ANALYST INCENTIVES AND SIGNALS: THE ROLE OF THE INSTITUTIONAL AND DISCLOSURE ENVIRONMENT

Rob BROWN
Department of Finance
Faculty of Economics and Commerce
University of Melbourne
Vic 3010
AUSTRALIA

Howard W.H. CHAN*
Department of Finance
Faculty of Economics and Commerce
University of Melbourne
Vic 3010
AUSTRALIA

Robert W. FAFF
Department of Accounting and Finance
Faculty of Business and Economics
Monash University
Clayton Vic 3168
AUSTRALIA

Yew Kee HO
Department of Finance and Accounting
School of Business
National University of Singapore 117591
SINGAPORE

Date: 23 July 2007

JEL Classification: G14
Keywords: Analyst recommendations; Broker market share

* Corresponding author.
Tel: 61 3 8344 7166; Fax: 61 3 8344 6914
e-mail address: chanhw@unimelb.edu.au

PRELIMINARY DRAFT ONLY. PLEASE DO NOT QUOTE.

Acknowledgements: We would like to thank the Melbourne Centre of Financial Studies for their generous financial support. We are grateful to East Coles, IRESS and SIRCA for assistance with data. The first and third authors are grateful to the Universities of Manchester and Amsterdam, respectively, for support during sabbatical leaves in 2006 and 2007.

ANALYST INCENTIVES AND SIGNALS: THE ROLE OF THE INSTITUTIONAL AND DISCLOSURE ENVIRONMENT

ABSTRACT

Despite the rapid growth of "discount" brokers, many securities firms continue to provide earnings forecasts and investment recommendations to their clients. Typically, these products are costly to produce yet no explicit charge is made for supplying them to clients. Instead, higher brokerage commissions are charged. It is therefore important for these securities firms to have evidence on whether clients respond to forecasts and recommendations by making transactions through the firm. While several studies have considered the long-term response of clients, only one study (Irvine 2004) has considered the short-term response. Irvine's study predates the rapid growth in discount brokers. We examine the short-term response of clients of Australian securities firms to approximately 3500 forecasts made in the period 1998 – 2004. We find very little evidence that clients respond in the short term, although it does appear that, for forecasts of the earnings of small firms, positive (negative) signals discourage sell (buy) orders that might otherwise have been placed.

1. INTRODUCTION

In the past decade there has been rapid growth in the volume of broking business undertaken in Australia by so-called “discount brokers”, many of whom provide an internet-based service to clients. Typically, these firms provide only transaction services such as the processing of buy and sell orders. Nevertheless, there remain a large number of “full service” securities firms who, in addition to the standard transaction services, also provide research and advice to their clients. The costs of operating a full service firm are considerably greater than the costs of operating an internet-based service and these higher costs are, of course, reflected in the brokerage rates charged by full service firms.

Earnings forecasts and analyst recommendations on individual stocks are major outputs of full service firms. Typically, earnings forecasts are stated in terms of earnings per share, while recommendations are summarised on a five-point scale: 1 (“strong buy”), 2 (“buy”), 3 (“hold”), 4 (“underperform”) and 5 (“sell”). Usually, an earnings forecast is accompanied by an investment recommendation and both are released simultaneously by the securities firm in the form of analyst reports.

Forecasts and recommendations are costly to produce since they require the employment and compensation of the analysts and support staff plus the provision of office services. Since a securities firm may have hundreds or thousands of clients, once a forecast and recommendation is released it is, in effect, publicly available information. This structure implies that a full service securities firm may face a considerable “free rider” problem. There is little to prevent an investor from obtaining knowledge of a full service firm’s forecasts and recommendations from a semi-public source, such as a dedicated information provider, but trading through an internet-based broker.

