The Effect of Canadian Stock Splits, Stock Dividends, and Reverse Splits on the Value of the Firm

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This study uses event date methodology to examine the market reaction to Canadian stock splits, reverse splits and stock dividends. The positive stock market response in Canada to regular stock splits and to stock dividends is consistent with U.S. findings. The positive response to reverse splits, however, contrasts sharply with the negative response found in U.S. studies. Our results support the hypothesis that reverse splits are a positive rather than a negative signal.

INTRODUCTION

Over the past several years an important body of literature on the impact of stock splits on stock prices has evolved. A widely held view is that when a company splits its stock, management is giving a positive information signal to investors that the stock is undervalued. U.S. studies such as McNichols and Dravid (1990), Brennan and Copeland (1988), Lakonishok and Lev (1987), Grinblatt, Masulis, and Titman (1984), and Desai and Jain (1995) lend support to this hypothesis. With respect to improving the marketability of shares, Baker and Gallagher (1980) in a survey of chief financial officers of firms that split their stocks find that 94 percent of the respondents did so to return the price to a more favorable or normal trading range. There is also a question regarding the relationship between stock splits and changes in stock risk; empirical evidence is mixed with some studies showing decreased risk (Bar-Yosef and Brown, 1977) and others showing increased risk (Ohlson and Penman, 1985; Sheikh, 1986).

In one of three Canadian studies investigating returns to stock splits, Charest (1980, p. 26) finds that split stocks outperform the market by 59 percent in the 49 months prior

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to the announcement, match the market in the first year after the announcement, and underperform by 7 percent in the second year after the announcement. Kryzanowski and Zhang (1991), using daily data, find that there is a statistically positive abnormal return on the announcement date and a positive but not statistically significant return on the approval date. In a later study, Kryzanowski and Zhang (1993, p. 57) find that "the mean abnormal return on the split ex-date is significant and positive using traditional event study techniques ..."

With respect to the impact of stock dividend announcements on the value of the firm, empirical studies in both the U.S. and Canada concur that the market responds positively.

To the best of our knowledge, there is no research on reverse splits in Canada. Even in the United States, the research on the impact of reverse stock splits on market price is limited. The reverse split is thought to have both a positive and a negative impact on share prices. On the one hand, a reverse split improves the image of the stock and reduces transaction costs, making the stock more attractive to investors. According to Peterson and Peterson (1992, p. 190):

> Proxy statements provided by management reveal that the decision to reverse split may be affected by factors related to marketability (e.g., commissions, reputation, marginability, acceptability to institutional investors). Share prices that are too low may harm marketability. Low priced securities may be viewed as speculative, and therefore not attractive to investors, especially institutional investors. Firms whose stocks trade at very low prices may wish to change their image as issuers of "penny" stock (i.e., those trading for under $1) ... A stock may also be considered more marketable if it is included in the National Market System which requires that the bid price be at least $5 per share for initial listing

To test the hypothesis of improved share marketability, Radcliffe and Gillespie (1979) segregate their stocks into three price groups but find no discernible differences in price movements between the groups in the month of the split or in the months following.

Contrary to the contention that a reverse split makes the stock more attractive to investors, Spudeck and Moyer (1985, p. 56) argue that reverse splits are management's signal of a lack of confidence in future stock price increases resulting from improved earnings; if regular splits signal increased earnings, then reverse splits should signal lower earnings and negative market returns. The hypothesis of negative returns is supported by empirical studies such as Brennan and Copeland (1988) and Lamoureux and Poon (1987) using daily data and Radcliffe and Gillespie (1979) using monthly data. Han (1995, p. 159) examines why managers would employ reverse splits when they adversely affect shareholders and why shareholders would approve such splits; he concludes that reverse splits enhance the liquidity of the stock because transaction costs decrease after the split. Furthermore, liquidity is improved because margin requirements are lowered. Like others, he finds a negative market response to reverse splits.

