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ABSTRACT

We investigate whether managers cater to investor preferences when demand for dividend-paying stocks is high, implementing a simple model developed by Baker and Wurgler (2004a). Expanding upon their work, we extend the sample period from 1980 to 2021 and implement two alternative approaches. Our findings present evidence in favour of the catering theory through both the dividend premium and the rate of initiation. However, no significant relationship was observed with announcement effects or future returns. Despite some evidence indicating catering, we conclude that the model fails to encapsulate all relevant aspects of this complex issue.

1. INTRODUCTION

The literature offers various explanations for why firms pay dividends, and whether the payout policy is price-neutral or not. One of these theories is “A Catering Theory of Dividends” (Baker & Wurgler, 2004a) which argues that the decision to pay dividends is driven by prevailing investors' demand for dividend-paying stocks. In its time, the study was innovative in terms of being the first paper that empirically tested the importance of investors' preferences in dividend-paying stocks at the scale of the entire market which challenged the market efficiency assumption from Miller and Modigliani (1961). Previous literature proposed that dividends were used to signal favourable information to the capital market (Bhattacharya, 1979; John & Williams, 1985; Miller and Rock, 1985). Other studies state that dividend-paying stocks should be more valuable since they reduce the agency cost of managers with substantial free cash flows that are more likely to invest in negative NPV projects (Deangelo & Deangelo, 2006). In contrast, Black (1976) argues that non-dividend payers should be worth more than payers since dividends are taxed more than capital gains.

Within finance, the preference for dividends seems to vary widely between investors. While some see dividends as a form of income (Becker et al., 2011), others might be inclined to always reinvest. In the early days of finance theory, companies that shared dividends with their investor were considered as solid value companies and companies that did not offer dividends were considered growth companies. However, this view on dividends has changed throughout the years and researchers are split on the topic. A Catering Theory of Dividends (Baker & Wurgler, 2004a) challenges traditional dividend literature and is in the cross-section between standard dividend theory and behavioural finance.

The question of whether managers cater to investor demand for dividends sits at the intersection of finance, strategy, and decision-making. Understanding the relationship between shareholder demand for dividends and managerial actions can help unravel the complex dynamics of these decisions. As such, this research could contribute to the broader understanding of the dynamics between corporate financial decision-making and investors.

This thesis uses the model of Baker and Wurgler (2004a) as a basis to investigate whether managers cater to investor demand for dividends when investors place a premium on dividend-paying stocks in the US market. We expand the sample period from 1980 to 2021 and perform ex-post testing of the model. It consists of three different measures for dividend premium: "the dividend premium", the average announcement effect of recent dividend initiation, and the difference between the future stock returns of payers and nonpayers. This period is interesting because it comprises the end of the dotcom bubble, multiple tax reforms, the financial crisis, periods of low-interest rates, and the Covid crisis.

To account for the possibility for managers to change the level of dividends, we propose an alternative approach that incorporates this (Li & Lie, 2006). Furthermore, we consider share repurchases (Grullon & Michaely, 2002), an increasingly common alternative to dividends in the late period of the sample.

We find results and some interesting trends that are consistent with the catering theory. The dividend premium - calculated as the log-difference between the average market-to-book of payers and nonpayers - and the rate of initiation results in favour of catering in some periods. Furthermore, we find the rate of initiation to be the measure that best formally captures the time-varying trends.

However, our findings are not entirely uniform. The model fails to capture any significant relationship between the announcement effect and the dividend premium. This is an important drawback since the theory suggests that managers cater to dividend demand to maximize the current share price. In contrast, using an alternative approach (Li & Lie, 2006), considering the announcement effect based on the change in dividend-level, we observe a positive correlation with the dividend premium. We are not able to find any evidence from future returns that are consistent with the catering theory.

Overall, for financial analysts and investors, these findings emphasize the need to consider multiple factors when investigating dividend policies and investor behaviour. Paying attention to a range of indicators—including but not limited to the dividend premium and rate of initiation—will provide a more comprehensive understanding of the factors driving dividend decisions. It is crucial, however, to recognize the potential limitations of each variable and remain open to other influences beyond those encapsulated by the model.

In the following sections, we present relevant literature, the methodology, findings, and the implications of our results. This helps understanding the complexities of dividend policy and the role of managerial catering to investor preferences. We also address the shortcomings of the model and how they impact our results, providing a comprehensive view of the catering theory.

2. LITERATURE REVIEW AND THEORY

One key question in the dividend policy literature is whether firms should pay dividends or retain earnings. The traditional view, known as the "dividend irrelevance theory," suggests that dividends do not affect a firm's value because investors can simply sell their shares if they want to receive income from their investments. However, more recent research has challenged this view and demonstrated that dividends can be relevant for firm valuation.

For example, some studies have found that firms issuing dividends tend to have higher valuations, possibly because dividends serve as a signal of a firm's financial strength and future performance. Other research has shown that dividend payments can affect the cost of capital for a firm, as investors may require a higher rate of return for non-dividend paying firms due to the lack of a tangible benefit.

2.1 Irrelevance of Dividend Policy

"Dividend Policy, Growth, and the Valuation of Shares" (Miller & Modigliani, 1961) is well-known within corporate finance and states that in the absence of taxes, bankruptcy costs, and other market imperfections, the value of a firm is independent of its capital structure. In the paper, also known as the "capital structure irrelevance" theorem or the "MM" theorem, Modigliani and Miller develop a theory of how dividends affect the value of a firm's shares. The authors consider a simple model of a firm that has a constant growth rate and that pays out all its earnings as dividends. They show that in this case, the value of the firm's shares is independent of dividends.

Furthermore, they build on this model and create a more realistic approach in which the firm has positive growth and pays out only a portion of its earnings as dividends. In this case, the value of the firm's shares is also independent of the dividends paid, as long as the dividends are paid out of its current earnings and not financed through the issuance of new shares. Finally, Modigliani and Miller consider a case where the firm has a negative growth rate and pays out dividends. In such a setting, the value of the firm's shares is dependent on the dividends paid, as the dividends represent a return on its declining assets.

The relevance of dividend policy has been researched extensively; however, researchers tend to have little consensus on the topic. Deangelo & Deangelo (2006) argues that payout policy is not irrelevant and that it affects stockholders' wealth. The seeming contradiction is due to the MM assumptions, which exclude the possibility of retained earnings. When retention is considered, dividend policy becomes relevant, aligning with most managers' beliefs. They propose that instead, the optimal payout policy involves large present-value distributions. This holds true in frictionless markets, in scenarios with agency costs, and when factors like personal taxes and asymmetric information problems encourage retention.

Furthermore, the authors critique the prevalent view of payout policy as secondary to investment policy, resulting from the idea of dividend irrelevance based on models involving signalling, dividend clientele, and behavioural biases.

2.2 Dividend Signalling Theory

Bhattacharya (1979) suggests that the dividend decision of a company can be viewed as a way of signalling its profitability and the quality of its investment opportunities. Profitable firms with attractive projects tend to pay higher dividends to differentiate themselves from those with less profitable ventures. Miller and Rock (1985), argue that in the presence of asymmetric information, the choice of dividend policy can affect a firm's cost of capital and its market value. They show that, under certain conditions, the firm can use its dividend policy as a signal to convey private information to investors. One of the main results of the paper is that, in the presence of asymmetric information, a firm's market value is not necessarily maximized by paying out all of its earnings as dividends. Instead, the optimal dividend policy depends on the relative strength of the signal being conveyed through dividends and the cost of retained earnings.

Miller and Rock's "Dividend Policy under Asymmetric Information" can be seen in light of the MM theorem by considering the role of dividends in reducing information asymmetry between management and shareholders. The authors argue that when there is asymmetric information, the firm's dividend policy can be used as a signal to shareholders about the future performance of a firm. This can help to reduce the information asymmetry between the two parties and make the firm's value more transparent.

In this sense, dividends can be seen as a form of "communication" between management and shareholders, providing a signal about the firm's prospects that can help to reduce the information asymmetry between the two parties. This is in contrast to the assumptions of the MM theorem, which assumes that there is perfect information and no information asymmetry between management and shareholders.

Nissim and Ziv (2001) provided new research on the topic and argue that there is a positive relationship between changes in dividends and future profitability. Based on the work of DeAngelo et. al. (1996) and Benartzi et. al. (1997), Nissim and Ziv find that changes in dividends are associated with subsequent investments in capital expenditures. The results suggest that announcements of dividend increases convey information about a company's belief that current profitability will be higher than expected. Then, the positive impact on profitability is likely to be long-lasting, and the company plans to invest in projects with a positive net present value that will generate profits in the future.

However, despite their new perspective on dividend changes and future earnings, Grullon et. al. (2005) criticized their work and particularly their model. The authors argue that the simple method of Nissim and Ziv, which fail to capture the potential nonlinear relations between dividends and earnings, is inappropriate and that the documented positive correlation can be spurious. By implementing a model of unexpected earnings, that explicitly controls for the nonlinear patterns in the behaviour of earnings, the relation between dividend changes and future earnings disappears. In addition, they find no evidence supporting the idea that dividend increases signal better prospects for firm profitability.

2.3 Dividend Clientele

Dividend clientele is a term that was first introduced by Modigliani and Miller (1961). They argue:

"(...) the existence of these [investor] preferences would clearly lead ultimately to a situation whose implications were different in no fundamental respect from the perfect market case. Each corporation would tend to attract to itself a 'clientele' consisting of those preferring its particular payout ratio, but one clientele would be entirely as good as another in terms of the valuation it would imply for the firm."

Black and Scholes (1974) corroborate this and argue that some investors may, for institutional or tax reasons, prefer dividends to capital gains. Stockholders in higher tax brackets show a preference for capital gains over dividend income relative to those in lower tax brackets (Elton & Gruber, 1970). Furthermore, retail investors, particularly older and lower-income individuals, show a preference for non-dividend-paying stocks, while institutions favour the hold dividend-paying stocks. Tax considerations influence these preferences, with high dividend stocks more common in tax-deferred accounts for younger investors, and tax increases leading to reduced dividend yield in retail portfolios (Graham & Kumar, 2006).

In the context of dividend clientele, two types of investors are identified: category investors and arbitrageurs. Category investors are interested in a particular company and may consider whether that company pays dividends or not. There are various explanations for this type of investor rationale. One reason is that there may be market imperfections, such as transaction costs, taxes, and institutional investment constraints, that lead to certain investors preferring dividend-paying stocks (Black and Scholes, 1974). Another reason is that there is a common belief that companies that pay dividends are less risky. This belief may be particularly appealing to inexperienced or naive investors, such as pensioners or those who hold dividend-paying stocks for "income" despite the tax penalty (Baker and Wurgler, 2004a).

