The Spinoff and Merger Ex-Date Effects

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ABSTRACT

This article shows that some of the wealth gains from financial decisions involving changes in security form occur on predictable ex dates. For a sample of 113 spinoffs during 1964 to 90, we document an average excess return of 3.0 percent on ex dates, roughly the same magnitude as the average announcement-date return. We conjecture that the spinoff ex-date return arises because the parent and subsidiary stocks attract different investors who prefer to buy the separated shares after the ex date. We also document that, on average, the target shareholders in stock-for-stock mergers earn an excess return of 1.5 percent on merger ex dates.

RECENT YEARS HAVE WITNESSED a large increase in restructuring programs that include divestitures. For example, Kaplan and Weisbach (1992) report that 44 percent of a sample of large acquisitions completed in the 1970s and early 1980s had already been divested by the end of the 1980s. Most divestitures are accomplished by selling an unwanted subsidiary or division to another company or a group of investors for cash (based on a casual survey of transactions reported in the *Mergers and Acquisitions* magazine). This divestiture form is commonly known as a selloff. In many cases, however, the parent company relinquishes control of a subsidiary by simply distributing the subsidiary shares as a nontaxable stock dividend to current stockholders. This latter divestiture form is known as a spinoff and has been gaining popularity in recent years.

Many authors have investigated the wealth effects of spinoffs. Hite and Owers (1983) report an event-period excess return of 3.30 percent surrounding first announcements and 7.00 percent over an extended period beginning fifty days before the first announcement and ending on the completion date when the spinoff becomes certain, such as following a formal declaration by the board of directors. Schipper and Smith (1983) document a two-day excess return of 2.84 percent and Miles and Rosenfeld (1983) report 3.34 percent.

With a recent sample of sixteen spinoffs during 1987 to 1989, Marais and Schipper (1991) also report an announcement-period excess returns of about 4 percent.

Using a sample of 113 spinoff announcements during 1964 to 1990, we document announcement-period returns comparable to the above-mentioned studies. In addition, we document excess returns of 3.03 percent on the spinoff ex dates (and another positive but insignificant 0.48 percent during the following five days). The ex-date returns are comparable in magnitude with the announcement-period returns. These returns were first documented by Copeland, Lemgruber, and Mayers (1987), who report an average wealth gain of 2.19 percent on ex dates of fifty-nine spinoffs during 1962 to 1981. They do not offer any explanation for the ex-date returns, however, except that these may be related to the bid-ask spread effect (i.e., a systematic tendency for the cum-date prices to lie at the bid price and/or ex-date prices to lie at the ask price).

At first, it appears surprising that such large returns occur on predictable ex dates when, on average, there is no fresh information. The returns are within bounds placed by transaction costs so as to preclude arbitrage by purchasing before ex dates and selling afterwards, however. We show that the ex-date returns are not caused by the bid-ask spread effect or any other measurement errors. Instead, these returns are based on stock prices that represent greater than average market depth and are significant within several different partitions of data. The ex-date returns seem to arise from a variety of microstructure considerations that make the combined stock less attractive than the separated stocks that start trading after the ex date. The article focuses on understanding these considerations and their relationship with stock prices.

We reason that the imminent separation of parent and subsidiary stocks makes it unattractive for many buyers to purchase the combined stock. Spinoffs are often justified by arguing that separation leads to better valuation of each business. The two business may be followed by different analysts and may attract different clienteles (depending, for example, on the type of industry, S&P 500 listing status, risk characteristics, and dividend yield). Now, if an investor only wanted to buy one of the two postdivestiture stocks, he would prefer to wait until after the ex date. Obtaining the desired stock by first purchasing the more expensive combined stock and then selling off the undesired portion would incur higher transaction costs. In addition he would pay an uncertain price, because the relative valuation of parent and subsidiary stock are not known until after the ex date. Small investors would face additional constraints, because purchasing the combined stock would require a greater cash investment and lead to an odd lot of subsidiary shares in most cases. One reason for ex-date returns, therefore, may be that many buyers are willing to pay a premium to wait until after the ex date. From the sellers' point of view, however, selling the combined stock before the ex date makes better sense, because selling the two stocks separately would incur higher transaction costs. Another reason for ex-date returns, therefore, may

be that potential sellers require a premium to defer their sales until after the ex date. From the market makers' and arbitrageurs' point of view, the spinoff ex dates are accompanied by increased volatility as the market discovers the prices of separated parent and subsidiary stocks. The extra risk may justify some extra return. A spinoff may also pose unique inventory balancing problems, as one stock is replaced by two, and the second stock is sometimes not even traded on the same exchange.

We present evidence of increases in ex-date volatility, trading volume, and bid-ask spreads consistent with the above conjectures. To further investigate whether ex-date returns reflect the greater investment appeal of separated shares, we examine the cum-date prices of when-issued parent and subsidiary shares. When-issued shares are like forward contracts on the actual shares that start trading after the ex date. In the context of stock splits, Choi and Strong (1983) argue that when-issued shares sell for a premium, because many small investors prefer to buy the postsplit shares. We find that the spinoff ex-date returns are of the same order as the combined when-issued premium on parent and subsidiary shares and that their correlation is very high.

Although spinoffs are the focus of our study, the ex-date returns accompany other changes in security form. Using a sample of 184 stock-for-stock mergers during 1980 to 1989, we find that target company shares trade at prices that are, on average, 1.38 percent less than conversion value based on the contemporaneous share price of the bidder company. The price discount persists until the last minute before the target company's stock ceases to exist and represents an excess return to shareholders who hold stock through the ex date.[1] We conjecture that merger ex-date returns could arise from higher transaction costs associated with trading odd lots received in a merger, the inconvenience of exchanging the old stock for new stock, and special inventory balancing problems facing market makers as the target stock ceases to exist. It appears as if both in the case of spinoffs and mergers there are advantages to buyers from buying the surviving securities, but there are disadvantages to sellers from holding onto the expiring securities.

Why is this study of spinoff and merger ex-date returns interesting? First, in the case of spinoffs, we show that the wealth gains are significantly larger than previously documented. This suggests the need for greater research into how spinoffs create value for the shareholders. The earlier articles by Hite and Owers (1983), Schipper and Smith (1983), and Linn and Rozeff (1985) suggest improved performance from focusing on a narrower set of activities after spinoff as a major reason for spinoff. Even without the ex-date returns, Hite and Owers (1983) observe that the gains seem too large to be explained

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[1]Many studies have investigated the wealth effects of mergers (see, for example, Dodd (1980), Jensen and Ruback (1983), Dennis and McConnell (1986), and the references in these articles). To the best of our knowledge, however, the ex-date returns arising from discrepancy between a target company's stock price and its conversion value have not been documented.

entirely by the synergies from separate operations.[2] Cusatis, Miles, and Woolridge (1993) suggest that spinoffs create wealth by providing a low-cost method of transferring control of corporate assets to bidders. This article suggests the clientele hypothesis as another explanation of the spinoff wealth gains. (A version of the clientele hypothesis was first suggested by Hakansson (1982).) Second, there are some similarities between spinoffs and stock splits from a market microstructure point of view. A spinoff can be thought of as a stock split in which the two split-up portions are different. Eades, Hess, and Kim (1984) and Grinblatt, Masulis, and Titman (1984) document similar but smaller ex-date returns for stock splits and stock dividends. Some of the microstructure considerations studied in this article may be useful in explaining excess returns on ex dates of stock splits and stock dividends. Third, by correlating the ex-date returns with the when-issued premium, this article provides some insight into the sources of when-issued premiums. Fourth, in recent years many researchers have investigated whether transaction costs and other market imperfections affect stock prices. Amihud and Mendelson (1986) show that monthly stock returns increase with bid-ask spreads. Lakonishok and Vermaelen (1990) find that buying stock before the expiration date of a repurchase tender offer and tendering to the firm produces, on average, abnormal returns of more than 9 percent, which they conjecture as a possible compensation for arbitrageurs who bear significant unsystematic risk in trading around expiration dates. Jarrow and O'Hara (1989) show that a prime and a score are worth more than the whole stock, which they suggest may be related to the cost of replicating a long-term call option via dynamic hedging. This article provides further evidence that transaction costs may affect stock prices and that ignoring such considerations may understate wealth gains accruing from important financial decisions.[3]

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[2] The comment: "One means of achieving independence would be to create an autonomous subsidiary. ... That spinoffs *per se* could generate gains roughly equal to the value of the divested unit is to suggest that the market value of the company is hardly diminished even though assets are distributed to the subsidiary. The gains seem quite large, to be explained by the savings from using separate specialized contracts in which parent and subsidiary have comparative advantages."

[3] It is interesting to contrast the implications of previous studies with our study. Because the percentage cost of trading separated shares is usually higher than the percentage cost of trading combined shares, Amihud and Mendelsohn's (1986) model suggests that spinoffs should lead to negative price reaction on that count. However, this negative reaction should occur on the announcement date, when it becomes known that trading costs will go up. (Other influences such as synergy gains may result in an overall positive announcement-date return.) Because ex dates are predictable with certainty, the ex-date returns should only reflect the actions of marginal traders around ex dates. Unlike repurchase offers, however, the return uncertainty that attracts arbitrageurs may not be present around spinoff ex dates. Repurchase offers are never pro rata to all shareholders, so arbitrageurs gain from making superior forecasts of posttender price and the number of shares likely to be tendered, which helps them decide whether to tender. Because spinoff dividends are always pro rata, there is no similar opportunity around spinoff ex dates (although there is some other opportunity in view of the high uncertainty concerning relative prices of the parent and subsidiary shares). The Jarrow and O'Hara (1989) results are the closest to ours in spirit; both suggest that two parts of a stock may be worth more apart than together.

