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Dividend changes and catering incentives ☆

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Abstract

We extend Baker and Wurgler's [2004a. Journal of Finance 59 1125–1165] catering theory to include decreases and increases in existing dividends. Consistent with our extended model, we find that the decision to change the dividend and the magnitude of the change depend on the premium that the capital market places on dividends. We also find that the stock market reaction to dividend changes depends on the dividend premium. Thus, the capital market rewards managers for considering investor demand for dividends when making decisions about the level of dividends.

JEL classification: G35

Keywords: Dividends; Payout policy; Catering

1. Introduction

The literature offers various explanations for why firms pay dividends. Most notably, Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985) propose that firms pay dividends to signal favorable information to the capital market, whereas Easterbrook (1984) argues that dividends mitigate agency problems between managers and shareholders by reducing funds available to managers. However, the empirical evidence on both of these theories is, at best, mixed. Nissim and Ziv (2001) report evidence in favor of the signaling theory, but Benartzi et al. (1997), Grullon et al. (2002), and Grullon et al. (2003) find no such evidence. Furthermore, consistent with the agency theory, Lang and

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Litzenberger (1989) report that the abnormal returns around announcements of regular dividend increases are positively related to a firm's potential to overinvest, but Denis et al. (1994) and Yoon and Starks (1995) find that this relation is spurious.

Baker and Wurgler (2004a) propose a new dividend theory. They argue that investor demand for dividend-paying stocks is time-varying, thereby causing the relative prices of dividend-paying and non-dividend-paying stocks to fluctuate (assuming arbitrage limits). As a result, managers cater to investor demand for dividends by paying dividends when investors place a premium on dividend-paying stocks, and vice versa. Consistent with their theory, Baker and Wurgler (2004a) report empirical evidence that aggregate dividend initiations are positively related to their measure of dividend premium, and Baker and Wurgler (2004b) report that the dividend premium is related to the propensity to pay dividends that is documented in Fama and French (2001).

There are, however, two shortcomings of Baker and Wurgler's (2004a) study. First, their empirical model is a discrete model in which firms are classified as either dividend payers or nonpayers. In particular, managers face the decision as to whether the firm should pay a dividend (and not how much to pay), and investors categorize firms into only two groups based on the firm's dividend policy (payers vs. nonpayers). Thus, while Baker and Wurgler's model might explain why some firms initiate or omit dividends, it cannot explain why firms change their dividend levels. This is a significant drawback, because the empirical incidence of dividend events suggests that corporate managers are far more likely to face decisions related to changing the level of existing dividends than decisions to either introduce dividends for the first time or eliminate existing dividends.

The second shortcoming of Baker and Wurgler's (2004a) study concerns the empirical results. A critical prediction of their model is that the stock return upon dividend initiation announcements increases with the dividend premium. If investors clamor for dividends, they should respond more favorably to news of dividend initiations. However, Baker and Wurgler find no statistically significant association between announcement returns and the dividend premium, which is disconcerting because it raises doubts about the empirical validity of the catering theory. If the capital market ignores the dividend premium upon dividend initiation announcements, why should managers care about the premium? In fact, unless the capital market rewards managers for considering the demand for dividends when making dividend decisions, the dividend catering model unravels because it presumes that managers cater to dividend demand to maximize the current share price.

In this paper, we first extend Baker and Wurgler's (2004a) catering theory to include a continuous dividend level. We think it is reasonable to assume that investors categorize firms into groups based not only on whether they pay dividends, but also on the dividend level. Consistent with our assumption, Grinstein and Michaely (2003) report that institutional holdings are related to both a dividend indicator variable and the dividend level. If investors indeed have more than two dividend categories and managers can choose from a continuum of dividend levels, our model shows that the dividend catering theory and its predictions pertain to dividend decreases and increases as well.

Next, we test the main predictions of our extended dividend catering model using a sample of 1,815 dividend decreases and 18,964 dividend increases announced between 1963 and 2000. Insofar as the lack of a significant relation between announcement period returns for dividend initiations and the dividend premium in Baker and Wurgler (2004a) is due to insufficient statistical power associated with their sample of initiations, our larger sample can potentially mitigate this problem.

We find that both the probability of dividend decreases and increases and the magnitude of the dividend changes are related to the dividend premium as predicted by the model. In particular, the probability that a firm decreases its dividend is higher when the dividend premium is low and the probability that a firm increases its dividend is higher when the dividend premium is high. Moreover, the magnitude of dividend decreases is greater when the dividend premium is low and the magnitude of dividend increases is greater when the dividend premium is high.

As a logical extension of the examination of the probability that firms increase and decrease dividends, we also examine whether the dividend premium affects the probability that firms repurchase shares. We expect that firms that wish to disburse funds when the dividend premium is low do so via repurchases, both because dividends are less appealing at such times and because repurchases serve as substitutes for dividends (Grullon and Michaely, 2002). The results support our conjecture. In particular, the probability of repurchases decreases with the dividend premium. Thus, the catering theory of dividends appears to have implications for alternate payout means also.

Finally, we investigate the link between the abnormal stock returns around dividend decrease or increase announcements and the dividend premium. We find that the announcement returns for dividend decreases are negatively related to the dividend premium and that the announcement returns for dividends increases are positively related to the dividend premium. These results are consistent with the predictions of the dividend catering theory. In particular, it appears that the capital market conditions its response to dividend change announcements on the aggregate dividend premium. This, in turn, explains why managers consider the dividend premium in the first place, as such behavior is rewarded with a higher market valuation.