Furthermore, investors may use dividend-paying stocks to infer a company's investment plans. For example, if a company does not pay dividends, investors may interpret this as evidence that the company believes it has strong investment opportunities, whereas if a company does pay dividends, this may indicate weaker future growth opportunities. Similarly, Thaler and Shefrin (1981) proposed that some investors prefer formal dividends over "homemade" dividends to combat self-control problems. They also motivate demand for dividends with prospect theory and regret aversion, which ultimately leads to a demand for dividend-paying stocks.

Arbitrageurs, on the other hand, focus on exploiting short-term price discrepancies or inefficiencies in the market. They take advantage of temporary price differences between securities, currencies, or other financial instruments to generate profits. These investors often have a keen understanding of market dynamics, including the timing and costs associated with executing trades (Shleifer & Vishny, 1997).

2.4 Catering Theory

To challenge the assumption of market efficiency by Miller-Modigliani, Baker and Wurgler (2004a) provide a behavioural approach based on investor preferences. The theory suggests that if there is a change in a company's dividend policy, but the fundamental characteristics of the firm remain unchanged, any resulting difference in the stock price can be attributed to investor behaviour or the demand for dividend-paying stocks. This theory is based on three assumptions:

- *"For either psychological or institutional reasons, some investors have an uninformed and perhaps time-varying demand for dividend-paying stocks.*
- *Arbitrage fails to prevent this demand from driving apart the prices of payers and nonpayers.*
- *Managers rationally cater to investor demand—they pay dividends when investors put higher prices on payers, and they do not pay when investors prefer nonpayers."*

They were the first to introduce the catering term and argue that catering to investor preferences can have an important effect on stock prices, as different investors will have different valuations for a given stock based on the dividends it offers. For instance, Becker (et al., 2011) highlights that dividend clienteles vary geographically, which creates differences in demand for dividends. The authors stress that these investors help appreciate the price of the stocks, causing other investors to take advantage, and followingly, managers will cater to the demand.

According to the MM theorem, if a firm can maintain a positive growth rate and does not finance dividends through the issuance of new shares, the value of its shares is independent of the dividends paid. This is because the dividends represent a return on the firm's assets, which are expected to grow at a constant rate. In contrast, the catering theory suggests that managers pay dividends when there is a demand for payouts, to increase the value of the firm.

3. METHODOLOGY AND HYPOTHESIS

“A Catering Theory of Dividends” argues that the decision to pay dividends is driven by the investors’ demand for dividend-paying stocks. To test the theory, Baker and Wurgler construct four measures for dividend premiums and examined whether those had a connection with the aggregated rate of initiation and omissions of dividends. In their sample of US stocks from 1962 to 2000, they find evidence of dividend catering, especially in the first 20-year period of their sample, but from 1980 until 2000 the relationship breaks down. We investigate this development further, by including the period after the dotcom bubble, to outline any new trends.

3.1 The Model

The foundation of the model is built on the three main assumptions of Baker and Wurgler, outlined in section 2. The demand from category investors comes from an irrational expectation of the terminal distribution and they do not recognize the cost of dividends. Arbitrageurs, on the other hand, have rational expectations over the terminal distribution, know the long-run cost of an interim dividend, and have aggregate risk tolerance per period. The risk aversion of arbitrageurs is how arbitrage is limited, and thus why the uninformed demand of category investors will drive prices from fundamentals. With arbitrage limited, the misperceptions of category investors cause the relative prices of payers and nonpayers to differ (Shleifer & Vishny, 1997).

The model relaxes the market efficiency assumption, offering a more nuanced understanding of the complex dynamics in the market regarding dividend payment decisions and price distortions from fundamentals. The role of risk aversion in arbitrageurs, which inherently limits arbitrage, significantly influences the distortion of prices from their fundamentals due to the uninformed demands of category investors. Given this, the manager chooses whether to pay dividends. He or she is risk neutral and considers both the current stock price and the total distribution. In a market where investors have a varied investment horizon, managers face the challenge of balancing short-term prices driven by investor demand with long-term fundamental values shaped by investment policy. Ultimately, the manager will pay dividends if the premium on dividend-paying stocks, after deducting the cost recognized by arbitrageurs, exceeds the implied long-run costs of dividends (Baker and Wurgler, 2004a).

However, this simple model does not capture insights about the persistence of dividends, the asymmetry in decisions to initiate and omit dividends, and the negative announcement effect of dividend omission. While the model is static, we apply time-series variation to interpret the model. The goal is to understand whether the dividend decisions cater to the prevailing dividend premium and if this premium correlates with specific, identifiable sources of demand. Time variation in the dividend premium proxies is presumed to reflect time variation in category investor demand and under traditional clientele arguments, category-level demand would vary with the imperfections that motivate clienteles. For example, the Jobs and Growth Tax Relief Reconciliation Act of 2003, a tax legislation in the U.S., reduced the tax rate on qualified dividends. Before 2003, dividends were taxed as ordinary income, while after the 2003 tax reform, the marginal federal dividend income tax rate was 15% for the recipients of most taxable dividends. This change was significant because it made dividend-paying stocks more attractive to a wider range of investors (Chetty & Saez, 2005).

3.2 Dividend Payment Variables

To distinguish between dividend payers and nonpayers we use the same method as Baker and Wurgler. Firms are considered a payer each fiscal year they have positive dividends per share, or else it is a nonpayer. To make a time series of the development in dividend payouts we categorize all firms into different groups depending on their dividend payout situation. Payers are all firms that pay dividends, New Payers are the number of initiators from last year's Nonpayers, Old Payers are the firms that also were payers last year, List Payers are the new payers that were not a part of the sample last year, New Nonpayers are the number of omitters among last year's payers and Delist Payers are last year's payers not in the sample anymore. The same categories hold for Nonpayers. When all firms are categorized, we use three variables to capture the dynamic of dividend payments:

$$Initiate_t = \frac{New\ Payers_t}{Nonpayers_{t-1} - Delist\ Nonpayers_t}$$

$$Continue_t = \frac{Old\ Payers_t}{Payers_{t-1} - Delist\ Payers_t}$$

$$Listpay_t = \frac{List\ Payers_t}{List\ Payers_t + List\ Nonpayers_t}$$

Initiate is the fraction of surviving nonpayers that become new payers. Continue is the fraction of surviving payers that continue to pay dividends in the following year and listpay is the fraction of newly listed firms that pay dividends in their first year. These dividend payment variables are the foundation of our analysis.

3.3 Dividend Premium Variables

When all firms are categorized, and the time-varying development in dividend payouts are identified, we need measures for the dividend premium to test if managers cater dividends when investors put a premium on dividend-paying stocks. To formalize this, we apply three measures for dividend premium from Baker and Wurgler (2004a).

The first measure is based on the market-to-book ratios of payers and nonpayers, referred to as “the dividend premium”. First, we calculate the market equity, book equity, and market-to-book ratio for all payers and nonpayers in the same way as Fama and French (2001). Then, we calculate the equal-weighted and value-weighted averages of the market-to-book ratio each year, for both payers and nonpayers. The dividend premium is the log-difference of market-to-book ratios between payers and nonpayers. In our analysis, we mainly focus on the equal-weighted premium due to several factors. The model in “A Catering Theory of Dividends” uses book values to weigh the market-to-book values in the value-weighted dividend premium. We find it more appropriate to use market capitalization as weights since it reflects the actual value of the companies more accurately. However, the problem with a value-weighted mean is that companies with a large market capitalization will have a large impact on the mean. Due to some issues with large outliers in the data sample, from problems with adjustment factors for both prices and shares, we are concerned that the value-weighted dividend premium is affected by some minor issues with the data. In addition, the dividend premium is measured against the dividend payment variables, which does not account for firm size. Therefore, it is more sensible to focus on the equal-weighted dividend premium.

The second measure is the average announcement effect of recent dividend initiation. This is based on the idea that if investors desire dividends they might make themselves heard through their reaction to dividend initiation. The announcement effect is captured by the average cumulative abnormal return in a three-day window from one day before the declaration date for initiators. To control for differences in volatility across firms and times (Campbell et al., 2001), we scale all the firms’ excess returns by the square root of three, times the standard deviation of its daily excess return. The standard deviation of the excess return is measured in a 115-day period from five days before the declaration date. The announcement effects each year is:

$$A_t = \sum_{n=1}^{N} \frac{Excess\ Return_n * \sqrt{3} * \sigma_n^2}{N}$$

To determine whether the average announcement return each year is statistically significant, we calculate the test statistic by multiplying A by the square root of the number of initiations each year. If managers cater dividends to investors' demand, intending to exploit a temporary mispricing of dividend-paying stocks, we expect the announcement return to be positive and correlated with the first dividend premium measure (Li & Lie, 2006).

The last measure considers the difference between future returns of payers and nonpayers. Since the theory is built on the prediction that managers cater dividends to investors to increase the share value, payers should be relatively overpriced compared to nonpayers when they initiate. If this is the case, high rates of initiation should forecast low returns on payers relative to nonpayers, as the price of payers reverts to fundamental value. We start by calculating the annual return for payers and nonpayers. Then, we compute the future return in t+1, t+2, and t+3 in addition to the cumulative return from year t+1 through t+3. Based on this, we calculate the difference in future return of payers and nonpayers. If the theory holds, we expect to see low returns on payers compared to nonpayers in times when the rate of initiation is high. It is important to note that this measure is based on expectations and predictions of future returns, which are inherently uncertain and subject to numerous factors that impact stock prices.

Moreover, we perform a correlation analysis of the three dividend premium variables. To the extent that the variables capture a common factor, we expect the dividend premium and the announcement effect to be positively correlated and negatively correlated to the future excess return of payers. In the correlation analysis, we also include an autocorrelation variable and a Dickey-Fuller test for unit root, to outline potential stationary variables.

3.4 Hypotheses

The catering theory predicts that the propensity to pay dividends depends on a dividend premium in stock prices. Moreover, we formalize hypotheses to test the if managers cater to the current dividend premium by applying time-variation in the three proxies for dividend premium. First, we perform several regression analyses for the different dividend payment variables on the dividend premiums.

For example:

$$Initiate_t = \alpha + \beta_1 P_{t-1}^{D-ND} + \beta_2 A_{t-1} + u_t \tag{1}$$

Initiate is the rate of initiation which express payers as a percentage of surviving nonpayers from t – 1. P_{t-1}^{D-ND} is the lagged equal-weighted dividend premium based on the market-to-book ratio of payers and nonpayers, and A_{t-1} is the lagged average initiation announcement effect. In addition to the rate of initiation, we run the regression on continue and listpay, as well as univariate regressions with initiate, continue, and listpay on the dividend premium and the announcement effect. The independent variables are standardized to have unit variance, and t-statistics use standard errors that are robust to heteroskedasticity and serial correlation up to four lags.

