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The dividend month premium ☆

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ABSTRACT

We find an asset pricing anomaly whereby companies have positive abnormal returns in months when they are predicted to issue a dividend. Abnormal returns in predicted dividend months are high relative to other companies and relative to dividend-paying companies in months without a predicted dividend, making risk-based explanations unlikely. The anomaly is as large as the value premium, but less volatile. The premium is consistent with price pressure from dividend-seeking investors. Measures of liquidity and demand for dividends are associated with larger price increases in the period before the ex-day (when there is no news about the dividend) and larger reversals afterward.

1. Introduction

Most theoretical models used in finance assume perfect liquidity, meaning that investors can purchase or sell arbitrary amounts of a firm's securities without affecting the price. However, empirical evidence exists that demand curves for stocks slope downward. A number of papers show price changes around the inclusion of stocks in an index, a one-off event that results in a largely permanent increase in demand but arguably does not contain information (Shleifer, 1986; Wurgler and Zhuravskaya, 2002; Greenwood, 2005, and others). But should price changes be expected for predictable and temporary shifts in demand? In such cases, arbitrageurs ought to have the best chance of reducing price impact by taking the opposite side of these trades. If predictable price patterns result from demand shifts in large, liquid companies around regularly scheduled, highly salient events, this presents a challenge for notions of market efficiency.

In this paper we study the reaction of stock prices when companies are expected to issue dividends. The lead-up to dividend payment is a period when the demand and supply of shares could shift. Investors who wish to receive the dividend, for whatever reason, must purchase the stock before the ex-day. Conversely, those who do not wish to receive the dividend must sell before the ex-day. At the same time, liquidity suppliers and arbitrageurs could be expected to enter the market to offset any price impact that dividend-motivated trading is having. If dividend-seeking investors are more numerous than dividend-avoiding investors, and if arbitrageurs are unable or unwilling to supply sufficient liquidity to the market (both empirical questions), then excess demand for the shares increases the price.

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Consistent with the above intuition, we find evidence of mispricing of stocks whereby companies have significantly higher returns in months when they are expected to issue a dividend. We term this the dividend month premium. Instead of conditioning on the actual payment of dividends, we forecast a predicted dividend if the company paid a quarterly dividend 3, 6, 9 or 12 months ago, a semi-annual dividend 6 or 12 months ago, or an annual dividend 12 months ago. A portfolio that buys all stocks expected to issue a dividend this month earns abnormal returns of 41 basis points. Other specifications produce even higher returns. For example, a portfolio of companies that had a semi-annual dividend six months ago has a four-factor alpha of 115 basis points per month.

The returns in predicted dividend months are unusually high on two dimensions: first, relative to all other companies and, second, relative to the same set of dividend-paying stocks in months when they are not expected to have a dividend. A portfolio that is long expected dividend payers and short all other companies (between companies) earns abnormal returns of 53 basis points relative to a four-factor model. Meanwhile, a portfolio that is long companies in the month of their predicted dividend and short same companies in other months (within companies) earns abnormal returns of 37 basis points.

These findings make the dividend month premium unlikely to be driven by risk. In particular, the within companies portfolio exploits only the time series variation in the same set of dividend paying companies, resulting in a portfolio with virtually zero loadings on any conventional risk factors. The reason is that the portfolio is long each company with quarterly dividends for four months of the year and short the same companies (at half the weight) for eight months of the year. Hence, any fixed loadings on risk factors tend to cancel out, making systematic risk a less likely explanation. Any explanation relating to risk would need to rely on time-varying risk loadings, with companies being systematically riskier in months of expected dividend payment.

We hypothesize that the dividend month premium is due to price pressure from dividend-seeking investors in the lead-up to dividend payment. Existing theories of dividends can provide some basis for this view. Theories of catering, such as in Baker and Wurgler (2004) and Li and Lie (2006), propose that investors could have an underlying demand for dividends themselves, such as for psychological or institutional reasons. A desire for dividends and a positive discount rate could cause investors to prefer to purchase dividend-paying stocks immediately before the dividend is paid rather than immediately afterward (and prefer to sell the stock after the dividend payment, not before). Price pressure around dividend payment could also arise under dividend clientele theories, whereby groups of investors desire dividend payments for reasons such as different tax treatment, a need for income streams, etc.[1] Trade is likely between investors with different tax rates in the lead-up to the ex-dividend day (Michaely and Vila, 1996; Michaely, Vila, and Wang, 1996), and such trades could impact prices.

To determine whether price pressure explains our results, we examine daily characteristic-adjusted returns within the dividend month. We find that abnormal returns are present for virtually the entire period between the announcement date and the ex-dividend date. We find abnormal returns on the actual announcement day (12 basis points), on the predicted announcement day (3 basis points) and on the ex-day (26 basis points). Most important, there are also abnormal returns of 17 basis points in the period between the announcement and ex dividend days. While previous research has highlighted the importance of returns on the ex-day, we find that these are less than half of the total abnormal returns during the dividend period.

The abnormal returns in the interim period between the announcement and ex-day are consistent with price pressure due to demand for dividends but are difficult to reconcile with alternative explanations. During this time, no news is being released about the dividend, and no uncertainty exists about the dividend size. In addition, an investor who sells the share before the ex-day does not receive the dividend. Thus, holding dividend-paying shares only for the interim period results in the same tax consequences as holding any other non-dividend-paying stock for the same length of time, and these returns are not limited to investors of a particular tax treatment. As such, it is surprising from an asset pricing perspective that there should be abnormal returns.

If the price increases before payment are a result of price pressure, then there ought to be an increase in selling after dividend payment that results in negative returns. Consistent with this, abnormal returns in the 40 days after the ex-dividend day are -72 basis points. This effect is large enough to offset the gains during the dividend month, reinforcing the conclusion that the main effect is a time series one and that the price increases are reversed by subsequent price decreases.

We also show that the high returns before the ex-day and the subsequent reversals are larger among less liquid securities, for which changes in demand for shares ought to have a bigger effect. Less liquid securities, measured using the Amihud (2002) variable, have more positive interim returns, more positive ex-day returns, and more negative returns (i.e., larger reversals) in the 40 days after the ex-day. Interim and ex-day returns are also significantly lower when a greater length of time passes between the announcement and the ex-dividend day, and returns after the ex-day are higher (i.e., smaller reversals). This is consistent with traders having more price impact when they are forced to buy shares over a shorter period of time. Third, returns are larger for companies with higher dividend yields, consistent with dividend-seeking investors having more demand for shares that pay larger dividends. The fact that these

[1] Dividend clienteles have been examined by Black and Scholes (1974), Elton and Gruber (1970), Allen, Bernardo, and Welch (2000), Graham and Kumar (2006), Becker, Ivković, and Weisbenner (2011), and many others.

variables predict larger price increases before the ex-day and larger reversals afterward is strong evidence of price pressure.

While it is difficult to determine whether the underlying source of demand for the dividends themselves is primarily due to tax-related clientele effects or from catering effects, some evidence exists that tentatively supports the latter interpretation. In particular, we find that the dividend month premium is 15 basis points higher during recessions and is also higher during periods of high market volatility [as measured by the Chicago Board Options Exchange Volatility Index (VIX)]. If the catering demand for dividends arises from psychology, as Baker and Wurgler (2004) suggest, it could be due to a perception that dividends represent a safe, guaranteed source of revenue. If so, such demand for dividends could increase with economic uncertainty, as risk aversion is higher and the availability of alternative safe assets is reduced. However, trading from tax-related clienteles also could have a larger effect in recessions and volatile markets if aggregate liquidity is reduced, so this evidence is not conclusive.

We also present evidence that the dividend month premium is driven by dividends specifically, instead of other events that coincide with dividend payment. The dividend month premium does not appear to be driven by the earnings announcement premium, as in Beaver (1968), Frazzini and Lamont (2006), and Savor and Wilson (2011). The effect is not restricted to certain calendar months of the year, and it is not driven by the seasonality of returns described in Heston and Sadka (2008). We show that the dividend month premium is not driven by news about the size of the dividend. By contrast, when companies omit dividend payments the effect is not present, consistent with the returns being driven by the dividend itself and not by other events during the month.

While we are far from the first to examine the effects of dividends on asset prices, we contribute to the literature in part by exploring the impact of predictable dividend payment using modern, calendar-time asset pricing methods. The results are striking. Notwithstanding its lack of loading on risk factors, the within companies portfolio has abnormal returns as large as the value premium, but with considerably less volatility. The within companies portfolio has an annual Sharpe ratio of 0.195, higher than the small minus big (SMB), high minus low (HML) and up minus down (UMD) portfolios, with the long-only dividend month portfolio having a Sharpe ratio of 0.421. In addition, the strategy produces positive excess returns in 73 out of 83 years, with the largest negative annual return being only −4.6%. The effects are not limited to small or illiquid stocks, as dividend-paying companies tend to be larger and more visible, and the patterns in returns hold on a value weighted as well as an equal weighted basis.[2] Most of the abnormal returns are from the long side of the difference portfolio, not the short side (for which costs of implementing the strategy are higher). Due to dividend payments being highly persistent, significant alphas can be obtained using dividend information lagged up to 20 years. Our findings contribute to the literature on asset pricing anomalies that finds abnormal returns around regular, predictable events.[3]

Our paper also contributes to the literature on the pricing of dividends. We present a result not apparent from earlier papers that examined short periods during the dividend month, namely, that abnormal returns are present during the entire dividend period, that large reversals are evident in the weeks afterward, and that both patterns appear to share a common underlying cause of investor price pressure. We also describe how dividend returns (and reversals) are significantly higher during recessions and volatile markets, both somewhat surprising facts from the perspective of standard theories of dividend payment. Our findings raise important questions as to what underlying model of investor demand for dividends is causing prices to predictably increase well in advance of the ex-day and reverse in the period afterward. Part of the challenge for such models is to explain why dividend-seeking investors do not purchase the share a few days earlier and thereby capture the abnormal returns as well as the dividend.

The remainder of the paper is structured as follows. Section 2 describes the hypotheses. Section 3 discusses the data. Section 4 presents the main results of the paper, Section 5 examines alternative explanations for our findings, and Section 6 concludes.

2. Literature review and hypotheses

2.1. Market efficiency

The null hypothesis is that, under simple models of market efficiency (Fama, 1970), using past information in dividend payments should not be able to generate risk-adjusted returns. Dividend payments tend to be stable over time (in the sample, 88% of firms that paid a dividend 12 months ago pay a dividend in the current month). While the news component of dividend announcements ought to affect prices, any predictable aspect of dividend announcements or payments should not result in abnormal risk-adjusted returns.

2.2. Price pressure

Our main alternative hypothesis is that returns are high because of predictable price pressure in the lead-up to dividend payment. During this time, the supply and demand of dividend-paying shares are determined in part by investors trading based on the dividends themselves and in part by liquidity providers and arbitrageurs hoping

[2] Many anomalies tend to be concentrated in smaller stocks, including post-earnings announcement drift (Chordia, Roll, and Subrahmanyam, 2008), momentum (Hong, Lim and Stein, 2000), and others.

[3] These include the earnings announcement premium (Beaver, 1968; Frazzini and Lamont, 2006; Savor and Wilson, 2011), the January effect (Keim, 1983), return seasonality (Heston and Sadka, 2008), one-month reversals (Jegadeesh, 1990), momentum (Jegadeesh and Titman, 1993), and three- to five-year reversals (DeBondt and Thaler, 1985).

to profit from short-term price movements. If some investors receive utility from dividends and discount rates are positive, these investors will have a higher willingness to pay for companies that pay dividends sooner. As a consequence, these investors will be more willing to buy the stock, or less willing to sell the stock, immediately before the dividend is paid instead of immediately afterward. This does not require that the same set of investors are purchasing the stock immediately before the ex-day and selling immediately afterward, however. Investors could be purchasing the same stocks that they were already going to buy, but accelerating the purchase to occur before the ex-day (and, similarly, delaying planned sales until after the ex-day).