The possibility of free riding is not the only complexity in the potential relationship between the release of a forecast and recommendation and the trading volume generated for the securities firm that made the release. For example, an active trader could direct a proportion of their trades through a full service firm in order to have their name included in the firm's list of clients, thus ensuring that they receive the forecasts and recommendations, while continuing to use a discount broker for most of their trades. If the proportion directed to the full service firm is miniscule, then this approach is merely a more efficient way for a client to free ride. However, if the proportion is significant, then the client could be profitable for the full service firm. In this case, the full service broker may not be able to observe a short-run volume response to a release but there may be a long-run relationship. This possibility is recognised in the literature (Michaely and Womack, 1999; Michaely and Womack 2005).

We do not dispute the argument that there could be a long-run relationship between releases and a broker's market share even in the absence of a short-run relationship. However, taking the viewpoint of a full service broker, we suggest that the most credible sign that a broker's forecasts and recommendations are valued by its clients would be evidence that its share of brokerage business tends to increase at the time of a release. Such evidence would be particularly compelling if it showed that buy orders tend to increase following positive recommendations, while sell orders tend to increase following negative recommendations. Unfortunately, the literature contains almost no evidence along these lines. Only one study (Irvine 2004) has conducted this type of research. Since Irvine's study is restricted to 835 forecasts made for 96 Canadian stocks for only one year, there is a limited scope to generalise on the basis of his results.

Moreover, the period of his study (1993-1994) precedes the rapid growth in internet-based trading.

In this paper we investigate the short-term response of broker market shares to releases of forecasts and recommendations. Our sample consists of 3496 earnings forecasts made by Australian brokers in the period 1998 to 2004. We also have daily data on the dollar volume of sales and purchases transacted by brokers. Thus we are able to align at the level of individual brokers and individual stocks, broker market shares with the release of earnings forecasts. In general, the results obtained are disappointing in that there is little evidence that, on average, a broker can expect its market share to respond in the short term to the release of an earnings forecast. The results seem consistent with the advent of "discount brokers", which further compounds the free rider problem for the full service firms. There is some evidence that, in the case of small companies, a positive signal discourages clients from selling, while a negative signal discourages clients from buying.

The remainder of the paper is organised as follows. Section 2 provides a literature review. In Section 3 the data and methodology are outlined, while Section 4 presents and discusses the results. Section 5 concludes.

2. LITERATURE REVIEW

The release of new information about a listed firm is likely to induce trading in its shares. According to Karpoff (1986), trading volume will increase when new information is either interpreted differently by different investors or is accorded the same interpretation by investors but this interpretation resolves an existing disagreement between investors.

Evidence reported by Barron (1995) supports Karpoff's predictions. An earnings forecast or investment recommendation issued by an analyst may well be an important piece of new information for investors. Many investors presume that analysts are well placed to gather and interpret information about investments and thus may be willing to trade in response to a new earnings forecast or a new recommendation.

From the viewpoint of a securities firm, issuing earnings forecasts and investment recommendations may enhance the reputation of the firm and may also induce trading, leading to an increase in the commissions earned by the firm's broking division. Such commissions are one of the two major sources of revenue earned by the firm from its clients. The other major source is fees earned by the firm's investment banking division in return for providing services such as arranging and underwriting new share issues and advising on mergers and acquisitions.[1] In the former case, advice is generally offered to a single client in private. In the latter case, advice is usually in the form of forecasts and/or recommendations made to a group of clients either publicly or semi publicly. In both cases, the greater is the firm's reputation for offering sound advice on pricing and other matters, the greater the revenue stream will be, *ceteris paribus*. Thus, in general, it is in the interests of both divisions of the firm that the advice offered should be as unbiased and as accurate as possible. Similarly, the compensation of an adviser or analyst employed by the firm will be higher, the higher is the individual's reputation for honesty and accuracy, at least in the long term.

[1] For simplicity, we assume that the securities firm has established formal divisions to house its broking and investment banking activities. In cases where this structure has not been adopted, the term "division" should be understood as referring to those employees whose main activities are broking or investment banking, respectively. Securities firms may also generate revenue from trading on its own account. See Michaely and Womack (1999).

