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What Do Stock Splits Really Signal?

David L. Ikenberry, Graeme Rankine, and Earl K. Stice*

Abstract

We observe significant post-split excess returns of 7.93 percent in the first year and 12.15 percent in the first three years for a sample of 1,275 two-for-one stock splits. These excess returns follow an announcement return of 3.38 percent, indicating that the market underreacts to split announcements. The evidence suggests that splits realign prices to a lower trading range, but managers self-select by conditioning the decision to split on expected future performance. Presplit runup and post-split excess returns are inversely related, indicating that our results are not caused by momentum.

I. Introduction

Stock splits are a puzzling corporate phenomenon. A split is a seemingly cosmetic corporate event, yet the market generally reacts favorably to split announcements. Since the publication of the classic paper by Fama, et al. (1969), the signaling hypothesis and the trading range hypothesis have emerged in the finance literature as the leading explanations of stock splits.

According to the signaling hypothesis, managers declare stock splits to convey favorable private information about the current value of the firm. Managers obtain pertinent information about the future because of their expertise in making operating and investment decisions. Splits credibly signal such information if it is costly for firms without favorable information to signal falsely. Brennan and Copeland (1988) argue that splits are costly because the fixed cost element of brokerage commissions increases the per-share trading costs of low-priced stocks. The existence of positive excess returns around split announcements is consistent with the signaling hypothesis (Grinblatt et al. (1984), Asquith et al. (1989), and McNichols and Dravid (1990)).

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The trading range hypothesis suggests that splits realign per-share prices to a preferred price range (McNichols and Dravid (1990)). Since the need to realign share prices usually stems from a presplit price runup (Lakonishok and Lev (1987)), the trading range hypothesis links splits more to past performance than to future performance. Baker and Phillips (1994) report that managers frequently justify splits on the basis that they improve liquidity and marketability.¹

Empirical evidence that splits lead to improved liquidity and marketability is inconclusive. Lamoureux and Poon (1987) and Maloney and Mulherin (1992) report that splits increase the number of stockholders and the number of trades, but there is little evidence that splits lead to increased trading volume (Lakonishok and Lev (1987), Lamoureux and Poon (1987), Conroy et al. (1990)). Furthermore, evidence that splits increase bid-ask spreads (Copeland (1979), Conroy et al. (1990)) and return volatility (Ohlson and Penman (1985), Conroy et al. (1990), Koski (1995)) suggests that splits could decrease liquidity. Baker and Gallagher (1980) claim that managers use splits to increase ownership by individual investors, but Szewczyk and Tsetsekos (1995) report that institutional ownership increases after a split.

The signaling and trading range hypotheses are not mutually exclusive. If managers believe that there are benefits from share prices trading within some range, yet also perceive that it is costly for prices to trade below some lower limit, the decision to split will be made conditional on managers' expectations about future performance. Pessimistic managers are less likely to undertake a split, fearing that a future decline in the firm's share price could result in the price falling below the acceptable range. Under these conditions, a split can be interpreted by the capital market as a signal of management's optimism about the future. This idea has been discussed in prior research (Grinblatt et al. (1984), McNichols and Dravid (1990)) and is referred to in this paper as the self-selection hypothesis.

We examine 1,275 two-for-one stock splits initiated by NYSE and ASE firms from 1975 through 1990. Our results are consistent with the self-selection hypothesis. Splits are most often observed when prices have increased substantially in the recent past or when shares trade at relatively high levels. In our sample, less than 3 percent of splitting firms have presplit prices below the median price observed for firms of similar size. In addition to a five-day announcement period return of 3.38 percent, we find that splits are associated with long-run excess returns following the announcement period. The mean excess return after a split is 7.93 percent in the first year and 12.15 percent in the first three years. This result provides additional evidence that the market sometimes underreacts to corporate events.² For firms with positive returns in the year before the split (96 percent of

¹Trading ranges might also arise for other reasons, including a desire by firms to control the relative tick size at which their shares trade (Anshuman and Kalay (1993), Angel (1994)), a desire by the brokerage community to preserve commission income (Brennan and Hughes (1991)), and a desire by managers to increase ownership by individual investors (Lakonishok and Lev (1987)).

²Several studies provide evidence on underreaction to corporate events such as takeover bids (Agrawal, et al. (1992)), initial and seasoned equity offerings (Ritter (1991), Loughran and Ritter (1995), Spiess and Affleck-Graves (1995)), proxy contests (Ikenberry and Lakonishok (1993)), spinoffs (Cusatis, et al. (1993)), open market share repurchases (Ikenberry, et al. (1995)), dividend initiations and omissions (Michaely, et al. (1995)), analyst recommendations (Womack (1996)), and exchange listings (Dharan and Ikenberry (1995)).

the sample), an inverse relationship between presplit runup and post-split excess return confirms that our results are not a consequence of momentum.

Splits undertaken by firms with low share prices or with negative presplit returns are associated with positive announcement returns but negative returns in the year following the split. This suggests that investors initially interpret these announcements as positive news, but are disappointed as post-split events unfold.

The outline of the paper is as follows. In Section II, we report descriptive information on both the presplit performance of the sample firms and the relative prices at which splits are initiated. In Section III, we examine the short-run market reaction to split announcements. Evidence on the long-run post-split performance of splitting firms is provided in Section IV, and the robustness of this evidence is examined in Section V. Our conclusions are summarized in Section VI.

II. The Sample, Past Performance, and Relative Prices

Brennan and Copeland (1988) and Brennan and Hughes (1991) argue that the size of the split factor signals information. We focus on a single distribution size to avoid any confounding influence of different split factors. Two-for-one splits are selected because they are the most common. The sample is formed by identifying all NYSE and ASE firms that declared two-for-one splits between 1975 and 1990. We further require that the firm's book equity value in the fiscal year preceding the split be reported in COMPUSTAT. The resulting sample consists of 1,275 two-for-one splits.

