



Another January effect—Evidence from stock split announcements



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ABSTRACT

This paper examines whether there is a January effect in the propensity and abnormal returns of stock split announcements. It provides primary evidence in the investigation of using monthly effects to explain the patterns of stock splits. The results show that the January effect exists in the likelihood of the occurrence of share splits and in the associated short-term abnormal returns. We also find that another monthly effect—the Halloween effect—exists in stock split announcements. However, the January effect has a much larger and considerably more significant impact on the probability and returns of these announcements. The results of this paper shed light on why we observe patterns in the announcement of corporate events.

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1. Introduction

Market efficiency is the central theory of finance and is the foundation for the study of market reactions to corporate news events. Under the efficient market hypothesis (EMH), security prices fully incorporate all existing information in an unbiased fashion, and the values of assets only change when new public information is released (Fama, 1970). The EMH assumes that all investors behave rationally and that market friction is negligible or insignificant (Fama, 1970). In 1991, Fama further developed the EMH into three forms: the weak form, the semi-strong form, and the strong form. Under these forms, investors should not earn excess returns using technical analysis, fundamental analysis, or insider information. However, there are growing numbers of empirical studies that have identified anomalies in market behaviors after the 1970s, such as fundamental-related, technical-related, and calendar-related anomalies (De Bondt, 2002; Lakonishok, Shleifer, & Robert, 1994; Beladi, Chao, & Hu, 2016). These anomalies show patterns in stock returns that are not based on market information, which contradicts the EMH.

The January effect is one of the calendar-related anomalies. It states that firms have higher returns in January in comparison to the rest of the year. It is also known as the “turn-of-the-year effect,” which indicates that risk-adjusted security returns are significantly larger and more positive in January than in other months of the year. This effect has been

extensively documented and widely accepted in the equity market in the US and around the world (Bouman & Jacobsen, 2002; Dyl & Maberly, 1992; Jacobsen & Zhang, 2013). Nevertheless, there is an open question as to whether this effect is related to corporate practice. In particular, if the market follows the patterns and investors buy stocks in January, do companies tend to announce corporate events in the beginning of the year? Can firms benefit from the increasing demand in stocks during this period to raise abnormal returns through corporate announcements?

This paper focuses on the corporate events of stock splits to examine the timing patterns of these events in relation to the monthly pattern of the January effect. Stock splits are always of particular interest to academics and professionals because firms' share prices usually increase, but the underlying value of the company does not change after the announcement. Many researchers attempt to find plausible reasons for why corporations split their shares and why there is an increase in stock price and returns associated with the announcements. For instance, common explanations for share splits include the signaling hypothesis (see, Ikenberry, Rankine, & Stice, 1996), the optimal trading range hypothesis (Fernando, Krishnamurthy, & Spindt, 1999), and the broker promotion hypothesis (Angel, 1997; Schultz, 2000). These existing studies and hypotheses explain stock splits using firms' characteristics, but to the best of our knowledge, none of them has linked financial anomalies of monthly patterns to elucidate the timing and returns of stock split announcements. Because January is included in the period of the other monthly anomaly—the Halloween effect, which states that stock returns are higher in the Halloween period (November to April) than in May to

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Table 1

A detailed description of all variables.

This table provides the detail description of all variables that used in this research. The first column is variable abbreviations; the second column is variable descriptions; the third column is the data source, and the last column is the sample period of each variable in this study.

Variable abbreviations	Variable descriptions	Database	Sample period
Control variables			
LogSize	The natural logarithm of market capitalization 1 day before announcements	CRSP	1926–2012
LogPrice	The natural logarithm of closing stock price 1 day before announcements	CRSP	1926–2012
SplFac	Split factor/ratio, defined as the number of additional shares per existing share	CRSP	1926–2012
LogSales	The natural logarithm of total sales revenue	CRSP/Compustat	1950–2012
Ato	Asset turnover, calculated as sale revenue scaled by total assets	CRSP/Compustat	1950–2012
Roa	Return on assets, calculated as operating income before depreciation scaled by total assets	CRSP/Compustat	1950–2012
Bmratio	Book-to-market ratio, calculated by dividing the book value per share by the current stock price	CRSP/Compustat	1950–2012
RE_TE	Represents retained earnings scaled by the book value of common equity	CRSP/Compustat	1950–2012
RE_TA	Represents retained earnings scaled by the total assets	CRSP/Compustat	1950–2012
Jan	A dummy variable that takes a value of one for stock splits announced in January and a value of zero if announcements are in other months of a year.	CRSP	1926–2012
Hal	A dummy variable that takes a value of one for stock splits announced in the months of November to April and a value of zero if announcements are in the months of May to October.	CRSP	1926–2012

October—we also examine and control for the Halloween effect to further scrutinize the January effect in stock splits.

We use a prolonged sample period from 1926 to 2012 in the US market, and we find that firms are more likely to announce stock splits in January. The short-term abnormal returns of stock split announcements are statistically positively correlated to the January dummy. In particular, the short-run excess returns are much higher in January for small-size firms and surprise stock splits, which are splits occurring without similar announcements in the past two years. We also find that the Halloween effect impacts the likelihood of the occurrence and short-run abnormal returns of stock splits. However, the statistical and economic significance of the Halloween effect is considerably smaller than that of the January effect. The long-run abnormal returns of split announcements appear to be lower in November to April than in May to October, whereas they are relatively higher in January compared to other months of the year. These results suggest that firms prefer to split their shares during the Halloween period, particularly in January, in order to achieve substantially larger returns. This research provides initial evidence that firms choose to split shares due to a high trading demand in stocks in January, and the January effect significantly exists in stock split announcements.

This paper is organized as follows: [Section 1](#) is the introduction. [Section 2](#) describes the literature review and hypotheses. [Section 3](#)

illustrates the sample data we use in this research. [Section 4](#) discusses the empirical results, and [Section 5](#) concludes the remarks.

2. Literature review

2.1. The January effect

The January effect has been widely observed in the US equity markets and other international markets. [Rozeff and Kinney \(1976\)](#) first find a positive return of 3.5% for common stocks in January, which is greater than the average returns of 0.5% in other months. [Gultekin and Gultekin \(1983\)](#) discovered that the January effects in stock returns are not only pronounced in the US, but also around the world after they scrutinized 17 stock markets between 1959 and 1979 in major industrialized countries. Apart from stock markets, the January effect has been discovered in bond and other financial markets. [Maxwell \(1998\)](#) finds that the January effect is statistically significant for noninvestment-grade bonds; the degree of the effect increases when bond rating declines. This result is similar to those obtained by [Fama and French \(1993\)](#). Moreover, the January effect is evident in the returns of municipal bond closed-end funds ([Starks, Yong, & Zheng, 2006](#)), real estate investment trusts (REIT), common stocks, and the associated underlying assets ([Friday & Peterson, 1997](#)). These findings certainly

Table 2

Descriptive statistics of variables.

This table shows summary statistics of variables. Price is closing stock price 1 day before announcements. LogPrice is the natural logarithm of closing stock price 1 day before announcements. Size is market capitalization 1 day before announcement. LogSize is the natural logarithm of market capitalization 1 day before announcements. SplFac is split factor/ratio, defined as the number of additional shares per existing share. Sales is total revenue and LogSales is the natural logarithm of total sales revenue. Ato is asset turnover, calculated as sales revenue scaled by total assets. Roa is return on assets, calculated as operating income before depreciation scaled by total assets. Bmratio is book-to-market ratio, calculated by dividing the book value per share by the current stock price. RE_TE is retained earnings scaled by the book value of common equity. RE_TA is retained earnings scaled by the total assets. The first column is the number of observations; the second column is variable means; the third column is standard deviations; the fourth column is medians of variables; the fifth column is the minimum values and the last column is the maximum values of each variable in the research.

	N	Mean	Std dev	Median	Minimum	Maximum
Control variables						
Price	13,364	27.1428	16.9940	23.8750	0.7813	362.75
LogPrice	13,364	3.1545	0.5475	3.1728	−0.2469	5.8937
Size	13,364	2,700,546	13,969,863	2,700,546	318.50	521,259,882
LogSize	13,364	5.5668	0.7934	5.4985	2.8689	8.7171
SplFac	13,364	1.83268	0.6702	2.0000	1.0050	40.0000
Sales	13,364	1290.12	5525	1285.35	0.0000	175,110
LogSales	13,364	5.3114	1.6912	5.4425	−0.3613	12.0756
Ato	13,364	1.4000	0.9415	1.2800	0.0000	15.2754
Roa	13,364	0.1812	0.0915	0.1714	−0.6837	0.7275
Bmratio	13,364	0.5055	0.5166	0.3540	−1.9104	10.2947
Retained earnings	13,143	394.5205	1878.00	42.4000	0.0000	52,890
RE_TE	12,821	0.2917	0.1810	0.2751	0.0000	1.4046
RE_TA	12,812	0.0054	0.4602	0.0304	0.0000	2.4738

Table 3

Correlation matrix between variables.

Variable	Splfac	LogPrice	LogSize	LogSales	Ato	Roa	Bmratio	RE_TE	RE_TA	Jan	Hal
Splfac	1										
LogPrice	0.11***	1									
LogSize	0.15***	0.68***	1								
LogSales	0.12***	0.52***	0.80***	1							
Ato	0.09***	−0.12***	−0.20***	0.11***	1						
Roa	0.15***	0.26***	0.17***	0.03***	0.17***	1					
Bmratio	−0.07**	−0.52***	−0.47***	−0.17***	0.06***	−0.32***	1				
RE_TE	0.02**	0.00	−0.06***	0.08***	−0.01	−0.02**	0.05***	1			
RE_TA	0.03**	0.25***	0.15***	0.07***	0.13***	0.47***	−0.14***	0.03***	1		
Jan	−0.01	0.01*	−0.01	−0.01	0.01	−0.01	0.01	0.00	0.01	1	
Hal	−0.04***	−0.01	−0.25***	0.05***	0.00	0.02**	−0.01	0.01	−0.00	0.30***	1

* Denotes statistical significance at the 10% significant level.

** Denotes statistical significance at the 5% significant level.

*** Denotes statistical significance at the 1% significant level.

have shown January seasonality in many areas, but whether it can be translated into corporate practice is still uncertain.

The January effect usually occurs with another financial anomaly: size effects. [Banz \(1981\)](#) report that January anomalies are more pronounced and generally larger for smaller-size firms than larger-size ones. This result is also confirmed by [Dyl and Maberly \(1992\)](#), and [Friday and Peterson \(1997\)](#) in which the January seasonal pattern naturally corresponds to market capitalizations. In addition, [Lamoureux and Sanger \(1989\)](#) investigate the size and turn-of-the-year effects for the US stocks traded via the NASDAQ and “over the counter” (OTC) markets in the period of 1973 to 1985. Similar to the outcomes of the studies that only examined listed publicly traded stocks on major organized exchanges, they report that small firms outperform large firms in January for non-listed publicly traded stocks in the OTC market. The total, systematic, and residual risks are significantly higher for small firms in the beginning of the year. To compensate for the higher risk, higher returns are required for small-size firms in January ([Semenov, 2015](#)). The author also finds the small-cap effect in the predictability of individual stock returns.

There are several other explanations for the January effect in the literature. The most well-known one is the tax-loss selling hypothesis, which assumes that investors sell their common stock “losers” to realize capital losses in order to reduce tax liability at the end of the year, then buy stocks to re-establish their portfolio in the beginning of the year. This generates a downward pressure on stock prices to decrease in December and increase in January ([Reinganum, 1983](#)). The author

argues that usable tax losses are more likely to occur in small-firm stocks because returns in smaller firms are more volatile than those in larger firms. Hence, smaller firms have a higher tendency to be candidates for tax-loss selling. [Givoly and Ovadia \(1983\)](#) also report a larger amount of sales in stocks with the tax-loss deduction purpose in December and higher abnormal returns in January from 1945 to 1979 in the US. The tax-loss sales happen in firms of all sizes, but the effect of tax sales is more pronounced for those of smaller size.