While a securities firm, its clients and its employees share many of the same objectives, it is widely accepted that not all objectives will be compatible at all times. For example, if an analyst employed by the broking division wishes to release a negative investment recommendation on a client of the investment banking division, there is likely to be a clash of interest between, on the one hand, the broking division and, on the other hand, the investment banking division and the client. This issue has been investigated empirically in a number of papers including Dugar and Nathan (1995), Lin and McNichols (1998) and Michaely and Womack (1999). These studies typically find evidence of optimism in the investment recommendations issued by securities firms on their investment banking clients.[2] Carleton, Chen and Steiner (1998) take a different approach but reach a similar conclusion. They find that recommendations issued by analysts employed by firms that offer investment banking services ("sell-side" analysts) are more optimistic and less accurate than recommendations issued by analysts employed by firms that do not offer investment banking services ("buy-side" analysts). Whether investors are aware of this bias and, if they are, the extent to which they discount for it, remains controversial.[3]

Conflicts of interest may also arise between the broking division, the analysts that it employs and its clients. *Ex ante*, clients are expected to favour unbiased investment recommendations to biased recommendations. But the broking division and the analyst may have a short-term interest in issuing biased forecasts and recommendations to

[2] Of course, it may be difficult to rule out 'reverse causation' – that is, client firms and investment banking divisions find a mutual attraction when the broking division has high regard for the client.
[3] Compare, for example, Michaely and Womack (1999) and Agrawal and Chen (2006).

encourage trading and, hence, increase commission revenue.[4] For example, a "strong buy" recommendation may encourage clients to buy the stock and, if they use the broking division to execute the trade, then commission revenue will be generated for the firm. Although, in the long term, such actions may damage the reputation of the analyst and the firm, and hence hurt revenue, the analyst and/or the broking division may prefer to follow a short-term strategy. Thus there may be a trade-off between short- and long-term incentives, leading to a conflict of interest between, on the one hand, the broking client and, on the other hand, the broking division and/or the analyst. While there is less evidence on this issue, it may become a more significant concern in future years as a clearer wedge is driven between analysts' research and investment banking activities (Jackson 2005, pp. 674-675).

Several studies have investigated the relationship between investment recommendations and trading activity by studying the reaction of the market-wide volume of trading in a given company to recommendations released via magazines and news outlets. Barber and Loeffler (1993) study 95 stocks recommended in the "Dartboard" column of the *Wall Street Journal* between October 1988 and October 1990. In this column, each week four stocks were recommended by analysts (known as the "pros' picks") and four stocks were chosen at random (known as the "dartboard stocks"). They find that on the day of publication the volume of trading in the pros' picks is nearly double the predicted volume, but there is no evidence of abnormal volume in the dartboard stocks. Palmon, Sun and Tang (1994) study 280 buy recommendations and 49

[4]A recent paper by Ljungqvist, Malloy and Marston (2007) documents ex post non-random changes to recommendations, including alterations of recommendation levels, additions and deletions of records, and removal of analyst names. The changes affect trading signal classifications, back-testing inferences, track records of individual analysts, and models of analysts' career outcomes in the three years following the changes.

sell recommendations published in *Business Week* between 1983 and 1989. It is clear that buy recommendations result in abnormally high volumes in the day or two surrounding the publication date. The results for sell recommendations are mixed, with one test even suggesting that volume is abnormally *low* at the time of publication. Kim, Lin and Slovin (1997) analyse trading behaviour for a sample of 87 initiating buy recommendations reported on the Dow Jones News Wire in 1991. They find that trading volume approximately doubles on the report day.

Womack (1996) and Green (2006) study recommendations released by brokerage firms to their clients and collected by the data vendor First Call. This data source enables the researcher to study much larger samples and to focus on recommendation changes rather than recommendation levels. [5] Womack (1996) studies 1537 recommendation changes into or out of the highest and lowest recommendation categories made by leading brokerage firms in the period 1989 to 1991. He finds that, on average, on the day of release, an added-to-buy recommendation doubles trading volume, while an added-to-sell recommendation trebles volume. The volume reaction for added-to-buy recommendations appears to be limited to one day either side of the release, and, while the volume increase for added-to-sell recommendations is also concentrated on those days, the reaction appears to be spill into a slightly wider time window. Green (2006) studies 7000 recommendation changes made by 16 major brokerage firms in the period 1999 to 2002. He finds that on the release date the volume is approximately double that of the previous day. In Green's words, there is a "dramatic rise in trading activity

