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# Do analysts generate trade for their firms? Evidence from the Toronto stock exchange☆

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**Abstract**

It has generally been assumed that the potential commission revenue is an important determinant of a sell-side analyst's decision of what firms to cover and what information to publicly release. However, because stock volume has not been disaggregated on a brokerage-firm level, uncertainty remains regarding the economic importance of the relation between analyst coverage and brokerage-firm volume. Using a unique data set that identifies the broker(s) involved in each trade, I find that brokerage volume is significantly higher in covered stocks than in uncovered stocks. On average, brokers increase their market share in covered stocks by 3.8% relative to uncovered stocks. © 2001 Elsevier Science B.V. All rights reserved.

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## 1. Introduction

A considerable amount of research examines analysts' forecasts and recommendations, yet we know relatively little about how analysts' forecasts are used by their clients. Schipper (1991) comments on this gap in the literature and encourages researchers to examine the process that generates forecasts as a key to understand the properties of the forecasts themselves. Subsequently, Francis and Philbrick (1993) show how analysts' relationships with company management could influence their recommendations and earnings estimates. Dugar and Nathan (1995), Lin and McNichols (1998) and Michaely and Womack (1999) document that lucrative corporate finance relationships can influence the analysts' recommendations.

The idea that analysts generate trade for their firms has also been suggested as an important determinant of analysts' coverage decisions and the properties of their forecasts. However, the relation between analyst coverage and trading volume has never been confirmed using brokerage-firm level data, hence uncertainty about the economic importance of this relation remains. Instead, prior studies rely on conventional Wall Street wisdom to support the assumption that analysts generate trade for their firms.[1] This paper provides direct empirical evidence on the relation between analyst coverage and brokerage-firm volume. To examine this relation, I use a unique data set obtained from the TSE (Toronto Stock Exchange, 1994) that identifies the broker(s) involved in individual trades. Unlike NYSE and Nasdaq transaction data, these data can be used to disaggregate stock volume into brokerage-firm volume and the strength of the relation between analyst coverage and brokerage volume can be directly measured.

The extent to which analysts generate trade for their firms is clearly a factor of first-order importance in the process that generates analysts' forecasts. Bhushan (1989) finds that the level of analyst coverage is positively related to trading volume. O'Brien and Bhushan (1990) suggest that trading volume determines the level of analyst coverage and hence the amount of research produced concerning a particular firm.[2] They demonstrate that analyst coverage and institutional ownership are jointly determined; institutional investors tend to own stocks that brokerage analysts choose to cover while, at the same time, analysts choose to cover firms that have high levels of institutional ownership. One implication from this research is that the level of analyst coverage in a particular stock depends on the potential brokerage revenue coverage provides. This assertion rests on the assumption that analyst coverage is driven,

[1] McNichols and O'Brien cite Darlin (1983) as an example.

[2] In McNichols (1990) commentary on O'Brien and Bhushan (1990) one of the first points of discussion is whether their assumption is realistic.

at least in part, by the ability of the analyst to generate trade in a particular stock.

The ability of analysts to generate trade is a key assumption in McNichols and O'Brien (1997), who show that self-censoring is a possible explanation for analysts' earnings optimism. They contend that potential trading revenue will influence an analyst's decision to release a particular forecast. For example, analysts may decide either to issue or withhold a forecast that contains bad news by trading off the costs of issuing (e.g., deterioration in relationships with company management) against the costs of withholding; namely lost brokerage revenue that could have been generated by issuing the forecast. Francis and Willis (2000) find that the average monthly stock volume is positively related to analysts' forecast optimism and conclude that this result is consistent with analysts' incentives to generate trade with their forecasts. The results in these papers suggest that the ability of analysts to generate trade can affect the properties, such as earnings optimism, of observed analysts' forecasts.

The empirical tests in this paper examine the relation between an analyst's decision to cover a stock and brokerage-firm volume in that stock. Using data covering an entire year, I compare brokerage-firm volume in covered stocks against brokerage-firm volume in stocks they do not cover. I find that analyst coverage of a particular stock results in significantly higher broker volume in that stock: on average, brokers increase their market share in covered stocks by 3.8% relative to uncovered stocks. Using an average institutional commission rate of six cents-per-share, Greenwich Associates (1993), this represents incremental brokerage revenue of approximately C$150,000 per-stock per-year. Brokerage-firm clients appear to reward their brokers, through trading commissions, for providing analyst coverage. These results support the idea that analysts' coverage decisions depend, at least in part, on the amount of trading revenue they expect their reports will generate.

Section 2 examines the market for analysts' research in the context of providing economic intuition for testing the relation between analyst coverage and brokerage-firm volume. Section 3 describes the properties of the data. Section 4 presents the results and Section 5 concludes the paper.