In sum, we find strong evidence in support of the dividend catering theory using a sample of dividend decreases and increases. This is important for a couple of reasons. First, it fills a void left by Baker and Wurgler (2004a), who find no evidence of the critical prediction that the capital market's response to dividend announcements depends on the dividend premium. Second, it suggests that the dividend catering theory extends beyond decisions to initiate or omit dividends, including also decisions regarding the dividend level. Thus, our results can be interpreted as evidence that the dividend catering theory is further reaching and more relevant to corporate managers than insinuated by Baker and Wurgler (2004a).

The remainder of the paper proceeds as follows. The next section provides our extension of Baker and Wurgler's (2004a) model. Section 3 discusses the sample. Section 4 presents empirical results. Finally, Section 5 summarizes and concludes.

2. Our model

In this section we extend the model presented by Baker and Wurgler (2004a) to include a continuous dividend level. The main purpose for doing so is to generalize the catering theory so that it pertains to all dividend changes, not only to initiations or omissions. Baker and Wurgler argue that "once dividends are initiated, increases and decreases appear to be governed more by firm-level profitability than by the relative valuations of payers and nonpayers" (p. 1161). However, whether profitability is more important in decisions to change existing dividend levels than in decisions to initiate or omit dividends is an unresolved question. Lie (2004) actually reports that industry-adjusted profitability is much lower leading up to dividend omissions than dividend decreases, suggesting that profitability is more important in the decision to omit dividends than in the decision to decrease dividends. Irrespective of the role of profitability, the market demand for dividends might, at a minimum, play an ancillary role in both types of dividend decisions. This is also supported by the empirical evidence in Grinstein and Michaely (2003), which suggests that investors care about both whether firms pay dividends and the dividend level. We therefore believe that the basic insight of the model, i.e., that the dividend decisions and the stock market reaction to dividend events depend on the dividend premium, should pertain to decisions regarding dividend levels also. Indeed, that is precisely what we examine in this study.

Consider a firm with Q shares outstanding. At the terminal date $t=1$, the firm pays a liquidating distribution of $V=F+\varepsilon$, where F is the expected fundamental value of the firm and ε is a standard normal random variable. At $t=0$, the manager chooses to pay an interim dividend $d\in[0,\infty)$. This dividend reduces the liquidation value by $d(1+c)$, where c is the unit cost of issuing the dividend. There are two types of investors, category investors and arbitrageurs. The category investors and arbitrageurs have aggregate risk tolerance per period of γ and γ_A, respectively. Like Baker and Wurgler (2004a), we assume that the category investors misestimate the mean, but not the variance, of the liquidating distribution and that they fail to recognize the cost of issuing a dividend. They expect firms with a dividend level of d to pay a liquidating distribution of $V(d;D)$, where D as a parameter of the model proxies the time-varying demand pressure of category investors. We assume that $V(d;D)$ is a concave function of d, i.e., $(\partial^2/\partial d^2)V(d;D)<0$. Furthermore, we assume that $V(d;D)$ is such that $(\partial^2/\partial D\partial d)V(d;D)>0$. The latter assumption formulizes the notion that as category investors demand more dividends, they place more value on a one-unit dividend increase. The arbitrageurs unbiasedly expect the liquidating distribution of $F–cd$. We further assume that $V(0;D)=F$, i.e., when the firm does not issue a dividend, there is no bias in the category investors' valuation.

At time $t=0$, demand from investor group k, where $k=C$ for category investors or A for arbitrageurs, is

$$D_0^k=\gamma_k(\mathrm{E}^k(V)-P_0),$$

where $\mathrm{E}^C(V)=V(d;D)$ and $\mathrm{E}^A(V)=F-cd$. The market clearing condition, $D_0^C+D_0^A=Q$, leads to the price

$$P_0=\frac{\gamma}{\gamma+\gamma_A}V(d;D)+\frac{\gamma_A}{\gamma+\gamma_A}(F-cd)-\frac{Q}{\gamma+\gamma_A}. \tag{1}$$

The manager's problem is to maximize $(1-\lambda)P_0+\lambda(-cd)$, which, like $V(d;D)$, is a concave function of d. Plugging the price function into the manager's objective function, we obtain the manager's objective

$$\max_d(1-\lambda)\left[\frac{\gamma_A F}{\gamma+\gamma_A}-\frac{Q}{\gamma+\gamma_A}\right]+(1-\lambda)\left[\frac{\gamma V(d;D)}{\gamma+\gamma_A}-\frac{\gamma_A cd}{\gamma+\gamma_A}\right]-\lambda cd. \tag{2}$$

We introduce the notation $\mu=\lambda/(1-\lambda)$, which is the relative weight of the firm's long-run fundamental against the firm's short-run price in the manager's objective function. The first-order condition of the optimization problem, if satisfied, is also the sufficient condition:

$$\frac{\partial}{\partial d} V(d^*; D) = \left[\left(1 + \frac{\gamma_A}{\gamma}\right)\mu + \frac{\gamma_A}{\gamma}\right]c. \tag{3}$$

We assume that, for any parameter value of D,

$$\lim_{d \to \infty} \frac{\partial}{\partial d} V(d^*; D) < \left[\left(1 + \frac{\gamma_A}{\gamma}\right)\mu + \frac{\gamma_A}{\gamma}\right]c,$$

so that it is never optimal for the manager to issue an infinitely large dividend. Denote the inverse function of $(\partial/\partial d)\ V(d; D)$ by $H(d;D)$. The optimal dividend policy is

$$(1) \quad d^* = 0;\ P_0 = P_0^G \equiv F - \frac{Q}{\gamma + \gamma_A} \text{ if } \frac{\partial}{\partial d}\ V(0; D) \leqslant \left[\left(1 + \frac{\gamma_A}{\gamma}\right)\mu + \frac{\gamma_A}{\gamma}\right]c,$$

and

$$(2) \quad d^* = H\left(\left[\left(1 + \frac{\gamma_A}{\gamma}\right)\mu + \frac{\gamma_A}{\gamma}\right]c; D\right);$$

$$P_0 = \frac{\gamma}{\gamma + \gamma_A} V(d^*; D) + \frac{\gamma_A}{\gamma + \gamma_A}(F - cd^*) - \frac{Q}{\gamma + \gamma_A} \text{ otherwise.} \tag{4}$$