[5] The latter is important because studies have suggested that investors tend to respond to changes rather than levels. See Stickel (1995), Francis and Soffer (1997), Ho and Harris (2000) and Dhiensiri, Mandelker and Sayrak (2005).

coupled with a more modest shift in order imbalances", suggesting "that the market interprets recommendation changes broadly as a liquidity event" (Green, 2006, p. 19).

Agrawal and Chen (2006) use the I/B/E/S database of recommendations. They simultaneously investigate conflicts of interest arising from investment banking and broking activities by measuring the percentage of each broking firm's revenue that is due to investment banking and the percentage that is due to commissions. The higher the percentage, the greater is the potential conflict of interest faced by the broking firm. Their analysis includes both price and market-wide volume reactions to recommendation changes. In the case of volumes, they find that, at the time of a recommendation change, the more conflicted is the analyst, the smaller (larger) is the volume response to a recommendation upgrade (downgrade). The rationale for this asymmetric response is that a conflict of interest reduces the credibility of an upgrade but increases the credibility of a downgrade.

Studies of market-wide trading activity in a stock have limited ability to identify directly the potential benefit that a forecast or recommendation can deliver to the particular firm that releases a recommendation. A clearer picture should emerge from data that are collected and analysed at the level of the *individual* brokerage firm's trading in each stock. However, it is important to distinguish very clearly between the long-run and short-run volume response to the release of a recommendation. In many countries, including the US, Canada and Australia, it is usual for investment recommendations to be issued to clients without an explicit or even implicit requirement that any trading based on that recommendation should be directed through the securities firm that issued the recommendation. Indeed, Michaely and Womack (1999, p. 660) go further and state that,

in the US, it "is the rule rather than the exception" that institutional customers will "use the ideas of one firm's analysts, but transact through another firm", a statement that they repeat in a more recently published survey, adding the comment that "a brokerage firm putting out a new research recommendation will not typically garner even a majority of the immediate transaction volume in the stock it recommends" (Michaely and Womack 2005, p. 416). Furthermore, as Green (2006) points out, if some clients trade stock as a result of receiving an investment recommendation, the increased liquidity may encourage clients of other firms to trade even if they have no knowledge of the recommendation change. Hence, even if a recommendation does generate some immediate increased trading for the securities firm, it does not necessarily follow that the securities firm's *share* of trading in the market will also increase. Thus, in the short run, a securities firm that issues a recommendation cannot be certain of an increase either in its absolute level of trading in the recommended stock or of its share of market-wide trading in that stock. In the longer run, however, we should expect to see a relationship between a securities firm's recommendations and its trading activity: over "a quarter or a year, the allocation of commission dollars among brokerage firms is more closely tied to research value added" (Michaely and Womack 1999, p. 660).

Perhaps because of limitations in the US on data availability, only three published studies have related recommendations to trading volume at the level of the *individual* securities firm's trades in *individual* stocks. Irvine (2001) uses Canadian data and Jackson (2005) uses Australian data to investigate the longer-run relationship, while Irvine (2004) uses the same Canadian data to investigate the reaction at the time a recommendation is released. Each of these papers is discussed in turn below. However,

our discussion emphasises Irvine (2004) because our study is also of the immediate volume response to the release of a recommendation.