Section I describes the spinoff sample, some institutional details, and methodology. Section II documents the spinoff ex-date returns, and Section III shows that the returns are not explained by measurement biases. Section IV suggests possible explanations for the spinoff ex-date returns and provides empirical evidence based on trading volume, excess volatility, bid-ask spreads, and prices of when-issued shares. Section V describes the merger ex-date returns, and Section VI concludes.

I. Data and Methodology

A. *The Sample of Spinoffs*

To identify the sample we searched the Center for Research in Security Prices (CRSP) daily tapes for spinoffs completed by the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and NASDAQ firms from 1962 to 1990. We then checked the *Moody's Dividend Records* and the *Wall Street Journal Index* for details of these spinoffs. CRSP identifies nontaxable spinoffs with a distribution code of 3763. However, this code also applies to new issues of another class of shares by the same firm. We exclude all such cases which were not bona fide spinoffs. We also excluded cases in which the announcement date or distribution details could not be found in the Moody's or the Journal index. Finally, we excluded four cases in which the parent company stock was trading at less than three dollars before the announcement date. In such cases, the parent and/or the subsidiary stocks are priced at pennies after spinoff. Including these cases adds considerable noise, but it does not change our results. Our final sample consists of 121 subsidiaries spun off in 113 different divestitures by 105 companies. One company spun off three subsidiaries in the same divestiture, and six companies spun off two subsidiaries at a time. The CRSP files include 119 of the spun-off firms.[4]

We identified the announcement and completion dates in a manner similar to Hite and Owers (1983). We first searched the *Wall Street Journal Index* for two years before the ex date in order to locate the first mention of a spinoff proposal, which we define as the announcement date. We define the completion date as the day all uncertainty was resolved and the terms of spinoff became final. This is typically the date of a formal declaration by the board or shareholder approval. In thirty-five cases, the *Wall Street Journal* carried only one report of the spinoff. In such cases, we additionally searched the Nexis database, which contains a comprehensive listing of media reports on any company. The Nexis database provides information only for spinoffs announced after 1984, however, and for announcements before 1984 we searched the *Predicasts F & S Index, Investment Dealers Digest Mergers & Acquisitions Reports*, and the *SEC News Digest*. In seventeen cases, we found an earlier announcement data and used this as the first announcement date. In the remaining eighteen cases with only one report, the same date was

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[4]Sample details are available from the author on request.

assigned for both the announcement and completion. The completion date excess returns for these eighteen cases are zero by construction. Our focus in this study is on the ex-date returns. Fortunately, the ex dates are unambiguous. The payment or distribution date, the ex date, and the date the new stock started trading are identified from CRSP and cross-checked with the Moody's manuals for accuracy.

Table I shows summary statistics for our sample of spinoffs. Our sample is concentrated during the last decade. As mentioned before, this partly reflects increased popularity of spinoffs in recent years. (The samples in Hite and Owers (1983), Schipper and Smith (1983), and Cusatis, Miles, and Woolridge (1993) are similarly skewed toward later years.) In addition, CRSP apparently did not record many spinoffs in earlier years. The companies in our sample spun off, on average 29 percent of their assets (median 18 percent).

B. Computation of Excess Returns

We compute excess returns on the announcement date, completion date, ex date, and an extended window starting fifty days before the announcement

Table I
Summary Statistics for the Sample of 113 Spinoffs Over the Period 1964 to 1990

The initial sample of spinoffs was identified from the CRSP 1990 files. Nontaxable spinoffs are identified with a distribution code of 3763 on CRSP files. The final sample of 113 spinoffs satisfies the following additional criteria: (1) The distribution was a bona-fide spinoff resulting in the creation of another company; (2) an announcement date can be identified from the *Wall Street Journal Index*, and the distribution details can be verified from Moody's manuals; and (3) the parent company stock was priced at more than three dollars on the announcement date.

Panel A. Observations by the Year of Ex Date			
1964–1970	1971–1980	1981–1985	1986–1990
1	21	35	56

Panel B. Observations by Exchange Listing on the Ex Date			
	NYSE	AMEX	NASDAQ
Parent companies	84	4	25
Subsidiaries	56	10	53

Panel C. Other Summary Statistics				
	Mean	25 Percentile	Median	75 Percentile
1. Parent company stock price on cum date	$29.65	$13.125	$24.250	$37.875
2. Parent company stock price on ex date	$21.72	$8.188	$17.000	$29.250
3. Subsidiary stock price on ex date	$15.26	$5.000	$11.875	$19.625
4. Combined market value on ex date (million dollars)	1188	111	391	1527
5. Fraction of assets spun off (based on market value)	0.289	0.055	0.179	0.467

date and ending five days after the ex date. Because the overall period may sometimes exceed a year, we employ buy-and-hold returns so that our results are not subject to biases of the kind discussed by Blume and Stambaugh (1983).[5] Excess returns are computed using market model parameters estimated over a 250-day period ending a year before the announcement date. Beginning with the ex date, the old company ceases to exist and the market model is no longer appropriate; the excess returns over this period are therefore calculated by simply subtracting market returns.[6] Market returns are proxied by returns on an equally weighted portfolio of all NYSE and AMEX stocks, and the *t*-statistics are calculated cross-sectionally by using the standard deviation of excess returns. (It makes little difference if we use the NASDAQ composite returns as a proxy for market returns in the case of NASDAQ stocks.) We verify that our announcement-date, completion-date, and ex-date returns are quite unaffected by whether we use market model or mean-adjusted return model, arithmetically added or geometrically compounded returns, or value-weighted or equally weighted market returns (although the returns measured over longer periods in between any of these dates are affected).

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[5] The buy-and-hold returns are computed as $(1 + R_{i1}) \times (1 + R_{i2}) \times \cdots \times (1 + R_{iT}) - 1$ rather than $R_{i1} + R_{i2} + \cdots + R_{iT}$, where R_{it} is the ordinary return on day t for security i. The difference between geometrically compounded buy-and-hold returns and simple arithmetically added returns increases with the number of intervals and with price volatility. In another context, Blume and Stambaugh (1983) show that problems related to arithmetic vs. geometric compounding, even with monthly returns, explain half of the size effect. To compute buy-and-hold excess returns, we first estimate the market model with log security returns (log returns are strictly additive), $r_{it} = \log(1 + R_{it})$, and log market returns, $r_{mt} = \log(1 + R_{mt})$, as follows:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \epsilon_{it}$$

The excess log return for the security on any day τ during the holding period is then estimated as $\hat{\epsilon}_{i\tau} = r_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i r_{m\tau}$, and the holding-period buy-and-hold excess return is determined by transforming log excess returns back to ordinary returns as $\exp(\Sigma \hat{\epsilon}_{i\tau}) - 1$. As a practical matter, the one- or two-day excess returns are almost completely unaffected by whether the returns are arithmetically added or geometrically compounded, but the longer period returns are significantly affected. As an extreme example of the latter, consider Texas International Company, which spun off Regal International Inc. Over the period from December 10, 1981 to June 1, 1982 (fifty days before the first announcement date to ex date), the stock price declined from $40.125 to $12.625, after adjusting for the subsidiary value. Over the same period, the market returns equaled −5.2 percent. The buy-and-hold excess returns for this company over the entire period equaled −76 percent, whereas the arithmetically cumulated excess returns equaled −141 percent! A hypothetical company that earns an excess return of −10 percent a day could earn an unacceptable −300 percent over 30 days if cumulated arithmetically.

[6] To assess the reasonableness of market adjustment procedure, we calculate betas for the parent and subsidiary companies over a 250-day period starting 6 trading days after the ex date. The parent betas average 1.037 and the subsidiary betas average 0.944. The weighted average of parent and subsidiary betas equals 1.047. All three postdivestiture betas are significantly different from the average beta of 1.131 for the combined stock measured over a 25-day period ending a year before the first announcement date. We verify that using post-ex-date beta to calculate parent and subsidiary excess returns over $ED + 1$ to $ED + 5$ makes very little difference.

The computation of ex date-returns requires special attention. In 77 cases out of 113, the subsidiary shares were distributed by the parent company on the last cum date and started trading on the ex date using regular delivery procedures.[7] This procedure is markedly different from ordinary cash dividends, for which the record date is usually the fifth business day after the ex date (in order to allow regular delivery and recording of all cum-dividend purchases on the fifth business day after purchase date—see Alfano (1987) and Choe and Masulis (1991) for details), and the distribution date is several days after the record date. For an example, note the following relevant dates for distributions made by Teledyne Inc. in the first half of 1990:

Distribution Type	Announcement Date	Record Date	Payment Date	Ex Date
Ordinary cash	900126 Fri	900207 Wed	900221 Wed	900201 Thu
5 for 1 stock split	900126 Fri	900208 Thu	900301 Thu	900302 Fri
Spinoff Unitrin Inc.	890613 Tue	900320 Tue	900420 Fri	900423 Mon
Ordinary cash	900426 Thu	900507 Mon	900522 Tue	900501 Tue

(The announcement date for spinoff is obtained from the *Wall Street Journal Index* and the other dates are all from CRSP files.) Note the ex dates for both the stock split and the spinoff are on the next trading date following the payment or distribution dates, so that the new shares in either case can be traded using regular delivery procedures on ex dates. Barring special or irregular delivery procedures, an investor can only buy the combined Teledyne and Unitrin stocks until 900420, but thereafter the two stocks must be bought or sold separately.[8] In such cases, the ex-date return is calculated by combining the ex date prices of the two firms in spinoff proportions and dividing by the cum-date price. In thirty-one cases, however, the new stock is distributed and/or listed an average of fifteen days after the ex date. In such cases, the first available price of newly issued stock after the distribution date is discounted by the market return over the period from the ex date to the date of this price. The discounted price is then combined with the ex-date price of the parent-company stock to determine ex-date returns. (In the remaining five cases, ex-date returns cannot be calculated, because the parent company is acquired or the subsidiary company is not included in CRSP files.) Excess returns over the five days following ex date are calculated by combining parent and subsidiary prices in the same fashion, but only for

[7] In four cases of seventy-seven, the subsidiary shares were distributed on the day before the last cum date.

