Is there Really a When-Issued Premium?

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Initial Draft: January 2000
This Draft: November 2001

Key Words: Law of One Price; Market Efficiency; Market Microstructure

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Abstract

We use a unique set of equities in the when-issued market to provide new tests of the law of one price in financial markets. We compare the prices of when-issued and regular-way shares of publicly-traded subsidiaries and their parents around the time the subsidiaries are fully divested. In contrast to prior analyses of when-issued trading in equity markets, we find that the when-issued shares of the subsidiary trade at a discount. Some of the pricing differences stem from measurement factors such as exchange location and bid-ask clustering that bias the observed when-issued pricing differential away from zero. The remaining difference between the when-issued and regular-way prices is due to asymmetric movements in bid and ask quotes in the two markets. We also find evidence of temporary price pressures on the date of execution of the spinoff of the subsidiary firms that bear resemblance to the pricing in the when-issued market. We interpret the evidence as consistent with the law of one price in the presence of transaction costs.

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I. Introduction

A fundamental tenet of financial economics is the law of one price, which states that identical assets will have the same market value. The law of one price is the linchpin of a well-functioning market, whether a stock exchange, the retail sector, or international trade. In financial markets, tests of the law of one price are considered tests of market efficiency.

Recent critics of market efficiency such as Thaler (1999) and Shleifer (2000) question whether the law of one price holds for financial assets. As evidence counter to market efficiency, these authors point to reported mispricing in pairs trading studies of closed-end funds (Lee, Shleifer & Thaler (1991)) and of dual-listed international securities (Rosenthal and Young (1990), Froot and Dabora (1999), Rosenthal (1999)). Other examples of reported rejections of the law of one price in financial markets include primes and scores (Barber (1994)) and tech-stock carve-outs (Lamont and Thaler (2001)).

The cited pairs studies, however, are not clean tests of market efficiency. Many of the reported violations of the law of one price entail pairs of securities with significant costs of arbitrage. Pontiff (1996), for example, finds that pricing differences between closed-end funds and underlying securities reflect costly arbitrage. (See, also, Elton, Gruber, and Busse (1998).) Trading across international financial exchanges also has non-trivial costs. For primes and scores, Jarrow and O'Hara (1989) find that pricing differences reflect the cost of dynamic hedging. Mitchell, Pulvino and Stafford (2002)

show that the inter-temporal arbitrage between parent firms and publicly traded

subsidiaries is constrained by information costs and idiosyncratic risk.

A cleaner setting for tests of the law of one price comes from when-issued trading

in equity markets. When-issued trading occurs immediately preceding the issuance of

new shares of a security due to an event such as a stock split. The when-issued shares of

the prospective security trade parallel to the regular-way shares in the same trading

location and offer the same claims to the firm's cash flows. Hence, when-issued trading

avoids many of the costs that impede arbitrage in the other pairs trading experiments and

provides a novel setting for tests of the law of one price. The law of one price predicts

that the when-issued shares, properly adjusted for the split factor, will trade at the same

price as the regular-way shares.

In the first study of when-issued trading, Choi and Strong (1983) surprisingly find

that when-issued shares trade at a premium over regular-way shares. As reported in Panel

A of Appendix A, subsequent research has also found the existence of a when-issued

premium for both stock splits and corporate spinoffs. Related research has found

evidence of non-zero returns on the execution date of the same events. (See Panel B of

Appendix A.) As summarized in Appendix B, this evidence of a when-issued premium

and of non-zero ex-date returns has been followed by a number of potential explanations,

ranging from market inefficiency, to improper measurement, to market microstructure

considerations. No consistent explanation has been offered.

In this paper, we use novel when-issued trading data to offer new tests of the law

of one price in financial markets. The sample entails NYSE-listed, publicly-traded

subsidiaries such as Lucent Technologies, Allstate, and Delphi Automotive Systems. The

when-issued trading that we study occurs in the period around the time the subsidiaries are fully spun off to the public from their parents such as AT&T, Sears, and General Motors.

A unique aspect of our data is that, because the subsidiary firm is publicly held, there is when-issued and regular-way trading in the subsidiary itself prior to the execution date. The subsidiary shares, therefore, are free of the trading constraints that induce clienteles (Vijh (1994)) and create convenience (Nayar and Rozeff (2001)) for when-issued shares immediately preceding stock splits and the spinoff of wholly-owned subsidiaries. We use the publicly-traded subsidiaries to distinguish the clientele and convenience explanations from other possible sources of pricing differences between when-issued and regular-way trading.

An additional feature of our data set is that it allows us to compare when-issued pricing for the subsidiary with that for the parent. These comparisons allow us to further distinguish the theories that have been offered to explain the when-issued premium. Among the questions that we address is why the premium for subsidiaries is of a different sign as that for parents.

We conclude our analysis by studying the magnitude and direction of the execution date returns for the subsidiary and parent firms. This allows us to test whether, as predicted by some theories, the when-issued premium and the ex-date return emanate from a similar source. Analysis of the execution date also facilitates tests as to whether the when-issued pricing differences reflect either temporary price pressures or, instead, more permanent effects induced by a downward sloping demand for securities.

Our principal finding is that the when-issued shares of the subsidiary firms trade at a discount to the regular-way shares. This contrasts with the premium found in both prior research and for the parent firms in our sample. Some of the price differential between the when-issued and regular-way shares can be explained by measurement factors such as exchange location and bid-ask clustering. The remaining differences stem from asymmetric movements in bid and ask quotes. As a whole, we interpret the evidence to be consistent with the law of one price in the presence of transaction costs.

The following section more fully reviews the prior literature and the offered explanations for the when-issued premium. Section III describes the sample. Section IV reports the findings for the when-issued premium for the subsidiary firms. The fifth section reports comparable estimates for the parent-subsidiary pairs. Section VI reports related evidence for the execution date return of the subsidiary and of the parent. The final section summarizes and offers concluding comments.

II. Literature Review

A. Prior Research on the When-Issued Premium

When-issued trading occurs in equity markets immediately preceding the issuance of new shares of a security. Events that trigger when-issued trading include stock splits and corporate spinoffs. The when-issued shares of the prospective security trade parallel to regular-way shares on organized markets such as the New York Stock Exchange and the price and volume data for the when-issued shares are reported next to the regular-way data in the Wall Street Journal, the Daily Stock Price Record, and other sources. The when-issued shares offer comparable claims to a firm's cash flows as regular-way shares.

Choi and Strong (1983) rely on the features of when-issued trading to provide a novel test of the law of one price in securities markets. They hypothesize that the when-issued price, properly adjusted for the split factor, will equal the regular-way price. Choi and Strong (1983) study 128 firms that have when-issued trading preceding a stock split. In a surprising result, they find that the split-adjusted when-issued shares trade at a 1.17 percent premium over the regular-way shares, even after controlling for differences in settlement procedures.

As surveyed in Panel A of Appendix A, subsequent analysis offers confirming evidence of a when-issued premium. Lamoreux and Wansley (1989), Brooks and Chiou (1995), and Nayar and Rozeff (2001) all report a positive difference between when-issued and regular-way shares prior to stock splits. Vijh (1994) reports a when-issued premium of 2.41 percent for a sample of 29 parent firms that spin off fully-owned subsidiaries.

B. Prior Research on Ex-Date Returns

A parallel literature studies stock returns on the date of execution of stock splits and corporate spinoffs. (See Panel B of Appendix A for a survey.) Similar to when-issued trading, execution dates offer novel tests of market efficiency. The dates are known well in advance and, for events such as stock splits, are rarely cancelled. Hence, the execution dates contain no new information and would be expected to have a zero return.

As in the when-issued literature, the results for execution dates are surprising. Grinblatt, Masulis and Titman (1984) find a significant return of 1.95 percent on the execution date of stock splits. Maloney and Mulherin (1992) and Conrad and Conroy

(1994) report similar findings for stock splits. Copeland, Lembgruber and Mayers (1987) and Vijh (1994) also find a positive return on the execution date of corporate spinoffs. Hwang (1995) reports a –5.09 percent return on the execution of reverse stock splits.

The prior research has noted a relation between the when-issued premium and the non-zero execution date return. Both Grinblatt, Masulis and Titman (1984) and Maloney and Mulherin (1992) note the comparable magnitude of the when-issued premium and the execution date return and conjecture that common underlying factors explain the two phenomena. Vijh (1994) explicitly detects a linkage between the when-issued premium and ex-date returns for corporate spinoffs. Nayar and Rozeff (2001) report a similar linkage for stock splits. Furthermore, Vijh (1994, p.584) conjectures that both the stock split and spinoff findings are related, as a spinoff can be viewed as a split with uneven pieces.

C. Potential Explanations for the When-Issued Premium and the Ex-Date Return

The initial evidence of a when-issued premium by Choi and Strong (1983) has been followed by a number of papers seeking an explanation. Appendix B outlines the various possible explanations that have been offered in the literature. The questions that have been addressed include: Why is there a when-issued premium? and Why is there a link between the when-issued premium and the ex-date return?

One possible explanation for the when-issued premium is market inefficiency. Indeed, critics of market efficiency such as Thaler (1999) and Shleifer (2000) use similar cases of pairs trading as evidence that simple arbitrage does not function in securities

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markets. Thaler (1999) references the pricing of dual-listed international securities (Rosenthal and Young (1990), Froot and Dabora (1999), Rosenthal (1999)). Shleifer (2000) points to research on closed-end funds (e.g, Lee, Shleifer and Thaler (1991)). Other evidence of anomalous pairs trading includes Barber's (1994) analysis of primes and scores and Lamont and Thaler's (2001) research on tech stock carve-outs.

Of course, evidence for or against market efficiency must incorporate transaction costs (Jensen (1978), Fama (1991)). Moreover, tests of apparent trading rules must account not only for trading costs but also the selection bias of ex-post strategies (Phillips and Smith (1980)). Hence, the literature on when-issued trading and ex-date returns has examined whether the apparent mispricing emanates from either improper measurement or market microstructure factors.

C.1. Improper Measurement

Brooks and Chiou (1995) suggest that one reason for the when-issued premium is differential timing of trades. They note that actual when-issued and regular-way trades do not always occur at identical times. In their analysis, Brooks and Chiou (1995) use intraday data to match the timing of when-issued and regular-way trades. The adjustment for the timing of trades follows the spirit of related research by Bookstaber (1983), Bhattacharya (1983), and Lin and Rozeff (1995).

Though not explicitly treated in the when-issued literature, another important measurement issue is stock exchange location. By SEC rules, NYSE-listed securities can also trade on the regional stock exchanges. As noted by Lee (1993), trades on the regionals tend to get less favorable execution. Hence a bias in the estimation of the when-

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issued premium may occur if the when-issued and regular-way shares have a differential likelihood of executing on the NYSE vis-à-vis the regionals. In recognition of such factors, Chordia, Roll and Subrahmanyam (2001) restrict their analysis to NYSE quotes when studying trading activity with the TAQ database.

