An Examination of the Narrow Window of Opportunity for Concurrent Regular Way and When-issued Trading

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Abstract

We examine the influence of concurrent regular way and when-issued trading on spin-off ex-date returns and order flow. Consistent with previous studies, we find positive parent and negative subsidiary when-issued premiums during this brief market period. In addition to the results paralleling prior research, we report that the change from negative when-issued trading to positive ex-date returns reflects support for the order flow imbalance versus the convenience argument for subsidiary shares. Also, we observe that spin-offs with when-issued trading outperform spin-offs that had regular way, but no when-issued trading. Moreover, our study confirms that when-issued premiums are temporary for carve-out/spin-off combinations.

JEL classification: G12, G32, G34
Keywords: Market Microstructure, Carve-outs, Spin-offs, Divestiture
1. Introduction

When there is enough investor interest prior to spin-offs -- complete divestitures of subsidiary firms by parent companies -- and stock splits (or stock dividends), specialists make markets in when-issued shares for the brief period -- approximately two weeks-- prior to the ex-date. Thus, investors have a narrow window of opportunity to take advantage of when-issued trading prior to the ex-date of a stock split or spin-off.

We examine a special case of concurrent regular way and when-issued trading that occurs for carve-out companies pending a spin-off. This unique, but short-lived opportunity arises for investors when spin-offs preceded by carve-outs trade regular way and, if there is sufficient ex-ante demand, when-issued. Pure spin-off subsidiary companies trade only on a when-issued basis prior to the ex date. In carve-outs (partial IPOs) parents retain at least a one-third ownership in subsidiaries, but both companies trade regular way. Publicly traded companies that are pending spin-offs such as Agilent Technologies and Monsanto, can cause investors to examine whether carve-outs trade at more than price for the regular way and when-issued shares.

Four sets of investors can participate in ex-ante trades for parent and subsidiary shares: regular way parent and subsidiary investors and when-issued parent and subsidiary investors. Parent company shareholders -- who will receive subsidiary shares via spin-off -- can sell these shares on a when-issued basis and cause selling pressure prior to the ex date. Investors that desire subsidiary shares may purchase regular way or when-issued shares. The trading volume for concurrent regular way shares dwarfs the volume for when-issued shares. Thus, given a choice, outside investors generally trade regular way shares. Therefore, the major impact on when-issued shares is, most likely, from parent company sellers of subsidiary when-issued shares. This deflates when-issued prices and causes when-issued discounts. Lease, Masulis, and Page (1991) observe similar results around secondary equity offerings. However, the parent company selling pressure on subsidiary when-issued shares may provide an opportunity for investors to buy discounted ex-ante when-issued shares and sell the shares on the ex date.

For this narrow window of opportunity (approximately ten days), we evaluate several research questions. First we examine whether subsidiary order flow components influence ex-date returns. Buying and selling pressure influences measurement biases, associated with changes in trading patterns in spin-off ex-ante and ex-date returns. Next we evaluate the impact of subsidiary when-issued premiums on order flow components and transaction returns. Lastly, we test whether when-issued premiums are temporary or permanent (Barclay and Litzenberger, 1988). The permanent effect suggests a downward sloping demand curve for securities (Vijh, 1994). The order flow imbalance theory suggests that the ex-date returns are only temporary (Ezzell, Miles, and Mulherin, 2003).

We extend the Ezzell, Miles, and Mulherin (2003) study in many aspects. First, we adapt the Conrad and Conroy (1994) order flow tests, used for stock splits, to capture the ex-date effects of spin-offs preceded by carve-outs. Ezzell, Miles, and Mulherin (2003)
adapt the Lease, Masulis, and Page (1991) order flow ratio. In the numerator they use the difference between the ask and transaction (last traded) prices. However, if the closing price is outside the bid-ask quotes, the observation must be excluded. We use the Keim (1989) location parameter (the difference between the transaction and bid prices divided by the difference between ask and bid prices) and avoid this problem. We find that location parameters and order flow (the difference between the event day and the day prior products of location parameters and proportional spreads) influence ex-date returns.