DATA AND METHODOLOGY

The methodology in this paper is taken from Masse *et al.* (1988). The sample is derived from three sources: The *Financial Post Dividend Record* from January 1, 1983 to

June 30, 1994, the *Toronto Stock Exchange Review* from January 1, 1975 to June 30, 1994, and the *Toronto Stock Exchange Daily Record* from January 1, 1975 to June 30, 1994. Only companies traded on the Toronto Stock Exchange are included in the sample. The Toronto *Globe and Mail* and the *Financial Post* are examined to determine the date of public disclosure. Companies are excluded if the public disclosure date can not be ascertained; if there were major concurrent corporate events such as mergers, tender offers, acquisitions, or capital restructuring; if stock splits, reverse splits, or stock dividends had occurred within one year of the announcement date; or if recurring annual stock dividends had been declared. These conditions leave samples of 245 companies for regular stock splits, 59 companies for reverse splits, and 59 companies for stock dividends. Due to insufficient financial or trading data, 59 additional firms are eliminated from the regular stock split sample, 27 firms from the reverse split sample, and 14 from the stock dividend sample. The final sample includes 186 firms in the regular split sample, 32 in the reverse split sample, and 45 in the stock dividend sample.

Table 1 presents the stock price and firm size characteristics of the sample. Companies reverse splitting their shares are much smaller than those splitting shares or those declaring stock dividends. Also, not unexpectedly, the stock price for reverse splits is substantially lower than for the other two categories.

Table 1—Sample Characteristics

	Regular Splits		Stock Dividends		Reverse Splits	
	Stock Price ($)	Sales ($ millions)	Stock Price ($)	Sales ($ millions)	Stock Price ($)	Sales ($ millions)
Mean	34.60	817.10	43.10	1,483.66	1.01	172.17
Median	29.00	136.80	36.16	337.05	0.52	21.45
Minimum	0.35	0.02	3.75	0.16	0.03	0.34
Maximum	140.00	15,100.00	166.88	19,310.50	4.65	2,071.40

Daily closing prices for 130 trading days before and 130 days after the announcement date are used to develop daily returns for each firm; day 1 is the first day of trading following the announcement.

Daily returns are determined as follows:

$$R_{jt} = \ln (P_{jt} + D_{jt}) - \ln (P_{jt-1})$$

where:

R_{jt} = The return on stock j on day t;
P_{jt} = The closing price for stock j on day t; and
D_{jt} = Cash dividend on the ex dividend day t.

Abnormal returns are derived using the mean-adjusted returns model, the market-adjusted returns model, and the simple OLS market model.[1] This study reports in detail

[1] For a discussion of the best event study methodology, see Brown and Warner (1980, p. 249) who conclude that "beyond a simple, one factor market model, there is no evidence that more complicated methodologies

only the results for the more common ordinary least squares market model. Two non-parametric tests also are performed: a sign test on the proportion of firms having positive abnormal returns on any given day and a rank test based on Corrado's (1989) methodology.

Abnormal returns are determined by the following ordinary least squares equation:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt}$$

where:

α_j = The intercept of the linear relationship between the return of stock j and the returns of the general market;

β_j = The slope of the linear relationship between the return of stock j and the returns of the general market;

R_{mt} = The return on the Toronto Stock Exchange on day t;

ε_{jt} = The unsystematic component of firm j's return; and

$\hat{\varepsilon}_{jt}$ = $R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{mt})$.

where:

$\hat{\alpha}_j$ and $\hat{\beta}_j$ = The ordinary least squares estimates of α_j and β_j ; and

$\hat{\varepsilon}_{jt}$ = The least squares residual.

In order to eliminate bias in the estimators, the 30 days prior to the announcement date are excluded; α_j and β_j therefore are derived using the first 100 days of the study period.[2]

The daily average residual ($\overline{DAR_t}$) for all companies is defined as

$$\overline{DAR_t} = \frac{1}{n} \sum_{j=1}^{n} \hat{\varepsilon}_{jt};$$

t = -30 to +30;

n = 185 for regular splits, 45 for stock dividends, and 32 for reverse splits;

and the cumulative average residual $\overline{CAR_t}$ is defined as

$$\overline{CAR_t} = \overline{DAR_t} + \overline{CAR_{t-1}};$$

$$= \sum_{s=-30}^{t} \left(\frac{1}{n} \sum_{j=1}^{n} \hat{\varepsilon}_{js} \right);$$

t = -30 to +30;

n = 278 (201 are splits, 45 are stock dividends, and 32 are reverse splits).

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convey any benefit. In fact ... more complicated methodologies can actually make the researcher worse off, both compared to the market model and the even simpler methods, like mean adjusted returns, which make no explicit risk adjustment."

See also Brown and Warner (1985, p. 27): "Procedures other than OLS for estimating the market model in the presence of nonsynchronous trading convey no clear-cut benefit in detecting abnormal performance."

[2] In addition, α_j and β_j are derived using the last 100 days of the study period and also using pooled data for the first and last 100 days of the study combined.