Another measurement issue stems from bid-ask clustering. Lamoreux and Wansley (1989) and Brooks and Chiou (1995) note that when-issued and regular-way shares may have a differential likelihood of trading at bid or ask prices. Such differences could create an observed pricing difference between when-issued and regular-way shares. The bias from bid-ask clustering has also been studied for stock split and spinoff ex-date returns (Maloney and Mulherin (1992), Conrad and Conroy (1994), Copeland, Lemgruber and Mayers (1987)).

In related analysis, Lease, Masulis and Page (1991) study the effect of bid-ask clustering on the day of equity offerings. The authors argue that the prices observed in secondary market trading are more likely to occur at bid prices, because purchase orders are directed to the primary market that day. As a diagnostic, Lease, Masulis and Page (1991) use the order flow ratio, defined as (Ask Price – Transaction Price) / (Ask Price – Bid Price), to detect clustering of transaction prices at bids or asks around execution.

In their analysis of when-issued trading, Brooks and Chiou (1995) control for bid-ask clustering by studying intraday bid and ask prices. While they find that bid-ask clustering explains away part of the observed when-issued premium, Brooks and Chiou (1995, p.454) conclude that the remaining premium for when-issued shares is puzzling.

C.2. Market Microstructure

In addition to simple measurement issues, the when-issued and ex-date literature suggest that market microstructure phenomena may explain some or all of the when-issued premium. We consider three microstructure factors that have been treated in the prior literature: (1) order flow imbalance, (2) investor clientele, and (3) convenience. As we will discuss, these three factors are related and are sometimes used interchangeably in the literature. We first describe the three phenomena and then distinguish their empirical content.

Relying on inventory models of the bid-ask spread (e.g., Ho and Stoll (1981)), Maloney and Mulherin (1992) and Conrad and Conroy (1994) relate ex-date returns to microstructure phenomena beyond simple bid-ask bounce. They argue that around events such as the execution of stock splits, market makers can face order flow imbalances. These order imbalances may induce an asymmetric movement of bid and ask prices in the direction of the order flow. The source of the order imbalance is the underlying purpose of the stock split: the addition of shareholders. If this addition occurs on the execution date, then the influx of buyers leads the market maker to disproportionately raise ask prices and thus create a non-arbitrageable positive return on the execution date. The story is consistent with more recent evidence of an increase of small, uninformed buyers on the ex-date by Schultz (2000) and Easley, O'Hara and Saar (2001). Order flow imbalance is also used by Hwang (1995) to argue that the negative return on the execution of reverse stock splits is driven by an asymmetric decline in ask prices. Maloney and Mulherin (1992, p.46) conjecture that the when-issued premium anticipates the imbalance of order flow on the ex-date.

A related story offered by Vijh (1994) is tied to investor clienteles. (See, also, Hakansson (1982).) Vijh (1994) argues that for the spinoff of wholly-owned subsidiaries, the execution date is an important event because it is the first date that an investor can obtain a piece of a regular-way share of either the subsidiary or the new parent. This trading constraint may affect the pricing of the separate pieces, the new parent and the new subsidiary, when they become available. Noting that it is an empirical issue, Vijh (1994, p.595) argues that the magnitude and direction of the ex-date return will depend on the relative number of investors that wish to hold only either the new subsidiary or new parent. He further argues that the when-issued premium may reflect similar factors.

A third explanation, also offered by Vijh (1994), stems from the convenience of trading. Vijh (1994) notes that after the record date for a spinoff, regular-way shares are relatively less convenient because of the attachment of due bills. Nayar and Rozeff (2001) offer evidence in support of this story for stock splits. They find a negative return around record dates and further show that the record date decline is associated with both the when-issued premium and the ex-date return.

These three microstructure phenomena are related in that they offer non-information reasons for price differentials and ex-date stock returns. Moreover, the three factors are often used interchangeably in the literature. For example, in developing his clientele and convenience arguments, Vijh (1994, p. 583) states that a spinoff may pose unique inventory balancing problems for market makers. Similarly, Nayar and Rozeff (2001, p.122) state that the convenience preference of investors may induce inventory build up by market makers.

In spite of the underlying similarity of the three phenomena, the arguments are distinct enough to provide empirical content. A unique prediction of the order flow imbalance explanation is that the magnitude of the when-issued premium can differ when estimated at bid or ask prices, with the asymmetry being a function of the direction of the order imbalance. (See, for example, Maloney and Mulherin (1992).) A further distinction between the order flow imbalance explanation and the convenience story is in the direction of the predicted sign of the when-issued premium. The convenience story predicts that the when-issued premium would always be positive, due to the absence of due bills for when-issued trading. By contrast, the order flow imbalance explanation predicts that the sign of the when-issued and regular-way differential will depend on the direction of the order flow imbalance. (See, for example, Hwang (1995).)

Another distinction between the three explanations is based on the predicted permanence of the ex-date effect. As noted in related literature such as Harris and Gurel (1986) and Barclay and Litzenberger (1988), ex-date returns can reflect either (1) a temporary price pressure or (2) a permanent price movement caused by downward sloping demand curves for securities. The existence of temporary price pressures is consistent with the Second Law of Demand which states that price elasticity is positively related to time. (See Alchian and Allen (1977, p.62).) The permanent effect suggested by the concept of a downward sloping demand curve for securities implies a relatively inelastic reaction in securities markets even in the long-run. For further discussion of temporary and permanent price effects in securities markets, see Lamoureux and Poon's (1987) analysis of stock splits and Madhavan's (2001) recent analysis of stock index reconstitution.

Using this terminology, the order flow imbalance story predicts that the ex-date return is only a temporary price pressure. By contrast, the investor clientele and convenience stories offered by Vijh (1994) predict a permanent ex-date return.

C.3.Liquidity

A final possible explanation for the when-issued premium is a liquidity differential between when-issued shares and regular-way trading. This argument relies on Amihud and Mendelson's (1986) research that market liquidity is priced in traded securities.

The liquidity explanation has not been emphasized in the when-issued literature. This is due in part to the fact that all of the prior research finds that when-issued shares trade at a premium but also have lower average trading volume. For such reasons, recent work such as Nayar and Rozeff (2001) does not attempt to test a liquidity hypothesis and instead considers a convenience explanation.

Conceptually, however, liquidity may be relevant to the pricing of when-issued and regular-way shares, even if liquidity is neither the sole nor dominant factor. For one, many of the measurement issues discussed in Section II.C.1 above are related to liquidity differences. The effect of the timing of trades and bid-ask bounce, for example, are more likely to be important if when-issued and regular-way trades occur at different rates and magnitudes. Similarly, a more heavily traded security may also be more likely to have volume on regional exchanges and thereby be more likely to trade under worse execution.

The concept of liquidity also offers further clarification of the microstructure explanations discussed in Section II.C.2 above. For example, liquidity is distinct from order flow imbalances. Liquidity is tied to high volume that is balanced between buys

and sells. By contrast, order flow imbalances stem from trades that cluster at either buys or sells, possibly under conditions of heavy volume. (See, Chordia, Roll and Subrahmanyam (2002) for a discussion of the contrast between liquidity and order imbalances at the market level.)

Liquidity can also be distinguished from the convenience explanation offered by Vijh (1994) and examined by Nayar and Rozeff (2001). Convenience refers to non-volume characteristics such as due bills that may induce a preference for when-issued shares vis-à-vis regular-way shares. Of course, one puzzle with the convenience explanation from the extant empirical results is why the more convenient security, the when-issued shares, would trade at noticeably lower levels of volume.

III. The Sample and Proposed Analysis

A. The Sample

Our sample comprises a set of NYSE-listed, publicly-traded subsidiaries and their parent firms around the time the subsidiaries are fully spun off to the public. For a week or more prior to the spin off, a when-issued market arises in shares of the subsidiary. For most of the firms in the sample, there is also when-issued trading in the shares of the parent firm.

To construct our sample, we use Standard and Poor's quarterly volumes of the NYSE Daily Stock Price Record, the same source used in prior studies such as Choi and Strong (1983), Vijh (1994) and Nayar and Rozeff (2001). We manually search the NYSE Daily Stock Price Record for all incidences of when-issued trading during the period from 1980 to 2nd quarter 1999, the most recent volume available when the project was

initiated. We discern roughly 3,000 cases of firms with when-issued trading over this time period. We then use information in the Daily Stock Price Record, the Wall Street Journal Index, Lexis-Nexis, and other financial media to determine the event associated with each case of when-issued trading. By far, most of the cases of when-issued trading (80 percent) are associated with stock splits. Other events making up more than five percent of the total number of cases of when-issued trading include bidders in corporate takeovers and parents and wholly-owned subsidiaries involved in a 100 percent spinoff.

Our data screening detects 23 cases of when-issued trading in NYSE-listed, publicly-traded subsidiaries around the time the firms are fully spun off to the public. The subsidiaries and parent firms in the sample are presented in Table 1. The data are presented by the date of the spinoff. The representative subsidiary firm in the sample experienced a 20 percent carve-out from its parent and then, within a year, was fully spun off to the public. For example, Lucent Technologies was carved out from AT&T in April 1996 and then was fully spun off in October of the same year. The earliest observation is Coopervision in 1983. The most recent observation is Delphi Automotive Systems in 1999. In three cases, the divestiture was completed via an exchange offer where parent shareholders had the choice of whether to receive shares in the subsidiary: Guidant Corp., Martin Marietta Materials, and Abercrombie & Fitch.

Table 2 overviews the incidence of when-issued trading for the subsidiary firms. For the 23 subsidiary firms, there is a total of 343 days when the Daily Stock Price Record reports either closing prices or bid-ask spreads in the when-issued market, an average of 15 days per firm. The number of days ranges from five days for Delphi Automotive Systems to 28 days for Bowater Inc.

Within the sample of 343 days from the Daily Stock Price Record, there are 298 days on which the subsidiary firms have positive when-issued volume. Table 3 compares when-issued volume with regular-way volume for the subsidiary firms. As reported, when-issued volume for the representative subsidiary firm is 50 percent of regular-way volume.

B. Proposed Analysis

We use our unique sample to better understand the pricing of when-issued shares. We begin the analysis in Section IV with a detailed treatment of the when-issued trading in the subsidiary firms. We first use daily data to compare the when-issued and regular-way shares of the subsidiaries. We then use intraday data to determine the extent to which observed pricing differences stem from measurement factors.

