results to other countries. However, the fundamental theories on dividend policy and firm value are universal, and our results could provide valuable insights to managers in other countries outside of the US.

7. Conclusions

This study provides an up-to-date analysis on the relation between dividend policy and firm value from a financial management perspective, discussed in the light of established theories and previous empirical research. The results from our regressions indicate the existence of a statistically significant relation between firm value and the dividend policy for listed firms in the US between 2015 to 2019. We see that firm value is positively related to paying dividends for both value and growth companies, but the impact is substantially larger for value companies. However, given that dividends are paid, the firm value is negatively related to increasing payout ratios for growth companies, whereas we find no relation between firm value and the payout ratio for value companies. Lastly, we find no evidence for a relation between firm value and in what form dividends are distributed for growth companies, while we find a significantly positive relation between firm value and increasing the proportion of cash dividends to share repurchases for value companies. Overall, MM's conclusion about dividend irrelevance seems rather uncertain, which implies that market imperfections may be relevant to the dividend setting process and firm value.

From the perspective of earlier literature on the topic of dividend policy, our results on the relation between firm value and dividend policy for US firms during 2015-2019 was both expected and unexpected. Overall, the evidenced relations between firm value and the level of dividends as well as the form of distribution were different for growth and value companies. Thus, different market inefficiencies are significant and insignificance for companies with many available investment opportunities compared to companies with less available investment opportunities. From the perspective of the agency cost theory, inefficiencies due to overinvestment could be more relevant for value companies than for growth companies as the relation between the dividend ratio and firm value is more positive for value companies than for growth companies. Further, the positive relation between the payout ratio and higher levels of cash dividends compared to share repurchases indicate that value investors rewards companies that signal commitment for future stability and performance. In contrast, the negative relation between firm value and the payout ratio indicates that growth investors reward companies that signal confidence in finding and undertaking investment opportunities. It can be argued that the signaling theory and the agency theory of dividends best explains our results and that the implications for dividend policy are different for value and growth companies.

The implications of our study are relevant for corporate leaders that are managing the dividend setting processes of firms. Our results suggests that an "optimal dividend policy" to maximize firm value existed for US listed firms in 2015 to 2019, but that optimal dividend policy was different for growth and value companies. On one hand, a growth company could maximize it value by paying dividend but to the smallest degree as possible. However, the distribution method used by growth companies is not relevant for firm value. On the other hand, a value company could maximize its value by paying any level of dividends and by distributing the payout in the form of cash. From a financial management perspective, it is important to understand how to manage the dividend policy depending on what type of company it is, as this could have implications for firm value. However, it is worth repeating that our results do not provide casual relationships between dividend policy and firm valuation. We simply know that, for the period 2015-2019 in the US, different types of companies with different types of

dividends polices tended to have different levels of value.

This study also contributes to the existing body of research on dividend policy in four main ways. First, we add to the existing research by providing up-to-date empirical results on how the existing dividend policy of firms relates to the current enterprise value for listed firms in the US during 2015-2019. Second, we connect our results to established theories and earlier empirical evidence, and therefore adds a piece to the so-called dividend puzzle. Third, our study provides valuable insight for corporate managers. As we study the relation between the dividend policy and firm value, we are thus indirectly studying how decisions made by corporate leaders regarding the dividend policy are related firm values. Fourth, this study provides an alternative way to analyze the relationship between dividend policy and valuation compared to existing theories.

Our study includes some limitations. Firstly, this study does, as mentioned, not examine the casual relationship between dividend policy and firm valuation and therefore we are not able to state that managers of a company can increase or decrease the value of the firm by altering the dividend policy. Nevertheless, the results indicate that companies with a certain dividend policy tend to have a certain firm value, which provide appropriate understandings for the purpose of our thesis which is focusing on the relation between the existing dividend policy and the enterprise value for firms. Secondly, using the payout ratio to measure how much dividends companies pay entails two main issues. When net income is negative, the payout ratio is deficient to use as it becomes negative as well. Our study thus excludes these observations and is therefore biased towards profitable companies. When net income is extraordinarily low the payout ratio will be inflated, so our study further excludes observations where the payout ratio exceeds 250%. A third limitation in our study is that we use a large sample including different types of companies with generally different types of dividend policies. For example, the group of non-dividend companies are rather different from the dividend paying companies. Thus, cannot with certainty exclude the risk of type I and type II errors being present in our analysis.