## 2. The brokerage analyst and client trading activity

### *2.1. The link between analyst coverage and brokerage-firm volume*

Three links are essential for a relation between analyst coverage and brokerage-firm volume to exist. First, it is necessary to establish that brokerage clients might use the information in analysts' reports when they make their trading decisions. Second, if analysts' reports do generate trades, at least some of the trades must be directed toward the analyst's brokerage firm. Third, the

incentives of the individual analysts must be aligned with those of their brokerage firm. In other words, are analysts rewarded for trade generated in the stocks they cover?

There is considerable evidence that some analysts' reports can be used to trade profitably. Bjerring et al. (1983) and Brown et al. (1991) examine the stock price impact of Canadian analysts' reports. Their results are similar to US studies by Elton et al. (1986) and Womack (1996). The results in these papers suggest a profitable trading rule: buy a security when a brokerage analyst recommends purchase, sell it when the analyst recommends sale.[3] Dimson and Marsh (1984) use a data set of transactions completed by an UK-based investment manager to conclude that trades motivated by analysts' research generated a net annual abnormal return of 1.7%. They find that some analysts' forecasts lead to multiple trades in the same stock in the days, or even weeks, following the forecast. Despite this evidence on the value of following analysts' recommendations, the contention that brokers can directly profit from providing these recommendations remains untested. Although Womack (1996) found that additions to a brokerage firm's recommended list did generate significant abnormal volume in the *stock*, McNichols (1990) correctly maintains that investors are not contractually obligated to trade through the broker from whom they receive a report. The more that investors choose to trade with another broker, the weaker the relation between analyst coverage and brokerage-firm volume.

It is a well-established fact that brokerage analysts tend to cover high volume stocks (Bhushan, 1989; O'Brien and Bhushan, 1990). This relation makes intuitive sense because the primary method of payment for research is through directed commissions, sometimes referred to as 'soft dollar' commissions. Instead of paying cash for research services, institutions pay through commissions on their trading activity. The soft dollar market is important, for instance, 506 of the largest US institutional investors allocated $769 million in commissions for research in 1993.[4] Admati and Pfleiderer (1990), Brennan and Chordia (1993) and Johnsen (1994) provide theories that suggest that commissions can be the profit maximizing method for the sale of analysts' information. Empirically, Conrad et al. (2000) examine the trades by 34 US institutions and find that a significant amount of institutional trading is directed to brokers that provide research and other soft dollar services.

The relation between brokers and institutions in Canada is similar to that in the US in that institutional investors are important customers. In 1994, the TSE estimated that institutions accounted for 70% of the trading on the exchange.

[3] Barber et al. (2000) find that a strategy of following *consensus* recommendations is only valuable to investors for whom trading costs are sunk costs, that is, investors who are otherwise considering a trade.

[4] Source: Greenwich Associates (1993).

All of the brokerage-firms examined herein reported to Nelson's Directory of Investment Research that institutions paid for their research coverage with soft dollar commissions.

Further, the practice of directing soft dollar commissions to Canadian brokerage firms enjoys the same safe harbor provisions as exist under Section 28 (e) of the US Securities Exchange Act of 1934. The payment of soft dollars for the receipt of analyst research is specifically mentioned in the Ontario Securities Act (the Act).[5] Specifically referred to in the Act as 'soft dollar deals', the Act provides for payment through commissions for such investment decision-making services as: "advice as to the value of securities and the advisability of effecting transactions in securities".[6]

The existence of a soft dollar market in Canada makes it reasonable to assume that brokerage-firm clients will direct some of their trades back to the broker that provides them with analysts' research. However, prevailing institutional arrangements in the market for soft dollar commissions suggest that determining the existence of a relationship requires a relatively long time series of trading data. Research directors at Canadian brokerage firms suggest that over 50% of brokerage volume with an institutional client is set in advance. This practice could limit the ability of an institution to reward a broker for a particular analyst report. For institutions, rewarding analysts' services is an adaptive process. Analysts that provide excellent services over the prior period (most often quarterly or semi-annually) are rewarded with increased allocations in the subsequent period.[7]

A third issue concerns whether analysts'compensation is related to amount of trade their brokers receive in the stocks they cover. In Canada, as in the United States, data on analysts' compensation contracts is hard to obtain. Instead, I conducted conversations with analysts and research directors at several of the Canadian brokerages in the sample. Based on these conversations, I conclude that Canadian brokerage firms do compensate analysts on the amount of commission revenue generated in their stocks. For example, at one firm the research department receives 10% of the brokerage's gross commission. Part of this revenue is pro-rated to analysts based upon trade in the securities they cover. Other factors are used to determine the actual bonus amount, including the number of reports produced and the number of client contact hours.

Other brokerage firms stated that they did not tie brokerage commissions to analyst compensation with a fixed percentage, but all agreed that the volume of

[5] The Ontario Securities Act is generally adopted as the standard in the other provinces of Canada.