If the catering theory of dividends holds, we expect to see a clear positive coefficient for the dividend premium in the regression of both the rate of initiation and listpay. From Equation (1), the null and alternative hypotheses are:

$$H_0: \beta_1 = 0 \; and \; \beta_2 = 0$$
$$H_1: \beta_1 \neq 0 \; or \; \beta_2 \neq 0$$

Further, we look at the relationship between dividend policy and our third dividend premium proxy, future return on payers over nonpayers. To test this, we run 36 different univariate regressions. The most interesting model considers the relative return of payers and nonpayers. Here, we regress the difference in return of payers and nonpayers in t+1, t+2, t+3 and the cumulative return from t+1 through t+3, on initiate, continue, and listpay. We also run the same regressions of returns for payers and nonpayers separately, in each period. For example:

$$Return\ Payers_{\ t+1} = \alpha + \beta(Initiate_t) + u_t \tag{2}$$

If there is a premium on dividend payers and managers do cater dividends in an effort to maximize the current share price, we expect to see negative returns for payers compared to nonpayers after periods with high initiation rates as the share prices revert to fundamental value.

The null and alternative hypotheses based on Equation (2) are:

$$H_0: \beta_1 = 0$$
$$H_1: \beta_1 \neq 0$$

To deal with persistent explanatory variables and contemporaneous correlation we compute the bias-adjusted coefficients for small-sample bias from Strambaugh (1999). The bias-adjusted coefficients and the p-values were found employing a similar bootstrap estimation technique as Baker and Stein (2004), Vuolteenaho (2000), Kothari and Shanken (1997), Stambaugh (1999), and Ang and Bekaert (2007). This technique helps obtain more reliable coefficient estimates and assess the statistical significance of our regression results. In addition, this technique helps mitigate potential biases and provides robust coefficient estimates and p-values for the regression analysis.

To obtain bias-adjusted coefficients, we conduct two sets of simulations. In the first set, we recursively simulated the regression model using the initial predictor variable values and the coefficient estimates obtained through ordinary least squares. Furthermore, we draw observations with replacement from the empirical distribution of the errors, discarding the initial 100 draws to account for the unconditional distribution of the predictor variable. Then an additional set of observations equal to the size of the original sample was drawn. With each simulated sample, we re-estimated the regression model, resulting in a set of coefficients. The bias-adjusted coefficient is equal to the mean of the simulated coefficients minus the OLS coefficients. (Baker & Wurgler, 2004a).

In the second set of simulations, the entire process was repeated under the null hypothesis of no predictability, imposing a constraint that the coefficient is equal to zero. This allowed us to obtain a second set of coefficients. By comparing the bias-adjusted coefficient with the coefficients obtained under the null hypothesis, the probability of observing an estimate as large as the bias-adjusted coefficient was determined and represents the p-value.

3.5 Alternative Approach

3.5.1 Change in Dividend-Level

The catering theory of dividends has received critique for not including changes in dividend payout (Li & Lie, 2006). “A Catering Theory of Dividends” discusses the possibility to investigate changes in dividend-level but decides to leave this out for two reasons. First, they argue that investors only categorize companies into two groups, payers and nonpayers. Second, as an empirical matter, the payout ratio is sensitive to profitability and the dividend yield is sensitive to changes in share prices. However, the decision to initiate or omit is always a policy decision (Baker & Wurgler, 2004a). Li and Lie, on the other hand, argue that this is a significant drawback since the empirical incidence of dividend events suggests that corporate managers are far more likely to make decisions about dividend-level rather than decisions to either initiate or omit dividends. They also question the empirical results from the correlations analysis, where Baker and Wurgler did not find any statistically significant correlation between the announcement effect and the dividend premium. In "Dividend Changes and Catering Incentives" (Li & Lie, 2006), the authors create a new model based on the catering theory that includes changes in dividend levels. To account for the critique of not taking changes in dividend levels into account, we investigate the relationship between dividend changes and dividend premium.

To investigate this, we calculate the dividend changes for each company from period t to t-1 if the following dividend payout was within one year. We exclude the first observed dividend payment for all companies when calculating the measure for positive dividend changes, to eliminate the effect of initiation. The changes in dividend levels are standardized using the following equation:

$$\Delta_t = \frac{Dividend_t - Dividend_{t-1}}{Price_t}$$

The change is divided by the share price five days before the declaration date. Additionally, we compute the annual average and median of changes in dividends. In our model, we compare the increase in dividends to the rate of initiation, under the assumption that, if managers consider a dividend premium on payers and want to cater to this demand, they will either consider initiating, if they are non-payers, or increase dividends, if they are a payer. Therefore, we perform a similar regression on positive changes in dividends as previously performed on the rate of initiation.

We also include an announcement effect that is based on a larger sample of increases in the dividend-level rather than initiations. Li and Lie address the small sample of Baker and Wurgler (2004a) and argue that it could be the reason they do not find any significant relationship between the announcement effect and the dividend premium. The announcement factor is calculated by taking the three-day return from one-day prior declaration date when the dividend change was announced to one day after. We then subtract the value-weighted CRSP index to get the three-day excess return. To control for differences in volatility across firms and times we use Campbell (et al., 2001), in the same way as previously described. The regression is:

$$Median\ Positive\ Change\ in\ Dividend_t = \alpha + \beta_1 P_{t-1}^{D-ND} + \beta_2 A(Li\ \&\ Lie)_{t-1} + u_t \quad (3)$$

The dependent variable is the median of positive dividend changes each year. P_{t-1}^{D-ND} is the lagged equal-weighted dividend premium and $A(Li\ \&\ Lie)_{t-1}$ is the lagged average initiation announcement effect based on the change in dividends.

We expect to see that the lagged dividend premium and announcement effect are positively related to increases in dividend payments. The hypotheses to formally test Equation (3) are:

$$H_0: \beta_1 = 0\ and\ \beta_2 = 0$$
$$H_1: \beta_1 \neq 0\ or\ \beta_2 \neq 0$$

3.5.2 Share Repurchase

Share repurchases were not allowed in the US by the SEC until 1984 but have become increasingly popular in the last two decades(*Final Rule: Purchases of Certain Equity Securities by the Issuer and Others; Release No. 33-8335; 34-48766; IC-26252; File No. S7-50-02; November 10, 2003*). The literature provides mixed evidence on whether share repurchase works as a substitute for traditional dividend payout (Jiang et al., 2013). Jagannathan (2000) argue that firms use dividends to disburse permanent cash flows and repurchases while, on the other hand, Grullon & Michaely (2002) find that firms that disburse less funds, in the form of dividends, than predicted, tend to repurchase relatively more shares. This is consistent with a substitution effect. Li and Lie (2006) argue that if the dividend premium is relatively low and managers want to distribute funds to investors, they will then do so by repurchasing shares rather than paying dividends. Due to the significant increase in this alternative method to distribute funds in recent years, we investigate the relationship between repurchase and traditional dividend payments. To formalize this, we construct a correlation matrix with the variable for initiation, positive changes in dividend level, and share repurchase each year. If the correlation between the variables is positive and significant, it can imply that share repurchase works as a substitute for dividend payments.

We expect a negative relation between the dividend premium and share repurchase. To investigate this theory, we regress the average share repurchase of all companies in the sample on the same independent variables as in the regression of dividend changes:

$$Share\ Repurchase_t = \alpha + \beta_1 P_{t-1}^{D-ND} + \beta_2 A(Li \,\&\, Lie)_{t-1} + u_t \tag{4}$$

The null and alternative hypotheses from Equation (4) are:

$$H_0: \beta_1 = 0\ and\ \beta_2 = 0$$

$$H_1: \beta_1 \neq 0\ or\ \beta_2 \neq 0$$

4. DATA

In this section, we present the data and data sources. This is an extension of Baker and Wurgler's work through a new dataset that uncovers recent factors affecting companies' dividend policies. We explain the data applied to the model and report initial observations and key features. These elements lay the foundation for our comprehensive analysis and further, the conclusion.

4.1 Main Datasets

The data is extracted from Compustat and Center for Research in Security Prices (CRSP) in Wharton Research Data Services (WRDS). The Compustat sample contains yearly data, based on fiscal years, and comprises all US firms with data items as in Fama French (2001, pp. 40-41), however, opposed to Baker and Wurgler (2004), our sample ranges from 1980-2021. Similarly, firms with book equity below $250,000 or assets below $500,000 are excluded. In addition, we exclude utilities (SIC code 4900-4949) and financial firms (SIC code 6000-6999) due to companies in these sectors being heavily regulated.

To compute the second dividend premium variable, the announcement effect, we extract daily prices in the sample period from CRSP. By only including the companies from the Compustat sample, we ensure that both datasets are based on the same companies. First, we restrict the data of daily observations to include only the companies identified as new payers. Next, we calculate the cumulative return for the three-day period and subtract the value-weighted CRSP index to get a three-day excess return for initiators. Both datasets do not report split-adjusted prices which makes it necessary to adjust the prices with the corresponding price factor. This factor in Compustat is wrong for some companies, making the corresponding returns extremely high in these cases. To address this, we exclude companies with yearly returns over 5000% in the Compustat sample and daily returns over 300% where we observe that this is not true. For the CRSP sample, however, calculating returns is not necessary since it includes a variable for the holding period return for each observation. This also excludes any miscalculations which we observed with the adjustment factor.

After restricting the data, we proceed by dividing the firms into payers and nonpayers, as described in section 3. Furthermore, Table 1 summarizes the calculated dividend payment variables and the aggregate totals for both payers and nonpayers.

The rate of initiation varies through the 1980s and 1990s, however, we can see a declining trend before 2003 when the rate sees a huge spike in the next years. In addition, it is interesting that the rate significantly increases following the financial crisis of 2008. Similar to “A Catering Theory of Dividends”, we also observe smaller variation in firms that continue to pay dividends, which is expected. The rate of listpay is high early in the sample, as expected, but we can see a declining trend through the sample period despite a spike in 2003 as well.

Table 1: Measures of Dividend Payment, 1980-2021

Dividend payers, nonpayers, and the rates at which subsamples pay dividends. The initiation rate Initiate expresses payers as a percentage of surviving nonpayers from t − 1. The rate at which firms continue paying dividends Continue expresses payers as a percentage of surviving payers from t − 1. The rate at which lists pay Listpay expresses payers as a percentage of new lists at t.