Irvine obtained data on every trade for one year (September 1993 to August 1994) made by each of 22 broking firms in each the 100 largest companies listed on the Toronto Stock Exchange. However, in his 2001 paper Irvine does not investigate data at the daily level. Instead, he aggregates across the whole sample period, and then focuses on the annual market share of each broker in the trading of each stock. The market share of broker *j* in the trading of shares in firm *k* is denoted by $Market\ Share_{j,k}$ and is defined as the number of shares in *k* that were traded by *j* in the year, divided by the number of shares in *k* that were traded by all 22 brokers in the year. The number of shares, rather than the dollar volume, is used because in the US brokerage commission is generally charged on a cents-per-share basis (Conrad, Johnson and Wahal, 2001). For each of the 2200 stock-broker pairs, Irvine defines a dummy variable, $Coverage_{j,k}$, that takes the value 1 if the broker "covers" – that is, issues recommendations on – that stock. Finally, $Market\ Share_{j,k}$ is regressed on the coverage dummy and several control variables. The coefficient on the coverage dummy is positive and significant at the 1% level. Irvine concludes that a broker's market share is positively related to its coverage decision. [6]

Jackson (2005) is considerably more detailed than Irvine (2001). It uses a larger data set and reports the results of more statistical tests. Its net is also cast wider as it investigates both earnings forecasts and recommendations. However, like Irvine (2001), the main objective of the study is to provide evidence on the relation between a broking

[6] Irvine also reports a number of other results using volume rather than market share and using other test statistics such as each broking firm's share of market trading summed across all stocks. All tests reported support the conclusion stated in the text.

firm's research activities and its market share of annual trading business. Jackson's main database consists of weekly dollar trading volumes[7] for each of 23 broking firms on approximately 350 Australian stocks. The time period is from 1992 to 2002 (inclusive). Jackson's sample size is approximately 14000 analyst-stock-years for earnings forecasts but, because of limitations on data availability, the sample size is only around 3000 analyst-stock-years for investment recommendations.

There are three main findings: (1) the higher is the analyst's reputation, the greater is the broking firm's future annual market share; (2) the more accurate are an analyst's earnings forecasts, the higher is the analyst's reputation; (3) more optimistic analysts generate higher trading volumes. Jackson also shows that these results are consistent with a model of rational behaviour when there is asymmetric information about the analyst's motives. Several other empirical predictions from this model are confirmed by the data. Jackson concludes that research activities have a long-run relationship with broking firms' market share of trading and that investors make rational assessments of the incentives facing analysts and their employers.

Both Irvine (2001) for Canada, and Jackson (2005) for Australia, confirm that analysts' research can affect their employer's share of annual trading activity. Thus, in the longer term, research activities are expected to generate gross revenue for the brokerage firm. Such findings do not, of course, preclude the possibility of immediate reactions as well. Although many clients who act on a recommendation made by Broker *A* will choose to trade through Broker *B*, not all will do so. As Jackson notes, "Informal discussions with several fund managers in the Australian market reveal that they often *do*

[7] In Australia, brokerage commissions are normally charged on an *ad valorem* basis and hence dollar volumes are an appropriate measure of trading activity.

trade with the broker whose analyst has provided them with an influential recent report on a stock, in order to maintain a good relationship with that analyst." (Jackson 2005, p. 684, emphasis in original). Given the extensive evidence on the behaviour of daily returns and volumes in response to recommendation releases, most short-term effects on market share should be apparent within a few days. As far as we are aware, Irvine (2004) is the only published study of this kind.

Irvine (2004) begins with the same 1993-94 data set as Irvine (2001). After applying various data screens, the final sample consists of 835 analysts' earnings forecasts issued by 15 broking firms on 96 stocks. Many of the hypotheses tested are based on the Hayes (1998) theoretical model. The main empirical findings are:

1. The greater the gap between the analyst's earnings forecast and the consensus forecast, the greater will be the broking firm's share of trading in the forecast stock following the release of the forecast.
2. The level of an investment recommendation accompanying an earnings forecast has an effect on market share that is independent of the effect of the earnings forecast.
3. The effect of "buy" and "strong buy" recommendations on market share is substantial, exceeding both the effect of positive earnings forecasts and the effect of "hold", "sell" and "strong sell" recommendations.
4. The greater the uncertainty surrounding an earnings forecast, the lower is the impact on market share.