If the trades of arbitrageurs and liquidity suppliers are insufficient to offset the trades from dividend-seeking investors, then we expect excess demand for dividend-paying shares, inasmuch as the quantity demanded exceeds the quantity supplied at the old price and the increase in price will restore equilibrium. In this case, the underlying demand for dividends themselves (which we alternatively refer to as a desire or a willingness to pay for dividends) translates into changes over time in the supply and demand of dividend-paying assets.

The existence of price pressure from dividend-seeking investors suggests price increases in the lead-up to dividend payment and price decreases afterward. In addition, the announcement of dividends will resolve investor uncertainty about whether the dividend will be paid and, thus, excess demand could increase around the announcement as well.

Price pressure as a general concept does not explain the underlying demand for dividends. A number of theoretical models are consistent (at least in spirit) with the intuition above. These include catering theories that firms respond to investor demand for dividends due to psychological or institutional reasons as in Baker and Wurgler (2004) or from the trading of dividend clienteles with different tax rates such as in Michaely, Vila, and Wang (1996).

Price pressure, regardless of how it arises, leads to specific predictions about returns. First, returns should be related to liquidity, as less liquid securities are likely to experience greater price movements from a given level of excess buying. Second, price pressure is likely to increase in the lead-up to dividend payment. If investors only wish to receive the dividend, they might not want to hold the stock for longer than necessary as it would expose them to price fluctuations. As the length of time before receiving the dividend becomes shorter, these investors are more likely to purchase the stock. Third, price pressure is likely to lead to reversals after the dividend is paid, either due to tax arbitrage traders unwinding their positions or catering investors having a lower preference for the stock. Such reversals should be related to the level of price increases that occurred before and, thus, be driven by the same types of variables.

2.3. Alternative hypotheses

A number of papers examine the relation between dividends and stock returns and could predict alternative reasons for high returns in months of dividend issuance.

2.3.1. The ex-day effect

One of the most studied aspects of dividends and stock returns is the returns on ex-dividend days. As early as Campbell and Beranek (1955), it has been found that the ex-dividend day stock price change is typically less than the full amount of the dividend. Elton and Gruber (1970) argue that this is driven by dividend clienteles and the tax-related consequences for the marginal investor.[4] Under this hypothesis, the taxability of dividends for the marginal investor causes the price drop on ex-dividend days to be equal to the after-tax value of the dividend to the marginal investor (which is less than the face value).

Subject to the possibility of price pressure before the ex-day, theories of the ex-day tend to predict that price increases should be limited to the ex-day itself. As a result, we test whether dividend month price effects are limited to the ex-day itself.

2.3.2. Announcement returns, risk, and pessimism

A smaller literature has examined the returns on dividend announcement days, most notably Kalay and Loewenstein (1985) and Eades, Hess, and Kim (1985). Both papers find that dividend announcements have positive returns, and Eades, Hess, and Kim (1985) find that aggregate returns are positive even if dividend omissions are included. Kalay and Loewenstein (1985) argue that the high returns could be explained by risk, as stock returns are also more volatile on announcement days. Dividend announcements could also be periods when the firm's returns are correlated with macroeconomic risks, as Savor and Wilson (2011) argue holds for the earnings announcement premium. A risk explanation predicts that dividend months should exhibit either loadings on standard factors (for systematic risk) or higher volatility (for both systematic and idiosyncratic risk).

Eades, Hess, and Kim (1985) argue that investors could be overly pessimistic about the likelihood of the firm being able to continue dividend payment. In such a case, then, they should on average experience a positive surprise around the period when announcements are expected. One way to distinguish this explanation is that, if investors are overly pessimistic, the returns effect should be limited to the announcement itself, as this is when the news is released.

2.3.3. Interim returns, post-period returns, and the Brennan (1970) model

Returns during the interim period between the announcement and the ex-day have received less systematic study. Empirically, Lakonishok and Vermaelen (1986) find that the five days before the ex-day have

[4] See Elton, Gruber, and Blake (2005), Green and Rydqvist (1999), McDonald (2001), Graham, Michaely, and Roberts (2003), Bell and Jenkinson (2002), and numerous others. Other proposed explanations for the ex-dividend day effect include microstructure arguments (Dubofsky, 1992; Bali and Hite, 1998; Frank and Jagannathan, 1998, and others) and dynamic clientele models related to taxation (e.g., Rantapuska, 2007; Koski and Scruggs, 1998; Graham and Kumar, 2006; Felixson and Liljeblom, 2008). For a discussion of the literature exploring why firms pay dividends, see Allen and Michaely (2003).

abnormal positive returns. Eades, Hess, and Kim (1985) examine the period around the announcement day and find that, after controlling for ex-day effects, there are no abnormal returns after dividend announcements. In terms of the post-period returns, Lakonishok and Vermaelen (1986) find that the five days after the ex-day have negative returns.

Theoretically, fewer models make clear predictions of high returns in the interim period. One possible explanation is the Brennan (1970) model of taxes and dividends, which predicts that pre-tax risk-adjusted returns should be higher for companies with a higher dividend yield. As Kalay and Michaely (2000) discuss, this is a cross-sectional prediction, meaning that dividend-paying companies should have high returns on average, including during the interim period.[5] A key distinction between the Brennan (1970) model and price pressure is that price pressure predicts positive returns before the ex-day but negative returns afterward, whereas Brennan (1970) predicts high returns in general.

3. Data and summary statistics

The data on daily and monthly stock returns and dividends come from the Center for Research in Security Prices (CRSP). Monthly returns run from January 1927 until December 2011. Dividend announcement dates and ex-dividend dates are taken from the CRSP daily file. We consider shares listed on the New York Stock Exchange (NYSE), American Stock Exchange (Amex) and Nasdaq exchange. We consider only common shares of US companies (CRSP share code 10 or 11) and thereby exclude American Depositary Receipts (ADRs), various ownership units (e.g., limited partnership interests), closed-end funds, Real Estate Investment Trusts (REITs), and shares of companies incorporated outside the United States. We also exclude shares with prices less than $5 in the previous month and firms missing a price in the previous month, with these restrictions applying to the previous day for the daily return analysis.

For dividend payments, we consider ordinary cash dividends paid in US dollars (CRSP distribution codes starting with 12). Because we are interested in predicting future dividends, we focus on dividends that are recurring in nature, namely, quarterly, semi-annual, and annual dividends (third digits of 3, 4, and 5). We also include unknown and missing frequency dividends (third digits 0 and 1) as being equivalent to a quarterly dividend, and exclude year-end or final, special, interim, and non-recurring dividends. Both assumptions can be reversed (i.e. omitting unknown and missing frequency dividends, or including all dividend types) without affecting any of the main results.

Overall, 65.4% of firm-month observations paid some cash dividend in the prior 12 months, and 89.25% of all dividend observations are quarterly, 1.50% of dividends are semi-annual, 0.48% are annual, and 8.09% are of unknown or missing frequency. Because we are generally examining dividend versus non dividend months for companies, we exclude companies that paid a monthly dividend in the previous 12 months unless otherwise noted (0.7% of dividend observations). Results are robust to the inclusion of monthly dividend observations. The results are also very similar if only quarterly dividends are included. Dividend months refer to months with an ex-date unless otherwise noted. Table 1 presents summary statistics for companies that paid a dividend in the past 12 months and those that did not.

4. Results

4.1. Predicted dividend months and raw returns

In this subsection we explore the question of whether dividend-paying stocks have different returns in months of expected dividend payment. The concept of expected dividend payment is an important one, as actual dividend payment involves both a news component and a predictable component. Companies are known to be reluctant to omit dividends, as shown by John and Williams (1985), Bernheim (1991), and Nissim and Ziv (2001). As a result, conditioning on the existence of a dividend announcement excludes the negative returns of dividend omissions, resulting in a sample with high returns, as in Kalay and Loewenstein (1985). However, because announcements are not known with certainty ahead of time, this portfolio is not tradable. Instead, the relevant asset pricing question is whether high returns are evident in the periods when an announcement is expected. This addresses the fact that returns are lower if the announcement is delayed or the dividend is omitted, as noted in Kalay and Loewenstein (1986) and Eades, Hess, and Kim (1985).

Precisely because companies are reluctant to omit dividends, the existence of a dividend payment is predictable using the timing of past payments. We forecast using the following rule: a company has a predicted dividend in month t if it paid a quarterly dividend in months $t-3$, $t-6$, $t-9$, or $t-12$, a semi-annual dividend in months $t-6$ or $t-12$, an annual dividend in months $t-12$, or a dividend of unknown frequency in months $t-3$, $t-6$, $t-9$, or $t-12$. In Table 2, we explore how returns vary based on the timing of past dividends. In Panel A, we consider dividends of all frequencies (monthly, quarterly, semi-annual, annual, unknown, and missing). We group stocks according to when the dividend was paid: one month ago, two months ago, etc., up to 12 months ago.

While the conditioning is on the month that contains the ex-day, this does not mean that it is only the ex-day that is of interest. The median time between the announcement and the ex-day is ten days and, hence, the month that includes the ex-day will in many cases

[5] The relation between dividend yield and expected returns has been studied in a number of papers. Litzenberger and Ramaswamy (1979, 1980, 1982) find a relation between dividend yield and expected return, while Black and Scholes (1974) and Miller and Scholes (1982) do not. Kalay and Michaely (2000) reconcile these results by showing that the relation between dividend yield and returns holds only when returns are measured in shorter periods (up to a month) around the ex-dividend date and, thus, is better understood as a time series effect, which is less consistent with Brennan (1970).

Table 1
Summary statistics.

This table presents summary statistics for companies according to whether they paid a dividend in the past 12 months, using monthly data from January 1927 to December 2011. Panel A presents information for companies that paid a cash dividend in the past 12 months, and Panel B presents information for companies that did not pay a cash dividend in the past 12 months. Panel C presents examines the distribution of dividend frequencies.

Panel A: Firms with a dividend in the past year

	N	Mean	Standard deviation	25%	Median	75%
Market capitalization (millions of dollars)	1,359,690	1,739	10,457	33	121	564
Book-to-market	950,171	0.8098	0.5561	0.4415	0.6862	1.0380
Turnover	1,262,032	0.5118	0.9443	0.1060	0.2443	0.5671
Bid-ask spread	563,930	0.0239	0.0381	0.0042	0.0134	0.0302
Dividend yield	4,448	0.0150	0.0590	0.0036	0.0069	0.0143
Number of firm months	1,359,690					
Number of firms	8,894					

Panel B: Firms with no dividend in the past year

	N	Mean	Standard deviation	25%	Median	75%
Market capitalization (millions of dollars)	718,726	894	6,308	33	113	436
Book-to-market	611,835	0.5959	0.9433	0.2471	0.4505	0.7714
Turnover	688,811	1.3737	2.0701	0.2887	0.7404	1.7160
Bid-ask spread	514,907	0.0250	0.0428	0.0027	0.0134	0.0324
Number of firm months	718,726					
Number of firms	13,578					

Panel C: Distribution of dividend frequencies

Dividend frequency	Percent of firm-months with dividend in the last year	Percent of dividend observations
Any frequency	65.42	
Monthly	0.17	0.70
Quarterly	56.61	89.25
Semi-annual	2.00	1.50
Annual	1.07	0.48
Unknown frequency	7.46	8.09

include at least a large part of the interim period, and often the announcement as well. The advantage of using a monthly returns measure is that it is easier to correct for known determinants of expected returns (size, book-to-market, momentum) using factor regressions, and the estimates of alpha thus obtained have a clear interpretation in terms of asset pricing theory and allow for comparison with other anomalies.