Moreover, the January effect may be due to the institutional investor window dressing hypothesis. Basically, they argue that portfolio managers tend to sell stocks when prices have declined during the year to avoid holding poorly performing stocks at year-end; they then reallocate funds at risk in a new year. In practice, bond portfolio managers, pension fund managers, and insurance companies often follow this strategy to sell their lower-quality issues in December to increase the average value and quality of their portfolios ([Maxwell, 1998](#)). [Ng and Wang \(2004\)](#) use a sample period from the first quarter of 1986 to the first quarter of 1999 to examine the turn-of-the-year effect for small stocks in relation to institutional trading strategy. They find that the year-end selling behavior is driven by window dressing and risk shifting activities. Institutional investors sell more poorly performing small stocks in the last quarter of the year, but they buy more losing and winning small stocks in the next quarter, which explains the observed January effect in the excess returns for winning stocks. [Ritter and Chopra \(1989\)](#) use valued-weighted rather than equal-weighted portfolios to examine market returns in the period of 1935 to 1986. They

Table 4

Number of stock splits from 1926 to 2012.

Panel A of this table shows the number of stock split announcements in each month from 1926 to 2012. Panel B of this table shows the number of stock splits between May–October and November–April from 1926 to 2012. Stock splits are identified from the Centre of Research in Security Prices (CRSP) files, using distribution codes 5523, 5543 and 5552 when the factor to adjust price is greater than 0, and code 5533 when distribution is greater than or equal to 25%.

Panel A: number of stock splits each month													
Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1926–1960	67	42	168	92	53	149	69	45	133	77	33	167	1095
1961–1975	267	298	207	186	205	155	133	110	156	176	210	183	2286
1976–1995	761	902	713	1089	1103	738	723	766	618	742	691	636	9482
1996–2012	387	410	513	454	608	728	487	403	385	321	296	473	5465
Total	1482	1652	1601	1821	1969	1770	1412	1324	1292	1316	1230	1459	18,328

Panel B: number of stock splits between November–April and May–October				
Number of stock splits	Nov–Apr	May–Oct	Difference	Total
Years				
1926–1960	569	526	43	1095
1961–1975	1351	935	416	2286
1976–1995	4792	4690	102	9482
1996–2012	2533	2932	399	5465
Total	9245	9083	960	18,328

Table 5

Logistic regressions for the likelihood of stock splits in relation to the January effect from 1960 to 2012.

This table shows the likelihood of stock split announcements related to the January and Halloween effects from 1960 to 2012. The dependent variable is a binary variable that contains a value of one if a firm announces a stock split in the month; otherwise, zero. *Jan* is a dummy variable that takes a value of one for stock splits announced in January and a value of zero if announcements are in other months of a year. *Hal* is another dummy variable that takes a value of one for stock splits announced in the months of November to April and a value of zero if announcements are in the months of May to October. *HalnoJan* is the dummy variable to separate the January effect from the Halloween effect, which takes a value of one for stock splits announced in the months of November to April, except January and a value of zero if the announcements are in the months of May to October. *LogPrice* is the natural logarithm of closing stock price 1 day before announcements. *LogSize* is the natural logarithm of market capitalization 1 day before announcements. *Bmratio* is book-to-market ratio, calculated by dividing the book value per share by the current stock price. *ATO* is asset turnover, calculated as sales revenue scaled by total assets. *ROA* is return on assets, calculated as operating income before depreciation scaled by total assets. *LogSales* is the natural logarithm of total sales revenue. *RE_TE* is retained earnings scaled by the book value of common equity. *RE_TA* is retained earnings scaled by the total assets. The first three columns of the results are for the full sample of stock split announcements. The next three columns are the results of stock split announcements for small sized firms. For the sample of small sized firms, we rank the size of all the firms from small to large in the whole sample, then take the first quintile. The last three columns of the results are for surprised stock splits, which are identified as stock splits that had not happened in the last two years. *p-values* are in parentheses under each parameter.

	Full sample			Stock splits in small size firms			Surprised stock splits		
Intercept	−2.4174 ($<.0001$)***	−2.4353 ($<.0001$)***	−2.2370 ($<.0001$)***	−2.8071 ($<.0001$)***	−2.7908 ($<.0001$)***	−2.8112 ($<.0001$)***	−2.2205 ($<.0001$)***	−2.1987 ($<.0001$)***	−2.1895 ($<.0001$)***
Jan	0.0955 (0.0018)***	0.0825 (0.0311)**	0.1166 (0.0002)***	1.5501 (0.0001)***	0.1325 (0.0012)***	1.6571 (0.0003)***	0.0987 (0.0001)***	0.0896 (0.0058)***	0.1002 (0.0014)***
Hal		0.0572 (0.0011)***			0.0754 (0.0003)***			0.0421 (0.0001)***	
HalnoJan			0.0453 (0.0135)**			0.0376 (0.0122)**			0.0297 (0.0021)***
LogSize	−0.4583 (0.0981)*	−0.4639 (0.0893)*	−0.4592 (0.0943)*	−0.4171 (0.0001)***	−0.4164 (0.0001)***	−0.4187 (0.0001)***	−0.4201 (0.0001)***	−0.4179 (0.0001)***	−0.4234 (0.0001)***
LogPrice	1.3387 ($<.0001$)***	1.3384 ($<.0001$)***	1.3386 ($<.0001$)***	1.1739 (0.0001)***	1.1814 (0.0001)***	1.1798 (0.0001)***	1.5401 (0.0001)***	1.5397 (0.0001)***	1.5477 (0.0001)***
Bmratio	−1.0374 (0.0001)***	−1.0390 (0.0004)***	−1.0388 (0.0003)***	−0.1037 (0.0443)**	−0.1039 (0.0449)**	−0.1042 (0.0452)**	−0.1233 (0.0453)**	−0.1245 (0.0476)**	−0.1279 (0.0469)**
ROA	3.7095 (0.4087)	3.6903 (0.4102)	3.7120 (0.4134)	3.5724 (0.0001)***	3.5801 (0.0001)***	3.5789 (0.0001)***	3.6683 (0.0001)***	3.6579 (0.0001)***	3.6605 (0.0001)***
ATO	0.1307 (0.5342)	0.1401 (0.5520)	0.1397 (0.5437)	0.0551 (0.0466)**	0.0567 (0.0449)**	0.0559 (0.0456)**	0.0037 (0.0987)*	0.0039 (0.0994)*	0.0045 (0.0886)*
Logsale	−0.0281 (0.0235)**	−0.0279 (0.0241)**	−0.0284 (0.0238)**	−0.0467 (0.9037)	−0.0463 (0.8995)	−0.0470 (0.9023)	−0.0372 (0.5674)	−0.0386 (0.5782)	−0.0375 (0.5804)
RE_TE	−0.8244 (0.0915)*	−0.8189 (0.0899)*	−0.8202 (0.0903)*	−0.4239 (0.0100)**	−0.4255 (0.0007)***	−0.4298 (0.0003)***	−0.2138 (0.0176)**	−0.2199 (0.0187)**	−0.2205 (0.0193)**
RE_TA	−1.1798 (0.0001)***	−1.1812 (0.0001)***	−1.1820 (0.0001)***	−2.6501 (0.0001)***	−2.6498 (0.0001)***	−2.6521 (0.0001)***	−2.7651 (0.0001)***	−2.7704 (0.0001)***	−2.7695 (0.0001)***
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* Denotes statistical significance at the 10% significant level.

** Denotes statistical significance at the 5% significant level.

*** Denotes statistical significance at the 1% significant level.

find that market returns are only positive in January for small firms, and the positive effect is greater when the beta is higher. They argue that the results are consistent with the window dressing or portfolio rebalancing hypothesis because institutional investors sell losing stocks in December and reinvest in risky small stocks in January. Hence, small firms with high beta outperform small firms with low beta in the first month of the new trading year. He, Ng, and Wang (2004) also agree with this hypothesis to explain the January effect and document that institution investors' incentives to window dress their portfolios are high at the turn of the year.

Alternatively, the January effect can be explained by the seasonal information release hypothesis. Rozeff and Kinney (1976) report that January is the month in which firms release large amounts of accounting information—such as earning performance—for the previous fiscal year. This information release encourages investors to react or overreact (De Bondt & Thaler, 1985) to the information to trade in January. This is especially true for small firms because they are usually considered information poor. Furthermore, Dyl and Maberly (1992) indicate that the January effect may simply be due to the parking-the-proceeds hypothesis, which states that investors “park” their reinvestment proceeds or start to reinvest after the New Year holiday. Kramer (1994) also reports that the January effect is correlated to the business cycle and real interest rate. Although the January effect has been widely explored, it has not been considered in the timing and returns of corporate events, particularly stock splits.

The Halloween effect is another common monthly anomaly, which is reported by Bouman and Jacobsen (2002). Using 37 stock markets, they find that 36 countries have higher risk-adjusted returns during the

Halloween period (November to April) than during the other half of the year (May to October). They report that the Halloween effect mainly exists in European markets, and the degree of the effect is positively correlated to the length and timing of summer holidays. The effect is bigger and stronger in the countries that have longer summer holidays or stronger summer vacation traditions.

However, Kamstra, Kramer, and Levi (2003) argue that the Halloween effect is caused by seasonal affective disorder (SAD), which is attributable to a reduction of day length in winter, making investors become depressed and reducing market activity. Similarly, Cao and Wei (2005) claim that temperature changes investor behavior; higher temperature leads to more aggressive trading in summer than in winter. Also, Hirshleifer and Shumway (2003) propose sunshine effects account for the occurrence of the Halloween effect. Although there are some debates on the reasons for this seasonal phenomenon in psychological studies, Jacobsen and Marquering (2008) further reiterate that the Halloween effect is a tenet of market wisdom that has been found to exist widely. Hence, we include and control for this effect to examine the January effect in stock split announcements.

2.2. Market reaction to stock split announcements

Stock splits are of particular interest to academics and professionals due to their non-capitalizing nature, whereby the share price generally increases after the announcements in the market, but the total book value of a firm remains the same. The market reaction to stock split announcements is usually positive in the short run. Lamoureux and Poon (1987) use the US listed firms for the period of 1962 to 1985 and find

that there are statistically positive excess abnormal returns of 0.4% six days after split announcements. In addition, Ikenberry, Rankine and Stice (1996) show 3.38% positive abnormal returns between 1975 and 1990. They further regress five-day ($-2, +2$) abnormal returns for the 2-for-1 split on firm size, post-split price, and book-to-market ratio (B/M) and report statistically negative coefficients of these independent variables. This means that smaller firms and glamour stocks (low B/M) experience higher abnormal returns from split announcements than larger firms and value stocks (high B/M). Moreover, split announcements not only generate significant and positive abnormal returns for splitting firms but also for non-splitting firms in the same industry. Tawatnuntachai and D'Mello (2002) examine short-term market reactions to stock splits from 1986 to 1995 and find a 3.82% significantly positive return for event firms five days ($-2, +2$) within the splits and a 0.34% significantly positive return for non-event firms in the same industry. These results are consistent with Chang, Hsu and McAleer (2013) and Lee, Chen and Chang (2013) results. Liu, Uchida, and Yang (2014) also find that share splits normally concurrently happen with cash dividend changes for Chinese listed firms, and the cash dividend policy is significantly related to ownership structure (Bradford, Chen, & Zhu, 2013) and political connections (Su, Fung, Huang, & Shen, 2014).

In the long run, Fama (1970) finds no statistically or economically long-term abnormal returns following stock splits from 1927 to 1959. Lakonishok and Lev (1987) report a similar result that there were no long-run excess returns of stock splits for the period of 1963 to 1982. In contrast, Ikenberry, Rankine, and Stice (1996) show a significantly positive long-run price drift one year and three years after stock split announcements. They focus on 2-for-1 splits between 1975 and 1990 and use the equal-weighted buy-and-holder portfolio method to calculate post-split abnormal returns. The portfolios are rebalanced at the end of each year, and the matching portfolios are formed based on the size/book-to-market/momentum criteria. They find a 19.11% average return for splitting firms and an 11.18% average return for non-splitting firms one year after split announcements. The excess returns of 7.93% are statistically significant at any significance level. Likewise, they find a 12.15% excess return three years after stock splits, and the abnormal returns are higher in smaller-size firms than in larger-size firms. Ikenberry and Ramnath (2002) claim that the market underreacts to stock split announcements; they also find an upward price drift of 9% in the long run.

