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Abstract

This paper models security price reaction to dividend cut announcements in the presence of informed traders and transaction costs. A transaction costs barrier prevents the attainment of a full information equilibrium price prior to the announcement of the cut. An empirical study of transaction costs and price reaction for both common stock and call options indicates that transaction costs may constitute a significant portion of security price reactions to cut announcements. Interestingly, the results of this interpretation allow for the simultaneous presence of dividend signaling and an informed subset of investors.

I. Introduction

The information content of dividend announcements has been studied regularly for at least two decades. Pettit (1972,1976), Watts (1973,1976) and Laub (1976) contributed to early studies concerning the relative importance of dividend information content as distinguished from earnings announcements. Many studies have demonstrated the positive association between dividend changes and stock price reactions. A partial listing includes Pettit (1972), Charest (1978), Aharony and Swary (1980), Kwan (1981), Eades (1982), Divecha and Morse (1983), Woolridge (1983), Benesh, Keown, and Pinkerton (1984), Dielman and Oppenheimer (1984), and Eddy and Seifert (1986). A literature of dividends as a signaling mechanism has developed, for example, see Ang (1975), Bhattacharya (1979), Miller and Rock (1985), and Ambarish, John, and Williams (1987).

How transaction costs impact security price reactions to dividend announcements is an unanswered question. While it is generally accepted that some investors have access to private information, empirical analysis of security returns has not isolated their impact. Several early studies, Pettit (1972) and Charest (1978) suggested there was little insider trading in daily return data in anticipation of dividend cuts. Transaction costs could preclude profitable trading schemes. Glosten and Milgrom (1985) and Venkatesh and Chiang (1986) investigated information asymmetries and the dealer bid-ask spread. Venkatesh and Chiang generally did not observe a widening of the bid-ask spread just prior to dividend announcements even though this might be expected as the specialist becomes aware of presumed anticipatory informed trading. Miller (1986) commented that the existence of transaction costs may give rise to a smoothed dividend as an optimal policy. In a related study, Blume and Stambaugh (1983) found that consideration of the bid-ask spread could halve the small firm effect on security returns.

The case for examining transaction costs and dividend decreases is strong because it is hard to imagine that a cut announcement is typically a surprise to everyone. Charest (1978) notes that the behavior of the cumulative average residual in an event study demonstrates a persistent downward trend well in advance of the announcement. He implies that cut announcements normally come in the wake of other bad news.

Though it is reasonable to assume a subset of informed investors privy to the bad news information content of a dividend cut, these investors do not fully discount the price of the security before the announcement of the cut. In the studies summarized by Ang (1987), stock prices drop on average about five percent in response to dividend cut announcements, and this suggests substantial information content.

II. The Transaction Costs Hypothesis

Transaction costs may explain why a full information revealing equilibrium price may not be attained prior to the cut announcement. Three components of transaction costs are commissions, the bid-ask spread, and illiquidity costs (also called "market impact") that relate to the depth of the quoted spread. Consider a market with information asymmetries between investors. Copeland and Galai (1983) show how a specialist creates the spread by pricing a call and a put with equal maturities and unequal exercise prices. The specialist offers at the asking price, while buying at the bid price. His perception of the true value of the security is within the bid-ask spread. Although the combination is short-lived, since spreads change frequently, the investor does not pay the premium in advance. It is paid implicitly whenever a trade occurs. The specialist sets a spread in the presence of a natural public order flow which tends to narrow the specialist spread to what is known as the market spread. Market makers are sensitive to the price pressure signals of informed trading, and respond by widening the spread. Typically the specialist profits from the uninformed or liquidity trader, and loses to the information trader.

In a frictionless efficient market without transaction costs, informed investors exert pressure at the margin until a full information equilibrium price is attained. With the presence of brokerage fees, bid-ask spreads and market impact costs, informed investors face a transaction cost barrier. Marginal price pressure towards a full information revealing equilibrium only exists when informed investors perceive profit opportunities. In the absence of such opportunities, the marginal price pressure from informed investors dissipates.