[8] An added complication arises because the record date of the spinoff dividend is before the ex date. Thus purchase made after the fifth trading day preceding 900320 and before 900420 will be entitled to the Unitrin stock, but will be too late to be on record to receive such distribution directly from the company. Rule 257 of the NYSE specifies that in such cases the seller will give a due bill for the amount of spinoff distribution to the buyer. Rule 259 further specifies that the due bill will become redeemable for the newly issued Unitrin stock on the distribution date of 900420. The overall effect of these rules is that, regardless of the record date, all cum-date buyers get the combined stock and all ex-date buyers get the separated stocks.

the seventy-seven clean cases in which the newly listed stocks were distributed on the last cum date and started trading on the ex date. All ex-date prices are cross-checked with hard copy sources for accuracy.

It is important to note that in every case our ex-date returns are based on subsidiary trade prices after the distribution date and using regular delivery procedures. None of our returns are based on when-issued prices, which are separately analyzed in Section IV.

II. Spinoff Announcement and Ex-Date Price Effects

Table II shows the excess returns on announcement date, completion date, ex date, and the surrounding periods for our sample of 113 spinoffs. Over a forty-nine day period ending two days before the announcement (publication) date, the parent companies earn a significantly positive excess return of 4.34 percent. This could be explained by leakages of news concerning spinoff or incomplete reporting by the *Wall Street Journal*. In some cases, spinoffs are announced in the middle of other restructuring events, which may also

Table II
Mean Excess Returns on Dates Surrounding 113 Spinoffs Over the Period 1964 to 1990

AD, *CD*, and *ED* refer to the announcement, completion, and ex dates respectively. The announcement date is the date of first *Wall Street Journal* report. The completion date is the day when the *Wall Street Journal* announces resolution of all uncertainty concerning the spinoff. In eighteen cases the announcement and the completion dates are identical. In such cases, the excess returns over $AD + 1$ to $CD - 2$ and $CD - 1$ to CD are assumed to be zero. Excess returns for any security around spinoff event dates are calculated using the market model parameters estimated over a 250-day period ending a year before the first announcement date. The daily excess returns are compounded geometrically to give buy-and-hold excess returns over longer periods (see Section I for details). Cases where excess returns over one or more of the subintervals are missing are dropped from the computation of cumulative excess returns. Because the sample sizes differ and because all returns are buy-and-hold returns, the mean cumulative excess returns over $AD - 50$ to AD and $AD + 1$ to $CD - 2$ do not add up to $AD - 50$ to $CD - 2$, etc.

		Mean Excess Returns				Mean Cumulative Excess Returns	
Interval	Sample Size	Mean (*t*-statistic)		Median	Percentage Positive	Sample Size	Mean (*t*-statistic)
$AD - 50$ to $AD - 2$	111	4.34	(2.73)**	2.56	60	111	4.34 (2.73)**
$AD - 1$ to AD	113	2.90	(5.39)**	2.10	63	111	7.15 (4.44)**
$AD + 1$ to $CD - 2$	113	1.35	(0.73)	0.00	NA	111	8.93 (3.31)**
$CD - 1$ to CD	111	0.79	(1.53)	0.05	NA	109	9.70 (3.45)**
$CD + 1$ to $ED - 1$	112	−0.16	(−0.13)	−0.22	45	109	10.32 (3.12)**
ED	108	3.03	(6.34)**	2.12	80	104	13.36 (3.68)**
$ED + 1$ to $ED + 5$	76	0.48	(0.68)	−0.38	47		

*Denotes significance at the 5 percent level.
**Denotes significance at the 1 percent level.

explain this excess return. The announcement period excess return averages 2.90 percent and is very significant. It is positive in sixty-three percent of the cases. In many cases, however, the uncertainty is not completely resolved by the first announcement date. The firms earn an extra 0.79 percent on the completion date and 1.35 percent between the announcement and completion dates (*t*-statistics 1.53 and 0.73). Between the completion and ex dates, the stocks earn an insignificant excess return of -0.16 percent.[9]

The ex-date returns are particularly interesting. Table II shows that investors earn an extra 3.03 percent on the ex date (*t*-statistic 6.34). The ex-date return is very significant and is positive in four-fifths of the cases. Its median value equals 2.12 percent, and its minimum and maximum values are -9.16 and $+19.73$ percent. It is not caused by small-priced stocks, which have been excluded from our sample. In dollar terms, the firms in our sample earn an average of 68 cents on ex dates after adjusting for the market returns.

During the five-day period following the ex date, the parent stocks earn another 1.20 percent (*t*-statistic 1.31), whereas the subsidiary stocks lose 1.36 percent (*t*-statistic -1.13) more than the market average. (Using the market model estimated over $ED + 6$ to $ED + 255$ as benchmark gives excess returns of 1.31 and -1.36 percent.) When combined in spinoff proportions, the portfolio of parent and subsidiary stocks earns a positive but insignificant 0.48 percent over the five days following the ex date.

Over an extended period starting fifty days before the first announcement date and ending on the ex date, the 113 firms in our sample earn an excess return of 13.36 percent (*t*-statistic 3.68). A large part of this return occurs on ex dates, which is anomalous because ex dates are known weeks in advance, and there is no fresh release of information.

III. Robustness Checks and Examination of Potential Biases in Ex-Date Returns

The spinoff ex-date returns are quite robust. For example, these returns are not confined to any one exchange. The eighty-four parent company stocks listed on the NYSE earn 2.27 percent and the twenty-five parent company stocks listed on the NASDAQ earn 6.20 percent (*t*-statistics: 4.92 and 4.57). Another natural classification is based on the size of the subsidiary's value relative to that of the prespinoff firm. (Hite and Owers (1983) show that announcement-date returns are increasing with the relative size of the spun-off subsidiary.) When arranged into three groups based on the relative size of the subsidiary, from smallest to largest, the ex-date returns equal 2.57, 3.52, and 2.99 percent (*t*-statistic: 6.45, 3.24, and 3.44). And when arranged into three groups based on the cum-date price of parent stock, from

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[9] The announcement-date returns are a smaller 2.13 percent (*t*-statistic 1.89) in eighteen cases where the *Wall Street Journal Index* carried only one report and no earlier media report could be found. The returns over $AD - 50$ to $AD - 2$ in these cases average 2.16 percent (*t*-statistic 0.51), but the returns over $AD + 1$ to $CD - 2$ and $CD - 1$ to CD average 0.00 (by construction).

smallest to largest, the ex-date returns equal 4.33, 2.38, and 2.46 percent (*t*-statistic: 4.42, 2.72, and 3.97). A final classification is based on the combined market value of parent and subsidiary companies. The ex-date returns for the low, medium, and high market value groups average 4.94, 2.61, and 1.65 percent (*t*-statistic: 4.37, 3.92, and 2.89). Thus our ex-date returns are not driven by a small subset of cases.

We now examine potential biases in ex-date returns. Hite and Owers (1983) and Schipper and Smith (1983) explain that they did not examine ex-date returns, because during the period of their studies most subsidiary stocks were distributed and listed several days after the ex date and even then the trading was quite sparse. Indeed, ten of fifteen stocks in our sample with ex dates before 1980 had been distributed and listed by the ex date. In the 1980s, however, the ex dates were usually set to be the next trading day after the distribution date. Both the ex-dividend parent company stocks and the newly issued subsidiary stocks thus started trading in normal fashion on ex dates. For the subset of seventy-seven stocks distributed and listed by the ex date, the excess returns average 2.46 percent (*t*-statistic 4.71) and are only slightly smaller than for all 108 cases in Table II. Thus our results are not much changed if we restrict our attention to cases in which subsidiary stock was distributed on the last cum date and started trading on the ex date.

We examine trading volume of spun-off subsidiary stocks to see whether their ex-date prices are based on adequate market depth. In this context, our results based on spinoffs concentrated in the late 1980s are opposite to those of earlier periods documented by Hite and Owers (1983) and Schipper and Smith (1983). The 1991 version of CRSP tapes record trading volumes for NASDAQ stocks since November 1982 and for NYSE/AMEX stocks since July 1962. Subsidiary trading volumes are thus available in seventy-six cases as reported in Table III. The ex-date trading volume averaged 141,400 shares (median 40,300 shares) for subsidiary shares and was greater than the average trading volume for all NYSE stocks, which as recently as 1990 averaged 115,000 shares (median 42,000 shares) a day. For one company, Unitrin, Inc., spun off from Teledyne, Inc., 1,524,000 shares were traded on April 23, 1990, making it the sixth most active NASDAQ issue on its ex date. For another company, Anadarko Petroleum Corp., spun off from Panhandle Eastern Corp., 692,000 shares were traded on its ex date of October 2, 1986, placing it among the twenty or so most active NYSE issues. Thus our ex-date returns are not based on thin trading volume.