The residuals are standardized as follows:

$$S\bar{\varepsilon}_{jt} = \frac{1}{n}\sum_{j=1}^{n}\frac{R_{jt} - \hat{\alpha} - \hat{\beta}R_{mt}}{S_{jt}}$$

where:

$$S_{jt} = \left\{ S_j^2 \left[1 + \frac{1}{L} + \frac{(R_{mt} - \bar{R}_m)^2}{\sum_{k=1}^{L}(R_{mk} - \bar{R}_m)^2} \right] \right\}^{1/2}$$

where:

S_j^2	=	The residual variance for security j from the market model regression;
L	=	The number of days in the estimation period;
$\bar{R}_m$	=	The average return of the market portfolio for the estimation periods; and
R_{mk}	=	The return on the market portfolio for the kth day of the estimation period.

If the $S\bar{\varepsilon}_{jt}$s are independent, identically distributed, and normal, the statistic for $S\bar{\varepsilon}_{jt}$ is the distributed Student t under the null hypothesis. It follows that the t statistic for CAR_t is the distributed Student t under the null hypothesis of zero cumulative excess returns. With 185, 44, and 31 degrees of freedom for stock splits, stock dividends, and reverse splits, respectively, the test statistics are approximately standard normal. The daily average residuals are tested for first order serial correlation using the Durbin-Watson statistic. There may be some cross section dependence in the security-specific excess returns. Because the event dates are not clustered and the securities come from different industries, the degree of dependence is minimal. According to Brown and Warner (1985, pp. 20-25), "if the degree of dependence is small, as in studies where event dates are not clustered, ignoring the dependence induces little bias in variance estimates. Furthermore, dependence adjustment can actually be harmful compared to procedures which assume independence."

In this study, except for reverse splits, the event dates are randomly distributed over a 19.5 year period and therefore are not clustered.[3] For reverse splits, the event dates are randomly distributed over 11.5 years. Two nonparametric tests were performed to test for the effect of outliers; specifically, a sign test on the proportion of firms having positive abnormal returns on any given day and a rank test based on Corrado's (1989) methodology. Although the results are not presented here, both tests indicate that our results are not driven by outliers. In all cases (including reverse splits) there is a substantial increase in the proportion of firms having positive abnormal returns on the day of the announcement. Using the rank test, stock dividends and regular splits are significant at the 5 percent and 10 percent level on the announcement day. Reverse splits are not significant even at the 10 percent level on the announcement day, but are significant at the 5 percent level on the day preceding the announcement.

[3] For a methodology to be used when event dates are clustered, see Gibbons (1982) and Shanken (1985).

EMPIRICAL RESULTS

As previously reported, abnormal returns are derived using the mean-adjusted returns model, the market-adjusted returns model, and the simple OLS market model. Because the results for the three models are not dissimilar, we report only the OLS results.[4]

The DARs and CARs for stock splits, stock dividends, and reverse stock splits for day -30 to day 30 are shown in Table 2. Although results based on post-announcement daily prices are not presented, they are consistent with those based on pre-announcement data. In addition, we combine the pre- and post-announcement data; although the numbers are somewhat different, the general conclusions do not change. These results contrast with Kryzanowski and Zhang (1993, p. 57) who find that "The significant increase in the observed return variance on the split ex-date appears to be caused by increased noise, and not increased true return variance." A possible explanation for the consistency of our regression results is our use of the announcement date rather than the split ex-date used by Kryzanowski and Zhang (1993).

For stock splits, positive CARs are shown throughout and are significant at the 1 percent level from day -12 to day 30. There are large positive DARs on day 0 and day 1, also significant at the 1 percent level. This positive response around the announcement date is consistent with U.S. findings of a favorable market response to stock splits.

For stock dividends, the CARs, with varying degrees of significance, are negative from day -30 to day -1 and thereafter positive. The DARs are positive from day -1 to day 2, with large positive DARs on day 0 and day 1 that are significant at the 1 percent level. Once again, these results are consistent with U.S. findings.

For reverse splits, the CARs are positive from day -25 through day 30, although not as significant as in the previous cases. The DAR on day 1 is negative but not significant. There are, however, large positive DARs on days -1, 0, and 2. This overall positive response is inconsistent with U.S. studies but does lend support to the hypothesis that reverse splits present a positive signal to investors.