	Payers				Nonpayers				Payment Rates (%)		
Year	**Total**	**New**	**Old**	**List**	**Total**	**New**	**Old**	**List**	**Initiate**	**Continue**	**Listpay**
1980	2226	67	2081	78	1547	79	1156	312	5.48	96.34	20.00
1981	2160	54	1974	132	2157	106	1350	701	3.85	94.90	15.85
1982	2026	53	1933	40	2227	100	1848	279	2.79	95.08	12.54
1983	1931	63	1812	56	2652	115	1936	601	3.15	94.03	8.52
1984	1875	97	1717	61	2732	70	2198	464	4.23	96.08	11.62
1985	1809	78	1671	60	2706	78	2227	401	3.38	95.54	13.02
1986	1731	71	1569	91	2974	101	2275	598	3.03	93.95	13.21
1987	1738	95	1519	124	3188	99	2515	574	3.64	93.88	17.77
1988	1681	123	1500	58	2956	86	2568	302	4.57	94.58	16.11
1989	1670	111	1494	65	2832	74	2459	299	4.32	95.28	17.86
1990	1634	88	1500	46	2798	93	2403	302	3.53	94.16	13.22
1991	1605	58	1492	55	2915	114	2431	370	2.33	92.90	12.94
1992	1642	93	1492	57	3211	94	2619	498	3.43	94.07	10.27
1993	1684	92	1485	107	3588	92	2831	665	3.15	94.17	13.86
1994	1768	115	1543	110	3807	83	3170	554	3.50	94.90	16.57
1995	1821	104	1648	69	4169	68	3433	668	2.94	96.04	9.36
1996	1819	91	1658	70	4682	73	3711	898	2.39	95.78	7.23
1997	1764	99	1607	58	4668	77	3979	612	2.43	95.43	8.66
1998	1730	84	1577	69	4389	60	3880	449	2.12	96.33	13.32
1999	1644	70	1521	53	4443	73	3763	607	1.83	95.42	8.03
2000	1523	66	1428	29	4385	95	3751	539	1.73	93.76	5.11
2001	1417	63	1314	40	3898	103	3545	250	1.75	92.73	13.79
2002	1352	77	1253	22	3632	101	3318	213	2.27	92.54	9.36
2003	1485	201	1254	30	3414	74	3135	205	6.03	94.43	12.77
2004	1565	142	1371	52	3320	56	2969	295	4.56	96.08	14.99
2005	1654	155	1445	54	3124	39	2813	272	5.22	97.37	16.56
2006	1617	95	1480	42	3118	69	2743	306	3.35	95.55	12.07
2007	1604	126	1433	45	3118	62	2713	343	4.44	95.85	11.60
2008	1535	82	1429	24	2852	83	2592	177	3.07	94.51	11.94
2009	1372	61	1295	16	2793	183	2469	141	2.41	87.62	10.19
2010	1440	137	1268	35	2725	79	2404	242	5.39	94.14	12.64
2011	1528	141	1352	35	2593	53	2307	233	5.76	96.23	13.06
2012	1666	197	1431	38	2398	46	2090	262	8.61	96.89	12.67
2013	1668	107	1500	61	2506	105	2083	318	4.89	93.46	16.09
2014	1722	116	1547	59	2514	74	2095	345	5.25	95.43	14.60
2015	1735	105	1586	44	2391	53	2100	238	4.76	96.77	15.60
2016	1668	72	1574	22	2317	84	2041	192	3.41	94.93	10.28
2017	1655	83	1538	34	2295	55	2003	237	3.98	96.55	12.55
2018	1631	89	1517	25	2341	54	2013	274	4.23	96.56	8.36
2019	1573	64	1493	16	2319	62	2005	252	3.09	96.01	5.97
2020	1511	59	1420	32	2528	97	2049	382	2.80	93.61	7.73
2021	1319	92	1190	37	2763	111	2049	603	4.30	91.47	5.78
Mean	1671	96	1522	54	3047	83	2572	392	3.75	94.79	12.23
SD	190	35	185	27	747	25	675	178	1.38	1.73	3.51

4.2 Data for Alternative Methodologies

For the model based on "Dividend Changes and Catering Incentives" (Li & Lie, 2006) we use daily data from CRSP in the same period from 1980-2021. We only include firms that are categorized as payers in our Compustat sample and all observations with a daily return larger than 300% are excluded. The first observed dividend payment for each firm is also ignored, to omit the effect of initiation. In the dataset for dividend changes, we have a sample with 35,404 dividend increases and 15,674 decreases.

To formally examine the effect of share repurchases, we use annual data from Compustat in the period from 1980-2021 and restrict this in the same way as the original dataset. The observations are sorted into two categories based on whether the firm repurchases shares in the given year. From this, we construct a ratio for the number of companies that repurchase shares over the total number of firms in the sample.

5. RESULTS AND ANALYSIS

In this section, we analyse the research question and investigate possible trends in the propensity to pay dividends in the period from 1980 to 2021. First, we address the three dividend premium variables and highlight the most important findings. Secondly, we outline potential common factors and time trends from the data with the use of univariate and multivariate regressions. In addition, we propose alternative explanations as to why managers cater dividends to investor demand. Lastly, we address the implications of the results based on a timeline of the sample period.

In "Appearing and disappearing dividends: The link to catering incentives" Baker & Wurgler (2004b) apply the methodology of Fama and French (2001) and identified four distinct trends in the propensity to pay dividends in the period from 1963 to 2000. All these trends were associated with the corresponding fluctuation in dividend premiums. To outline possible trends, it is important to understand the basics, namely why an investor would invest in dividend-paying stocks over non-paying stocks. From traditional dividend clientele, it is not necessarily the fundamental value of a firm that appeals to investors.

5.1 Dividend Premium Variables

5.1.1 The Dividend Premium

In Table 2, we observe that the equal-weighted dividend premium is low relative to the mean early in the period before increasing conservatively. The measure is negative in all periods before the financial crisis, where it spikes and is positive in 2008, 2010, and 2011. Noteworthy is also the value-weighted dividend premium which experiences a much lower variability and a lower mean. This measure is negative throughout the sample period, also in the stressed periods which is somewhat expected considering the larger weighting of high market-to-book companies and the composition of companies. This subsequently makes the weighted market-to-book values of nonpayers relatively higher, with a mean of 3.32 versus 2.54 for the equal-weighted premium.

However, the dividend premium best captures the relative change rather than the actual values based on the market-to-book ratio, and hence it is more useful to look at the trends. The dividend premium implicitly measures the premium investors put on payers over nonpayers. From our data, this implies that investors highly value dividend payers in the financial crisis. This is somewhat supported in the years after the dotcom bubble of 2000 and supports the traditional consensus that dividend-paying stocks are viewed as less risky.

It is also important to understand the drivers of the dividend premium which is solely based on the market-to-book ratio. Although it is a good tool to measure the relative change over time, it can potentially leave out some key features when comparing dividend payers to nonpayers.

Table 2: The Dividend Premium, 1980-2021

The market valuations of dividend payers and nonpayer. The table reports the average market-to-book for payers and nonpayers, respectively, both equal-weighted and value-weighted. The dividend premium is the log-difference between payers and nonpayers.

	Payers (M/B)		Nonpayers (M/B)		Dividend Premium	
Year	EW	VW	EW	VW	EW	VW
1980	1.35	1.46	2.57	3.18	-64.49	-78.22
1981	1.22	1.24	1.80	2.28	-39.22	-60.86
1982	1.31	1.35	1.94	2.58	-39.16	-65.21
1983	1.45	1.42	2.25	2.60	-44.16	-60.96
1984	1.35	1.34	1.84	2.01	-31.15	-40.66
1985	1.48	1.48	2.14	2.42	-36.93	-49.39
1986	1.51	1.59	2.24	2.70	-38.94	-53.30
1987	1.46	1.66	2.00	2.40	-31.01	-36.58
1988	1.51	1.57	1.93	2.39	-24.42	-42.18
1989	1.55	1.74	1.96	2.37	-23.58	-30.84
1990	1.40	1.73	1.73	2.56	-20.91	-39.26
1991	1.59	2.11	2.33	3.32	-38.28	-45.25
1992	1.65	1.98	2.17	2.80	-27.26	-34.58
1993	1.69	1.86	2.31	3.00	-31.38	-47.54
1994	1.55	1.78	2.01	2.40	-25.56	-30.00
1995	1.61	2.01	2.49	3.23	-43.48	-47.31
1996	1.69	2.23	2.42	3.09	-36.11	-32.63
1997	1.83	2.66	2.33	3.59	-24.38	-29.82
1998	1.79	3.40	2.18	4.59	-20.13	-29.94
1999	2.01	6.58	3.87	10.55	-65.58	-47.15
2000	1.84	3.41	2.36	6.30	-25.14	-61.19
2001	1.70	2.47	2.37	3.35	-33.29	-30.64
2002	1.61	1.99	1.77	2.48	-9.75	-22.39
2003	1.87	2.07	2.67	2.65	-35.34	-24.78
2004	2.06	2.02	2.91	2.99	-34.58	-39.18
2005	2.09	1.98	2.70	3.26	-25.28	-49.81
2006	2.20	2.01	2.69	2.83	-20.29	-34.27
2007	2.11	2.19	2.63	3.38	-22.08	-43.32
2008	1.78	1.83	1.65	2.03	7.51	-10.48
2009	1.86	1.80	2.17	2.28	-15.61	-23.90
2010	3.93	2.22	2.40	2.33	49.20	-4.88
2011	3.45	2.10	2.67	2.48	25.57	-16.59
2012	2.75	1.93	2.93	2.51	-6.20	-26.11
2013	3.01	2.06	3.50	3.20	-15.17	-43.71
2014	2.79	2.16	3.15	3.30	-12.33	-42.68
2015	2.08	2.09	3.50	3.60	-51.90	-54.19
2016	2.22	2.04	2.74	3.01	-20.85	-38.75
2017	2.26	2.28	3.80	3.71	-52.11	-48.58
2018	2.05	2.24	3.29	3.85	-47.45	-53.86
2019	1.95	2.51	2.86	3.91	-38.36	-44.30
2020	1.97	3.17	3.87	5.82	-67.36	-60.87
2021	2.16	3.20	3.59	6.07	-50.80	-63.95
Mean	1.92	2.17	2.54	3.32	-28.76	-41.43
SD	0.57	0.87	0.61	1.51	21.80	15.36

5.1.2 The Announcement Effect

The announcement effect captures whether investors respond to the alleged clamouring for dividends by investing in initiators. Table 3 reports the findings, and we observe that the announcement effect is positive in all years except in 1986. So, the average responses to dividend initiation after controlling for differences in volatility across firms and time, are positive nearly each year. If investors respond positively to dividend initiation because they clamour for dividends and want to make themselves heard through their reaction to initiation as Baker and Wurgler argue, we expect to see a clear relationship between the announcement factor and the dividend premium.