We then consider microstructure explanations for the when-issued premium for the subsidiary firms. Our sample allows us to contrast the investor clientele and convenience explanations from the order-flow-imbalance explanation. The investor clientele and convenience explanations rely on differential features between regular-way and when-issued trading that are not present for the subsidiary firms. Hence, these two explanations predict no difference between the regular-way and when-issued prices for the subsidiaries. By contrast, the order-flow-imbalance explanation predicts that the price difference between the when-issued and regular-way shares will depend on the direction of order flow and that this direction will be reflected in an asymmetric premium when measured at bid and ask prices.

In Section V, we provide complementary analysis of the when-issued premium for parent-subsidiary pairs in the sample. We focus on tests that further distinguish the

microstructure explanations by analyzing any asymmetry in the when-issued premium when computed at bid and ask prices.

We conclude our analysis in Section VI by studying the execution date returns for the subsidiary firms and the parent-subsidiary pairs. This analysis considers whether the when-issued premium and the ex-date return are of the same sign in our sample. The analysis also examines whether the factors underlying the when-issued premium and non-zero ex-date returns reflect temporary price pressures or instead stem from a downward-sloping demand for securities.

IV. The When-Issued Premium for Subsidiary Firms

This section begins our analysis by estimating the when-issued premium for the subsidiary firms in the sample. After reporting our initial estimates of the premium, the analysis follows the outline sketched in Appendix B. We consider measurement issues that may influence the reported premium. We also perform tests that distinguish between potential microstructure explanations of the premium.

A. Analysis Using Data from the Daily Stock Price Record

Our initial estimates of the when-issued premium employ closing prices for regular-way and when-issued trading taken from the NYSE Daily Stock Price Record. The analysis entails 298 days on which when-issued trading is positive. For a particular firm on a given day, we estimate the percentage difference between the when-issued closing price and the regular-way closing price:

w.i. premium = (w.i. closing price – reg way closing price) / reg way closing price.

As a test of the law of one price, we test the null hypothesis that the when-issued premium equals zero.

Table 4 presents the estimates of the when-issued premium using daily closing prices. As reported in Panel A, the mean when-issued premium for the sample of 298 days is –0.68 percent. This value is more than 10 standard deviations from zero. The median when-issued premium is –0.53 percent (p-level =0.0001). These results indicate that the when-issued shares generally trade at a discount to regular-way trading. In other words, the when-issued "premium" is actually negative for the publicly-traded subsidiaries in our sample.

As a measure of the robustness of the estimates, Panel B of Table 4 reports the average when-issued premium for each of the 23 subsidiary firms in the sample. On an equally-weighted basis, the average when-issued premium across firms is –0.63 percent (t=-5.43). For the 23 firms, 21 (or 91 percent) have an average negative premium. The results by firm confirm the overall finding that the when-issued shares trade at a discount to the regular-way transactions.

As a further robustness check, we also estimate the when-issued premium in event time. In results not reported in the tables, but available upon request, we also find evidence of a negative when-issued premium. For each of the ten days prior to the spinoff, the when-issued premium is negative. The average when-issued premium for the ten days is –0.61 percent (t=-6.72).

These results of a negative when-issued premium for publicly-traded subsidiaries are strikingly different from the prior evidence reported for stock splits (e.g., Choi and Strong (1983)) and the spinoff of wholly-owned subsidiaries (Vijh (1994)). Note that in some of the prior research, the estimates of the when-issued premium have accounted for the fact that when-issued shares generally settle at a later date than regular-way trading. Out of simplicity and because of low interest rates during our sample period, we have not made such adjustments. But if we did, the when-issued estimates would be even more negative. Overall, our results indicate that the previous findings of a when-issued premium are not robust.

The literature surveyed in Appendix B, however, cautions against drawing conclusions from analysis using closing transaction prices. One measurement issue noted by Maloney and Mulherin (1992) for stock splits and Lease, Masulis and Page (1991) for secondary offerings, is that observed transaction prices may be biased around large share issuances due to clustering at either the bid or the ask. One remedy for such clustering is to perform estimation employing quote midpoints rather than transaction prices.

The nature of the reporting procedure followed by the Daily Stock Price Record enables an initial examination as to whether bid-ask clustering affects our estimates of the when-issued premium. On days with zero trading volume, the Daily Stock Price Record reports the closing bid and ask quotes for a given security. In their paper on when-issued trading around stock splits, Choi and Strong (1983, p.1294) exclude such days "in order to concentrate on investor behavior rather than specialist pricing." In subsequent research on stock splits, Lamoureux and Wansley (1989) incorporate the zero-volume when-issued days into their analysis.

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As noted in Table 2, there are 45 days in our sample on which when-issued trading volume is zero. On all of those days, volume for regular-way shares is positive and the Daily Stock Price Record reports closing transaction prices. For these 45 days, we estimate the when-issued premium as the percentage difference between the when-issued midpoint and the regular-way transaction price:

w.i. premium = (w.i. midpoint – reg way closing price) / reg way closing price.

The results for this estimation are reported in Table 5. As reported in Panel A for all 45 observations, the average when-issued premium using when-issued quote midpoints is 0.009 percent and is not reliably different from zero (t=0.51). The median value is equal to 0 (p-level=0.57). Comparable results are presented in Panel B for each of the ten firms with at last one day of zero when-issued trading volume. The average premium across the ten firms is –0.04 percent (t=-0.11). Half of the firms have a positive premium, half have a negative premium.

Overall, the results using quote midpoints from the Daily Stock Price Record evince a when-issued premium that is effectively zero. These results suggest that measurement and microstructure factors may be at play in the finding of a negative premium for observed closing prices. To provide a broader analysis of the measurement and microstructure factors affecting the estimate of the when-issued premium, we next employ intraday prices and quotes from the Trade and Quote (TAQ) Database of the New York Stock Exchange.

B. Analysis of Intraday Transaction Prices from TAQ

Prior research discussed in Section II and outlined in Appendix B suggests that measurement issues may affect tests of the law of one price in financial markets. These measurement issues include the exchange location of trades and the timing of trades.

To control for measurement issues, we employ intraday transaction prices from the TAQ database. The data are available for the 16 subsidiary firms in the sample that were spun off in 1993 or later. The TAQ sample entails 210 days on which the subsidiary firms had positive when-issued trading volume.

Our initial inspection indicates that the last when-issued trade of the day occurs predominantly on the NYSE. The last when-issued trade of the day is, on average, 53 minutes earlier than the last regular-way trade of the day.

To gauge the effect of exchange and timing differences, we estimate the when-issued premium as the difference between the final when-issued price and four different regular-way prices: (1) the final regular-way price (which may or may not be an NYSE transaction), (2) the final NYSE regular-way price, (3) the adjacent NYSE trade immediately following the final when-issued trade, and (4) the adjacent NYSE trade immediately preceding the final when-issued trade. By design, compared to the closing prices, the adjacent regular-way trades are much closer in time to the final when-issued trades. The adjacent preceding trade is, on average, 6 minutes and 35 seconds before the when-issued trade. The adjacent following trade is, on average, 4 minutes and 50 seconds after the when-issued trade.

The results of the estimation with TAQ transaction data are reported in Table 6. Panel A reports the results for the full sample of 210 trading days. Using the last TAQ

price for regular-way trading, the when-issued premium equals –0.59 percent (t=-8.99). By comparison, the premium using the last NYSE price is –0.55 percent (t=-9.51). This narrowing of the differential between the when-issued and regular-way prices is consistent with evidence such as Lee (1993) that prices on the NYSE reflect better execution than that of the regionals.

The estimates of the when-issued premium using adjacent regular-way NYSE prices indicate a further reduction in the magnitude of the when-issued premium for the full sample. The average premium is –0.52 percent using the regular-way trade that immediately follows the final when-issued trade; the average premium is –0.53 percent using the immediately preceding NYSE regular-way trade. The results by firm in Panel B of Table 6 confirm a reduction in the magnitude of the when-issued premium by accounting for exchange location and the timing of trades within the day.

As a robustness check, we perform similar estimation for the when-issued trade closest to 12 noon to ensure that the results are not driven by day-end pricing patterns. (See, for example, Harris (1989) and Cushing and Madhavan (1999).) In results not reported in the tables, we find that for both the adjacent preceding and following regular-way trades, the when-issued premium equals –0.53 percent (t=-11.0). Hence, the finding of a negative when-issued premium is not isolated to closing transactions on the NYSE.

These results suggest a reinterpretation of prior intraday analysis of when-issued trading. In their study of stock splits, Brooks and Chiou (1995) provide similar evidence that the non-synchronous matching of trades was one component of the differential between regular-way and when-issued prices. Because they were trying to explain the positive premium observed in prior research, Brooks and Chiou (1995) argued that the

time-inconsistent matching induced an upward bias in the estimated premium. Our results, however, indicate that the bias is not positive but instead is <u>away from zero</u>.

C. Analysis of Bid and Ask Quotes from TAQ

While the magnitude of the when-issued premium is reduced by matching the exchange location and the timing of when-issued and regular-way trades, the when-issued prices still reflect a discount to regular-way transactions. Following guidance from the literature reviewed in Appendix B, we use bid and ask data from TAQ to further dissect the sources of the observed pricing differences.

The TAQ data are summarized in Table 7. Estimates are taken at the time of the last when-issued trade of the day. In Panel A, the average bid-ask spread for when-issued trading is twice the magnitude of that for regular-way trading. The median spread for the when-issued shares is ¼ while the median for regular-way shares is 1/8.

As reported in Panel B of Table 7, there is variation in the bid-ask spreads across the 16 subsidiary firms in the sample. Prior research such as Maloney and Mulherin (1992) and Lin and Rozeff (1995) find that the cross-section of pricing can be affected by the variation in bid-ask spreads. As an initial examination of the importance of bid-ask spreads for the when-issued premium, we regress the estimated percentage when-issued premium on the percentage when-issued bid-ask spread. We obtain the following results for a specification using the when-issued premium by firm from the last NYSE prices in Panel B of Table 6 and the relative when-issued bid-ask spread in Panel B of Table 7:

w.i. premium =   -0.002   -   0.35 * bid-ask spread.

(t=-1.05)   (t=-2.91)

N=16   Adjusted R-square = 0.33

The regression results indicate that the when-issued premium is more negative when the bid-ask spread is wider. In results available upon request, we obtain similar results using specifications employing other estimates of the when-issued premium, such as those in Table 4. The results are consistent with the view that the observed when-issued premium is related to bid-ask spreads.

The literature in Appendix B distinguishes two different effects of bid-ask spreads. The first is simple bid-ask clustering and the second stems from broader microstructure factors such as order flow imbalances. We consider these two factors in turn.