Figures 1, 2, and 3 show positive CARs occurring before the announcement date for regular and reverse splits, indicating that the market anticipates the announcement to some extent. In the case of reverse splits, the market anticipation occurs earlier. For stock dividends, there is no anticipation prior to the announcement, but a significant and erratic response thereafter. For stock splits and stock dividends, the CARs begin to decline shortly after the announcement date. For reverse splits, the decline is less steep and eventually reverses. Why is there more market anticipation of reverse split events compared to stock splits and stock dividends? A possible explanation for this apparent information leakage is that reverse splits, for the most part, are junior stocks; this is consistent with the results of Masse *et al.* (1997) who find more information leakage for low price shares regardless of the stock exchange on which they were traded.

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[4] For the market-adjusted model, the CARs for regular splits are significantly greater throughout. The CARs for regular splits using the mean-adjusted model are either greater or substantially the same throughout. For stock dividends, the mean adjusted CARs are mostly negative to day -1 and positive thereafter as is the case for the OLS; the market-adjusted CARs are positive and substantially greater from day -29 onward. For reverse splits, the market-adjusted CARs are somewhat smaller but positive from day -20 to day 11, and the mean-adjusted CARs are positive from day -20 to day 30. Our results are therefore robust.

Figure 1—Cumulative Residuals for Regular Stock Splits, January 1975 to June 1994

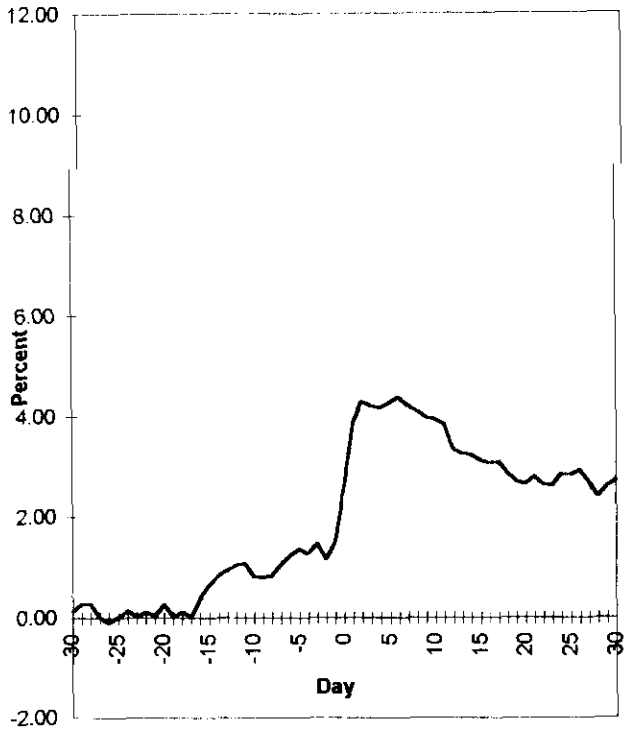
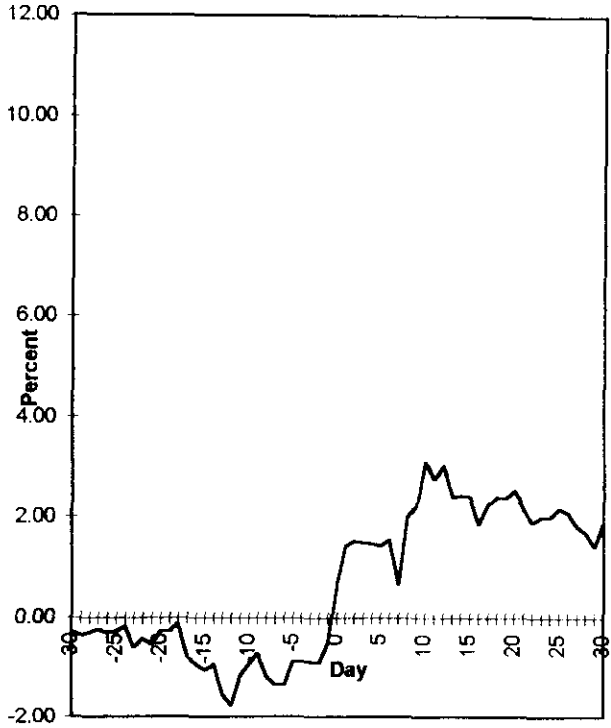


Table 3 presents the price characteristics of our sample of reverse split securities. The price of securities at the announcement date ranges from $0.03 to $4.65 with a mean price of $1.01. In Canada stocks trading below $5.00 trade in increments of $0.01. For those trading at $5.00 and above, the increment increases to $0.05. In Table 3 the average nominal price which is defined as the announcement date price multiplied by the split ratio, is $5.37.