Nevertheless, Fama (1998) argues that the reason why stock splits have an effect on equity price in the long term is due to errors in the selection of the methodology and market index. To reduce or minimize bias, more recent studies recommend the monthly rebalanced calendar time abnormal return (CTAR) method (Byun & Rozeff, 2003). Byun and Rozeff (2003) report that the one-year long-term abnormal returns of stock splits are reduced to 1.68% for 2-for-1 splits and 1.21% for all splits with the equal-weighted three-factor Fama and French (1993) CTAR model. Using the equal-weighted four-factor Carhart (1997) CTAR model, abnormal returns are only 0.6% for all ratios of splits. With the value-weighted four-factor CTAR model (Carhart, 1997), the 2-for-1 splits have 0.84% excess returns, and all splits have 0.48% excess returns one year following the announcements. These results suggest that the significant long-run price drift of stock split announcements is not robust across models, and there is a debate concerning the market efficiency of these announcements.

According to the literature, if the market demand and stock prices are high in January, and firms and investors want to achieve high returns, companies should split their shares more in January than in other months of the year, and the associated abnormal returns of stock splits should be higher in January. Therefore, we formulate the hypotheses as follows:

H1. There are more stock splits in January, and the likelihood of stock splits is positively correlated to the *January* dummy.

H2. Abnormal returns generated from stock split announcements are higher in January than in other months of the year, and these returns are positively correlated to the *January* dummy.

3. Data

3.1. The sample

The sample of stock split announcements is from the Centre for Research in Security Prices (CRSP). We identify stock splits if the stock has distribution codes of 5523, 5543, and 5552 with split factors greater than zero, as well as distribution codes of 5533 with distributions greater than or equal to 25%. We do not include reverse stock splits with split factors less than zero or small stock dividends with stock distributions less than 25%. However, we include large stock dividends with distributions between 25% and 100%. The selection method is consistent with the previous studies of stock splits announcements (i.e., Byun & Rozeff, 2003; Fama, 1998). The sample period of this research is from 1926 to 2012, and it only considers ordinary common shares listed on the US market. Therefore, American depositary receipts (ADRs), real estate investment trusts (REITs), closed-end funds, various ownership units, and shares of companies incorporated outside the US are excluded from the sample. Other control variables and accounting data are extracted from the CRSP/Compustat Merged Database. Table 1 illustrates the details of each variable in terms of variable abbreviations and descriptions, databases, and the sample period used in this research.

3.2. Descriptive statistics

Summary statistics of the variables are exhibited in Table 2, and the correlation matrix between the variables is presented in Table 3. According to the results, the mean of the stock prices of our sample having stock split announcements is \$27.14 with a median of \$23.88. The average split factor is 1.83, and the median of the share split ratio is 2 for 1. The means of asset turnover, return on assets, and book-to-market ratio are 1.4, 0.18, and 0.5, respectively. The retained earnings scaled by book value of common equity is substantially larger than the retained earnings scaled by the total assets of the sample firms. Most of the variables are not highly correlated to each other, indicating that there are no perfect multicollinearity problems in the regressions. Therefore, ordinary least square (OLS) estimates are valid to provide unbiased estimates of the effects of the independent variables in the regressions.

4. Empirical results

4.1. Frequency of stock split announcements

In this section, we begin to discuss empirical results in relation to our hypotheses. To investigate whether the January effect translates into the stock split area, an analysis is made of the frequency of stock splits, the likelihood of stock splits, and the abnormal returns of stock splits, particularly in January compared to other months of the year. The number of stock split announcements each month is shown in Panel A of Table 4. The table shows that the number of splits per month over the period of 1926 to 2012 ranges from 1292 to 1969. May is the month having the most stock splits, and September is the month having the least. The month of January lies in the mid-range in terms of the frequency of stock splits. Panel B compares the frequency of the announcements between the Halloween period—November to April (Nov–Apr)—and May to October (May–Oct). The results show a higher number of splits in Nov–Apr (9245) than in May–Oct (9083) from 1926 to 2012. The sub-period analysis basically confirms the findings in the overall sample.

Table 6

Short-run excess returns of stock split announcements in each month from 1926 to 2012.

This table calculates excess returns for the firms announcing stock splits in each month from 1926 to 2012. Panel A reports the short-run excess returns of all stock split announcements. Panel B reports the short-run excess returns of stock splits for small sized firms. We rank the size of all the firms from small to large in the whole sample, then take the first quintile to get the sample of small sized firms. Panel C reports the short-run excess returns of surprised stock splits, which are identified as stock splits that had not happened in the last two years. Panel D reports the short-run excess returns of stock splits that are announced without cash dividend announcements in the same month. The abnormal returns are calculated using market model adjusted returns that are measured by $AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i \times R_{mt}$ with value-weighted market indexes. Estimator $\hat{\alpha}_i$ and $\hat{\beta}_i$ are estimated from the Market Model of $R_{it} = \alpha_i + \beta_i \times R_{mt} + \varepsilon_i$ with estimation period of 255 trading days. Short term event windows are examined one day surrounding an announcement date, one week after an announcement date, two weeks, one month, two months, three months and six months after an announcement date (0 represents the actual announcement day). All returns are in percentage with t -statistics underneath.

Event window results	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Panel A: Short-run excess returns of all stock split announcements in each month from 1926 to 2012</i>												
(−30, −2)	2.96 [6.30]***	4.82 [10.55]***	4.48 [9.86]***	3.08 [7.73]***	3.51 [9.57]***	3.14 [6.64]***	2.76 [6.49]***	1.70 [4.82]***	2.03 [3.97]***	2.12 [5.65]***	1.59 [3.50]***	2.77 [7.99]***
(−1, +1)	3.22 [19.45]***	2.83 [20.38]***	2.41 [16.18]***	2.43 [17.90]***	2.82 [21.10]***	2.82 [9.87]***	2.57 [16.05]***	2.43 [17.00]***	2.59 [15.66]***	2.70 [16.15]***	2.61 [15.08]***	2.30 [13.21]***
(−1, 0)	1.91 [15.50]***	1.72 [15.50]***	1.47 [12.41]***	1.49 [14.05]***	1.79 [16.87]***	1.59 [12.70]***	1.53 [14.44]***	1.38 [12.90]***	1.51 [11.66]***	1.76 [13.08]***	1.56 [12.03]***	1.37 [9.14]***
(0, +1)	2.86 [19.44]***	2.49 [20.31]***	2.30 [17.19]***	2.18 [18.86]***	2.53 [21.32]***	2.59 [9.48]***	2.39 [15.97]***	2.38 [18.01]***	2.38 [14.85]***	2.33 [15.61]***	2.49 [15.70]***	2.15 [13.70]***
1 week	1.40 [7.87]***	1.38 [7.88]***	1.05 [7.18]***	1.30 [8.30]***	1.17 [9.02]***	1.42 [5.47]***	0.85 [6.06]***	1.40 [7.68]***	1.17 [5.99]***	0.77 [4.65]***	1.77 [8.27]***	1.39 [7.10]***
2 weeks	0.68 [3.46]***	0.65 [3.50]***	−0.16 [−3.35]***	0.16 [1.27]	0.52 [4.24]***	0.61 [2.86]***	−0.12 [1.57]	0.63 [3.28]***	0.38 [2.70]***	−0.14 [−0.74]	1.20 [4.50]***	0.90 [3.34]***
1 month	0.92 [2.43]**	−0.65 [−0.18]	−1.32 [−1.81]*	−0.61 [−0.72]	−0.49 [−0.51]	−1.19 [−0.54]	−1.34 [−1.90]*	−0.15 [−1.15]	−1.20 [−1.46]	−1.13 [−0.57]	0.74 [2.32]**	0.55 [1.58]
2 months	−3.97 [−2.81]***	−3.63 [−4.14]***	−4.68 [−1.54]	−3.20 [−5.07]***	−5.37 [−7.97]***	−7.08 [−8.32]***	−4.62 [−5.67]***	−4.63 [−5.11]***	−4.77 [−4.06]***	−2.63 [−1.90]*	−1.58 [−0.54]	−2.24 [−2.08]**
3 months	−8.49 [−7.50]***	−7.23 [−6.80]***	−9.50 [−4.41]***	−7.87 [−10.92]***	−10.16 [−13.36]***	−12.34 [−12.30]***	−9.24 [−9.23]***	−8.99 [−8.27]***	−7.31 [−5.53]***	−6.24 [−4.72]***	−6.00 [−4.14]***	−6.11 [−4.81]***
6 months	−23.86 [15.93]***	−21.18 [−15.46]***	−26.65 [−13.15]***	−18.29 [−18.31]***	−23.27 [−18.56]***	−23.95 [−14.64]***	−19.85 [−13.25]***	−19.88 [−12.71]***	−19.64 [−10.68]***	−19.59 [−11.84]***	−21.44 [−12.24]***	−20.60 [−12.00]***
<i>Panel B: Short-run excess returns of stock split announcements for small sized firms in each month from 1926 to 2012</i>												
(−30, −2)	4.50 [7.13]***	4.90 [11.25]***	4.70 [10.21]***	5.00 [7.88]***	4.40 [10.34]***	4.79 [7.15]***	3.98 [7.26]***	3.87 [5.25]***	3.91 [4.11]***	3.86 [6.25]***	4.07 [4.52]***	3.57 [8.26]***
(−1, +1)	4.97 [21.45]***	3.59 [22.14]***	3.99 [17.25]***	4.00 [18.26]***	4.36 [22.15]***	4.15 [10.14]***	4.01 [17.43]***	2.98 [17.72]***	2.59 [16.36]***	4.14 [13.64]***	4.21 [16.26]***	3.89 [15.26]***
(−1, 0)	4.36 [17.36]***	3.21 [15.67]***	1.94 [13.25]***	4.01 [15.36]***	3.42 [18.79]***	3.08 [13.12]***	3.11 [15.26]***	2.89 [12.53]***	3.05 [13.25]***	3.26 [15.36]***	3.29 [14.26]***	1.94 [9.92]***
(0, +1)	4.38 [22.14]***	2.99 [21.24]***	3.87 [18.25]***	3.89 [19.52]***	4.02 [22.34]***	4.11 [11.03]***	3.85 [17.82]***	3.88 [19.63]***	4.10 [15.26]***	3.89 [16.26]***	4.02 [18.26]***	3.56 [15.26]***
1 week	5.14 [8.46]***	4.22 [9.45]***	3.78 [8.25]***	4.21 [9.35]***	4.01 [10.84]***	3.97 [6.43]***	2.98 [7.55]***	3.35 [8.92]***	4.03 [6.26]***	3.74 [4.89]***	4.29 [9.02]***	4.59 [8.26]***
2 weeks	4.31 [4.25]***	3.43 [4.25]***	2.19 [4.25]***	1.43 [1.62]	2.01 [5.25]***	3.24 [3.56]***	2.41 [1.64]	3.02 [4.66]***	2.84 [4.26]***	1.93 [0.89]	3.68 [5.25]***	3.56 [4.26]***
1 month	2.93 [3.52]**	1.43 [0.25]	1.52 [1.96]**	1.31 [0.89]	1.38 [0.79]	1.28 [0.84]	1.29 [1.98]**	1.10 [1.32]	1.78 [2.42]**	1.28 [1.43]	2.35 [3.45]**	2.74 [3.42]
2 months	0.31 [0.81]	−1.13 [−5.25]***	−1.96 [−1.47]	−0.89 [−5.72]***	−2.10 [−5.67]***	−4.61 [−6.23]***	−1.67 [−6.36]***	−1.74 [−5.83]***	−1.59 [−5.26]***	−0.98 [−1.97]**	−0.02 [−0.76]	−0.25 [−2.78]***
3 months	−4.70 [−3.54]***	−4.37 [−7.52]***	−5.72 [−5.26]***	−3.89 [−12.62]***	−6.22 [−12.19]**	−8.36 [−0.25]***	−5.77 [−8.46]***	−4.59 [−7.25]***	−4.05 [−5.92]***	−2.84 [−5.26]***	−3.86 [−5.39]***	−2.85 [−5.36]***
6 months	−15.69 [17.36]***	−17.56 [−13.26]***	−18.97 [−11.24]***	−17.64 [−19.22]***	−18.52 [−19.57]***	−16.79 [−12.35]***	−16.01 [−12.15]***	−15.99 [−11.45]***	−16.27 [−9.56]***	−16.13 [−12.46]***	−15.40 [−14.57]***	−15.43 [−12.78]***