Second, we expand the number of companies and timeframe for the study. Ezzell, Miles, and Mulherin (2003) used only New York Stock Exchange companies during the period from 1983 to 1997, a sample of 23 companies. Our study includes NYSE, AMEX, and Nasdaq companies form 1981 to 2004, resulting in a sample of 51 companies. Thus, our sample is twice as large as the Ezzell, Miles, and Mulherin (2003) study and nine years longer. Third, we test for permanence of the when-issued premium and show that consistent with Ezzell, Miles, and Mulherin (2003) and in contrast with Vijh (1994), when-issued premiums are temporary for carve-out/spin-off combinations and that spin-off companies with concurrent regular way and when-issued trading have negative when-issued premiums. This indicates parent shareholder selling of subsidiary when-issued shares and allows for possible arbitrage.

In addition to the above results paralleling prior studies, we report distinct findings. We find that spin-offs with when-issued trading outperform spin-offs that had regular way, but no when-issued trading. Moreover, we show that when-issued premiums influence ex-date location parameters and proportional spreads (the bid-ask spread divided by the bid price).

Section II reviews relevant previous research. Section III describes the data and methodology with results and related findings provided in Section IV. Section V discusses conclusions and implications.

2. Background

During our review of background literature we compare the studies that offer contrasting reasons for when-issued premiums and ex-date returns. First we discuss when-issued premium studies. Next, we review literature for microstructure and ex-date returns. Recent studies address convenience factors for these complete distributions: Nayar and Rozeff (2001) for stock splits and Vijh (1994) for spin-offs. These and other studies address the influence of when-issued trading on ex-date returns and provide the foundation for our analysis. From this basis we can examine the influences on order flow components, when-issued premiums and ex-date returns.

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1 Firms conduct spin-offs (distributions of subsidiary shares by a parent) to increase focus for parents or to provide a pure play for subsidiary managers. A spin-off is tax-free if at least 80% of the subsidiary’s ownership is distributed to shareholders (26USCS355). Companies conduct stock splits to increase their trading volume.
2a. When-issued Premiums
If there is sufficient market interest prior to the ex date -- the first day of trading after a spin-off, specialists initiate when-issued trading for stocks that are pending spin-offs, stock-splits, exchanges, or other actions. Thus, the when-issued shares are similar to forward contracts on these shares. Also, the when-issued premium may foreshadow post-ex-date demand. Based on the law of one price, Choi and Strong (1983) developed the seminar paper for when-issued trading during stock splits. Vijh (1994) examines the impact on pure spin-offs. Ezzell, Miles, and Mulherin (2003) evaluate the effect on spin-offs with concurrent regular way trading.

For spin-offs with concurrent regular way trading, the when-issued premium for subsidiaries is:

\[ WIP_i = \frac{(P_{iWSi} - P_{iSt})}{P_{iSt}} \]  

(1)

where \( WIP_i \) is the when-issued premium; \( P_{iWSi} \) is the subsidiary when-issued closing price; and \( P_{iSt} \) is the subsidiary regular way closing price (Vijh, 1994 and Ezzell, Miles, and Mulherin, 2003). Given potential parent company selling pressure, we expect a negative WIP for subsidiaries.

The when-issued premium for parent-subsidiary pairs is:

\[ WIP_i = \frac{(P_{iWPi} + \text{factor} \times P_{iWSi} - P_{iPt})}{P_{iPt}} \]  

(2)

where \( WIP_i \) is the when-issued premium; \( P_{iWPi} \) is the parent when-issued closing price; \( P_{iWSi} \) is the subsidiary when-issued closing price; factor is the ratio of subsidiary shares to be received per parent company share post-spin-off; and \( P_{iPt} \) is the parent regular way closing price. Also, we exclude split-off companies from the parent-subsidiary pairs to avoid the confounding effects of parent share exchanges for new subsidiary shares. In effect, no new ownership is created, but is transferred from parent to subsidiary.

Vijh (1994) finds positive when-issued premiums (2.41%) and significant ex-date returns (3.03%) for parent-subsidiary pairs, and increased trading volume, excess volatility, and higher bid-ask spreads for subsidiaries and parents. However, these results are limited to pure spin-offs without a previously traded carve-out.