Consider an informed group of traders which has knowledge of a firm's deteriorating condition which is not reflected in the current security price. The informed group puts downward price pressure on the security. With transaction costs, the marginal price pressure from this group continues to a price level which reflects transaction costs. Unable to profit further at this level the marginal downward price pressure is withdrawn and price support from liquidity traders maintains the value of the security at an asymmetric information equilibrium price which is higher than the full information equilibrium price.

For a firm which decreases its dividend, according to the informed trader transaction cost hypothesis, as management declares a dividend cut, information concerning the firm's prospects is revealed to all traders. That is, the announcement eliminates asymmetries associated with the information content of a dividend cut. With the announcement there is an abrupt fall to a lower equilibrium price. Had there not been transaction costs, the lower equilibrium price would have been reached earlier as informed investors would not have withdrawn from trading at the margin. With the transaction cost barrier, this level was not attained until uniformed liquidity traders trading at the margin eliminated price support form below. According to the transaction costs hypothesis, ceteris paribus, the differential between the equilibrium security price just before and after the announcement of a dividend cut equals transaction costs to the informed investor.

III. Empirical Analysis Of Security Returns

A. The Sample

For the ten year period, 1976-1985, dividend cut declarations were initially obtained from the CRSP database. All cuts were checked for consistency by looking up each cut in the *Wall Street Journal Index*. For the quarter between a

regular dividend and a subsequent cut, each observation was required to be free of other confounding distribution factors such as stock splits or stock dividends as reported in the CRSP database. The sample is composed only of cuts in the regular dividend; omissions were excluded. This procedure yielded a sample of 407 observations. The cuts were not spread evenly over the 1976-1985 ten year period. About 23 percent occurred in 1982, and the smallest number (about 5%) were in 1978. Nearly 30 percent of the dividend cuts were approximately 50 percent in size, and the great majority of cuts were within the 25 percent to 75 percent size range. This supports the notion that when firms reduce the dividend, the cut is substantial. Unlike like dividend increases, there are few small dividend decreases.

Daily common stock returns and value weighted market index returns for 54 trading days before and 54 trading days following the announcement of a cut were also derived from the CRSP file. This trading period was chosen so as to capture roughly six months surrounding the cut without overlapping other dividend announcements. Since the cuts were not spread evenly over time, a residual adjustment methodology consistent with Brown and Warner (1985) is employed in which each security return is replaced with a residual by subtracting the market return.

For the 407 decrease declarations, useful call option data was obtained for 36 observations. The volume of trading on the remaining listed call options and the few available put options was judged too small to provide meaningful return series. The returns were compiled from the *Wall Street Journal* for twenty days before to twenty days after the cut announcement. Four options series were obtained for each of the 36 observations. These included short term in-the-money call options (SI), short term out-of-the-money call options (SO), long term in-the-money call options (LI), and long term out-of-the money call options (LO). In some cases not all series were available for each observation, but at least two were available and in most cases all four were available.

Transaction costs for trading in stocks and call options in the sample prior to the two day cut announcement period is detailed in the Appendix. Transaction costs were calculated for two types of investors. The first was a small investor who transacts at retail rates, and the second is the large or institutional investor. Table 1 summarizes these costs for stock and options trading. The table presents costs with and without market impact or illiquidity considerations, and considers both one way and round trip transactions.

B. Methodology And Results

The cumulative average residual return for the 407 common stock observations confirms event study patterns observed by others. There is a persistent deterioration in the return pattern up to the declaration date of the cut. There is an abrupt drop in the cumulative average residual of 4.68% on the declaration date and the following trading date. This is consistent with other studies such as Woolridge (1983) who reported a two day drop of 4.75%. (Using raw returns without adjustment for market trend resulted in a two day drop of 4.59%). In the eight trading days following the two day announcement period, there is an upward adjustment suggestive of a market overreaction (1). The remainder of the cumulative residual pattern is relatively flat.