Panel C: Short-run excess returns of surprised stock split announcements in each month from 1926 to 2012

(−30,−2)	3.45	5.62	5.52	4.44	4.63	4.79	3.99	2.31	3.79	3.87	2.76	3.92
	[1.35]	[0.96]	[0.89]	[0.78]	[1.35]	[1.45]	[1.50]	[0.89]	[0.79]	[1.43]	[1.54]	[0.98]
(−1,+1)	4.78	4.11	3.97	3.66	3.91	4.00	3.99	3.78	4.01	3.94	4.02	3.96
	[20.53]***	[21.25]***	[17.36]***	[18.12]***	[19.54]***	[10.22]***	[16.52]***	[18.36]***	[14.25]***	[18.26]***	[19.35]***	[16.26]***
(−1,0)	3.32	3.00	2.79	2.88	3.04	2.78	2.97	2.79	3.00	2.98	2.79	2.65
	[16.26]***	[15.67]***	[13.57]***	[15.05]***	[18.01]***	[13.25]***	[13.25]***	[11.45]***	[12.41]***	[15.16]***	[14.26]***	[10.54]***
(0,+1)	4.27	4.00	3.92	3.94	4.01	4.04	3.84	3.90	3.87	3.78	3.83	3.65
	[22.31]***	[22.35]***	[19.25]***	[19.54]***	[20.11]***	[10.54]***	[16.25]***	[20.51]***	[11.53]***	[19.64]***	[17.65]***	[12.55]***
1 week	3.42	3.16	2.97	2.88	2.76	2.64	1.46	2.81	2.75	2.92	3.05	2.86
	[8.43]***	[8.24]***	[8.26]***	[9.25]***	[10.43]***	[6.45]***	[6.42]***	[8.25]***	[6.02]***	[6.26]***	[9.25]***	[8.64]***
2 weeks	2.04	1.86	0.78	0.99	1.44	1.87	0.06	1.72	1.56	0.07	1.94	1.89
	[4.25]***	[4.51]***	[4.36]***	[1.34]	[5.24]***	[3.25]***	[1.98]**	[5.25]***	[2.99]***	[0.89]	[5.26]***	[3.96]***
1 month	1.88	0.98	0.92	0.57	0.82	0.74	−0.59	0.38	0.09	−0.87	1.59	1.69
	[3.25]**	[0.25]	[2.78]***	[−0.99]	[0.65]	[0.95]	[−1.93]*	[1.76]*	[1.69]*	[−0.73]	[3.52]**	[3.00]***
2 months	−1.15	−1.64	−2.86	−1.87	−2.95	−4.76	−3.98	−1.96	−2.68	−1.32	−1.66	−1.24
	[−1.43]***	[−5.15]***	[−1.64]*	[−6.25]***	[−6.92]***	[−7.25]***	[−6.36]***	[−5.62]***	[−6.35]***	[−3.01]***	[−0.55]	[−1.95]**
3 months	−5.31	−5.34	−6.70	−5.45	−7.82	−8.55	−7.90	−6.13	−5.48	−5.40	−4.95	−4.79
	[−5.65]***	[−7.36]***	[−4.36]***	[−11.21]***	[−12.18]**	[−11.54]***	[−10.43]***	[−9.25]***	[−6.70]***	[−3.98]***	[−3.67]***	[−5.55]***
6 months	−17.89	−18.01	−21.22	−17.97	−18.95	−19.57	−18.02	−17.90	−17.24	−17.58	−17.96	−16.74
	[−12.53]***	[−16.72]***	[−11.25]***	[−19.56]***	[−19.25]***	[−15.65]***	[−12.11]***	[−13.25]***	[−11.35]***	[−13.26]***	[−12.65]***	[−10.52]***

Panel D: Short-run excess returns of stock split announcements without cash dividends in each month from 1926 to 2012

(−30,−2)	2.43	4.06	4.32	2.76	3.03	2.65	2.43	1.19	1.65	1.85	1.12	2.23
	[7.25]***	[12.15]***	[9.14]***	[8.15]***	[9.99]***	[6.92]***	[7.33]***	[5.24]***	[4.33]***	[6.16]***	[5.35]***	[7.11]***
(−1,+1)	3.10	2.53	2.25	2.18	2.65	2.61	2.43	2.26	2.42	2.54	2.43	2.06
	[21.35]***	[21.54]***	[15.36]***	[18.54]***	[23.14]***	[10.43]***	[14.25]***	[18.15]***	[15.25]***	[17.25]***	[17.26]***	[12.11]***
(−1,0)	1.77	1.54	1.31	1.30	1.54	1.44	1.40	1.17	1.36	1.43	1.37	1.15
	[16.75]***	[16.26]***	[11.53]***	[16.25]***	[18.84]***	[11.54]***	[11.54]***	[13.10]***	[15.25]***	[12.64]***	[14.26]***	[8.53]***
(0,+1)	2.40	1.98	1.85	1.76	2.05	2.17	1.95	1.99	1.99	1.92	2.02	1.76
	[21.43]***	[22.54]***	[16.94]***	[19.42]***	[22.10]***	[10.54]***	[16.01]***	[19.25]***	[16.26]***	[14.26]***	[17.25]***	[13.26]***
1 week	1.12	1.03	0.78	1.09	0.83	1.07	0.56	1.04	0.88	0.59	0.89	1.00
	[8.14]***	[8.25]***	[8.25]***	[8.87]***	[9.87]***	[6.54]***	[6.82]***	[8.25]***	[6.71]***	[4.67]***	[9.62]***	[8.92]***
2 weeks	0.87	0.76	0.09	0.07	0.37	0.47	−0.01	0.52	0.19	0.09	0.81	0.66
	[4.25]***	[4.25]***	[4.25]***	[1.21]	[5.47]***	[3.25]***	[−1.72]*	[5.25]***	[3.16]***	[0.89]	[6.27]***	[4.26]***
1 month	0.68	0.59	−1.36	−0.89	−0.85	−1.32	−1.56	−0.33	−1.42	−1.52	0.48	0.39
	[3.27]**	[0.63]	[−2.15]**	[−1.20]	[−0.95]	[−0.73]	[−1.96]**	[1.55]	[−1.96]**	[−1.09]	[3.64]**	[1.78]*
2 months	−4.00	−4.55	−5.16	−4.23	−6.29	−8.00	−5.64	−5.79	−6.03	−4.07	−3.98	−4.65
	[−1.91]***	[−5.26]***	[−1.61]	[−5.88]***	[−6.73]***	[−7.66]***	[−6.25]***	[−6.21]***	[−3.69]***	[−2.22]**	[−0.98]	[−3.88]***
3 months	−8.03	−8.97	−10.03	−9.03	−11.65	−14.57	−11.66	−9.97	−9.03	−8.75	−8.32	−8.71
	[−6.72]***	[−7.26]***	[5.61]***	[−12.14]***	[−12.19]**	[−12.67]***	[−9.96]***	[−9.25]***	[−4.93]***	[−5.20]***	[−3.56]***	[−5.16]***
6 months	−25.00	−23.11	−27.09	−21.17	−26.10	−25.87	−23.00	−23.41	−22.39	−24.50	−23.71	−24.98
	[−11.59]***	[−16.26]***	[−11.54]***	[−19.43]***	[−19.53]***	[−15.79]***	[−11.25]***	[−13.11]***	[−8.98]***	[−14.34]***	[−10.26]***	[−10.25]***

* Denotes statistical significance at the 10% significant level.

** Denotes statistical significance at the 5% significant level.

*** Denotes statistical significance at the 1% significant level.

Table 7

Short-run excess returns of stock split announcements in November–April and May–Oct from 1926 to 2012.

This table calculates excess returns for the firms announcing stock splits between November–April and May–Oct from 1926 to 2012. Panel A reports the short-run excess returns of all stock split announcements. Panel B reports the short-run excess returns of stock splits for small sized firms. We rank the size of all the firms from small to large in the whole sample, then take the first quintile to get the sample of small sized firms. Panel C reports the short-run excess returns of surprised stock splits, which are identified as stock splits that had not happened in the last two years. Panel D reports the short-run excess returns of stock splits that are announced without cash dividend announcements in the same month. Market adjusted returns are using $AR_{it} = R_{it} - R_{mt}$, where R_{mt} is proxied by CRSP value-weighted market indexes. Market model adjusted returns are measured by $AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i \times R_{mt}$ with value-weighted market indexes. Estimator $\hat{\alpha}_i$ and $\hat{\beta}_i$ are estimated from the Market Model of $R_{it} = \alpha_i + \beta_i \times R_{mt} + \varepsilon_i$ with estimation period of 255 trading days. Short term event windows are examined one day surrounding an announcement date, one week after an announcement date, two weeks, one month, two months, three months and six months after an announcement date (0 represents the actual announcement day). All returns are in percentage with t-statistics underneath.

May–Oct				Nov–Apr			
Event windows	Raw returns	Value-weighted market adjusted returns	Value-weighted market model adjusted returns	Event windows	Raw returns	Value-weighted market adjusted returns	Value-weighted market model adjusted returns
<i>Panel A: Short-run excess returns of all stock split announcements in May–Oct and Nov–Apr from 1926 to 2012</i>							
(−30, −2)	9.30 [51.75]***	7.66 [46.56]***	2.64 [15.52]***	(−30, −2)	10.68 [57.96]***	8.12 [47.36]***	3.35 [18.94]***
(−1, +1)	3.29 [42.68]***	3.20 [46.89]***	2.67 [36.87]***	(−1, +1)	3.35 [50.31]***	3.13 [48.61]***	2.64 [41.87]***
(−1, 0)	2.03 [39.84]***	1.96 [40.44]***	1.61 [33.52]***	(−1, 0)	2.08 [39.59]***	1.91 [37.18]***	1.59 [32.07]***
(0, +1)	2.85 [40.14]***	2.80 [44.90]***	2.44 [36.08]***	(0, +1)	2.88 [49.28]***	2.74 [48.51]***	2.41 [43.09]***
1 week	2.51 [27.49]***	2.36 [28.29]***	1.13 [15.54]***	1 week	2.92 [34.62]***	2.48 [30.15]***	1.37 [18.92]***
2 weeks	3.30 [26.52]***	2.95 [25.61]***	0.32 [6.27]***	2 weeks	3.81 [32.19]***	2.94 [26.28]***	0.52 [7.77]***
1 month	5.12 [28.99]***	4.39 [26.78]***	−0.89 [−1.16]**	1 month	6.33 [36.13]***	4.63 [28.92]***	0.19 [3.00]***
2 months	7.00 [28.86]***	5.72 [25.39]***	−4.90 [−13.72]***	2 months	9.67 [41.54]***	6.44 [29.85]***	−3.29 [−6.70]***
3 months	9.09 [32.08]***	6.58 [25.06]***	−9.17 [−22.07]***	3 months	11.66 [41.05]***	7.14 [28.25]***	−7.62 [−15.54]***
6 months	16.87 [42.63]***	9.13 [24.19]***	−21.23 [−33.70]***	6 months	15.25 [41.21]***	8.35 [24.95]***	−21.86 [−35.57]***
<i>Panel B: Short-run excess returns of stock splits for small sized firms in May–Oct and Nov–Apr from 1926 to 2012</i>							
(−30, −2)	11.23 [55.36]***	9.23 [49.25]***	4.56 [18.52]***	(−30, −2)	12.36 [59.26]***	10.53 [47.36]***	5.24 [21.53]***
(−1, +1)	5.65 [43.65]***	4.98 [49.26]***	4.53 [38.25]***	(−1, +1)	5.66 [53.25]***	5.22 [48.61]***	4.76 [44.54]***
(−1, 0)	4.51 [40.36]***	3.56 [43.52]***	3.24 [37.25]***	(−1, 0)	4.86 [40.53]***	3.60 [37.18]***	3.03 [35.02]***
(0, +1)	4.01 [42.25]***	4.25 [45.65]***	4.25 [38.25]***	(0, +1)	4.32 [52.54]***	4.45 [48.51]***	4.29 [45.67]***
1 week	4.58 [29.36]***	4.86 [30.25]***	3.42 [18.25]***	1 week	4.64 [36.52]***	4.92 [30.15]***	3.56 [29.95]***
2 weeks	5.05 [28.26]***	4.27 [28.25]***	2.49 [6.95]***	2 weeks	5.72 [34.25]***	4.52 [26.28]***	2.65 [8.22]***
1 month	7.34 [29.26]***	6.26 [29.25]***	1.95 [1.42]	1 month	7.58 [39.01]***	6.98 [28.92]***	3.36 [3.45]***
2 months	8.95 [29.64]***	7.25 [26.26]***	−3.00 [−15.22]***	2 months	11.24 [44.25]***	8.01 [29.85]***	0.84 [5.42]***
3 months	11.94 [35.03]***	8.05 [29.25]***	−7.64 [−25.25]***	3 months	15.21 [43.25]***	9.00 [28.25]***	−3.32 [−13.59]***
6 months	19.92 [43.54]***	11.14 [28.25]***	−17.84 [−30.25]***	6 months	20.95 [44.25]***	12.17 [24.95]***	−14.55 [−29.56]***
<i>Panel C: Short-run excess returns of surprised stock split announcements in May–Oct and Nov–Apr from 1926 to 2012</i>							
(−30, −2)	12.31 [1.36]	9.34 [1.25]	4.31 [1.25]	(−30, −2)	13.11 [0.25]	10.13 [1.25]	5.25 [1.54]
(−1, +1)	5.77 [44.25]***	5.43 [48.25]***	5.24 [39.25]***	(−1, +1)	4.99 [49.92]***	4.78 [50.55]***	4.36 [43.52]***
(−1, 0)	4.36 [43.26]***	4.23 [43.25]***	3.76 [34.25]***	(−1, 0)	4.04 [42.52]***	3.78 [38.53]***	3.25 [33.54]***
(0, +1)	5.21 [42.25]***	4.97 [45.25]***	4.26 [36.99]***	(0, +1)	4.98 [52.35]***	4.25 [49.05]***	4.15 [45.25]***
1 week	4.65 [29.06]***	4.52 [31.35]***	3.42 [16.36]***	1 week	4.36 [36.72]***	4.11 [33.25]***	3.00 [19.95]***
2 weeks	6.01 [29.26]***	5.00 [28.25]***	2.56 [9.36]***	2 weeks	5.75 [35.45]***	5.28 [28.53]***	2.14 [8.25]***
1 month	7.17 [30.25]***	6.21 [29.25]***	1.45 [−1.98]*	1 month	8.56 [38.25]***	6.87 [31.53]***	1.52 [3.89]***
2 months	9.35 [29.25]***	7.20 [27.25]***	−1.46 [−10.25]***	2 months	10.78 [44.25]***	8.42 [31.54]***	1.75 [5.61]***
3 months	12.54 [34.26]***	8.72 [28.52]***	−6.83 [−19.54]***	3 months	14.59 [44.25]***	9.02 [30.25]***	−3.42 [−13.59]***
6 months	19.02 [44.52]***	14.32 [25.25]***	−15.46 [−29.65]***	6 months	21.45 [45.05]***	12.34 [28.91]***	−10.02 [−43.65]***