Applying the law of one price -- assets should trade at the same price in all markets -- and utilizing a sample of spin-offs preceded by carve-outs, Ezzell, Miles, and Mulherin (2003) develop a when-issued premium that encompasses regular way trading for carve-out shares concurrent with when-issued trading for subsidiary shares. For publicly traded companies, they report positive when-issued premiums (0.58%) for parent-subsidiary pairs and negative when-issued premiums (-0.68%) for subsidiaries. The negative when-issued premiums for subsidiaries contrast with the positive premiums (3.03%) for parent-subsidiary pairs found by Vijh (1994).
A measurement factor such as bid and ask clustering causes non-zero when-issued premiums and order flow imbalance prior to the ex date. Subsidiaries tend to cluster at the bid quotation of when-issued shares and provide normal market action for regular way shares. This selling pressure provides negative when-issued premiums due to the separate market forces. Ezzell, Miles, and Mulherin (2003) find -0.87% and 1.02% ex-date returns for subsidiaries and parent-subsidiary pairs, respectively. They report the differences between regular way and when-issued prices never get larger than the bid-ask spread. However, the advent of decimalization narrows transaction spreads and provides arbitrage opportunities for when-issued premiums or discounts larger than the transaction spread.

2b. Microstructure and Ex-date Returns
Previous studies provide three non-information related, microstructure reasons for when-issued premiums and ex-date returns: order flow imbalance, investor clientele, and convenience.

Ezzell, Miles, and Mulherin (2003) cite order flow as the primary influence on ex-date returns.\(^2\) Buying and/or selling pressure from market participants can influence location parameters, proportional spreads, and order flow effects.

We test for order flow bias for subsidiaries by using a location parameter (Nayar and Rozeff, 2001; and Keim, 1989):

$$L_{it} = (P_{iTt} - P_{iBt})/(P_{iAt} - P_{iBt})$$

(3)

where, for subsidiaries, \(L_{it}\) is the location parameter for security \(i\) on day \(t\), \(P_{iTt}\) is the closing transaction price in security \(i\) on day \(t\), \(P_{iBt}\) is the closing bid quote, and \(P_{iAt}\) is the closing ask quote. A value between 0.50 and 1.0 signifies a tendency to close at the ask price; a value between 0 and 0.50 indicates a tendency to close at the bid price (Nayar and Rozeff, 2001; Conrad and Conroy, 1994); and Copeland, Lembruber, and Mayers (1987). Brooks and Chiou (1995) suggest that differential timing of trades causes when-issued premiums. Although they control bid-ask clustering with intra-day data, they conclude that the remaining when-issued premium is puzzling.

For proportional spreads we use the mid-point between bid and ask prices to eliminate the bias of closing prices towards bid or ask prices (Lease, Masulis, and Page, 1991). For subsidiaries, the proportional spread is:

$$s_{it} = (P_{At} - P_{Bt})/ P_{Bt}$$

(4)

where \(s_{it}\) is the proportional spread, \(P_{At}\) is the ask price and \(P_{Bt}\) is the bid price on the ex date. With more subsidiary shares available after the spin-off, there should be increased

\(^2\) Our term “order flow” is distinct from the payment for order flow where exchanges compensate broker-dealers for trades.
trading on the spin-off ex date. With larger trading volumes there is less risk for the market maker. Thus, spreads for spin-offs should narrow on the ex date (Maloney and Mulherin, 1992; and Vijh, 1994).

Conrad and Conroy (1994) examine stock split ex-date returns and order flow. They show that if there are more buy orders than sell orders, the closing trade most likely will be at the ask price. Also, they note that if a specialist widens the spread to accommodate a large sell order with small buy orders, the specialist creates a return that investors cannot earn. In addition, they report that depending on the mechanism by which the spread is measured, increases in the spread can impact measured returns. Ho and Stoll (1981) make similar arguments. Maloney and Mulherin (1992) offer that the when-issued premium anticipates the imbalance of order flow on the ex date.

Clientele effects are market imperfections that result in many investors being interested in one, but not both post-spin-off firms. Vijh (1994) reports positive ex-date returns and clientele effects for spin-offs because many financial decisions regarding spin-offs are made on the ex date.

