Scrip Dividends and Extrapolative Beliefs

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Abstract

Using data on scrip dividends, which give shareholders the option to receive additional shares instead of cash dividends, we investigate how investors form expectations of future returns. We find that more shareholders choose to receive dividends in shares when recent past returns are higher, especially when returns are positive and volatile. In addition, extrapolative beliefs among shareholders are stronger in small firms, growth firms, and firms with low institutional ownership. Finally, take-up rates of scrip dividends negatively predict both short-run and long-run future returns. Our findings show that shareholders, like general investors, are affected by extrapolative beliefs when forming expectations of future returns on their holdings.

Keywords: dividends, extrapolative expectations

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1 Introduction

Many studies have investigated how investors form their expectations about future asset returns. One of the useful ideas is return extrapolation, the belief that an asset's future return is a positive function of its recent past returns. Expectation models based on return extrapolation can explain important facts about asset prices, such as return prediction at the aggregate level, excess volatility, and asset bubble [Barberis, Greenwood, Jin, and Shleifer, 2015, Jin and Sui, 2021]. In particular, recent studies using survey data provide convincing evidence that extrapolative beliefs affect investors' expectations of future stock returns [Vissing-Jorgensen, 2004, Greenwood and Shleifer, 2014, Cassella and Gulen, 2018, Da, Huang, and Jin, 2021].

However, existing studies have limitations in terms of providing evidence that extrapolative beliefs affect expectation formation. Existing literature mainly focuses on analyzing the aggregate stock market return using survey data, except for Da et al. [2021], who study individual stock returns. There is a question on whether extrapolative beliefs affect expectations for individual stock prices, not the aggregate stock return. This difference is potentially significant because firm-specific information can be involved in forecasting individual stock returns. A problem is also inherent in the survey data used to analyze the expectation formation process. In investment situations, investors' expectations are deeply associated with future economic consequences. On the other hand, when predicting stock prices in surveys, making a prediction has no economic consequence. Since the economic consequence is not tied to answering a survey, the expectation in a survey and in an actual investment situation can be different. Therefore, it is difficult to tell from survey data whether return extrapolation affects expectation formation if expectations are associated with future wealth.

To overcome this issue, we analyze a hand-collected data set on scrip dividends. A scrip dividend is a process of providing shareholders the option of receiving either a cash dividend or common stock. Shareholders who hold shares as of record date can decide to elect for the scrip dividend program and receive dividends in stocks. This choice reflects a shareholder's expectation of future returns on their holdings. The expectation reflected in taking the scrip dividend is directly linked to the shareholder's future wealth. In particular, shareholders will choose the scrip dividend option if they believe stock prices will increase in the future.[1] Otherwise, shareholders can opt out to receive cash and use it elsewhere.

[1] One other possible economic incentive is that shareholders can increase the holdings without additional transaction costs. However, the motivation from transaction costs does not affect the fact that shareholders will choose scrip dividends only when their expectation of future stock price is higher than the current price.

Taking advantage of our data on scrip dividends, we investigate whether extrapolative beliefs affect shareholders' expectations of future stock returns. We use a fraction of shareholders taking scrip dividends, namely, scrip take-up, as a proxy for shareholders' expectations. We hypothesize that a larger fraction of shareholders will choose the scrip dividend option when recent past returns of their holdings are higher. To investigate this, we first estimate a linear regression of scrip take-up on recent past stock returns. We find that more shareholders choose to receive dividends in stock when the recent monthly returns are higher. The regression coefficient is positive and significant for the most recent returns but insignificant for more distant past returns. The result is stronger when past returns are positive and more volatile. Importantly, the relationship between scrip take-up and past returns holds for the idiosyncratic component but not for the systematic component of past returns. Our results are robust to the inclusion of market returns and various firm characteristics.

To quantify the tendency of investors to overweigh recent returns, we estimate Greenwood and Shleifer [2014]'s specification of extrapolation with exponential decay function as the weighting scheme for past returns. In this framework, the degree of extrapolative weighting is measured by two parameters. The first parameter, β, measures the extent to which shareholders' expectations are associated with past returns overall. The second parameter, λ, measures the relative weight of distant past returns to recent past returns when shareholders extrapolate past returns to predict future prices. We find that β is positive and significant, meaning that shareholders relate past returns to expectations in their decisions to take scrip dividends. Moreover, λ is significantly lower than 1, suggesting that shareholders significantly overweigh recent past returns compared to distant past returns in expectation formation. Our result is consistent with other research that use a survey response as a proxy for investors' expectations.

We explore how firm characteristics affect the fraction of shareholders to take scrip dividends and whether shareholders form expectations differently according to the size and growth opportunity of a firm. We first show that β is positive and significant for small firms but insignificant for large firms. This result indicates that shareholders of small firms are more strongly affected by past returns in their expectations than shareholders of large firms. However, a larger δ for small firms implies that both distant and recent past returns affect shareholders' expectations. Next, we show that β is positive and significant for firms with a low book-to-market ratio (growth firms) but insignificant for firms with a high book-to-market ratio (value firms). This result provides evidence that shareholders of growth firms are more reliant on past returns when forming expectations than shareholders of value firms. The size of λ is comparable between growth and value firms.

Next, we investigate how institutional ownership is associated with extrapolative beliefs affecting the fraction of shareholders to take scrip dividends. Through this analysis, we study whether extrapolative beliefs are more prevalent among retail investors than institutional investors. We find that β is positive and significant only for firms with low institutional ownership. This finding implies that institutional investors are less affected by extrapolative beliefs when deciding to take scrip dividends. Similar to what we observed in the results for small firms, δ is larger for firms with low institutional ownership. This result indicates that both distant and recent past returns affect retail shareholders' expectations.

We explore how firm characteristics affect the extrapolative beliefs of shareholders in taking scrip dividends and whether shareholders form expectations differently according to the size and growth opportunity of a firm. We first show that β is positive and significant for small firms but insignificant for large firms. This result indicates that shareholders of small firms are more strongly affected by past returns in their expectations than shareholders of large firms. However, a larger δ for small firms implies that both distant and recent past returns affect shareholders' expectations. Next, we show that β is positive and significant for firms with a low book-to-market ratio (growth firms) but insignificant for firms with a high book-to-market ratio (value firms). This result provides evidence that shareholders of growth firms are more reliant on past returns when forming expectations than shareholders of value firms. The size of δ is comparable between growth and value firms.

Finally, we investigate whether expectations reflected in the take-up rate of scrip dividend is accurate or systematically biased. If shareholders' expectation on scrip take-up rate is accurate, then there should be a positive relationship between scrip take-up rate and future stock returns. On the other hand, if shareholders' expectation on scrip take-up rate is biased, then there should be a negative relationship between scrip take-up rate and future stock returns. Our results show that both general investors and shareholders can have biased beliefs on their holdings. Using the Fama–Macbeth regression, we find that a higher scrip take-up rate predicts a lower return in the future. This return predictability persists over the next 24 months. Our results are robust to the inclusion of various firm characteristics, including firm size, book-to-market ratio, dividend-to-price, and earnings-to-price ratio as controls.