As pointed out by Baker and Wurgler (2004a), and discussed in extant literature, the manager's horizon, measured as μ, depends on a variety of firm-specific factors. Firms also differ in the fundamental value, F, the shares outstanding, Q, and the cost of the dividend, C. When pooling all firms, we take the view that firm characteristic parameters μ, F, Q, and c are random variables with some joint distribution, and we state the cross-firm implications of the model in the language of probability. Notice that in our model μ and c are the variables that play active roles in determining managers' optimal dividend decisions. Below, we derive the main hypotheses of the model.

Proposition 1. *The probability that a firm increases (decreases) the dividend level is increasing (decreasing) in the category investors' demand pressure, D.*

Proof. Assume the firm's previous dividend level is d^p. Let there be any two levels of D, denoted by D_1 and D_2, with $D_1 < D_2$. Because $(\partial^2/\partial d \partial D) V(d; D) > 0$, we have $(\partial/\partial d)\ V(d^p; D_1) < (\partial/\partial d)\ V(d^p; D_2)$. Therefore,

$$\left\{\frac{\partial}{\partial d} V(d^p; D_1) > \left[\left(1 + \frac{\gamma_A}{\gamma}\right)\mu + \frac{\gamma_A}{\gamma}\right]c\right\} < \left\{\frac{\partial}{\partial d} V(d^p; D_2) > \left[\left(1 + \frac{\gamma_A}{\gamma}\right)\mu + \frac{\gamma_A}{\gamma}\right]c\right\}. \tag{5}$$

Hereafter, we adopt de Finetti's notation and use the same symbol for a set and its indicator function. Notice that for a given level of D, by concavity of $V(d;D)$, condition (4), and/or Eq. (3), we have

$$\{d^* > d^p\} = \left\{\frac{\partial}{\partial d} V(d^p; D) > \frac{\partial}{\partial d} V(d^*; D)\right\} = \left\{\frac{\partial}{\partial d} V(d^p; D) > \left[\left(1 + \frac{\gamma_A}{\gamma}\right)\mu + \frac{\gamma_A}{\gamma}\right]c\right\}. \tag{6}$$

Therefore, the left-hand side of inequality (5) is $\{d^* > d^p|D_1\}$ and the right-hand side is $\{d^* > d^p|D_2\}$. Inequality (5) thus implies that

$$\Pr[d^* > d^p|D_1] < \Pr\lfloor d^* > d^p|D_2\rfloor.$$

That is, the probability that a firm increases its dividend level is increasing in the category investors' demand pressure, D. By the same token, we have

$$\Pr\lfloor d^* < d^p|D_1\rfloor > \Pr\lfloor d^* < d^p|D_2\rfloor.$$

That is, the probability that a firm decreases its dividend level is decreasing in D. □.

Corollary. *The probability that a firm pays a dividend is increasing in the category investors' demand pressure, D.*

Proof. This corollary is a special case of Proposition 1 with $d^p = 0$. □

Remark. This corollary formally states the main hypothesis tested by Baker and Wurgler (2004a).

Proposition 2. *The magnitude of dividend increases (decreases) is increasing (decreasing) in D.*

Proof. It suffices to prove that d^* is increasing in D. The optimal dividend level d^*, if larger than zero, is implicitly determined by the first order condition (Eq. (3)). Taking the derivative with respect to D, we obtain

$$\frac{\partial d^*}{\partial D} = -\frac{(\partial^2/\partial d \partial D)V(d^*;D)}{(\partial^2/\partial d^2)V(d^*;D)} > 0. \qquad \square$$

Proposition 3. *The stock price reaction to announcements of dividend increases (decreases) is more positive (less negative) when D is larger.*

Remark. This proposition arises more or less directly from the assumptions of the model.

Proof. The price reaction to announcements of dividend increases (decreases) is measured in our model by $\partial P_0(d;D)/\partial d$. It suffices to show that $\partial P_0(d;D)/\partial d$ is increasing in D, where P_0 is given by Eq. (1). It follows that

$$\frac{\partial}{\partial D}\left(\frac{\partial P_0(d;D)}{\partial d}\right) = \frac{\gamma}{\gamma+\gamma_A}\frac{\partial^2}{\partial D \partial d}V(d;D) > 0. \qquad \square$$

Because D, as a parameter of the model that measures the time-varying demand pressure from the category investors, is not directly observable, Baker and Wurgler (2004a) propose the dividend premium as one of their major empirical measures, where the dividend premium is estimated as the log difference in the value-weighted average market-to-book value of dividend-payers and the value-weighted average market-to-book value of

Table 1
Descriptive statistics
Descriptive statistics for the sample of 1,815 dividend decreases and 18,964 dividend increases announced between 1963 and 2000. Dividend change is the change in dividend scaled by the pre-announcement stock price. Announcement period returns are the abnormal stock returns measured from the day before through the day after the announcement using a one-factor market model, where the equal-weighted index is used to proxy overall market returns and the estimation period spans from 250 to ten days prior to the announcement.