In addition, Vijh (1994) offers a convenience explanation for the impact of when-issued prices on ex-date returns. This explanation encompasses several points. First, the investors would save transaction costs by not purchasing the undesired portion of the combined company and then selling it afterwards. Second, purchases of the combined companies would require greater cash investments. Third, small investors often end up with odd lots of subsidiary shares. In many cases the cost to sell the shares is prohibitive. Fourth, because the relative valuations of the companies are not known until the ex date, the investors have no control over the prices they would pay for the desired portion of the combined companies. In support of the convenience argument, Nayar and Rozeff (2001) examine record date, when-issued, and ex-date effects for stock splits. They find negative abnormal stock returns for the record date, but observe positive when-issued and ex-date returns.

Sometimes these related factors -- when-issued premiums, order flow effects, and convenience -- are used interchangeably, but have distinct characteristics. The size and direction of the when-issued premiums differ when they are estimated by the bid or ask price (Maloney and Mulherin, 1992). The order flow imbalance differs from the clientele effect due to the predicted sign of the when-issued premium. The convenience theory argues that the sign will always be positive due to the absence of due bills for when-issued trading (Vijh, 1994). The order flow imbalance position states that the sign depends on the direction of order flow (Ezzell, Miles, and Mulherin, 2003). Negative when-issued premiums indicate selling pressure for when-issued shares of carve-out/spin-off combinations. Also, with concurrent regular way and when-issued trading, investors have a choice that lessens the convenience argument.
3. Data and Methodology

3a. Data
In 1981, the first combination carve-out and spin-off took place. From 1981 to 2004, 71 combinations were completed. During this sample period 51 subsidiaries and 36 parent-subsidiary pairs had when-issued trading. We double the Ezzell, Miles, and Mulherin (2003) sample of when-issued trading -- from 23 spin-offs to 51 spin-offs -- to include Nasdaq and AMEX companies and extend the timeframe from the 1983-1999 period to 1981-2004. Also, our sample is distinct from Vijh (1994) who excludes spin-offs preceded by carve-outs.

We use several data sources. Mergers and Acquisition Magazine lists carve-outs from 1990 to 2004. For those combinations prior to 1990 we use the Ritter (1991) database of IPOs from 1979 to 1983, the Klein, Rosenfeld, and Beranek (1991) list of carve-outs for 1983 and prior years, and Dow Jones News Service reports. All carve-out and spin-off events are cross checked with Lexis-Nexis, the Investment Dealer’s Digest, Standard and Poor’s Dividend Record, Mergent Dividend Record (formerly Moody’s), Mergent Industrial Manual (formerly Moody’s) and the Dow Jones News Service.

The Center for Research in Security Prices (CRSP) and Thomson Datastream provide regular way stock price and return data. Similar to Lease, Masulis, and Page (1991), Vijh (1994), and Nayar and Rozeff (2001) we compare stock returns to CRSP equal-weighted index results (to include distributions) during the sample period. The Daily Stock Price Record for the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and the Over-the-Counter (OTC) provide when-issued prices. SEC filings and news articles provide additional information for the two-stage carve-outs and spin-offs.

The time from carve-out to spin-off varies from 4 to 36 months (with one exception of nine years) for the total period (1981 to 2004). We include five split-offs among the spin-offs because split-offs are instances where shares of the parent are exchanged for shares of the subsidiary. This is similar to a spin-off except that there are fewer shares of the parent after a split-off.

3b. Model Development
Given the likelihood of negative when-issued premiums for subsidiaries, we investigate ex-ante and ex-date order flow imbalances. First, we discuss the calculation of ex-date returns. Thereafter, we combine the components of order flow -- location parameters and proportional spreads -- to show the relationship between ex-date returns and order flow components.

We calculate ex-date returns for subsidiaries as:

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3 Although Ezzell, Miles, and Mulherin (2003) use closing stock prices and Trade and Quote (TAQ) data, we use closing prices to contrast our results with other studies such as Vijh (1994).
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\[ r_{It} = \frac{(P_{ist} - P_{ist-1})}{P_{ist-1}} \]  \hspace{1cm} (5)

where \( r_{It} \) is the ex-date return, \( P_{ist} \) is the ex-date closing price and \( P_{ist-1} \) is the closing price the day prior.