[6] Consolidated Ontario Securities Act and Regulation, 1995. Ontario Securities Commission Policy Statements, Section 1.9, Section II, (a).

[7] Michaely and Womack (1999) claim that a similar compensation system prevails in the US.

trade done in a particular analyst's stocks had some impact on his or her compensation. Laderman (1998) reports that some brokers have their institutional salespeople rank analysts on their ability to generate trade and that part of an analyst's compensation is tied to this rank. Thus, this anecdotal evidence suggests analysts have incentives to convince clients to trade in the securities they follow.

### 2.2. Hypothesis development

One reason analyst coverage will be associated with greater brokerage volume is because analysts tend to cover high-volume stocks. However, this does not imply the relation between coverage and brokerage-firm volume is tautological. High-volume stocks tend to attract more competition from other brokerage-firm analysts, who are themselves trying to generate trade. The volume pie is larger in high-volume stocks, but it must be cut into more pieces. Hence, brokerage-specific volume data is particularly useful in this setting. A second reason we might expect to see a relation between coverage and volume is that the soft dollar market, described above, is predicated on trades as compensation for analyst's services. But the existence of a soft dollar market does not guarantee a relation between coverage and brokerage volume. There is no explicit contract that ties institutional trading to the receipt of analysts' reports; therefore, the client is not legally obligated to trade with the brokerage firm that provides a particular report (McNichols, 1990). Michaely and Womack (1999) go farther and claim that, for institutional customers, trading with a different broker is the rule rather than the exception. Even if the nature of the soft dollar market suggests a *quid pro quo* relationship, the institution receiving analyst coverage on stock A may respond with trades in stock B.

The discussion above suggests that the strength of the relation between analyst coverage and brokerage-firm volume is an open question. To address this question I examine the following primary hypothesis (stated in alternative form):

*Hypothesis*: *Brokerage-firm volume in covered stocks is greater than brokerage-firm volume in uncovered stocks.*

To empirically test this hypothesis, I use two measures of brokerage volume: brokerage Share Volume and brokerage Market Share. Share Volume, the number of shares traded, is used because brokerage-firm revenue is directly related to Share Volume. Soft dollar commissions are almost always completed on a cents-per-share basis (Greenwich, 1993; Conrad et al., 2000).

Using Share Volume in these tests has distinct disadvantages. First, Share Volume is not generally a statistically well-behaved variable. Ajinkya and Jain (1989) and Tkac (1999) find that stock volume generally exhibits positive

skewness. Second, because analysts tend to cover high-volume stocks, a few outlying covered stocks that have particularly high volumes could bias the test against the null. As an alternative to Share Volume, I also test the relation between analyst coverage and brokerage Market Share, where Market Share is brokerage-firm Share Volume normalized by total Share Volume in the stock. Specifically, the Market Share of broker $j$ for stock $k$ is calculated as the total volume traded by broker $j$ in stock $k$ over the sample period of $T$ days, divided by the total volume in stock $k$. In Eq. (1) total volume for stock $k$ is represented as the sum of Share Volume for all $J$ brokers in the market:

$$\text{Market Share}_j^k = \frac{\sum_{t=1}^{T} \text{Share Volume}_j^k}{\sum_{j=1}^{J}\sum_{t=1}^{T} \text{Share Volume}_j^k}. \tag{1}$$

Summation over the entire time period $T$, as opposed to taking the average of $T$ daily Market Shares, avoids distortions that might arise if a particular broker happens to execute an extremely large market share on one particular day. Empirically, Market Share has two desirable properties. It is significantly positively correlated with broker Share Volume, this is important since Share Volume is directly related to brokerage revenue. However, Market Share is uncorrelated with total stock volume, thus removing total stock volume as a source of bias in these tests.

The primary hypothesis is evaluated with three statistical tests. The first compares mean broker volume in covered stocks against mean broker volume in uncovered stocks. I evaluate significance using a one-tailed test of the null that mean covered-stock brokerage-firm volume is equal to mean uncovered-stock brokerage-firm volume. Since the distributions of Share Volume and Market Share across stocks may exhibit considerable skewness, one or two large outliers could lead to rejection (or failure to reject) the null hypothesis in a test for differing means. To control this possibility, I also apply the non-parametric Wilcoxon rank sum test.

Finally, the difference in means and Wilcoxon tests are brokerage-specific in the sense that they produce a separate statistic on the likelihood of the null being true for each broker. It is convenient to aggregate these data across all brokerage firms by using a second non-parametric test. I examine the Share Volume Ratio (Market Share Ratio), which is formed from the ratio of average brokerage-firm Share Volume (Market Share) in covered stocks to average brokerage-firm Share Volume (Market Share) in uncovered stocks. Across all brokers, the primary hypothesis is tested using a binomial test based on whether the Share Volume Ratio (Market Share Ratio) is, on average, greater than one. Alternatively, under the null hypothesis that analyst coverage and Share Volume (Market Share) are not related, then the Share Volume Ratio (Market Share) is as likely to be less than one as greater than one.