We observe a large increase in the announcement effect and excess return around the year 2000. Accordingly, we also see high t-stats in this time period indicating a positive reaction to dividend initiations. Except for these years, there is not a visible pattern in the measure which could suggest that these findings are due to the high volatility in the period. Surprisingly, we observe the opposite of the implications of the catering theory. There is little sign of interest from investors regarding dividend initiation overall, which implies that investors do not make themselves heard through their reaction to initiation. Moreover, there is little evidence of a clear relationship between the announcement effect and the dividend premium, which is inconsistent with the catering theory (Appendix 1).

Table 3: Market Reactions to Dividend Initiations, 1980-2021

We calculate the sum of the differences between the firm return and the CRSP value-weighted market return for a three-day window [−1, +1] around the declaration date. The announcement effect A scales this return by the standard deviation of the excess returns between 120 calendar days and five trading days before the declaration date. The test statistic tests the null hypothesis of zero average price reaction in year t.

Year	N	Excess Return	A	t-stat
1980	41	2.54	0.19	1.19
1981	26	2.07	0.08	0.41
1982	30	1.18	0.05	0.25
1983	47	1.65	0.10	0.66
1984	44	1.46	0.04	0.25
1985	44	2.46	0.09	0.62
1986	43	1.09	-0.07	-0.46
1987	70	2.24	0.10	0.88
1988	60	1.94	0.09	0.67
1989	42	3.94	0.15	0.94
1990	50	1.18	0.15	1.09
1991	39	4.91	0.47	2.93
1992	51	2.37	0.16	1.16
1993	60	2.85	0.15	1.15
1994	78	1.21	0.07	0.60
1995	74	0.83	0.04	0.32
1996	61	2.37	0.11	0.85
1997	56	2.70	0.10	0.77
1998	67	2.34	0.11	0.92
1999	76	6.38	0.54	4.68
2000	58	4.02	0.41	3.14
2001	65	0.77	0.08	0.67
2002	59	2.82	0.25	1.95
2003	141	3.12	0.24	2.87
2004	105	2.45	0.19	1.96
2005	96	1.79	0.07	0.65
2006	87	1.97	0.08	0.73
2007	86	1.60	0.05	0.42
2008	68	1.69	0.14	1.19
2009	58	2.56	0.13	1.02
2010	94	2.78	0.16	1.55
2011	105	2.00	0.09	0.96
2012	167	3.18	0.16	2.09
2013	87	2.50	0.08	0.76
2014	72	2.32	0.12	1.01
2015	78	1.54	0.07	0.60
2016	46	2.66	0.17	1.12
2017	60	1.52	0.06	0.44
2018	82	3.09	0.20	1.85
2019	51	1.02	0.07	0.50
2020	46	4.19	0.29	1.93
2021	74	2.55	0.16	1.34
Mean	68	2.38	0.14	1.16
SD	28	1.12	0.11	0.93

5.1.3 Future Returns

If managers rationally decide to start paying dividends to take advantage of market mispricing, a high frequency of initiations should predict lower future returns for firms that pay dividends compared to nonpayers. This occurs as the relative overvaluation of dividend-paying firms experiences a reversal. Figure 1 shows the rate of initiation and the three-year cumulative excess returns of payers to nonpayers. Our analysis shows this to be somewhat true in certain periods, mainly after the dotcom bubble. In 2012 we observe a high rate of initiation following a dip in future returns, which implies negative returns for payers compared to nonpayers after the period with high initiation. This is consistent with the catering theory; however, we do not observe other periods where the relationship holds which could suggest that the measure is not applicable to the theory.

Although there are some trends in the future excess return, to draw a conclusion solely based on this, is too simplistic. We also observe huge decreases in future returns in 1989 and 2002 without a spike in the rate of initiation (Figure 1). This could indicate that it is explained by market forces or variables not captured in the model. Future returns depend on a variety of different market- and behavioural factors, such as irrational investors who change their preference for dividends. To conclude that managers rationally exploit this market mispricing is one-sided. This weakens one of the main arguments of the model, the relationship between initiations and future returns, which ultimately gives doubt to the catering theory.

Figure 1: Cumulative Difference in Future Returns and the Rate of Initiation, 1980-2021

5.1.4 Relationship Between the Dividend Premium Variables

To formally investigate the relationship between the different dividend premium variables we create a correlation matrix and perform a test for autocorrelation. We also apply a Dickey-Fuller test to assess the presence of unit roots in the time series. The results are summarised in Table 4 with the corresponding p-values in square brackets. As expected, there is a high correlation between the equal-weighted and the value-weighted dividend premium, and both measures for future returns. Furthermore, both measures of dividend premium are negatively correlated with future returns. Although not statistically significant for the equal-weighted measure, this is consistent with the catering theory since a high dividend premium implies a low future return for payers over nonpayers and overall strengthens the hypothesis.

To the extent that they capture a common factor, Baker and Wurgler (2004a) expect the dividend premium and announcement effects to be positively correlated with each other, and negatively correlated with the future excess returns of payers. An interesting finding is that the dividend premium negatively correlates with the announcement effect (Appendix 1). This implies that the stock return upon dividend initiation announcements decreases with the dividend premium. However, we find no statistically significant results to back this up. This is disconcerting because it raises doubts about the empirical validity of the catering theory (Li & Lie, 2006). The authors expand upon the idea of why managers might concern themselves with the dividend premium, especially when the stock market appears indifferent to dividend initiation announcements. They propose that if the stock market does not respond to these initiations, the catering theory might not hold. Essentially, if the market does not value managers' efforts towards meeting the demand for dividends, there would be little incentive for managers to continue this practice.

In the context of the Dickey-Fuller test, the null hypothesis is that a time series has a unit root, meaning it is non-stationary. Generally, non-stationarity in a time series implies that the properties, such as the mean or the variance, of the series change over time. We fail to reject the null hypothesis for the equal-weighted dividend premium and the cumulative future returns, which indicate non-stationarity. This is concerning for our analysis and potentially implies that some results are spurious.

Table 4: Statistics for Demand for Dividend Measures, 1980-2021

The first column shows the autocorrelation coefficient, the second column shows a Dickey–Fuller test, and the remaining columns show the correlations among the variables. p-values are in brackets.

			Dividend Premium		Announcement Effect	Future Returns	
	ρ	Unit Root	VW	EW	A	r(t+1)	R(t+3)
VW	0.56	-3.70	1.00				
	[0.00]	*[0.00]*					
EW	0.49	-2.03	0.78	1.00			
	[0.00]	*[0.27]*	*[0.00]*				
A	0.25	-4.83	-0.04	-0.16	1.00		
	[0.02]	*[0.00]*	*[0.79]*	*[0.31]*			
r(t+1)	-0.15	-4.44	-0.31	-0.19	-0.14	1.00	
		[0.00]	*[0.03]*	*[0.12]*	*[0.65]*		
R(t+3)	0.50	-2.79	-0.32	-0.13	-0.28	0.60	1.00
		[0.06]	*[0.04]*	*[0.27]*	*[0.16]*	*[0.00]*	

Table 4 also reports the autocorrelation coefficients for the measures of demand. We observe that both dividend premiums and the announcement effect have relatively high autocorrelation and low p-values. This questions the robustness of the model and implies that these time series are highly dependent on their past values. Thus, we use the Newey-West standard errors in further analysis with these variables to make the results more robust in the presence of autocorrelation and heteroscedasticity.

5.2 Dividend Premium Variables and the Rate of Initiation

5.2.1 Time-Varying Regressions

To examine the time-varying relationship, we introduce several regressions for the rate of initiation and the dividend premium variables. The regression output from Equation (1) is summarized in Table 5. All independent variables have been standardized to possess unit variance. We reject the null hypothesis regarding autocorrelation; thus, we use Newey-West´s heteroscedasticity and autocorrelation consistent standard error with up to four lags to ensure robustness. Model 1 corresponds to the rate of initiation regressed on the value-weighted dividend premium. The same holds for models 2 and 3 for the equal-weighted dividend premium and the announcement effect, respectively. Model 4 shows initiation regressed on all variables.

From the regression output, we observe that the equal-weighted measure is statistically significant at a 0.001 level. This means that we reject the null hypothesis and find that there is a significant relationship between the equal-weighted dividend premium and the rate of initiation. As expected, we see a clear positive coefficient for the dividend premium. The number implies that a one-standard-deviation increase in the equal-weighted premium will lead to a 0.79% increase in initiations, or roughly a half-standard-deviation of the initiation rate, with an explanatory power of 29% of the time-series variation.

Table 5: Regression on the Rate of Initiation, 1980-2021

Regressions of dividend initiation and omission rates on the equal-weighted- and value weighted dividend premium and the announcement effect. The initiation rate expresses payers as a percentage of surviving nonpayers from t − 1. The independent variables are standardized to have unit variance. t-statistics use standard errors that are robust to heteroskedasticity and serial correlation up to four lags.

	Model 1	**Model 2**	**Model 3**	**Model 4**
	Initiate			
VW (t-1)	0.51*			
	(0.27)			
EW (t-1)		0.79***		0.78***
		(0.23)		*(0.22)*
A (t-1)			-0.18	-0.05
			(0.20)	*(0.14)*
R-squared	0.12	0.29	0.02	0.29
N	35	35	35	35

Regarding the rate of continuation, the announcement effect is the only significant variable with explanatory power of 4%. This implies that a one-standard-deviation increase in the announcement effect decreases the continuation rate by -0.34 percentage points which further suggests that managers are more likely to omit in the presence of an announcement effect. Furthermore, we observe no significant findings in our model regarding listpay which is surprising given that we should expect to see a clear positive coefficient for the dividend premium in the regression of listpay (Appendix 2).

To formally look at the link between initiate and the equal-weighted premium we plot both time series (Figure 2). It reveals a weak relationship from 1980 to 2008 which is consistent with Fama and French (2001) who observes: *"It suggests that the relationship has broken down in the most recent period. (...) After 1980, the sample tilts toward small, unprofitable, high market-to-book firms that are* *unlikely to initiate dividends regardless of market conditions."* In the period after 2008, on the other hand, the relationship reverts and highly correlates. This could imply the period between 1985 and the financial crisis is largely affected by the industry composition of firms. Before 1980, the two variables were highly correlated and almost moved in lockstep and Baker and Wurgler (2004a) argue that this was due to the high ratio of listed companies being payers. Consistent with Doidge (et. al., 2017), this decrease in (typically) smaller companies could incentivize managers to initiate dividends, when demand is high.

There is a relatively clear relationship between the dividend premium and the rate of initiation. The period before the dotcom bubble was dominated by nonpayers, whereas before and during the financial crisis investors preferred dividends. From the rate initiation we see that managers initiate dividends based on this preference and the same is somewhat visible for the dividend premium, although this has more noise in certain periods. This is consistent with the catering theory.