For parent-subsidiary pairs the ex-date return is:

\[ r_{It} = \frac{[(P_{ipt} + (\text{factor} \times P_{ist}) - P_{ipt-1})]}{P_{ipt-1}} \]  \hspace{1cm} (6)

where \( r_{It} \) is the ex-date return, \( P_{ipt} \) is the parent’s ex-date closing price, \( P_{ist} \) is the subsidiary’s ex-date price, \( P_{ipt-1} \) is the parent’s day minus 1 closing price, and factor is the number of shares of the subsidiary to be received by the parent at the execution of the spin-off.

Given that the opposing arguments for the permanency of the when-issued premium center on subsidiaries, we focus on subsidiary order flow. We use the location parameter and the proportional spread to estimate the order flow impact on subsidiary ex-date transaction returns:

\[ r_{it} = r_{itB} + L_{itSit} - L_{it-1S_{it-1}} \]  \hspace{1cm} (7)

where \( r_{it} \) is the transaction return, \( r_{itB} \) is the return measured in bid quotes, \( s_{it} \) is the proportional spread, and \( L_{itS_{it}} - L_{it-1S_{it-1}} \) is the change in order flow. If there is a tendency to close at the ask price, the location parameter \( (L_{it}) \) increases from day t-1 and the transaction return increases. If the proportional spread \( (s_{it}) \) increases from day t-1, the transaction return also increases. Thus, the changes in order flow combine both the changes in the tendency to close at bid or ask and changes in the size of the spread (Conrad and Conroy, 1994). Similarly, if there is a tendency to close at the bid price, the location parameter decreases after day t-1. Also, with increased trading volume and depth, the proportional spread most likely will narrow.

3c. Integration

Given that when-issued trading precedes ex-date returns, it is possible that the when-issued premiums influence these returns and order flow components. As a robustness check, we examine the impact of when-issued premiums (\( WIP_i \)) on the changes in location parameters \( (L_{it} - L_{it-1}) \), proportional spreads \( (S_{it} - S_{it-1}) \), order-flow \( (L_{itS_{it}} - L_{it-1S_{it-1}}) \), and ex-date returns \( (r_{It}) \) for subsidiaries as follows:

\[ L_{it} - L_{it-1} = WIP_i \]  \hspace{1cm} (8)
\[ S_{it} - S_{it-1} = WIP_i \]  \hspace{1cm} (9)
\[ L_{itS_{it}} - L_{it-1S_{it-1}} = WIP_i \]  \hspace{1cm} (10)
\[ r_{It} = WIP_i \]  \hspace{1cm} (11)

When-issued premiums \( (WIP_i) \) are defined in equation 1 for subsidiaries and equation 2 for parent-subsidiary pairs. Location parameters \( (L_{it} - L_{it-1}) \), proportional spreads \( (S_{it} - S_{it-1}) \),
and ex-date returns ($r_{it}$) are shown in equations 3, 4, and 5, respectively. The change in order flow ($L_{it} - L_{it-1}$) is developed in the paragraph following equation 7.

3d. Test for Permanence
A major issue between the prior when-issued premium studies is whether the ex-date effect is temporary or permanent. If return signs reverse, the impact is temporary. As an additional robustness test, we use a difference of means to test permanence of the ex-date effect:

$$t_{x1 - x2} = (r_{it} - r_{it+5})/ (s_{1}^2/N_{1} + s_{2}^2/N_{2})^{1/2}$$

where $t_{x1 - x2}$ is the value for the difference in mean returns, $r_{it}$ is the ex-date market adjusted return, $r_{it+5}$ is the cumulative abnormal ex-date five day market adjusted returns, and $s_{1}$ ($s_{2}$) is the standard deviation and $N_{1}$ ($N_{2}$) is the sample size for the ex-date (cumulative abnormal ex-date five day) return.

4. Results

Table 1 provides summary statistics. Panel A reports that the 51 subsidiaries with concurrent regular way and when-issued trading had mean when-issued trading periods of 11.08 days and mean when-issued premiums of -0.68%. Total days sums of all days in which there is when-issued trading.