As reported in Table 1, for the institutional trader round trip transaction costs (including market impact as a percentage of price) are 2.4%. On average there is information content in the announcement of a dividend cut beyond the level of transaction costs for the institutional trader (2). At most, transaction costs for the institutional trader constitute about half of the observed drop in the cumulative residual. In comparison, for the retail trader transaction costs for nearly any type of trade exceed the average drop in the cumulative residual.

As explained in the Appendix, security price is a good proxy for transaction costs (Stoll and Whaley review how the major components of

Table 1. Summary Of Transaction Costs

	WITH MARKET IMPACT	WITHOUT MARKET IMPACT
COMMON STOCK		
Institutional:		
One-way	1.53%	1.00%
Two-way	2.40%	1.50%
Retail:		
One-way	NA	4.90%
Two-way	NA	9.30%
OPTIONS		
Institutional:		
One-way	13.2%	8.78%
Two-way	14.76%	10.34%
Retail:		
One-way	NA	13.80%
Two-way	NA	18.82%

The calculation of these transaction costs are described in the Appendix.

transaction costs are inversely correlated with security price). The informed trader transaction costs hypothesis implies that larger price drops are associated with larger transaction costs. To test this the sample of 407 observations was divided into two groups on the basis of share price. Percentage transaction costs are presumed lower in the group with the higher share prices.

A t-test of the difference in mean responses between the two groups showed that the low transaction cost group experienced an average 4.11% two day drop as compared to a 5.26% drop for the higher transaction cost group. The t-statistic for the difference in means was -1.78, which is significant at the five percent level of significance for a one-tailed test. Dividing the sample into three equal groups on the basis of share price also supports the transaction costs hypothesis. The average percentage responses for the low to high transaction costs groups were 4.04%, 4.78% and 5.23% respectively. Division into four or more groups and more complex analysis of variance models provided inconclusive results. The large variability in two day responses limits testing the transaction cost hypothesis because the variability in transaction costs across individual securities is not large. For example, the bid-ask spread is typically 1/8. That is, the variation of responses within samples is much larger than the variability between samples. While differences in common stock transaction costs in the sample vary by a few percent, the 407 two day responses range from a 33.67% drop to an increase of 13.6%.

There is evidence that the performance of the security just prior to the cut announcement has some impact on the announcement effect, and can contribute to explaining the variability described above. For example, Kane, Lee and Marcus (1984) demonstrated that dividend and earnings announcements are corroborative. The reaction to a dividend decrease would be less if

it were preceded by a disappointing earnings announcement. Other leakages of bad news prior to the cut would likely dampen the impact of the cut announcement. As information becomes available before the cut announcement, information asymmetries are reduced. In some cases the cut information may be known to investors prior to the announcement. This implies information asymmetries are eliminated and the security price is fully discounted before the cut announcement. At the other extreme the cut announcement may be a surprise to investors. Particularly, if a security were performing well just prior to a cut announcement, the announcement effect could be large.

The sample was stratified into three subsamples based on the magnitude of the two day response. For the subsample which experienced the largest two day drop, the cumulative average residual increased during the eight trading days just before the announcement. For the middle subsample which exhibited a moderate two day drop, the cumulative residual declined modestly in the eight days just before the cut. And finally, for the third subsample which showed a rise in the two day announcement period, the cumulative average residual fell precipitously in the eight days prior to the announcement.