We next examine whether the ex-date returns are explained by the bid-ask spread bias as suspected by Copeland, Lemgruber, and Mayers (1987). Suppose, in an extreme case, the cum-date price is always a bid price, the ex-date price is an ask price, and all other prices are the average of bid-ask prices. Suppose also that all true returns are zero. Then we will measure a positive ex-date return equal to the full bid-ask spread even when the true return is zero. We first note that in this case the cum-date return (i.e., between $ED - 2$ and $ED - 1$) should equal minus half the bid-ask spread as the closing price on $ED - 1$ is understated by the half spread. The return on the

day after the ex date (i.e., between *ED* and *ED* + 1) should also equal minus half the bid-ask spread as the closing price on *ED* is overstated by the half spread. Instead, we find that the excess return on the one day preceding and following the ex date are both an insignificant -0.07 and $+0.20$ percent. (Table II shows that returns on an extended five-day period following the ex date are also a positive 0.48 percent.) Second, we test this potential bias by examining only cases where CRSP recorded the midpoint of closing bid-ask prices instead of the closing trade prices. CRSP daily prices of all NASDAQ issues before November 1982 and NASDAQ non-National Market System (NMS) issues right up to December 1990 are quote midpoints. In fifteen cases where both the parent and subsidiary prices were quote midpoints, we observe ex-date returns of 6.02 percent (*t*-statistic 3.54). Third, the 1991 version of CRSP tapes provide the closing trade prices of NASDAQ-NMS stocks after November 1982 in regular files and the closing bid-ask prices in a separate file. For the eleven cases of parent stock included in both files, the last trade price on cum date is lower than the spread midpoint in five cases, equal in two cases, and higher in four cases. For the twenty-eight cases of parent or subsidiary stock included in both files, the last trade price on the ex date is lower than the spread midpoint in eleven cases, equal in seven cases, and higher in ten cases. These results suggest that the ex-date returns are not explained by the bid-ask spread bias.

We finally explore whether our returns are explained by any other distributions sharing an ex date with the spinoff distribution. In three cases in spinoff ex date was also the ex date for a taxable dividend distribution. Excluding these three cases makes no difference to the spinoff ex-date returns. It also makes no difference to exclude another three cases in which the spinoff ex date is the joint ex date for a two-for-one reverse split of the parent stock.

In summary, we find that the ex-date returns are quite robust and cannot be explained by any well-known measurement biases. The ex-date returns are of the same order as the announcement-date returns. However, because ex dates are often known weeks in advance, the ex-date returns cannot be explained by the arrival of new information. This also raises the question of whether one can make arbitrage profits by trading around ex dates. Purchasing the combined stock on the cum date and selling the separated stocks on ex dates would incur three one-way transaction costs. Using transactions data for a brief period during March to April 1984, we estimate the bid-ask spread portion of transaction costs of similarly priced stocks to average more than two percent.[10] The bid-ask spread and other transaction costs should

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[10] For a subset of the smaller NASDAQ stocks, Table V reports higher actual bid-ask spreads. To examine arbitrage possibilities, we also test a strategy of purchasing the combined stock at the cum-date ask price and selling the separated stocks at the ex-date ask prices. Unfortunately, the bid and the ask prices for the parent stocks on the cum date and *both* the parent and subsidiary stocks on the ex date are available in only seven cases. In these seven cases, the strategy produces an average gain of -1.02 percent before market adjustment and -1.33 percent after market adjustment.

make arbitrage unlikely, especially because it involves some holding-period risk between the cum date and the ex date.

IV. Possible Sources of Spinoff Ex-Date Returns: A Microstructure Analysis

A spinoff announcement tells the market that two businesses will separate. It also tells that a package of stocks will be unbundled. We argue that the imminent unbundling makes it attractive for potential buyers to wait until after the ex date but for potential sellers to act before the ex date. The resultant excess supply before and excess demand after the ex date prevent full realization of spinoff wealth gains when all uncertainty is resolved. Some of the wealth gains are deferred until the actual separation on the ex date.

The very existence of spinoffs may suggest that the parent and subsidiary stocks attract different investors. Otherwise, as argued by Hite and Owers (1983), many of the synergies arising from separate operations can be achieved by granting full autonomy to the subsidiary within the existing charter. The parent and subsidiary stocks may differ in their industry type, risk character-istics, dividend yield, and S&P 500 listing status. An investor interested in only one of the two postdivestiture stocks may want to delay his purchase until after the ex date for several reasons. First, he would save transaction costs by not purchasing the undesired portion of the combined stock and not having to sell it afterward. Second, purchasing the combined stock would require greater cash investment. Third, small investors would often end up with an odd lot of subsidiary shares, which are expensive to trade. Only one in three spinoffs pays a round lot of subsidiary shares for every round lot of combined shares. Fourth, purchasing the combined stock during the time between the record date and ex date would involve the extra inconvenience of receiving a due bill and exchanging it for the subsidiary shares. Fifth, the investor would have no control over the price he would end up paying for his desired portion of the combined stock. The relative valuation of parent and subsidiary stocks is unknown until after the ex date. Brennan and Hughes (1991) argue that many investors invest only in the shares of companies they "know about"; for example, the shares recommended by their brokers. But few brokers or analysts would recommend a stock without a price, and thus few investors would part with their money before the ex date.

Figure 1 shows the result of buyers' preference for postdivestiture stocks. *DD* represents the aggregate demand for combined shares before ex date and *D'D'* represents the aggregate demand for separated shares after ex date. The vertical distance between *D'D'* and *DD* equals the amount that buyers are willing to pay to receive the separated shares instead of the combined shares for the many reasons listed above. For example, if these reasons justify paying an extra $\$a$ per share (assumed constant across all buyers for simplicity), then the marginal buyers would be indifferent between purchas-ing at the cum-date price of $\$x$ or the ex-date price of $\$(x + a)$.
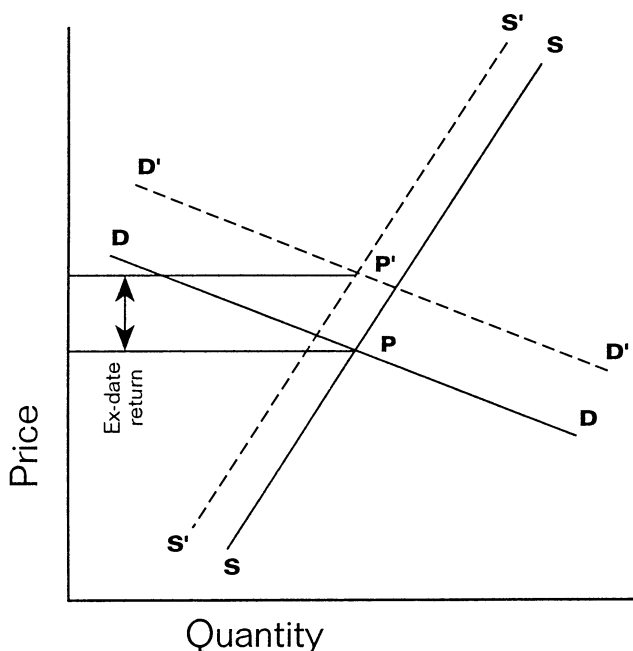
Figure 1. Spinoff ex-date returns and when-issued premia. *DD* represents the before ex-date demand schedule of potential buyers of postdivestiture stocks. Because potential buyers may want either parent or subsidiary stock, but not both, they prefer to buy their preferred stock after the ex date (see Section IV for details). The after ex-date demand schedule *D'D'* is therefore higher than *DD*. The before ex date supply schedule is shown by *SS*. Because potential sellers incur higher transaction costs in deferring their sales to after ex dates, the after ex-date supply schedule *S'S'* is also higher than *SS*. The equilibrium before and after ex-date prices is shown by *P* and *P'*. Both the spinoff ex-date return and the cum-date premium on parent and subsidiary stocks equal the difference between *P* and *P'*.

Potential sellers also attach a greater price to the separated shares, but for different reasons. First, selling before the ex date requires only one transaction instead of two, and that saves both the brokerage commission and bid-ask spread. Second, the odd lots received in a spinoff could increase the transaction costs of many sellers who presumably hold round lots of the combined stock. Figure 1 shows this graphically. The vertical distance between the after-ex-date supply curve *S'S'* and the before-ex-date supply curve *SS* equals the amount that compensates the seller for incremental transaction costs. For example, if transaction costs of selling after spinoff are higher by b per share, then the marginal sellers would be indifferent between selling at the cum-date price of y or the ex-date price of $(y + b)$.

The intersection of *D'D'* and *S'S'* in Figure 1 gives the after ex-date price, *P'*, which is higher than the cum-date price *P*. The ex-date return should equal the difference between *P'* and *P*, and so should the combined when-issued premium on parent and subsidiary shares.

We must point out two caveats to this analysis. First, if a potential buyer were interested in buying both postdivestiture shares and in proportions similar to the spinoff distribution, he could actually reduce transaction costs by purchasing the combined stock before the ex date. If there were a sufficient number of such buyers, then there would be buying pressure before rather than after the ex date. But then there would also be very little reason for a spinoff. Second, some potential sellers may want to defer their sale until after the ex date, if, for example, they want to retain one of the two postdivestiture stocks. But if they knew of the impending spinoff, then they would perhaps not buy the combined stock in the first place. Overall, the ex-date returns will reflect the relative numbers of different types of buyers and sellers, which becomes an empirical issue.