## 3. Analyst coverage and brokerage trading volume

### 3.1. The Toronto stock exchange data set

This paper uses a transaction data set obtained from the TSE, the largest stock exchange in Canada.[8] On the TSE, every trade goes through a seat holder on the exchange, a broker who can trade as an agent or as a principal. When the TSE documents a trade, they record the time, volume and price information as well as two brokerage-firm identification codes. The TSE assigns each seat holder a unique two-digit code. As a result of this system, the broker that sold the security and the broker that bought the security are identified for each trade.

The identification codes can be used to calculate brokerage-firm volume. Volume is assigned to a broker when their identification code is attached to a trade. Simply matching the total number of shares traded to each broker presents a double counting problem. There are two parties (buyer and seller) to every trade. Measuring Share Volume as the total number of shares executed by each broker would result in total broker Share Volume being twice the size of the actual number of shares traded. To avoid this problem, I scale down the actual number of shares traded by each broker by one-half. Under this scaling procedure crossed trades (the same broker buys and sells) produce a broker Share Volume equal to the trade size. If there are different buying and selling brokers then each broker is credited with half of the trade size. For example, if broker 01 sells 1000 shares to broker 02, credit broker 01 with 500 shares sold and broker 02 with 500 shares bought. Using this method ensures that the sum of individual broker Share Volumes is equal to the total number of shares traded.

### 3.2. The sample

The TSE sample consists of every trade of the largest 100 companies on the TSE that occurred between September 1, 1993 and August 31, 1994. These companies represent a significant fraction of the market value of all Canadian-based public companies. Ninety-seven of these companies are in the TSE 300, the TSEs primary index, and they comprise 78.2% of the market value of the index. In addition, these companies include 18 of the 20 most active issues on the TSE. Table 1 presents summary information on total TSE trading volume in the sample period and the distribution of average daily volume (number of shares traded) for the 100 sample stocks. The distribution of average daily volume exhibits positive skewness. Mean daily volume across all 100 stocks is

[8] According to the TSE Official Trading Statistics (1994), the TSE is the world's twelfth largest exchange in terms of US dollar trading volume and the seventh largest in terms of market capitalization. The average daily turnover in 1994 was 61.5 million shares, or C$726 million.

Table 1
Volume summary statistics[a]

Panel A

| Month | Volume (MM) | Dollar volume (C$MM) | Transactions (M) |
|---|---|---|---|
| September 1993 | 1284 | 12,566 | 483 |
| October 1993 | 1142 | 12,453 | 479 |
| November 1993 | 1591 | 15,166 | 600 |
| December 1993 | 1279 | 14,220 | 504 |
| January 1994 | 1649 | 19,791 | 616 |
| February 1994 | 1510 | 18,328 | 589 |
| March 1994 | 1764 | 19,690 | 614 |
| April 1994 | 1165 | 14,119 | 446 |
| May 1994 | 1281 | 12,107 | 413 |
| June 1994 | 1210 | 13,481 | 435 |
| July 1994 | 984 | 11,297 | 339 |
| August 1994 | 1280 | 16,292 | 460 |

Panel B

| | | | | Distribution | | | | |
|---|---|---|---|---|---|---|---|---|
| | $N$ | Mean | $\sigma$ | 10% | 25% | Median | 75% | 90% |
| Stock volume | 100 | 238.5 | 170.9 | 40.3 | 104.0 | 204.0 | 334.8 | 599.3 |

[a] Panel A presents a monthly summary of total Toronto Stock Exchange volume between September 1993 and August 1994. Panel B presents statistics describing the distribution of average daily stock volume (thousands of shares traded) for the 100 stocks in the sample.

238.5 thousand shares and the median stock has an average daily volume of 204.0 thousand shares. This observation supports the use of the non-parametric Wilcoxon test to confirm that any rejections of the null using a difference in means tests are robust.

Analyst coverage for these 100 firms is determined by examining Nelson's Directory of Investment Research. Nelson's reveals that a total of 22 different brokerage firms provide research on at least one of these companies. The 22 brokerage firms in the sample account for 84.4% of total volume in the sample stocks.[9]

Table 2 presents summary information on brokerage-firm volume in the sample stocks. The first column in Table 2 lists the 22 brokers in the sample. The

[9] The remaining volume comes from discount brokers, which do not provide research, brokers who provide only execution services, and brokers who cover only small stocks, but occasionally execute trades in the sample stocks.