Table 7 (continued)

May–Oct				Nov–Apr			
Event windows	Raw returns	Value-weighted market adjusted returns	Value-weighted market model adjusted returns	Event windows	Raw returns	Value-weighted market adjusted returns	Value-weighted market model adjusted returns
<i>Panel D: Short-run excess returns of stock splits without cash dividends in May–Oct and Nov–Apr from 1926 to 2012</i>							
(−30, −2)	8.12 [54.36]***	6.25 [48.16]***	2.00 [16.78]***	(−30, −2)	8.02 [59.82]***	7.54 [49.53]***	2.56 [19.01]***
(−1, +1)	2.35 [44.64]***	2.14 [49.26]***	2.98 [39.35]***	(−1, +1)	2.54 [53.25]***	2.41 [50.25]***	2.05 [42.35]***
(−1, 0)	1.65 [40.25]***	1.54 [43.25]***	1.02 [38.25]***	(−1, 0)	1.76 [40.53]***	1.06 [39.53]***	1.02 [34.05]***
(0, +1)	1.85 [43.25]***	2.05 [46.81]***	1.87 [39.25]***	(0, +1)	2.06 [52.25]***	2.32 [49.53]***	1.94 [44.25]***
1 week	1.43 [32.53]***	1.67 [29.35]***	0.84 [16.26]***	1 week	1.78 [35.15]***	1.57 [35.15]***	0.98 [19.53]***
2 weeks	2.60 [29.64]***	1.99 [27.89]***	0.07 [6.92]***	2 weeks	2.95 [34.25]***	2.21 [29.25]***	0.27 [7.92]***
1 month	4.28 [29.25]***	3.65 [30.25]***	0.69* [−1.65]	1 month	5.36 [37.93]***	3.79 [29.41]***	0.71 [4.98]***
2 months	6.05 [30.26]***	4.42 [27.26]***	−1.43 [−10.54]***	2 months	8.13 [44.25]***	5.73 [30.21]***	0.74 [7.80]***
3 months	8.45 [35.36]***	5.89 [28.35]***	−6.87 [−18.54]***	3 months	10.65 [43.14]***	6.38 [29.57]***	−5.97 [−11.24]***
6 months	15.03 [45.26]***	8.03 [25.29]***	−18.47 [−30.24]***	6 months	14.35 [43.10]***	7.22 [25.67]***	−15.36 [−31.59]***

* Denotes statistical significance at the 10% significant level.

** Denotes statistical significance at the 5% significant level.

*** Denotes statistical significance at the 1% significant level.

4.2. The likelihood of stock split announcements

There is a possibility that an analysis of the raw frequency of the announcements per month is too crude a measure because of the varying number of firms in existence over time. To examine the likelihood that the number of splits in January is higher than the norm, the logistic regression is employed with a dummy variable of *Jan*. *Jan* takes a value of one for stock splits announced in January, and zero otherwise. Because January is also included in the Halloween period, we create another dummy variable—*Hal*—to control for the Halloween effect, which takes a value of one for stock splits announced in the months of Nov–Apr and a value of zero if announcements are made in May–Oct. To check that the two effects do not veil each other, an additional dummy variable of *HalnoJan* is generated, taking a value of one for stock splits announced in the months of November to April, except January, and a value of zero if the announcements are in the months of May to October. The dependent variable of the logistic models is a binary variable that takes a value of 1 if firms announce stock splits, otherwise 0. The expected signs of the coefficients for these dummy variables are statistically positive.

Because the January effect is normally related to the size effect, we run the logistic regressions with the overall sample, the sample for stock splits in small-size firms, as well as the sample for surprise stock splits. To identify the small-sized firms, we rank the size of all the splitting firms from small to large, then take the first quintile of the sample. For surprise stock splits, we select stock splits that have not happened in the last two years. Table 5 shows the results of logistic regressions for the likelihood of stock splits. The first three columns of the results are for the full sample of stock split announcements; the next three columns are the results of stock split announcements for small-sized firms, and the last three columns of the results are for surprise stock splits. According to the results, the *Jan* dummy is statistically significant and positive across all the models; firms are more likely to split their shares in January. We also find that the Halloween effect is evident in the propensity for firms to announce splits; the *Hal* dummy is also statistically positive. However, after we control for the Halloween effect in stock splits either using the *Hal* dummy or the *HalnoJan* dummy, the January effect still strongly exists in the probability of firms splitting

shares, and this effect is more pronounced in small-size firms and for surprise stock splits, which is consistent with our first hypothesis and the size effect influencing the January effect.

4.3. Short-run market reactions to stock split announcements

We calculate both the value-weighted market adjusted returns and the value-weighted market model adjusted returns to investigate the short-run market reaction to stock split announcements in January compared to other months of the year. These two statistical models are commonly used to compute event returns in event studies, and they entail less bias (Fama, 1998). The estimation window is 255 trading days prior to the event window. The market model incorporates stock risk into the calculation of excess returns with the assumption of beta that measures the individual stock risk in relation to the market risk being constant. The short-run event windows used in this study include one day surrounding an announcement date, one week after an announcement date, two weeks after an announcement date, as well as one month, two months, three months, and six months after an announcement date. The event windows are displayed as (−1, +1), (−1, 0), (0, +1), (1, 7), (1, 15), (1, 30), (1, 61), (1, 92), and (1, 183), with 0 representing an announcement day. The abnormal returns of one month before the announcement date (−30, −2) are also calculated to show the effect of information leakage before stock split announcements, if there is any. We calculate the excess returns of stock splits not only for the full sample but also for small-sized firms and surprise stock splits, as well as for stock splits without cash dividends in the same month. The purpose of running the last sub-sample is to separate the signaling effect of stock splits from cash dividend announcements; the market reaction to split announcements may be due to the cash dividend payments if they are announced in the same month.

In Table 6, the short-term abnormal returns of stock split announcements in each month for the period of 1926 to 2012 are listed in Panel A; Panel B shows the abnormal returns of stock splits for small-sized firms; Panel C shows the abnormal returns of surprised stock splits; and Panel D shows the abnormal returns of stock splits without cash dividend announcements in the same month. According to the results, January provides the highest abnormal returns on average, and this effect is

Table 8

Long-term post-announcement abnormal returns for stock split announcements between January and February–December from 1926 to 2012.* ** ***

This table calculates long term abnormal returns for the one-, two-, three-, and five-year post-announcement horizons, for the firms announcing stock splits between January and February–December during the period 1926 to 2012. For small sized firms, we rank the size of all the firms from small to large in the whole sample, then take the first quintile. Surprised stock splits are identified as stock splits that had not happened in the last two years. Stock splits without cash dividends are stock splits announced without cash dividend announcements in the same month. Monthly rebalanced calendar time portfolio returns are calculated each month from all firms experience a stock split in the previous 12, 24, 36, or 60 calendar months. Monthly excess returns to calendar time portfolios are: $CTAR_t = R_{pit} - E(R_{pit})$, where R_{pit} is monthly return on portfolio of event firms at time t , and $E(R_{pit})$ is expected return on event portfolio at time t . The expected return on event portfolio, for each sample firm in month t , is measured by Fama–French (1993) three-factor model and Carhart (1997) four-factor model:

$$R_{it} - R_{ft} = \alpha_i + \beta_1(R_{mt} - R_{ft}) + \beta_2SMB_t + \beta_3HML_t + \varepsilon_{it}$$

$$R_{it} - R_{ft} = \alpha_i + \beta_1(R_{mt} - R_{ft}) + \beta_2SMB_t + \beta_3HML_t + \beta_4PR1YR_t + \varepsilon_{it}$$

R_{it} is firm i 's monthly return, R_{ft} is the one-month T-bills return, and R_{mt} is the market return on CRSP value-weighted portfolio of all NYSE, AMEX, and Nasdaq stocks. SMB_t is the difference in returns between portfolios of small and big stocks. HML_t is the difference in returns between portfolios of high and low book-to-market ratio stocks. $PR1YR_t$ is defined as in Carhart (1997) as an equally weighted portfolio return of stocks with highest returns less an equally weighted portfolio return of stocks with lowest returns in months $t - 12$ to $t - 2$. Ordinary, Weighted Least Squares (White, 1980) and Generalized Method of Moment (GMM) are estimated. All abnormal returns are in percentage and t -statistics of intercepts are shown in brackets under each parameter.