Although it is improbable that one can control for all the factors giving rise to variation in the two day responses for common stocks, the transaction costs barrier model can be tested cross-sectionally with other securities. For bonds and preferred stock analysis this may be impractical. The illiquidity of these instruments makes it difficult to attach meaning to computed return series over time. Options trading, however, provides an additional test. Options provide an easier method of taking a bearish position than trading directly in securities (Jennings and Starks (1986)). The short seller of listed common stock faces a number of constraints. First is the up-tick rule which allows a short position to be initiated only if the trade was up. Second, it may be difficult to borrow shares promptly in quantity. Third, some brokerage houses refuse to credit the client with interest earned while the position is open. Fourth, the short seller will be presented with a due bill for dividends. Trading in options is not subject to the up-tick rule. Substantial leverage is possible without the need to actually incur margin debt whose tax deductibility is questionable in a portfolio that also holds tax advantaged securities. In addition, there is no dividend due bill or exercise price adjustment when trading in exchange-listed options.

Examination of daily returns in the options sample showed positive skewness in low priced options (for example, an increase from 1/16 to 3/16 in price). However, there were no extreme positive returns in the two day announcement period to bias averages. Furthermore the great majority of large negative drops in the option series occurred in the two day announcement period. For the 36 observations for which meaningful option price series were available, the average two day percentage cumulative drop was 21% for the short in-the-money series, 19% for the short out-of-the-money series, 15% for the long in-the-money series, and 24% for the long out-of-the money series (3).

The large average price drops in the four series during the dividend announcement period would at first suggest potential market inefficiencies. However, a comparison with the transaction costs for options trading in Table 1 shows this may not be the case. Average two-way trading costs for the institutional investor of 13.2% represent a substantial portion of the two day return drop. Transaction costs for options are very large compared to those of common stock. As predicted by the transaction cost hypothesis, the larger price drops for call options are associated with larger transaction costs.

IV. Summary and Conclusions

Responses of security prices to announcements of dividend cuts have been well documented in event studies. It is also generally accepted that some investors have access to private information. In an efficient market without consideration of transaction costs, this information would already be discounted in the security price by the

time of a cut announcement. In that setting, large average drops in response to these announcements imply substantial new information content. This study tempers the amount of new information content by considering the impact of transaction costs. In an idealized model where cuts are fully anticipated, the negative response to cut announcements would be equal to transaction costs to the informed trader.

Empirical analysis of transaction costs and security returns lends some support to the transaction cost hypothesis. For common stock returns it is shown that higher transaction costs are associated with larger average drops to cut announcements. Options were also analyzed. Transaction costs are substantially larger for options than common stock; and consistent with the transaction cost hypothesis, the average price drops in call options are correspondingly larger than those of common stocks.

On average, there is new information content in the announcement of a dividend cut, but the existence of transaction costs likely reduces the amount of new information as generally perceived in the literature. In the case of the retail trader, prohibitive transaction costs preclude insider trading schemes just prior to a cut announcement in most instances. For the institutional trader, more opportunities would be available because the average price drop to a cut announcement exceeds transaction costs. However, the average drop is highly influenced by a number of large negative responses, and is not generalized across securities.

Endnotes

1 The sample was divided into ten subsamples by every tenth observation. This was essentially random except that a firm with multiple observations could appear only once in a subsample. The upward correction was observed in all ten subsamples. Dielman and Oppenheimer (1988) noted a similar correction for large firms but not for small firms.

2 A true comparison would determine the actual percentage price decline over the two day period as opposed to using the cumulative two day drop. Except for the extreme values in the sample, the cumulative approximation is sufficiently close so as to not warrant a deviation from a well established event study methodology.

3 Manaster and Rendleman (1982) demonstrate some anticipatory ability in option prices. Options markets might anticipate unfavorable dividend announcements before stock markets. We were unable to detect any suggestion of a systematic lead or lag in the daily return series for the call options.

Appendix

Transaction Costs

Transaction costs are calculated for two types of investors. The first is a small investor who transacts at retail rates. The second is a large investor or institution. The retail transaction analyzed is 200 shares or 15 calls. The institutional transaction is 10,000 shares or 100 calls. These order sizes are intended to be large enough to offer profit potential, but small enough to be within normal lot size levels for each investor, respectively.