The negative when-issued premiums for the ex-ante period indicate selling pressure by parent company shareholders prior to the spin-off ex date. For subsidiaries with concurrent regular way and when-issued trading, our market adjusted ex-date returns of 0.79% contrast with mean ex-date returns of -2.00% for the 20 unreported carve-out/spin-off combinations without when-issued trading. Given positive ex-date returns for our sample, ex-ante when-issued share sell-offs may have reduced ex-post selling for subsidiary shares. Also, our findings of negative when-issued premiums and positive ex-date returns differ somewhat from Ezzell, Miles, and Mulherin (2003) who report ex-date returns of -0.87%, but when-issued premiums of -0.68%, the same as our sample. Also, our sample’s mean and median subsidiary when-issued premiums are significant and the 1% level. We observe that the difference between regular way and when-issued prices are less than the transaction spread. Thus, we support Ezzell, Miles, and Mulherin (2003), who find no violation of the law of one price (no arbitrage opportunity) for concurrent when-issued and regular way trading. Vijh’s (1994) market-adjusted ex-date returns of 2.46% for pure spin-offs appear to dwarf the ex-date returns of carve-out/spin-off combinations.
Table 1
Summary Data

Panel A: Subsidiary Firms

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<table>
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<tbody>
<tr>
<td>Number</td>
<td>51</td>
</tr>
<tr>
<td>Total Days</td>
<td>565</td>
</tr>
<tr>
<td>Mean Days</td>
<td>11.08</td>
</tr>
<tr>
<td>Mean WIP (t-statistic)</td>
<td>-0.0068 (-4.2164) ***</td>
</tr>
<tr>
<td>Median WIP (p-level)</td>
<td>-0.0063 (0.0001) ***</td>
</tr>
<tr>
<td>Transaction Return</td>
<td>0.0079</td>
</tr>
<tr>
<td>Mean Regular Way Volume</td>
<td>84,128.0265 shares (100’s)</td>
</tr>
<tr>
<td>Mean When-issued Volume</td>
<td>3846.6908 shares (100’s)</td>
</tr>
</tbody>
</table>

Panel B: Parent-Subsidiary Pairs

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<table>
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<tr>
<td>Number</td>
<td>36</td>
</tr>
<tr>
<td>Total Days</td>
<td>372</td>
</tr>
<tr>
<td>Mean Days</td>
<td>10.33</td>
</tr>
<tr>
<td>Mean WIP (t-statistic)</td>
<td>0.0033 (2.5977) **</td>
</tr>
<tr>
<td>Median WIP (p-level)</td>
<td>0.0032 (0.0008) ***</td>
</tr>
<tr>
<td>Transaction Return</td>
<td>0.0236</td>
</tr>
</tbody>
</table>

Table 1 reports the average and median when-issued premiums for subsidiary and parent-subsidiary pairs using closing transaction prices and mean volumes for subsidiary concurrent regular way and when-issued trading reported in the appropriate Daily Stock Price Record for the period 1981-2004. Total days sums all days in which there is when-issued trading. Mean days = total days / number of when-issued firms. The when-issued premium for subsidiaries is defined as (w.i. price – regular way price)/ regular-way price. The when-issued premium for parent-subsidiary pairs is defined as  

\[
[w.i. \text{ parent} + (\text{factor} \times w.i. \text{ subsidiary})] – \text{regular way parent}/ \text{regular way parent}
\]

Factor is the number of shares of the subsidiary to be received at the execution of the spin-off. Transaction returns are ex-date returns adjusted by the CRSP equal-weighted index results (to include distributions).

*** and ** indicate significance at the 1% and 5% levels, respectively.

If one considers the 22% first-day returns (offering price to first day close) for carve-outs that were followed by spin-offs for the period 1981-2002, investors can reap a significant return for combination carve-outs and spin-offs (Thompson and Apilado, 2006; and Vijh, 2002). This lower risk may abate the ex-date selling pressure and allow the slightly positive spin-off ex-date returns shown in Table 1, Panel A.

Also, mean subsidiary regular way volume is over 20 times the when-issued trading volume. Since the sample spin-offs are tax free, the ex-ante retained ownership is
approximately 80% whereas the regular way ownership is approximately 20%. Thus, the when-issued trading has the potential to be four times the regular way trading and magnify trading gains or losses during the ex-ante period.