Calendar portfolio post period	Model estimated	Intercept of the Fama–French three-factor regression (value-weighted)		Intercept of the Carhart four-factor with momentum regression (value-weighted)		Intercept of the Fama–French three-factor regression (value-weighted)		Intercept of the Carhart four-factor with momentum regression (value-weighted)	
		Jan	Feb–Dec	Jan	Feb–Dec	Jan	Feb–Dec	Jan	Feb–Dec
		All stock split announcements				Stock splits for small size firms			
Horizon = 1 year	OLS	1.89 [12.75]***	1.44 [14.43]***	1.71 [11.15]***	1.25 [13.23]***	2.65 [13.24]***	1.71 [15.35]***	2.56 [11.76]***	1.65 [14.36]***
	Hetero t	12.10***	15.14***	9.85***	14.25***	12.98***	16.25***	10.34***	14.02***
	WLS	2.41 [25.90]***	1.98 [25.83]***	2.28 [24.19]***	1.75 [25.29]***	3.01 [24.37]***	2.22 [24.24]***	2.88 [24.77]***	2.03 [15.36]***
	GMM	1.89 [11.95]***	1.44 [12.75]***	1.71 [9.72]***	1.25 [13.19]***	2.65 [11.32]***	1.71 [14.25]***	2.56 [10.18]***	1.65 [13.46]***
	OLS	1.45 [10.54]***	1.18 [11.3]***	1.37 [9.61]***	0.97 [10.44]***	2.58 [10.91]***	1.56 [12.36]***	2.43 [10.45]***	1.38 [10.56]***
	Hetero t	10.11***	13.99***	8.59***	11.24***	10.27***	13.98***	9.74***	11.36***
Horizon = 2 years	WLS	1.58 [20.95]***	1.22 [21.43]***	1.62 [20.95]***	0.91 [19.34]***	2.87 [21.27]***	1.97 [22.36]***	2.66 [21.12]***	1.78 [19.04]***
	GMM	1.45 [10.04]***	1.18 [11.24]***	1.37 [8.52]***	0.97 [9.37]***	2.58 [11.04]***	1.56 [12.55]***	2.43 [9.32]***	1.38 [9.84]***
	OLS	1.12 [8.34]***	0.67 [14.35]***	1.22 [8.72]***	0.47 [12.35]***	2.32 [9.23]***	1.75 [15.36]***	2.29 [9.31]***	1.69 [12.75]***
	Hetero t	8.33***	13.94***	8.06***	13.18***	9.10***	16.02***	8.99***	12.56***
	WLS	1.16 [17.14]***	0.77 [19.45]***	1.28 [18.93]***	0.52 [16.79]***	2.54 [18.13]***	1.62 [18.36]***	2.33 [19.27]***	1.37 [18.62]***
	GMM	1.12 [8.42]***	0.67 [12.56]***	1.22 [7.97]***	0.47 [10.34]***	2.32 [9.34]***	1.75 [12.65]***	2.29 [8.11]***	1.69 [10.25]***
Horizon = 5 years	OLS	0.71 [7.00]***	0.36 [13.32]***	0.75 [7.16]***	0.13 [11.53]***	1.67 [7.88]***	1.14 [13.98]***	1.54 [7.95]***	1.00 [10.98]***
	Hetero t	7.40***	12.91***	6.51***	12.54***	7.97***	15.36***	7.27***	11.45***
	WLS	0.80 [13.54]***	0.41 [13.10]***	0.93 [16.03]***	0.30 [13.59]***	1.82 [14.12]***	1.52 [14.37]***	1.67 [16.91]***	0.68 [13.25]***
	GMM	0.71 [7.52]***	0.36 [10.02]***	0.75 [6.50]***	0.13 [9.34]***	1.67 [8.00]***	1.14 [10.35]***	1.54 [7.83]***	1.00 [9.26]***
		Surprised stock split announcements				Stock splits without cash dividends			
Horizon = 1 year	OLS	2.98 [13.24]***	1.90 [13.24]***	2.87 [12.25]***	1.81 [13.56]***	1.75 [12.31]***	1.25 [14.56]***	1.68 [11.23]***	1.11 [12.01]***
	Hetero t	12.98***	15.11***	10.34***	20.03***	12.76***	15.92***	10.32***	11.98***
	WLS	3.23 [26.27]***	2.75 [25.35]***	3.10 [25.24]***	2.87 [28.42]***	2.12 [26.03]***	1.54 [24.99]***	2.01 [25.35]***	1.92 [22.19]***
	GMM	2.98 [12.04]***	1.90 [12.35]***	2.87 [10.21]***	1.81 [13.56]***	1.75 [12.12]***	1.25 [13.56]***	1.68 [10.21]***	1.11 [10.84]***
	OLS	2.56 [11.34]***	1.87 [11.45]***	2.34 [11.02]***	1.73 [12.69]***	1.13 [11.02]***	0.86 [12.46]***	1.01 [10.03]***	0.78 [10.25]***
	Hetero t	12.14***	13.56***	9.45***	12.45***	10.98***	14.36***	9.45***	10.84***
Horizon = 2 years	WLS	2.49 [30.14]***	2.00 [19.85]***	2.11 [21.34]***	1.89 [20.54]***	1.01 [21.12]***	1.01 [22.54]***	1.19 [21.23]***	0.84 [19.03]***
	GMM	2.56 [11.42]***	1.87 [11.43]***	2.34 [9.45]***	1.73 [10.44]***	1.13 [11.91]***	0.86 [12.67]***	1.01 [9.04]***	0.78 [9.25]***
	OLS	2.01 [9.04]***	1.09 [12.98]***	1.88 [9.56]***	0.94 [13.25]***	0.98 [8.98]***	0.43 [13.68]***	1.07 [9.45]***	0.38 [12.53]***
	Hetero t	8.89***	12.87***	9.43***	16.36***	8.76***	15.02***	9.87***	14.26***
	WLS	2.29 [18.32]***	1.37 [18.45]***	2.16 [19.30]***	1.23 [16.32]***	0.86 [18.14]***	0.51 [18.26]***	0.96 [19.32]***	0.40 [17.26]***
	GMM	2.01 [9.04]***	1.09 [11.34]***	1.88 [8.28]***	0.94 [11.45]***	0.98 [9.34]***	10.43 [12.59]***	1.07 [8.34]***	0.38 [9.88]***
Horizon = 5 years	OLS	1.31 [7.87]***	0.86 [12.59]***	1.16 [8.19]***	0.71 [12.44]***	0.62 [7.98]***	0.22 [12.16]***	0.58 [8.45]***	0.10 [10.91]***
	Hetero t	7.98***	12.46***	7.23***	13.56***	7.95***	13.59***	7.34***	11.42***
	WLS	1.42 [14.21]***	0.79 [13.33]***	1.31 [16.87]***	0.68 [13.54]***	0.73 [12.32]***	0.30 [13.46]***	0.86 [15.93]***	0.21 [13.58]***
	GMM	1.31 [8.23]***	0.86 [10.24]***	1.16 [6.99]***	0.71 [10.45]***	0.62 [8.03]***	0.22 [10.35]***	0.58 [7.21]***	0.10 [9.36]***

* Denotes statistical significance at the 10% level.

** Denotes statistical significance at the 5% level.

*** Denotes statistical significance at the 1% level.

Table 9

Long-term post-announcement abnormal returns for stock split announcements between May–October and November–April from 1926 to 2012.^{a, **}

This table calculates long term abnormal returns for the one-, two-, three-, and five-year post-announcement horizons, for the firms announcing stock splits between May–October and November–April during the period 1926 to 2012. For small sized firms, we rank the size of all the firms from small to large in the whole sample, then take the first quintile. Surprised stock splits are identified as stock splits that had not happened in the last two years. Stock splits without cash dividends are stock splits announced without cash dividend announcements in the same month. Monthly rebalanced calendar time portfolio returns are calculated each month from all firms experience a stock split in the previous 12, 24, 36, or 60 calendar months. Monthly excess returns to calendar time portfolios are: $CTAR_t = R_{pt} - E(R_{pt})$, where R_{pt} is monthly return on portfolio of event firms at time t , and $E(R_{pt})$ is expected return on event portfolio at time t . The expected return on event portfolio, for each sample firm in month t , is measured by Fama–French (1993) three-factor model and Carhart (1997) four-factor model:

$$R_{it} - R_{ft} = \alpha_i + \beta_1(R_{mt} - R_{ft}) + \beta_2SMB_t + \beta_3HML_t + \beta_4PR1YR_t + \varepsilon_{it}$$

$$R_{it} - R_{ft} = \alpha_i + \beta_1(R_{mt} - R_{ft}) + \beta_2SMB_t + \beta_3HML_t + \beta_4PR1YR_t + \beta_5MOM_t + \varepsilon_{it}$$

R_{it} is firm i 's monthly return, R_{ft} is the one-month T-bills return, and R_{mt} is the market return on CRSP value-weighted portfolio of all NYSE, AMEX, and Nasdaq stocks. SMB_t is the difference in returns between portfolios of small and big stocks. HML_t is the difference in returns between portfolios of high and low book-to-market ratio stocks. $PR1YR_t$ is defined as in Carhart (1997) as an equally weighted portfolio return of stocks with highest returns less an equally weighted portfolio return of stocks with lowest returns in months $t - 12$ to $t - 2$. Ordinary, Weighted Least Squares (White, 1980) and Generalized Method of Moment (GMM) are estimated. All abnormal returns are in percentage and t -statistics of intercepts are shown in brackets under each parameter.

Calendar portfolio post period	Model estimated	Intercept of the Fama–French three-factor regression (value-weighted)		Intercept of the Carhart four-factor with momentum regression (value-weighted)		Intercept of the Fama–French three-factor regression (value-weighted)		Intercept of the Carhart four-factor with momentum regression (value-weighted)	
		May–Oct	Nov–Apr	May–Oct	Nov–Apr	May–Oct	Nov–Apr	May–Oct	Nov–Apr
		All stock split announcements				Stock splits for small size firms			
Horizon = 1 year	OLS	1.82 [13.91]***	1.67 [18.54]***	1.67 [12.51]***	1.54 [16.87]***	1.89 [14.35]***	1.72 [19.21]***	1.75 [13.24]***	1.58 [16.87]***
	Hetero t								
	WLS	2.16 [37.82]***	2.14 [36.54]***	2.00 [36.19]***	1.97 [34.83]***	2.21 [39.24]***	2.18 [38.79]***	2.12 [38.93]***	2.01 [35.36]***
	GMM	1.82 [12.88]***	1.67 [18.10]***	1.67 [12.04]***	1.54 [13.40]***	1.89 [13.25]***	1.72 [19.03]***	1.75 [14.96]***	1.58 [15.36]***
	OLS	1.15 [10.78]***	1.13 [15.75]***	1.08 [9.79]***	1.10 [14.86]***	1.20 [11.23]***	1.16 [16.24]***	1.14 [10.32]***	1.16 [15.29]***
	Hetero t								
Horizon = 2 years	WLS	1.38 [28.62]***	1.37 [29.20]***	1.36 [27.36]***	1.37 [28.23]***	1.42 [29.24]***	1.36 [30.24]***	1.40 [29.12]***	1.41 [30.24]***
	GMM	1.15 [13.63]***	1.13 [15.55]***	1.08 [11.03]***	1.10 [12.90]***	1.20 [15.25]***	1.16 [16.46]***	1.14 [13.23]***	1.16 [14.35]***
	OLS	0.88 [13.20]***	0.85 [13.10]***	0.90 [13.11]***	0.91 [13.72]***	0.93 [14.56]***	0.90 [15.63]***	0.95 [14.56]***	0.95 [14.26]***
	Hetero t								
	WLS	1.02 [22.41]***	0.98 [22.99]***	1.08 [23.26]***	1.05 [24.58]***	1.08 [23.21]***	1.03 [25.02]***	1.12 [24.25]***	1.08 [25.63]***
	GMM	0.88 [13.08]***	0.85 [13.47]***	0.90 [12.62]***	0.91 [12.71]***	0.93 [14.25]***	0.90 [15.24]***	0.95 [14.32]***	0.95 [14.26]***
Horizon = 3 years	OLS	0.64 [12.67]***	0.55 [11.10]***	0.69 [13.31]***	0.63 [12.64]***	0.69 [13.25]***	0.61 [11.94]***	0.71 [15.26]***	0.68 [13.67]***
	Hetero t								
	WLS	0.69 [16.38]***	0.63 [15.92]***	0.78 [18.63]***	0.74 [19.00]***	0.73 [17.92]***	0.68 [16.78]***	0.82 [19.02]***	0.77 [20.41]***
	GMM	0.64 [12.46]***	0.55 [11.32]***	0.69 [12.07]***	0.63 [11.49]***	0.69 [13.45]***	0.61 [12.05]***	0.71 [13.41]***	0.68 [13.56]***
	OLS	1.97 [13.43]***	1.83 [19.43]***	1.89 [14.25]***	1.74 [17.56]***	1.60 [15.34]***	1.59 [19.43]***	1.58 [13.15]***	1.47 [17.34]***
	Hetero t								
Horizon = 1 year	WLS	2.32 [39.54]***	2.14 [37.35]***	2.25 [40.24]***	2.11 [35.36]***	1.98 [39.45]***	1.91 [37.53]***	1.95 [38.49]***	1.92 [35.63]***
	GMM	1.97 [13.13]***	1.83 [19.32]***	1.89 [13.24]***	1.74 [14.56]***	1.60 [13.11]***	1.59 [19.25]***	1.58 [12.73]***	1.47 [14.35]***
	OLS	1.34 [10.78]***	1.32 [16.36]***	1.28 [10.42]***	1.23 [14.78]***	0.95 [12.12]***	0.90 [17.12]***	0.94 [10.23]***	0.92 [14.25]***
	Hetero t								
	WLS	1.45 [29.45]***	1.44 [30.05]***	1.50 [29.31]***	1.41 [29.45]***	1.00 [29.53]***	0.92 [30.22]***	1.01 [29.53]***	0.99 [29.25]***
	GMM	1.34 [14.14]***	1.32 [16.26]***	1.28 [12.32]***	1.23 [14.56]***	0.95 [14.25]***	0.90 [16.23]***	0.94 [11.98]***	0.92 [13.02]***
Horizon = 2 years	OLS	0.97 [13.98]***	0.93 [14.25]***	0.98 [13.98]***	0.91 [17.01]***	0.80 [13.15]***	0.77 [14.20]***	0.78 [14.24]***	0.74 [14.53]***
	Hetero t								
	WLS	1.23 [23.22]***	1.02 [25.33]***	1.24 [24.17]***	1.11 [27.34]***	0.96 [23.21]***	0.92 [23.21]***	0.91 [24.25]***	0.90 [25.26]***
	GMM	0.97 [15.34]***	0.93 [14.56]***	0.98 [13.23]***	0.91 [13.01]***	0.80 [14.14]***	0.77 [14.21]***	0.78 [13.15]***	0.74 [13.25]***
	OLS	0.72 [13.23]***	0.69 [12.53]***	0.78 [15.24]***	0.68 [12.04]***	0.52 [13.14]***	0.48 [12.31]***	0.50 [13.45]***	0.44 [13.25]***
	Hetero t								
Horizon = 3 years	WLS	0.79 [17.23]***	0.76 [16.73]***	0.86 [20.94]***	0.75 [19.92]***	0.58 [16.91]***	0.45 [16.42]***	0.46 [19.02]***	0.41 [19.45]***
	GMM	0.72 [13.45]***	0.69 [13.42]***	0.78 [13.25]***	0.68 [12.23]***	0.52 [13.12]***	0.48 [12.42]***	0.50 [12.56]***	0.44 [12.33]***