D. Analysis of Bid-Ask Clustering

One potential explanation for the observed when-issued premium is that regular-way and when-issued trades exhibit differential clustering at bids and asks. As a diagnostic of such tendencies, we compute the order-flow ratio, defined as:

Ratio = (Ask Price – Transaction Price) / (Ask Price – Bid Price).

This ratio ranges from 0, if the transaction occurs at the ask, to 1, if the transaction occurs at the bid.

Table 8 reports the order flow ratio for the final when-issued transaction price as well as for the four sets of regular-way closing prices. As reported in the final column of Panel A, the when-issued trades have an average order-flow ratio equal to 0.52, indicating a tendency to trade on the bid side of quote midpoints. By contrast, the four different regular-way prices have order flow ratios ranging form 0.38 to 0.40, indicating a

relative tendency for regular-way shares to trade near ask prices. Tests of the null

hypothesis that the order-flow ratio for regular-way trading equals that for when-issued

trading reject the null for each of the four sets of regular-way trades (t-statistics range

from 3.37 to 3.75). Similar results are provided in Panel B for the average across the 16

firms available on TAQ: the order-flow ratio indicates that the when-issued trades are

relatively more likely to be at bid prices.

The result in Table 8 naturally raises the question: why would the when-issued

shares of the subsidiary be more likely to trade at bid prices? An answer from the prior

literature (e.g., Maloney and Mulherin (1992)) is that the when-issued pricing anticipates

trading around the execution date. In our case of publicly-traded subsidiaries, there is

likely to be selling pressure on the execution date. This is because, on the margin, those

investors wishing to hold the subsidiary would have obtained shares at or soon after the

initial carve-out. By contrast, some investors in the parent are relatively less likely to

retain the subsidiary's shares after the spin off. This net selling pressure leads to the

greater tendency for the when-issued shares to trade at bid prices. For a related story, see

the Lease, Masulis, and Page (1991) discussion of the tendency for trades to occur at bid

prices around a secondary equity offering.

The standard remedy for clustering at bid or ask prices suggested by Lease,

Masulis and Page (1991) is to re-estimate with quote midpoints rather than transaction

prices. Table 9 reports such estimates by basing the when-issued premium on when-

issued and regular-way quotes at the time of the final when-issued trade of the day. For

the full sample of 210 observations in Panel A, the mean is –0.47 percent (t=-8.60). The

results are similar in Panel B when averaged by firm. Consistent with a bias due to

differential clustering at bids and asks in when-issued and regular-way trades, the premium estimated using midpoints is less than that for transaction prices in Table 6.

E. Additional Microstructure Effects

The literature surveyed in Appendix B points to additional factors that can influence when-issued pricing beyond movements within the bid-ask spread. These include order flow imbalance, investor clienteles, and convenience. The parallel when-issued and regular-way trading of our sample of publicly-traded subsidiaries enables us to distinguish between these three potential explanations.

The investor clientele story relies on trading constraints prior to the execution date that are not present for our sample. Similarly, the convenience explanation relies on hindrances such as due bills that are not pertinent to the publicly-traded subsidiaries. Hence, these two explanations would predict that the when-issued premium is zero for the publicly-traded subsidiaries. The results for publicly-traded subsidiaries do not support this prediction.

By contrast, the order-flow-imbalance explanation predicts that the sign of the when-issued premium is a function of the direction of order flow at the execution date. (Compare, for example, Maloney and Mulherin's (1992) discussion of stock splits and Hwang's (1995) discussion of reverse splits.) As discussed above in Section D., for publicly-traded subsidiaries, this direction is expected to be toward bid prices, resulting in a negative premium.

The order-flow-imbalance explanation further predicts an asymmetric effect on the when-issued premium between estimates computed at bid and ask prices. We report

evidence on this test in Table 10. Panel A indicates that the when-issued premium employing bid quotes is –0.65 percent, which is more than double the magnitude of the when-issued premium of –0.28 percent estimated with ask quotes. Indeed, the median when-issued premium using ask quotes is equal to zero. In results not reported in the tables, analysis of quotes at 12 noon indicates a similar asymmetry: the when-issued premium using bid quotes is –0.66 percent (t=-11.5) while the premium using ask quotes is –0.39 percent (t=-7.04).

The analysis by firm in Panel B of Table 10 also indicates asymmetric results for bid prices versus ask prices. The when-issued premium estimated at bid prices is –0.70% (t=-6.18). The when-issued premium estimated at ask prices is much smaller in magnitude, -0.14 percent, and is statistically not reliably different from zero, having a t-statistic of –0.84.

The evidence in Table 10 indicates that in providing a market in the when-issued shares of publicly-traded subsidiaries, the specialists on the NYSE asymmetrically alter the bid and ask quotes in that market vis-à-vis regular-way trading. Such quote-setting anticipates the net order flow at the execution date. These findings and interpretation are consistent with related findings for stock splits (Maloney and Mulherin (1992), Conrad and Conroy (1994)), reverse splits (Hwang (1995)), and seasoned equity offerings (Lease, Masulis, and Page (1991), Barclay and Litzenberger (1988)).

A natural question is whether there are any expected arbitrage profits from the differences in quotes between the when-issued and regular-way shares. Could an investor expect to profit from instantaneously buying low and selling high in the when-issued nad regular-way markets?

Table 11 speaks to these queries. The table reports the average asks, midpoints, and bids for when-issued and regular-way trades as well as the difference (in levels) between the quotes in the two markets. The first observation is that the differences between the markets are small: for example, the difference between the quote midpoints is less than the tick size of $1/8^{th}$ that prevailed for the better part of our sample. (The NYSE switched to trading in sixteenths on June 24, 1997.) The second observation is that the when-issued ask quote exceeds the regular-way bid quote. Hence, an investor cannot expect to arbitrage any pricing differences between when-issued and regular-way prices.

Even accounting for differences in settlement practices between when-issued and regular-way trading does not allow arbitrage. As first noted in Choi and Strong (1983), when-issued settlement is based on the ex-date, while regular-way settlement is based on the trade date. Hence, the time value of money implies that the actual price paid for when-issued shares is marginally less than for regular-way shares. In the TAQ sample, the average number of days for when-issued trading is 13. For such a difference in settlement and an interest rate of 5 percent (the average t-bill rate for the time period of the TAQ sample), the time value savings for the $32 share reported in Table 11 is 6 cents. This is less than the difference of 10 cents between the regular-way bid and the when-issued ask.

F. Summary of the Analysis of the Subsidiary Firms

The analysis of the when-issued premium for the 23 subsidiary firms in our sample has produced several new findings. First, the premium in this sample is actually negative. Second, the analysis of bias brought by timing, exchange location, and bid-ask

clustering indicates that the nature of the bias is <u>away from zero</u>, rather than being a positive bias. Finally, we find that the magnitude of the when-issued premium differs when estimated at bid and ask prices. This suggests that the direction and magnitude of the when-issued premium are affected by order flow. We build on these findings by next analyzing data for the parent firms in our sample.

V. The When-Issued Premium for Parent Subsidiary Pairs

To further understand when-issued pricing, we next analyze parent and subsidiary pairs. We are interested in the sign and significance of the when-issued premium for the parent-subsidiary pairs. We are also interested in whether there are any asymmetries in the premium when estimated at bid and ask quotes.

Like the analysis in Vijh (1994), we compare the when-issued prices for the subsidiary and new parent with the regular-way price of the old parent. The estimate is:

[(w.i. parent + (factor*w.i. subsidiary)) – regular-way parent] / regular-way parent,

where factor is the shares of stock in the subsidiary to be received per share of stock in the parent at the execution of the spinoff.

The initial estimates come from data in the Daily Stock Price Record. Of the 23 cases in the full sample, 18 have data available to estimate the when-issued premium for parent-subsidiary pairs, although there are slightly fewer observations for some of these cases due to missing data. Three subsidiaries previously analyzed (Bowater, First Colony, and Abercrombie & Fitch) are excluded because their parent firms do not have when-

issued trading around the time of the spinoff. Two other subsidiary firms previously analyzed (Guidant and Martin Marietta Materials) are excluded because the method of divestiture is an exchange offer. Note, also, that at the time of the spinoff of Sante Fe Energy Resources in 1990, the parent, Sante Fe Pacific Corp, also spun off a wholly-owned subsidiary, Catellus Development.

The parent-subsidiary pairs with available data are described in Table 12. The table reports a total of 226 days with available data. The table also reports the factor at which the parent shareholders received an interest in the subsidiary firm at the execution of the spinoff, which averages 0.82 across the sample firms.

Table 13 compares when-issued volume for the parent with regular-way volume for the parent. Similar to the estimates for the subsidiary firms, the parents, on average, have less volume in the when-issued market vis-à-vis regular-way volume.

Table 14 reports the when-issued premium for the parent-subsidiary pairs using information from the Daily Stock Price Record. As reported in Panel A, the estimated premium averages 0.53 percent (t=9.52). Similarly, the average across firms in Panel B is 0.58 percent (t=4.20). Consistent with Vijh (1994), we find a positive and significant when-issued premium for parent-subsidiary pairs.

In his analysis, Vijh (1994) argued that the when-issued premium reflected behavior on the date of spinoff execution. Since he was studying wholly-owned subsidiaries, investors could not obtain shares in the subsidiary or the new, separate parent until the spinoff occurred. Vijh (1994) argued that these constraints created clientele effects that were reflected in when-issued pricing.

The clientele story of Vijh (1994) does not explain our finding above of a negative premium for the subsidiary firms. An alternative argument that can explain both the negative premium for the subsidiary and the positive premium for the parent-subsidiary pairs is order-flow imbalances. A key distinction of the order-flow-imbalance explanation is that there will be an asymmetry in the premium when estimated at bid and ask prices.

To test for this prediction of the order-flow-imbalance explanation, we employ the TAQ database. As reported in Table 15, data are available for 12 parent-subsidiary pairs and 162 observations. To account for timing of trades and exchange location, the estimates in the table are taken from TAQ at the time of the last parent when-issued trade of the day. As reported in Panel A of Table 15, the time and exchange matched estimates obtain an average when-issued premium of 0.37% (t=8.00). Panel B reports the same average across the 12 firms.

To consider the bid-ask asymmetry prediction of the order-flow-imbalance explanation of the when-issued premium, Table 16 estimates the when-issued premium for the parent-subsidiary pairs using bid quotes and ask quotes. As reported in Panel A of the table, the results differ when the premium is estimated at the bid and at the ask. Using ask prices, the when-issued premium for parent subsidiary pairs is positive and significant. The mean when-issued premium computed at the ask is 0.63% (t=11.95). By contrast, the when-issued premium computed with bid prices is not meaningfully different from zero. Similar results obtain for the estimates across the 12 parent-subsidiary pairs in Panel B.