	Dividend decreases		Dividend increases	
	Mean	Median	Mean	Median
Market capitalization (in thousand $)	713,653	70,035	1,864,942	211,071
Dividend yield	0.0803	0.0640	0.0313	0.0270
Dividend change	−0.0089	−0.0062	0.0014	0.0009
Announcement period return	−0.0407	−0.0288	0.0095	0.0056

non-dividend-payers. With some additional assumptions, we can establish the positive relation between the empirical proxy of the dividend premium and D in our framework. Given that such a relation is fairly intuitive, we omit the proof here.[1] Thus, the empirical measure of the dividend premium can take D's place in the monotonic relations in Propositions 1, 2, and 3.

3. Sample

Our sample of quarterly dividend decreases and increases is obtained from the Center for Research in Security Prices (CRSP).[2] We require that (i) the announcement occurs between 1963 and 2000, which allows us to use the estimated dividend premiums from Baker and Wurgler (2004a), (ii) the firm is not a financial or utility firm, and (iii) no stock split or other cash distribution occurred between the previous and the current (and higher) dividend (as in Denis et al., 1994). For the tests that rely on financial data such as debt ratios and profitability, we also require that the data are available in Compustat at the end of the year before the announcement. These criteria yield a final sample of 1,815 dividend decreases and 18,964 dividend increases.

Table 1 presents descriptive statistics for the sample. The mean (median) market capitalization of dividend-decreasing and dividend-increasing firms is $714 million ($70 million) and $1,865 million ($211 million), respectively. Shortly before the announcements, the mean (median) dividend yield for dividend-decreasing and dividend-increasing firms is 8.0% (6.4%) and 3.1% (2.7%), respectively. Finally, the mean (median) decrease in dividends scaled by the pre-announcement price is −0.89% (−0.62%), while the mean (median) increase in dividends scaled by the pre-announcement price is 0.14% (0.09%).

The table also provides abnormal stock returns around the announcement dates. All announcement dates come from CRSP. The abnormal returns are computed using the one-factor model, where the CRSP equal-weighted index is used to proxy overall market

[1]These assumptions and the proof are available from the authors upon request.
[2]Our sample of dividend decreases does not include omissions, and our sample of dividend increases does not include initiations. Thus, omissions and initiations do not drive any of our empirical results.

returns and the estimation period is the 250 trading days that end ten days prior to the announcement. The mean (median) three-day announcement period return is −4.07% (−2.88%) and 0.95% (0.56%) for dividend decreases and increases, respectively. These statistics are statistically different from zero at the 1% level of significance, suggesting that the capital market interprets quarterly dividend decreases as unfavorable news and dividend increases as favorable news.

Table 2 presents descriptive statistics by year, including the number of dividend increase announcements and the dividend premium.[3] The pattern for the frequency of dividend increases is similar to that for dividend initiations in Baker and Wurgler (2004a). In particular, there is steady growth in the number of events during the 1970s. This is followed by a quick decline in the early 1980s, after which the pattern is more irregular. The dividend premium, which peaked in the early 1970s, might explain some of the pattern in dividend increases. In particular, the number of dividend increases appears to rise within a few years after the dividend premium has increased, and vice versa, suggesting that a high dividend premium might induce firms to increase their dividends. It is also interesting to see that both the magnitude of the dividend change and the announcement period returns peaked shortly after the peak in the dividend premium in the 1970s, consistent with the notion that a large dividend premium stimulates larger dividend changes, which in turn give rise to greater stock price reactions. The pattern for the frequency of dividend decreases is a little more erratic, however, with peaks in 1970–1971, 1975, 1982, and 1991, and it is not clear how this frequency relates to the dividend premium. In later sections, we investigate more closely the relation between the dividend premium and both the frequency and magnitude of dividend changes in a multivariate setting, which allows us to control for other determinants of the dividend decisions.

4. Empirical results

4.1. The decision to increase or decrease dividends

We first examine whether the probability of dividend changes is related to the dividend premium. To do so, we run a multinomial logistic regression of the decisions to either decrease or increase dividends against various financial variables for the preceding year and the dividend premium at the beginning of the year. The sample for this analysis includes all Compustat firm-years from 1962 to 1999, unless (1) the firm does not pay a

[3]The dividend premium is obtained from Table 2 of Baker and Wurgler (2004a), and is estimated as the log difference in the value-weighted average market-to-book value of dividend-payers and the value-weighted market-to-book value of non-dividend-payers. Baker and Wurgler (2004b) also use this measure in their study of the empirical relation between the dividend premium and the propensity to pay dividends. Baker and Wurgler (2004a) argue that a component of the dividend premium reflects relative mispricing. In particular, they argue that the dividend premium is at least partially driven by investor sentiment. For example, when investors seek safer investment vehicles, they demand dividend-paying stocks because dividends are generally viewed as a sign of safety, thereby driving up the prices of such stocks. Alternatively, when investors are optimistic about general growth opportunities, they demand stock with more capital appreciation potential, i.e., non-dividend paying stocks, thereby driving up the prices of these stocks. Consistent with the notion that sentiment drives the dividend premium, Baker and Wurgler report that the dividend premium is related to the closed-end fund discount, which is often viewed as a measure of investor sentiment. In contrast, they find no evidence that the dividend premium is driven by traditional dividend clienteles resulting from taxes, transaction costs, or institutional investment constraints.

Table 2
Descriptive statistics by year

Descriptive statistics by the year of the dividend change announcements. Dividend premium is the value-weighted dividend premium from Baker and Wurgler (2004a) at the end of the year. Dividend change is the change in dividend scaled by the pre-announcement stock price. The announcement period returns are the abnormal stock returns measured from the day before through the day after the announcement using a one-factor market model, where the equal-weighted index is used to proxy overall market returns and the estimation period spans from 250 to ten days prior to the announcement.