^a Denotes statistical significance at the 10% level.

** Denotes statistical significance at the 5% level.

*** Denotes statistical significance at the 1% level.

Table 10
Regression results between abnormal returns of stock splits and January dummy from 1926 to 2012.

The Panel A of this table shows the relationship between abnormal returns of stock split announcements with the event window of $(-2, +2)$ and dummy variables of Jan and Hal for the period 1926 to 2012. The Panel B of this table shows the relationship between abnormal returns of stock split announcements with the event window of $(-1, +9)$ and dummy variables of Jan and Hal for the period 1926 to 2012. The dependent variable is the value-weighted market model adjusted abnormal returns for firms announcing stock splits. Market model adjusted returns are measured by $AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i \times R_{mt}$ with value-weighted market indexes. Estimator $\hat{\alpha}_i$ and $\hat{\beta}_i$ are estimated from the Market Model of $R_{it} = \alpha_i + \beta_i \times R_{mt} + \varepsilon_i$ with estimation period of 255 trading days. The event windows $(-2, +2)$ $(-1, +9)$ (in days) are relative to announcements for which abnormal returns are being measured (0 represents the actual announcement day). *Jan* is a dummy variable that takes a value of one for stock splits announced in January and a value of zero if announcements are in other months of a year. *Hal* is another dummy variable that takes a value of one for stock splits announced in the months of November to April, except January and a value of zero if the announcements are in the months of May to October. For small sized firms, we rank the size of all the firms from small to large in the whole sample, then take the first quintile. Surprised stock splits are identified as stock splits that had not happened in the last two years. Stock splits without cash dividends are stock splits announced without cash dividend announcements in the same month. LogPrice is the natural logarithm of closing stock price 1 day before announcements. LogSize is the natural logarithm of market capitalization 1 day before announcements. *SplFac* is the split ratio obtained from CRSP and defined as the number of additional shares per existing share. Bmratio is book-to-market ratio, calculated by dividing the book value per share by the current stock price. ATO is asset turnover, calculated as sales revenue scaled by total assets. ROA is return on assets, calculated as operating income before depreciation scaled by total assets. LogSales is the natural logarithm of total sales revenue. RE_TE is retained earnings scaled by the book value of common equity. RE_TA is retained earnings scaled by the total assets. *t*-statistics are in parentheses under each parameter and all standard errors are adjusted by clustered standard errors.

	All stock split announcements			Stock splits for small size firms			Surprised stock split announcements			Stock splits without cash dividends		
Panel A: Event window (−2, +2)												
Intercept	11.5943 [11.50]***	11.5173 [11.39]***	11.5020 [11.40]***	13.1276 [13.18]***	13.5462 [13.16]***	13.3460 [13.14]***	12.4576 [14.11]***	12.4671 [14.19]***	12.4761 [14.16]***	8.5426 [10.52]***	8.5431 [10.49]***	8.5437 [10.46]***
Jan	0.6091 [2.51]**	0.5234 [2.13]*	0.6744 [2.70]***	1.2113 [2.65]***	1.0115 [2.15]*	0.9578 [2.74]***	1.1170 [2.98]***	0.9547 [2.36]*	0.8763 [2.73]***	0.3506 [2.53]**	0.3276 [2.14]*	0.4024 [2.65]***
Hal		0.2295 [1.70]*			0.2407 [1.66]*			0.2012 [1.64]*			0.1982 [1.67]*	
HalnoJan			0.1382 [1.97]**			0.1531 [1.64]*			0.1312 [1.67]*			0.1112 [1.75]*
LogSize	−0.1923 [−1.60]	−0.1918 [−1.59]	−0.1907 [−1.58]	−0.1943 [−1.69]*	−0.1945 [−1.79]*	−0.1965 [−1.73]*	−0.1759 [−1.86]*	−0.1763 [−1.91]*	−0.1762 [−1.88]*	−0.1582 [−1.37]	−0.1575 [−1.35]	−0.1581 [−1.34]
LogPrice	−2.0957 [−8.12]***	−2.0906 [−8.12]***	−2.0979 [−8.14]***	−2.0142 [−4.39]***	−2.0152 [−4.36]***	−2.0148 [−4.32]***	−1.8756 [−4.95]***	−1.8785 [−4.99]***	−1.8775 [−4.98]***	−1.9032 [−0.98]	−1.9112 [−1.02]	−1.9078 [−0.99]
SplFac	1.3764 [3.85]***	1.3717 [3.86]***	1.3769 [3.86]***	1.9875 [3.41]***	1.9880 [3.38]***	1.9879 [3.36]***	1.5694 [3.69]***	1.5692 [3.74]***	1.5698 [3.67]***	1.5231 [3.83]***	1.5342 [3.81]***	1.5401 [3.79]***
Bmratio	0.0567 [0.74]	0.0586 [0.73]	0.0574 [0.71]	0.0589 [0.67]	0.0595 [0.65]	0.0601 [0.69]	0.0523 [0.81]	0.0527 [0.78]	0.0525 [0.75]	0.0250 [0.58]	0.0256 [0.57]	0.0257 [0.53]
ROA	0.4587 [1.34]	0.4592 [1.39]	0.4590 [1.41]	0.4321 [1.49]	0.4376 [1.46]	0.4357 [1.42]	0.4532 [1.58]	0.4541 [1.59]	0.4538 [1.56]	0.3201 [1.37]	0.3425 [1.42]	0.3379 [1.35]
ATO	0.3994 [3.13]***	0.3989 [3.12]***	0.4018 [3.14]***	0.6571 [4.31]***	0.6578 [4.25]***	0.6582 [4.22]***	0.6210 [4.37]***	0.6209 [4.34]***	0.6204 [4.28]***	0.0989 [2.54]**	0.1002 [2.53]**	0.0998 [2.56]**
Logsale	−0.2536 [−2.17]**	−0.2543 [−2.17]**	−0.2549 [−2.18]**	−0.2897 [−2.52]**	−0.2893 [−2.53]**	−0.2899 [−2.54]**	−0.2092 [−2.14]**	−0.2093 [−2.10]**	−0.2097 [−2.12]**	−0.1368 [−1.90]*	−0.1378 [−1.93]*	−0.1374 [−1.89]*

RE_TE	−0.1705 [−3.85]***	−0.1689 [−3.86]***	−0.1702 [−3.91]***	−0.3215 [−4.24]***	−0.3227 [−4.26]***	−0.3219 [−4.29]***	−0.2145 [−5.18]***	−0.2149 [−5.21]***	−0.2148 [−5.19]***	−0.1356 [−3.46]***	−0.1358 [−3.42]***	−0.1361 [−3.45]***
RE_TA	0.1348 [4.21]***	0.1356 [4.22]***	0.1361 [4.25]***	0.2167 [5.02]***	0.2055 [5.04]***	0.1987 [5.09]***	0.1998 [3.72]***	0.2001 [3.71]***	0.1997 [3.74]***	0.1108 [4.79]***	0.1106 [4.80]***	0.1109 [4.76]***
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
All stock split announcements				Stock splits for small size firms			Surprised stock split announcements			Stock splits without cash dividends		
Panel B: Event window (−1, +9)												
Intercept	19.7247 [16.13]***	19.5271 [15.86]***	19.5280 [15.86]***	23.1434 [17.22]***	23.1437 [18.13]***	23.1439 [16.83]***	22.1345 [18.43]***	22.1252 [19.03]***	22.1256 [18.94]***	15.2525 [11.49]***	15.2728 [11.61]***	15.2637 [11.54]***
Jan	0.5975 [1.86]*	0.5129 [2.01]*	0.7687 [2.31]**	0.7410 [1.94]*	0.6938 [1.98]*	0.9013 [2.62]**	0.8751 [1.96]**	0.8210 [1.95]*	0.8832 [1.68]*	0.5727 [1.52]	0.5190 [1.46]	0.7572 [2.17]**
Hal		0.4314 [2.45]**			0.4635 [2.43]**			0.4713 [2.12]**			0.3727 [1.59]	
HalnoJan			0.3622 [1.97]**			0.4019 [2.01]**			0.3934 [2.14]**			0.3398 [1.65]*
LogSize	−0.9195 [−6.30]***	−0.9161 [−6.27]***	−0.9152 [−6.27]***	−1.1245 [−7.94]***	−1.1248 [−7.89]***	−1.1254 [−7.85]***	−1.1130 [−8.59]***	−1.1134 [−8.61]***	−1.1145 [−8.57]***	−0.7564 [−5.20]***	−0.7532 [−5.18]***	−0.7583 [−5.16]***
LogPrice	−3.3924 [−10.60]***	−3.3926 [−10.63]***	−3.3982 [−10.63]***	−3.5412 [−9.58]***	−3.5509 [−9.61]***	−3.5510 [−9.65]***	−3.1240 [−7.49]***	−3.1245 [−7.47]***	−3.1251 [−7.51]***	−2.2367 [−9.68]***	−2.2376 [−9.79]***	−2.2372 [−9.78]***
SplFac	1.7020 [4.00]***	1.6993 [4.01]***	1.7033 [4.01]***	1.9982 [5.65]***	2.0003 [5.69]***	1.9989 [5.71]***	2.1424 [6.84]***	2.1440 [6.81]***	2.1437 [6.78]***	1.3678 [4.83]***	1.3791 [4.75]***	1.3699 [4.86]***
Bmratio	0.1033 [0.46]	0.0986 [0.43]	0.0992 [0.45]	0.1237 [0.67]	0.1254 [0.68]	0.1248 [0.71]	0.0898 [0.61]	0.0915 [0.65]	0.0921 [0.69]	0.0973 [0.73]	0.0978 [0.74]	0.0984 [0.76]
ROA	0.4436 [1.15]	0.4456 [1.19]	0.4467 [1.20]	0.4876 [1.34]	0.4891 [1.37]	0.4887 [1.43]	0.4308 [1.01]	0.4310 [1.03]	0.4302 [1.07]	0.4215 [1.35]	0.4218 [1.37]	0.4219 [1.34]
ATO	0.6575 [4.55]***	0.6543 [4.52]***	0.6537 [4.52]***	0.4561 [2.57]**	0.4569 [2.56]**	0.4570 [2.60]**	0.4633 [2.05]**	0.4636 [2.03]**	0.4640 [1.98]**	0.4987 [5.56]***	0.4976 [5.60]***	0.4985 [5.63]***
Logsale	−0.5623 [−3.77]***	−0.5584 [−3.74]***	−0.5561 [−3.73]***	−0.6573 [−2.17]**	−0.6580 [−2.22]**	−0.6578 [−2.15]**	−0.6781 [−2.76]***	−0.6789 [−2.89]***	−0.6793 [−2.78]***	−0.4569 [−2.21]**	−0.4572 [−2.14]**	−0.4573 [−2.15]**
RE_TE	−0.2545 [−5.11]***	−0.2564 [−5.10]***	−0.2571 [−5.07]***	−0.2428 [−6.83]***	−0.2424 [−6.78]***	−0.2438 [−6.73]***	−0.2013 [−8.75]***	−0.2015 [−8.69]***	−0.2019 [−8.72]***	−0.2314 [−6.78]***	−0.2310 [−6.72]***	−0.2268 [−6.74]***
RE_TA	0.1452 [6.14]***	0.1458 [6.11]***	0.1462 [6.12]***	0.1765 [5.96]***	0.1773 [5.89]***	0.1771 [5.99]***	0.1865 [6.42]***	0.1872 [6.44]***	0.1869 [6.37]***	0.1239 [5.72]***	0.1235 [5.69]***	0.1198 [5.68]***
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* Denotes statistical significance at the 10% level.