For future research, it would be interesting to pursue a comparative study of a developed and an emerging market because empirical evidence related to emerging markets are relatively limited compared to the US market. With the increasing level of global equity investments along with the fact that emerging markets still differ to developed markets in matters of ownership structures, regulations, corporate governance as well as socio-political and financial stability, new insights about how dividend policy might relate to firm values could emerge. Additionally, based on the results in this study and previous research, there are still no explicit answers to why managers decide on one way of distribution before another. Crafting a model that better explains the reasons behind the choice of dividend policy could be interesting topic for future research as well.

8. References

E-journals

Al-Najjar, B. and Kilincarslan, E. (2019) "What Do We Know About the Dividend Puzzle? – A Literature Survey." International journal of managerial finance 15.2: 205–235.

Allen, F. and Michaely, R. (2003). "Payout policy", in Constantinides, G.M., Harris, M. and Stulz, R.M. (Eds), Handbook of the Economics of Finance, Vol. 1A, North Holland, Amsterdam, pp. 337-429.

Akerlof, G., (1970). "The market for lemons: qualitative uncertainly and market mechanism". Quarterly Journal of Economics 89, 488–500.

Baker, H. K., Powell, G. E., & Veit, E. T. (2002). "Revisiting the dividend puzzle: Do all of the pieces now fit?" Review of Financial Economics, 11(4), 241–261.

Baker, H.K., Singleton, J.C. and Veit, E.T. (2011). "Survey Research in Corporate Finance − Bridging the Gap between Theory and Practice", Oxford University Press, New York, NY.

Baker, H. and Weigand, W. (2015). "Corporate dividend policy revisited", Managerial Finance, Vol. 41, pp. 126-144.

Baker, M. and Wurgler, J. (2004a). "A catering theory of dividends", Journal of Finance, Vol. 59, No. 3, pp. 1125-1165.

Benartzi, Shlomo, Roni Michaely, and Richard H. Thaler. (1997). "Do changes in dividends signal the future or the past?" Journal of Finance 52:3, pp. 1007–43.

Black, F., & Scholes, M. (1974). "The effects of dividend yield and dividend policy on common stock prices and returns". Journal of Financial Economics, 1, 1–22.

Brav, A., Graham, J.R., Harvey, C.R. and Michaely, R. (2008). "Managerial response to the may 2003 dividend tax cut", Financial Management, Vol. 37 No. 4, pp. 611-624.

Brav A, Graham JR, Harvey CR, Michaely R. (2005). "Payout policy in the 21st century". J Finance Econ 77:483–527

Brennan, M. (1970). "Taxes, market valuation and financial policy". National Tax Journal,23, 417–429.

Bulan, L.T. and Subramanian, S. (2009), "The firm life cycle theory of dividends", in Baker, H.K. (Ed.), Dividends and Dividend Policy, John Wiley & Sons Inc., Hoboken, NJ, pp. 201-213.

Chan, K., Ikenberry, D., Lee, I. (2004). "Economic sources of gain in share repurchases".

Journal of Financial and Quantitative Analysis 39, 461–479.

DeHaan, Ed. (2021). Using and Interpreting Fixed Effects Models. SSRN Working Paper

DeAngelo, H., DeAngelo, L., and Skinner, D. (1995.) “Corporate payout policy”. Foundations and Trends in Finance 3:2-3, pp. 95–287.

DeAngelo, H., DeAngelo, L., and Douglas, S. (1994). “Reversal of fortune, dividend signaling and the disappearance of sustained earnings growth”. Journal of Financial Economics 40:3, pp. 341–71.

DeAngelo, H., DeAngelo, L., Stulz, R.M., (2006), “Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory”, Journal of Financial Economics 81, 227-254.

Denis, D. and Setpanyan, G. (2009), “Factors influencing dividends”, in Baker, H.K. (Ed.), Dividends and Dividend Policy, John Wiley & Sons, Hoboken, NJ, pp. 55-69.