We now consider the role of market makers and arbitrageurs. If the ex dates are accompanied by higher volatility as the market discovers the separate valuation of parent and subsidiary shares, then both short-term traders may require a risk premium in the form of an ex-date return. It is possible that like most long-term investors, short-term arbitrageurs are also interested in one rather than both stocks. For example, Cusatis, Miles, and Woolridge (1993) suggest that one of the post-divestiture companies is often an attractive takeover target, which may be of special interest to arbitrageurs. By purchasing the combined stock before the ex date, the arbitrageurs would incur the risk of not knowing the price paid for their portion of the combined stock. The market makers perhaps face the greatest risk. On the morning of the ex date they are required to quote the prices of two stocks that never existed before. They would lose money to informed traders, who would buy the relatively underpriced portion and sell the overpriced portion. The ex-date risk is of an unsystematic nature, but Kalay and Loewenstein (1985), Lakonishok and Vermaelen (1990), and Bajaj and Vijh (1993) argue that the positive excess returns accompanying other predictable events (such as dividend announcements and stock repurchase ex dates) can be explained as a compensation to short-term traders, who typically hold undiversified portfolios. In addition to bearing extra risk, the market makers also face unique inventory balancing problems in cases where the spun-off stock trades on a different exchange. In such cases, they incur incremental costs in disposing of the leftover inventory of subsidiary stock after the ex date.

Below we provide empirical evidence consistent with several of the above conjectures.

A. Trading Activity Surrounding Spinoff Ex Dates

Table III shows the average trading volume and turnover ratio of parent stocks over a period starting 500 days before the announcement date and ending 500 days after the ex date. The sample includes all parent stocks for which the trading volume data are available. (The CRSP 1991 tapes provide daily volume data for NYSE and AMEX stocks from July 1962 and NASDAQ stocks from November 1982, but frequently the data may be incomplete.) The

Trading Volume Changes on Dates Surrounding 113 Spinoffs Over the Period 1964 to 1990

The trading volumes are obtained from the 1991 version of CRSP files and are frequently missing, which reduces the sample. (For example, trading volumes for NASDAQ stocks before November 1982 are not available at all.) AD, CD, ED, and RD refer to the announcement date, completion date, ex date, and record date, respectively. The announcement date is the date of first *Wall Street Journal* report. The completion date is the day when the *Wall Street Journal* announces resolution of all uncertainty concerning the spinoff. In eighteen cases the announcement and the completion dates are identical. In such cases, the trading volume on the completion date and the period between announcement and completion dates is assumed to be missing. The subsidiary data is included only if the subsidiary stock had been distributed before the ex date and started trading using regular delivery procedure on the ex date (see Section I.B for details). Trading volumes preceding the record date are reported only if the record date lies between the completion date and the ex date. Turnover ratios are calculated by dividing the daily average dollar trading volume by the market value of all outstanding stock. Trading volume is expressed in hundreds of shares traded each day, and the turnover ratio is expressed in units of percent of outstanding equity traded each day. Figures in parentheses are normalized scores for easy compression.

	Parent Stock			Subsidiary Stock		
Interval	Sample	Trading Volume	Turnover Ratio	Sample	Trading Volume	Turnover Ratio
$AD - 500$ to $AD - 251$	93	949 (100)	0.255 (100)			
$AD - 50$ to $AD - 2$	99	1,184 (125)	0.350 (137)			
$AD - 1$ to AD	101	2,342 (247)	0.666 (261)			
$AD + 1$ to $CD - 2$	81	1,255 (132)	0.294 (115)			
$CD - 1$ to CD	81	1,654 (174)	0.417 (164)			
$CD + 1$ to $ED - 1$	97	1,156 (122)	0.307 (120)			
ED	96	1,560 (164)	0.430 (169)	76	1,414 (279)	0.787 (222)
$ED + 1$ to $ED + 5$	96	1,452 (153)	0.383 (150)	78	1,336 (264)	0.763 (215)
$ED + 251$ to $ED + 500$	79	1,068 (113)	0.253 (99)	75	506 (100)	0.355 (100)
$RD - 6$ to $RD - 5$	76	1,603 (169)	0.392 (154)			
$RD - 4$ to $RD - 3$	76	1,145 (121)	0.349 (137)			

corresponding data for subsidiary stocks is reported over a period starting on the ex date and ending 500 days after the ex date, but only in cases where the subsidiary shares had been distributed before the ex date and started trading on the ex date using regular delivery procedures. The trading volume is obtained by averaging the number of shares traded each day over the relevant subperiod. The turnover ratio is obtained by averaging the dollar value of shares traded each day over the subperiod and dividing by the end-of-subperiod market value.

Not surprisingly, the average trading volume and turnover ratio for parent stocks on the announcement date and completion date are higher than during the unaffected benchmark period spanning $AD - 500$ to $AD - 251$. Somewhat more surprisingly, the trading activity on the ex date is also very high. The ex-date trading volume of parent stock averages 156,200, which is 64

percent higher than during $AD - 500$ to $AD - 251$ and 46 percent higher than during $ED + 251$ to $ED + 500$. The typical subsidiary company is smaller than the parent company, yet 141,400 shares of subsidiary stock are traded on the ex date, nearly three times as many as during the latter benchmark period spanning $ED + 251$ to $ED + 500$. The parent and subsidiary stock turnovers on the ex date average 0.430 and 0.787 percent of all outstanding equity.

For a subset of sixty-nine observations for which the turnover data for both the parent and subsidiary stocks are available, the weighted-average turnover of separated shares on ex date equals 0.470 percent and is higher than the average turnover of parent stock during $CD + 1$ to $ED - 1$, which equals 0.306 percent. The difference equals 0.164 percent (t-statistic 2.79) and is positive in 43 cases (z-statistic 2.05), significant at the 1 percent and 5 percent levels. If the weighted-average turnover during the five days after the ex date is substituted in place of the ex-date turnover, the difference still equals 0.129 percent (t-statistic 3.83) and is positive in forty-seven cases (z-statistic 3.01), significant at the 1 percent level in both tests (perhaps because averaging over five days reduces the noise).

The significant increase in turnover from before ex date to after ex date supports the clientele hypothesis (although it may also be consistent with the existence of arbitrage trading activity). The clientele hypothesis suggests that the parent and subsidiary shares attract different investors. The strength of the clientele effect should be judged from the additional observation that the volume effects exists despite a substantial ex-date premium, which could induce many investors to shift their trades to before the ex date.

B. Price Discovery and the Ex-Date Volatility

Table IV shows the intraday volatility for parent and subsidiary shares on the various event dates and benchmark periods. The dollar volatility is measured by the average difference between the highest and lowest trade prices each day over a relevant subperiod and the percentage volatility is measured after dividing the dollar difference by the closing trade price. The highest and lowest trade price data are available only for the NYSE/AMEX stocks since July 1962 and NASDAQ-NMS stocks since November 1982. (The NASDAQ non-NMS stocks are altogether missing.)

The ex-date volatility is higher than even the announcement and completion date volatility despite a measurement disadvantage.[11] The percentage difference between the highest and lowest trade prices on the ex date equals

[11]The suggested measure may be the best available measure of intraday volatility, but it understates our results. To illustrate this, suppose that an announcement occurs during trading hours and is always accompanied by a large increase in price but no volatility. The difference between the highest and lowest price in this case will still be quite large. The first-moment effect overstates the announcement and completion date volatilities, because many announcements occur while the market is open. However, because ex dates are known weeks ahead of time, the ex-date returns are likely to occur during the overnight period and the ex-date volatility is not likely to be overstated.

Table IV

Intraday Volatility on Dates Surrounding 113 Spinoffs Over the Period 1964 to 1990

The highest and lowest trade prices on CRSP daily files are available only for the NYSE-AMEX stocks since July 1962 and the NASDAQ-NMS stocks since November 1982, which reduces the sample. *AD*, *CD*, and *ED* refer to the announcement, completion, and ex date, respectively. The announcement date is the date of first *Wall Street Journal* report. The completion date is the day when the *Wall Street Journal* announces resolution of all uncertainty concerning spinoff. In eighteen cases the announcement and the completion dates are identical. In such cases, the data on the completion date and the period between announcement and completion dates is assumed to be missing. The subsidiary data is included only if the subsidiary stock had been distributed before the ex date and started trading using regular delivery procedure on the ex date (see Section I.B for details). The dollar volatility is measured by the average difference between the highest and the lowest trade prices on any given day. The percentage volatility divides one hundred times the dollar difference between the highest and the lowest prices by the closing trade price. Figures in parentheses are normalized scores for any comparison.

| | Parent Stock | | | Subsidiary Stock | | |
| | | Average Volatility | | | Average Volatility | |
Interval	Sample	Dollar	Percentage	Sample	Dollar	Percentage
$AD - 500$ to $AD - 251$	88	0.712 (100)	2.62 (100)			
$AD - 50$ to $AD - 2$	91	0.678 (95)	2.62 (100)			
$AD - 1$ to AD	92	1.077 (151)	3.92 (150)			
$AD + 1$ to $CD - 2$	75	0.713 (100)	2.44 (93)			
$CD - 1$ to CD	75	0.984 (138)	3.04 (116)			
$CD + 1$ to $ED - 1$	89	0.674 (95)	2.45 (94)			
ED	93	0.884 (124)[a]	5.67 (216)	68	0.836 (177)[b]	6.13 (199)
$ED + 1$ to $ED + 5$	92	0.602 (85)	3.43 (131)	68	0.688 (146)	5.28 (171)
$ED + 251$ to $ED + 500$	81	0.502 (71)	2.72 (104)	64	0.472 (100)	3.08 (100)

[a] The average price of parent stocks in this subset decreased from $31.59 on the cum date to $23.88 on the ex date as a result of the spinoff.