Our paper contributes to the literature on scrip dividend. Studies in this literature focus on the motivation of firms to pay scrip dividends. Both Lasfer [1997a] and Lasfer [1997b] suggest that scrip dividends may not be motivated by the financial considerations of firms. Recently, however, Feito-Ruiz, Renneboog, and Vansteenkiste [2020] provide contradicting evidence that scrip dividends are offered by firms when financial constraints are binding.

Different from prior studies, our paper investigates the motivation of shareholders to take scrip dividend.

More broadly, our paper adds to the literature studying investors' biased beliefs using survey data [Malmendier and Nagel, 2011, Hirshleifer, Li, and Yu, 2015, Amromin and Sharpe, 2016, Bordalo, Gennaioli, La Porta, and Shleifer, 2019, **?**, Bordalo, Gennaioli, Ma, and Shleifer, 2020, Choi and Robertson, 2020, Giglio, Maggiori, Stroebel, and Utkus, 2021].[2] Our paper is specifically related to a part of the literature that analyzes the consequence of return extrapolation on asset prices [Greenwood and Shleifer, 2014, Barberis et al., 2015, Nagel and Xu, 2019, Jin and Sui, 2021]. In particular, our results contribute to the literature by providing direct evidence of the variation of return extrapolation in a time series or cross-section [Cassella and Gulen, 2018, Da et al., 2021].

The remainder of the paper proceeds as follows. Section 2 discusses the institutional background of scrip dividend in detail. Section 3 explains our data and empirical methodology. Section 4 explores the main results of the experiment. Section **??** concludes.

2 Institutional Background

Scrip dividend is one of the forms of dividend distribution in the United Kingdom (UK) that allows shareholders to receive shares in lieu of cash. Shareholders can join the scrip dividend program by signing a scrip dividend election notice before the pre-scheduled election date. The election notice is mailed to all shareholders appearing on the shareholder register at the record date of the respective dividend payment. Shareholders are required to complete, sign, and return the Notice of Election if they wish to participate in the scrip dividend program. Those who wish to opt out from the program should return the Notice of Cancellation by the stated deadline while those who want to keep their permanent elections do not need to take further action.

The scrip dividend reference price, the price of a share an investor can purchase via the scrip dividend program, is announced a few days before the election date. It is usually the average closing market price of shares over the five trading days starting or ending with the relevant ex-dividend day. The scrip dividend is distributed at the pay date together with the cash dividend. Figure 1 presents the typical timeline of a scrip dividend in our sample. The reference start date, the most crucial event in our analysis, roughly coincides with the

[2] See Barberis [2018] for a comprehensive review of this topic.

ex-dividend date and is approximately 37 days before the pay date. The scrip election date, the final deadline to register for a scrip dividend program, is approximately 23 business days after the ex-dividend date and approximately 14 business days before the pay date.

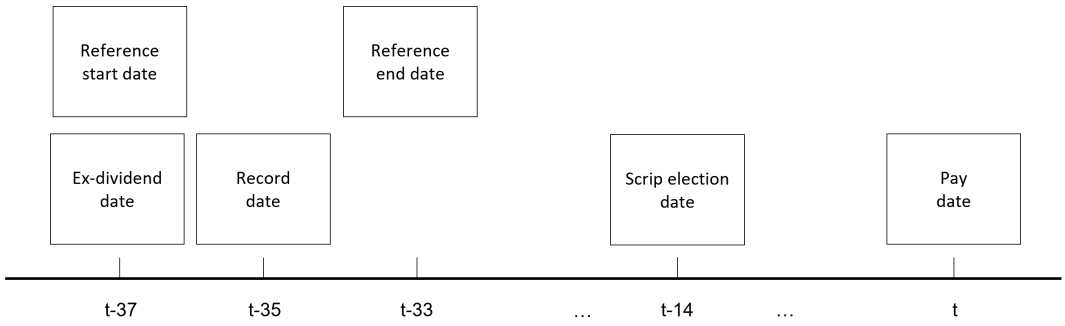


Figure 1
Dividend timeline

The numbers on the timeline indicate the average number of trading days between key dates for scrip dividend events in our sample.

The number of shares a shareholder receives from the scrip dividend is determined as follows:

$$\#\ of\ shares\ received = \frac{\#\ of\ shares\ held\ at\ record\ date * cash\ value\ of\ dividend}{scrip\ dividend\ reference\ price}, \quad (1)$$

and the total number of shares issued is the sum of the number of shares received by all shareholders. Note that a shareholder whose stake of holding is not large enough to receive a full share receives a cash dividend, as the scrip dividend does not distribute fractional shares.[3] The total number of shares issued from the scrip dividend is the number of shares collectively received by all shareholders.

The scrip take-up rate represents the proportion of existing shares registered in the scrip dividend program. This rate can be computed by the number of shares elected to participate in the scrip dividend divided by the total number of shares outstanding. The number of shares registered is not directly announced in most of our samples. Instead, we compute this number from the number of shares issued from the scrip dividend, which is mandatory to report to the London Stock Exchange. We first compute the number of shares needed to

[3] The minimum number of shares held to receive a share from the scrip dividend can be computed as follows: *scrip dividend reference price*/*cash value of dividend*

receive an additional share as follows:

$$\#\ of\ shares\ needed = \frac{scrip\ dividend\ reference\ price}{cash\ value\ of\ dividend} \tag{2}$$

The number of shares registered is the number of shares issued multiplied by the number of shares needed to receive an additional share. Therefore, the scrip take-up rate can be computed as follows:

$$Scrip(\%) = \frac{\#\ of\ shares\ issued * \#\ of\ shares\ needed}{\#\ of\ shares\ outstanding} * 100 \tag{3}$$

The institutional background of the scrip dividend is suitable for studying the extrapolative behavior of investors:

1. Scrip dividends provide shareholders the opportunity to increase their holdings without incurring any transaction costs. Therefore, taking scrip dividends is a cheaper—hence better—option for shareholders who wish to reinvest dividends in the same stock.

2. Unlike the stock dividends offered in the United States, the scrip dividend is taxed at the personal income tax rate, just like the cash dividend. This tax feature ensures that the purpose of investors who take the scrip dividend is not to avoid tax payment.

3. Unlike the dividend reinvestment plans, scrip dividends do not offer shares at a discounted price. The only exception is the enhanced scrip dividend, which we exclude from our sample.

3 Data and Methodology

3.1 Data

We start by identifying firms that pay scrip dividends at some point in their operation. We search Factiva for mentions of "scrip dividends" in articles sourced from the Regulatory News Service (RNS). RNS transmits both regulatory and non-regulatory information published by companies listed on the London Stock Exchange.[4] The search results retrieved mention 219 unique firms.