Table 2
Analyst coverage and brokerage volume[a]

| Broker | Mean broker share volume | Mean broker market share | Number of analysts | Stocks covered |
|---|---|---|---|---|
| Barclay De Zoete Wedd | 2265 | 1.45 | 9 | 58 |
| BBN James Capel | 2892 | 1.00 | 12 | 55 |
| Bunting Warburg | 4535 | 1.96 | 13 | 66 |
| Burns Fry | 22,667 | 9.64 | 22 | 97 |
| Credifinance | 202 | 0.12 | 6 | 36 |
| First Marathon | 21,557 | 6.43 | 6 | 41 |
| Goepel Shields | 1073 | 0.46 | 6 | 32 |
| Gordon Capital | 26,043 | 6.83 | 6 | 52 |
| Levesque Beaubien | 4716 | 3.61 | 11 | 63 |
| Loewen Ondaatje | 3997 | 1.70 | 7 | 37 |
| Majendie | 2581 | 1.39 | 5 | 40 |
| Marleau Lemire | 1280 | 0.68 | 13 | 1 |
| Midland Walwyn Capital | 11,393 | 6.00 | 12 | 57 |
| Nesbitt Thomson | 16,251 | 6.89 | 20 | 92 |
| RBC Dominion | 24,381 | 13.58 | 20 | 94 |
| Research Capital | 983 | 0.67 | 6 | 43 |
| Richardson Greenshields | 13,135 | 5.48 | 14 | 81 |
| Sanwa McCarthy | 762 | 0.49 | 9 | 35 |
| ScotiaMcLeod | 16,902 | 6.17 | 15 | 77 |
| Sprott | 245 | 0.17 | 7 | 34 |
| Wood Gundy | 21,195 | 8.62 | 13 | 82 |
| Yorkton | 2114 | 1.05 | 9 | 10 |

[a]This table presents information on brokerage trading activity in the 100 largest stocks traded on the TSE. In the year of the study, Nelson's Directory of Investment Research listed 22 different brokerage firms that provided coverage on these stocks. *Mean broker share volume* is the average daily volume (number of shares traded) per stock traded by the brokerage. *Mean broker market share* is the average daily market share of the brokerage. *Number of analysts* is the total number of sell-side analysts the broker employs. *Stocks covered* represents the number of stocks in the sample covered by the brokerage. The maximum possible is 100.

next two columns present mean broker Share Volume and mean broker Market Share over all 100 stocks; both covered and uncovered stocks. The fourth column presents the number of sell-side analysts each broker employs (number of analysts) and the final column presents the number of sample stocks covered by each broker (stocks covered). Brokerage firms with larger market shares tend to employ more analysts and cover more stocks. Smaller brokers, all else equal, will have less commission revenue available to support a research department. One broker covers just one of the large-cap stocks in the sample, concentrating instead on small and mid-cap stocks.

## 4. Results

### 4.1. Analyst coverage and brokerage volume

Table 3 presents the primary tests. Panel A presents the results for Share Volume. The second and third columns in Panel A disaggregate total broker Share Volume, as reported in Table 2, into average Share Volume in covered stocks and uncovered stocks. In the full sample mean (median) Share Volume is 13,917 (6651) in covered stocks, significantly greater than the mean Share Volume of 3592 (1108) in uncovered stocks. Differences in means tests compare the average broker Share Volume in covered stocks against the average broker Share Volume in uncovered stocks. For 11 of the 21 brokers where a difference in means test can be calculated, the null hypothesis is rejected at the 5% significance level. Fifteen of 21 brokers reject the null at the 10% significance level. The rejections all occur because Share Volume in covered stocks is greater than Share Volume in uncovered stocks.[10] These results lend support to the primary hypothesis: brokers trade greater Share Volumes in stocks they cover. Column five of Panel A presents the results of the Wilcoxon rank sum test of equal Share Volume in covered and uncovered stocks. The Wilcoxon test rejects the null of equal Share Volume for 11 of 21 brokers at the 5% level and 13 of 21 brokers at the 10% level. These results are consistent with the parametric tests.

Panel B of Table 3 presents tests based on brokerage-firm Market Share. Columns two and three of Panel B present average Market Share in covered stocks and average Market Share in uncovered stocks for all 22 brokers in the sample. In the full sample mean (median) Market Share in covered stocks, 5.63% (2.57%), is significantly greater than mean Market Share in uncovered stocks, 1.80% (0.29%). Column 4 presents the results of difference in means test of average broker Market Share in covered stocks against average broker Market Share in uncovered stocks. The difference in means tests on individual broker's Market Share rejects the null of equal market share in 10 of 21 cases at the 5% significance level. Sixteen of 21 brokers reject the null at the 10% significance level. The rejections all occur because the broker's Market Share in covered stocks is greater than their Market Share in uncovered stocks.

Column 5 of Panel B presents the results of the Wilcoxon rank sum test of equal Market Share in covered and uncovered stocks. The Wilcoxon test rejects the null of equal Market Share for 13 of 21 brokers at both the 5 and 10% levels. Hence, the findings in Table 3 are robust across different volume measures and hold for both parametric and non-parametric tests.