Table 2, Panel A, presents average returns, standard deviation of returns, and the probability of dividend payments in the current month according to past dividend timing. It shows the patterns in abnormal returns common throughout the paper, namely, that the returns are higher in months when dividends are expected to be paid. The four months with the highest average returns are those when a dividend is expected to be paid (12, 6, 3, and 9 months ago, with returns of 1.43%, 1.43%, 1.41%, and 1.40%, respectively). Average returns are lowest one month after a dividend is expected to be paid (10, 4, and 7 months and 1 month ago, with returns of 1.03%, 1.03%, 1.04%, and 1.06%, respectively). Expected dividend months also have the lowest standard deviation of returns. The four lowest standard deviation months are for dividends 3, 6, 9, and 12 months ago (9.61%, 9.64%, 9.65%, and 9.65%, respectively). The four most volatile months, by contrast, are immediately before an expected dividend (2, 5, 8, and 11 months ago).

The result that the high return dividend months also have lower volatility suggests that the explanation in Kalay and Loewenstein (1985), whereby high announcement day returns also have higher risk, does not seem to hold for the dividend month as a whole. Panel A also shows the persistence of dividend payments. Companies that paid dividends 3, 6, 9, and 12 months ago have probabilities of paying dividends in the current month equal to 85%, 85%, 84%, and 88%, respectively (slightly higher if only quarterly dividends are considered).

Panel B shows the distribution of monthly returns for portfolios formed using our formal definition of predicted dividends. Months with a predicted dividend have

Table 2
Returns and the probability of current dividend payment, sorted by timing of past-dividends.

This table presents the monthly stock returns of companies according to the timing of the past dividend payments, using monthly data from January 1927 to December 2011. Panel A examines the average returns and probability of dividend payment in the current month based on payment of dividends in previous months. Averages are taken over all firm-month combinations. "Months since dividend payment" indicates that the returns are taken for companies that paid a dividend a given number of months ago. "All dividends" refers to all regular cash dividends paid in US dollars (distributions with the first two digits of the Center for Research in Security Prices DISTCD variable equal to 12 with the third digit under 6). "Quarterly dividends" refers only to quarterly cash dividends. Panel B presents the distribution of returns according to companies predicted to pay a dividend this month, companies that paid a dividend in the past 12 months but are not predicted to pay in the current month, and companies that did not pay a dividend in the past 12 months. Returns are time series averages for portfolios, formed by aggregating companies into portfolios each month. Dividends are predicted in the current month if a quarterly dividend was paid 3, 6, 9, or 12 months ago, if a semi-annual dividend was paid 6 or 12 months ago, or if an annual dividend was paid 12 months ago. The Sharpe ratio is equal to average returns minus the risk free rate, divided by the standard deviation of returns. All columns listing percentiles are for monthly returns.

Panel A: Raw returns and dividend payments

Months since dividend payment	Returns in current month given dividend payment *N* months ago		Probability of dividend in current month given dividend payment N months ago	
	Mean return	Standard deviation	All dividends	Quarterly dividends
1	1.06	9.72	0.009	0.001
2	1.18	9.81	0.060	0.053
3	1.41	9.61	0.853	0.879
4	1.03	9.73	0.062	0.054
5	1.20	9.84	0.066	0.057
6	1.43	9.65	0.853	0.862
7	1.04	9.75	0.067	0.058
8	1.18	9.87	0.064	0.056
9	1.40	9.64	0.835	0.855
10	1.03	9.78	0.065	0.057
11	1.17	9.87	0.050	0.040
12	1.43	9.65	0.881	0.879

Panel B: Returns based on predicted dividends

	Mean return	Standard deviation	Sharpe ratio	1%	5%	25%	Median	75%	95%	99%
(1) Predicted dividend month	1.38	5.76	0.188	−15.99	−7.25	−1.29	1.67	4.29	8.86	15.78
(2) All other companies with a dividend in the last 12 months	1.02	5.75	0.125	−16.22	−8.07	−1.57	1.48	3.92	8.36	14.78
(3) All other companies with no dividend in the last 12 Months	1.01	8.52	0.084	−22.87	−12.57	−3.37	1.39	5.41	13.15	20.75
Portfolio long (1) and short (2)	0.36	0.71	0.098	−1.24	−0.75	−0.07	0.33	0.74	1.51	2.36
Portfolio long (1) and short (3)	0.37	3.80	0.021	−10.52	−5.76	−1.42	0.38	2.28	6.17	9.45

average returns of 1.38% and a standard deviation of 5.76%. Companies with a dividend in the last 12 months that do not have a predicted dividend this month have average returns of 1.02% and a standard deviation of 5.75%. Companies that did not pay a dividend in the past 12 months have an average return of 1.01% and a standard deviation of 8.52%. Hence, the portfolio of companies predicted to pay dividends has higher expected returns and the same standard deviation of returns as the portfolio of past payers not predicted to pay dividends this month. Consequently, predicted dividend payers have the highest Sharpe ratio of the three categories. This suggests that predicted dividend payers are not more risky.

4.2. *Abnormal returns in dividend months*

While predicted dividend payers have higher expected returns, the central asset pricing question is whether these higher returns represent compensation for some source of risk that is important to investors. Companies that pay dividends could be more exposed to systematic risk, and the high returns could reflect this different risk loading. We consider this question in several regards. The first is the level of abnormal returns to predicted dividend payers under standard models of expected returns. The second is to compare predicted dividend payers with other companies: all other companies not predicted to pay a dividend this month (between companies), and those companies that paid dividends in the past year but are not predicted to pay a dividend in the current month (within companies).

Systematic risk could be a likely explanation of differences in returns between companies. The short side of the between companies portfolio includes companies that never pay dividends, as well as dividend-paying companies in non-dividend months. Dividend-paying and

Table 3

Abnormal returns in predicted dividend months.

This table presents the results of Fama French four-factor regressions of US monthly stock returns based on predicted dividend payment. Portfolios of stock returns are formed based on predicted dividend payments, and these are regressed on excess market returns, small minus big (SMB), high minus low (HML), and up minus down (UMD) (available from Ken French's website) and in some cases the Pastor and Stambaugh (2003) liquidity factor. Both equal-weighted and value-weighted portfolios are formed. To be included in the long portfolio a stock needs to have a predicted dividend. A predicted dividend month has a quarterly or unknown dividend 3, 6, 9, or 12 months ago, a semi-annual dividend 6 or 12 months ago, or an annual dividend 12 months ago. Stocks with monthly dividends in the previous 12 months are excluded from the analysis. For the short portfolios, "all other companies" contains all companies not included in the long portfolio, "All other past dividend payers" contains companies that are not in the long portfolio, but have paid at least one dividend in the last 12 months, and "dividend 1, 4, 7, or 10 months ago" contains companies not in the long portfolio with a dividend in at least one of the months occurring 1, 4, 7 or 10 months ago. Panel A presents only the intercepts from four-factor regressions, for the various long and short portfolios as labeled, with "difference" being a portfolio long in the predicted dividend portfolio and short the labeled "short" portfolio. Panel B presents the intercepts for regressions of excess portfolio returns on a capital asset pricing model (CAPM) model (excess market returns only), three-factor regressions (excess market returns, SMB, and HML), 4 factor regressions (excess market returns, SMB, HML and UMD) and 4 factor plus liquidity (excess market returns, SMB, HML UMD, and liquidity). To be included in these regressions a company needs a non-missing return from 12 months ago. The data in all regressions consists of monthly returns of NYSE, Amex and Nasdaq common shares, from January 1927 to December 2011. We consider dividend observations to be those months with regularly scheduled cash dividends, measured as distributions where the first two digits of the Center for Research on Security Prices DISTCD variable equal to 12 with the third digit under 6. The top number is the coefficient, the lower number in parentheses is the *t*-statistic, and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A—Four factor alphas for difference portfolios based on predicted dividends

	Equal weighted			Value weighted		
	Predicted dividend (long portfolio)			Predicted dividend (long portfolio)		
	All other companies (short portfolio)	All other past dividend payers (short portfolio)	Dividend 1, 4, 7, or 10 months ago (short portfolio)	All other companies (short portfolio)	All other past dividend payers (short portfolio)	Dividend 1, 4, 7, or 10 months ago (short portfolio)
Long	0.406***	0.406***	0.406***	0.234***	0.234***	0.234***
	(8.68)	(8.68)	(6.82)	(6.82)	(6.82)	(6.82)
Short	−0.123***	0.038	−0.044	−0.079***	−0.047*	−0.175***
	(−3.37)	(0.82)	(−0.91)	(−4.41)	(−1.70)	(−4.43)
Difference	0.528***	0.366***	0.448***	0.313***	0.280***	0.409***
	(12.43)	(15.48)	(16.39)	(6.64)	(6.64)	(8.09)

Panel B: Factor loadings from Fama French four factor difference portfolios

Long predicted dividend, short all other companies

	CAPM Alpha	Three-factor alpha	Four−factor alpha	Four-factor+liq. alpha	MktRf	SMB	HML	UMD	Liquidity
Long	0.472***	0.361***	0.406***	0.404***	0.890***	0.417***	0.418***	−0.051***	−0.034**
	(7.74)	(7.87)	(8.68)	(6.35)	(61.92)	(20.62)	(19.03)	(−3.59)	(−1.99)
Short	0.000	−0.002***	−0.001***	−0.001**	0.970***	0.682***	0.167***	−0.078***	−0.014
	(−0.53)	(−4.47)	(−3.37)	(−2.57)	(104.04)	(51.89)	(11.73)	(−8.47)	(−1.26)
Difference	0.507***	0.519***	0.528***	0.511***	−0.081***	−0.265***	0.251***	0.027**	−0.020
	(10.31)	(12.57)	(12.43)	(10.36)	(−7.27)	(−16.90)	(14.76)	(2.48)	(−1.52)

Long predicted dividend, short all other companies with dividend in the last year

	CAPM Alpha	Three-factor alpha	Four−factor alpha	Four-factor+liq. alpha	MktRf	SMB	HML	UMD	Liquidity
Long	0.472***	0.361***	0.406***	0.404***	0.890***	0.417***	0.418***	−0.051***	−0.034**
	(7.74)	(7.87)	(8.68)	(6.35)	(61.92)	(20.62)	(19.03)	(−3.59)	(−1.99)
Short	0.113*	0.009	0.038	−0.024	0.892***	0.412***	0.420***	−0.053***	−0.019
	(1.90)	(0.21)	(0.82)	(−0.38)	(63.50)	(20.82)	(19.57)	(−3.83)	(−1.16)
Difference	0.355***	0.349***	0.366***	0.428***	−0.002	0.005	−0.002	0.002	−0.015**
	(15.39)	(15.10)	(15.48)	(17.03)	(−0.42)	(0.68)	(−0.26)	(0.40)	(−2.19)

non-paying companies differ in many economic respects. As Table 1 indicates, dividend-paying stocks tend to have larger market capitalizations and higher book-to-market ratios. Dividend payment could be correlated with economy-wide risks that investors care about, and such risk exposure could drive differences in returns between dividend-paying and non-dividend-paying stocks.