[4] https://www.lseg.com/areas-expertise/market-information/regulatory-news-service

We match these firms to Capital IQ and exclude firms classified by Capital IQ as investment funds or government institutions.[5] We then use Bloomberg to extract the dividend history for firms in our sample. Bloomberg reports the net amount per share, relevant dates (i.e., declaration, ex-dividend, record, and payment), dividend frequency, and whether the dividend is interim or final. It does not provide data on scrip dividends.[6]

For each dividend in the sample, we search Factiva, London Stock Exchange, and Morningstar for information on whether a scrip dividend option was offered and, if it was, what the applicable terms and take-up rate were. Specifically, we record the 1) election date, which is the deadline to decide whether shareholders want to receive scrip or cash dividend; 2) the reinvestment price or number of existing shares needed to receive one new share; and 3) the take-up rate. When the take-up rate is not reported, we compute it as

$$Take\text{-}up\ rate = \frac{\#\ of\ shares\ issued \times \#\ of\ shares\ needed\ to\ receive\ 1\ new\ share}{\#\ of\ shares\ outstanding}$$

Monthly returns are calculated using the Datastream total return index adjusted for stock splits and dividend payments. Financial variables, including book-to-market equity (B/M) and market value of equity (size) are from Worldscope. Data on institutional and blockholder ownership are from Capital IQ and Factset. Firms that had offered scrip dividends less than three times in their history are excluded from our study. We further exclude the enhanced scrip dividends wherein firms encourage shareholders to receive shares over cash by offering shares with discounts. Our final sample consists of 1,005 dividend events for 80 firms.

Table 1 reports summary statistics for our sample.

3.2 Methodology

We take a revealed preference approach to provide evidence of extrapolative expectations affecting investor decisions. We estimate regressions of scrip dividend take-up rate on lagged

[5] Specifically, we exclude the following company types: public funds, public investment firms, private investment firms, and government institutions.

[6] Bloomberg terminal does indicate whether a given dividend included the scrip dividend option, but it does not provide information on the terms and is not consistent in its reporting of whether there was a scrip dividend option.

Table 1
Summary Statistics

This table reports summary statistics for the scrip dividend events in our sample. R_{t-1} is the 1-month return during the month before the ex-dividend date. $Mktcap$ is the market capitalization in millions of pounds. B/M is the book to market ratio in month $t-1$. D/P is the amount of dividend paid divided by price per share. Scrip take-up rate is the fraction of outstanding shares that choose the scrip dividend option, i.e., to receive new shares instead of cash. E/P is the annual net income divided by price per share. *Div.amount* is the amount of dividend paid per share.

				Percentile			
	Mean	SD	Min	25th	50th	75th	Max
R_{t-1}	1.75	9.13	-67.48	-3.25	1.42	6.83	63.72
$Mktcap$	23,411.35	46,366.52	8.52	556.98	2572.01	18,041.02	217,803.59
B/M	0.83	0.64	-1.59	0.40	0.70	1.10	5.26
$Div.Yield$	0.04	0.04	0.00	0.03	0.04	0.05	1.29
E/P	0.08	0.10	0.00	0.05	0.07	0.09	2.00
Take-up	23.44	20.41	0.45	7.02	17.23	33.98	100.00
Div. amount(Pence)	7.51	9.81	0.03	1.50	4.30	9.02	86.53

stock returns as follows:

$$\textit{Scrip take-up (\%)}_{f,t} = \alpha + \sum_{k=1}^{n} \beta_k \cdot R_{f,t-k} + \gamma' X_{f,t-1} + \varepsilon_{f,t}, \tag{4}$$

where f indexes firms and t indexes months relative to the ex-dividend date. If investors have extrapolative expectations, then high past stock returns will increase their expectations of future stock returns and make them more willing to opt for the scrip dividend option.

We measure returns through months $t-1$ relative to the ex-dividend date, because after the reference price is set, subsequent price changes directly affect shareholders' incentive to select the scrip dividend option. For example, if the reference price is set at £20 and the stock price goes up to £25 by the election date, then the scrip dividend will be a bargain. By selecting the scrip dividend option, shareholders are able to purchase new shares at the £20 reference price instead of the current stock price of £25. Thus, any relationship between the scrip take-up rate and stock returns after the reference price is set is likely due to the direct economic incentive and not the extrapolative beliefs. To estimate the effect of extrapolative beliefs, we measure returns through months $t-1$ relative to the ex-dividend date.

To study whether shareholders put more weight on more recent stock returns than on distant ones, we estimate the nonlinear least square model from Greenwood and Shleifer [2014]:

$$\textit{Scrip take-up(\%)}_{f,t} = \alpha + \beta \cdot \sum_{k=1}^{n} w_k \cdot R_{f,t-k} + \gamma' X_{f,t} + \varepsilon_{f,t}, \quad \text{where } w_k = \frac{\lambda^{k-1}}{\sum_{s=0}^{n-1} \lambda^s}. \tag{5}$$

This specification captures extrapolative expectations with two parameters. λ measures the relative weight of past returns in forming expectations. When λ is small, recent returns receive greater weight than distant past returns. One can think of $1 - \lambda$ as the degree of extrapolation. Parameter β, on the other hand, measures the sensitivity of the scrip take-up rate to investors' expectations of future returns, as captured by the weighted past returns.

4 Results

We start by investigating the relationship between the scrip take-up rate and the first lag of stock returns in Table 2. In column (1), we regress the scrip take-up rate on the lagged stock return and the excess return on the market. The coefficient on the lagged stock return indicates that a 10% increase in the lagged stock return is associated with a 1.29% increase in the scrip take-up rate. This increase in the take-up rate is about 5.6% of the average take-up rate of 23.4%. The coefficient on the excess market return is negative and not statistically significant. While we have less variation with which to estimate the effect of excess market returns, the magnitude is roughly similar to the effect of the stock return, suggesting that investors may be basing their decision on the market-adjusted returns. The coefficient on the *Scrip default* dummy is large and highly statistically significant. When scrip dividend is the default option, the take-up rate is 63.3% higher. In column (2), we add controls for stock characteristics, including log market capitalization, book-to-market, dividend-to-price, and earnings-to-price, which may be correlated with investor expectations of future returns and may affect the take-up rate. We find a positive and statistically significant coefficient on log market cap, a positive but not statistically significant coefficient on the book-to-market ratio, a negative and statistically significant coefficient on the dividend-to-price ratio, and a positive but not statistically significant coefficient on the earnings-to-price ratio.

Columns (1) and (2) are the results without year- and firm-fixed effects, respectively. The results show that shareholders take more scrip dividends with higher past returns at the event level. The coefficient of about 0.13 indicates that a 10% increase in past monthly return is associated with a 1.3% increase in the proportion of shares registered for the scrip dividend program. The coefficients of R_{t-1} are positive and significant regardless of the inclusion of controlling variables. Columns (3) and (4) are the results with year-fixed effects. The results show that our finding is robust to taking a yearly variation into account. The coefficients are positive in both specifications and statistically significant if we include controls. Note that the result in Equation (3) is significant at the 15% level with a p-value of 12%.