[b] The average price of subsidiary stocks in this subset on the ex date equals $17.80.

5.67 and 6.13 percent for the parent and subsidiary shares, respectively, and is higher than during any other subperiod. We conjecture that the higher ex-date volatility arises as the market discovers the prices of stand-alone parent and subsidiary stocks. The uncertainty concerning relative prices before the ex date could decrease the attractiveness of combined shares to long-term investors interested in either stock and also justifies an excess return to short-term traders who bear this risk.

C. The Ex-Date Bid-Ask Spreads

Table V shows the closing bid-ask spreads for parent and subsidiary shares. The sample in this table is smaller than in other tables, because the closing bid-ask prices are available only for the NASDAQ stocks. The following result should be interpreted with the caution that the NASDAQ stocks are smaller than NYSE stocks, and the NASDAQ bid-ask spreads are larger.

Table V

Bid-Ask Spreads on Dates Surrounding 113 Spinoffs Over the Period 1964 to 1990

The bid-ask spreads on CRSP daily files are available only for NASDAQ stocks, which reduces the sample considerably. *AD, CD,* and *ED* refer to the announcement, completion, and ex date, respectively. The announcement date is the date of first *Wall Street Journal* report. The completion date is the day when the *Wall Street Journal* announces resolution of all uncertainty concerning spinoff. In eighteen cases the announcement and the completion dates are identical. In such cases, the data on the completion date and the period between announcement and completion dates are assumed to be missing. The subsidiary data are included only if the subsidiary stock had been distributed before the ex date and started trading using regular delivery procedure on the ex date (see Section I.B for details). The dollar spread is measured simply by the average closing bid-ask spread. The percentage spread divides one hundred times the dollar spread by the closing trade price. Figures in parentheses are normalized scores for easy comparison.

| | | Parent Stock | | | Subsidiary Stock | |
| | | Average Bid-Ask Spread | | | Average Bid-Ask Spread | |
Interval	Sample	Dollar	Percentage	Sample	Dollar	Percentage
$AD - 500$ to $AD - 251$	27	0.509 (100)	5.11 (100)			
$AD - 50$ to $AD - 2$	27	0.557 (109)	4.32 (85)			
$AD - 1$ to AD	27	0.549 (108)	3.98 (78)			
$AD + 1$ to $CD - 2$	28	0.662 (130)	4.07 (80)			
$CD - 1$ to CD	16	0.547 (107)	3.90 (76)			
$CD + 1$ to $ED - 1$	28	0.539 (106)	3.96 (78)			
ED	27	0.583 (115)[a]	8.90 (174)	31	0.859 (174)[b]	13.62 (146)
$ED + 1$ to $ED + 5$	27	0.556 (109)	8.38 (164)	30	0.634 (129)	11.44 (123)
$ED + 251$ to $ED + 500$	22	0.366 (72)	5.01 (98)	25	0.493 (100)	9.32 (100)

[a] The average price of parent stocks in this subset decreased from $21.07 on the cum date to $11.50 on the ex date as a result of the spinoff.

[b] The average price of subsidiary stocks in this subset on the ex date equals $12.00.

The ex-date bid-ask spreads of both the parent and subsidiary stocks are greater than during any other subperiod. Many researchers (e.g., Benston and Hagerman (1974)) have documented that bid-ask spreads decrease with an increase in trading volume and increase with an increase in volatility. In the present case, it appears that the volatility effect dominates the volume effect. The higher bid-ask spreads thus reinforce the conjectures derived from the higher volatility.

D. *The Role of Unusual Settlement Procedures*

In the Teledyne example of Section I.B., an investor purchasing the parent stock over the interval bounded by five trading days preceding the record date of 900320 and the ex date of 900423 would find that he is too late to receive the subsidiary stock from Teledyne and too early to receive it from the seller. The buyer in such cases would receive a due bill that would be

exchanged for the subsidiary stock five days after the ex date. Our informal inquiries revealed that the current procedure of handling due bills is quite automated, but until a few years back, the physical handling of due bills involved many extra steps. We examine the impact of this unusual settlement procedure with data.

If due bills are an extra inconvenience, then many investors should rush in to trade the stock on or before $RD - 5$ (RD refers to the record date.), the last day to trade the combined shares without having to deal with due bills. The bottom two rows in Table III suggest that this may be the case. For the 76 stocks that followed the normal exchange procedures typified by Teledyne, Inc., the trading volume averages 160,300 shares a day on $RD - 6$ and $RD - 5$ and 114,500 shares a day on $RD - 4$ and $RD - 3$. The trading volume decreases in forty-six cases and increases in thirty cases (the z-statistic of 1.84 is significant at the 10 percent level). The dollar turnover decreases in forty-seven cases and increases in twenty-nine cases (the z-statistic of 2.07 is significant at the 5 percent level). In an effort to see whether the due bills are more of an inconvenience for buyers as compared with sellers, we also examine the excess returns. The parent stocks earn an extra $+0.27$ percent during $RD - 6$ and $RD - 5$ and -0.52 percent during $RD - 4$ and $RD - 3$, but with t-statistics of $+0.84$ and -1.26. If these results are interpreted as a slight increase in buying pressure on $RD - 6$ and $RD - 5$, which dissipates on $RD - 4$ and $RD - 3$, then this is consistent with buyers finding due bills to be a relatively unattractive financial claim. The overall evidence suggests that some of the attractiveness of separated parent and subsidiary shares after the ex date may reflect the desire of investors to avoid the unusual settlement procedures.

E. Odd Lot Considerations in Spinoffs

Spinoffs frequently create odd lots of subsidiary shares. If odd lots are expensive to trade, then spinoffs that pay odd lots should be accompanied by higher ex-date returns than spinoffs that pay only even lots of subsidiary shares. We note, however, that the ex-date returns of 71 stocks belonging to the former stock group average 2.30 percent, whereas the ex-date returns of 37 stocks belonging to the latter stock group average 4.44 percent. (For the purpose of this test, any spinoff that does not pay an integer number of subsidiary shares for every parent company share is said to create odd lots.) The evidence appears to be contradictory at first, but a second look at the data shows that the latter group includes a greater percentage of smaller NASDAQ stocks (due to unknown reasons). Within the subset of NYSE stocks, the odd lot and even lot stock groups earn 2.18 and 2.31 percent on ex dates. The insignificant difference between these two subgroups may simply suggest that we cannot derive too much inference from a rather limited sample. But it may also suggest that odd lots are not a problem, which would be the case if the marginal traders were large institutional traders.

F. Ex-Date Returns and the When-Issued Premium

If the spinoff ex-date returns reflect the greater attractiveness of separated shares, then there should be a correspondence between the ex-date returns and the when-issued premiums. Presumably, both reflect the greater attractiveness of separated shares. When-issued shares are like forward contracts on the ex-split or ex-spinoff shares and were first studied by Choi and Strong (1983). If a stock distribution is substantial, both in percentage and in number of shares, the exchanges consider it desirable from the standpoint of public interest to start trading in when-issued shares a few weeks before the ex date, when the new shares become available. The delivery of when-issued shares occurs on the fifth trading day following the ex date. We obtain the prices and trading volumes for when-issued shares from the NYSE, AMEX, and NASDAQ daily stock price records. When-issued shares of both the parent and subsidiary companies were traded in twenty-nine cases. (When-issued shares of only the subsidiary company were traded in another thirty-nine cases.) These were the more substantial spinoffs; the median combined market value equals $785 million, and the median subsidiary market value as a proportion of the combined value equals 29 percent (corresponding figures for the full sample: $391 million and 18 percent). The very existence of when-issued shares indicates that many investors prefer to buy the separated shares. Table IV shows the relevant details of each case.

To compute the when-issued premium, we add the closing trade prices of parent and subsidiary shares in relevant proportions and calculate the percentage difference between the sum of prices and the closing trade price of regular shares. We average this percentage difference over five trading days preceding the ex date to obtain a final estimate of the when-issued premium. We make no adjustment for the interest saving on deferred delivery. (Assuming an interest rate of 10 percent a year, the average interest saving over 2.5 trading days should equal $2.5 \times 10/252$, or only 0.10 percent.) We make no adjustment for dividend distributions on any of the securities either, because Choi and Strong (1983) point out that exchanges do not permit other dividend distributions during the period when the when-issued shares are traded.

Table VI shows that the average when-issued premium equals 2.41 percent and is nearly identical to the average ex-date return of 2.48 percent. Looking across the table, we also find a strong correspondence between the ex-date returns and the when-issued premiums in individual cases. The parametric correlation equals 0.77 and the nonparametric rank correlation equals 0.50 (both significant at the 1 percent level). Such high correlation suggests that the ex-date return and the when-issued premium are driven by similar factors, which we conjecture to be the transaction costs and other considerations that make the separated shares worth more than the combined share.