The when-issued results for the parent-subsidiary pairs have both similarities and differences with the results for the subsidiaries reported in Section IV. The similarity is the asymmetry between bid and ask estimates of the premium. The difference is that the premium for the parent-subsidiary pairs is positive and that the premium is significantly positive when estimated at ask prices.

The results suggest that the when-issued prices reflect order flow imbalances at the execution of the spinoff. For the subsidiaries alone, the net order flow is negative on the execution date. For the parent-subsidiary pairs, the net order flow for the parent is positive, possibly because the execution date is the first date on which investors can access shares in the new, separate parent. To test these implications, we next analyze the stock returns for the subsidiary and parent on the execution date of the spinoff.

VI. The Execution Date Return of the Subsidiary and the Parent

In this section, we report the execution date return for the subsidiaries and the parents in the sample. These estimates enable us to shed further light on the sources of the when-issued premium. We examine whether the sign of the ex-date return for the subsidiaries and the parent-subsidiary pairs is the same as that for the comparable when-issued premium. We are also interested in the permanence of the ex-date return. The order-flow-imbalance explanation suggests that the ex-date return reflects temporary price pressures that would be more likely to be reversed the longer the window around the date of execution.

A. Execution Date Return for the Subsidiary

Table 17 reports the stock return for the 23 subsidiary firms in the sample on the execution date. Data are taken from the Daily Stock Price Record. The return for the ex-date itself is reported in Panel A. The mean return on the ex-date is –0.87% (t=-1.28). This estimate is both of the same sign and magnitude of the estimates of the when-issued premium for the subsidiary firms in Section IV.

One potential explanation for the negative return for the subsidiaries is that order-flow imbalances induce temporary price pressure at the ex-date. If the order-flow-imbalance explanation is correct, then the stock return should be zero in wider windows around the ex-date. Lamoureux and Poon (1987) and Maloney and Mulherin (1992) make similar observations about the execution of stock splits.

To test for the existence of temporary price pressure around the ex-date, we re-estimate the ex-date return for the (-1,+1) window, where Day 0 is the ex-date. The results are reported in Panel B of Table 17. The sign of the observed return reverses from that of the Day 0 estimate: the mean value is 0.22 percent (t=0.16). This reversal in sign is consistent with temporary order-flow imbalances in subsidiary shares around the execution date.

B. Execution Date Return for the Parent-Subsidiary Pairs

We next perform similar estimates of the ex-date return for the parent subsidiary pairs. Data are available for 19 spinoffs. In addition to the 18 subsidiary-parent pairs in Table 12, the analysis includes First Colony Corp/Ethyl Corp. For the parent-subsidiary pairs, the ex-date return is:

[(Parent's Ex-Date Price + (factor*Subsidiary's Ex-Date Price)) - Parent's Day Minus 1 Price] / Parent's Day Minus 1 Price,

where factor is the number of shares of the subsidiary to be received per share of stock of the parent at the execution of the spinoff.

The estimate for the execution date return for parent-subsidiary pairs is reported in Table 18. As shown in Panel A, the average ex-date return is 1.02 percent (t=2.31). This estimate is of the same sign and magnitude of the when-issued premium reported in Section V for parent-subsidiary pairs. The symmetry between the ex-date and the when-issued premium resembles the results for the subsidiary firms.

Panel B of Table 18 reports the ex-date return for the parent-subsidiary pairs over the longer (-1,+1) window, where Day 0 is the ex-date. The average estimate is 2.28 percent (t=2.26), which is actually twice as large as the Day 0 result. This result is unlike the reversals found for the subsidiary firms around the ex-date.

The larger ex-date return for wider windows around the ex-date does not directly fit any of the explanations offered in the literature. If the clientele or convenience explanation applied, one would expect the positive return to obtain only on the ex-date itself.

The parent-subsidiary ex-date results likely stem from price pressures due to order flow imbalances. As shown by Lamoureux and Poon (1987) and Maloney and Mulherin (1992) for stock splits and Barclay and Litzenberger (1988) for seasoned equity offerings, the effect of price pressures around a share offering can persist for a sustained period. Of course, the larger ex-date effect for the longer window may also reflect a downward

sloping demand for parent shares. A finer dissection of the ex-date results for the parent-subsidiary pairs is a topic for future research.

VII. Summary and Concluding Comments

In this paper, we use a unique sample of when-issued trading to provide novel tests of the law of one price in financial markets. For the 23 subsidiary firms in the sample, we find that when-issued shares trade at a discount to regular-way shares. This result provides a striking contrast to the finding of a premium in all prior studies of when-issued trading in equity markets.

Although our results for the subsidiary firms differ from prior research, we find that the magnitude and direction for the when-issued discount can be resolved via a synthesis of explanations previously offered in the literature. One collective source for the observed pricing differences between when-issued and regular-way shares is improper measurement, stemming from differential exchange location and timing of trades and from bid-ask clustering. Our analysis further indicates that the measurement factors bias the when-issued premium <u>away from zero</u> rather than in a positive direction as argued in prior research.

The unique nature of the subsidiary firms in our sample enables us to distinguish between microstructure explanations for the remaining differential between the when-issued and regular-way shares. The finding of a non-zero pricing differential for the subsidiary firms is not consistent with either the investor clientele or convenience explanations. By contrast, the finding of an asymmetric when-issued premium for the subsidiary firms using bid and ask prices is consistent with an order-flow-imbalance

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explanation. The order-flow-imbalance story is further supported by the results for the when-issued premium for parent-subsidiary pairs.

Our analysis of execution date returns is also consistent with the order-flow-imbalance explanation for the when-issued premium. For both the subsidiary firms and the parent-subsidiary pairs, the ex-date return is of the same magnitude and direction as the when-issued premium. For the subsidiary firms, the ex-date return is not permanent, suggesting that the underlying factor for both the when-issued premium and the execution date return is temporary price pressures brought about by order-flow imbalances.

One implication of the order-flow-imbalance explanation is that the evidence on when-issued trading is consistent with the law of one price in the presence of transaction costs. Our results, therefore, can be interpreted as consistent with stock market efficiency. Hence, our interpretation of the evidence for when-issued trading is more optimistic toward market efficiency than that of Thaler (1999) and Shleifer (2000) for other cases of pairs trading.

Our results have important policy implications. Our results suggest that many apparent violations of the law of one price in financial markets simply reflect transaction costs. This resembles findings in the retail sector and in international trade (Engel and Rogers (2001), Asplund and Friberg (2001)). Under this interpretation, one can rely on innovations in market design to evolve to mitigate purported mispricing in financial markets. (See, for example, Kadapakkam (2000).)

Regardless of one's policy viewpoint, our results confirm that trading costs are an important feature of financial markets. A fruitful direction for future study would be to better understand the degree to which the trading costs in financial markets influence the

decisions of corporate managers and the design of corporate securities. Might market microstructure phenomena explain why corporate managers often engage in a multi-stage divestiture process that begins with an equity carve-out and ends with a corporate spinoff? Indeed, the corporate decisions that create the natural experiment for both our research and that of Lamont and Thaler (2001) and Mitchell, Pulvino and Stafford (2002) likely reflect a deeper interplay between corporate finance and market microstructure.

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Appendix A. Prior Empirical Research. This table summarizes prior empirical research on the when-issued premium and on execution date returns.

Panel A. Prior Research on the When-Issued Premium

Paper	Event	Time Period	# Firms	Premium
Choi & Strong (1983)	stock splits	1977-80	128	1.17%
Lamoreux & Wansley (1989)	stock splits	1962-85	140	0.70%
Brooks & Chiou (1995)	stock splits	1989	71	1.24%
Nayar & Rozeff (2001)	stock splits	1973-93	1,528	1.93%
Vijh (1994)	spinoffs (parent-subsidiary pairs)	1974-90	29	2.41%

Panel B. Prior Research on Ex-Date Returns

Paper	Event	Time Period	# Firms	Return
Grinblatt, et al (1984)	stock splits	1967-76	1,360	1.95%
Maloney & Mulherin (1992)	stock splits	1985-89	446	2.24%
Conrad & Conroy (1994)	stock splits	1980-83	217 NYSE	0.48%
		1983-90	1,419 NASDAQ	1.72%
Hwang (1995)	reverse splits	1972-90	430	-5.09%
Copeland, et al (1987)	spinoffs	1962-83	160	2.19%
Vijh (1994)	spinoffs	1964-90	113	3.03%

Appendix B. Potential Explanations for the When-Issued Premium. This table summarizes potential explanations for the when-issued premium that have been offered in the when-issued literature, as well as potential explanations that can be derived from the research on ex-date returns and from related research.

Potential Explanation	When-Issued Literature	Research on Ex-Date Returns	Related Research
Market Inefficiency			Thaler (1999), Shleifer (2000), Barber (1994), Lamont & Thaler (2001)
Improper Measurement			
Timing	Brooks & Chiou (1995)		Bookstaber (1983), Bhattacharya (1983), Lin & Rozeff (1995)
Exchange Location			Lee (1993)
Bid-Ask Clustering	Lamoreux & Wansley (1989), Brooks & Chiou (1995)	Maloney & Mulherin (1992), Conrad & Conroy (1994), Copeland, Lemgruber & Mayers (1987)	Lease, Masulis & Page (1991)
Market Microstructure			
Order Flow Imbalance		Maloney & Mulherin (1992), Conrad & Conroy (1994), Hwang (1995)	Barclay & Litzenberger (1988), Harris & Gurel (1986)
Investor Clientele	Vijh (1994)	Vijh (1994), Lamoreux & Poon (1987)	Easley, O'Hara & Saar (2001) Schultz (2000)
Convenience	Vijh (1994), Nayar & Rozeff (2001)	Vijh (1994), Nayar & Rozeff (2001)	
Liquidity			Amihud & Mendelson (1986)

Table 1. The Sample Firms

This table reports the 23 subsidiary firms in the sample, their former parents, and the dates of their carve-out and subsequent spinoff. The sample was collected by first identifying cases of when-issued trading in the NYSE Daily Stock Price Record and then using information in the Daily Stock Price Record, the Wall Street Journal Index, Lexis-Nexis, and other financial media to detect cases of when-issued trading of publicly-traded subsidiaries around the time they are fully spun off to the public.