Table 2
Past Returns and Scrip Dividend Take-Up Rate

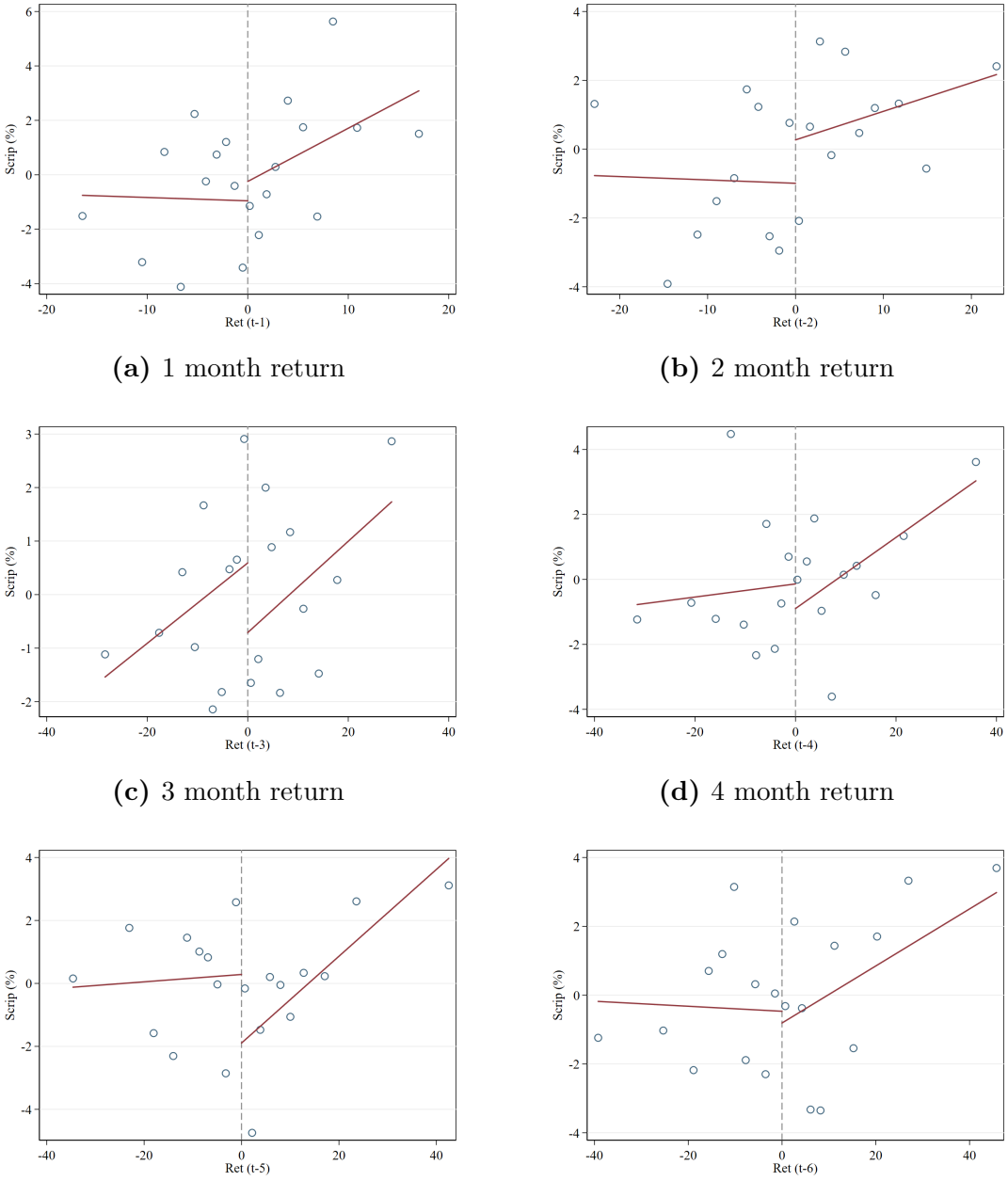
This table reports the results of regressions of the scrip dividend take-up rate on past stock returns:

$$\textit{Take-up}_{f,t} = \alpha + \beta \cdot R_{f,t-1} + \gamma \cdot X_{f,t-1} + \varepsilon_{f,t}$$

where f indexes firms and t indexes time in months. Scrip take-up rate is the fraction of outstanding shares that choose the scrip dividend option, i.e., to receive new shares instead of cash. R_{t-1} is the 1-month return during the month before the ex-dividend date. $Rmrf$ is the monthly UK market premium in month $t-1$. $Mktcap$ is the market capitalization in millions of pounds. B/M is the book to market ratio in month $t-1$. *Default* is a dummy variable that equals to one if the default option of the scheme is to take scrip dividend. Standard errors are adjusted for clustering by year and firm.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$R_{f,t-1}$	0.129***	0.123***	0.080	0.091**	0.156***	0.165***	0.143***	0.131***
	(0.035)	(0.032)	(0.051)	(0.034)	(0.036)	(0.044)	(0.037)	(0.046)
Enhanced	26.741***	27.349***	20.089***	19.630**	22.348***	24.610***	19.327**	20.402**
	(6.435)	(6.639)	(7.165)	(7.809)	(7.338)	(7.630)	(8.333)	(8.611)
Default	63.790***	61.489***	65.602***	61.193***				
	(2.025)	(4.021)	(2.387)	(3.207)				
Rmrf	-0.045	-0.102	-0.067	-0.105	-0.087	-0.134	-0.158	-0.158
	(0.204)	(0.205)	(0.212)	(0.216)	(0.162)	(0.177)	(0.143)	(0.162)
Mktcap		1.255*		1.423*		3.715**		-0.924
		(0.699)		(0.703)		(1.393)		(1.403)
B/M		1.668		1.851		-1.139		-0.681
		(2.271)		(2.443)		(1.580)		(1.615)
D/P		-0.849		-0.444		-0.901**		-0.790**
		(0.703)		(0.615)		(0.407)		(0.338)
E/P		0.134		-0.242		0.536*		0.274
		(0.309)		(0.229)		(0.268)		(0.166)
N	1005	898	1005	898	1005	897	1005	897
R^2	0.282	0.320	0.356	0.392	0.560	0.579	0.621	0.630
Year FEs			✓	✓			✓	✓
Firm FEs					✓	✓	✓	✓

Some of the results for the control variables from columns (1) through (4) are worth mentioning. First, the coefficient on the market premium is negative and not significant throughout all specifications. We take this insignificance as evidence that shareholders do not consider overall market performance when registering for the scrip dividend. Second, the coefficient for the default dummy is about 60 and statistically significant. When the default option is to take a scrip dividend and shareholders have to take action to opt out, the average scrip take-up rate is about 60% higher. This result echoes the results in behavioral economics that the default option matters.



(a) 1 month return

(b) 2 month return

(c) 3 month return

(d) 4 month return

(e) 5 month return

(f) 6 month return

Figure 2
Scrip Take-up and Stock Return

This figure reports the binned scatter plot to represent the relationship between scrip take-up and past stock returns. Both scrip take-up and returns are residualized at the firm-level. The lines represent the linear fit lines from regressing scrip take-up on returns with a discontinuity at 0. The sample period is from 1993 to 2018.

We then move on to the results with firm-fixed effects. The results in columns (5) and (6) indicate that the positive relationship between scrip take-up rate and past returns exists for the within-firm variation. Results including firm-fixed effects provide more direct clues about the extrapolative beliefs of shareholders. When a stock price increases, the proportion of shareholders enrolled in the scrip dividend program increases. When the price is falling, shareholders tend to opt out.

Figure 2 is the binned scatter plot that presents the within-firm relationship between scrip take-up and past returns with the various horizon. Both scrip take-up and returns are residualized at the firm level. The results show that a higher proportion of existing shares participate in the scrip dividend program when past returns are high. The regression lines slope upward in general for various return horizons. For example, Figure suggests that when past returns are positive, the scrip take-up rate increases about 2 percentage points when the past one-month return increases about 10 percentage points. Shareholders are interested in increasing their stake in a firm when past returns are positive.