In Panel B, we show that the 36 parentsubsidiary pairs have mean when-issued trading periods of 10.33 days, mean when-issued premiums of 0.33% and ex-date transaction returns of 2.36%. These findings are consistent with Vijh (1994) and Ezzell, Miles, and Mulherin (2003) who find when-issued premiums of 2.41% and 0.58%, respectively as well as ex-date returns of 3.03% and 1.02%, respectively. Our mean and median parentsubsidiary pair when-issued premiums are significant at the 5% and 1% levels, respectively.

4a. Order Flow Impact

Table 2 provides location parameters, proportional spreads, and order flow for subsidiaries on the spin-off ex date and the day prior in Panel A. Panel B reports the impact of order flow on subsidiary spin-off ex-date returns.

Table 2  
Location Parameters, Proportional Spreads and Order Flow  
and Estimate of Regression of Ex-date Returns on  
Order Flow Components for Subsidiaries

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<th>Ex-date</th>
<th>Ex-date -1</th>
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<tbody>
<tr>
<td><strong>Panel A: Location Parameters, Proportional Spreads and Order Flow</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location Parameter</td>
<td>0.4725</td>
<td>0.5719</td>
</tr>
<tr>
<td>Proportional Spread</td>
<td>0.0646</td>
<td>0.0717</td>
</tr>
<tr>
<td>Order Flow</td>
<td>0.0305</td>
<td>0.0410</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Bid to bid return</th>
<th>Order Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(t-values)</td>
<td>(t-values)</td>
</tr>
<tr>
<td>Transaction Return</td>
<td>0.0079</td>
<td>0.3942</td>
</tr>
<tr>
<td></td>
<td>(3.64)**</td>
<td>(5.95)*****</td>
</tr>
</tbody>
</table>

Table 2 reports for the period 1981-2004, location parameter (the difference between transaction and bid prices divided by the difference between ask and bid prices), proportional spread (the difference between ask and bid prices divided by the bid prices), and order flow (the product of location parameters and proportional spread) for subsidiaries in Panel A. In Panel B we report estimates of regression of ex-date returns on order flow components for subsidiary firms. Transaction returns are ex-date returns adjusted by the CRSP equal-weighted index results (to include distributions).

*** indicates significance at the 1% level
In Panel A the location parameters for subsidiaries move from 0.5719 on the day prior -- an indication to sell at the ask price and buying pressure -- to 0.4725 on the ex-date -- a tendency to close at the bid and possible selling pressure. Thus, regular way subsidiary shares reflect buying pressure (or lack of selling pressure) ex ante in contrast with the selling pressure we note for when-issued shares. Also, narrowed proportional spreads reflect lower risk for market makers due to the increased shares available for trading after the spin-off as found by Maloney and Mulherin (1992) and Vijh (1994). However, positive subsidiary ex-date returns (Table 1, Panel A) and lower risk reduce the selling pressure for subsidiary shares.

Panel B reports the regression of ex-date transaction returns on bid to bid returns and order flow. The $t$-values for bid to bid returns and the order flow parameter are positive and significant at the 1% level. This indicates a positive impact of order flow on ex-date returns. Thus, for carve-out/spin-off combinations order flow significantly impacts spin-off ex-date transaction returns.

4b. When-issued Premium Impact

In Table 3 we report the effect of when-issued premiums on changes in location parameters, proportional spreads, and order flow, and on ex-date transaction returns. Similar to the results in Table 2, Panel A, the negative changes in location parameters reflect tendencies to close at the bid price, and selling pressure for spin-off shares. The negative and 5% significant WIP coefficient indicates positive influence of the when-issued premium on the change in location parameters.
The negative change in the mean proportional spread coefficient reflects a narrowing spread and lower risk from the day prior to the ex date. The statistically insignificant WIP coefficient indicates an inconclusive relationship between the when-issued premium and the change in proportional spread.

For change in order flow, the WIP parameter is negative and significant at the 1% level. The negative change in the order flow coefficient shows a decrease in order flow from the day prior to the ex date. As for the change in location parameter, the when-issued premium influences the change in order flow. Also, similar to Maloney and Mulherin (1992), the when-issued premiums anticipate ex-date order flow imbalances.