Why are our results for reverse splits different from those in the U.S.? One reason for reverse splits is to improve the marginability of the stock. In Canada stocks priced under $1.50 have no margin loan value; stocks from $1.50 to $1.74 have a 20 percent margin loan value; stocks from $1.75 to $1.99 have a 40 percent margin loan value; and stocks $2.00 and over have a 50 percent margin loan value. In our sample 16 of the 32 stocks moved from non-eligibility for margin loans to a 50 percent loan value, two moved to a 40 percent loan value, and one moved to a 20 percent loan value. Thus, the reverse splitting of the stocks in our sample made the majority of the stocks eligible for margin loans. Unfortunately, to the best of our knowledge, there is no comparable information on the effect of reverse splits on marginability in the U.S. where stocks over $5 typically are marginable on a long position and stocks over $10 on a short position. A second possible reason is that a reverse split in Canada is not effective in preventing the delisting

Figure 2—Cumulative Residuals for Stock Dividends, January 1975 to June 1994

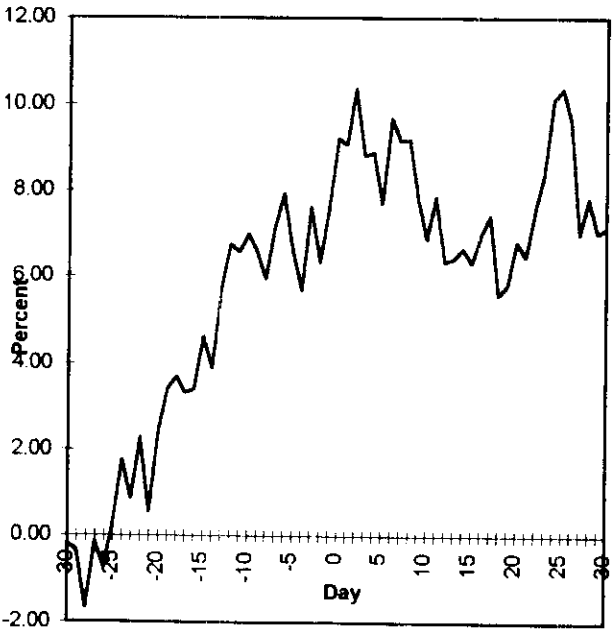


requirements of common shares, unlike the U.S. where Nasdaq, for example, has a minimum price listing requirement that can trigger a reverse split to avoid delisting. In Canada a corporation can be delisted by the Toronto Stock Exchange if the total market value of its publicly held shares falls below a predetermined level, for example, $350,000 in 1989. Because the total market value of the shares is not affected by a reverse split, our sample consists of reverse splits made at the discretion of the corporation or as part of a formal reorganization and not as a device to prevent delisting.

During the period of our study extensive discount brokerage was introduced, and the full fee structure changed a number of times. Consequently, it is impossible to determine the exact effect of reverse splits on transaction costs. There was, however, some advantage, albeit small, to reverse splitting.

Although not presented in this paper, regressions also are run for stock splits, stock dividends, and reverse splits with the day of record as the event date. The lack of significant DARs and CARs around the record date reinforces the contention that the announcement date is critical with respect to signaling.

Figure 3—Cumulative Residuals for Reverse Stock Splits, January 1975 to June 1994



CONCLUSIONS

In this paper we use event date methodology to examine the market reaction to regular stock splits, reverse splits, and stock dividends. For regular stock splits we find that the market reacts positively with a cumulative abnormal return of 4.3 percent on the first trading day following the announcement. We also find that the market anticipates the stock split but underestimates the increase. Our results are consistent in sign and magnitude with those in the United States. They are also consistent with other Canadian studies, but to a lesser extent.

With respect to stock dividends, the market again reacts positively with a cumulative abnormal return of 1.4 percent on the first trading day after the announcement rising to 3.1 percent on the ninth day. The market's anticipation of the dividend is less pronounced than in the case of stock splits. Once again, these results are comparable to those found in other studies.

For reverse splits, the market reacts positively with a cumulative abnormal return of 9.3 percent on the announcement date which, for the most part, is thereafter maintained. There is a strong market anticipation commencing 25 days before the announcement. These results sharply contrast with U.S. studies that find a negative reaction to reverse splits. A possible explanation for our Canadian results could be institutional differences between the two countries such as stock exchange regulations and government legislation.