Systematic risk seems less likely to explain the patterns in returns within companies. By comparing the same set of companies in different months, any risk loadings that are constant over time tend to cancel out. For risk to explain the within companies returns, the systematic risk of the stock must be higher in months of expected dividend payments. Savor and Wilson (2011) argue that earnings announcements can cause a firm to be more exposed to macroeconomic risks, resulting in higher returns. For the rest of the month outside the announcement, it is less clear why the firm should have a different exposure to risk. The most plausible change in exposure would be for liquidity, which we examine below (and which loads in the wrong direction to explain the effect).

Table 3 examines the returns of predicted dividend-paying stocks relative to standard factors: the market, size, book-to-market, momentum, and liquidity. We form portfolios of stocks based on predicted dividend payment and regress them on returns of portfolios for excess market returns (Mkt-Rf), SMB, HML, UMD (all from Ken French's website), and in some specifications the Pastor and Stambaugh (2003) liquidity factor:

$$R_{PredDiv,t}-R_f=\alpha+\beta_{Mkt-Rf}*R_{Mkt-Rf,t}+\beta_{SMB}*R_{SMB,t} +\beta_{HML}*R_{HML,t}+\beta_{UMD}*R_{UMD,t}+\varepsilon_t \quad (1)$$

Table 3, Panel A, shows the abnormal returns relative to a four-factor model (α in the above regression) for predicted dividend payers versus other stocks. In each case, the long portfolio is the average return of all predicted dividend payers, equal weighted or value weighted according to the specification. We consider several different short portfolios: all companies that are not expected to pay a dividend this month, companies that paid a dividend in the past year but are not expected to pay this month, and companies one month after they are expected to pay a dividend. The first short portfolio corresponds to the between companies question, and the latter two are within companies tests.

Panel A shows that predicted dividend payers have significantly positive abnormal returns. An equal weighted portfolio of predicted dividend-payers has abnormal returns of 41 basis points per month (with a t-statistic of 8.68), and a value weighted portfolio of predicted dividend-payers has abnormal returns of 23 basis points per month (with a t-statistic of 6.82).

Predicted dividend payers also have high returns relative to the comparison portfolios. A portfolio that is long predicted dividend payers and short all other companies (between companies) earns abnormal returns of 53 basis points per month on an equal weighted basis (t-statistic of 12.43) and 31 basis points on a value weighted basis (t-statistic of 6.64). The portfolio of all companies other than predicted dividend payers has significantly negative returns: −12 basis points for equal weighted portfolios (t-statistic of −3.37) and −8 basis points for value weighted portfolios (t-statistic of −4.41).

Perhaps more importantly, predicted dividend payers have abnormal returns relative to past dividend payers in other months (within companies). This can be seen in the portfolio that is long predicted dividend payers and short all other companies with a dividend in the last 12 months. The within companies difference portfolio earns abnormal returns of 37 basis points on an equal weighted basis (t-statistic of 15.48) and 28 basis points on a value weighted basis (t-statistic of 6.64). The effect is larger when shorting companies only in the month immediately after a predicted dividend. In addition, the portfolio that is short companies one month after a predicted dividend earns abnormal returns of −18 basis points per month when value weighted (t-statistic of −4.43), although the effect is smaller on an equal weighted basis. This is consistent with dividend-seeking investors creating selling pressure after the dividend has been paid.

Table 3, Panel B, shows that the effects are similar under different models of expected returns. For the between companies difference portfolio, monthly abnormal returns are 51 basis points under a capital asset pricing model (CAPM), 52 basis points under the Fama and French (1993) three-factor model, 53 basis points when the momentum factor is added, and 51 basis points when the Pastor and Stambaugh (2003) liquidity factor is added (all highly significant). The abnormal returns for the within companies portfolio are similar for the CAPM, three-factor and four-factor models, and adding the liquidity factor makes the effect larger, to 43 basis points per month.

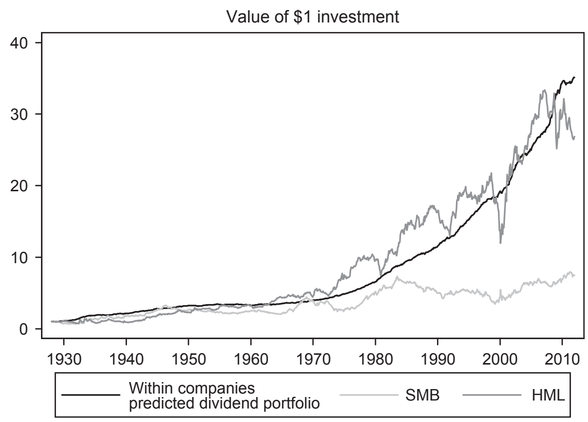

Fig. 1. Cumulative value of the dividend month premium compared with size and book-to-market anomalies. This figure presents the cumulative value for the dividend month premium portfolio compared with the small minus big (SMB) and high minus low (HML) portfolios. In each case, the cumulative value of an initial one dollar investment on December 31, 1927 is plotted on the y-axis, versus the year on the x-axis. The black line is for the within companies dividend month premium, a portfolio that is long in all companies predicted to pay a dividend this month and is short in all companies that paid a dividend in the past 12 months but are not predicted to pay a dividend this month. The light gray line is the cumulative value of the SMB portfolio and the dark gray line is the cumulative value of the HML portfolio, both taken from Ken French's website.

Panel B also shows the loadings on excess market returns, SMB, HML, UMD, and LIQ (all taken from the four-factor plus liquidity regression). The within companies portfolio has insignificant loadings on excess market returns, SMB, HML, and UMD. This is consistent with the earlier argument that this difference portfolio has little exposure to risk factors that are constant over time because it operates within a set of companies. The only somewhat significant loading is on the liquidity factor (−0.015, *t*-statistic of −2.19). However, the loading on liquidity is negative, consistent with companies having less liquidity risk in months of predicted dividend payment, not more. This explains why the alpha gets larger when adding liquidity to the four-factor model.

Overall, Table 3 provides strong evidence of abnormal returns for predicted dividend payers. These returns are not driven by standard factors and are unlikely to be driven by other factor loadings that remain constant through time. To demonstrate the relative size of the anomaly, Fig. 1 plots the cumulative value of the within companies portfolio starting with an initial investment of $1 on December 31, 1927. For comparison, the cumulative value the SMB and HML portfolios are also shown. The final value in December 2011 is $35.11 for the dividend month premium, versus $7.47 for SMB and $26.84 for HML. The dividend month premium is also less volatile than either SMB or HML.

4.3. Daily returns within dividend months

To examine the extent to which price pressure is contributing toward the dividend month premium, we consider daily returns within dividend months. The hypothesis that returns are driven by price pressure arising from an increase in the excess demand for stocks has the following testable predictions.

1. If returns (announcement, interim, ex-day) are driven by price pressure, they should lead to reversals after dividend payment.
2. If returns are driven by price pressure, then they should be greater in cases in which investor trades are likely to have a bigger price impact, such as when there is less liquidity and when the demand for dividends is higher. Such cases should also experience larger subsequent reversals.

In terms of alternative hypotheses, we consider the following.

3. If the effect is driven by announcement risk or by investors being positively surprised by dividend news, then returns should be concentrated around the announcement (when the actual news is revealed, and investors are positively surprised).
4. If the effect is driven by the direct tax effects from dividend payment (as in Elton and Gruber, 1970), the effect should be concentrated on the ex-dividend day itself, when the tax treatment changes.
5. If the effect is driven by the Brennan (1970) model, higher dividend yields should be associated with higher returns in all periods.

While our results do not rule out the existence of the alternative explanations, we are interested in examining the extent to which such explanations explain the entirety of the returns available in the dividend period. To evaluate this, we calculate the characteristic-adjusted returns for dividend-paying companies in different periods around dividend payment. Similar to Daniel, Grinblatt, Titman, and Wermers (1997), we sort stocks into quintiles based on their market capitalization, book value of equity divided by market value of equity (as in Fama and French, 1992) and returns from $t-20$ days to $t-250$ days (thus computing a daily analog of months $t-2$ to $t-12$), and we match the stock to the portfolio with the same quintiles of each variable. Characteristic-adjusted returns are then the returns of the stock minus the returns on the portfolio matched on quintiles of size, book-to-market ratio, and momentum. If returns are calculated using daily calendar-time portfolios and abnormal returns using daily four-factor alphas, the results are very similar.

Ex-dividend days are taken from the CRSP daily file, as are dividend announcement days. A tradable strategy using the announcement date must use the predicted announcement days, because the actual announcement day will not be known in advance. Predicted dividend days are taken to be 63 trading days after the last dividend announcement day.[6] We calculate returns for the actual announcement day, the predicted announcement day, the interim period (one day after announcement until one day before the ex-day), the ex-day, and the 40 days after the ex-day. For the daily returns, we limit the sample to quarterly dividends.

We examine the patterns in daily returns in Table 4. Panel A presents the mean characteristic-adjusted returns for each of the periods described above. The actual announcement day has average adjusted returns of 11.6 basis points, the predicted announcement day has adjusted returns of 3.1 basis points, the interim period has adjusted returns of 15.8 basis points, the ex-day has adjusted returns of 26.2 basis points, and the 40-day period after the ex-day has adjusted returns of −71.9 basis points (all highly statistically significant). Out of the total effect of 53.6 basis points from announcement to ex-day, roughly 21% is due to the announcement day, roughly 31% is due to the interim period, and roughly 48% is due to the ex-day. For taxable investors, the after-tax return on the ex-dividend day is less, but tax-free investors such as charitable institutions would be able to receive the full ex-dividend return. Rantapuska (2007)

[6] This is roughly the average number of trading days per year divided by four. The results are very similar if dividends are predicted based on three months from the average date of the last four dividends, or by adding in the average gap between the last four dividends. More complicated rules based on day-of-the-week estimates, as in Kalay and Loewenstein (1986) and Graham, Koski, and Loewenstein (2006), lead to greater accuracy.

Table 4
Daily abnormal returns around dividend months.

This table examines daily characteristic-adjusted returns in periods around dividend months. Each adjusted return takes the company's stock return and subtracts the returns of a portfolio matched on quintiles of market capitalization, book-to-market ratio and momentum. A predicted announcement date is 63 trading days after the previous announcement date. Panel A presents the average returns in each period: the announcement day, the interim period (one day after announcement to one day before the ex-day, inclusive), the ex-dividend day, and the 40 days after the ex-dividend day. Panel B takes the same set of returns and regresses them on two measures of liquidity: the number of days in the interim period (divided by ten), and the liquidity measure used in Amihud (2002): $1/D\Sigma_{t=1}^{D}|R_t|/VOLD_t$, where *VOLD* is the dollar volume that day and *D* is the number of days that the stock traded (over the past 250 days). Regressions are run on daily returns of NYSE, Amex, and Nasdaq common shares, from January 1927 to December 2011. The top number is the coefficient, the lower number in parentheses is the *t*-statistic, and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Average characteristic-adjusted returns

Period	Return
Announcement day	0.116***
	(24.25)
Predicted announcement day	0.031***
	(7.14)
Interim period	0.166***
	(12.91)
Ex-day	0.262***
	(63.40)
Declaraction to ex-day	0.536***
	(38.09)
40 days after ex-day	−0.719***
	(−32.65)

Panel B: Liquidity and daily characteristic-adjusted returns

Length of interim period

	Announcement day	Interim period	Ex-day	Announcement to ex-day	40 days after ex-day
Constant	0.107***	0.339***	0.292***	0.728***	−0.897***
	(13.07)	(14.74)	(32.08)	(28.68)	(−21.05)
Days in interim period divided by 10	0.007	−0.123***	−0.022***	−0.138***	0.128***
	(1.49)	(−6.34)	(−5.07)	(−6.96)	(6.22)
R^2	0.000	0.000	0.000	0.000	0.000
N	283,166	282,795	284,406	284,406	284,414

Amihud illiquidity

	Announcement day	Interim period	Ex-day	Announcement to ex-day	40 days after ex-day
Constant	0.107***	0.185***	0.188***	0.473***	−0.577***
	(17.51)	(7.06)	(26.13)	(16.15)	(−9.56)
Amihud illiquidity measure	2.07	26.51***	18.19***	44.06***	−72.918***
	(0.45)	(3.47)	(4.23)	(3.76)	(−3.61)
R^2	0.000	0.000	0.001	0.000	0.000
N	245,553	245,425	246,648	246,648	246,603

examines individual trading behavior and finds that tax-advantaged traders do, in fact, engage in overnight trades to take advantage of ex-day effects, earning significant returns.