Three components of transaction costs are commissions, the bid-asked spread, and illiquidity costs that relate to the depth of the quoted spread. These last costs are also known as "market impact." Each component is discussed in turn, and estimates are derived for the firms and time period of this study.

Prevailing retail commissions were obtained from the 1984 rate sheet of a major retail oriented New York Stock Exchange firm. Phillips and Smith (1980) quote an SEC study that found that individuals traders enjoyed an average 18.3% discount in December 1977. Although discounting is common, we assume only a ten percent discount since the size of the trade is relatively small. Rates charged by discount brokers are approximately half of the above rates.

Institutional commissions were obtained by interviewing three institutional brokers. The rates used here are typical for a small institutional transaction in 1986. Commissions which prevailed during the years of the options sample, 1977-1985, could have been slightly higher, as the discounting of rates which began in 1975 accelerated over the ensuing decade. The common stock commissions used here are in the range of those found in Phillips and Smith (1980), Brown and Lummer (1986), Joehnk, Bowlin and Petty (1980), Elton, Gruber and Rentzler (1984), Kalay (1984) and Stoll and Whaley (1983).

As shown by Cohen, Maier, Schwartz and Whitcomb (1979) the bid-ask spread is a function of the specialist (or competing market-makers on certain options exchanges) as well as an array of public limit orders. This spread is estimated through interviews, by sampling from a real time quotation service, and by the investment advisory experience of one of the authors. For both options and stocks, the spreads used here are on the low end of those in Hamilton (1976) and EGR. Branch and Freed (1977) demonstrate that the percentage spread rises rapidly as prices decline, which supports the idea of a higher spread for the present relatively low priced sample. The bid-ask spread used here for options is slightly higher than that of PS. Their sample consisted of options for which both calls and puts were listed on the Chicago Board Options Exchange. This choice of markets skewed their sample to more liquid option series.

Illiquidity costs are essentially changes in the bid-ask spread which occur when an investor transacts in amounts greater than the depth of the market-maker or specialist quote. Venkatesh and Chiang (1986) show how a rational specialist will widen the spread to offset a tendency to lose money to information traders. Present estimates of illiquidity costs are derived from interviews with several brokerage firms, as well as monitoring a real time quotation service concurrent with the placing of actual orders. When trading is thin, a sizable order will widen the bid-ask spread. Due to thin trading in the options sample, estimates of liquidity costs are substantial.

A large increase in volume of stock trading occurs on the announcement date relative to the volume before the announcement. For an informed investor to profit from information in a dividend reduction, trades would need to be executed in the thin market that prevailed before the announcement. Although this is not a problem for the small retail trader, for the institutional investor a trade of 10,000 shares looms rather large compared to the samples's average volume of 95,320 shares. Illiquidity costs arise when the order placed by an informed investor is large in relationship to normal volume. The bid-ask spread widens as the specialist backs off from what appears to be an information trader, (see Glosten and Milgram (1985), Copeland and Galai (1983), and Venkatesh and Chiang (1986)). Alternatively, a block trade could be executed through a member firm, or such a firm might "position" the stock. In the latter case, the firm risks capital, either as a speculation, or to maintain an important client relation. In either case, it is likely that the trade will occur at some disadvantage with respect to the recent quote.

The volume in the options sample was such that an institutional size order of 100 contracts would have been difficult to consummate for any series except the short in-the-money call. For puts, when listed, such an order was much larger than the normal size of this market. In general, volume of in-the-money calls was higher in the week of the announcement than in earlier weeks. However, overall, in the month before the announcement, trading stock in 10,000 share blocks or options in 100 contract lots was a delicate task.