Table 1 reports the number of splits in each calendar year and summarizes the total returns in the 12 months before the split. For comparison purposes, the corresponding mean S&P 500 return in the year prior to the split is also reported. The mean annual return of 76.55 percent preceding split announcements is substantially greater than the contemporaneous S&P return of 22.31 percent, a result consistent with previous research (Grinblatt et al. (1984), McNichols and Dravid (1990), Maloney and Mulherin (1992)).³ The largest number of splits (164) occurs in 1983 following a year in which the S&P return was 43.73 percent; the smallest number of splits (35) occurs in 1988 when the S&P return in the prior year was -2.29 percent. Generally speaking, more splits are observed following bull markets.

Relative pre- and post-split share prices are plotted in Figure 1. To control for the fact that large firms have higher share prices, relative share prices are computed by ranking a firm's share price relative to other firms in the same size decile. Each month, all NYSE and ASE stocks included in both CRSP and COMPUSTAT are sorted into deciles on the basis of market equity. The nominal share price of stocks within each decile is used to define price percentiles. Relative presplit prices are determined by classifying sample firms on the basis of month-end market capitalization and nominal share price in the month immediately preceding the split announcement. Post-split price percentiles can be viewed as the target price managers consider when planning a two-for-one split and are calculated by dividing the presplit price by two and classifying this new value.

³This simple comparison of presplit performance is only for illustration. The comparison neglects to account for a survivor bias in the split sample that is not present in the S&P 500 benchmark.

TABLE 1
Annual Returns Prior to Two-for-One Stock Splits of NYSE and ASE Firms 1975 to 1990

<u>Year</u>	<u>n</u>	<u>Mean</u>	<u>Median</u>	<u>Min.</u>	<u>Max.</u>	<u>Mean S&P 500</u>
1975	38	91.05	62.83	-25.61	602.97	11.87
1976	68	77.10	53.09	-22.20	526.99	23.71
1977	59	48.35	30.00	-19.47	208.65	3.48
1978	68	56.91	43.06	-24.46	244.56	3.26
1979	49	73.45	51.00	-1.95	386.71	12.71
1980	123	87.98	75.92	-14.69	256.20	22.25
1981	106	101.83	59.87	-39.29	1,003.96	23.83
1982	50	68.66	54.82	-12.68	300.63	3.20
1983	164	139.26	112.67	11.66	668.52	43.73
1984	61	28.63	22.28	-20.17	181.36	7.66
1985	80	57.04	49.37	0.20	196.73	22.82
1986	135	72.88	55.05	6.78	441.87	33.47
1987	126	60.80	46.11	-5.55	531.44	28.54
1988	35	26.52	18.55	-16.10	97.85	-2.29
1989	68	61.29	51.72	-31.88	256.75	25.87
1990	45	39.72	30.23	-9.79	117.05	14.36
All Years	1,275	76.55	53.79	-39.29	1,003.96	22.31

This table reports, by year, the mean, median, minimum, and maximum annual returns (in percent) ending in the month prior to the split announcement for all two-for-one splitting firms in the sample. For comparison purposes, the corresponding mean return to the S&P 500 is also reported.

Figure 1 shows that presplit prices are typically quite high. More than three-quarters of the sample firms have share prices above the 80th percentile. Less than 3 percent of sample firms have presplit prices at or below the median price for firms of similar size. Post-split prices have comparatively more dispersion even though all sample firms used the same two-for-one split factor. The median post-split price falls in the 39th percentile while the upper and lower quartiles are at the 57th and 25th percentiles, respectively. Consistent with the trading range hypothesis, Figure 1 indicates that splits realign share prices from relatively high levels to a range that is closer to the median level for comparably sized firms.

Another way to view the results in Table 1 and Figure 1 is that, if splits are in fact signals, they are not used by all managers possessing favorable private information. It seems unlikely that the only managers with good news to convey are in firms with high share prices resulting from a recent price runup.

III. The Market Reaction to Split Announcements

The market reaction to split announcements is examined by computing five-day market-adjusted returns from two days before to two days after the announcement. Market-adjusted returns are calculated by subtracting the five-day holding period return on the CRSP value-weighted NYSE-ASE portfolio from the five-day holding period return for the splitting firms. Significance levels are assessed using cross-sectional standard errors.

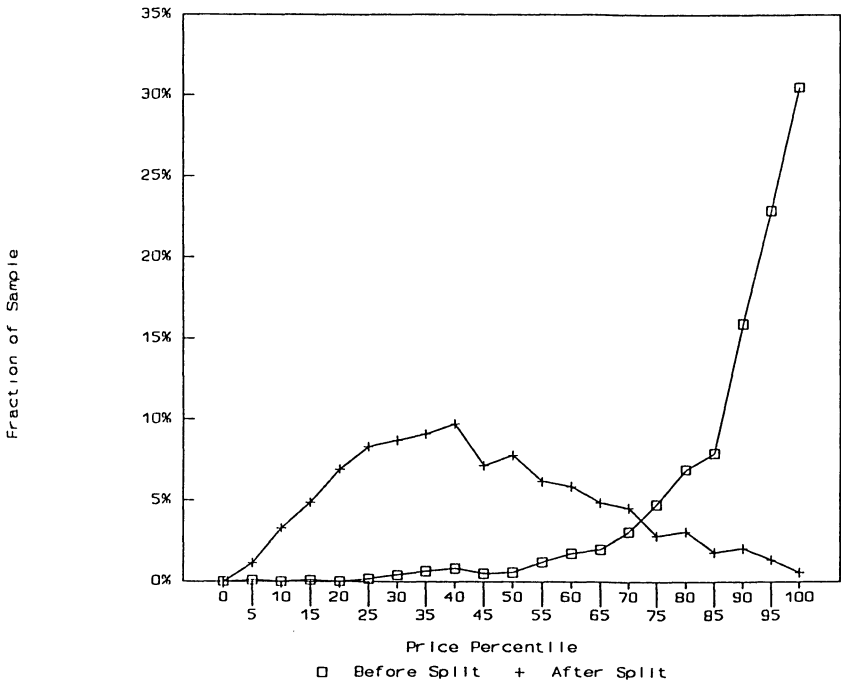


FIGURE 1

Histogram of Price Percentiles before and after Two-for-One Splits, 1975–1990

This histogram plots the frequency of share price percentiles before and after two-for-one splits in the sample. Price percentiles are determined in the month before the split was declared relative to all NYSE and ASE firms ranked in the same size decile as the splitting firm.