5. Despite the restrictions on short sales, earnings forecasts that are below the consensus forecast are *not* found to have a weaker effect on market share than forecasts that are above the consensus.
6. Greater *ex post* errors in earnings forecasts are *not* found to increase market share; hence, an analyst who consciously adds error to an earnings forecast is not likely to generate a higher market share for the broking firm.
7. "Buy" recommendations generate a higher market share on *both* the buy side and the sell side, a result that might be attributable to increased liquidity.

Irvine also investigates the effects attributable to recommendation changes (that is, upgrades and downgrades), rather than levels. However, the results are generally insignificant (Irvine 2004, Table 5). This outcome is unexpected given the evidence on the impact of recommendation changes (Womack 1996, Barber et al 2001, Dhiensiri, Mandelker and Sayrak 2005, Michaely and Womack 2006). The cause may be the limited sample size: for example, the sample includes only 20 cases where the recommendation is a downgrade to a "sell" or a "strong sell".

3. DATA AND METHODOLOGY

Analysts' forecasts and recommendations on listed Australian stocks are obtained from the Institutional Broker Estimates System (I/B/E/S). Each recommendation is expressed on a five-point scale of 1 ("strong buy"), 2 ("buy"), 3 ("hold"), 4 ("underperform") and 5 ("sell"). Our sample of recommendations begins on 1 January 1998 and terminates on 31 December 2004. The market consensus recommendation is the median of the available recommendations and is also obtained from I/B/E/S.

The selection of our sample of brokerage firms differs from that of Irvine (2004) in a significant respect. Irvine's sample consisted of 15 brokerage firms whose trading, in total, represented 54.8% of trading on the Toronto Stock Exchange. In contrast, our market share measure as outlined in equation (1) consists of all brokerage firms whose trading in total represents 100% of trading on the Australian Stock Exchange. Information for daily buy and sell volumes, total volumes, number of trades, dollar values for every broker on the Australian Stock Exchange (ASX) for each of the ASX300 companies[8] were downloaded from the Broker Share History files of IRESS on a daily frequency.[9]

Following Irvine (2004), our approach is based on event study methodology and our dependent variable is a measure of the change in the market share of the broker[10] that releases an earnings forecast and an accompanying recommendation. Specifically, the market share of broker j in trading in stock k on day i, which we denote as $MKTSHARE_{j,i}^{k}$, is:

$$MKTSHARE_{j,i}^{k} = \frac{Volume_{j,i}^{k}}{\sum_{j=1}^{J} Volume_{j,i}^{k}}, \qquad (1)$$

where $Volume_{j,i}^{k}$ is the dollar volume[11] of trading undertaken by broker j in stock k on day i and

J is the number of brokers in the sample.

[8] Any company that was in the ASX 300 at the beginning of each calendar year was included in our sample of companies for which broker share history information was downloaded for the entire sample period.
[9] IRESS is the main provider of market information on a real time and historical basis for the Australian market.
[10] For brevity, we will henceforth use the term "broker" rather than "brokerage firm" or "securities firm".
[11] We use dollar volume because, in Australia, brokerage is usually charged on *an ad valorem* basis. Apart from this difference, we follow Irvine's approach. In subsequent work, we will use alternative measures of market share.

Again following Irvine (2004), we then calculate the variable *SUMSHARE*, which is the accumulation of market shares across event time. We do so for two event-time windows: from day –5 to day –1 and from day 0 to day +5. We expect the primary reaction to occur in the period from day 0 to day +5 but if there is leakage of the report prior to its release, then there may also be a reaction observable in the period from day –5 to day –1.

We also calculate, on a similar basis, market shares and sums of market shares on each of the buy and sell sides. For example, a broker's buy side market share is:

$$MKTSHAREBUY_{j,i}^{k} = \frac{Volumebuy_{j,i}^{k}}{\sum_{j=1}^{J} Volumebuy_{j,i}^{k}}, \tag{2}$$

where $Volumebuy_{j,i}^{k}$ is the dollar volume of buy trades undertaken by broker *j* in stock *k* on day *i*.

We create corresponding measures, *MKTSHARESELL*, using sell volumes.