[10] The statistic cannot be calculated for one brokerage because it covers only one firm in the sample.

The tests performed thus far produce a separate statistic on the likelihood of the null being true for each broker. As discussed in Section 2, it is convenient to aggregate these tests in order to make inferences on the overall relation between analyst coverage and brokerage-firm volume for the full sample. A third test based on the ratio of Share Volume (Market Share) in covered stocks to uncovered stocks is presented in Column 6 of Panel A (Panel B). Across all brokers, a binomial test provides strong evidence in support of the primary hypothesis. In 21 of 22 cases both the Share Volume ratio and the Market Share ratio is greater than one. For both measures, the null of no relation between analyst coverage and brokerage-firm volume is rejected with a $p$-value of $< 0.01$. Collectively, the results in Table 3 strongly suggest that brokers generate more trade in stocks that their analysts' cover.

Table 3
Tests of coverage and brokerage volume[a]

Panel A: Share volume

| Broker | Covered share volume | Uncovered share volume | $T$-test $p$-value | Wilcoxon $p$-value | Share volume ratio |
|---|---|---|---|---|---|
| Barclay De Zoete Wedd | 2739 | 1611 | 0.03 | 0.05 | 1.70 |
| BBN James Capel | 4406 | 1041 | 0.01 | 0.01 | 4.23 |
| Bunting Warburg | 6366 | 979 | 0.01 | 0.01 | 6.50 |
| Burns Fry | 23,288 | 2562 | 0.06 | 0.01 | 9.09 |
| Credifinance | 268 | 164 | 0.04 | 0.40 | 1.63 |
| First Marathon | 36,910 | 10,888 | 0.01 | 0.01 | 3.39 |
| Goepel Shields | 2195 | 545 | 0.01 | 0.01 | 4.03 |
| Gordon Capital | 35,087 | 16,244 | 0.01 | 0.10 | 2.16 |
| Levesque Beaubien | 4969 | 4284 | 0.16 | 0.54 | 1.16 |
| Loewen Ondaatje | 4377 | 3774 | 0.14 | 0.49 | 1.16 |
| Majendie | 2933 | 2346 | 0.15 | 0.15 | 1.25 |
| Marleau Lemire | 3496 | 1257 | n/a | n/a | 2.78 |
| Midland Walwyn Capital | 12,612 | 9776 | 0.08 | 0.01 | 1.29 |
| Nesbitt Thomson | 16,540 | 12,922 | 0.19 | 0.20 | 1.28 |
| RBC Dominion | 24,942 | 15,588 | 0.22 | 0.05 | 1.60 |
| Research Capital | 930 | 1022 | 0.67 | 0.93 | 0.91 |
| Richardson Greenshields | 14,442 | 7561 | 0.02 | 0.08 | 1.91 |
| Sanwa McCarthy | 1323 | 459 | 0.01 | 0.24 | 2.88 |
| ScotiaMcLeod | 20,808 | 3825 | 0.01 | 0.01 | 5.44 |
| Sprott | 303 | 215 | 0.08 | 0.39 | 1.41 |
| Wood Gundy | 22,244 | 15,960 | 0.09 | 0.04 | 1.40 |
| Yorkton | 8388 | 1417 | 0.01 | 0.01 | 5.92 |
| Number $> 1.00$ | | | | | 21 |
| $p$-value | | | | | 0.01 |

Table 3 (continued)
Panel B: Market share

| Broker | Covered market share | Uncovered market share | *T*-test *p*-value | Wilcoxon *p*-value | Market share ratio |
|---|---|---|---|---|---|
| Barclay De Zoete Wedd | 1.65 | 1.17 | 0.07 | 0.01 | 1.41 |
| BBN James Capel | 1.41 | 0.41 | 0.01 | 0.02 | 2.87 |
| Bunting Warburg | 2.53 | 0.85 | 0.01 | 0.01 | 2.96 |
| Burns Fry | 9.71 | 7.25 | 0.10 | 0.01 | 1.34 |
| Credifinance | 0.14 | 0.11 | 0.10 | 0.21 | 1.23 |
| First Marathon | 9.39 | 4.37 | 0.01 | 0.01 | 2.15 |
| Goepel Shields | 0.86 | 0.27 | 0.01 | 0.01 | 3.14 |
| Gordon Capital | 8.09 | 5.47 | 0.01 | 0.01 | 1.48 |
| Levesque Beaubien | 4.13 | 2.72 | 0.08 | 0.44 | 1.52 |
| Loewen Ondaatje | 2.17 | 1.43 | 0.02 | 0.59 | 1.52 |
| Majendie | 1.22 | 1.50 | 0.60 | 0.40 | 0.81 |
| Marleau Lemire | 2.37 | 0.66 | n/a | n/a | 3.58 |
| Midland Walwyn Capital | 6.27 | 5.65 | 0.13 | 0.26 | 1.11 |
| Nesbitt Thomson | 6.99 | 5.73 | 0.10 | 0.03 | 1.22 |
| RBC Dominion | 13.72 | 11.43 | 0.02 | 0.05 | 1.20 |
| Research Capital | 0.71 | 0.64 | 0.18 | 0.04 | 1.11 |
| Richardson Greenshields | 5.68 | 4.62 | 0.07 | 0.01 | 1.23 |
| Sanwa McCarthy | 0.78 | 0.33 | 0.01 | 0.04 | 2.36 |
| ScotiaMcLeod | 6.83 | 3.97 | 0.01 | 0.03 | 1.72 |
| Sprott | 0.18 | 0.17 | 0.43 | 0.94 | 1.06 |
| Wood Gundy | 8.92 | 7.25 | 0.03 | 0.15 | 1.23 |
| Yorkton | 1.60 | 0.99 | 0.12 | 0.01 | 1.62 |
| Number $> 1.00$ | | | | | 21 |
| *p*-value | | | | | 0.01 |