Interestingly, there are clear discontinuities in the relationship between past returns of the various horizon and scrip take-up at $R_{t-k} = 0$. The slope of the regression line is positive if $R_{t-k} > 0$. When $R_{t-k} < 0$, the slope is flat at 0, indicating that the scrip take-up rate moves around the historical average level regardless of the level of past returns. This finding suggests that extrapolative beliefs affect the decision to take scrip dividends when past returns are positive.

In Table 3, we further investigate how past return characteristics affect extrapolative beliefs in taking scrip dividends. In the first three columns, we investigate whether shareholders extrapolate returns asymmetrically for the positive and negative returns. To test this conjecture, we create a dummy variable Pos that equals 1 if the past one-month return is positive. Columns (1)–(3) reports the results from the regression, including Pos and the interaction between Pos and R_{t-1}. We start with a specification with a firm-fixed effect. The coefficient for the interaction term is positive and statistically significant in column (2) while the coefficient for R_{t-1} is close to 0, not statistically positive. This result suggests that shareholders register more for the scrip dividends with higher past returns within a firm's history but only if the return is positive. Our result is not robust to the inclusion of year-fixed effects.

In the last three columns, we test whether shareholders extrapolate returns asymmetrically for stocks with high past volatility. For the specification with year-fixed effects, $HighVol(2)$ is a dummy that equals 1 if volatility from the past 24 monthly returns is above

Table 3
Part Returns and Scrip Dividend Take-Up Rate

This table reports the results of regressions of the scrip dividend take-up rate on past stock returns:

$$\textit{Take-up}_{f,t} = \alpha + \beta \cdot R_{f,t-1} + \phi \cdot \textit{Dum}_{f,t} + \xi \cdot R_{f,t-1} \cdot \textit{Dum}_{f,t} + \gamma \cdot X_{f,t-1} + \varepsilon_{f,t}$$

where f indexes firms and t indexes time in months. Scrip take-up rate is the fraction of outstanding shares that choose the scrip dividend option, i.e., to receive new shares instead of cash. R_{t-1} is the 1-month return during the month before the ex-dividend date. *Pos* is a dummy that equals 1 if $R_{t-1} > 0$. $HighVol(2)$ is a dummy that equals 1 if the weekly stock return volatility over the past 24 months leading up to the ex-dividend date is above the median past volatility of firms that paid scrip dividend for the same period. Standard errors are adjusted for clustering by year and firm.

	(1)	(2)	(3)	(4)	(5)	(6)
R_{t-1}	0.131	0.054	0.120	0.172	0.018	0.014
	(0.127)	(0.174)	(0.120)	(0.103)	(0.074)	(0.077)
Pos	-4.237**	-3.633**	-3.059*			
	(1.872)	(1.670)	(1.582)			
R_{t-1}*Pos*	0.303	0.440*	0.237			
	(0.209)	(0.253)	(0.182)			
HighVol(2)				2.585*	2.173*	0.103
				(1.427)	(1.501)	(1.077)
R_{t-1}*HighVol(2)*				-0.071	0.262***	0.204**
				(0.122)	(0.085)	(0.089)
N	986	973	973	912	902	902
R^2	0.368	0.599	0.645	0.387	0.598	0.649
Controls	✓	✓	✓	✓	✓	✓
Year FE	✓		✓	✓		✓
Firm FE		✓	✓		✓	✓

the past median volatility of firms that paid scrip dividends in the same year. For the specification with firm-fixed effects, $HighVol(2)$ is a dummy that equals 1 if volatility from the past 24 weekly returns is above the past median volatility of its scrip dividend history. The results in column (4) suggest that past volatility affects the extrapolative beliefs in the cross-section; specifically, more dispersed past returns are associated with a higher regression coefficient in the cross-section. The coefficient for the interaction term is also positive and significant for column (5). The within-firm analysis suggests that shareholders with extrapolative beliefs only affect the take-up rate of scrip dividends only when the past returns are dispersed. Our result is not robust to the inclusion of both firm- and year-fixed effects. These results highlight that investors are affected by the characteristics of historical returns when forming expectation of future returns.

4.1 Expectation Formation in Scrip Dividends

We now explore how shareholders form expectations of future returns from a series of past returns. To test whether shareholders rely heavily on recent returns in making their decision to receive scrip dividends, we first rely on a linear regression model in Equation (4) with six lagged returns. Specifically, we focus on the firm-level variation of the scrip take-up rate and returns by including firm-fixed effects.

Table 4 presents the results. Column (1) shows the results by using raw returns as independent variables. We find that the coefficients diminish as the returns become more distant. The coefficient of R_{t-1} is positive and statistically significant while the coefficients of distant returns are close to 0. In addition, only the coefficients for R_{t-2} and R_{t-3} are positive. These results strongly suggest that shareholders tend to extrapolate only recent returns while disregarding returns from the distant past.

From column (2) to column (4), we present results from the idiosyncratic components of the past monthly returns. In column (2), the dependent variable is the idiosyncratic returns from CAPM estimated from the UK stock market. Column (3) utilizes the Fama–French three-factor model that uses market premium, size, and book-to-market as dependent variables. Column (4) uses the Carhart four-factor model that adds momentum factor to the Fama–French three-factor model. These results present evidence that shareholders are especially reliant on the recent idiosyncratic returns. The coefficient for R_{t-1} is positive and significant for all three specifications. Similar to the result in column (1), the coefficients tend to decay while k increases, the pattern we expect if investors have extrapolative beliefs. We interpret these results as strong evidence that shareholders extrapolate idiosyncratic component of returns when they decide to receive stock or cash dividends.

Lastly, from columns (5) and (6), we reconfirm our baseline result from column (1). Column (5) includes both year- and firm-fixed effects in the specification. Column (6) includes controls such as market premium, size, and book-to-market. Our results are robust to the inclusion of year-fixed effect and controls. All results are consistent with column (1), that is, the coefficient of R_{t-1} is greater than other coefficients and statistically significant.

To further investigate how shareholders form expectations depending more on recent returns than on distant returns, we use the nonlinear least square model in Equation (5) from Greenwood and Shleifer [2014] with lagged returns for the past 12 months. We particularly focus on within-firm variations of scrip take-up rate and past returns. For this purpose, we demeaned both the monthly returns and scrip take-up rate to estimate the nonlinear model.

Table 4
Extrapolative Beliefs: Linear Regression Model

This table reports the results of regressions of the scrip dividend take-up rate on lagged monthly returns:

$$\textit{Take-up}_{f,t} = \alpha + \sum_{k=1}^{6} \beta_k \cdot R_{f,t-k} + \gamma \cdot X_{f,t-1} + \varepsilon_{f,t}$$

where f indexes firms and t indexes time in months. Scrip take-up rate is the fraction of outstanding shares that choose the scrip dividend option, i.e., to receive new shares instead of cash. R_{mm} is the idiosyncratic component of the monthly stock returns from the market model. R_{3f} is the idiosyncratic component of the monthly stock returns from the Fama—French 3 factor model. R_{4f} is the idiosyncratic component of the monthly stock returns from the Carhart 4 factor model. Standard errors are adjusted for clustering by year and firm.