In summary, for the firms in this study the costs of trading are substantial, especially when illiquidity costs are included. Transaction costs for the stock and option series appear in Table 1 of the paper. Calculations are shown with and without market impact costs. Lower transaction costs are available to market-makers and exchange members who have absorbed the costs of an exchange membership, personnel and facili-

ties. However, these groups are constrained by front-running rules, zone restrictions and other fiduciary responsibilities. There are additional transaction costs in SEC fees, floor trading and clearing fees, and margin requirements. These are small and are subsumed in commission estimates.

Tables describing the components of the calculation of transaction costs are available on request from the authors.

References

1 J. Aharony and I. Swary. "Quarterly Dividends and Earnings Announcements and Stockholders' Returns: An Empirical Analysis." *Journal of Finance*, Vol. 35, pp. 1-12, March 1980.

2 R. Ambarish, K John and J Williams. "Efficient Signalling with Dividends and Investment." *Journal of Finance*, Vol. 42, pp. 321-343, June 1987.

3 J.S. Ang. "Do Dividends Matter? A Review of Corporate Dividend Theories and Evidence." Monograph Series in Finance and Economics, New York University, No. 1987-2.

4 S. Battacharya. "Imperfect Information, Dividend Policy, and "The Bird in the Hand' Fallacy." *Bell Journal of Economics*, Vol. 10, pp. 259-270, Spring 1979.

5 G. Benesh, A Keown and John Pinkerton. "An Examination of Market Reaction to Substantial Shifts in Dividend Policy." *Journal of Financial Research*, Vol. 7, pp. 131-142, Summer 1984.

6 M. Blume and R. Stambaugh. "Biases in Computed Returns: An Application to the Size Effect." *Journal of Financial Economics*, Vol. 12, pp. 387-404, November 1983.

7 B. Branch and W. Freed. "Bid-Asked Spreads on the Amex and the Big Board." *Journal of Finance*, Vol. 32, pp. 159-163, March 1977.

8 K. Brown and S.Lummer. "A Reexamination of the Covered Call Option Strategy for Corporate Cash Management." *Financial Management*, pp. 13-17, Summer 1986.

9 S. Brown and J. Warner. "Using Daily Stock Returns, The Case of Event Studies." *Journal of Financial Economics*, Vol. 14, pp. 3-31, March 1985.

10 K. Cohen, S. Maier, R. Schwartz and D. Whitcomb. "Market Makers and the Market Spread: A Review of the Recent Literature." *Journal of Finance and Quantitative Analysis*, Vol. 14, pp. 813-835, November 1979.

11 T. Copeland and D. Galai. "Information Effects on the Bid-Ask Spread." *Journal of Finance*, Vol. 38, pp. 1457-1469, December 1983.

12 G. Charest. "Dividend Information, Stock Returns and Market Efficiency-II." *Journal of Financial Economics*, Vol. 6, pp. 297-330, 1978.

13 W.F.M. DeBondt and R.H. Thaler. "Further Evidence on Investor Overreaction and Stock Market Seasonality." *Journal of Finance*, pp. 557-581, July 1987.

14 T. Dielman and H. Oppenheimer. "The Information Content of Dividend Change Announcements: Exchange and Size Effects." Paper presented at the Eastern Finance Association Annual Meeting, 1988.

15 A. Eddy and B. Seifert. "Dividend Changes of Financially Weak Firms." *The Financial Review*, pp. 419-443, November 1986.

16 E. Elton, M.Gruber and J.Rentzler. "The Ex-Dividend Day Behavior of Stock Prices; A Re-Examination of the Clientele Effect: A Comment." *Journal of Finance*, Vol. 39, pp. 551-556, June 1984.

17 L. Glosten and P. Milgrom. "Bid, Ask and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders." *Journal of Financial Economics*, Vol. 14, pp. 71-100, 1985.

18 J. Hamilton. "Competition, Scale Economics, and Transaction Cost in the Stock Market." *Journal of Financial and Quantitative Analysis*, Vol. 11, pp. 779-802, December 1976.