[a]This table presents test statistics for three tests of the association between analyst coverage and brokerage-firm volume. Panel A concerns Share Volume. *Covered Share Volume* is the average number of shares traded in the sample stocks the broker covers. *Uncovered Share Volume* is the average number of shares traded in uncovered sample stocks. *T-test p-value* is a one-tailed significance level for the null hypothesis of no difference between covered Share Volume and uncovered Share Volume. *Wilcoxon p-value* presents the significance level for a Wilcoxon rank sum test of covered Share Volume against uncovered Share Volume. *Share Volume Ratio* represents the ratios of two averages; average brokerage Share Volume in covered stocks is divided by average brokerage Share Volume in uncovered stocks. Panel B concerns Market Share. *Covered Market Share*, *Uncovered Market Share*, *t-test p-value and Wilcoxon p-value* are analogous statistics for average Market Share. *Market Share Ratio* represents the analogous ratio for Market Share. The *Share Volume* and *Market Share Ratios* are used in a binomial test of the null hypothesis that Share Volume and Market Share ratios are equal to one. The test statistics and significance levels for this test is presented at the bottom of each column.

This is an important result because it provides insight into the micro-economics of the brokerage industry. Since analyst services are costly, we should see incremental benefits such as increased trading associated with the analyst's

decision to provide coverage. The confirmation of this link is evidence that analyst coverage influences their clients' choice of broker. Both O'Brien and Bhushan (1990) who analyze the relation between the institutional investors and analyst coverage, and McNichols and O'Brien (1997) who examine analysts' self-censoring, use the assumption that generating trade is an important influence on analyst activity. The findings in Table 3 provide empirical verification for this assumption.

A second possible implication of these results is that the contents of an analyst's earnings forecast could be affected by the fact that analysts generate trade for their firms. Schipper (1991) hypothesizes that certain properties of analysts' forecasts may be designed to generate trade. Hayes (1998) formalizes this concept, and suggests that an analyst interested in maximizing the trading volume generated from his or her reports will search for information that generates trading. Furthermore, she asserts that the information that generates trading is not necessarily the most precise information available. While testing Hayes (1998) hypothesis is beyond the scope of this paper, a relation between coverage and brokerage-firm volume is a necessary, but not sufficient, condition for Hayes' hypothesis to hold.

### *4.2. The average impact of analyst coverage*

The brokerage firms in our sample exhibit considerable diversity in their size and their average Market Share. In addition, the stocks in the sample exhibit considerable variation in average trading volume. Given this diversity, it is difficult to obtain firm conclusions on the average impact of analyst coverage on brokerage-firm volume without additional analysis. A simple regression analysis provides a convenient way to summarize the average impact of analyst coverage on brokerage-firm Market Share.

The Market Share of a particular broker in a particular stock is the dependent variable in the regressions presented in Table 4. Data for all 22 brokers over the 100 stocks in the sample produces the 2200 observations used in the regression. An analysis of the average impact of analyst coverage is given by

$$\begin{aligned}\text{Market Share}_{j,k} = {} & \beta_0 + \beta_1\,\text{Coverage}_{j,k} + \beta_2\,\text{NA\_Broker}_j \\ & + \beta_3\,\text{NA\_Stock}_k + \beta_4\,\text{Coverage}_{j,k} * \text{NA\_Stock}_k + \varepsilon_{j,k},\end{aligned} \tag{2}$$

where $\text{Market Share}_{j,k}$ is the market share for broker $j$ in stock $k$, $\text{Coverage}_{j,k}$ the dummy variable set to 1 if broker $j$ covers stock $k$, $\text{NA\_Broker}_j$ the number of analysts employed by broker $j$, $\text{NA\_Stock}_k$ the number of analysts covering stock $k$, and $\text{Coverage}_{j,k} * \text{NA\_Stock}_k$ an interactive dummy variable calculated by multiplying Coverage by the number of analysts that cover the stock.