To illustrate the pattern in daily returns, Fig. 2 plots the daily characteristic-adjusted returns around the ex-dividend date, from 30 days beforehand until 60 days afterward. Returns increase as the ex-day approaches, with the largest abnormal return on ex-dividend day, and become negative in period between dividends, increasing again as the next dividend approaches. Fig. 3 presents returns centered around the announcement date. The largest returns are on the announcement day and the day afterward, decreasing over time but still significantly positive for the ten subsequent trading days. Importantly, the returns after the announcement are not driven by companies with an ex-day over the subsequent days, as we exclude ex-day observations from the sample. The results in Fig. 3 contrast with Eades, Hess, and Kim (1985), who find abnormal returns only on the announcement day. We examine a much longer time period than their study, which could account for the different results.

If the positive returns in dividend periods are driven by price pressure, we could expect them to be associated with increases in trading volume. We examine the daily

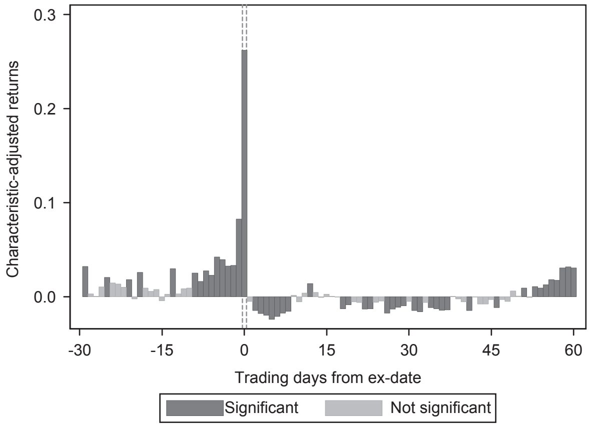

Fig. 2. Daily characteristic-adjusted returns around ex-dividend date. This figure presents average daily characteristic-adjusted stock returns around ex-dividend dates. Each adjusted return takes the company's stock return and subtracts the returns of a portfolio matched on quintiles of market capitalization, book-to-market ratio, and momentum. Adjusted returns are taken relative to the ex-dividend date, with negative dates being before the ex-dividend date and positive dates being afterwards. All returns are in percent (e.g., "0.1" corresponds to 10 basis points). Lines in dark gray have a *t*-statistic that is significant at the 5% level, and lines in light gray are not significant at a 5% level.

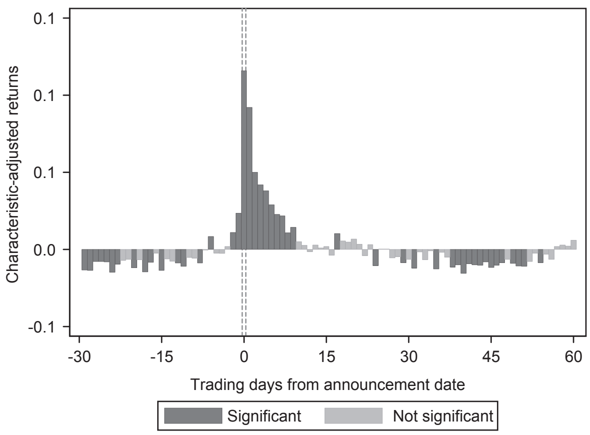

Fig. 3. Daily characteristic-adjusted returns around announcement date. This figure presents average daily characteristic-adjusted stock returns around dividend announcement dates. Each adjusted return takes the company's stock return and subtracts the returns of a portfolio matched on quintiles of market capitalization, book-to-market ratio, and momentum. Adjusted returns are taken relative to the announcement date, with negative dates being before the announcement date and positive dates being afterwards. All returns are in percent (e.g., "0.1" corresponds to 10 basis points). Lines in dark gray have a *t*-statistic that is significant at the 5% level, and lines in light gray are not significant at a 5% level.

abnormal trading volume around the ex-day and the announcement day, with abnormal volume computed as:

$$Abnormal\ Volume_t = (Volume_t - 250\ Day\ Avg\ Volume_t)/250\ Day\ Avg\ Volume_t, \quad (2)$$

where *Volume* is the daily trading volume (adjusted for stock splits, etc.) and 250*DayAvgVolume* is the average daily volume over the previous 250 trading days taken over days when the share traded, provided there are at least 120 non-missing volume observations. Observations

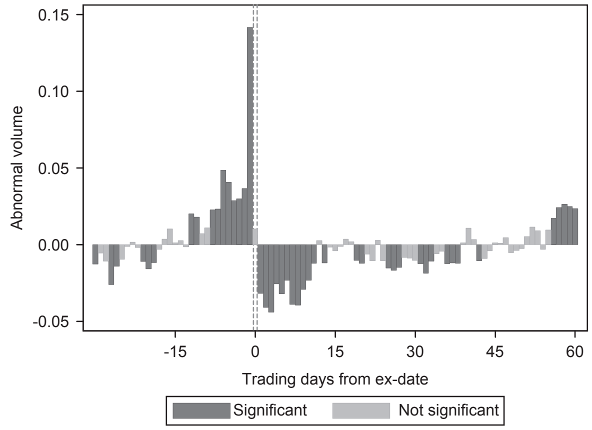

Fig. 4. Abnormal volume around ex-dividend date. This figure presents the average abnormal trading volume around ex-dividend dates. Abnormal volume is computed each day as (Volume—250 day Average Volume)/250 day Average Volume. This is computed daily for each company and averaged for each day relative to the ex-dividend date, with negative dates being before the ex-dividend date and positive dates being afterwards. Lines in dark gray have a *t*-statistic that is significant at the 5% level, and lines in light gray are not significant at a 5% level.

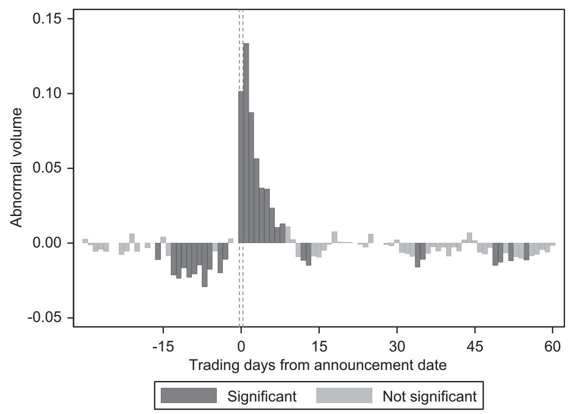

Fig. 5. Abnormal volume around announcement date. This figure presents the average abnormal trading volume around announcement dates. Abnormal volume is computed each day as (Volume—250 day Average Volume)/250 day Average Volume. This is computed daily for each company and averaged for each day relative to the announcement date, with negative dates being before the announcement date and positive dates being afterwards. Lines in dark gray have a *t*-statistic that is significant at the 5% level, and lines in light gray are not significant at a 5% level.

are winsorized at the 0.1% level. Abnormal volume is thus a time series measure computed on a rolling basis, comparing each day's volume as a percentage change relative to the previous yearly average. We plot the average level on each day and compute the *t*-statistics for each mean (with darker-shaded bars indicating a *t*-statistic greater than 2).

Figs. 4 and 5 present abnormal daily volume around the ex-day and announcement day, respectively. The patterns in volume are similar to the patterns in returns in Figs. 2 and 3. Around the ex-day (Fig. 4), abnormal volume is significantly positive in the lead up to the ex-day (peaking at almost 15% above average on the day before the ex-day) and significantly negative afterward. High volume periods are generally associated with high return periods, and vice versa for negative returns after the ex-day. The only exception to this pattern is the ex-day itself, which has very high returns in Fig. 2 but does not have significant abnormal volume. Around the announcement day (Fig. 5), abnormal volume is significantly negative before the announcement and significantly positive on the announcement day and the eight days afterward. The largest abnormal volume is the day after the announcement (at around 15% higher than average). The strong relation between returns and volume is consistent with price impact from investor trades. This result complements the findings in Michaely and Vila (1996) that volume increases in the period around the ex-day.

We next investigate how the dividend month returns are related to liquidity, in Table 4 Panel B. Karpoff and Walkling (1988, 1990) find that ex-day returns are related to the level of spreads and transaction costs. We extend this to examine how liquidity and price impact affect returns during the rest of the dividend cycle, using two measures of liquidity. First, we examine the measure of illiquidity used in Amihud (2002), defined as

$$Illiq_{i,t} = \frac{1}{D}\sum_{t=1}^{D}\frac{|R_t|}{VOLD_t},$$

where *VOLD* is the dollar volume that day and *D* is the number of days when the stock traded (over the past 250 days). The measure is multiplied by one thousand, and winsorized at the 1% level. For each return period (announcement, interim, etc.), the measure is taken from five days before the announcement to 255 days before the announcement, provided at least 120 days have some trades. The Amihud measure captures how large a price movement is associated with each dollar traded, with large numbers indicating less liquidity.

Second, we consider the length of the interim period between the announcement and the ex-dividend day. Because liquidity has a time dimension, when traders need to execute their orders over a shorter period they are likely to have more price impact. In all cases, we predict that less liquid companies exhibit greater price pressure before the dividend payment and greater reversals afterward. All standard errors are clustered by firm and by day.

The regression equation is, for example,:

$$R_{period,i,t} - R_{Benchmark,t} = \alpha + \beta * Amihud_{i,t,} + \varepsilon_{it}, \tag{3}$$

where *period* is the announcement day, the interim period, the ex-day, or the 40 days afterward, and *Benchmark* is the average returns over the same period for the portfolio of firms in the same quintiles of size, book-to-market ratio, and momentum. In other regressions, the *Amihud* liquidity measure is replaced with the number of days in the interim period.

The results indicate that lower levels of liquidity are associated with higher interim and ex-day returns, as well as larger reversals. When examining the effect of the length of the interim period, for interim returns the coefficient is −0.123, for ex-date returns the coefficient is −0.022, and for the 40-day post-period the coefficient is 0.128 (all significant at a 1% level). A 1 standard

Table 5

Daily abnormal returns, economic uncertainty, and dividend yield.