These announcement return results are consistent with prior research supporting the self-selection hypothesis (Grinblatt et al. (1984), Asquith et al. (1989), McNichols and Dravid (1990)). That research suggests that, in addition to bringing share prices back into a trading range, splits also serve as positive signals to the market. The announcement period results also provide a reference point for interpreting the long-run post-split performance results reported later in the paper.

A. Univariate Analysis

In Table 2, the market reaction to the sample split announcements is reported for all firms by subperiod, size decile, and book-to-market quintile. The mean announcement return of 3.38 percent ($t = 19.47$) indicates that splits are interpreted by the market as good news. The mean announcement return declines from 4.26 percent ($t = 13.10$) in the 1975–1980 period to 2.02 percent ($t = 8.03$) in 1986–1990 period.

Partitioning the sample by firm size reveals that two-for-one splits are undertaken by large firms; more than half the sample is classified in the three largest

TABLE 2

Announcement Returns for Two-for-One Stock Splits of NYSE and ASE Firms 1975 to 1990

	<i>n</i>	Abnormal Return	<i>t</i> -Stat.
All Two-for-One Splits	1,275	3.38	19.47
<i>Time period</i>			
1975 to 1980	405	4.26	13.10
1981 to 1985	461	3.82	12.43
1986 to 1990	409	2.02	8.03
1975 to 1980–1986 to 1990		2.24	5.46
<i>Size decile</i>			
1, 2, & 3 (small firms)	69	10.04	7.22
4	71	6.25	7.36
5	114	5.00	7.85
6	148	4.20	8.83
7	172	3.40	8.22
8	210	3.24	8.58
9	230	1.97	6.43
10 (large firms)	261	1.01	4.19
Deciles 1, 2, & 3–decile 10		9.03	6.40
<i>Book-to-market quintile</i>			
1 (glamour stocks)	543	3.96	13.18
2	336	3.37	10.28
3	212	3.25	9.33
4	139	2.14	4.94
5 (value stocks)	45	0.91	1.57
Quintile 1–quintile 5		3.05	4.70

This table reports average abnormal returns for NYSE and ASE firms announcing two-for-one stock splits between 1975 and 1990. Abnormal returns are calculated for each firm by taking the five-day holding period return from two days before through two days after the declaration date, and subtracting the five-day holding period return to the value-weighted CRSP NYSE-ASE index. Average abnormal returns are reported overall, by time period, by size decile at the time of the announcement, and by book-to-market quintile at the time of the announcement.

size deciles. Only 5 percent of the sample falls in the three smallest size deciles. The announcement return is 10.04 percent ($t = 7.22$) for the smallest three deciles combined, and 1.01 percent ($t = 4.19$) for firms in the largest decile. The return difference of 9.03 percent ($t = 6.40$) between small and large firms is consistent with evidence reported by Brennan and Copeland (1988) and by Grinblatt et al. (1984) that split announcement returns are larger for smaller firms. As with other information events, such as earnings announcements, split announcements are more informative for small firms because less information about small firms generally is available to market participants.

Lakonishok, et al. (1994) and Haugen (1995) suggest book-to-market ratio as a measure of undervaluation, with high book-to-market firms being more likely to be undervalued. If a stock split is a signal of undervaluation, and if book-to-market ratio is a good proxy for the degree of undervaluation, the magnitude of the split announcement reaction should be positively correlated with book-to-market ratio. The market reaction by book-to-market quintiles is provided in the bottom

panel of Table 3.⁴ The fact that more than 40 percent of the sample falls in the low book-to-market quintile (glamour stocks) is consistent with the prior stock price runup experienced by the splitting firms. Less than 4 percent of the sample have high book-to-market ratios (value stocks). Contrary to our expectations, the announcement reaction for glamour stocks is 3.96 percent ($t = 13.18$), which is actually greater than the announcement return for value stocks of 0.91 percent ($t = 1.57$). The difference in return of 3.05 percent ($t = 4.70$) suggests that the market interpretation of a split announcement is more positive for glamour stocks, at least in the short run.

TABLE 3
Announcement Returns for Two-for-One Stock Splits of NYSE and ASE Firms 1975 to 1990:
By Post-Split Price Percentile

	<u><i>n</i></u>	<u>Abnormal Return</u>	<u><i>t</i>-Stat.</u>
All Two-for-One Splits	1,275	3.38	19.47
<i>Post-split price percentile</i>			
1 to 10 (low prices)	56	5.42	5.33
11 to 20	150	4.56	7.49
21 to 30	217	4.16	10.46
31 to 40	240	3.26	9.64
41 to 50	190	2.91	6.92
51 to 60	154	2.34	4.21
61 to 70	120	2.83	5.79
71 to 80	75	2.85	3.98
81 to 90	49	1.98	2.20
91 to 100 (high prices)	24	3.14	2.54
Low price percentiles 1 to 20	206	4.80	9.18
High price percentiles 81 to 100	73	2.36	3.25
Low-high price percentiles		2.44	2.72

This table reports average abnormal returns for NYSE and ASE firms announcing two-for-one stock splits between 1975 and 1990. Abnormal returns are calculated for each firm by taking the five-day holding period return from two days before through two days after the declaration date and subtracting the five-day holding period return to the value-weighted CRSP NYSE-ASE index. Abnormal returns are reported by post-split price percentiles. Post-split price percentiles are calculated by taking the ending price for the month preceding the split declaration, dividing the price by two to adjust for the split factor, and comparing the resulting value to prices of all NYSE and ASE firms in the same size decile as the splitting firm.