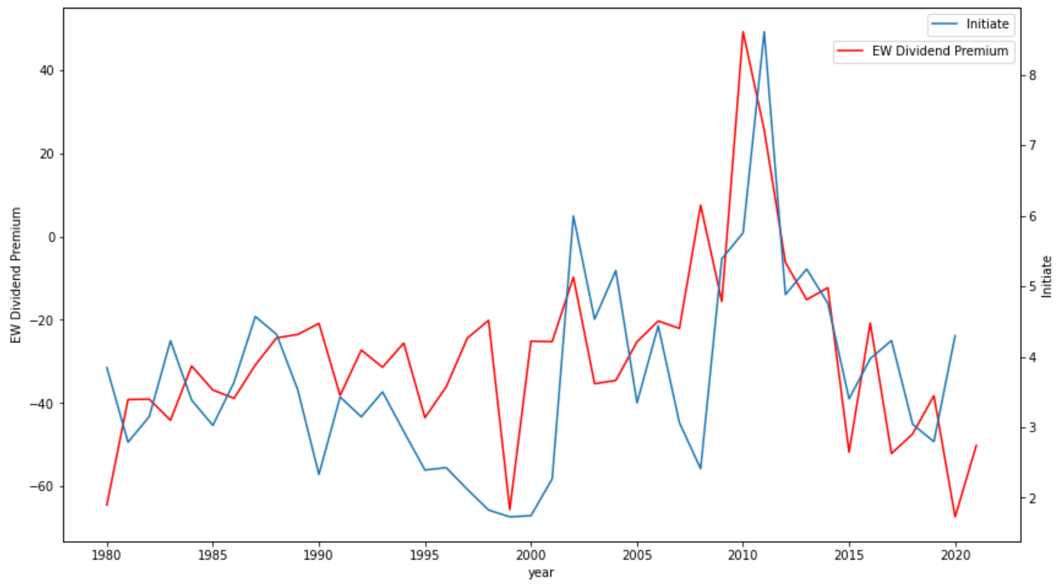

Figure 2: The Dividend Premium and the Rate of Initiation, 1980-2021

5.2.2 Predicting Future Returns

A widely researched topic in corporate finance is whether changes in dividend policy affect future returns. To further examine the time-varying relation of the variables, we impose a model for the prediction of returns that captures the relationship between dividend payment variables and future returns. We created a measure for the returns of payers and nonpayers in each of the three years following a dividend payment. In addition, we calculated the cumulative returns from year one through year three following a dividend initiation. The regression is split into three panels. To obtain Panel A, the relative returns between payers and nonpayers, we first predict returns for payers and nonpayers separately in Panel B and Panel C (Appendix 3). Table 6 reports the regression output from Equation (2) which corresponds to Panel A.

The OLS coefficient represents the beta of initiate, while the BA coefficients adjust the OLS coefficients for small-sample bias (Stambaugh, 1999). This implies that a one-standard-deviation increase in the rate of initiate increases the one-year future returns by 3.23 percentage points. We observe, as expected, high p-values, high standard deviations, and little explanatory power in the regressions. The high p-values indicate that we fail to reject the null hypothesis - dividend initiations predict future returns. This is not surprising given the difficulty to predict returns and the many different factors affecting future returns which are not captured in our model.

Table 6: Predicting Future Relative Returns, 1980-2021

Univariate regressions of future excess returns of dividend payers over nonpayers on the initiation rate. We estimate both OLS- and bias-adjusted (BA) coefficients. Bootstrap p-values represent a two-tailed test of the null hypothesis of no predictability. The dependent variable is the difference in real returns between dividend payers rD and nonpayers rND. The independent variables are standardized to have unit variance.

	N	*Initiate*				*Continue*				*Listpay*			
		OLS	BA	p-value	R-squared	OLS	BA	p-value	R-squared	OLS	BA	p-value	R-squared
$rD_{t+1} - rND_{t+1}$	40	3.23	3.17	0.29	0.03	1.04	1.04	0.74	0.00	3.44	3.30	0.30	0.03
$rD_{t+2} - rND_{t+2}$	39	1.66	1.64	0.59	0.01	-0.16	-0.12	0.96	0.00	-0.50	-0.48	0.89	0.00
$rD_{t+3} - rND_{t+3}$	38	3.26	3.28	0.29	0.03	-0.45	-0.35	0.89	0.00	7.14	7.34	0.05	0.10
$RD_{t+3} - RND_{t+3}$	38	10.43	10.48	0.09	0.08	3.74	3.28	0.57	0.01	11.07	11.37	0.13	0.06

Despite finding no significant results, we observe a high coefficient for listpay and initiate, especially for the three-year cumulative return. This is the opposite of what Baker and Wurgler (2004a) found and is not consistent with the catering theory. Nissim and Ziv (2001) report that dividend increases are positively associated with profits, but dividend decreases are not related to future profits. This illustrates the weakness of our model. However, their work is not supported by other researchers such as Grullon (et. al., 2005) who argue that models that include dividend changes do not outperform those that do not. Further, they criticise the model of Nissim and Ziv to potentially be spurious and conclude the opposite, that nothing is supporting the idea that dividend increases signal better prospects for firm profitability. Overall, there is little evidence that supports the relationship between future return and initiation.

5.3 Alternative Approach

5.3.1 Change in Dividend Level and Alternative Announcement Effect

Based on the critique of the catering theory (Li & Lie, 2006), we analyse change in dividends. In Figure 3, we compare the average positive changes in dividends to the rate of initiation. There is a relatively clear relationship between the two measures with a positive correlation of 0.29. Since the measure for change in dividends does not include initiations, the relation could reflect that, regardless of whether managers already pay dividends or not, they either initiate dividends or increase payouts based on the same time-varying factors.

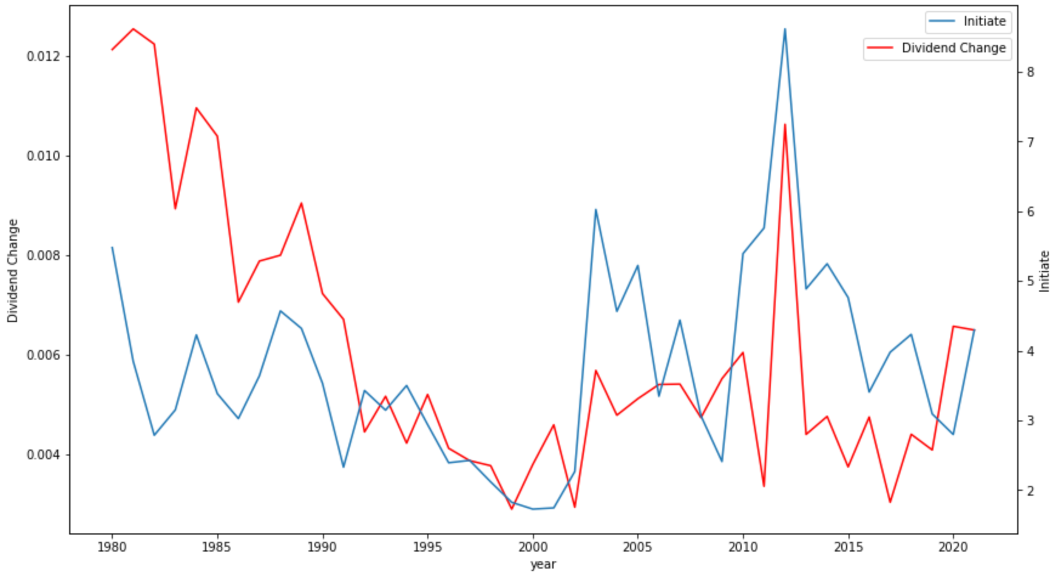

Figure 3: Dividend Change and Initiation, 1980-2021

Furthermore, we perform a regression of the positive dividend change on the dividend premium and announcement effect that is based on changes in the dividend level. Table 7 reports the regression output from Equation (3). From Model 14, it is evident that a one-standard-deviation increase in the lagged equal-weighted dividend premium suggests a 0.34% rise in positive dividend changes. In Model 15, we observe that a one-standard deviation increase in the lagged announcement effect corresponds to a 0.44% positive change in the dependent variable. Lastly, Model 16 reveals that the two dependent variables have an explanatory power of 20% on the fluctuation in the median of positive dividend changes. Both variables are significant at a 0.01 and 0.05 level, respectively, which implies that we reject the null hypothesis. This suggests that if demand for dividends rise, or investors' reaction to dividend increases is more positive, it will have a positive impact on the dividend level in the following period.

Table 7: Regression on Median Positive Dividend Change

Regressions of dividend premium and the announcement effect from Li and Lie (2006) on the median of positive dividend change. The independent variables are standardized to have unit variance. t-statistics use standard errors that are robust to heteroskedasticity and serial correlation up to four lags.

	Model 13	Model 14	Model 15	Model 16
	Median Positive Dividend Change			
VW (t-1)	0.21			
	(0.15)			
EW (t-1)		0.34*		0.33**
		(0.18)		*(0.15)*
A (t-1) (Lie&Li)			0.44*	0.43*
			(0.25)	*(0.23)*
R-squared	0.03	0.08	0.13	0.20
N	35	35	35	35

In contrast to Baker and Wurgler (2004a), Li and Lie found a positive relationship between the dividend premium and the announcement effect when analysing the change in dividend level, rather than only studying data on dividend initiations. Similar to Baker and Wurgler, we also failed to find any significant connection between the two variables which gives incentives to implement the approach of Li and Lie (2006).

The announcement effect, based on dividend initiations, is negatively correlated with the equal-weighted dividend premium. The announcement effect based on dividend increases, on the other hand, is positively correlated with the dividend premium (Table 8). This suggests that investors respond positively to an increase in the dividend-level when there is a premium on dividend-payers, which is consistent with the catering theory. However, none of the findings are statistically significant.

Table 8: Statistics for Demand for Dividend Measures and Dividend Change

The first column shows the autocorrelation coefficient, the second column shows a Dickey–Fuller test, and the remaining columns show the correlations among the variables including the announcement effect from Li and Lie (2006). p-values are in brackets.