This table examines daily characteristic-adjusted returns in periods around dividend payment. Each adjusted return takes the company's stock return and subtracts the returns of a portfolio matched on quintiles of market capitalization, book-to-market ratio, and momentum. Regressions are run separately for the announcement day, the interim period (one day after announcement to one day before the ex-day, inclusive), the ex-dividend day, and the 40 days after the ex-dividend day. The independent variable is either the dividend yield (the average from the previous 12 months of dividends payment in months that included a dividend, divided by the share price from the previous month), a dummy variable that equals one if the economy was in recession at that point, or the VIX index measure of market volatility. Regressions are run on daily returns of NYSE, Amex and Nasdaq common shares, from January 1927 to December 2011. The top number is the coefficient, the lower number in parentheses is the *t*-statistic, and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Announcement day	Interim period	Ex-day	Announcement to ex-day	40 days after ex-day
Constant	0.109***	−0.194***	0.201***	0.491***	−0.241***
	(10.89)	(−4.71)	(15.95)	(10.03)	(−2.49)
Dividend yield	0.000	0.404***	0.070***	0.033	−0.562***
	(0.03)	(10.67)	(4.28)	(0.76)	(−5.91)
R^2	0.000	0.001	0.000	0.000	0.001
N	280,825	280,055	282,352	282,352	282,282
Constant	0.118***	0.150***	0.249***	0.511***	−0.673***
	(21.75)	(8.87)	(37.82)	(27.09)	(−21.07)
Recessions	−0.013	0.096**	0.081***	0.151***	−0.282***
	(−0.80)	(2.08)	(5.51)	(2.99)	(−3.09)
R^2	0.000	0.000	0.000	0.000	0.000
N	283,166	282,795	284,406	284,406	284,414
Constant	0.069***	−0.372***	0.146***	−0.153*	−0.048
	(2.65)	(−4.72)	(5.26)	(−1.79)	(−0.39)
VIX divided by 10	0.012	0.228***	0.044***	0.274***	−0.371***
	(0.93)	(5.60)	(3.11)	(6.27)	(−5.84)
R^2	0.000	0.001	0.000	0.001	0.001
N	136,045	136,003	136,647	136,647	136,632

deviation increase in the length of the interim period is 13.9 days (which gives 1.39, as the variable is divided by ten), corresponding to interim returns being lower by 17.1 basis points, ex-day returns being lower by 3.0 basis points, and the post-period returns being higher (i.e., less negative) by 17.8 basis points.

Under the Amihud (2002) illiquidity measure, less liquid securities also exhibit larger interim and ex-day returns, as well as greater reversals. The coefficient on interim returns is 26.51, the coefficient for the ex-day is 18.19, and the coefficient for the forty days after the ex-day is -72.92, all significant at a 1% level. The standard deviation of the Amihud measure is 0.00307, meaning that a 1 standard deviation increase in illiquidity is associated with higher interim returns by 8.1 basis points, higher ex-day returns by 5.6 basis points, and lower (i.e., more negative) returns in the subsequent 40 days by 22.4 basis points. Overall, Table 4 indicates that dividend month returns are related to liquidity, consistent with their being associated with price pressure. Liquidity affects both the size of the initial price increase and the size of the subsequent reversal.

4.4. *Dividend month returns and proxies for the demand for dividends*

Next, in Table 5 we examine how the returns in each period could be affected by shifts in the demand for dividends. We seek to test whether the stock price changes are due to investor demand for the dividends themselves, either due to tax or behavioral reasons, being translated into increases in excess demand for dividend-paying stocks around the period of payment (as discussed in Subsection 2.2). Because we cannot observe the demand for dividends directly, we examine whether stock price changes around dividend periods are different in cases in which we would expect investor demand for dividends to be larger.

We consider two variables that could be associated with higher demand for dividends. The first is the dividend yield. We measure this as the average dividend payment from the previous 12 months (in months that included a dividend), divided by the share price from the previous month. If investors desire dividends, either due to catering or due to tax-arbitrage trades, they likely have a greater preference for companies that pay larger dividends. This presents a test of the Brennan (1970) model as well. Under this model, dividend yield should be associated with higher returns in all periods, whereas under price pressure it should lead to higher price increases up to the ex-day and higher reversals afterward.

The second proxy for dividend demand is economic uncertainty. Under a catering model, if dividend demand is driven by psychological reasons [as Baker and Wurgler (2004) suggest], it could be due to a desire for the safe and secure payouts that dividends represent. Dividends tend to be less volatile than prices (Shiller, 1981). If investors view dividends and capital gains in separate mental accounts [such as described in Thaler (1980)], they could perceive dividends to guarantee a certain level of returns in the future. Investors could fail to appreciate the Miller and Modigliani (1961) argument that dividends are offset by equivalent price decreases in the absence of taxes and frictions. This could cause them to view dividends as being a guaranteed source of returns, while viewing unrealized capital gains as risky.

These possibilities suggest that the demand for dividends is higher during periods of aggregate economic uncertainty. In such times, risk aversion is higher and the availability of alternative safe assets is reduced, making dividends especially attractive. Economic uncertainty could also affect the returns in dividend periods if it is associated with changes in the level of aggregate liquidity. In such cases, a reduction in trading or an increase in the price of liquidity could cause tax-motivated traders to have a larger price impact, as there are fewer offsetting trades from liquidity providers.

An increase in demand for dividends can lead to an increase in excess demand for dividend-paying assets before the ex-day, even if the same individual investors are not actively trading in and out of the asset over short time horizons. Investors could simply shift the timing of trades they were already planning to make to receive the dividend. Another possibility is that even if individual investors are not implementing dividend capture strategies themselves, mutual funds could be doing so on their behalf to satisfy investor demand for assets with higher dividend yields. Harris, Hartzmark, and Solomon (2012) provide evidence consistent with this possibility, as some funds (particularly those with high dividend yields) consistently pay more dividends than what their quarterly holdings imply they should be earning, suggesting that additional dividend capture strategies are occurring.

We examine the effect of economic uncertainty using two measures. First, whether the economy is in recession, taken from the National Bureau of Economic Research definitions, and second, VIX, which measures the market volatility for the next month implied by Standard & Poors 500 index options. Out of the two measures, VIX is perhaps more likely to be associated with liquidity changes, as it responds more directly to the levels of trade and market movements. To the extent that the recession indicator is a slower-moving variable, it would be associated only with lower frequency shifts in liquidity.

We consider these questions in Table 5. The methodology is similar to Table 4. Characteristic-adjusted returns from the announcement, interim, ex-day, and post-period are regressed on the dividend yield, on a dummy for recessions, and on VIX. The results indicate that higher dividend yields are associated with higher interim and ex-date returns, but lower post-period returns (i.e., larger reversals). The coefficient on interim is 0.404, the coefficient on ex-day is 0.070, and the coefficient on 40-day post-period is -0.562 (all significant at a 1% level when clustered by firm and day). A 1 standard deviation increase in dividend yield is 0.58%, corresponding to an additional 23.5 basis points during the interim period, an additional 4.1 basis points on the ex-day, and lower returns by 32.6 basis points in the post-period.

The association between high dividend yields and lower returns in the post period is difficult to reconcile with Brennan (1970), which predicts high returns from high dividend yields in each period. The negative post-period returns tend to offset the higher interim and ex-day returns, consistent with Kalay and Michaely (2000), who find no relation between dividend yield and returns when measured over quarterly or longer horizons and, thus, argue that the effects of dividend yield tend to operate in the time series. To this extent, our findings that the dividend month premium is a within-firm time series effect is consistent with their results.

For recessions, we also find that interim and ex-day returns are higher, but post-period returns are lower (i.e., reversals are larger). Interim returns are larger by 9.6 basis points during recessions (significant at a 5% level), ex-day returns are higher by 8.1 basis points (significant at a 1% level), and post-period returns are lower by 28.2 basis points (significant at a 1% level). This pattern is also repeated for the VIX, whereby higher implied market volatility predicts higher interim and ex-day returns, but lower (more negative) post-period returns. A 1 standard deviation increase in VIX (0.794) increases interim returns by 18.1 basis points, increases ex-day returns by 3.5 basis points, and decreases post-period returns by 29.4 basis points. None of dividend yields, recessions, or VIX has any significant effect on announcement day returns.

Overall, these results give support to the explanation of price pressure. The large effects during the interim period occur when there is no news about the dividend and when holding the share does not subject the investor to additional tax consequences, as the dividend is not received unless the stock is held until the ex-dividend day. In addition, the returns in the period after the dividend are negative, consistent with the temporary price pressure being reversed. The fact that both interim returns and subsequent returns are related to measures of liquidity and proxies for the level of demand for dividends supports the view that both effects share the same underlying cause of price pressure.

Tables 4 and 5 also suggest that the Savor and Wilson (2011) announcement risk explanation does not drive the results. Roughly 80% of the returns occur after the announcement, when little rationale exists for risk exposure. Moreover, to the extent that dividend-month returns are related to macroeconomic risk (as measured by recessions and VIX), the relation holds for interim, ex-day, and post-period returns, but not for the announcement day.

5. Alternative explanations

5.1. Potential alternative explanations

A number of other potential explanations exist for high returns during dividend months. One possibility is other

Table 6
Abnormal returns by dividend frequency.
This table presents the results of Fama French four factor regressions of US monthly stock returns based on the timing of past dividend payments of different frequencies. "Dividend *N* months ago" means that the portfolio of returns is formed based on companies that paid a dividend of the given type *N* months earlier. Dividend types are from Center for Research in Security Prices classifications of the dividend as quarterly, semi-annual, annual, monthly, or unknown, with "All" including all these categories. Each combination of dividend type and time since the dividend is the output of a separate regression of portfolio returns on a Fama French four factor model [excess market returns, small minus big (SMB), high minus low (HML), and up minus down (UMD) portfolios]. The dependent variable is the returns of an equal-weighted portfolio that is long all companies that paid a dividend of the given type in the given earlier period, and short all companies that did not pay any dividend in that month. Regressions are run on monthly returns of NYSE, Amex, and Nasdaq common shares, from January 1927 to December 2011. The top number is the coefficient, the lower number in parentheses is the *t*-statistic, and *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, level respectively.

Dividend *N* months ago	All	Quarterly	Semi-annual	Annual	Monthly	Unknown
1	−0.055	−0.062	0.118	−0.120	0.225	0.098
	(−1.23)	(−1.11)	(0.60)	(−0.40)	(1.30)	(0.60)
2	0.203***	0.186***	0.213	0.414	0.204	0.314**
	(4.71)	(3.73)	(1.09)	(1.23)	(1.10)	(2.03)
3	0.548***	0.636***	0.028	0.380	0.200	0.363**
	(12.88)	(11.32)	(0.15)	(1.21)	(1.11)	(2.56)
4	−0.071*	−0.103**	−0.342*	−0.244	0.207	−0.003
	(−1.66)	(−2.03)	(−1.71)	(−0.76)	(1.18)	(−0.01)
5	0.151***	0.128***	0.664***	−0.345	0.137	0.029
	(3.59)	(2.69)	(3.81)	(−1.01)	(0.76)	(0.18)
6	0.563***	0.539***	1.146***	0.144	0.329*	0.791***
	(13.98)	(11.65)	(5.70)	(0.49)	(1.82)	(4.24)
7	−0.094**	−0.116**	0.231	−0.323	0.212	0.050
	(−2.26)	(−2.43)	(1.07)	(−1.09)	(1.17)	(0.30)
8	0.101**	0.074	0.261	−0.712**	0.318*	0.503***
	(2.47)	(1.60)	(1.37)	(−2.23)	(1.69)	(3.10)
9	0.498***	0.505***	−0.102	0.427	0.382**	0.238
	(12.68)	(10.93)	(−0.52)	(1.31)	(2.03)	(1.34)
10	−0.112***	−0.159***	0.372*	0.701**	0.212	−0.064
	(−2.75)	(−3.26)	(1.72)	(2.23)	(1.15)	(−0.37)
11	0.126***	0.110**	0.272	0.242	0.232	0.158
	(3.11)	(2.48)	(1.45)	(0.70)	(1.25)	(0.86)
12	0.494***	0.484***	0.837***	0.567*	0.450**	0.568***
	(12.10)	(10.21)	(4.25)	(1.75)	(2.35)	(3.47)

events that coincide with dividend months. If dividend-paying months coincide with earnings announcement months, the dividend month premium could be picking up the earnings announcement premium (Beaver, 1968; Frazzini and Lamont, 2006). Another potential explanation lies in the seasonality in returns identified in Heston and Sadka (2008), in which returns in 12-month increments (12 months ago, 24 months ago, etc.) predict current month returns. The dividend month effect could be driven by news contained in the dividend announcements. It could be driven by calendar-month effects such as being concentrated in January, as Keim (1983) noted for the small firm effect.