Year	Div. prem.	Dividend decreases					Dividend increases				
		Number	Dividend change		Announc. return		Number	Dividend change		Announc. return	
			Mean	Median	Mean	Median		Mean	Median	Mean	Median
1963	32.9	27	−0.0050	−0.0046	−0.0595	−0.0537	174	0.0015	0.0012	0.0103	0.0070
1964	35.6	22	−0.0044	−0.0041	−0.0520	−0.0427	314	0.0015	0.0013	0.0116	0.0100
1965	22.6	15	−0.0055	−0.0062	−0.0459	−0.0412	403	0.0013	0.0011	0.0092	0.0067
1966	5.4	16	−0.0058	−0.0065	−0.0804	−0.0919	370	0.0014	0.0011	0.0166	0.0116
1967	−17.2	11	−0.0050	−0.0038	−0.0856	−0.0772	256	0.0012	0.0010	0.0097	0.0071
1968	−18.8	30	−0.0042	−0.0040	−0.0549	−0.0528	199	0.0009	0.0007	0.0067	0.0044
1969	−3.8	32	−0.0051	−0.0049	−0.0562	−0.0460	194	0.0009	0.0007	0.0103	0.0081
1970	16.0	84	−0.0071	−0.0069	−0.0746	−0.0733	140	0.0008	0.0006	0.0112	0.0070
1971	18.2	86	−0.0061	−0.0058	−0.0572	−0.0640	121	0.0008	0.0005	0.0041	0.0020
1972	26.6	33	−0.0055	−0.0050	−0.0621	−0.0414	309	0.0006	0.0003	0.0067	0.0029
1973	25.9	32	−0.0066	−0.0059	−0.0598	−0.0306	755	0.0013	0.0009	0.0098	0.0059
1974	13.2	51	−0.0113	−0.0098	−0.0839	−0.0650	896	0.0021	0.0016	0.0180	0.0122
1975	15.6	107	−0.0087	−0.0085	−0.0609	−0.0582	616	0.0018	0.0014	0.0193	0.0116
1976	15.6	20	−0.0070	−0.0067	−0.0804	−0.0675	1,073	0.0017	0.0014	0.0132	0.0083
1977	4.6	38	−0.0083	−0.0078	−0.0675	−0.0646	1,166	0.0018	0.0015	0.0144	0.0100
1978	−5.0	21	−0.0068	−0.0063	−0.0602	−0.0542	1,172	0.0016	0.0014	0.0132	0.0075
1979	−14.3	37	−0.0074	−0.0067	−0.0689	−0.0593	1,102	0.0016	0.0015	0.0093	0.0055
1980	−22.1	60	−0.0079	−0.0070	−0.0456	−0.0426	820	0.0014	0.0012	0.0074	0.0056
1981	−24.9	35	−0.0080	−0.0070	−0.0416	−0.0384	683	0.0013	0.0012	0.0094	0.0056
1982	−16.9	143	−0.0085	−0.0075	−0.0381	−0.0310	484	0.0012	0.0011	0.0069	0.0023
1983	−26.2	69	−0.0060	−0.0059	−0.0328	−0.0262	457	0.0010	0.0008	0.0054	0.0010
1984	−12.5	29	−0.0089	−0.0056	−0.0408	−0.0162	586	0.0011	0.0009	0.0071	0.0055
1985	−11.0	34	−0.0060	−0.0045	−0.0443	−0.0346	477	0.0009	0.0008	0.0001	−0.0002
1986	−7.3	63	−0.0163	−0.0095	−0.0358	−0.0182	378	0.0009	0.0006	0.0084	0.0030
1987	−7.8	34	−0.0096	−0.0056	−0.0208	−0.0152	462	0.0010	0.0006	0.0082	0.0026
1988	−7.8	44	−0.0093	−0.0076	−0.0299	−0.0085	573	0.0012	0.0008	0.0039	0.0028
1989	−8.7	40	−0.0101	−0.0059	−0.0339	−0.0225	519	0.0013	0.0008	0.0041	0.0023
1990	−1.0	54	−0.0188	−0.0103	−0.0150	−0.0112	445	0.0017	0.0007	0.0076	0.0022
1991	−4.6	87	−0.0107	−0.0078	−0.0266	−0.0198	352	0.0014	0.0006	0.0031	−0.0002
1992	−5.3	83	−0.0073	−0.0056	−0.0329	−0.0086	381	0.0010	0.0005	0.0066	0.0037
1993	−11.5	62	−0.0086	−0.0049	−0.0039	−0.0053	408	0.0013	0.0005	0.0069	0.0033
1994	−7.5	34	−0.0113	−0.0049	0.0035	−0.0084	486	0.0015	0.0005	0.0094	0.0056
1995	−15.1	53	−0.0082	−0.0049	−0.0198	−0.0089	500	0.0010	0.0006	0.0070	0.0040
1996	−9.4	45	−0.0065	−0.0040	−0.0087	−0.0013	481	0.0009	0.0005	0.0062	0.0017
1997	−4.8	49	−0.0081	−0.0060	−0.0268	−0.0159	386	0.0010	0.0005	0.0093	0.0038
1998	1.4	45	−0.0239	−0.0048	−0.0165	−0.0126	291	0.0014	0.0004	0.0047	0.0014
1999	−33.2	53	−0.0087	−0.0054	−0.0166	−0.0163	301	0.0011	0.0004	0.0025	−0.0012
2000	−20.6	37	−0.0122	−0.0088	−0.0068	0.0072	252	0.0011	0.0004	0.0103	0.0049

dividend, (2) the firm is a financial firm or a utility, (3) the book value of assets is less than one million dollars, or (4) data used in the analysis are unavailable. We use Compustat data from 1962 to 1999 because we have dividend changes from 1963 to 2000, and we need financial data at the end of the fiscal year before the dividend change. As control variables, we use the dividend yield, market capitalization, debt ratio, cash ratio, market-to-book value of assets, and operating income at the end of the preceding fiscal year.