	(1)	(2)	(3)	(4)	(5)	(6)
Indep. Var:	*R*	*R(MM)*	*R(3F)*	*R(4F)*	*R*	*R*
R_{t-1}	0.140**	0.119***	0.167***	0.166***	0.115**	0.136**
	(0.054)	(0.039)	(0.043)	(0.044)	(0.046)	(0.061)
R_{t-2}	0.007	0.040	0.049	0.040	-0.003	0.029
	(0.067)	(0.060)	(0.063)	(0.064)	(0.066)	(0.085)
R_{t-3}	0.009	0.045	0.095	0.082	-0.002	-0.010
	(0.064)	(0.081)	(0.102)	(0.103)	(0.065)	(0.085)
R_{t-4}	-0.047	-0.053	-0.077*	-0.091*	-0.011	-0.047
	(0.073)	(0.061)	(0.040)	(0.046)	(0.073)	(0.080)
R_{t-5}	-0.004	-0.018	-0.002	0.004	-0.026	0.004
	(0.047)	(0.062)	(0.066)	(0.062)	(0.049)	(0.071)
R_{t-6}	-0.048	-0.032	-0.027	0.003	-0.051	-0.049
	(0.048)	(0.048)	(0.064)	(0.064)	(0.047)	(0.060)
N	1005	1005	926	926	1005	897
R^2	0.560	0.560	0.565	0.565	0.621	0.631
Controls						✓
Year FE					✓	✓
Firm FE	✓	✓	✓	✓	✓	✓

Table 5 provides evidence that shareholders extrapolate past returns while weighing heavily on recent returns. Column (1) is the result when standardized returns are used as independent variables. The estimated value for λ is 0.498 and statistically significant. This value indicates that shareholders extrapolate past returns by weighting R_{t-1} twice as much as R_{t-2}. In addition, the estimated value for β is 0.137, suggesting that shareholders take more (less) scrip dividends when the weighted past returns are high (low). The combined coefficient for R_{t-1} from the estimated λ and β is 0.069. In column (5), we report that column (1) is robust to control variables, including one-month market premium, market capitalization, and book-to-market. Specifically, our estimation indicates that the value of λ remains similar while the value of β increases by including controls.

Our results also hold for the idiosyncratic returns. In all specifications from column (2)

Table 5
Extrapolative Beliefs: Non-linear Regression Model

This table reports the results of regressions of the scrip dividend take-up rate on past stock returns:

$$\textit{Take-up}_{f,t} = \alpha + \beta \cdot \sum_{k=1}^{12} w_k R_{f,t-k} + \gamma \cdot X_{f,t-1} + \varepsilon_{f,t} i, t, \quad \text{where } w_k = \frac{\lambda^{k-1}}{\Sigma_{s=0}^{12} \lambda^s},$$

f indexes firms and t indexes time in months. Scrip take-up rate is the fraction of outstanding shares that choose the scrip dividend option, i.e., to receive new shares instead of cash. R_{mm} is the idiosyncratic component of the monthly stock returns from the market model. R_{3f} is the idiosyncratic component of the monthly stock returns from the Fama—French 3 factor model. R_{4f} is the idiosyncratic component of the monthly stock returns from the Carhart 4 factor model. Standard errors are adjusted for clustering by year and firm.

	(1)	(2)	(3)	(4)	(5)
Indep. Var:	*R*	*R(mm)*	*R(3f)*	*R(4f)*	*R*
α	0.025	0.032	0.039	0.038	-0.222
	(0.414)	(0.414)	(0.440)	(0.440)	(1.387)
β	0.137*	0.170	0.306*	0.260*	0.133
	(0.074)	(0.117)	(0.160)	(0.139)	(0.107)
λ	0.498***	0.581***	0.619***	0.596***	0.554***
	(0.097)	(0.105)	(0.066)	(0.075)	(0.129)
N	1001	1001	922	922	896
R^2	0.007	0.004	0.007	0.007	0.019
Controls					✓

to (4), λ ranges from 0.498 to 0.619, suggesting that the weights of recent returns are much higher than those of distant returns. Column (2) uses the idiosyncratic returns from CAPM as a main variable interest and reports a λ of 0.581, suggesting that shareholders put more weight on the recent idiosyncratic returns than on distant returns. Similarly, λ is 0.619 in column (3), which uses idiosyncratic returns from the Fama–French three-factor model and 0.554 in column (4), which uses the Carhart four-factor model. β is economically larger for idiosyncratic returns from the three-factor and four-factor models. We report β of 0.306 in column (3) and 0.260 in column (4). These results suggest that the relationship between past returns and scrip take-up rate is stronger for idiosyncratic returns, consistent with the results in Table 4.

We now study the heterogeneity of β and λ for different firm characteristics. Specifically, we study whether the degree of extrapolative beliefs among shareholders are different across small and large firms and growth and value firms. In each year, we first rank firms that paid scrip dividends into two groups according to the firm characteristics and then separately estimate the model in Equation (5) for each group.

Table 6 presents the result. In panel A, we separately estimate the nonlinear model for firms with a market capitalization below and above the median of firms that paid scrip

Table 6
Extrapolative Beliefs: Firm Characteristics

This table presents the results from the regression of scrip take-up rate on the monthly stock return for each sub-group. The specification of the regression equation is as follows:

$$\textit{Take-up}_{f,t} = \alpha + \beta \cdot \sum_{k=1}^{12} w_k R_{f,t-k} + \gamma \cdot X_{f,t-1} + \varepsilon_{f,t} i, t, \quad \text{where } w_k = \frac{\lambda^{k-1}}{\Sigma_{s=0}^{12} \lambda^s},$$

f indexes firms and t indexes time in months. Scrip take-up rate is the fraction of outstanding shares that choose the scrip dividend option, i.e., to receive new shares instead of cash. R_{mm} is the idiosyncratic component of the monthly stock returns from the market model. R_{3f} is the idiosyncratic component of the monthly stock returns from the Fama—French 3 factor model. R_{4f} is the idiosyncratic component of the monthly stock returns from the Carhart 4 factor model. Standard errors are adjusted for clustering by year and firm.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Low vs High Mktcap								
Dep. Var:	*Low Mktcap*				*High Mktcap*			
Indep. Var:	*R*	*R(mm)*	*R(3f)*	*R(4f)*	*R*	*R(mm)*	*R(3f)*	*R(4f)*
α	-0.038	-0.040	-0.081*	-0.082*	0.027	0.028	0.053	0.053
	(0.036)	(0.036)	(0.045)	(0.045)	(0.038)	(0.038)	(0.043)	(0.043)
β	0.314**	0.350**	0.456**	0.466**	0.085	0.037	0.022	0.019
	(0.159)	(0.150)	(0.184)	(0.184)	(0.079)	(0.063)	(0.045)	(0.037)
λ	0.712***	0.724***	0.711***	0.709***	0.569***	0.502*	0.398	0.366*
	(0.027)	(0.025)	(0.023)	(0.023)	(0.146)	(0.283)	(0.270)	(0.217)
N	548	548	526	526	511	511	449	449
R^2	0.017	0.010	0.012	0.009	0.007	0.001	0.002	0.002
Panel B: Low vs High B/M								
Dep. Var:	*Low B/M*				*High B/M*			
Indep. Var:	*R*	*R(mm)*	*R(3f)*	*R(4f)*	*R*	*R(mm)*	*R(3f)*	*R(4f)*
α	-0.016	-0.020	-0.029	-0.028	0.005	0.005	0.014	0.014
	(0.037)	(0.037)	(0.040)	(0.040)	(0.038)	(0.038)	(0.048)	(0.048)
β	0.432***	0.417***	0.451***	0.421**	0.297*	0.186	0.080	0.084
	(0.149)	(0.150)	(0.162)	(0.164)	(0.174)	(0.170)	(0.137)	(0.178)
λ	0.738***	0.746***	0.742***	0.748***	0.724***	0.733***	0.622***	0.659***
	(0.021)	(0.024)	(0.022)	(0.025)	(0.028)	(0.048)	(0.209)	(0.196)
N	533	533	495	495	526	526	480	480
R^2	0.019	0.012	0.019	0.018	0.004	0.001	0.001	0.001