5.2. Returns sorted by dividend frequency

Because most dividends in the sample are quarterly, the dividend month returns could be driven by some other event with similar quarterly timing to dividends. To test this, we examine dividends of different frequencies. If the effects are driven by dividends, then companies that pay dividends on a semi-annual basis should show abnormal returns for dividends 6 months ago and 12 months ago, but not for 3 or 9 months ago. Similarly, annual dividend payers should show abnormal returns only for dividend payments 12 months ago, but not 3, 6 or 9 months ago. We test these predictions in Table 6, which shows the intercepts from a four-factor regression according to the time since payment (one month to 12 months ago) and dividend frequency (all dividends, quarterly, semi-annual, annual, monthly, and unknown).

Table 6 shows that the patterns in abnormal returns match the frequency of the dividends, providing support for the proposition that the abnormal returns are a property of dividend-paying months specifically, not some other quarterly event. Companies with quarterly dividends have abnormal returns 3, 6, 9, and 12 months after dividend payments (between 48 and 64 basis points per month and highly significant). Companies with semi-annual dividends have abnormal returns 6 months after dividend payment (115 basis points, t-statistic of 5.70) and 12 months after payment (84 basis points, t-statistic of 4.25), but not for dividends paid 3 months ago or 9 months ago. For annual dividends, the results are somewhat weaker. Payment 12 months ago generates abnormal returns of 57 basis points, although the t-statistic is only 1.75, but there are no abnormal returns for 3, 6 or 9 months ago. These weak results could be partly due to the small number of annual dividend observations (only 0.48% of dividend months are annual, and each annual-dividend firm is in the long portfolio only one month per year). In addition, annual dividends are less predictable than other types of dividends. A firm that paid a quarterly dividend 3, 6, 9, or 12 months ago has an 87.6% chance of paying a dividend in the current month, while a firm that paid an annual dividend 12 months ago has only a 61.5% chance of paying a dividend in the current month.

5.3. Earnings months, seasonality

If dividend-paying months coincide with earnings announcement months, then the dividend-month effect could be merely proxying for months with earnings announcements. In such a case, the dividend month premium ought to disappear once we control for whether the month had an earnings announcement or not. To

Table 7

Abnormal returns of double-sorted portfolios on predicted dividends, earnings months, and seasonality.

This table presents the intercepts from Fama French four factor regressions of US monthly stock returns double-sorted on predicted dividend payment and other company characteristics. All portfolios are equal weighted, and monthly stock returns are regressed on monthly excess market returns, small minus big (SMB), high minus low (HML), and up minus down (UMD), with the intercept from these regressions being shown. Rows and columns other than "Difference" show the intercept from four factor regressions that are long in the portfolio indicated in the row or heading. "Difference" gives the intercept from a four factor regression that is long the portfolio in the top row (or left column) and short the portfolio in the bottom row (or right column). "Predicted dividend" is a portfolio of stocks that paid a quarterly or unknown dividend 3, 6, 9, or 12 months ago, a semi-annual dividend 6 or 12 months ago, or an annual dividend 12 months ago. Stocks with monthly dividends in the previous 12 months are excluded from the analysis. For the short portfolios, "other past dividend payers" contains all companies that paid a dividend in the past 12 months but are not expected to pay a dividend this month under the above definition. Earnings months indicate a month that a company reported earnings. The Heston and Sadka (2008) seasonality variable is taken as the average return for the stock from 12, 24, 36, 48, and 60 months ago. Each month stocks are sorted according to whether they are above or below the median value for this variable in that month and split into two portfolios accordingly. Regressions are run on monthly returns of NYSE, Amex, and Nasdaq common shares, from January 1927 to December 2011. The top number is the intercept (i.e. the portfolio abnormal returns), the lower number in parentheses is the t-statistic, and *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, level respectively.

	Predicted dividend	Other past dividend payers	Difference
Earnings month	0.647***	0.338***	0.309***
	(7.35)	(4.17)	(5.07)
Non-earnings month	0.325***	−0.125*	0.450***
	(4.74)	(-1.84)	(14.62)
Difference	0.322***	0.463***	−0.141**
	(4.40)	(6.90)	(−2.06)
Above median Heston-Sadka (2008) seasonality	0.581***	0.275***	0.312***
	(10.84)	(5.33)	(10.09)
Below median Heston-Sadka (2008) seasonality	0.143***	−0.091*	0.238***
	(2.70)	(−1.77)	(6.28)
Difference	0.438***	0.365***	0.074
	(9.06)	(7.73)	(1.59)

Table 8
Abnormal returns in predicted dividend months sorted by dividend news.

This table presents the intercepts from Fama French four factor regressions of US monthly stock returns double sorted on predicted dividend payment and recent dividend news. All portfolios are equal weighted, and monthly stock returns are regressed on monthly excess market returns, small minus big (SMB), high minus low (HML), and up minus down (UMD), with the intercept from these regressions being shown. All long portfolios are companies with a predicted dividend in the current month, meaning that the stocks paid a quarterly or unknown dividend 3, 6, 9, or 12 months ago, a semi-annual dividend 6 or 12 months ago, or an annual dividend 12 months ago. In addition, the stocks must have experienced a dividend increase, constant dividends, a dividend decrease, or dividend omission accordingly some time during the past 12 months. The short portfolio is all stocks that had the same dividend news in the past year (increase, constant, decrease or omission) but are not predicted to pay a dividend in the current month. "Difference" is the difference portfolio of long minus short. Regressions are run on monthly returns of NYSE, Amex, and Nasdaq common shares, from January 1927 to December 2011. The top number is the intercept (i.e. the portfolio abnormal returns), the lower number in parentheses is the t-statistic, and *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, level respectively.

	Predicted dividend, dividend increase in last year (long portfolio)	Predicted dividend, constant dividend in last year (long portfolio)	Predicted dividend, dividend decrease in last year (long portfolio)	Predicted dividend, dividend missed in last year (long portfolio)
	All other companies with dividend increase in last year (short portfolio)	All other companies with constant dividend in last year (short portfolio)	All other companies with dividend decrease in last year (short portfolio)	All other companies with missed dividend in last year (short portfolio)
Long	0.860***	0.485***	0.407***	−0.785***
	(7.98)	(9.10)	(2.70)	(−3.49)
Short	0.429***	0.066	−0.403***	−0.669***
	(4.99)	(1.25)	(−3.30)	(−3.96)
Difference	0.447***	0.397***	0.729***	−0.008
	(4.16)	(12.47)	(4.19)	(−0.03)

investigate this, we split the dividend month sample into those months with an earnings announcement and those without, and we compare the within companies portfolio for each category.

Another possibility is that the dividend month premium is measuring the effects of seasonality, as in Heston and Sadka (2008). This result finds that monthly returns at 12-month intervals tend to predict returns in the current month. They form their portfolios based on the average returns of the stock from 12, 24, 36, 48, and 60 months ago. To test whether this effect is driving our results, we form a two-way sort, based on predicted dividend payment and also on whether companies are above or below the median of the Heston and Sadka (2008) variable. We then regress these returns on the excess market return, SMB, HML and UMD portfolios.

We test these predictions in Table 7 and find that neither earnings months nor seasonality explain the dividend month announcement premium. For earnings, the within companies dividend month premium is 30.9 basis points in months with earnings announcements, versus 45.0 basis points per month for non-earnings months, with the double difference portfolio having negative returns that are somewhat significant (−14.1 basis points, *t*-statistic of −2.06). While we do not have a clear explanation for why the dividend premium should

Table 9
Long-term persistence of dividend month premium.

This table presents the intercept from Fama French four factor regressions of US monthly stock returns sorted on predicted dividend payment at different horizons. Portfolios are equal weighted or value weighted as indicated, and monthly stock returns are regressed on monthly excess market returns, small minus big (SMB), high minus low (HML), and up minus down (UMD). The intercept from these regressions is shown in the table. The 'predicted dividend' variable selects companies that paid a quarterly or unknown dividend 3, 6, 9 or 12 months ago, a semi-annual dividend 6 or 12 months ago, or an annual dividend 12 months ago. This variable is then lagged in years by adding multiples of 12 months to each of the date requirements – e.g. a lag of one year means a stock that paid a quarterly dividend 15, 18, 21 or 24 months ago (and equivalently for semi-annual and annual), a lag of two years means quarterly dividend payment 27, 30, 33 or 36 months ago, etc. The long portfolio is all stocks with a predicted dividend lagged by that number of years. The short portfolio includes all companies that paid a dividend in the 12 months of the lagged year that aren't predicted to pay a dividend (e.g. a lag of 1 year means the short portfolio consists of companies that paid a dividend some time from 13 to 24 months ago, but that are not predicted to pay a dividend this month). Regressions are run on monthly returns of NYSE, Amex and NASDAQ common shares, from January 1927 to December 2011. The top number is the intercept (i.e. the portfolio abnormal returns), the lower number in parentheses is the t-statistic, and *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, level respectively.

Years lagged	Equal weight	Value weight
1	0.329***	0.245***
	(13.82)	(5.76)
2	0.281***	0.258***
	(10.73)	(5.96)
3	0.280***	0.287***
	(11.20)	(6.59)
4	0.258***	0.258***
	(10.71)	(5.80)
5	0.210***	0.232***
	(8.65)	(5.36)
6	0.180***	0.216***
	(7.46)	(5.15)
7	0.190***	0.229***
	(7.97)	(5.20)
8	0.155***	0.199***
	(6.36)	(4.49)
9	0.157***	0.197***
	(6.44)	(4.50)
10	0.148***	0.165***
	(6.11)	(3.74)
11	0.126***	0.125***
	(4.93)	(2.82)
12	0.143***	0.106**
	(5.78)	(2.34)
13	0.096***	0.100**
	(3.72)	(2.12)
14	0.134***	0.120**
	(5.08)	(2.57)
15	0.125***	0.098**
	(4.54)	(2.02)
16	0.111***	0.105**
	(4.09)	(2.14)
17	0.112***	0.037
	(4.05)	(0.71)
18	0.122***	0.045
	(4.11)	(0.81)
19	0.104***	0.038
	(3.44)	(0.70)
20	0.104***	0.040
	(3.35)	(0.74)