Table 4
The average impact of coverage on brokerage market share[a]

| | Dependent variable: market share | | | |
|---|---|---|---|---|
| Model | 1<br>Coefficient<br>(Standard error) | 2<br>Coefficient<br>(Standard error) | 3<br>Coefficient<br>(Standard error) | 4<br>Coefficient<br>(Standard error) |
| Intercept | 1.80[b]<br>(0.17) | − 1.23[b]<br>(0.29) | 3.69[b]<br>(0.49) | − 2.06[b]<br>(0.61) |
| Coverage | 3.83[b]<br>(0.24) | | | 7.14[b]<br>(0.90) |
| NA_Broker | | 0.45[b]<br>(0.04) | | 0.37[b]<br>(0.04) |
| NA_Stock | | | 0.01<br>(0.04) | 0.01<br>(0.05) |
| Coverage * NA_Stock | | | | − 0.35[b]<br>(0.08) |
| Adjusted $R^2$ (%) | 10.6 | 14.4 | 0.0 | 21.6 |

[a]This table presents OLS regression estimates of the average impact of analyst coverage on brokerage-firm market share. The dependent variable consists of 2200 observations of brokerage-firm market share. Market share is calculated from September 1993 to August 1994 for the 22 brokers that provide analyst coverage on at least one of the 100 largest (market value) stocks on the Toronto Stock Exchange. Coverage is a dummy variable set to one if Nelson's Directory of Investment Research indicates the broker provides coverage on a particular stock. NA_Broker is the total number of sell-side analysts employed by the broker. NA_Stock is the total number of analysts covering a stock. Coverage * NA_Stock is an interactive dummy variable.
[b]Significant at the 0.01 level.

The coefficient of Coverage is of primary interest. It represents the estimate of the average increase in brokerage Market Share resulting from analyst coverage. Given the test results presented in Table 3, I expect that the coefficient will be significantly positive. The number of analysts employed by the broker, NA_Broker, is a variable included to control for the size of the brokerage firm. The number of sell-side analysts employed by each broker is given in Table 2. Given that brokers with large research staffs have to do more trading to support that staff, I expect that the coefficient of NA_Broker, will be greater than zero. It is well known that the number of analysts covering the stock, NA_Stock, is positively related to stock volume. This relation was a concern when testing the primary hypothesis using Share Volume. The fact that brokers tend to cover

high-volume stocks could bias those tests against the null. If Market Share does not suffer from this bias, then the coefficient of NA_Stock should be insignificantly different from zero. The coefficient of the interactive dummy variable, Coverage * NA_Stock, is expected to be significantly negative since, all else equal, the greater the level of competition for trading revenue, the smaller the impact of the decision to provide coverage.

The results of OLS estimation of Eq. (2), reported in Table 4, indicate that providing coverage significantly increases brokerage-firm market share by 3.83%. The corresponding value using Share Volume as the dependent variable (results not tabulated) is 10,325 shares per-day per-stock. As expected, the size of the brokerage-firm research staff is positively related to Market Share. In the univariate regression reported in Column three, the total number of analysts covering a stock has no effect on brokers' Market Share. However, Column four shows that expected Market Share from providing coverage is declining in the number of analysts covering the stock. The coefficient on the variable Coverage * NA_Stock is negative and significant: this suggests that diminishing marginal returns characterize the brokerage industry. The more competition in a particular stock, the less market share a broker can expect to capture by providing coverage. When deciding what firms to cover, brokers trade off the possibility of capturing a larger market share in lightly covered (and likely low-volume) stocks against the smaller market share they are likely to capture in the more competitive, high-volume stocks.

## 5. Conclusion

This paper directly documents a positive relation between analysts' coverage and brokerage-firm volume using a unique data set from the Toronto Stock Exchange to disaggregate stock volume into brokerage-firm volume. Over an entire year, analyst coverage is positively associated with brokerage-firm volume. Brokers trade significantly more shares and have higher market shares in covered stocks than they do in uncovered stocks. On average, brokers increase their market shares in covered stocks by 3.8% relative to uncovered stocks. This result is consistent with compensation for analysts' research services coming from clients' directed commissions. These results provide empirical support for O'Brien and Bhushan's (1990) assumption that brokerage-firm trading volume is an important determinant of analyst coverage decisions, and for McNichols and O'Brien (1997) who contend that brokerage-firm trading volume affects analysts' decisions of when to publicly release a forecast.

Future research into the strength of the relation between brokerage-firm volume and the contents of analysts' forecasts could further our understanding of how analysts' incentives affect their forecasts. One example is Francis and Willis (2000) who examine how trading incentives interact with corporate

finance incentives, selection and judgmental explanations to explain the properties of analysts' forecast optimism.

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