Subsidiary Firm	Parent	Carve-out Date	Spinoff date
Coopervision Inc	Cooper Labs	1/21/83	12/15/83
Trans World Airlines	Transworld Corp	2/24/83	2/2/84
Bowater Inc	Bowater PLC	5/18/84	9/4/84
Burlington Resources	Burlington Northern	7/8/88	1/3/89
Kaufman & Broad Home	Broad Inc	8/1/86	3/7/89
Santa Fe Energy Resources	Santa Fe Pacific	3/9/90	12/5/90
El Paso Natural Gas	Burlington Resources	3/13/92	7/1/92
First Colony Corp	Ethyl Corp	12/8/92	7/1/93
Dean Witter Discover	Sears	2/23/93	7/13/93
Airtouch	Pacific Telesis	12/3/93	4/6/94
Santa Fe Pacific Gold	Santa Fe Pacific	6/16/94	10/3/94
Capital One Financial	Signet Bank	11/16/94	3/1/95
Allstate	Sears	6/3/93	7/13/95
Guidant Corp	Eli Lilly	12/14/94	9/29/95
Lucent Technologies	AT&T	4/4/96	10/1/96
Sterling Commerce	Sterling Software	3/8/96	10/8/96
Union Pacific Resources	Union Pacific Corp	10/11/95	10/16/96
Martin Marietta Materials	Lockheed Martin	2/17/94	11/4/96
Midway Games	WMS Industries	10/30/96	4/7/98
Associates First Capital	Ford	5/8/96	4/8/98
Abercrombie & Fitch	Limited	9/26/96	6/2/98
Convergys Corp	Cincinnati Bell	8/13/98	1/4/99
Delphi Automotive Systems	General Motors	2/5/99	5/28/99

Table 2. The Incidence of When-Issued Trading for the Subsidiary Firms

This table overviews the incidence of when-issued trading for the 23 subsidiary firms in the sample. Information to construct the table is taken from the NYSE Daily Stock Price Record. The 1st w.i. date is the initial date for which either when-issued transaction prices or bid and ask quotes are reported in the Daily Stock Price Record. The # w.i. days are the total number of days for which either when-issued transaction prices or bid and ask quotes are reported in the Daily Stock Price Record. Pos Vol indicates the number of days for which there is positive volume in the when-issued market and the Daily Stock Price Record reports closing transaction prices. Zero Vol indicates the number of days in the when-issued market with zero volume where the Daily Stock Price Record reports closing bid and ask quotes. The Spinoff Date is the date on which the sample firm is fully spun off to the public and is also the day following the last day of when-issued trading.

Subsidiary Firm	1st w.i. date	# w.i. days	Pos Vol	Zero Vol	Spinoff Date
Coopervision Inc	12/6/83	7	4	3	12/15/83
Trans World Airlines	12/29/83	24	24	0	2/2/84
Bowater Inc	7/24/84	28	15	13	9/4/84
Burlington Resources	12/12/88	14	14	0	1/3/89
Kaufman & Broad Home	2/22/89	9	8	1	3/7/89
Santa Fe Energy Resources	11/23/90	8	8	0	12/5/90
El Paso Natural Gas	6/9/92	16	15	1	7/1/92
First Colony Corp	6/7/93	18	3	15	7/1/93
Dean Witter Discover	6/21/93	15	9	6	7/13/93
Airtouch	3/15/94	15	15	0	4/6/94
Santa Fe Pacific Gold	9/6/94	19	19	0	10/3/94
Capital One Financial	2/6/95	16	15	1	3/1/95
Allstate	6/21/95	15	15	0	7/13/95
Guidant Corp	9/19/95	8	8	0	9/29/95
Lucent Technologies	9/13/96	12	12	0	10/1/96
Sterling Commerce	9/25/96	9	9	0	10/8/96
Union Pacific Resources	9/23/96	17	15	2	10/16/96
Martin Marietta Materials	10/10/96	17	17	0	11/4/96
Midway Games	3/27/98	7	7	0	4/7/98
Associates First Capital	3/10/98	21	21	0	4/8/98
Abercrombie & Fitch	4/29/98	20	20	0	6/2/98
Convergys Corp	11/30/98	23	21	2	1/4/99
Delphi Automotive Systems	5/21/99	5	4	1	5/28/99
	Total	343	298	45	

Table 3. Trading Volume for the Subsidiary Firms

This table reports average daily when-issued and regular-way trading volume (in hundreds of shares) for the 23 subsidiary firms in the sample. Data come from the Daily Stock Price Record and are for days with positive when-issued volume. Ratio is average daily when-issued volume as a fraction of average daily regular-way volume.

Subsidiary Firm	# days	When-issued	Regular-way	Ratio
Coopervision Inc	4	56	143	39%
Trans World Airlines	24	1338	2208	61%
Bowater Inc	15	25	1079	2%
Burlington Resources	14	1148	3549	32%
Kaufman & Broad Home	8	228	944	24%
Santa Fe Energy Resources	8	431	346	124%
El Paso Natural Gas	15	169	216	78%
First Colony Corp	3	627	561	112%
Dean Witter Discover	9	102	8030	1%
Airtouch	15	6084	12141	50%
Santa Fe Pacific Gold	19	3029	5711	53%
Capital One Financial	15	368	2550	14%
Allstate	15	2139	8066	27%
Guidant Corp	8	10794	11867	91%
Lucent Technologies	12	8974	18014	50%
Sterling Commerce	9	2850	5464	52%
Union Pacific Resources	15	2149	5016	43%
Martin Marietta Materials	17	7502	4229	177%
Midway Games	7	280	1331	21%
Associates First Capital	21	5984	9431	63%
Abercrombie & Fitch	20	1704	7197	24%
Convergys Corp	21	401	3694	11%
Delphi Automotive Systems	4	676	40627	2%
Total	298		Average	50%

Table 4. When-Issued Premium for Subsidiary Firms Using Daily Closing Prices

This table reports the when-issued premium for subsidiary firms using the closing transaction prices reported in the NYSE Daily Stock Price Record. The when issued premium is defined as (w.i. price - regular way price)/regular way price. Panel A reports the data for the full sample of 298 trading days where there was positive trading volume in the when-issued market. The p-level for the median is based on the Wilcoxon signed rank test of the null that the median is zero. Panel B reports the data by subsidiary firm. The t-statistic in this panel tests the null that the average premium by firm equals zero.

Panel A. When-Issued Premium Using Closing Prices (N=298)

Mean	-0.68%	Median	-0.53%
(t-statistic)	(-10.6)	(p-level)	(0.0001)

Panel B. When-Issued Premium by Subsidiary Firm

Subsidiary Firm	# days		w.i. premium
Coopervision Inc	4		0.38%
Trans World Airlines	24		-1.56%
Bowater Inc	15		-1.06%
Burlington Resources	14		-0.89%
Kaufman & Broad Home	8		-0.49%
Santa Fe Energy Resources	8		-0.62%
El Paso Natural Gas	15		-0.70%
First Colony Corp	3		-1.98%
Dean Witter Discover	9		-0.76%
Airtouch	15		-0.74%
Santa Fe Pacific Gold	19		-0.93%
Capital One Financial	15		-1.03%
Allstate	15		-0.13%
Guidant Corp	8		-0.30%
Lucent Technologies	12		-0.12%
Sterling Commerce	9		-0.38%
Union Pacific Resources	15		-0.24%
Martin Marietta Materials	17		-0.70%
Midway Games	7		-1.26%
Associates First Capital	21		-0.14%
Abercrombie & Fitch	20		-0.26%
Convergys Corp	21		-0.97%
Delphi Automotive Systems	4		0.31%
Total	298	Mean	-0.63%
		(t-statistic)	(-5.43)

Table 5. When-Issued Premium for Subsidiary Firms on Days when When-Issued Volume Equals Zero

This table reports the when-issued premium for subsidiary firms using information taken from the NYSE Daily Stock Price Record for the 45 days when when-issued trading volume equals zero. On those days, the Daily Stock Price Record reports bid and ask quotes for the when-issued market. The when-issued premium is defined as (w.i. midpoint - regular way price)/regular way price. Panel A reports the data for the full sample of 45 days where there was zero trading volume in the when-issued market. The p-level for the median uses the Wilcoxon signed rank test to test the null that the median value is zero. Panel B reports the data for the 10 sample firms with at least one day on which when-issued trading volume equals zero. The t-statistic in this panel tests the null that the average premium by firm equals zero.

Panel A. When-Issued Premium on Days with Zero When-Issued Volume (N=45)

Mean	0.09%	Median	0
(t-statistic)	(0.51)	(p-level)	(0.57)

Panel B. When-Issued Premium by Subsidiary Firm

Subsidiary Firm	# days		w.i. premium
Coopervision Inc	3		1.40%
Bowater Inc	13		0.04%
Kaufman & Broad Home	1		-1.56%
El Paso Natural Gas	1		-0.53%
First Colony Corp	15		0.36%
Dean Witter Discover	6		-0.85%
Capital One Financial	1		-1.47%
Union Pacific Resources	2		-0.11%
Convergys Corp	2		0.51%
Delphi Automotive Systems	1		1.82%
Total	45	Mean	-0.04%
		(t-statistic)	(-0.11)

Table 6. When-Issued Premium for Subsidiary Firms Using TAQ Transaction Data

This table reports the when-issued premium for subsidiary firms using information taken from TAQ for the 16 firms with spinoffs in 1993 or later. For the final when-issued trade of the day, we compute premiums using 4 different regular-way prices: the last regular-way price reported on TAQ (Last Price), the last reported NYSE regular-way trade (last NYSE), the adjacent NYSE regular-way trade immediately following the last when-issued trade (Adjacent After), and the adjacent NYSE regular-way trade immediately preceding the last when-issued trade (Adjacent Before). Panel A reports the data for the full sample of 210 trading days. Panel B reports the data by firm.

Panel A. When-Issued Premium Using TAQ Data (N=210)

	Last Price	Last NYSE	Adjacent After	Adjacent Before
Mean	-0.59%	-0.55%	-0.52%	-0.53%
(t-statistic)	(-8.99)	(-9.51)	(-10.45)	(-10.45)
Median	-0.45%	-0.42%	-0.40%	-0.41%
(p-level)	(0.0001)	(0.0001)	(0.0001)	(0.0001)

Panel B. When-Issued Premium by Firm

Sample Firm	# days	Last Price	Last NYSE	Adjacent After	Adjac Before
First Colony Corp	3	-2.11%	-2.12%	-2.12%	-1.83%
Dean Witter Discover	9	-0.60%	-0.64%	-0.49%	-0.50%
Airtouch	15	-0.98%	-0.55%	-0.48%	-0.40%
Santa Fe Pacific Gold	19	-0.89%	-0.97%	-0.97%	-0.97%
Capital One Financial	15	-1.08%	-0.98%	-0.98%	-0.98%
Allstate	15	-0.13%	-0.11%	-0.19%	-0.17%
Guidant Corp	8	-0.30%	-0.36%	-0.41%	-0.35%
Lucent Technologies	12	-0.10%	0.05%	0.03%	0.00%
Sterling Commerce	9	-0.38%	-0.47%	-0.47%	-0.56%
Union Pacific Resources	15	-0.30%	-0.27%	-0.18%	-0.21%
Martin Marietta Materials	17	-0.67%	-0.64%	-0.64%	-0.67%
Midway Games	7	-1.26%	-1.22%	-1.30%	-1.46%
Associates First Capital	21	-0.03%	-0.01%	-0.02%	-0.03%
Abercrombie & Fitch	20	-0.49%	-0.54%	-0.58%	-0.59%
Convergys Corp	21	-0.98%	-1.02%	-0.59%	-0.68%
Delphi Automotive Systems	4	0.31%	0.46%	-0.23%	-0.08%
Mean		-0.62%	-0.59%	-0.60%	-0.59%
(t-stat)		(-4.25)	(-3.88)	(-4.46)	(-4.62)

Table 7. When-Issued and Regular-Way Bid-Ask Spreads Using TAQ Data

This table reports when-issued and regular-way bid-ask spreads for the subsidiary firms using information from TAQ. Estimates are taken at the time of the last when-issued trade of the day. Data are available for the 16 firms with spinoffs in 1993 or later. Panel A reports the data for the full sample of 210 trading days. Panel B reports the data by firm. Absolute Spread is the Ask Price minus the Bid Price. Relative spread is the Absolute Spread divided by the average of the Bid Price and the Ask Price.