Table 2—Daily Residuals for Regular Stock Splits, Stock Dividends, and Reverse Splits, January 1975 to June 1994

	Regular Stock Splits (n = 186)		Stock Dividends (n = 45)		Reverse Stock Splits (n = 32)	
Day	DAR (%)	CAR (%)	DAR (%)	CAR (%)	DAR (%)	CAR (%)
-30	0.14	0.14	-0.28	-0.28	-0.20	-0.20
-25	0.12	0.16	0.03	-0.27	0.97*	0.24
-20	0.24***	0.37	0.27	-0.28	1.87**	2.41
-19	-0.27*	0.10	0.01	-0.27	1.00	3.42
-18	0.10*	0.20	0.15	-0.12	0.26	3.68
-17	-0.07	0.13	-0.67***	-0.78*	-0.37	3.31
-16	0.34	0.47**	-0.16	-0.95*	0.10	3.40
-15	0.26	0.73***	-0.11	-1.06*	1.20	4.61
-14	0.19**	0.92***	0.12	-0.94*	-0.72*	3.88
-13	0.09	1.01***	-0.62**	-1.56*	1.86**	5.74
-12	0.11	1.12***	-0.21	-1.76*	1.01	6.75
-11	-0.02	1.10***	0.59**	-1.17*	-0.19	6.57
-10	-0.26	0.84***	0.24	-0.93*	0.44	7.00
-9	-0.02	0.82***	0.21	-0.72	-0.45	6.55
-8	0.09	0.91***	-0.46**	-1.18*	-0.61	5.94
-7	0.25*	1.16***	-0.17	-1.35*	1.23*	7.17
-6	0.21*	1.37***	0.00	-1.35*	0.78	7.95
-5	0.14***	1.51***	0.47**	-0.88*	-1.34**	6.61
-4	-0.06	1.45***	-0.01	-0.89*	-0.93	5.68
-3	0.23	1.68***	0.00	-0.90*	1.97**	7.65
-2	-0.29***	1.39***	-0.02	-0.91*	-1.32*	6.33
-1	0.36***	1.75***	0.41	-0.51*	1.28	7.61
0	1.11***	2.86***	1.19***	0.68	1.61**	9.23*
1	1.40***	4.26***	0.74***	1.41	-0.15	9.08
2	0.37***	4.63***	0.11	1.52	1.30*	10.38*
3	-0.08	4.56***	-0.03	1.49	-1.56*	8.82
4	-0.03	4.53***	-0.02	1.47	0.07	8.89
5	0.08	4.61***	-0.04	1.43	-1.19	7.70
6	0.15*	4.76***	0.11	1.54	1.98*	9.69
7	-0.09	4.67***	-0.88***	0.66	-0.52	9.17
8	-0.12	4.55***	1.34***	2.00	0.02	9.19
9	-0.13	4.42***	0.23	2.23	-1.32*	7.88
10	-0.09	4.32***	0.88***	3.11*	-0.99	6.89
20	-0.11	3.05***	0.16*	2.54*	1.00	6.82
25	-0.02*	3.20***	0.18***	2.18*	0.25	10.37
30	0.10	3.10***	0.48**	1.89*	0.14	7.16

* Significant at the 10 percent level
** Significant at the 5 percent level
*** Significant at the 1 percent level

For example, the Toronto Stock Exchange has no minimum price requirements for the delisting of securities. Therefore, there is less stigma associated with reverse splits in Canada. Another possible explanation is the positive effect of reverse splits on the margin eligibility of low priced shares in our sample. Thus, reverse splits in Canada are voluntary with respect to exchange requirements and therefore are undertaken to achieve positive results. Although our sample is small, our results do support the hypothesis that reverse splits are a positive rather than a negative signal. Unfortunately, there are no other Canadian studies for comparison.

Table 3—Price Characteristics of Reverse Splits

Price ($) Interval	Number of Firms	Actual Mean at Announcement	Standard Deviation	Number of Firms	Nominal Mean at Announcement*	Standard Deviation
0-.99	22	0.390	0.286	7	0.577	0.245
1.00-1.99	4	1.438	0.331	4	1.745	0.064
2.00-4.99	6	2.983	1.004	11	4.099	0.742
5.00+	0	-	-	10	11.585	7.688

*Stock price at announcement date multiplied by the split ratio

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