			Dividend Premium		Announcement Effect		Future Returns	
	ρ	Unit root	VW	EW	A	A(Li&Lie)	r(t+1)	R(t+3)
VW	0.56	-3.70	1.00					
	[0.00]	*[0.00]*						
EW	0.49	-2.03	0.78	1.00				
	[0.00]	*[0.27]*	*[0.00]*					
A	0.25	-4.83	-0.04	-0.16	1.00			
	[0.21]	*[0.00]*	*[0.99]*	*[0.31]*				
A(Li&Lie)	-0.01	-5.72	0.15	0.11	0.00	1.00		
	[0.56]	*[0.00]*	*[0.54]*	*[0.49]*	*[0.99]*			
r(t+1)	-0.17	-4.67	-0.34	-0.25	-0.07	0.12	1.00	
		[0.00]	*[0.02]*	*[0.12]*	*[0.65]*	*[0.44]*		
R(t+3)	0.46	-2.28	-0.33	-0.18	-0.23	-0.09	0.59	1.00
		[0.18]	*[0.02]*	*[0.27]*	*[0.16]*	*[0.57]*	*[0.02]*	

5.3.2 Share Repurchase

Based on researchers being split on the topic of share repurchases, and whether it can be recognized as a substitute to dividends, we study share repurchases in contrast to initiate and change in dividend-level. Table 9 reports the correlation matrix with corresponding p-values in square brackets. We observe a relatively clear positive relationship between the rate of initiation, dividend increase, and share repurchase. This could infer that share repurchases have common time-varying trends with dividends, and possibly, be a substitute.

Table 9: Correlation Matrix for Dividend Payment Variables and Share Repurchase

	Initiate	Positive Dividend Change		Share Repurchase	
		Average	Median	Average	Median
Initiate	1.00				
Average Change	0.38	1.00			
	[0.01]				
Median Change	0.40	0.78	1.00		
	[0.01]	*[0.00]*			
Average Repurchase	0.35	-0.02	-0.16	1.00	
	[0.03]	*[0.91]*	*[0.32]*		
Median Repurchase	0.39	0.00	-0.12	0.95	1.00
	[0.01]	*[0.98]*	*[0.46]*	*[0.00]*	

Table 10 shows the regression output from Equation (4) which corresponds to the three linear regressions for average share repurchase each year on the dividend premium and the announcement effect. The beta coefficients for both dividend premiums are positive and significant at a 0.01 level. We observe that a one-standard-deviation increase in the lagged equal-weighted premium will lead to a rise of 63% in the average share repurchase which roughly corresponds to a half-standard-deviation of the variable. This implies that the lagged premium for payers over nonpayers has a relatively big impact on the average amount of share repurchase in the following year. Furthermore, the relationship suggests that share repurchase work as a substitute for traditional dividends. The announcement effect, on the other hand, has a negative impact on the dependent variable. This suggests that a one-standard-deviation increase in the announcement effect corresponds to a decrease of 22% in share repurchases which could imply that an increase in the announcement effect has a negative impact on the average share repurchase in the following year. Further, this could mean that managers pay redundant cashflows as dividends, rather than repurchase shares, when the market responds positively to increased dividends.

Table 10: Regressions on Share Repurchase

Regressions of share repurchase on dividend premium and the announcement effect from Li and Lie (2006). The independent variables are standardized to have unit variance. t-statistics use standard errors that are robust to heteroskedasticity and serial correlation up to four lags.

	Model 17	**Model 18**	**Model 19**	**Model 20**
	Share Repurchase			
VW (t-1)	48.45***			
	(11.54)			
EW (t-1)		63.46***		64.15***
		(10.52)		*(11.28)*
A (t-1) (Li & Lie)			-22.31*	-24.15**
			(12.73)	*(11.66)*
R-squared	0.17	0.30	0.04	0.34
N	35	35	35	35

5.4 Implications

To tie this all together, we formalize the research question with a timeline of the period. The years around the dotcom bubble and the financial crisis, not surprisingly, stick out in our dataset. The period between these events, with 2003 as a benchmark, also has some interesting findings.

5.4.1 Early Period, 1980-2000

Early in the sample, there are few key factors to consider. An interesting event in this period is the 1986 Tax Reform Act. In our data, we do not find any significant changes that could be explained by this. This is consistent with Baker and

Wurgler (2004a) who observe no visible effect in the dividend premium. Furthermore, other studies show that few significant or systematic changes are observed in the ex-dividend behaviour of common stocks because of this tax reform (Hearth & Rimbey, 1993).

From the dividend clientele, investors have different rationales to invest in dividend-paying stocks. A category investor might view nonpayers as growth firms and must decide from other preferences than dividends versus capital gains. However, over the early years of our sample period, theperception of a typical nonpaying firm changed. A large proportion of this can be explained by the industry composition of firms. This term was proposed by Fama and French (2001) used to explain the changing characteristics of publicly traded firms during the 1990s. They describe the development of companies to have a lower propensity to pay dividends due to their typical characteristics – low earnings, strong investments, and small size. In addition, they point out that investors are more likely to consider the tax penalty of dividends, and thus, the perceived benefits have changed.

In Figure 4 we plot the development of payers and nonpayers. Consistent with Doidge (et al., 2017), we observe a peak in firms listed in 1996 which is largely explained by a huge increase in nonpayers during the 1990s. In the period from 1980 to 1995, we find little evidence in support of the catering theory when considering the dividend premium. This can be explained by the large number of nonpayers around 1996 and the company composition effect in the following period. Doidge (et al., 2017) lists various reasons to why fewer companies are listed in the US after the peak. They argue that the net benefit of being listed decreased and that, although fewer firms are listed, the typical listed company is larger. Furthermore, they dispute the catering theory and claim that it is now easier for firms to thrive without being listed.

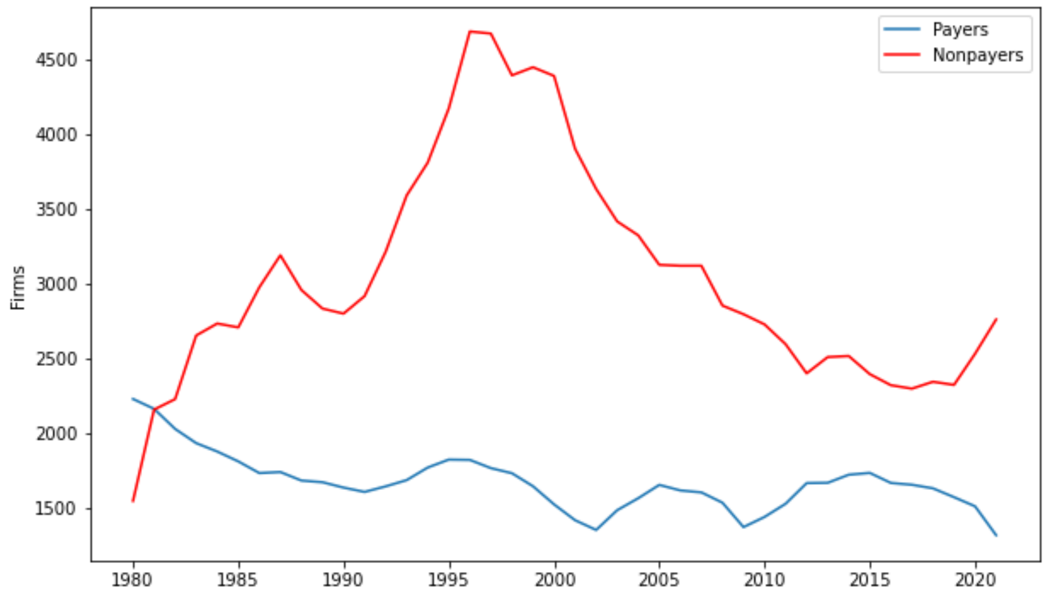

Figure 4: Number of Payers and Nonpayers, 1980-2021

In addition, to get an insight into the company composition effect, Figure 5 shows the aggregated mean of market-to-book for payers and nonpayers. Despite the huge spike of nonpayers during the 90s, the market-to-book values do not see a large change before the financial crisis. In this period, the dividend premium and the rate of initiation are low. This suggests that investors preferred nonpayers, mainly due to the industry composition of companies, to possibly capitalize from the growth of high-market-to-book companies, typically tech companies.

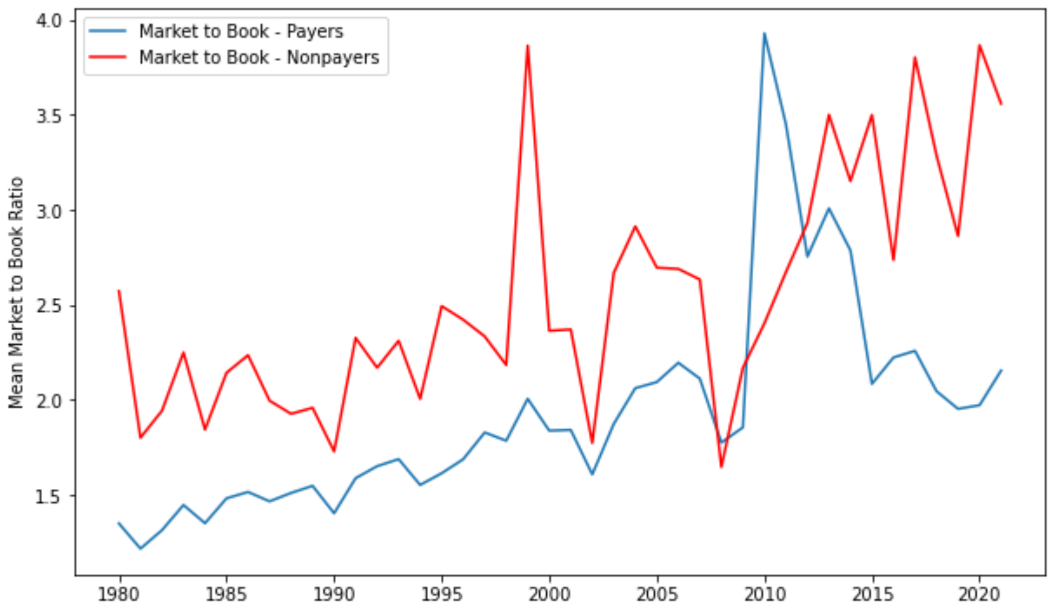

Figure 5: Market-to-Book for Payers and Nonpayers, 1980-2021

Overall, similar to Baker and Wurgler (2004a), we find no significant evidence of the catering theory in this period. The perception of non-dividend-paying firms underwent a substantial shift, primarily due to industry composition and characteristics such as low earnings, strong investments, and smaller size. The period saw a shift in investor preferences, with an increased inclination towards non-dividend-paying firms, particularly those with high-market-to-book values, as a potential strategy to capitalize on their growth.

5.4.2 Late Period, 2000-2021

The Jobs and Growth Tax Relief Reconciliation Act of 2003 in the United States (the "2003 tax reform") introduced a large cut in taxation on individual dividend income. This could explain the surge of initiations in the following period and why the dividend premium was negative prior to this. Moreover, dividend-paying firms were significantly more likely to increase their regular dividend payments after the reform (Chetty & Saez, 2005). Li and Lie (2006) emphasizes the drawback in the model of Baker and Wurgler (2004a) which does not capture the level of dividends. They argue that corporate managers are far more likely to face decisions to related to changing the level of dividends rather than initiate or omit.