Fama, E. F., & French, K. R. (2001). “Disappearing dividends: changing firm characteristics or lower propensity to pay?” Journal of Financial Economics, 60, 3–43.

Farre-Mensa, J., Michaely, R. and Schmalz, M.C. (2014). “Dividend policy”, Ross School of Business Paper No. 1227, February 24.

Filbeck, G. (2009). “Asymmetric information and signaling theory”, in Baker, H.K. (Ed.), Dividends and Dividend Policy, John Wiley & Sons Inc., Hoboken, NJ, pp. 163-177.

Gordon, M.J. (1959). “Dividends, earnings and stock prices”, Review of Economics and Statistics, Vol. 41 No. 2, pp. 99-105.

Gormley, T. A., and D. A. Matsa. (2014). “Common Errors: How to (and Not to) Control for Unobserved Heterogeneity”. Review of Financial Studies 27: 617–661.

Grullon, G and Michaely, R. (2002). “Dividends, share repurchases, and the substitution hypothesis”. Journal of Finance, 57(4), pp. 1649-1684.

Jagannathan, M, Stephens, C.P. and Weisbach, M.S. (2000). “Financial flexibility and the choice between dividends and stock repurchases”. Journal of Financial Economics, 57(3), pp. 355-384.

Jensen, M, (1986). “Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers”. The American Economic Review, Vol. 76, No. 2, pp. 323-329

Jiang, B., & Koller, T. (2011). “Paying back your shareholders”, McKinsey on Finance, no 39, 2-7.

Kalay, A. and Michaely, R. (2000). “Dividends and taxes: a re-examination”, Financial Management, Vol. 29 No. 2, pp. 55-75.

Kasetner, R and Liu, F. (1998). “New Evidence on the Information Content of Announcements.” The Quarterly Review of Economics and Finance, 38. (2), pp. 251-274

Leland, H. E., Pyle, D. H. (1977). “Informational asymmetries, financial structure, and financial intermediation”. Journal of Finance 32, 371–387.

Lintner, J. (1956). “Distribution of income of corporations among dividends, retained earnings and taxes”, American Economic Review, Vol. 46 No. 2, pp. 97-113.

Megginson, W. (1996). “Corporate Finance Theory”, Addison-Wesley, Reading, MA.

Miller, M., & Modigliani, F. (1961). “Dividend policy, growth, and the valuation of shares”. Journal of Business, 34, 411 – 433.

MSCI. (2018). “MSCI Cyclical and Defensive Sectors Indexes Methodology”.

Myers, S.C. (1984). “The capital structure puzzle, The journal of finance”, 39 (3), 574-592

Oswald, D; Young, S E. (2008). “Share reacquisitions, surplus cash, and agency problems.” Journal of Banking and Finance, Vol. 32, No. 5, 2008, p. 795-80

Zeng, L., & Luk, P. (2020). “Examining Share Repurchasing and the S&P Buyback Indices in the U.S. Market”, S&P Dow Jones Indices.

Newspaper articles

Business Law Today, “Should Congress or the SEC ‘Do Something’ About Stock Buybacks?”. Mar. 20, 2021. Available at: https://businesslawtoday.org/2021/03/congress-sec-something-stock-buybacks/ [Accessed Dec 3rd, 2021]

CNBC, “Stock buybacks surge to likely record highs, but a tax from Congress poses a threat”. Oct. 27, 2021. Available at: https://www.cnbc.com/2021/10/27/stock-buybacks-surge-to-likely-record-highs-but-a-tax-from-congress-poses-a-threat.html [Accessed Dec 3rd, 2021]

The New York Times, “Big Tech’s Domination of Business Reaches New Heights”. Aug. 19, 2020. Available at: https://www.nytimes.com/2020/08/19/technology/big-tech-business-domination.html [Accessed Dec 3rd, 2021]

The Wall Street Journal, “Record Stock Buybacks Draw Fire From Democratic Presidential Hopefuls”. Feb. 4, 2019. Available at https://www.wsj.com/articles/record-stock-buybacks-draw-fire-from-democratic-presidential-hopefuls-11549321288 [Accessed Dec 3rd, 2021]

9. Appendix

Figure 1b.