Brennan and Hughes (1991) argue that splits resulting in low post-split share prices provide more credible signals of management's private information. This suggests that announcement returns should be inversely related to post-split prices. Announcement returns partitioned by post-split percentile are reported in Table 3. The largest announcement reaction of 5.42 percent ($t = 5.33$) is observed for the lowest post-split price firms. The difference in announcement return between the lowest and highest 20 percent of the post-split percentile groups is 2.44 percent

⁴The procedure for determining book-to-market quintiles is discussed more thoroughly later when we examine long-run performance. Briefly, book-to-market quintiles are determined by sorting exchange-listed stocks into size deciles on the basis of market equity, and then sorting into book-to-market quintiles within each size decile.

($t = 2.72$), confirming that the market reacts more positively to splits that reduce prices to lower levels.

B. Multivariate Analysis

To control for possible interaction of size, book-to-market ratio, post-split price, and time period, the five-day announcement return is regressed on each of these variables. The results are reported in Table 4. Consistent with the univariate evidence, firm size and book-to-market are inversely related to announcement returns. The relation between post-split prices and announcement returns also is negative. In addition, the time period dummy variables included in model 6 in Table 4 indicate that the market reaction to splits has been declining over time, and this decline is not explained by size, book-to-market ratio, or post-split prices.

TABLE 4
Cross-Sectional Regressions of the Announcement Reaction to Two-for-One Stock Splits of NYSE and ASE Firms 1975 to 1990

	β_j						R^2
	α	Size Decile	Book/Mkt Quintile	Post-Split Percentile	d_{75-80}	d_{81-85}	
(1)	10.73 (18.29)	-0.99 (-13.05)					11.79%
(2)	4.61 (13.06)		-0.60 (-3.99)				1.24%
(3)	11.64 (18.22)	-0.97 (-12.88)	-0.49 (-3.49)				12.63%
(4)	4.87 (12.78)			-0.04 (-4.38)			1.48%
(5)	15.63 (20.08)	-1.14 (-14.96)	-0.50 (-3.66)	-0.06 (-8.52)			17.35%
(6)	14.55 (17.51)	-1.13 (-14.79)	-0.43 (-3.17)	-0.07 (-9.08)	2.10 (5.31)	0.96 (2.49)	19.15%

This table reports regression coefficients from regressing the announcement return (in percent) on Size Decile, Book-to-Market Quintile, Post-Split Percentile, and two time-period dummy variables. The announcement return ($AR_{i,-2,+2}$) is computed by compounding daily returns for splitting firms from two days before through two days after the date the split was declared, and subtracting the concurrent CRSP value-weighted index holding period return. Size deciles are determined in the month prior to the split relative to all NYSE and ASE firms on CRSP and Compustat. Book-to-market quintiles are determined within each size decile. Post-split price percentiles are calculated by taking the month-end price preceding the split declaration, dividing the price by two to adjust for the split factor, and comparing the resulting value to prices of all NYSE and ASE firms in the same size decile as the splitting firm. Time-period dummy variables take on the value of one for splits that occurred between 1975 and 1980 (d_{75-80}) or 1981 and 1985 (d_{81-85}), respectively.

$$AR_{i,-2,+2} = \alpha + \beta_1 \text{Size Decile}_i + \beta_2 \text{Book/Mkt Quintile}_i + \beta_3 \text{Post-Split Percentile}_i + \beta_4 d_{i,75-80} + \beta_5 d_{i,81-85} + \epsilon_i$$

t-statistics are in parentheses.

To summarize, the five-day market reaction to a split announcement is negatively related to size, post-split price, and book-to-market ratio. The next section examines the stock price performance of split firms in the three years after the split.

IV. Long-Run Performance

A. Measuring Long-Run Performance and Significance

Long-run performance subsequent to the split announcement is calculated in a manner similar to the buy-and-hold strategy used by Ikenberry, et al. (1995) for open market share repurchases. We assume an equal-weighted strategy beginning in the month *following* the split announcement. This initial investment is allowed to compound over event-time such that gains or losses incurred in one year are carried over into the next. If a splitting firm stops trading for some reason, such as a takeover or bankruptcy, the investment in the splitting firm is maintained through the date trading ceases. The remaining days in that partial month are assumed to be invested to earn the daily return to the CRSP value-weighted index. The monthly returns remaining in the resulting partial year are assumed to be invested to earn the mean monthly return to firms in the splitting firm's size and book-to-market benchmark. At the end of each year, portfolios are rebalanced among the surviving firms. This technique results in a slight sample size decrease over the three-year post-split period as firms cease trading. Portfolio returns for the benchmarks portfolios described below are computed in a similar manner.

Excess performance for the splitting sample is determined relative to a reference portfolio. This portfolio is formed using size and book-to-market benchmarks. Benchmarks are determined by sorting all eligible NYSE/ASE firms each month into size deciles on the basis of market value. Within each size decile, firms are further sorted into quintiles on the basis of book-to-market ratios.⁵ Thus, for each month in the sample period, all eligible NYSE/ASE firms are sorted into one of 50 possible size and book-to-market portfolios. Each split firm is matched with one of the 50 size/book-to-market portfolios formed in the month prior to the split. The overall reference portfolio return is computed assuming equal-weighting and annual rebalancing among the portfolios matched with each of the split firms.