Table VI shows that an average of 34,300 and 40,100 when-issued shares of the parent and subsidiary companies, respectively, were traded on each of the five days preceding the ex date. (The corresponding trading volume in parent shares averaged 129,900 shares, and the ex-date volume in parent and

Table VI

Spinoff Ex-Date Returns and When-Issued Premia during 1964 to 1990

When-issued shares are traded on both the parent and subsidiary companies in only twenty-nine cases. We obtain the ex-date excess returns by adjusting for expected returns based on a market model. To compute the when-issued premium, we first add the closing trade prices of parent and subsidiary stocks in relevant proportions and calculate the percentage difference between this and the closing trade price of regular shares. We then average the percentage difference over five trading days preceding the ex date to obtain the when-issued premium reported below.

Parent Company	Subsidiary	Ex Date	Ex-Date Return	When-Issued Premium	Trading Volume in 00s	
					Parent	Subsidiary
1. Olin Corp.	Olinkraft Inc.	740603	0.41	1.72	13	21
2. Safeguard Scientifics Inc.	Safeguard Business Sys Inc.	800305	5.17	2.51	227	53
3. MGM Grand Hotels Inc.	Metro Goldwyn Mayer Film Co.	800617	1.73	2.30	754	419
4. Peabody International Corp.	Geo International Corp.	810219	-0.94	1.83	242	78
5. Philadelphia Suburban Corp.	Enterra Corp.	810701	5.81	2.70	111	55
6. Peoples Energy Inc.	Midcon Corp.	811221	0.65	2.40	60	37
7. Scope Inc.	National Controls Inc.	820719	9.47	8.33	10	4
	Repo Inc.					7
8. Rollins Truck Leasing Corp.	Rollins Environmental Svcs Inc.	820803	8.86	5.98	6	40
9. Mesa Petroleum Co.	Mesa Offshore Trust.	821229	1.63	2.23	69	370
10. IU International Corp.	Echo Bay Mines Ltd.	821212	-1.23	1.03	2114	1333
11. Time Inc.	Temple Inland Inc.	840127	1.41	1.05	166	426
12. RJR Nabisco Inc.	Sea Land Corp.	840620	3.36	0.61	266	671
13. Centex Corp.	Cenergy Corp.	841015	3.92	5.03	1	4
14. Datapoint Corp.	Intelogic Trace Inc.	850813	0.08	1.91	1470	1118
15. General Mills Inc.	Kenner Parker Toys Inc.	851126	-0.27	0.28	155	311
	Crystal Brands Inc.					714
16. Panhandle Eastern Corp.	Anadarko Petroleum Corp.	861002	1.78	0.33	1034	1942
17. Transamerica Corp.	Imo Delaval Inc.	870107	3.13	3.43	1	42
18. Maxus Energy Corp.	Diamond Shamrock R & M	870519	-3.25	0.61	370	104
19. Lucky Stores Inc.	Hancock Fabrics Inc.	870522	-0.30	1.72	219	106
20. Penn Central Corp.	Sprague Technologies Inc.	870813	2.58	2.87	NA	1140
21. Cencor Inc.	Concorde Career Colleges Inc.	880701	9.84	10.14	7	226
22. Sun Inc.	Sun Expl & Prodtn Co.	881101	3.99	0.69	285	345
23. Burlington Northern Inc.	Burlington Resources Inc.	890103	0.11	1.01	1313	1097
24. Rollins Truck Leasing Corp.	Matlack Systems Inc.	890126	3.27	3.62	11	44
25. Broad Inc.	Kaufman & Broad Home Corp.	890308	3.48	0.56	261	400
26. Household International Inc.	Schwitzer Inc.	890418	2.25	0.63	92	291
	Scotsman Industries Inc.					245
	Eljer Industries Inc.					324
27. Community Psychiatric Ctrs.	Vivra Inc.	890908	0.10	1.67	5	47
28. Cray Research Inc.	Cray Computer Corp.	891130	0.38	1.09	1	814
29. Honeywell Inc.	Alliant Techsystems Inc.	901024	4.63	1.59	NA	407
Average			2.48	2.41	343	401

subsidiary shares averaged 207,900 and 161,300 shares.) In comparison, the trading volume in when-issued shares before stock splits is only about 9,000 shares per day (Lamoureux and Wansley (1989)). The large trading volume in when-issued shares before spinoff and the ex-date volume in regular shares after spinoff highlight the investor interest in separated shares.

G. Summary

A minimum interpretation of our empirical results is that ex dates for spinoffs are important economic events. We document a large excess return, which is accompanied by increased trading volume, excess volatility, and higher bid-ask spreads. The strong correspondence between the ex-date returns and when-issued premiums suggests a common set of underlying factors.

If announcement-period returns were measured as the difference between the price of combined shares before the first announcement date and the price of when-issued shares after the completion date, the ex-date return would clearly show up as a part of the wealth gains from spinoffs. This observation has two implications. First, it shows that the spinoff wealth gains are larger than traditionally measured by the appreciation in price of the combined shares. Second, it provides an explanation of spinoff wealth gains that is based on secondary market effects and is comparable in scope with the synergy effects that presumably occur on the announcement date.

V. Merger Ex-Date Returns

This section examines whether the ex-date returns are particular to spinoffs or whether they accompany other restructuring events that involve a change in the form of outstanding securities. In a stock-for-stock merger, the bidder company issues its own stock in exchange for the target company's stock, which ceases to exist. From an operational perspective, a merger is the opposite of a spinoff; in the former case two companies become one, and in the latter case one company becomes two. Yet, from a secondary markets perspective, the two share an important similarity; both involve the exchange of an old security for a new security. Below, we show that the expiring securities in a merger are also undervalued by 1.43 percent before the ex date.

We constructed a sample of stock-for-stock mergers by examining all stocks delisted from the NYSE, AMEX, and NASDAQ during 1980 to 1989, which had both a delisting code between 200 and 203 and a last dividend distribution code of 3723. We then checked each observation with the Capital Adjustments register to determine the number of bidder company's shares received in exchange for the target company's shares. We also confirmed that the merger was non-taxable. Thus, cases involving cash payment options were excluded.[12] Because we want to measure the difference between the

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[12] Fractional shares of acquirer company's stocks are usually settled in cash, but this feature is not considered cash payment in this context.

target company's stock price and its conversion value based on the contemporaneous bidder company's stock price, we also excluded eleven cases in which a merger resulted in delisting of both companies and creation of a new company. The final sample includes 184 mergers.

Dodd (1980) discusses the chronology of events in a merger. At the end of successful negotiations, a merger proposal is approved by the target firm's board of directors, which then puts the proposal to a shareholder vote. All state corporate codes require that a merger be approved by at least a simple majority and in many cases a two-thirds majority of the shareholders. In practice, however, the outcome of a shareholder vote is predictable. In a sample of 151 mergers proposals, Dodd does not find even one case where the shareholders had voted to reject the proposal. The uncertainty concerning the merger appears to have been resolved before the shareholder vote. The merger can become effective any time after the shareholder vote. In some cases it may be the following day, but in some other cases several weeks may elapse before the merger becomes effective. The last day of trading is the delisting date, and the following day is the ex date.

Mergers are big events, and the legal work involved may take several weeks. An important aspect of mergers concerns the delisting of the target stock. Starting with the ex date, the target stock can no longer be traded. To make sure that target shareholders are not put to any sudden inconvenience, exchanges require a sufficient notice before delisting. Conversations with the NYSE officials revealed that they prefer to be informed at least two weeks ahead of the scheduled ex date. Sometimes a tentative ex date may later be postponed, but in any case they need a notice of at least two days to inform the concerned market participants of the proposed delisting. The sufficient notice requirement and the empirical fact that no merger proposal is ever rejected by shareholders suggest that there may be no uncertainty concerning a merger's fate during the last few days before delisting. Any price discount on the target stock should then reflect microstructure considerations.

A. Merger Ex-Date Returns

Table VII shows the excess returns earned by the target and bidder stocks over a window starting five days before and ending five days after the merger ex date. Once the uncertainty concerning the merger is resolved, the bidder and target stock prices will be connected. We assume that this is approximately the case five days before ex date and, of course, exactly the case any time after the ex date. This suggests the following procedure of calculating excess returns. We first obtain the expected returns for both the bidder and target stocks by using the market model parameters estimated over $ED - 500$ to $ED - 251$. We then subtract a weighted average of the two expected returns from raw returns to obtain both the bidder and target stock excess returns. Alternate procedures of calculating excess returns by using the market model parameters for the bidder stocks estimated over a benchmark period starting 250 days after the ex date or simply subtracting the equally

Table VII

Stock Returns Around Merger Ex Dates During 1980 to 1990

The sample of stock-for-stock mergers during 1980 to 1989 was identified by examining all stocks delisted from the NYSE, AMEX, and NASDAQ during 1980 to 1989 that had the CRSP delisting code between 200 and 203 and the last dividend distribution code of 3723. The final sample of 184 mergers satisfies the following additional criteria: (1), the number of bidder company's shares received in exchange for the target company's shares can be obtained from the Capital Adjustments register; (2), no cash payment option exists; (3), the merger does not result in delisting of both stocks; and (4), for fifty-three observations included in Panel B, the target company's shares continued to be traded for at least one day after the shareholders approved the merger. *ED* refers to the merger ex date. The conversion value of target shares is based on the closing price of bidder shares. The excess returns for both the bidder and target shares before and after the ex date are calculated by subtracting from raw returns a value-weighted average of expected returns for the two shares based on a market model estimated over $ED - 500$ to $ED - 251$. All returns and price differences are expressed in percentage form.