Total sample

Allocation of observations across groups represent different payout ratio groups

Payout ratio intervals	Number of observations	Share of total (%)
0%	1781	19.94
>0-25%	1521	17.02
>25-50%	1344	15.04
>50-75%	1224	13.70
>75-100%	1083	12.12
>100-250%	1981	22.17
Total	8,934	100.00

Figure 2b.

Total sample

Allocation of observations across groups represent different payout mix groups

Payout mix intervals	Number of observations	Share of total (%)
0% (100% share repurchases)	2,141	23.96
1-25%	614	6.87
>25-50%	1,053	11.79
>50-75%	810	9.07
>75-99%	1,309	14.65
100% (0% share repurchases)	1,226	13.72
No dividends paid	1,781	19.94
Total	8,934	100.00

Figure 3b.

Growth companies

Allocation of observations across groups represent different payout ratio groups

Payout ratio intervals	Number of observations	Share of total (%)
0%	686	15.36
>0-25%	602	13.48
>25-50%	610	13.66
>50-75%	677	15.16
>75-100%	642	14.38
>100-250%	1,248	27.95
Total	4465	100.00

Figure 4b.

Growth companies

Allocation of observations across groups represent different payout mix groups

Payout mix intervals	Number of observations	Share of total (%)
0% (100% share repurchases)	1,114	24.95
1-25%	349	7.82
>25-50%	675	15.12
>50-75%	486	10.88
>75-99%	634	14.20
100% (0% share repurchases)	521	11.67
No dividends paid	686	15.36
Total	4,465	100.00

Figure 5b.

Value companies

Allocation of observations across groups represent different payout ratio groups

Payout ratio intervals	Number of observations	Share of total (%)
0%	1,095	24.50
>0-25%	919	20.56
>25-50%	734	16.42
>50-75%	547	12.24
>75-100%	441	9.87
>100-250%	733	16.40
Total	4,469	100.00

Figure 6b.

Value companies

Allocation of observations across groups represent different payout mix groups

Payout mix intervals	Number of observations	Share of total (%)
0% (100% share repurchases)	1,027	22.98
1-25%	265	5.93
25-50%	378	8.46
50-75%	324	7.25
75-99%	675	15.10
100% (0% share repurchases)	705	15.78
No dividends paid	1,095	24.50
Total	4,469	100.00

Table 2.

Summary statistics				
	p25	Median	p75	Std. Dev.
Total sample				
Payout ratio (%)	4.8	46.7	93.2	57.9
Payout mix (%)	0.0	23.4	95.5	40.7
ROA (%)	6.0	9.3	0.139	.693
Market value (m)	458	1,951	8,088	47,720
EV/EBITDA (x)	7.1	10.3	14.6	362.9
Price-to-Book (x)	1.4	2.4	4.3	84.3
"Value"				
Payout ratio (%)	0.3	33	77.7	55
Payout mix (%)	0	14.5	99.8	42.5
ROA (%)	4.7	7.1	10.3	96.3
Market value (m)	196	891	3,670	24,290
EV/EBITDA (x)	5.4	7.9	10.7	421.4
Price-to-Book (x)	0.9	1.4	1.9	81.9
"Growth"				
Payout ratio (%)	15.8	61.8	106.3	58.8
Payout mix (%)	0	28.3	87.1	38.9
ROA (%)	8.4	11.9	16.8	17.1
Market value (m)	1,210	3,913	12,930	62,337
EV/EBITDA (x)	9.8	13.0	17.9	292.8
Price-to-Book (x)	3.2	4.3	6.6	86.1

Table 3.

Percentage of observations with "high sales growth", split between growth and value companies			
	Growth companies	Value companies	Total
Payout ratio group			
0%	78%	50%	61%
> 0-25%	68%	48%	56%
>25-50%	57%	43%	49%
>50-75%	51%	35%	44%
>75-100%	45%	37%	42%
>100-200%	47%	39%	44%
Payout mix group			
0% (100% share repurchases)	70%	47%	59%
>0-25%	43%	37%	40%
>25-50%	39%	36%	38%
>50-75%	41%	35%	39%
>75-99%	47%	40%	43%
100% (0% share repurchases)	55%	42%	48%
No dividends paid	78%	50%	61%
Total	56%	43%	50%

Table 4b.