Table 3 reports the impact of the when-issued premium (WIP) on changes in location parameter (the difference between transaction and bid prices divided by the difference between the ask and bid prices), changes on proportional spread (the difference between the ask and bid prices divided by the bid prices), changes in order flow (the product of location parameters and proportional spread), and on transaction returns from the day prior to the spin-off ex-date for subsidiaries with concurrent regular way and when-issued trading during the period 1981-2004. Transaction returns are ex-date returns adjusted by the CRSP equal-weighted index results (to include distributions).

Subsidiary ex-date returns are positive (0.79%), but WIP coefficients are negative and statistically insignificant. Thus, when-issued premiums influence location parameters and
order flow, but there is little statistical support that when-issued premiums influence proportional spreads or ex-date returns.

C. Test for Permanence

In Table 4 we report that the when-issued premiums are temporary. The positive subsidiary ex-date returns (0.79%) become negative (-2.53%) for the five-day cumulative period following the spin-off. The reversal of return signs indicates that the WIP is temporary. Also, the test for difference in means and the Wilcoxon signed rank test are significant at the 5% level.

### Table 4

<table>
<thead>
<tr>
<th></th>
<th>Ex-date Returns</th>
<th>Five-day Cumulative Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>N =51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (t-statistic)</td>
<td>0.0079 (1.1462)</td>
<td>-0.0253 (-1.5132)</td>
</tr>
<tr>
<td>Median (p-level)</td>
<td>-0.0029 (0.6979)</td>
<td>-0.0172 (0.2624)</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.0478</td>
<td>0.1166</td>
</tr>
<tr>
<td>$t$-statistic (difference in means)</td>
<td><strong>-2.0315</strong></td>
<td></td>
</tr>
<tr>
<td>p-level (Wilcoxon signed test)</td>
<td><strong>0.0388</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 provides the test results for the difference in means and the Wilcoxon signed test for ex-date and five-day cumulative ex-post returns for subsidiaries with concurrent regular way and when-issued trading for the period 1981-2004. Transaction returns are ex-date returns adjusted by the CRSP equal-weighted index results (to include distributions).

** indicates significance at the 5% level

5. Conclusions and Implications

Our study supports findings of previous studies of the temporary nature of when-issued premiums during concurrent when-issued and regular-way trading. Also, we provide distinct results that investors can benefit during this brief trading period.

Given negative order flow and proportional spread coefficients, we show that when-issued shares with concurrent regular way trading experience when-issued discounts prior to the ex date. Also, when-issued discounts are temporary as shown by the positive ex-date returns and the subsequent negative cumulative five-day ex-date returns. In addition, the difference in means for these returns is significant at the 5% level. These results are
consistent with Ezzell, Miles, and Mulherin (2003) who find that when-issued premiums are temporary for spin-offs preceded by carve-outs.

Our distinct findings include that the selling pressure on when-issued shares reduces the potential for sell-off of subsidiary shares on the spin-off ex date. Our cross-sectional results show that the when-issued premium has a significant impact on order flow, but little influence on ex-date returns. Also, the combination carve-out/spin-off provides corporations an opportunity to increase shareholder wealth.

As illustrated by our empirical results, investors benefited from when-issued trading in three ways. First, companies with concurrent regular way and when-issued trading had a 279 basis point spread over spin-off shares without when-issued trading on the ex date. Second, on average, investors benefited by investing in discounted when-issued subsidiary shares with mean when-issued discounts of 68 basis points and selling them on the ex date with mean transaction returns of 79 basis points. These were 147 basis point gains from buying at when-issued discounts to selling after the ex-date. Third, investors in the parent subsidiary pairs sample obtained 2.36% ex-date returns. For example, if one assumes 100 basis point roundtrip (buy and sell) transaction costs and similar results, investors can benefit from when-issued trading for the three cases. As firms merge or grow internally, they can increase focus with carve-outs and follow-on spin-offs. This creates further opportunities for concurrent regular way and when-issued trading and potential investor profits.
References


Internal Revenue Code, 26 US Code, Section 355.


Nayar, N. and M.S. Rozeff (2001). Record Date, When-Issued, and Ex-Date Effects in