Excess performance in year one, for example, is defined as the difference between the annual return to split firms beginning in the first full month following the announcement and the concurrent mean return to the matched size and book-to-market reference portfolios. At the beginning of years two and three, both the split portfolio and the reference portfolios are rebalanced to equal weights. This procedure approximates a three-year buy-and-hold strategy for both the firms in the split portfolio and the firms included in the reference portfolios. That is, once firms are classified in a given size and book-to-market group at a specific point in time, the composition of that portfolio is held constant for the next three years.

Applying standard parametric tests to long-run performance measures is problematic because of assumptions regarding normality, stationarity, and time depen-

⁵To avoid a look ahead bias, we assume a four-month reporting delay when calculating book-to-market ratios (Banz and Breen (1986)).

dence (Kothari and Warner (1995), Barber and Lyon (1996)). To avoid these concerns, we estimate statistical significance using a bootstrap approach. For each splitting firm in the sample, a matching firm with the same size decile rank and book-to-market quintile rank is randomly drawn from the NYSE/ASE population in the month prior to the split. The excess return to this randomly formed portfolio provides one observation from the distribution of excess returns formed under the null hypothesis that a stock split has no impact on long-run performance. This process is repeated to generate 5,000 such observations. The empirical distribution of these simulated returns is used to determine p -values for the actual returns observed for splitting firms. Each empirical distribution is specific to the sample being evaluated; the entire bootstrap process is repeated for each particular subsample examined.

B. The General Case

Annual buy-and-hold and compounded holding period returns for splitting firms are reported in Table 5. The return to splitting firms in the first year following the split announcement is 19.11 percent, which is 7.93 percent higher than the 11.18 percent mean return for the reference portfolios. The p -value of 0.000 for this difference indicates that none of the 5,000 bootstrap portfolios produces excess returns this high. Placed in perspective, the magnitude of this one-year post-split excess return is larger than the average annual equity risk premium earned by common stocks during the same time period. Over the first three years following the two-for-one splits, the excess compounded return is 12.15 percent (p -value = 0.000), suggesting that the first-year excess return is permanent. Desai and Jain (1995) verify this result using other distribution factors.

Excess returns for splits declared in three subperiods are reported in the bottom panels of Table 5. In each case, year one excess returns are positive, the lowest value being 4.82 percent (p -value = 0.001) for splits announced between 1986 and 1990. The largest excess return is generated in the subperiod 1981 to 1985, where splitting firms outperformed their benchmark by 11.79 percent in year one and by 21.28 percent after three years, with p -values of 0.000 in both cases. Overall, the observation of excess positive post-split performance is robust over time, particularly for year one returns where p -values are 0.000 or 0.001 in each subperiod. Insignificant excess annual buy-and-hold returns in years two and three suggest that the favorable information associated with a split announcement is incorporated into prices within one year, and that the positive excess returns in year one are not reversed in later years.

The existence of long-run excess returns after splits announcements is consistent with the self-selection hypothesis. Managers in firms with high share prices condition their decision to split on expected future performance. Positive announcement returns confirm that splits are interpreted by the market as good news. However, evidence of long-run excess returns in the year following split announcements indicates that the market underreacts to the announcements.

TABLE 5
Annual Buy-and-Hold Returns following
Two-for-One Splits of NYSE and ASE Firms 1975 to 1990

	<i>n</i>	Annual Buy-and-Hold Returns				Compounded Holding-Period Returns			
		Split Firms	Reference Portfolio	Diff.	(p-Value)	Split Firms	Reference Portfolio	Diff.	(p-Value)
<i>All Years</i>									
Year 1	1275	19.11	11.18	7.93	0.000	19.11	11.18	7.93	0.000
Year 2	1215	16.18	16.61	−0.44	0.645	38.38	29.64	8.74	0.000
Year 3	1137	19.44	18.12	1.32	0.445	65.28	53.13	12.15	0.000
<i>1975 to 1980</i>									
Year 1	405	25.88	19.18	6.70	0.001	25.88	19.18	6.70	0.001
Year 2	398	13.33	13.96	−0.63	0.612	42.67	35.82	6.85	0.018
Year 3	384	27.78	28.88	−1.08	0.706	82.32	75.05	7.28	0.081
<i>1981 to 1985</i>									
Year 1	461	19.56	7.76	11.79	0.000	19.56	7.76	11.79	0.000
Year 2	443	26.12	25.20	0.92	0.304	50.78	34.93	15.86	0.000
Year 3	429	16.06	13.93	2.13	0.143	75.00	53.72	21.28	0.000
<i>1986 to 1990</i>									
Year 1	409	11.90	7.09	4.82	0.001	11.90	7.09	4.82	0.001
Year 2	405	8.09	9.55	−1.45	0.832	20.96	17.31	3.65	0.080
Year 3	398	15.02	12.19	2.83	0.057	39.12	31.61	7.51	0.025

This table reports annual and compounded buy-and-hold returns (in percent) following two-for-one splits of NYSE and ASE firms for up to three years. Equal-weighted portfolios are formed beginning in the month following the split for all splits between 1975 and 1990, and for three subperiods, 1975 through 1980, 1981 through 1985, and 1986 through 1990. The reference portfolio is formed using benchmark returns corresponding to each particular split sample, matched on the basis of size and book-to-market ranking. Compounded holding-period returns assume annual rebalancing. Significance levels are determined via bootstrapping.

V. The Robustness of Long-Run Performance

A. Long-Run Performance by Size and Book-to-Market Ranking

The five-day announcement period results indicate that the immediate market reaction to split announcements is greater for small firms. If the degree of market underreaction is also greater for small firms, then long-run excess performance for these firms will exceed that for large firms. Long-run performance by size decile ranking is provided in Panel A of Table 6. The results indicate that excess returns are positive for all size groups for up to three years following the split. The first-year excess returns are significant in six of the eight size groups. For the three-year returns, excess performance for the mid-cap firms (size deciles 4 through 8) is the greatest. The relationship between firm size and post-split excess returns is examined in a multivariate setting later in the paper.