** Denotes statistical significance at the 5% level.

*** Denotes statistical significance at the 1% level.

particularly strong in Panel B, the sample of smaller-sized firms. For the three-day event window ($-1, +1$), the excess returns of stock split announcements are 4.97% in January, which is 0.5% higher than the second highest excess returns in May for smaller-sized firms. For the same event window, the excess returns of stock splits are 4.78% in January for surprise stock splits, which is 0.6% higher than the second highest excess returns in February, as shown in Panel C. For stock splits without cash dividends announced in the same month, the three-day excess returns are 3.10% in January, which is larger than the second highest excess returns of 2.65% in May in Panel D. Similarly, for the whole sample of stock splits, the three-day excess returns are 3.22% in January, which is higher than the second largest excess returns of 2.83% in February in Panel A. These results are consistent with the results of the January effect being more pronounced in small-sized firms. Additionally, the abnormal returns of stock splits are higher for surprise split announcements in Panel C, compared to the whole sample in Panel A and splits without cash dividends announced in the same month in Panel D. These findings show that the January effect generally exists in the value-weighted abnormal returns of stock split announcements.

In Table 7, we also compare the short-term abnormal returns of stock splits between the months of November to April (Nov–Apr) and May to October (May–Oct). From the results, we find that the Halloween effect is also present in the abnormal returns of split announcements for the event windows after a week: the excess returns are larger in Nov–Apr than in May–Oct for the event windows of one week, two weeks, one month, two months, three months, and six months. The market reactions are also stronger for smaller-size firms in Panel B and for surprise stock split announcements in Panel C in comparison to the whole sample in Panel A and stock splits without cash dividend announcements in Panel D. On average, the abnormal returns are around 2–4% in the Halloween period a week after stock split announcements, which is about 0.2–0.5% higher than those in May–Oct. The Halloween effect may be attributable to the January effect in the announcement returns of stock splits because January is included in the Halloween period (November to April). These results are consistent with our second hypothesis (H2).

4.4. Long-run market reactions to stock split announcements

We also examine the long-term market reaction to stock split announcements to investigate whether there is a long-run price drift for firms splitting shares in different months. Because some historical long-term event study methodologies have tended to produce biased results, this study carefully chooses models to calculate the abnormal returns. The conventional long-run model of buy and hold abnormal returns (BHARs) can create a false impression on price adjustment to corporate events because BHARs have the problem of cross-sectional correlations among firms, and thus t -statistics are overstated. These issues produce a misspecified model problem and lead to a deceptive inference for market efficiency in the long run (Fama, 1998). Boehme and Sorescu (2002) and Byun and Rozeff (2003) suggest that the calendar time portfolio method is a better way to examine long-term returns after they scrutinized and compared long-run models of BHARs, cumulative abnormal returns (CARs), and calendar time abnormal returns (CTARs) with several corporate event announcements. In particular, they point out that CTARs not only overcome the problems of cross-sectional correlations and reduce the misspecified model problem, but they also minimize and eliminate the heteroskedasticity problem in the model. Therefore, in order to reduce biases and draw better market efficiency inferences, this study employs CTARs to compute long-term abnormal returns of stock split announcements.

For a robustness check, both value-weighted Fama and French (1993) three-factor and Carhart (1997) four-factor calendar time portfolio methods are applied. Ordinary least square (OLS), weighted least square (WLS), and generalized method of moment (GMM) regressions are estimated. Monthly returns in the WLS model are weighted by the

square root of the number of firms contained in the month (White, 1980). Long-term event windows of abnormal returns for this research include one year, two years, three years, and five years after the announcements of stock splits. The dependent variable is the monthly abnormal returns and independent variables are the monthly actual returns on the portfolio of event firms at time t , the one-month treasury bill returns, the monthly market returns in the value-weighted CRSP indexes, the monthly difference in returns between portfolios of small (size) firms and large (size) firms, the monthly difference in returns between portfolios of firms with high BE/ME (book-to-market) ratios and with low BE/ME (book-to-market) ratios, and the monthly difference in returns between portfolios of firms with the highest returns and with the lowest returns in months $t - 12$ to $t - 2$. The estimators of the regressions are estimated within 12 months prior to the event windows. All the portfolios are rebalanced every month.

Table 8 shows the long-term post-announcement abnormal returns for stock splits between January and other months of the year (February–December) from 1926 to 2012. On average, the abnormal returns are 0.4%–0.7% higher in January than in Feb–Dec for the overall sample, 0.5%–1% higher for stock splits announced by the smallest size-quintile group of firms, 0.6%–1% higher for surprise stock splits, and 0.5%–0.8% higher for stock splits without cash dividends announced in the same month. The long-term returns of stock splits decrease over the years. In particular, the returns are about 1% to 2% one or two years after the announcements, then they decrease to 0.1%–0.5% after five years. These results show that although January contains larger returns than other months, the returns are relatively and economically small, which supports the efficient market hypothesis, suggesting no significant abnormal returns of corporate announcements in the long run (Boehme & Sorescu, 2002; Byun & Rozeff, 2003; Fama, 1998). Similarly, Table 9 illustrates long-term excess returns of stock splits between the Halloween periods to the other half of the year in the period of 1926 to 2012. The returns are around 1%–1.5% one or two years after the announcements; returns then decrease to 0.4%–0.9% after three and five years. The returns are marginally higher for surprise stock splits and stock splits in small-sized firms in comparison to the whole stock splits sample and the sample of stock splits without cash dividends announced in the same month. The difference in the abnormal returns between Nov–Apr and May–Oct is also minimal. These results indicate no significant Halloween effect in the long-run performance of firms splitting shares. The OLS, WLS, and GMM produce rather similar results, suggesting a robust result using different methods.

4.5. Multivariate regression analysis

This section examines whether there is a January effect in the abnormal returns of stock split announcements using cross-sectional multivariate regression analysis. The dependent variable is abnormal returns of stock splits calculated by the value-weighted market model adjusted abnormal returns. Our event windows consist of a five-day window with two days before and two days after the announcements ($-2, +2$) and a 10-day window with one day before and nine days after the announcements ($-1, +9$) (0 represents the actual announcement day). These are the most commonly used event windows in the literature. The control variables are the same as those listed in Table 1. The coefficient of the *Jan* dummy should be statistically positive after controlling for the Halloween effect, indicating a higher market reaction to split announcements, particularly in January. In order to avoid the problems of autocorrelation, heteroskedasticity, and the correlations amongst firms in the cross-sectional regressions, we adjust the standard errors of the parameters using clustered standard errors.

Table 10 shows the regression results between abnormal returns of stock split announcements and the *Jan* dummy from 1926 to 2012. The dependent variable is five-day abnormal returns in Panel A and 10-day abnormal returns in Panel B. The coefficients of the *Jan* dummy are not only statistically significant and positive but also economically

large in both panels, suggesting that the abnormal returns of stock splits are higher in January than in other months of the year. This finding is the same as the event study results we discussed in the previous sections, and the positive effect between the excess returns of stock splits and January is also more evident in small-size firms or for surprise split announcements. In addition, the short-run abnormal returns of stock splits are positively correlated to the *Hal* dummy, although the coefficients of the *Hal* dummy are relatively smaller than the coefficients of the *Jan* dummy. We also separate and extract the January effect from the Halloween effect by employing another dummy variable, *HalnoJan*. The coefficients of *Jan* and *HalnoJan* are statistically significant and positive in both panels when we run these two dummy variables together. These findings further confirm that January positively affects the excess returns of stock splits, and the January effect, as well as the Halloween effect, exist in short-run returns of split announcements, which provides additional evidence to support our hypotheses.

4.6. Robustness check

For the robustness check, this paper employs various models to examine whether there is a January effect in the propensity and abnormal returns of firms splitting shares, including the mean adjusted model, equal-weighted market adjusted model, value-weighted market adjusted model, and equal-weighted market model adjusted returns. For the long-run returns, we also use the equal-weighted index to rerun the three-factor Fama–French model and the four-factor Carhart model. Additionally, we divide the sample into sub-periods, different industries, and size quintiles to avoid noise. The sub-periods consist of the dormant period for stock splits (1926 to 1960), the growth period (1961 to 1975), the peak period (1976 to 1995), and the fluctuation period (1996 to 2012). The industry groups are agriculture, forestry, fishing, mining, and construction (AFFMC) (SIC 0100–1700); manufacturing (SIC 2000–3900); transportation, communication, and electric (TCE) (SIC 4000–4900); wholesale and retail trade (SIC 5000–5900); and services and public administration (SPA) (SIC 7000–9900). The size quintiles are ranked from the smallest-sized firms to the largest-sized firms that announced stock splits.

The results are similar to our main findings and further support our hypotheses. The January effect in short-term abnormal returns of stock split announcements is more robust in the value-weighted abnormal returns for most sub-periods, industries, and size quintiles. Abnormal returns are also higher in January than in the other months of the year (February–December) in the event window of one day within split announcements, and the value-weighted abnormal returns are larger in the Halloween period than in the other half of the year in most sub-samples. However, the equal-weighted abnormal returns are generally lower in January compared to February–December (Feb–Dec), especially for the sub-period of 1961 to 1975. The firms in the first quintile (the smallest size group) usually have higher excess returns in January, whereas the companies in the fourth quintile have larger returns in Feb–Dec. Likewise, the coefficients of *Jan* are statistically positive in the logistic models and in the value-weighted excess returns after 1960, but negative in the equal-weighted abnormal returns in the sub-periods of 1961 to 1995.

5. Conclusion

In conclusion, this paper investigates whether there is a January effect in the corporate events of stock splits. We find that the likelihood of the occurrence and abnormal returns of stock split announcements are positively correlated to the *Jan* dummy, suggesting that firms are more likely to split shares and the market reaction to these announcements are greater in January compared to the other months of the year. The January effect exists in stock split announcements, especially for small-sized firms. We also find the existence of another monthly effect—the Halloween effect—in the decisions and the associated

returns of share splits, which may be due to the January effect because the Halloween period (November to April) includes January. This study provides initial evidence on the examinations of using monthly effects to explain the aggregate patterns of stock splits, which is a new way to link the monthly patterns to corporate practice. Future studies may focus on the investigation of whether other monthly effects exist in other corporate events.

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