Panel A. Bid-Ask Spreads for Subsidiary Firms Using TAQ Data (N=210)

	When-Issued		Regular-Way	
	Absolute	Relative	Absolute	Relative
Mean	0.2571	0.97%	0.1577	0.60%
Median	0.2500	0.78%	0.1250	0.55%

Panel B. Bid-Ask Spreads by Subsidiary Firm

Subsidiary Firm	days	When-Issued		Regular-Way	
		Absolute	Relative	Absolute	Relative
First Colony Corp	3	1.2500	4.35%	0.2917	1.01%
Dean Witter Discover	9	0.5000	1.35%	0.2222	0.60%
Airtouch	15	0.2167	0.98%	0.1750	0.79%
Santa Fe Pacific Gold	19	0.1908	1.13%	0.1447	0.85%
Capital One Financial	15	0.2750	1.64%	0.1750	1.03%
Allstate	15	0.2333	0.76%	0.2000	0.64%
Guidant Corp	8	0.1719	0.64%	0.1719	0.64%
Lucent Technologies	12	0.3021	0.73%	0.1771	0.43%
Sterling Commerce	9	0.1667	0.56%	0.2083	0.70%
Union Pacific Res	15	0.2000	0.71%	0.1500	0.53%
Martin Marietta Mat	17	0.1912	0.84%	0.1691	0.73%
Midway Games	7	0.1339	0.58%	0.0893	0.39%
Associates First Cap	21	0.2619	0.33%	0.1280	0.16%
Abercrombie & Fitch	20	0.1750	0.41%	0.1156	0.27%
Convergys Corp	21	0.3274	1.67%	0.1339	0.67%
Delphi Automotive	4	0.4219	2.05%	0.0781	0.38%
Total	210				

Table 8. Order Flow Ratio for Subsidiary Firms Using TAQ Data
This table reports information on the location of the trades for regular-way and when-issued trading for the 16 subsidiary firms with data available from TAQ. The statistic reported is the order flow ratio, defined as (Closing Ask Quote - Closing Transaction Price) / (Closing Ask Quote - Closing Bid Quote). The ratio is bounded by 0, if the trade occurs at an ask price, and 1, if the trade occurs at a bid price. The ratio is reported for the final when-issued trade and 4 different regular-way prices: the last regular-way price reported on TAQ (Last Price), the last reported NYSE regular-way trade (last NYSE), the adjacent NYSE regular-way trade immediately following the last when-issued trade (Adjacent After), and the adjacent NYSE regular-way trade immediately preceding the last when-issued trade (Adjacent Before). Panel A reports the data for the full sample of 210 trading days. Panel B reports the data by firm. For each of the 4 regular-way variables, the t-statistics in both panels test the null that the difference between the regular-way ratio and the when-issued ratio equals zero.

Panel A. Order Flow Ratio Using TAQ Data (N=210)

	Last Price	Last NYSE	Adjacent After	Adjacent Before	When Issued
Mean	0.38	0.38	0.38	0.40	0.52
(t-statistic)	(3.59)	(3.51)	(3.75)	(3.37)	

Panel B. Order Flow Ratio by Firm

Sample Firm	# days	Last Price	Last NYSE	Adjacent After	Before	When Issued
First Colony Corp	3	0.33	0.33	0.33	0.67	0.83
Dean Witter Discover	9	0.33	0.28	0.61	0.72	0.66
Airtouch	15	0.40	0.60	0.53	0.53	0.72
Santa Fe Pacific Gold	19	0.32	0.26	0.32	0.29	0.48
Capital One Financial	15	0.20	0.23	0.27	0.29	0.36
Allstate	15	0.46	0.42	0.34	0.37	0.56
Guidant Corp	8	0.44	0.44	0.31	0.38	0.63
Lucent Technologies	12	0.29	0.46	0.50	0.58	0.51
Sterling Commerce	9	0.65	0.54	0.26	0.26	0.22
Union Pacific Resources	15	0.10	0.10	0.33	0.37	0.60
Martin Marietta Materials	17	0.56	0.56	0.56	0.47	0.70
Midway Games	7	0.50	0.50	0.29	0.21	0.64
Associates First Capital	21	0.47	0.42	0.34	0.37	0.56
Abercrombie & Fitch	20	0.39	0.34	0.27	0.39	0.41
Convergys Corp	21	0.38	0.42	0.52	0.39	0.43
Delphi Automotive Systems	4	0.25	0.25	0.00	0.54	0.58
	Mean	0.38	0.38	0.36	0.42	0.54
	(t-stat)	(2.95)	(3.27)	(4.05)	(3.59)	

Table 9. When-Issued Premium for Subsidiary Firms Using TAQ Midpoints

This table reports the when-issued premium using bid and ask quotes reported on TAQ for the 16 firms with spinoffs in 1993 or later. For the final when-issued transaction for each day, the bid and ask quotes at that time for when-issued and regular-way trading are used to estimate the when-issued premium using quote midpoints (Midpoint). Panel A reports the data for the full sample of 210 trading days. Panel B reports the data by firm.

Panel A. When-Issued Premium Using TAQ Midpoints (N=210)

	Midpoint
Mean	-0.47%
(t-statistic)	(-8.60)
Median	-0.35%
(p-level)	(0.0001)

Panel B. When-Issued Premium by Firm

Sample Firm	# days	Midpoint
First Colony Corp	3	-0.10%
Dean Witter Discover	9	-0.30%
Airtouch	15	-0.27%
Santa Fe Pacific Gold	19	-0.84%
Capital One Financial	15	-1.02%
Allstate	15	-0.22%
Guidant Corp	8	-0.47%
Lucent Technologies	12	-0.16%
Sterling Commerce	9	-0.49%
Union Pacific Resources	15	-0.18%
Martin Marietta Materials	17	-0.52%
Midway Games	7	-1.17%
Associates First Capital	21	0.00%
Abercrombie & Fitch	20	-0.53%
Convergys Corp	21	-0.80%
Delphi Automotive Systems	4	0.14%
	Mean	-0.42%
	(t-stat)	(-4.36)

Table 10. When-Issued Premium for Subsidiary Firms Using TAQ Bids and Asks

This table reports the when-issued premium for subsidiary firms using bid and ask quotes reported on TAQ for the 16 firms with spinoffs in 1993 or later. For the final when-issued transaction for each day, the bid and ask quotes at that time for when-issued and regular-way trading are used to estimate the when-issued premium using bid prices (Bid), and ask prices (Ask). Panel A reports the data for the full sample of 210 trading days. Panel B reports the data by firm.

Panel A. When-Issued Premium Using TAQ Bids and Asks (N=210)

	Bid	Ask
Mean	-0.65%	-0.28%
(t-statistic)	(-10.6)	(-4.94)
Median	-0.44%	0
(p-level)	(0.0001)	(0.0001)

Panel B. When-Issued Premium by Firm

Sample Firm	# days	Bid	Ask
First Colony Corp	3	-1.58%	1.76%
Dean Witter Discover	9	-0.68%	0.07%
Airtouch	15	-0.36%	-0.17%
Santa Fe Pacific Gold	19	-0.98%	-0.70%
Capital One Financial	15	-1.33%	-0.72%
Allstate	15	-0.28%	-0.16%
Guidant Corp	8	-0.47%	-0.47%
Lucent Technologies	12	-0.31%	-0.01%
Sterling Commerce	9	-0.43%	-0.56%
Union Pacific Resources	15	-0.27%	-0.09%
Martin Marietta Materials	17	-0.57%	-0.47%
Midway Games	7	-1.27%	-1.07%
Associates First Capital	21	-0.08%	0.09%
Abercrombie & Fitch	20	-0.60%	-0.46%
Convergys Corp	21	-1.29%	-0.31%
Delphi Automotive Systems	4	-0.70%	0.97%
	Mean	-0.70%	-0.14%
	(t-stat)	(-6.18)	(-0.84)

Table 11. Average Bid & Ask Quotes of Subsidiary Firms and the Absolute W.I Premium

This table reports the average values of when-issued and regular-way quotes and the absolute level of the w.i. premium for the 16 subsidiary firms from TAQ. Quotes for both when-issued and regular-way trading are those reported at the time of the final when-issued trade of the day. The Absolute Premium is the difference between the when-issued quote and the regular-way quote.

Mean Values of Bid & Ask Quotes and Absolute W.I. Premium (N=210)

	When-Issued	Regular Way	Absolute Premium
Ask Quote	$32.30	$32.36	-$0.06
Midpoint	$32.17	$32.28	-$0.11
Bid Quote	$32.04	$32.20	-$0.16

Table 12. Parent and Subsidiary Pairs

This table reports data availability and characteristics of parent-subsidiary pairs. The sample entails 226 observations across 18 firms having positive when-issued volume for both the parent and the subsidiary. Data are from the Daily Stock Price Record and from financial media. Factor is the number of shares of the subsidiary to be received per share of stock in the parent at the execution of the spinoff.

Data Availability and Characteristics of Parent-Subsidiary Pairs

Subsidiary	Parent	# days	factor
Coopervision Inc	Cooper Labs	4	1
Trans World Airlines	Transworld Corp	17	0.93
Burlington Resources	Burlington Northern	14	1.74
Kaufman & Broad Home	Broad Inc	8	0.75
Santa Fe Energy Resources	Santa Fe Pacific	8	0.30303[a]
El Paso Natural Gas	Burlington Resources	13	0.2381
Dean Witter Discover	Sears	9	0.4
Airtouch	Pacific Telesis	15	1
Santa Fe Pacific Gold	Santa Fe Pacific	19	0.5882
Capital One Financial	Signet Bank	15	1
Allstate	Sears	15	0.927035
Lucent Technologies	AT&T	12	0.3241
Sterling Commerce	Sterling Software	9	1.5926
Union Pacific Resources	Union Pacific Corp	15	0.8469
Associates First Capital	Ford	21	0.2625
Midway Games	WMS Industries	7	1.1977
Convergys Corp	Cincinnati Bell	21	1
Delphi Automotive Systems	General Motors	4	0.7
	Total	226	Avg 0.82

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[a] Catellus Development was also spun off by Sante Fe Pacific at the same time.