Table 3, Model A, reports the results. Firms are more likely to raise their dividends if they are large and profitable and the past dividend yield, debt ratio, cash ratio, and market-to-book ratio are low. These results are generally as expected, perhaps with the exception of the result for the cash ratio. Firms are more likely to cut their dividends if they have poor operating income, low cash balances, and a low market-to-book ratio. It is curious that the market-to-book ratio negatively affects both the probability of dividend increases and decreases. One interpretation is that in the case of dividend increases, the market-to-book ratio measures growth opportunities, such that firms with poor growth opportunities need less future funds and therefore increase their dividends. Meanwhile, in the case of dividend decreases, the market-to-book ratio measures past and expected future performance, such that firms with poor performance are forced to cut their dividends.

Most important for the purposes of this study, firms are more likely to increase dividends when the dividend premium is large and are more likely to decrease dividends when the dividend premium is small. This is consistent with Proposition 1. Thus, the evidence suggests that managers cater to aggregate demand of investors for dividends when altering the dividend level, in the manner predicted by the dividend catering theory.

We also examine the magnitude of the dividend premium coefficients. When the independent variables are set at their respective means, a one-standard deviation increase in the dividend premium increases the probability of a dividend increase from 20.20% to 21.17%, representing an absolute (relative) increase in the probability of 0.97% (4.78%). The same increase in dividend premium decreases the probability of a dividend decrease from 1.60% to 1.46%, representing an absolute (relative) decrease of 0.14% (8.65%). In comparison, Baker and Wurgler (2004a) find that a one-standard deviation increase in the dividend premium is associated with a 3.90% increase in the probability that non-dividend-payers initiate dividends and a 0.85% decrease in the probability that dividend-payers omit dividends. Roughly speaking, these results imply that the initiation/omission decision is five times more sensitive to changes in the dividend premium than the increase/decrease decision. A possible explanation for this is that the market reaction is larger for initiations/omissions than for increases/decreases, because the catering theory suggests that managers are more likely to consider the dividend premium if the stock-price reward for doing so is higher. Indeed, Lie (2004) finds that the average market reaction to dividend omissions is twice as large as that to dividend increases. Furthermore, the results reported here combined with those reported in Baker and Wurgler (2004a) suggest that the average market reaction to dividend initiations is three times as large as that to dividend increases.

We should also note that our estimated marginal effects are likely to underestimate the true dividend catering effects for at least three reasons. First, the dividend premium is measured at the beginning of the year, whereas most of the dividend decisions are likely to be made significantly later in the year. This is not a trivial issue, given that the standard deviation of yearly dividend premium changes is 10.6, which indicates that there are great fluctuations over relatively short periods. Unfortunately, it is hard to mitigate this problem, because the dividend premium can only be estimated at certain intervals and it is

Table 3
Regression of the decisions to increase dividend, decrease dividends, or repurchase shares

Multinomial logistic regression of the decisions to increase or decrease dividends based on the universe of firm-years on Compustat with available financial data and book value of assets in excess of one million. Model A is based on fiscal years 1962–1999 and includes 62,401 observations. Model B also requires data on repurchases for the subsequent fiscal year, and is therefore based on fiscal years 1970–1999 (repurchase data is not available until 1971), and includes 50,214 observations. A firm is defined to repurchase shares if the repurchases (Compustat item ♯ 115) scaled by the market capitalization at the beginning of the year exceeds 0.01. The financial variables are based on the fiscal year immediately prior to the dividend changes (and the repurchases in model b). Debt is defined as long-term debt (Compustat item ♯ 9) and cash is defined as cash and cash equivalents (Compustat item ♯ 1). Debt, cash, and operating income are scaled by book value of assets. Dividend premium is the value-weighted dividend premium from Baker and Wurgler (2004a) at the beginning of the year.

	Model A				Model B					
	Dividend decreases		Dividend increases		Dividend decreases		Dividend increases		Repurchases	
	Coeffic.	*p*-value	Coeffic.	*p*-value	Coeffic.	*p*-value	Coeffic.	*p*-value	Coeffic.	*p*-value
Intercept	−2.088	0.000	−1.595	0.000	−1.857	0.000	−1.270	0.000	−1.364	0.000
Dividend yield	−0.001	0.853	−3.925	0.000	0.001	0.914	−3.827	0.000	0.003	0.414
Market capitalization (in billion $)	−0.020	0.085	0.011	0.000	−0.040	0.012	0.012	0.000	0.011	0.000
Debt	−0.148	0.512	−0.472	0.000	−0.205	0.399	−0.757	0.000	−0.265	0.007
Cash	−2.867	0.000	−1.575	0.000	−3.074	0.000	−1.499	0.000	0.676	0.000
Market-to-book value of assets	−0.869	0.000	−0.124	0.000	−0.823	0.000	−0.157	0.000	−0.263	0.000
Operating income	−2.486	0.000	5.585	0.000	−2.283	0.000	6.299	0.000	1.606	0.000
Dividend premium	**−0.006**	**0.004**	**0.004**	**0.000**	**−0.008**	**0.001**	**0.002**	**0.001**	**−0.013**	**0.000**

difficult to discern when payout decisions are made (especially decisions not to change dividends). Second, while Baker and Wurgler (2004a) and we argue that the dividend premium can be used as a proxy for the time-varying demand for dividends, it is clearly not a perfect proxy. For example, the dividend premium might also capture time-varying investment opportunities of dividend payers versus non-dividend payers. If firms with good (poor) investment opportunities are more likely to lower (raise) dividends, this would offset the catering effect. Third, corporate decision-makers base their decisions on perceived, rather than actual, demand for dividends, thus introducing more measurement error.