| | | | Difference between Target Stock Price and Conversion Value | |
Date	Bidder Stock Excess Returns (*t*-Statistic)	Target Stock Excess Return (*t*-Statistic)	Percentage Difference (*t*-Statistic)	Number Negative, Zero, and Positive (*z*-Statistic)
		Panel A: All 184 Merger Announcements		
−5	0.16 (1.12)	0.39 (2.41)*	2.09 (10.84)**	24 1 159 (9.95)**
−4	−0.05 (−0.39)	0.12 (0.86)	1.93 (10.04)**	27 2 155 (9.44)**
−3	0.02 (0.16)	0.13 (0.81)	1.84 (9.86)**	24 3 156 (9.76)**
−2	−0.17 (−1.23)	0.17 (1.15)	1.48 (8.08)**	31 2 150 (8.80)**
−1	−0.14 (−1.00)	−0.03 (−0.16)	1.39 (6.85)**	34 6 144 (8.11)**
ED	0.04 (0.25)	1.43 (5.87)**		
1	−0.12 (−0.75)			
2	0.10 (0.63)			
3	0.10 (0.65)			
4	0.00 (0.03)			
5	−0.06 (−0.40)			
	Panel B: Subset of 53 Merger Announcements for which the Target Company's Shares Continue To Be Traded after the Shareholder Vote			
−5	0.23 (0.81)	0.22 (0.60)	1.74 (5.82)**	9 0 44 (4.81)**
−4	−0.22 (−0.97)	−0.11 (−0.44)	1.61 (5.74)**	8 1 44 (4.94)**
−3	0.06 (0.19)	0.33 (1.10)	1.33 (4.62)**	9 1 43 (4.67)**
−2	−0.18 (−0.70)	0.00 (0.01)	1.15 (3.59)**	12 1 40 (3.85)**
−1	−0.19 (−0.77)	−0.33 (−1.12)	1.32 (5.48)**	7 2 44 (5.08)**
ED	0.03 (−0.10)	1.38 (3.51)**		
1	0.04 (0.16)			
2	0.36 (0.99)			
3	−0.28 (−1.16)			
4	0.40 (1.67)			
5	0.33 (0.93)			

*Denotes significance at the 5 percent level.
**Denotes significance at the 1 percent level.

weighted market returns give nearly identical results. Table VII also shows the difference between the target stock price and its conversion value during the five days preceding the ex date. For this purpose, the conversion value is obtained by multiplying the closing price of bidder company's shares on any particular day by the number of shares received in merger. Both the bidder and target share prices are adjusted for cash dividends paid between the date under consideration and the ex date.

Panel A of Table VII shows the results for all 184 mergers. During the five days preceding the ex date, the bidder and target stock excess returns are insignificantly different from zero (except target stock return on $ED - 5$, which averages 0.39 percent and is significant at the 5 percent level). The generally insignificant returns suggest that there may be no resolution of uncertainty concerning the fate of a merger during the last few hours of trading before delisting. Yet the target shares sell for a discount from their conversion value. The discount averages 2.09, 1.93, 1.84, 1.48, and 1.39 percent on $ED - 5$ to $ED - 1$. Nonparametric tests show that the discount is positive in roughly four cases out of five. The average discount is small enough to preclude arbitrage by purchasing the target company's shares before the ex date and selling the bidder company's shares after the ex date, but it does imply an excess return of 1.43 percent to investors willing to hold the target shares through ex date (t-statistic 5.87). In dollar terms, the excess return equals 31 cents.

Panel B of Table VII reports a subset of 53 mergers for which the *Wall Street Journal* reported that the shareholders had approved the merger at least one day before the last day of trading. The *Wall Street Journal* did not carry reports of any other event for these firms on the following day, except that the merger had been successfully completed. For this subset, we can be doubly sure that there was no resolution of uncertainty in the last hours of trading. Yet the target shares were trading for an average 1.38 percent discount right until the last minute before delisting (t-statistic 3.51).

B. Possible Explanations for the Merger Ex-Date Returns

We examine whether the target stock ex-date returns and the price discounts prevailing before the ex date can be explained by the bid-ask spread effect. Unlike the case of spinoffs, we do find some tendency for closing trade prices of bidder stock on and before the ex date to be nearer the ask prices and closing trade prices of t-statistic stock to be nearer the bid prices. (This by itself may suggest that new investors prefer to buy the surviving securities and existing holders prefer to sell the expiring securities.) In a subset of 41 NASDAQ-NMS cases for which both the closing trade prices and bid-ask prices of the bidder and target stocks are available, we find target price discounts of 2.25, 1.88, 2.13, 1.27, and 0.97 percent on $ED - 5$ to $ED - 1$ and ex-date return of 1.65 percent by using the closing trade prices as reported in Table VII. Each of these figures is significantly different from zero at the 1 percent level. In comparison, the price discounts based on the average of

closing bid-ask spreads equal 1.94, 1.65, 1.54, 1.09, and 0.75 percent and the ex-date return equals 1.43 percent. The latter six figures are smaller, by an average of 0.29 percent, but remain significantly different from zero at the 1 percent level. If a similar tendency prevails in the overall sample, the true ex-date returns may be somewhat smaller than 1.43 percent in Table VII.

The merger ex-date returns are smaller than spinoff ex-date returns. The overall wealth gains are even smaller, because the merger returns are earned only by the target shareholders whereas the spinoff returns are earned by the holders of combined parent and subsidiary shares. We note that the reasons behind merger ex-date returns are also less compelling. Hakansson (1982) argues that mergers contract the space of feasible allocations (in a state-contingent claims world). The clientele effect would thus appear to work in reverse. In addition, there is no obvious price discovery process, and the trading volume remains almost unchanged from before to after the ex date. (The percentage turnover decreases somewhat as a result of the increased equity.)

We conjecture that the price discount on target shares before ex date and the resultant excess return on merger ex date may arise from the following reasons. First, mergers almost always create odd lots of bidder shares. If odd lots are expensive to trade, then potential buyers may want to wait until after ex date, whereas potential sellers may want to sell out before ex date. Unfortunately, the sample of mergers that paid an even number of bidder shares for every target share is too small (nine cases) to test this proposition. Second, buying target shares in the last few days before delisting involves the inconvenience of exchanging target shares for bidder shares. The exchange is not automatic, and the target shareholders need to submit their old shares to the bidder company. The marginal buyers may want to wait until after the ex date to escape the inconvenience of mailing old shares and receiving new shares (possibly an odd lot) along with a check in lieu of fractional shares (which would also force them to compute the tax basis of new shares and capital gains on the cash payment). For the same set of reasons, the marginal sellers may want to sell out before the ex date. The combined effect would be as shown before in Figure 1. Third, the market makers face unusual inventory balancing problems around merger ex dates. The target shares cease to exist after the ex date, and getting rid of any leftover inventory incurs both the inconvenience of receiving new shares from the bidder company and a substantial expense in selling them to other market makers.

We examine bid-ask spreads to test the last proposition. The bidder and target shares are nearly perfect substitutes immediately before ex date (both represent claims on the combined company) and should command nearly identical percentage bid-ask spreads (especially if both are traded on the same exchange or over the counter). However, in the sample of forty-one NASDAQ-NMS stocks with bid-ask data, the percentage spread of target shares over $ED - 5$ to $ED - 1$ averages 2.04 percent and is much greater than the percentage spread of bidder shares over $ED - 5$ to $ED - 1$, which averages 1.35 percent. The target spread is higher in thirty-four cases and

lower in seven cases (significant at the 1 percent level). This is despite the fact that percentage spreads decrease with increasing stock price, and the average target stock, at $29.83, is priced higher than the average bidder stock, at $26.62. We also examine two subsets formed on the basis of relative stock prices. When the target stock price is smaller than the bidder stock price, the target percentage spread is higher than the bidder spread in nineteen cases and lower in one case (significant at the 1 percent level). However, even when the target stock price is greater than or equal to the bidder stock price, the target percentage spread is higher in fifteen cases and lower in six cases (significant at the 10 percent level). The large target bid-ask spreads indicate that the market makers face abnormal costs of carrying target shares through the ex date. It may be that they quote lower prices before ex date in order to not accumulate an inventory.

VI. Conclusions

The results of this article support an old saying that "It ain't done until it is done." And financial decisions involving changes in security form only get done on the ex date. We document excess returns of 3 percent on spinoff ex dates and 1.5 percent on merger ex dates. Similar but smaller excess returns have previously been measured around stock split and stock dividend ex dates. Our major contribution has been to offer microstructure-based explanations of excess returns that occur on predictable event dates and cannot be attributed to the arrival of systematically positive new information.

In the case of spinoffs, we offer an explanation of ex-date returns based on a relatively ignored clientele effect. Market imperfections result in many investors being interested in one but not both of the postdivestiture shares. The strength of clientele effect may be judged from an observation that the ex-date trading volumes in parent and subsidiary stocks equal 1.64 and 2.79, respectively, times the trading volumes on unaffected reference dates, despite a 3 percent price discount that could induce many buyers to shift their trades to before the ex date. In addition, we suggest transaction cost-based explanations of why the potential sellers, market makers, and arbitrageurs each may attach a higher price to separated shares that start trading after the ex date. The spinoff ex-date returns are of the same order of magnitude as announcement-date returns and highlight the relative importance of microstructure considerations in financial decisions. The merger ex-date returns are a much smaller fraction of the target shareholder gains, but they provide further evidence that microstructure considerations can affect stock prices and measured stock returns.

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