Chetty and Saez also address multiple fraud scandals between 2000 and 2002, creating distrust among shareholders and potentially increasing demand for dividends. Despite the surge in the demand for dividend-paying stocks in this period, this is not captured in our model.

Interestingly, in the same period, share repurchases became more usual. Before 1982, share repurchases were not allowed by the SEC (*Final Rule: Purchases of Certain Equity Securities by the Issuer and Others; Release No. 33-8335; 34-48766; IC-26252; File No. S7-50-02; November 10, 2003*). Between 1982 and 2000, there were few incidents of share repurchases, however, after the dotcom bubble burst the activity spiked and companies used repurchases as an alternative to dividends. For instance, a high market-to-book company such as a tech company, can experience some periods with large excess cash holding. The firm does not necessarily want to commit to paying dividends, and thus, seeks other possibilities to reward its investors.

Following both the dotcom bubble and the financial crisis, the two main crises in our period, we observe a different preference for dividends, captured by both the dividend premium and managers who either initiate or increase the dividend-level. Typically, a dividend payout during a crisis is signalling the robustness of a company and theory suggests that investors tend to prefer this, which is consistent with our data. Figure 2 shows that the dividend premium spikes in 2002 and 2010. In this period, we observe a relatively high dividend premium and a high rate of initiation. This suggests that investors prefer dividend-paying stocks, which can be explained by the 2003 tax reform and the consensus of dividend-paying stocks being more attractive after periods of financial distress.

Considering both the dividend premium and the rate of initiation, we observe that managers did not tend to initiate when the demand was low before the year 2000. Moreover, after year 2000 and 2008 the rate of initiation, in line with the dividend premium, spiked, consistent with catering. The overall trend is more visible in the rate of initiation as opposed to the dividend premium, which subsequently strengthens the theory.

In the period after the financial crisis, we note that the rate of initiation drops drastically towards the levels observed early in the sample. The same holds for the dividend premium. The relationship seems to somewhat stabilize after 2015 which implies that there is less of a market mispricing managers try to utilize. According to the catering theory, a high rate of initiation should forecast low future returns. This relationship seems to some extent hold through in this period with the cumulative future returns steadily declining through this period. This could also suggest that there is too much variability in the data during the previous period to formally capture this relationship in the model. Furthermore, the market-to-book values, especially for nonpayers, shift to a higher level (Figure 5) suggesting that the typical nonpayer is larger than previously observed. This supports the theory that despite the decrease in firms listed, the typical listed firm is higher valued (Doidge et al., 2017).

Overall, the period post-2000 revealed several key trends. The 2003 tax reform stimulated a surge in dividend initiations and increases in regular dividend payments. The decision-making pattern of corporate managers was investigated

(Li and Lie, 2006), highlighting the need for a model that captures dividend levels rather than just initiation or omission. Concurrently, share repurchases emerged as an alternative to dividends, particularly for high market-to-book companies such as tech firms, especially after the dotcom bubble burst. The dotcom bubble and the financial crisis appeared to shift investor preference toward dividend payouts, possibly as a sign of a company's stability. This shift is supported by spikes in the dividend premium in 2002 and 2010. The rate of dividend initiation dropped significantly after the financial crisis but stabilized after 2015. Despite a decrease in listed firms, the typical listed firm was valued higher, indicated by the higher market-to-book values, especially for nonpayers (Doidge et al., 2017). These observations hint at a potential overreaction of the market in periods of financial distress and subsequent corrections, aligning with the catering theory.

6. CONCLUSION

This thesis investigates whether managers cater to investor demand for dividends. Utilizing the model by Baker and Wurgler (2004a), we extend the sample period from 1980-2021 to conduct ex-post testing of the research question. The model consists of three measures for dividend premium and multiple time-varying regressions which allows for testing of the relationship between these measures. Due to critique suggesting the model does not adequately consider changes in the level of dividends, we introduce an alternative approach to address this issue. In addition, we consider share repurchases as an alternative to dividend payouts, reflecting the market increase in such practices post-2000.

The main findings suggest varying support for the catering theory, particularly pronounced after significant market events such as the dotcom bubble and the financial crisis. The dividend premium, share repurchases, and the rate of initiation results in favour of the catering theory. On the other hand, the analysis of the announcement effect and future returns indicates no significant relationship of catering. Overall, despite observing statistically significant results in some measures, the outcome demonstrates considerable variability across the entire sample period. Similar to Baker and Wurgler (2004a), we struggle to find a strong relationship in the first half of the sample period. However, after the dotcom bubble and the financial crisis, affected by the 2003 tax reform, the rate of initiation and the dividend premium could suggest, to some extent, that managers tend to initiate dividends when the demand from investors is relatively high.

Nevertheless, the model is not without limitations. When investigating the change in dividend-level the relationship suggests that, regardless of whether managers pay dividends or not, they either initiate dividends or increase payouts based on the same time-varying factors. Furthermore, the relationship suggests that if demand for dividends rise, or investors' reaction to dividend increases is more positive, it will have a positive impact on the dividend-level in the following period. We also find a clear positive relationship between the rate of initiation, both measures for dividend increase, and share repurchase. This highlights the increasing significance of share repurchases as a potential substitute for dividends, suggesting a shift in corporate financial strategies and investor preferences.

These limitations open potential areas for future research. It would be interesting to see further research conducted on how changes in tax laws and corporate governance structures impact dividend behaviour and investor preferences over time. Additionally, the role of financial crises in shaping investor demand for dividends deserves closer inspection. Studies examining the trend of share repurchases as an alternative to dividends, particularly in high market-to-book companies, would further improve the understanding of corporate financial strategies. This could help in understanding whether these trends are a temporary market overreaction or indicative of a more lasting change in the corporate landscape.

To conclude, this research provides a new perspective on the catering theory. Although some evidence suggests catering, we cannot conclude that the theory holds. It is important to recognize the limitations in the imposed model which potentially exclude important variables in dividend theory. This highlights the need for more comprehensive models that take into account evolving factors impacting dividend behaviour and investor preferences, thereby leading to more robust and informed strategies in the corporate world.

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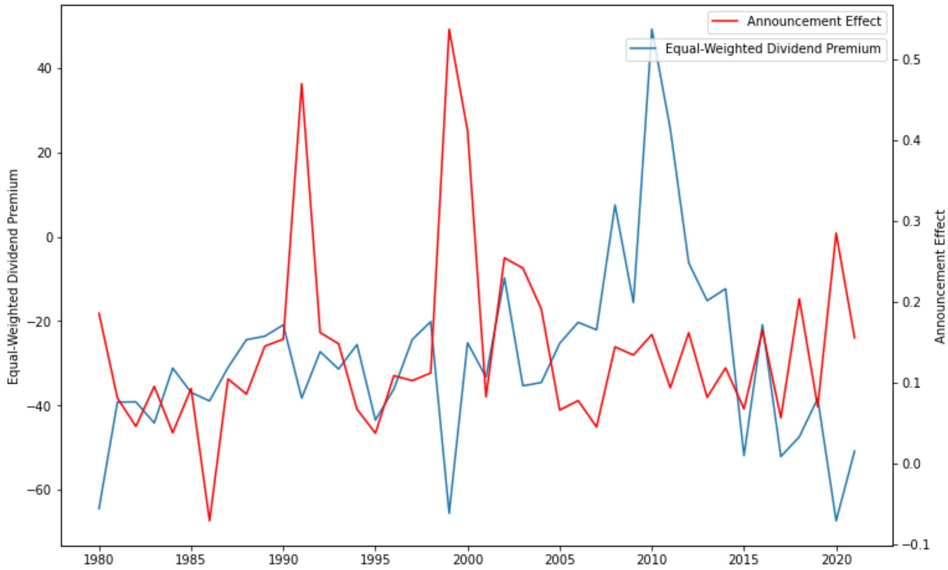
8. APPENDICES

Appendix 1

Relationship Between Equal-Weighted Dividend Premium and Announcement Effect, 1980-2021



Appendix 2

Regression on the Rate of Continuation and Listpay, 1980-2021

	Model 5	**Model 6**	**Model 7**	**Model 8**
	Continue			
VW (t-1)	-0.15			
	(0.34)			
EW (t-1)		-0.03		-0.09
		(0.32)		(0.33)
A (t-1)			-0.33***	-0.34**
			(0.12)	*(0.14)*
R-squared	0.01	0.00	0.04	0.04
N	35	35	35	35

	Model 9	**Model 10**	**Model 11**	**Model 12**
	Listpay			
VW (t-1)	-0.22			
	(0.28)			
EW (t-1)		0.45		0.35
		(0.56)		*(0.48)*
A (t-1)			-0.64	-0.59
			(0.52)	*(0.51)*
R-squared	0.01	0.02	0.04	0.06
N	35	35	35	35

Appendix 3

Predicting Future Relative Returns, 1980-2021 - Panel B and C

	N	*Initiate*				*Continue*				*Listpay*			
		OLS	**BA**	**p-value**	**R-squared**	**OLS**	**BA**	**p-value**	**R-squared**	**OLS**	**BA**	**p-value**	**R-squared**
rD_{t+1}	41	-0.48	-0.51	0.83	0.00	-2.08	-2.17	0.38	0.02	-1.57	-1.61	0.51	0.01
rD_{t+2}	40	0.41	0.33	0.86	0.00	0.79	0.86	0.75	0.00	2.39	2.45	0.33	0.02
rD_{t+3}	39	-2.02	-1.99	0.39	0.02	-3.74	-3.63	0.12	0.06	-1.76	-1.82	0.50	0.01
RD_{t+3}	39	-2.20	-2.12	0.58	0.01	-6.13	-6.22	0.14	0.06	0.90	0.94	0.84	0.00

	N	*Initiate*				*Continue*				*Listpay*			
		OLS	**BA**	**p-value**	**R-squared**	**OLS**	**BA**	**p-value**	**R-squared**	**OLS**	**BA**	**p-value**	**R-squared**
rND_{t+1}	41	-3.41	-3.37	0.44	0.02	-3.31	-3.34	0.48	0.01	-4.89	-4.82	0.29	0.03
rND_{t+2}	40	-0.95	-0.97	0.83	0.00	0.73	0.77	0.88	0.00	2.97	2.91	0.54	0.01
rND_{t+3}	39	-4.29	-4.48	0.35	0.02	-3.06	-2.92	0.53	0.01	-6.85	-6.95	0.18	0.05
RND_{t+3}	39	-10.53	-10.35	0.18	0.05	-9.96	-10.61	0.23	0.04	-7.86	-7.76	0.37	0.02