19 J. Hill, A Jain and R. Wood. "Volatility Risk and Futures Mispricing in Portfolio Insurance Strategies." Kidder, Peabody and Co., 1986.

20 J. Jaffe and R. Winkler. "Optimal Speculation Against an Efficient Market." *Journal of Finance*, Vol. 31, pp. 49-61, March 1976.

21 R. Jennings and L. Starks. "Earnings Announcements, Stock Price Adjustment, and the Existence of Option Markets." *Journal of Finance*, Vol. 41, pp. 107-125, March 1986.

22 M. Joehnk, O. Bowlin and J. Petty. "Preferred Dividend Rolls: A Viable Strategy for Corporate Money Managers." *Finance Management*, pp. 78-87, Summer 1980.

23 A. Kalay. "The Ex-Dividend Day Behavior of Stock Prices: A Re-Examination of the Clientele Effect: A Reply." *Journal of Finance*, Vol. 39, pp. 557-561, June 1984.

24 A. Kane, Y. Lee and A. Marcus. "Earnings and Dividend Announcements: Is there a Corroboration Effect?" *Journal of Finance*, Vol. 39, pp. 1091-1100, September 1984.

25 C.C.Y. Kwan. "Efficient Market Tests of the Informational Content of Dividend Announcements: Critique and Extensions." *Journal of Financial and Quantitative Analysis*, Vol. 16, pp. 193-206, June 1981.
26 P. Michael Laub. "On the Informational Content of Dividends." *Journal of Business*, Vol. 49, pp. 73-80, January 1976.
27 S. Manaster and R. Rendleman. "Option Prices as Predictors of Equilibrium Stock Prices." *Journal of Finance*, Vol. 37, pp. 1043-1058, September 1982.
28 M. Miller. "The Informational Content of Dividends." Working Paper 162. Graduate School of Business, University of Chicago, 1985.
29 M. Miller and K. Rock. "Dividend Policy under Asymmetric Information." *Journal of Finance*, Vol. 40, pp. 1031-1051, September 1985.
30 S. Myers. "The Capital Structure Puzzle." Presidential Address, *Journal of Finance*, Vol. 39, pp. 575-590, July 1984.
31 R. Pettit. "Dividend Announcements, Security Performance and Capital Market Efficiency." *Journal of Finance*, Vol. 27, pp. 993-1007, December 1972.
32 R. Pettit. "The Impact of Dividends and Earnings Announcements: A Reconciliation." *Journal of Business*, Vol. 49, pp. 86-96, January 1976.
33 S. Phillips and C. Smith. "Trading Costs for Listed Options: The Implications for Market Efficiency." *Journal of Financial Economics*, Vol. 8, pp. 1979-2001, July 1980.
34 R. Roll. "A Simple Implicit Measure of the Effective Bid-Ask Spread in an Efficient Market." *Journal of Finance*, Vol. 39, pp. 1127-1139, September 1984.
35 H. Stoll and R. Whaley. "Transaction Costs and the Small Firm Effect." *Journal of Financial Economics*, Vol. 12, pp. 57-59, 1983.
36 P. Venkatesh and R. Chiang. "Information Asymmetry and the Dealer's Bid-Ask Spread: A Case Study of Earnings and Dividend Announcements." *Journal of Finance*, Vol. 41, pp. 1089-1102, December 1986.
37 R. Watts. "The Information Content of Dividends." *Journal of Business*, Vol. 46, pp. 191-211, April 1973.
38 R. Watts. "Comments on the Informational Content of Dividends.'" *Journal of Business*, Vol. 49, pp. 81-85, January 1976.
39 R. Watts "Comments on 'The Impact of Dividend and Earnings Announcements: A Reconciliation." *Journal of Business*, Vol. 49. pp. 97-106, January 1976.
40 R. Woolridge. "Dividend Changes and Security Prices. *Journal of Finance*, Vol. 38, pp. 1607-1615, December 1983.