As an extension, we separate out firms that repurchase shares. Firms might use share repurchases as a viable substitute for dividends, especially if the aggregate demand for dividends is low. Thus, we expect that, ceteris paribus, firms are more likely to repurchase shares when the dividend premium is low.

Model B of Table 3 reports the results of the extended logistic regression that also includes share repurchases. This model includes fewer observations, because Compustat does not report repurchase data for fiscal years before 1971. As expected, the results indicate that firms that repurchase shares have low debt ratios and market-to-book ratios and high cash levels and operating income. Further, the negative and statistically significant coefficient on dividend premium for repurchases suggests that repurchases are relatively more frequent when the dividend premium is low. The magnitude of the dividend premium coefficient indicates that a one-standard deviation increase in the dividend premium decreases the probability of a repurchase from 19.79% to 16.88%, representing an absolute (relative) decrease of 2.92% (14.74%). Overall, our results suggest that firms that increase cash disbursements do so via increased dividends when the dividend premium is high and via share repurchases when the dividend premium is low.

4.2. Determinants of the magnitude of dividend changes

The previous section shows that the dividend premium affects the decision to increase or decrease dividends. The natural extension is to examine whether the dividend premium also affects the magnitude of the dividend changes, as stated in Proposition 2. To do so, we regress the absolute dividend changes scaled by pre-announcement stock prices (essentially the changes in dividend yield) against both the same control variables as in the previous analysis and the dividend premium. The dividend premium is estimated here as the weighted average of the value-weighted dividend premium from Baker and Wurgler (2004a) at the beginning and the end of the year, where the weights depend on the number of days that have passed since the beginning of the year.[4] Most of the control variables are taken from Compustat. Because not all of the sample firms are listed on Compustat or some have missing data on Compustat, we also run regressions with market capitalization as the sole control variable to boost the sample size and statistical power.

Table 4 reports the results. The only coefficient that is statistically significant at the 0.01 level for the regressions of the magnitude of dividend decreases is the positive coefficient on dividend yield, suggesting that firms tend to cut the dividend more if their past dividend is high. This is an intuitive result, given that firms that pay small dividends cannot cut the

[4] For example, if the announcement takes place on January 20, we estimate the dividend premium as (((365– 20)/ 365) × Dividend premium at the beginning of the year) + ((20/365) × Dividend premium at the end of the year).

Table 4
Regressions of absolute changes in dividends

Regressions of absolute changes in dividends scaled by pre-announcement stock prices. The financial variables are based on the fiscal year immediately prior to the dividend changes. Debt is defined as long-term debt (Compustat item ♯ 9) and cash is defined as cash and cash equivalents (Compustat item ♯ 1). Debt, cash, and operating income are scaled by book value of assets. Dividend premium is the value-weighted dividend premium from Baker and Wurgler (2004a) at the time of the dividend announcement divided by one thousand.

	Dividend decreases				Dividend increases			
	Model A		Model B		Model C		Model D	
	Coeffic.	*p*-value	Coeffic.	*p*-value	Coeffic.	*p*-value	Coeffic.	*p*-value
Intercept	0.000	0.443	0.001	0.005	0.000	0.000	−0.001	0.000
Dividend yield	0.105	0.000	0.098	0.000	0.055	0.000	0.046	0.000
Market capitalization (in billion $)	0.000	0.853	0.000	0.525	0.000	0.076	0.000	0.598
Debt			0.002	0.078			0.001	0.006
Cash			0.004	0.053			0.001	0.000
Market-to-book value of assets			−0.001	0.018			−0.0002	0.000
Operating income			−0.004	0.077			0.003	0.000
Dividend premium	**−0.027**	**0.266**	**−0.027**	**0.049**	**0.009**	**0.000**	**0.008**	**0.000**
Number of observations	1,810		1,506		18,964		16,367	
Adjusted R-squared	0.248		0.350		0.293		0.126	

dividends much further. The coefficient on the dividend premium is negative, as predicted. However, its p-value is as high as 0.266 in the first regression and 0.049 in the second regression, which includes more control variables. Thus, the results for dividend decreases provide some evidence for Proposition 2, although the evidence is statistically rather weak.

The results further show that dividend increases are larger when past dividends, debt ratios, cash ratios, market-to-book ratios, profitability, and the dividend premium are large. Not all of the results for the control variables are intuitive. For example, it is not obvious why firms with high debt ratios tend to increase the dividends more than firms with low debt ratios. Maybe firms tend to use debt payments and dividend payments as complimentary means of disbursing funds to claimholders. In any event, the coefficient on the dividend premium has the predicted sign and is statistically significant at conventional levels, providing more support for Proposition 2. The magnitudes of the coefficients suggest that a one-standard deviation increase in the dividend premium decreases the dividend decrease by 0.043% (representing 4.9% of the mean dividend decrease of 0.89%) and increases the dividend increase by 0.013% (representing 10.3% of the mean dividend increase of 0.14%). As discussed earlier, these figures probably underestimate the true dividend catering effects. Overall, our results show that the magnitude of the dividend changes can be partially explained by the dividend catering theory.