dividends in a year. The results estimated from the small firm group (low *mktcap*) are significantly different from the results from the large firm group (high *mktcap*). For the small firm group, λ from column (1) to (4) are about 0.7 and significant. The estimated values of λ from both total returns and idiosyncratic returns are slightly higher than the estimated values from all samples in Table 5. On the other hand, values of β range from 0.314 to 0.456 and are significant for all specifications. Especially, the values of β from the small firm group are larger than the values of β from all samples. The results provide

evidence that shareholders extrapolate past returns strongly when taking scrip dividends for small firms.

However, the results do not support the notion that shareholders of the large firm group are affected by extrapolative beliefs. While λ for total returns and idiosyncratic returns are lower and statistically significant for three columns, the values of β are close to 0 and statistically insignificant. The estimated coefficient of R_{t-1} in column (5) is 0.0115, which is about one-sixth of the coefficient of R_{t-1} from the whole sample. These results suggest that shareholders of larger firms tend to rely less on the past returns when deciding to receive scrip dividends.

In panel B, we estimate the nonlinear model for firms with book-to-market ratios below and above the median of firms that paid scrip dividends in a year. In the case of λ, the estimated values are statistically significant in both growth firms (low B/M) and value firms (high B/M). However, in the case of β, the estimated coefficients from the two groups differ considerably. The estimated β coefficients from growth firms are 0.432 for total returns and ranges from 0.417 to 0.451 for idiosyncratic returns. β is statistically significant in all specifications from column (1) to (4). On the other hand, β coefficients from value firms are not statistically significant for idiosyncratic returns and has a value of about 0.1. In addition, for total returns, the β estimated from the value firms is about 32% smaller than the β estimated from growth firms. We take these results as evidence that extrapolative beliefs play a more important role in decisions to receive scrip dividends among shareholders of growth firms than among value firms.

Finally, we study whether the degree of extrapolative beliefs are different among shareholders of firms with low institutional ownership and high institutional ownership. In each year, we rank firms that paid scrip dividends into two groups according to the institutional ownership and then separately estimate the model in Equation (5) for each group.

Table 7 presents the results. We find that the λ for firms with low institutional ownership ranges from 0.642 to 0.729 while the λ for firms with high institutional ownership ranges from 0.312 to 0.625. Larger coefficients of λ indicate that the weight decays more slowly into the past for firms with low institutional ownership. On the other hand, the contrast of β coefficients between the two groups of firms is dramatic. For raw returns, β is 0.844 for firms with low institutional ownership. This result suggests that a 1 percentage point increase in weighted average of past returns is associated with a 0.844 percentage point increase in scrip take-up rate. However, β is 0.089 and statistically insignificant for firms with high ownership. Using idiosyncratic returns, β ranges from 0.403 to 0.658 for firms with low

Table 7
Extrapolative Beliefs: Institutional Ownership

This table presents the results from the regression of scrip take-up rate on the monthly stock return for each sub-group. The specification of the regression equation is as follows:

$$\textit{Take-up}_{f,t} = \alpha + \beta \cdot \sum_{k=1}^{12} w_k R_{f,t-k} + \gamma \cdot X_{f,t-1} + \varepsilon_{f,t} i, t, \quad \text{where } w_k = \frac{\lambda^{k-1}}{\Sigma_{s=0}^{12} \lambda^s},$$

f indexes firms and t indexes time in months. Scrip take-up rate is the fraction of outstanding shares that choose the scrip dividend option, i.e., to receive new shares instead of cash. R_{mm} is the idiosyncratic component of the monthly stock returns from the market model. R_{3f} is the idiosyncratic component of the monthly stock returns from the Fama—French 3 factor model. R_{4f} is the idiosyncratic component of the monthly stock returns from the Carhart 4 factor model. Standard errors are adjusted for clustering by year and firm.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var:	*Low Ownership*				*High Ownership*			
Indep. Var:	*R*	*R(mm)*	*R(3f)*	*R(4f)*	*R*	*R(mm)*	*R(3f)*	*R(4f)*
α	1.377**	1.298*	0.634	0.622	1.931***	1.894**	2.855***	2.867***
	(0.692)	(0.697)	(0.716)	(0.717)	(0.723)	(0.732)	(0.854)	(0.853)
β	0.844***	0.658*	0.588*	0.403	0.089	0.193	0.086	0.104
	(0.322)	(0.338)	(0.330)	(0.267)	(0.061)	(0.254)	(0.074)	(0.075)
λ	0.720***	0.729***	0.672***	0.642***	0.339***	0.625***	0.312***	0.319***
	(0.020)	(0.033)	(0.043)	(0.072)	(0.058)	(0.164)	(0.041)	(0.041)
N	352	352	308	308	346	346	271	271
R^2	0.025	0.010	0.017	0.013	0.012	0.003	0.018	0.021

institutional ownership, but β ranges from 0.086 to 0.193.

4.2 Return Predictability of Scrip Dividend

We investigate whether the scrip take-up rate predicts future returns. The predictability helps us identify what drives the relationship between past returns and scrip take-up rates. If return extrapolation drives a high scrip take-up rate when past returns are high, then this overreaction should be negatively related to future returns. Alternatively, suppose it is information advantage or learning from experience that causes shareholders to take more scrip dividends when past returns are high. In that case, the high scrip take-up should be positively related to the future returns.

We examine the return predictability of scrip take-up rate by using Fama–Macbeth forecasting regressions with a rolling window of 12 months updated quarterly. Specifically, at the end of each quarter, scrip dividends in the past 12 months are grouped. The dependent variable is R_{t+k}, the cumulative return from the beginning of month $t+1$ to the end of

Table 8
Scrip Dividend and Return Predictability

This table presents the results of Fama-Macbeth forecasting regressions with rolling window of 12 months updated quarterly. For each scrip dividend event of firm f with pay date in month t, the dependent variable is the cumulative monthly return beginning from month $t+1$ to $t+k$, for $k = 1, 3, 6, 9, 12, 24$. Scrip take-up rate is the fraction of outstanding shares that choose the scrip dividend option, i.e., to receive new shares instead of cash. R_{t-1} is the 1-month return during the month before the ex-dividend date. $Rmrf$ is the monthly UK market premium in month $t-1$. $Mktcap$ is the market capitalization in millions of pounds. B/M is the book to market ratio in month $t-1$. The robust standard errors are in parenthesis.