Variable type equals one for growth companies. In Table 4, type equals one for value companies. Regression on the natural logarithm of enterprise value using firm fixed effects.

	Model (1)	Model (2)	Model (3)	Model (4)
Payout ratio (pr)	-0.0535***	-0.0534***	0.00434	-0.0554***
	(-4.72)	(-4.71)	(0.29)	(-4.88)
Payout mix (pm)	0.0580*	0.0525	0.0494	0.108**
	(1.99)	(1.78)	(1.70)	(3.16)
p=1	0.153***	0.201***	0.150***	0.150***
	(5.45)	(5.63)	(5.34)	(5.34)
p_type=1		-0.108*		
		(-2.18)		
pr_type			-0.105***	
			(5.05)	
pm_type				-0.108**
				(-2.94)
type=1	0.284***	0.373***	0.344***	0.326***
	(-14.32)	(-7.39)	(-13.62)	(-12.17)
growth=1	0.106***	0.106***	0.105***	0.106***
	(10.45)	(10.42)	(10.30)	(10.45)
margin=1	0.119***	0.118***	0.117***	0.118***
	(4.88)	(4.82)	(4.80)	(4.83)
profile=1	0.0389*	0.0397*	0.0404*	0.0402*
	(2.02)	(2.07)	(2.11)	(2.10)
liquidity=1	-0.0165	-0.0164	-0.0156	-0.0163
	(-1.06)	(-1.07)	(-1.01)	(-1.06)
Constant	7.638***	7.692***	7.676***	7.663***
	(265.63)	(186.33)	(249.43)	(250.09)
Observations	8,214	8,214	8,214	8,214
R^2	0.985	0.985	0.985	0.985
Within R^2	0.102	0.104	0.106	0.104

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. *t* statistics in parentheses.

This table provides the results of four fixed effects regressions to test each of the four hypotheses in this study. The dependent variable is the natural logarithm of enterprise value. Observations consist of the full non-singleton sample. Both *pr* (payout ratio) and *pm* (payout mix) are continuous variables. All other variables are dummy variables: *p* equals one if the observation pays dividends, otherwise zero; *type* equals one if the observation is a growth company, otherwise zero; *profile* equals one if the observation has a high ROA, otherwise zero; *margin* equals one if the observation has a high EBITDA-margin, otherwise zero; *liquidity* equals one if the observation is liquid, otherwise zero. The variable *p_type* is an interaction term between variable *p* and *type*, and equals one for growth companies that pays dividends, otherwise zero. The variable *pr_type* is an interaction term between variable *pr* and *type*, and equals *pr* for growth companies, otherwise zero. The variable *pm_type* is an interaction term between variable *pm* and *type*, and equals *pm* for growth companies, otherwise zero. The regressions include firm fixed effects (equivalent to including a dummy variable for each firm), however the coefficients are not included in the table. The within R2 disregards the dummies that are introduced in the model with firm fixed effects.

Table 5.

Standard deviation and residual variation				
	Std. Dev.			
	Pooled	Within*	Ratio (%)	R2 by fixed effect
ln(EV)	2.3720	0.3031	12.78	0.985
pr	0.5785	0.3398	58.73	0.683
pm	0.4115	0.1538	37.37	0.872
p	0.3995	0.1781	44.59	0.817
type	0.5000	0.2450	48.99	0.779
growth	0.5000	0.3825	76.49	0.462
margin	0.5000	0.2043	40.86	0.846
profile	0.5000	0.2692	53.84	0.734
liquidity	0.5000	0.2616	52.32	0.748
Variable type equals one for value companies (relevant for interaction terms in Table 4)				
p_type	0.4848	0.2547	52.53	0.746
pr_type	0.4601	0.2816	61.21	0.656
pm_type	0.3592	0.1729	48.13	0.787
Variable type equals one for growth companies (relevant for interaction terms in Table 4b)				
p_type	0.4941	0.2440	49.38	0.776
pr_type	0.5415	0.3043	56.21	0.710
pm_type	0.3369	0.1655	49.13	0.778

Note: columns with * were computed excluding singleton observations.
Column "Pooled" reports the standard deviation for the pooled sample. Column "Within*" reports the within-fixed-effect standard deviation. Column "Ratio (%)" reports the within-fixed effect variation. Column "Fixed effects" reports how much of the variation that is explained by the fixed effects. The results for the non-interaction terms are applicable for all regression models in Table 4 and Table 4b, as they are based on the same observations. For the interaction terms the results are provided for when variable *type* equals one for value companies (related to Table 4) and when variable *type* equals one for growth companies (related to Table 4b).