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Table 13. Trading Volume for the Parent Firms

This table reports average daily when-issued and regular-way trading volume (in hundreds of shares) for parent firms. The sample entails 226 observations across 18 firms having positive when-issued volume for both the parent and the subsidiary. Data are from the Daily Stock Price Record. Ratio is average daily when-issued volume as a fraction of average daily regular-way volume.

Parent Firm	# days	When-issued	Regular-way	Ratio
Cooper Labs	4	63	298	21%
Transworld Corp	17	846	2769	31%
Burlington Northern	14	2997	3441	87%
Broad Inc	8	89	1638	5%
Santa Fe Pacific	8	1310	4610	28%
Burlington Resources	13	54	2523	2%
Sears	9	3745	11269	33%
Pacific Telesis	15	4587	9724	47%
Santa Fe Pacific	19	1345	6207	22%
Signet Bank	15	1292	2658	49%
Sears	15	2187	8892	25%
AT&T	12	19500	62069	31%
Sterling Software	9	2607	3423	76%
Union Pacific Corp	15	864	5597	15%
Ford	21	11267	30000	38%
WMS Industries	7	2911	1777	164%
Cincinnati Bell	21	1375	4595	30%
General Motors	4	426	25832	2%
Total	226		Average	39%

Table 14. When-Issued Premium for Parent and Subsidiary Pairs Using Daily Data
This table reports the when issued premium for parent-subsidiary pairs. The premium is estimated as the percentage difference between the sum of the when-issued price of the parent plus the properly adjusted when-issued price of the subsidiary and the regular way parent price, or

$$[(w.i.\ parent + (factor*w.i.subsidiary)) - regular\ way\ parent] / regular\ way\ parent$$

where factor is the number of shares of the subsidiary to be received per share of stock in the parent at the execution of the spinoff. The sample entails 226 observations across 18 firms having positive when-issued volume for both the parent and the subsidiary. Data are from the Daily Stock Price Record. Panel A reports the results for the full sample of 226 observations. Panel B reports the data by parent-subsidiary pair.

Panel A. When Issued Premium (N=226)

Mean	0.53%	Median	0.41%
(t-stat)	(9.52)	(p-level)	(0.0001)

Panel B. When-Issued Premium by Parent-Subsidiary Pair

Subsidiary	Parent	# days	factor	w.i. prem
Coopervision Inc	Cooper Labs	4	1	1.88%
Trans World Airlines	Transworld Corp	17	0.93	1.02%
Burlington Resources	Burlington Northern	14	1.74	0.89%
Kaufman & Broad Home	Broad Inc	8	0.75	2.04%
Santa Fe Energy Resources	Santa Fe Pacific	8	0.30303[a]	0.26%
El Paso Natural Gas	Burlington Resources	13	0.2381	0.50%
Dean Witter Discover	Sears	9	0.4	0.64%
Airtouch	Pacific Telesis	15	1	0.12%
Santa Fe Pacific Gold	Santa Fe Pacific	19	0.5882	-0.11%
Capital One Financial	Signet Bank	15	1	0.47%
Allstate	Sears	15	0.927035	0.29%
Lucent Technologies	AT&T	12	0.3241	0.39%
Sterling Commerce	Sterling Software	9	1.5926	-0.01%
Union Pacific Resources	Union Pacific Corp	15	0.8469	0.25%
Associates First Capital	Ford	21	0.2625	0.74%
Midway Games	WMS Industries	7	1.1977	0.60%
Convergys Corp	Cincinnati Bell	21	1	0.59%
Delphi Automotive Systems	General Motors	4	0.7	-0.04%
	Total	226	Mean	0.58%
			(t-stat)	(4.20)

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[a] The estimates incorporate Catellus Development, also spun off by Sante Fe Pacific.

Table 15. When-Issued Premium for Parent and Subsidiary Pairs Using TAQ LAST NYSE Data

This table reports the when issued premium for parent-subsidiary pairs using TAQ data for the last NYSE transaction of the day. The premium is estimated as the percentage difference between the sum of the when-issued price of the parent plus the properly adjusted when-issued price of the subsidiary and the regular way parent price, or

[(w.i. parent + (factor*w.i.subsidiary)) - regular way parent] / regular way parent

where factor is the number of shares of the subsidiary to be received per share of stock in the parent at the execution of the spinoff. Prices are taken from TAQ at the time of the last parent NYSE when-issued trade of the day. The sample entails 162 observations across 12 firms having positive when-issued volume for both the parent and the subsidiary and having a spinoff date in 1993 or later. Panel A reports the results for the full sample of 162 observations. Panel B reports the data by parent-subsidiary pair.

Panel A. When Issued Premium (N=162)

Mean	0.37%	Median	0.33%
(t-stat)	(8.00)	(p-level)	(0.0001)

Panel B. When-Issued Premium by Parent-Subsidiary Pair

Subsidiary	Parent	# days	factor	w.i. prem
Dean Witter Discover	Sears	9	0.4	0.63%
Airtouch	Pacific Telesis	15	1	0.20%
Santa Fe Pacific Gold	Santa Fe Pacific	19	0.5882	-0.12%
Capital One Financial	Signet Bank	15	1	0.49%
Allstate	Sears	15	0.927035	0.28%
Lucent Technologies	AT&T	12	0.3241	0.38%
Sterling Commerce	Sterling Software	9	1.5926	-0.01%
Union Pacific Resources	Union Pacific Corp	15	0.8469	0.25%
Associates First Capital	Ford	21	0.2625	0.74%
Midway Games	WMS Industries	7	1.1977	0.59%
Convergys Corp	Cincinnati Bell	21	1	0.59%
Delphi Automotive Systems	General Motors	4	0.7	-0.04%
	Total	162	Mean	0.37%
			(t-stat)	(5.37)

Table 16. When-Issued Premium for Parent and Subsidiary Pairs Using TAQ Bid and Ask NYSE Data

This table reports the when issued premium for parent-subsidiary pairs using TAQ data for the last NYSE bid and ask quotes of the day. The premium is estimated as the percentage difference between the sum of the when-issued price of the parent plus the properly adjusted when-issued price of the subsidiary and the regular way parent price, or

[(w.i. parent + (factor*w.i.subsidiary)) - regular way parent] / regular way parent

where factor is the number of shares of the subsidiary to be received per share of stock in the parent at the execution of the spinoff. Prices are taken from TAQ at the time of the last NYSE quotes of the day. The sample entails 162 observations across 12 firms having positive when-issued volume for both the parent and the subsidiary and having a spinoff date in 1993 or later. Panel A reports the results for the full sample of 162 observations. Panel B reports the data by parent-subsidiary pair.

Panel A. When Issued Premium (N=162)

	Bid	Ask
Mean	0.02%	0.63%
(t-stat)	(0.43)	(11.95)
Median	0.00%	0.47%
(p-level)	(0.90)	(0.0001)

Panel B. When-Issued Premium by Parent-Subsidiary Pair

Subsidiary	Parent	# days	factor	Bid	Ask
Dean Witter	Sears	9	0.4	0.03%	0.64%
Airtouch	Pacific Telesis	15	1	-0.03%	0.34%
Santa Fe Pac Gold	Santa Fe Pacific	19	0.5882	-0.33%	0.28%
Capital One Fin	Signet Bank	15	1	-0.04%	1.00%
Allstate	Sears	15	0.927035	0.01%	0.46%
Lucent Technologies	AT&T	12	0.3241	0.09%	0.35%
Sterling Commerce	Sterling Software	9	1.5926	-0.04%	0.22%
Union Pacific Res	Union Pacific Corp	15	0.8469	0.11%	0.40%
Associates First Cap	Ford	21	0.2625	0.50%	0.78%
Midway Games	WMS Industries	7	1.1977	0.16%	0.78%
Convergys Corp	Cincinnati Bell	21	1	-0.15%	1.34%
Delphi Automotive	General Motors	4	0.7	-0.28%	0.51%
		Total 162	Mean	0.003%	0.59%
			(t-stat)	(0.048)	(6.17)

Table 17. Execution Date Returns for the Subsidiary

This table reports the execution date returns for the subsidiary. Data are for the full sample of 23 firms. Data are from the Daily Stock Price Record.

Panel A reports the return on Day 0, the ex-date itself, estimated as:

(Subdiary Ex-Date Price - Subsidiary Day Minus 1 Price) / (Subsidiary Day Minus 1 Price).

Panel B reports the comparable return for the (-1,+1) window, where Day 0 is the ex-date.

Panel A. Execution Date Return for the Subsidiary, Day 0 (N=23)

Mean	-0.87%		Median	-1.66%
(t-stat)	(-1.28)		(p-level)	(0.13)

Panel B. Execution Date Return for the Subsidiary, (-1,+1) Window (N=23)

Mean	0.22%		Median	-0.86%
(t-stat)	(0.16)		(p-level)	(0.81)

Table 18. Execution Date Returns for Parent and Subsidiary Pairs

This table reports the execution date returns for parent-subsidiary pairs. Results are for the 19 parent-subsidiary pairs with available data. In addition to the subsidiary-parent pairs listed in Table 12, the analysis includes First Colony Corp/Ethyl Corp. Data are from the Daily Stock Price Record.

Panel A reports the return on Day 0, the ex-date itself, estimated as:

[(Parent's Ex-Date Price + (factor*Subsidiary's Ex-Date Price)) - Parent's Day Minus 1 Price] / Parent's Day Minus 1 Price,

where factor is the number of shares of the subsidiary to be received per share of stock in the parent at the execution of the spinoff. [a]

Panel B reports the comparable return for the (-1,+1) window, where Day 0 is the ex-date.

Panel A. Execution Date Return for Parent-Subsidiary Pairs, Day 0 (N=19)

Mean	1.02%	Median	0.82%
(t-stat)	(2.31)	(p-level)	(0.04)

Panel B. Execution Date Return for Parent-Subsidiary Pairs, (-1,+1) Window (N=19)

Mean	2.28%	Median	3.06%
(t-stat)	(2.26)	(p-level)	(0.04)

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[a] For the Sante Fe Energy Resources spinoff, the estimates include Catellus Development, spun off by Sante Fe Pacific at the same time.