The relative magnitudes of the five-day announcement reaction and first-year post-split excess returns differ across the size groups. For all but the largest size decile, the sum of the announcement reaction (Table 2) and year one excess return is between 12 percent and 14 percent. However, for size deciles 1 through 4, 60 percent of that excess return occurs during the five-day announcement period,

TABLE 6
Compound Buy-and-Hold Returns following Two-for-One Splits of NYSE and ASE Firms 1975 to 1990: By Size and Book-to-Market

Panel A. Compounded Return Differences by Size Decile														
Small Stocks														
Deciles 1, 2, & 3			Decile 4			Decile 5			Decile 6			Decile 7		
Year	n	ρ - Diff.	Return	ρ - Value	n	Return	ρ - Diff.	Value	n	Return	ρ - Diff.	Value	ρ - Diff.	n
1	69	4.07	0.224	71	6.45	0.104	114	9.56	0.010	148	7.78	0.015	172	9.27
2	67	5.49	0.256	67	13.95	0.081	108	11.46	0.049	144	13.25	0.017	167	14.31
3	63	4.44	0.328	61	17.33	0.133	105	20.54	0.038	141	22.99	0.008	161	17.35
Panel B. Compounded Return Differences by Book-to-Market Quintile														
Glamour or Low Book-to-Market Stocks														
Quintile 1			Quintile 2			Quintile 3			Quintile 4			Quintile 5		
Year	n	ρ - Diff.	Return	ρ - Value	n	Return	ρ - Diff.	Value	n	Return	ρ - Diff.	Value	ρ - Diff.	n
1	543	10.88	0.000	0.000	336	6.72	0.001	212	1.91	0.177	139	10.21	0.000	45
2	530	9.21	0.001	0.006	326	8.21	0.006	210	3.20	0.182	135	15.63	0.000	45
3	516	10.57	0.006	0.006	314	11.92	0.006	205	9.25	0.050	131	19.84	0.002	45
Value or High Book-to-Market Stocks														
Year	n	ρ - Diff.	Return	ρ - Value	n	Return	ρ - Diff.	Value	n	Return	ρ - Diff.	Value	ρ - Diff.	n
1	543	10.88	0.000	0.000	336	6.72	0.001	212	1.91	0.177	139	10.21	0.000	45
2	530	9.21	0.001	0.006	326	8.21	0.006	210	3.20	0.182	135	15.63	0.000	45
3	516	10.57	0.006	0.006	314	11.92	0.006	205	9.25	0.050	131	19.84	0.002	45

This table reports compounded buy-and-hold return differences (in percent) between split firms and the reference portfolio for three years following two-for-one splits of NYSE and ASE firms. Panel A reports return differences by firm size deciles, while Panel B reports return differences by book-to-market quintile. Equal-weighted portfolios are formed beginning in the month following the split. The reference portfolio is formed using benchmark returns corresponding to each particular split sample, matched on the basis of size and book-to-market ranking. Compounded holding-period returns assume annual rebalancing. The sample size (n) reflects the number of firms in each group at the beginning of Year 1. Significance levels are determined via bootstrapping matched to each particular subsample.

compared to only 16 percent of the total for size deciles 9 and 10. Grinblatt et al. (1984) suggests that a possible motivation for declaring a split is to attract the attention of analysts. One interpretation of the high proportion of the market reaction occurring in the five-day announcement period for small firms is that the analyst attention accompanying a split has a proportionately greater impact in the announcement period for small firms that typically are not followed as closely by analysts.

The five-day announcement return results did not support the interpretation of a high book-to-market ratio as an indication of undervaluation. However, if high book-to-market firms initiating a stock split are truly undervalued in comparison to other high book-to-market firms, there should be a positive relation between excess long-run performance and book-to-market rankings.⁶ Panel B of Table 6 reports long-run performance by book-to-market quintiles. In the first year after the split announcement, firms in the lowest book-to-market quintile, or glamour stocks, exhibit excess returns of 10.88 percent (p -value = 0.000), the largest return among the book-to-market groups.⁷ After three-years, the excess compounded return for this group is 10.57 percent (p -value = 0.006), suggesting that much of the excess long-run performance for glamour stocks is confined to year one.

For firms with higher book-to-market ratios, first-year excess returns are positive but substantially lower than those observed for glamour stocks. When quintiles 2 through 5 are combined, the excess return in year one is 5.75 percent, a return that is only half that observed for glamour stocks. This effect is magnified when the announcement period returns and first-year excess returns are considered together. However, unlike glamour stocks where long-run excess performance is essentially confined to the first year, moderate to high book-to-market firms show evidence of continuing excess returns in years two and three. In fact, for firms in book-to-market quintiles 3, 4, and 5, the total first-year market reaction to the split announcement (five-day announcement return plus year one excess return) comprises less than half of the cumulative excess return for the three years after the split. In addition, after three years, there is evidence of a positive relation between book-to-market ratio and excess performance. For example, three-year compounded excess performance increases from 10.57 percent for quintile 1 to 19.84 percent and 20.80 percent for quintiles 4 and 5, respectively.

B. Long-Run Performance by Post-Split Price Percentile

If splitting to a low price level is a more informative signal, as suggested by Brennan and Hughes (1991), but the market underreacts to this information, excess returns for low post-split price firms should be greater than for firms maintaining high post-split prices. Panel A of Table 7 reports long-run performance by post-split price level. Excess returns in year one are positive for each group and significant for six of the 10 groups. However, there is no evidence that firms splitting to low post-split prices have better long-run performance. In fact, the

⁶Ikenberry, et al. (1995) uses a similar argument to explain why value firms repurchasing shares might also be expected to perform well, even when performance is measured against a value stock benchmark.