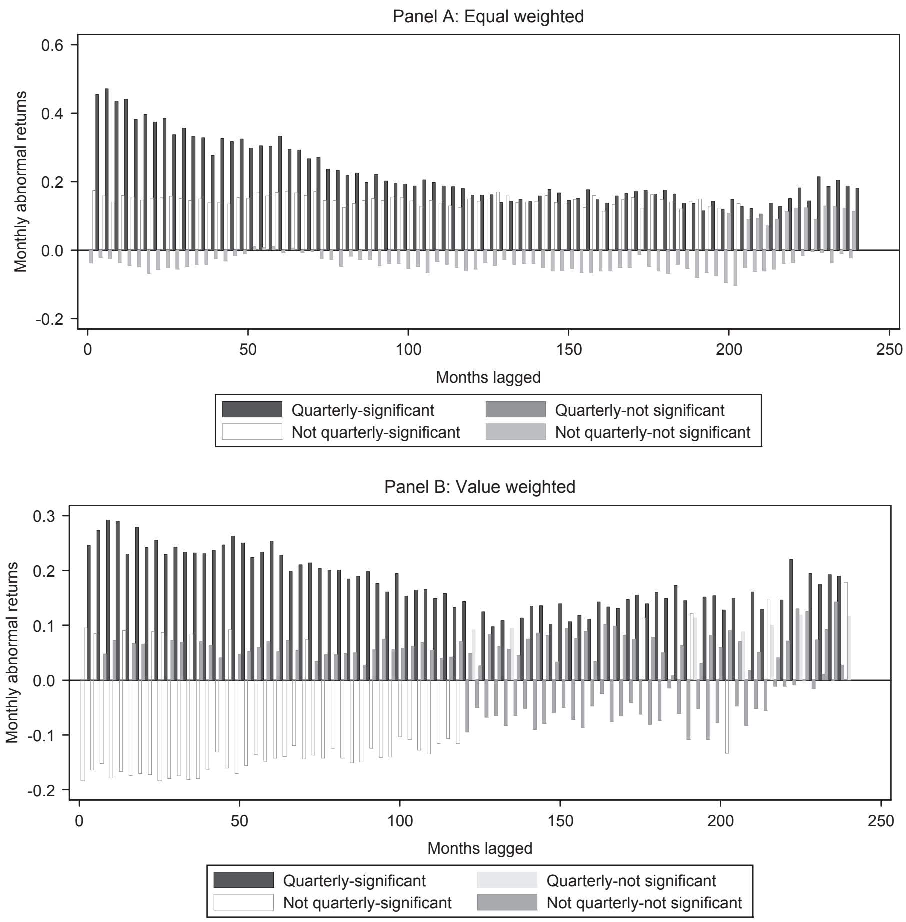

Fig. 6. Abnormal returns for portfolios of past dividend payers. This figure presents the intercepts from four-factor regressions of monthly stock returns for companies that paid a dividend in previous months. Each point is from a separate regression of a portfolio of monthly stock returns on excess market returns, small minus big (SMB), high minus low (HML), and up minus down (UMD) portfolios. The y-axis is monthly abnormal returns, in percent. In Panel A, the results are for equal weighted portfolios, and in Panel B they are for value weighted portfolios. Portfolios are formed for all companies that paid a dividend of any kind in the number of months prior indicated. If a month is a multiple of three (i.e., paid a dividend three months ago, six months ago, etc.) it is labeled "quarterly." A "quarterly" bar is black if the intercept has a t-statistic that is significant at the 5% level and white if the intercept is not significant at the 5% level. When the month is not a multiple of three it is labeled "not quarterly." A "not quarterly" bar is light gray if the intercept has a t-statistic that is significant at the 5% level and dark gray if the intercept is not significant at the 5% level.

be higher in non-earnings months, this result does clearly indicate that the dividend month effect is not limited to earnings months alone, as under an earnings announcement effect. For the Heston and Sadka (2008) double sort, the dividend month premium is 7.4 basis points higher in the high Heston and Sadka (2008) firms, but the difference is not significant. The dividend month premium is positive and significant in all specifications: earnings and non-earnings months, high and low seasonality.

5.4. Dividend news

Another possibility is that the dividend month premium is masking an effect related to news about the dividends. A number of papers have examined whether news in dividends, such as increases, decreases, omissions, and initiations, is able to predict future returns and earnings.[7] We examine whether the results differ in months following past dividend increases, decreases, omissions, and constant dividends. To keep the timing of changes consistent, we restrict the study to quarterly dividends and examine cases in which a given month is predicted to have a dividend and a dividend increase (or decrease or omission, respectively) was also evident in the previous 12 months. Companies with a constant dividend are companies without any increase, decrease, or omission in dividends in the previous 12 months. We then compare

[7] For the effects of dividend news on earnings, see Fama and French (1998, 2000), Liu, Szewcyk and Zantout (2008), and Fuller and Goldstein (2011). For the effect on future earnings, see Bernartzi, Michaely, and Thaler (1997), DeAngelo, DeAngelo, and Skinner (1996), Nissim and Ziv (2001), and Grullon, Michaely, Benartzi, and Thaler (2005).

Table 10
Calendar seasonality, and sub-periods.

This table presents the intercepts from Fama French four factor regressions of US monthly stock returns sorted on predicted dividend payment in different calendar months, and in different sub-periods. Monthly stock returns are regressed on monthly excess market returns, small minus big (SMB), high minus low (HML), and up minus down (UMD), with the intercept from these regressions being shown. Predicted dividend refers to stocks that paid a quarterly or unknown dividend 3, 6, 9, or 12 months ago, a semi-annual dividend 6 or 12 months ago, or an annual dividend 12 months ago. "All other past dividend payers" is all companies that paid a dividend in the past 12 months but are not predicted to pay a dividend this month based on the above formula. The dividend month premium is the abnormal returns to the difference portfolio long predicted dividend payers and short all other past dividend payers. Panel A examines the equal weighted dividend month premium in different calendar months of the year. Panel B examines the dividend month premium in different sub-periods: 1926–1945, 1946–1965, 1966–1985 and 1986–2011. The top number is the intercept (i.e. the portfolio abnormal returns), the lower number in parentheses is the *t*-statistic, and *, ** and *** indicate statistical significance at the 10%, 5%, and 1%, level respectively.

Panel A: Dividend month premium by calendar month

Month	Equal weighted, predicted dividend minus all other past dividend payers
January	0.343*
	(1.79)
February	0.548***
	(3.66)
March	0.638***
	(5.47)
April	0.354**
	(2.56)
May	0.502***
	(4.34)
June	0.515***
	(3.70)
July	0.759***
	(4.65)
August	0.555***
	(4.85)
September	0.423***
	(2.92)
October	0.284*
	(1.98)
November	0.562***
	(4.13)
December	0.615***
	(3.29)

Panel B: Different subperiods

Period	Equal weighted	Value weighted
1926–1945	0.790***	0.520***
	(6.36)	(4.23)
1946–1965	0.214***	0.046
	(4.92)	(0.53)
1966–1985	0.604***	0.468***
	(11.32)	(5.70)
1985–2009	0.472***	0.268***
	(7.65)	(3.68)

these portfolios with the returns of companies with past dividend increases (decreases, omissions, constant dividends) that are not predicted to pay a dividend this month. As before, we regress these returns on Mkt-Rf, SMB, HML, and UMD portfolios.

Table 8 presents these results. The dividend month premium is positive and significant for all categories of past dividend changes when dividends were paid: increases, decreases, and constant dividends. The monthly abnormal returns for the within companies portfolio are 44.7 basis points for dividend increases, 39.7 basis points for constant dividends, and 72.9 basis points for dividend decreases. This indicates that the effect is not simply a proxy for the sign of dividend news. By contrast, there is no dividend premium when the company omitted dividend payment. This is important, as it suggests that the abnormal returns are coming from the dividend payments themselves, and when dividends disappear, so does the anomaly.

Another way to examine whether the main results are proxying for dividend news is to examine how persistent the effects are over time. The more stale the dividend information is, the less likely that it still contains value-relevant news about the dividends. To examine this question, we use earlier time periods to predict current dividend payments. We use the definition of "predicted dividend in lag year" and "other companies with dividend in lag year" (similar to the within companies definition) and lag these values by 12, 24, 36 months, etc. For instance, a lag of 60 means that a company has a predicted dividend if it paid a dividend 63, 66, 69, or 72 months ago, while other companies with dividend in lag year paid a dividend 61, 62, 64, 65, 67, 68, 70, or 71 months ago. To make sure that the survivorship bias is the same between the long and short portfolios, we restrict the sample to include only firms with data from lag month♯+12. We examine the returns to the long-short portfolios regressed on a four-factor model as before.

Table 9 presents these results. Abnormal returns are present using up to 20-year-old dividend data for equal weighted portfolios (10.4 basis points per month, with a *t*-statistic of 3.35) and up to 16-year-old data for the value weighted portfolio The returns gradually become smaller in both magnitude and significance, as some past dividend payers stop paying dividends and other past non-payers initiate payments. Fig. 6 shows the abnormal returns to portfolios formed on a simpler definition of paying any dividend at each monthly horizon. In the Panel A and Panel B graphs, portfolios are formed that are long if a company paid a dividend *X* months ago and short if the company did not. The four-factor intercepts for equal weighted portfolios are plotted in Panel A, value weighted portfolios, in Panel B. The results are difficult to reconcile with the effect being driven by dividend news, unless the news has persistent effects at a 20-year horizon.

5.5. Calendar and seasonal effects, subperiods

Finally, we examine whether the returns are concentrated in certain months of the year such as January, hold only in particular sub-periods, or have been eliminated in recent years. We investigate these possibilities in Table 10. Panel A presents the standard within companies results using only returns from each calendar month of the year. The results show that the returns are not concentrated in any particular month of the year, and the abnormal returns are significant at a 5% level in ten out of the 12 calendar months and significant at a 10% level in all months. Panel B examines the returns to the within companies strategy during four subperiods: 1926–1945, 1946–1965, 1966–1985 and 1986–2011. The equal weighted portfolio had economically and statistically significant four-factor alphas in all four subperiods, ranging from 79 basis points per month during 1926–1945 to 21 basis points per month during 1946–1965.

6. Conclusion

In this paper, we show a robust price pattern: Companies have predictably higher returns in months when they are expected to pay a dividend. Simple difference portfolios produce abnormal returns of 37 to 53 basis points per month relative to a four-factor model, with some specifications producing abnormal returns as high as 115 basis points per month. We argue that the effect is driven by price pressure from dividend-seeking investors in the lead-up to the ex-day. Consistent with this explanation, substantial returns are evident in the interim period between announcement and ex-day (around 31% of the total returns of the dividend period), and significant reversals are seen in the 40 days after the ex-dividend day.

We argue that price pressure from dividend-seeking investors is consistent with models of dividend clienteles (such as tax-related trading) and dividend catering. But our results pose a puzzle: Why do dividend-seeking investors, regardless of underlying motivation, not purchase the stock slightly earlier, securing both the dividend and the abnormal returns? Given that the median duration between the dividend announcement and the ex-day is only ten days, and those days contain substantial abnormal returns, it is not clear why investors who planned on buying before the ex-day do not buy the share a few days earlier. This question is challenging, both from the perspective of investor rationality and models of dividend payment, and one for which we do not have a clear answer.

Our results also have implications for corporate finance. Models such as Brennan (1970) and Green and Hollifield (2003) argue that if the marginal investor pays personal taxes, and the present value of the tax liability is incorporated in equity prices, then dividends raise the firm's cost of capital. The conclusion from these models is altered, however, if taxable investors can costlessly avoid receiving the dividend by selling the share to tax-free investors before the ex-day in exchange for full value. The evidence in this paper is consistent with the existence of frictions in the trades occurring before the ex-day (which are required for investors to transfer the taxable dividends). In other words, these trades do not appear to be costless, but instead involve a leakage of value.

Stock returns during dividend months represent a substantial asset pricing anomaly. The dividend month premium is as large as the value premium, but with less volatility. It survives a wide battery of control variables. It holds on both a value weighted and equal weighted basis. It is driven mainly by the long side of the portfolio. It is highly persistent, and abnormal returns are available sorting on 20-year-old data. Because of its operation within a given set of companies, it appears unlikely to be driven by risk. These facts do not seem to be broadly appreciated in the literature that examines dividends and stock returns as a way of understanding why firms pay dividends in the first place. Our results appear at odds with market efficiency and suggest that prices are not fully incorporating information about the predictable component of dividend payments.

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