4.3. *Determinants of announcement period returns*

In our final set of tests we examine whether the dividend premium affects the stock price reaction to announcements of dividend decreases and increases. A premise for managers catering to investor demand for dividends is that the stock price reaction to dividend

Table 5
Regressions of announcement period returns
Regressions of the abnormal returns during the three days centered on the announcements of dividend changes. Dividend change is the change in dividend scaled by the pre-announcement stock price. Dividend premium is the value-weighted dividend premium from Baker and Wurgler (2004a) at the time of the dividend announcement divided by one thousand.

	Dividend decreases		Dividend increases	
	Coeffic.	*p*-value	Coeffic.	*p*-value
Intercept	−0.048	0.000	0.005	0.000
Dividend yield	0.023	0.319	0.032	0.004
Market capitalization (in billion $)	0.001	0.013	0.000	0.671
Absolute dividend change	0.152	0.160	2.701	0.000
Dividend premium	**−0.788**	**0.000**	**0.121**	**0.000**
Number of observations	1,799		18,841	
Adjusted R-squared	0.032		0.054	

increases is increasing in the dividend premium and that the stock price reaction to dividend decreases is decreasing in the dividend premium. To examine these relations, we regress abnormal stock returns around announcements of dividend decreases and increases against the dividend premium and control variables. The control variables include the dividend yield, market capitalization, and the change in dividend scaled by the pre-announcement stock price.

Table 5 reports the results of our regressions. Like Denis et al. (1994), Yoon and Starks (1995), and Lie (2000), we find that the announcement period returns for dividend increases are positively related to the magnitude of the dividend change. Moreover, like Bajaj and Vijh (1990), Denis et al. (1994), Yoon and Starks (1995), and Lie (2000), we find that the same returns are positively related to the dividend yield. However, the relations between announcement period returns for dividend decreases and either the magnitude of the dividend cut or the dividend yield are statistically insignificant.

Consistent with the catering theory and Proposition 3, we also find that the announcement period returns for dividend increases are positively related to the estimated dividend premium at the time of the announcements, whereas the relation is negative for dividend decreases. Thus, when the capital market places a low premium on dividend-paying stocks, the capital market perceives news of dividend increases as particularly favorable and news of dividend decreases as particularly unfavorable. The magnitudes of the coefficients imply that a one-standard deviation increase in the dividend premium decreases the returns around announcements of dividend decreases by 1.26% (representing 30.98% of the mean announcement return of −4.07%) and increases the returns around announcements of dividend increases by 0.19% (representing 20.38% of the mean announcement return of 0.95%). Thus, the effect of the dividend premium on the announcement returns is economically significant.

This result complements the other results on the catering theory reported herein as well as those reported in Baker and Wurgler (2004a). Whereas Baker and Wurgler document that firms tend to initiate dividends when the dividend premium is high, they report a statistically insignificant relation between the abnormal stock returns around dividend initiations and the dividend premium.[5] Our evidence is therefore important both in that it provides general support for the dividend catering theory and in that it shows that the catering theory is likely to extend beyond just dividend initiations (and perhaps omissions) to include the far more frequent dividend increases and decreases.

5. Summary and conclusion

Baker and Wurgler's (2004a) catering theory of dividends suggests that investors' time-varying demand for dividends causes the premium on dividend-paying stocks relative to non-dividend-paying stocks to fluctuate, and that in turn affects firms' decisions to change dividends. Indeed, Baker and Wurgler find that firms are more likely to initiate dividends when the dividend premium is large. Another prediction is that the stock price reaction to dividend initiations increases with the dividend premium; however, Baker and Wurgler find no empirical evidence in support of this conjecture.

We revisit the dividend catering theory for two reasons. First, the lack of a significant relation between the stock market reaction and the dividend premium might cast doubts about the underlying theory. For managers to consider investor demand for dividends when making dividend decisions, it is necessary that investors "make themselves heard through their reaction" (Baker and Wurgler, 2004a, p. 1140). A second reason is that it is useful to examine whether the insight from the theory extends to dividend changes other than just initiations and omissions. After all, initiations and omissions are much less frequent than changes in existing dividends, so any evidence that the model and its predictions hold for changes in existing dividends would make the catering theory even more relevant to financial managers.

Based on a large sample of dividend decreases and increases from 1963 through 2000, we document results that consistently support our extended version of the catering theory, which allows for a continuous dividend level. In particular, when the dividend premium is high, firms are more likely to increase dividends, the dividend increases tend to be larger, and the stock price reaction to news of dividend increases is more favorable. Conversely, when the dividend premium is low, firms are more likely to repurchase shares (which is an alternate means of boosting payouts) and decrease dividends, the dividend decreases tend to the larger, and the stock price reaction to news of dividend decreases is more favorable.

Collectively, the results suggest that managers take into account varying investor demand in their dividend decisions, and that this behavior tends to inflate the stock price. A further implication is that managers who disregard dividend demand are penalized via a relatively lower stock price. Given the frequency with which dividend decreases and especially dividend increases occur, this implication is highly relevant to corporate decision makers.

We concede, however, that there is more to the story than dividend catering. While the dividend premium has significant explanatory power in our analyses, so do individual firm characteristics, suggesting that both internal and external factors affect decisions to change dividends and the capital market's reaction to such decisions. The role of other

[5] One possible reason that Baker and Wurgler (2004a) find an insignificant relation between the stock price reaction to dividend initiations and the dividend premium is that they do not control for the dividend change. However, we find that the relation between the stock price reaction to dividend increases and the dividend premium is statistically significant even if we do not control for the dividend change (not tabulated).

noncatering factors is especially apparent in the negative stock market reaction to dividend decreases, which the dividend catering theory cannot explain by itself. Thus, it would be unwise for corporate managers to look solely to the capital market for guidance in their dividend policy.

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