⁷The large excess return is not due entirely to the use of a low glamour stock benchmark. If a size-only benchmark is used, the excess return in year one is still 6.86 percent.

three-year excess returns of firms with very low post-split share prices (price percentiles of 1 to 10) are actually negative (−4.83 percent). Since the five-day announcement return for the low post-split price firms is 5.42 percent (see Table 3), the poor subsequent performance suggests that the market misinterprets these split announcements in the short run.

TABLE 7
Compound Buy-and-Hold Returns following Two-for-One Splits of NYSE and ASE Firms 1975 to 1990:
By Post-Split Price Percentile and Pre-Split Runup

Panel A. By Post-Split Price Percentile					Panel B. By Presplit Runup				
Post-Split Price Percentile	<i>n</i>	Year 1	Year 2	Year 3	Presplit Runup Group	<i>n</i>	Year 1	Year 2	Year 3
1–10 (low prices)	56	0.98 (0.406)	−4.53 (0.747)	−4.83 (0.671)	1 (negative runups)	52	−1.92 (0.657)	−3.90 (0.678)	−16.53 (0.916)
11–20	150	6.70 (0.011)	6.23 (0.086)	10.41 (0.058)	2 (low-positive runups)	136	11.65 (0.000)	19.06 (0.001)	19.17 (0.007)
21–30	217	8.10 (0.000)	11.37 (0.002)	14.41 (0.007)	3	136	12.74 (0.000)	17.58 (0.001)	30.11 (0.000)
31–40	240	10.68 (0.000)	8.57 (0.013)	10.05 (0.001)	4	136	9.44 (0.001)	10.31 (0.017)	16.73 (0.010)
41–50	190	11.09 (0.000)	11.55 (0.007)	14.30 (0.018)	5	136	8.90 (0.002)	5.02 (0.142)	11.28 (0.050)
51–60	154	6.47 (0.010)	4.03 (0.212)	3.95 (0.296)	6	136	7.93 (0.012)	12.44 (0.010)	19.22 (0.006)
61–70	120	7.15 (0.016)	12.81 (0.024)	12.62 (0.089)	7	136	9.06 (0.003)	5.29 (0.146)	9.73 (0.098)
71–80	75	7.06 (0.078)	14.24 (0.040)	16.58 (0.075)	8	136	8.10 (0.002)	8.93 (0.037)	16.24 (0.022)
81–90	49	0.34 (0.433)	6.59 (0.235)	7.93 (0.268)	9	136	3.14 (0.160)	0.92 (0.477)	−0.99 (0.584)
91–100 (high prices)	24	9.68 (0.143)	6.26 (0.330)	−2.33 (0.490)	10 (largest runups)	135	4.22 (0.086)	4.57 (0.211)	−0.28 (0.515)

This table reports compound buy-and-hold return differences (in percent) by post-split price percentile and by presplit runup. Post-split price percentiles are determined by taking the ending price for the month preceding the split declaration, dividing the price by two to adjust for the split factor, and comparing the resulting value to the prices of all NYSE and ASE firms in the same size decile. Runup Portfolio 1 contains 52 firms for which the total return in the year prior to the split was negative. The remaining firms are evenly divided into nine portfolios with runup portfolio 10 containing the highest positive presplit runups. Excess return performance is calculated beginning in the month following the split announcement and is determined relative to reference portfolio performance formed on the basis of size and book-to-market. Compounded holding-period returns assume annual rebalancing. The sample size (*n*) reflects the number of firms in each group at the beginning of Year 1. Significance levels are determined via bootstrapping matched to each particular subsample.

C. Momentum

Chan, et al. (1995) finds evidence of persistence, or momentum, in stock returns over horizons of six months to a year. Since stock splits are preceded by large stock price runups, post-split excess performance could be simply a manifestation of momentum, particularly since much of the excess post-split performance accrues in the first year.

If momentum drives post-split performance, presplit and post-split stock returns should be positively related. To examine this possibility, long-run post-split performance is reported by presplit total return (or runup) in Panel B of Table 7. In the sample, 52 firms have negative presplit total returns and are grouped separately in portfolio 1. The remaining 1,223 firms are sorted by presplit runup and divided

into nine equal portfolios with portfolio 10 containing the firms with the highest runups.

Setting aside the results for the negative runup firms, there is some evidence of an *inverse* relationship between year one excess performance and presplit runup. For example, portfolio 2 has the smallest positive presplit runup, and the second highest year one excess return (11.65 percent). Portfolio 10 has the highest presplit runup, and the second lowest year one excess return (4.22 percent). For the three-year period following a split, portfolio 2 firms have excess returns of 19.17 percent, compared to the three-year excess return of -0.28 percent for the firms with the largest runups. In summary, the excess returns following a split announcement are not attributable to momentum.

For the 52 firms in portfolio 1 with negative total returns prior to splitting, the excess return after three years is -16.53 percent. What the objective of the managements of these firms might have been in declaring a split is not clear, but this evidence demonstrates that not all splits are undertaken to signal private information about favorable future prospects. The negative post-split returns for the negative runup firms, coupled with a similar result for firms splitting to low post-split prices, suggests that some splits provide a false signal.

D. Multivariate Analysis

The univariate results provide evidence that the variables size, book-to-market ratio, and presplit runup are related to long-run post-split performance. To determine whether these results hold in a multivariate setting, one-year and three-year excess returns are regressed on these variables. The results are provided in Table 8. The regressions include a dummy variable (False Signal) that is equal to one if presplit returns are negative.

With regard to one-year excess returns, the results are similar to the univariate results reported in Tables 6 and 7. Book-to-market ratio ($t = -3.09$) and presplit runup ($t = -3.49$) are negatively related to post-split performance. The conclusion that glamour stocks show the strongest excess performance in the year following the split does not change once other factors are controlled. Moreover, the conclusion regarding momentum does not change either; high presplit performance is related to lower post-split performance after controlling for the effects of book-to-market, firm size, and post-split price. The negative coefficient on the dummy variable False Signal ($t = -2.56$) confirms that firms with a negative presplit runup experience significantly lower post-split returns. As observed earlier, no relation is apparent between post-split prices and year one excess performance, or between firm size and year one excess performance.