	(1)	(2)	(3)	(4)	(5)	(6)
Indep. Var:	R_{t+1}	R_{t+3}	R_{t+6}	R_{t+9}	R_{t+12}	R_{t+24}
Take-up	-0.051*	-0.047	-0.122***	-0.183***	-0.153***	-0.310***
	(0.031)	(0.039)	(0.029)	(0.044)	(0.049)	(0.097)
Rmrf	0.115	0.508*	0.487**	0.300	0.424	0.447
	(0.070)	(0.262)	(0.241)	(0.298)	(0.291)	(0.476)
Mktcap	0.003	-0.005	-0.001	-0.010	-0.004	-0.011
	(0.002)	(0.005)	(0.009)	(0.009)	(0.012)	(0.019)
B/M	0.000	-0.062	-0.082	-0.083	-0.145*	-0.275***
	(0.006)	(0.043)	(0.063)	(0.056)	(0.075)	(0.101)
D/P	0.130	0.012	1.342	1.571**	2.234**	5.160***
	(0.327)	(0.421)	(0.862)	(0.629)	(0.924)	(1.858)
E/P	0.080	0.724***	0.941*	1.363**	1.509**	3.241**
	(0.162)	(0.249)	(0.476)	(0.652)	(0.717)	(1.457)
Constant	-0.010	-0.022	-0.071	-0.106	-0.101	-0.240**
	(0.014)	(0.035)	(0.063)	(0.068)	(0.074)	(0.111)
N	2124	2124	2124	2124	2076	1972
R^2	0.315	0.402	0.374	0.402	0.418	0.434

month $t+k$ for $k = 1, 3, 6, 9, 12, 24$. To avoid using the period before the scrip election date, we set t as the month of the pay date instead of the ex-dividend date.

Table 8 reports the result. The table clearly shows that the scrip take-up rate predicts the forward stock returns with negative signs. The coefficients of scrip take-up rates are all negative and statistically significant at least at the 10% level, except for column (1). While the return predictability does not rise for the 3-month return, predictability exists for all other horizons, from 1 month up to 24 months. Specifically, a 1 percentage point increase in scrip take-up rate is associated with a 0.051 decrease in 1-month forward returns. The predictability becomes stronger as the horizon increases. For example, a 1 percentage point increase in scrip take-up rate is associated with a 0.122 decrease in 6-month forward returns, a 0.183 decrease in 9-month forward returns, a 0.153 decrease in 12-month forward returns, and a 0.310 decrease in 24-month forward returns. The statistical significance of all results are at the 1% level. Overall, the results in Table 8 indicate that a systematic bias exists in shareholders' decision to receive additional shares in lieu of cash dividends.

4.3 Robustness

Table 9
Past Returns and Scrip Dividend Take-Up Rate

This table reports the results of regressions of the scrip dividend take-up rate on past stock returns:

$$\textit{Take-up}_{f,t} = \alpha + \beta \cdot R_{f,t-1} + \gamma \cdot X_{f,t-1} + \varepsilon_{f,t}$$

where f indexes firms and t indexes time in months. Scrip take-up rate is the fraction of outstanding shares that choose the scrip dividend option, i.e., to receive new shares instead of cash. R_{t-1} is the 1-month return during the month before the ex-dividend date. $Rmrf$ is the monthly UK market premium in month $t-1$. $Mktcap$ is the market capitalization in millions of pounds. B/M is the book to market ratio in month $t-1$. *Default* is a dummy variable that equals to one if the default option of the scheme is to take scrip dividend. Standard errors are adjusted for clustering by year and firm.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$R_{f,t-1}$	0.171***	0.162***	0.147**	0.157***	0.199***	0.238***	0.203***	0.195***
	(0.039)	(0.038)	(0.060)	(0.042)	(0.040)	(0.053)	(0.040)	(0.060)
$R_{f,elect}$	0.418***	0.422***	0.465***	0.477***	0.417***	0.471***	0.453***	0.474***
	(0.057)	(0.070)	(0.049)	(0.057)	(0.049)	(0.059)	(0.046)	(0.062)
N	856	759	856	759	854	756	854	756
R^2	0.186	0.219	0.288	0.319	0.515	0.545	0.608	0.611
Controls		✓		✓		✓		✓
Year FEs			✓	✓			✓	✓
Firm FEs					✓	✓	✓	✓

In our previous results, we investigated the relationship between returns before ex-dividend date when the reference price is set and the scrip take-up rate to study extrapolative beliefs among investors. The reason is because returns after the reference price is set determine whether obtaining shares through scrip dividends is a discount or not. For example, if a reference price is set to be \$100 and returns between ex-dividend date and election date is 10%, then the price of a stock on election date is \$110. Thus, shareholders have a clear incentive to receive scrip dividends.

We study whether our previous finding still holds after controlling the returns between ex-dividend date to election date. Table 9 presents the results. In all specifications, coefficients for $R_{f,t-1}$ are positive and significant, suggesting that the positive relationship between past returns and scrip take-up rate is robust to the inclusion of returns between ex-dividend date and election date. While shareholders react to returns before the ex-dividend date, they also react to the obvious economic incentive to take scrip dividends. The positive and significant coefficients for $R_{f,elect}$ indicate that more shareholders receive scrip dividends when the stock price is higher than the reference price on election date.

5 Conclusion

Existing studies provide convincing evidence that investors have extrapolative beliefs. However, the problem of survey data is that it is difficult to study investor expectations on individual stocks. Expectations collected via survey are also loosely linked, if at all, to the economic incentive of respondents. To resolve this issue, we use novel data on scrip dividends to study how shareholders form expectations of future stock returns on their holdings. Scrip dividends provide shareholders options to receive additional shares instead of cash dividends. When there is no other economic incentives, shareholders choose to take scrip dividends if they expect stock prices to increase in the future. Therefore, shareholders' expectations of future returns are reflected in the scrip dividends, and their decisions to take scrip dividends are tightly linked to their future wealth.

Taking advantage of this institutional setting, we use the proportion of shareholders choosing to take scrip dividends as a proxy for shareholders' expectations. By doing so, we provide direct evidence that shareholders' expectations of the future returns of their holdings reflect extrapolative beliefs. In particular, we find that only recent past returns are positively associated with the proportion of shareholders to take scrip dividends. The relationship between past returns and scrip take-up rate is stronger when past returns are positive and more volatile. Next, using a nonlinear specification from Greenwood and Shleifer [2014], we find that shareholders of small and growth firms tend to be more reliant on past returns when deciding to take scrip dividends. At the same time, these shareholders also extrapolate both recent and distant past returns. On the other hand, shareholders of firms with low institutional ownership tend to extrapolate past returns more when deciding to take scrip dividends.

Finally, we investigate whether expectations reflected in shareholders' decisions to take scrip dividends are biased. In particular, we investigate the return predictability of the scrip take-up rate. If shareholders' expectations are biased, then we expect higher scrip take-up rates to be related to lower future returns. We find that a higher scrip take-up rate is associated with negative future returns even after controlling for various firm characteristics and market returns. Moreover, this return predictability persists from the subsequent 1-month returns to 24-month returns. Overall, our results indicate that extrapolative beliefs are prevalent even among shareholders, who are more likely to have an information advantage over general investors.

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