Table 7.

Firms and observations with no within-variation for different variables

	Number of firms (FE groups)	Share of all firms*	Number of observations	Share of all observations*
Payout ratio	297	13%	871	11%
Payout mix	1,041	47%	3,456	42%
p	1,894	85%	6,968	85%
p_type	1,576	70%	5,641	69%
pr_type	1,013	45%	3,735	45%
pm_type	1,461	65%	5,272	64%
type	1,625	73%	5,838	71%
growth	822	37%	2,640	32%
margin	1,815	81%	6,562	80%
profile	1,506	67%	5,345	65%
liquidity	1,547	69%	5,488	67%

Note: columns with * were computed excluding singleton observations.
The column "Number of firms (FE groups)" describes how many firms in the non-singleton data (firms with more than one observation) that have no variation for each variable in the table. "Share of all firms" indicate how many firms that had no within variation in the given variable out of the total non-singleton firm sample (2,237 firms). The column "Number of observations" indicates how many observations the "Number of firms (FE groups)" relate to for each variable in the table. "Share of all observations" indicate how many observations these fixed effects groups (firms) relate to out of the total non-singleton sample (8,214 observations).

Table 8.

Firms and observations with no within-variation for different variables, only dividend paying firm

	Number of firms	Share of all firms*	Number of observations	Share of all observations*
Payout ratio	0	0%	0	0%
Payout mix	655	29%	2,145	26%
pr_type	667	30%	2,623	32%
pm_type	1,061	47%	3,900	47%
type	1,316	59%	4,767	58%
growth	629	28%	2,016	25%
margin	1,481	66%	5,408	66%
profile	1,219	54%	4,404	54%
liquidity	1,251	56%	4,470	54%

Note: columns with * were computed excluding singleton observations.
The column "Number of firms" describes how many dividend paying firms in the non-singleton data (firms with more than one observation) that have no variation for each variable in the table. "Share of all firms" indicate how many firms that had no within variation in the given variable out of the total non-singleton firm sample, i.e., including both dividend paying and non-paying firms (2,237 firms). The column "Number of observations" indicates how many observations the "Number of firms (FE groups)" relate to for each variable in the table. "Share of all observations" indicate how many observations these fixed effects groups (firms) relate to out of the total non-singleton sample, i.e., including both dividend-paying and non-paying observations (8,214 observations). The two variables *p* and *p_type* are irrelevant when only including dividend paying companies and thus not included.

Table 9.

Regression on the natural logarithm of Enterprise Value using firm fixed effects		
	(a)	(b)
	Dividend paying firms	Non-dividend paying firms
type=1	-0.234***	-0.518***
	(-12.23)	(-6.86)
growth=1	0.105***	0.0734
	(11.02)	(1.53)
margin=1	0.0661**	0.333***
	(2.88)	(3.91)
profile=1	0.0172	0.0841
	(0.84)	(1.40)
liquidity=1	-0.0112	0.0184
	(-0.72)	(0.33)
Constant	8.186***	5.813***
	(428.59)	(71.98)
Observations	6,652	1,211
R^2	0.985	0.977
Within R^2	0.081	0.139

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This table provides compares estimated coefficients of control variables between dividend paying and non-paying firms. The dependent variable is the natural logarithm of Enterprise Value. Observations are excluding singletons. The control variables are dummy variables: *type* equals one if the observation is a value company, otherwise zero; *growth* equals one if the observation has high growth, otherwise zero; *profile* equals one if the observation has a high ROA, otherwise zero; *margin* equals one if the observation has a high EBITDA-margin, otherwise zero; *liquidity* equals one if the observation is liquid, otherwise zero. The regressions include firm fixed effects (equivalent to including a dummy variable for each firm), however the coefficients are not included in the table. The within R2 disregards the dummies that are introduced in the model with firm fixed effects.