For the three-year results, size and presplit runup are both negatively related to post-split excess performance. The size result confirms the univariate evidence in Panel A of Table 6 showing that mid-cap firms exhibit better three-year post-split performance than do large firms. The evidence that three-year excess performance is greater for high book-to-market firms (see Table 6, Panel B) is clarified in Table 8. The superior three-year performance of the high book-to-market firms is a consequence of the fact that these firms generally have a low presplit runup. In

TABLE 8
Cross-Sectional Regressions of One- and Three-Year Excess Returns for Two-for-One
Stock Splits of NYSE and ASE Firms 1975 to 1990

	β_j					
α	Size Decile	Book-to- Market Quintile	Post-Split Percentile	Presplit Runup Decile	False Signal	
<i>Panel A. One-Year Excess Performance</i>						
(1)	5.38 (1.52)	0.26 (0.57)			-8.41 (-1.73)	
(2)	10.46 (5.30)	-1.54 (-1.85)			-7.72 (-1.58)	
(3)	6.96 (3.24)		0.01 (0.18)		-8.39 (-1.72)	
(4)	13.13 (5.25)			-0.97 (-2.54)	-12.28 (-2.41)	
(5)	21.45 (3.42)	-0.03 (-0.06)	-2.78 (-3.09)	0.02 (0.35)	-1.49 (-3.49)	-13.06 (-2.56)
<i>Panel B. Three-Year Excess Performance</i>						
(1)	22.99 (2.47)	-1.74 (-1.46)			-18.68 (-1.46)	
(2)	6.37 (1.22)	1.74 (0.80)			-19.54 (-1.52)	
(3)	12.96 (2.91)		-0.07 (-0.60)		-18.84 (-1.47)	
(4)	28.06 (4.27)			-3.03 (-3.00)	-30.81 (-2.30)	
(5)	62.32 (3.77)	-3.01 (-2.38)	-1.22 (-0.51)	-0.12 (-0.95)	-3.75 (-3.34)	-33.14 (-2.47)

This table reports regression coefficients from regressing excess one-year and three-year returns (in percent) on various firm characteristics. For each firm in the sample, the excess return is computed as the difference between the raw return and the return to firms in the same size and book-to-market benchmark. For firms not surviving three years following the split, benchmark returns are used to fill in missing returns. Size Decile is determined in the month prior to the split relative to all NYSE and ASE firms on CRSP and Compustat. Book-to-Market Quintile is determined within each size decile. The Post-Split Price Percentile is calculated by taking the month-end price preceding the split declaration, dividing the price by two to adjust for the split factor, and comparing the resulting value to the prices of all NYSE and ASE firms in the same size decile as the splitting firm. The Presplit Runup Decile is determined by classifying all firms with negative total returns in the year prior to the split into portfolio 1. False Signal is a zero-one dummy variable that takes on the value of one if the total return in the year prior to the split is negative. The remaining firms are then sorting on the basis of presplit performance into one of nine portfolios.

$$\text{Excess return}_i = \alpha + \beta_1 \text{Size Decile}_i + \beta_2 \text{Book/Mkt Quintile}_i + \beta_3 \text{Post-Split Percentile}_i + \beta_4 \text{Presplit Runup Decile}_i + \beta_5 \text{False Signal}_i + \epsilon_i$$

t-statistics are reported in parentheses.

a multivariate setting, book-to-market is an insignificant factor in explaining three-year post-split returns, but presplit runup is still inversely related to post-split returns. The exceptions to this relationship are the negative runup firms that have negative post-split returns.

VI. Conclusions

Stock splits are a puzzling phenomenon to financial economists. Splits seem to be cosmetic in nature, yet they are associated with positive announcement returns. Two stylized explanations for splits are that they are used to move share prices into a trading range to increase liquidity, and that they are used by management as signal of positive private information. The self-selection hypothesis is a synthesis of these two explanations and suggests that managers use splits to move share prices into a trading range, but condition their decision to split on expectations about the future performance of the firm.

We examine a sample of 1,275 two-for-one stock splits announced by NYSE and ASE firms between 1975 and 1990. Splits generally occur when stocks trade at high prices. In the month preceding the split announcement, nearly four out of five sample firms traded at prices at or above the 80th percentile in comparison to firms of similar size. Post-split prices show substantial dispersion, but are generally lower than the median price observed for firms of comparable size. This result is consistent with the view that splits are typically used to realign share prices to a normal trading range.

The five-day announcement return of 3.38 percent confirms prior research that splits convey favorable information. The market reaction is greater for small firms, low book-to-market firms, and firms splitting to low share prices. However, we find evidence that investors underreact to split announcements. Splitting firms generate significant excess returns of 7.93 percent in the first year after the split, and excess returns of 12.15 percent in the three years following the split. The highest first-year excess return is exhibited by low book to-market (glamour) stocks. We observe an *inverse* relationship between the presplit runup and post-split excess returns, suggesting that our results are not attributable to momentum. Two exceptions to the finding of significant positive post-split returns are splits undertaken by firms with a negative presplit runup and splits to low post-split prices.

The evidence is consistent with the self-selection hypothesis. Splits realign share prices to lower trading levels, but managers condition their decision to split on their expectations of the firm's future performance. Firms that announce two-for-one splits exhibit favorable long-run performance after the announcement.

The fact that the market initially underreacts to the information in a split announcement is consistent with results observed for other corporate events. Apparently, the failure of the market to fully respond to information within a short announcement period is a general result and not specific to a particular corporate event.

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