Again following Irvine (2004), our main independent variable is *ABSDEV*, which is the absolute value of the difference between the forecast earnings per share and the consensus forecast of earnings per share, deflated by the share price:

$$ABSDEV_{j,i}^{k} = \frac{\left| F_{j,i}^{k} - \overline{F}_{i}^{k} \right|}{P_{i}^{k}}, \tag{3}$$

where $F_{j,i}^{k}$ is the earnings per share forecast for stock *k*, released by broker *j* on day *i*,

$\overline{F}_{i}^{k}$ is the consensus earnings per share forecast for stock *k* on day *i* and

P_{i}^{k} is the price of stock *k* on day *i*.

Thus *ABSDEV* represents the news content (if any) of the analyst's report. If the clients of broker *j* respond to the report, and choose to trade through broker *j*, then we expect to observe a positive relationship between *ABSDEV* and *MKTSHARE* in the days following the release of the report. As the methodology is based on an event-study approach, we denote the day on which a report is released to be day 0.

When $F_{j,0}^k > \bar{F}_0^k$, the signal is positive and our primary expectation is that clients will respond by buying stock *k*. We also expect that clients who would otherwise have sold stock *k* will revise their plans and scale back their sales. Therefore, if $F_{j,0}^k > \bar{F}_0^k$, we expect to observe a positive (negative) relationship between *ABSDEV* and *MKTSHAREBUY* (*MKTSHARESELL*). By similar reasoning, if $F_{j,0}^k < \bar{F}_0^k$, we expect to observe a positive (negative) relationship between *ABSDEV* and *MKTSHARESELL* (*MKTSHAREBUY*). To reduce noise, we exclude from the sample cases where $F_{j,0}^k = \bar{F}_0^k$.

A client's response to a report should also depend on the uncertainty associated with the analyst's forecast: greater uncertainty should dampen the response. Following Irvine (2004), we use the Barron et al (1998) measure of uncertainty:

$$UNCERTAINTY = \left(1 - \frac{1}{N}\right) D + SE, \tag{4}$$

where N is the number of forecasts

D is the sample variance of the analysts' forecasts

SE is the sample squared error in the consensus forecast.[12]

[12] See Irvine (2004, pp. 130-131) for further details.

Two other independent variables are included as controls. The Australian stock market has a large finance sector and a large resources sector. To control for possible industry effects we use the dummy variables *DFIN* which takes the value 1 if the stock is in the finance sector (and zero otherwise) and *DIND* which takes the value 1 if the stock is in the industrial sector – that is, it is not in either the finance sector or the resources sector – and zero otherwise.

Our central test is based on the regression equation:

$$SUMSHARE = \alpha + \beta_1\ ABSDEV + \beta_2\ UNCERTAINTY + \beta_3\ DFIN + \beta_4\ DIND + \varepsilon \quad (5)$$

We estimate this regression separately for positive signals $\left(F_{j,0}^{k} > \bar{F}_{0}^{k}\right)$ and negative signals $\left(F_{j,0}^{k} < \bar{F}_{0}^{k}\right)$. We also estimate this regression separately depending on the size of the company whose earnings are being forecast. For this purpose, we divide the sample into large companies (those whose market capitalisation of equity places them in the top 100 stocks) and small companies (the remainder of our sample). Because there tend to be fewer trades in small stocks, and fewer reports on small stocks, we expect market share to respond more noticeably when the earnings forecast relates to a small company.

4. RESULTS

Table 1 provides descriptive statistics for our sample. Both explanatory variables, *ABSDEV* and *UNCERTAINTY*, are skewed in the same direction, with the mean being much larger than the median. The sample is also skewed towards larger firms, with the median capitalisation being slightly greater than A$4 billion and the mean being A$1.1 billion. The Pearson correlation coefficients were computed for the variables in Table 1. *ABSDEV* and *UNCERTAINTY* have a correlation coefficient of 0.2024 while the rest of the dependent variables are highly positively correlated.

The results of estimating equation (1) are shown in Table 2. The results shown in this table are disappointing. Contrary to our expectations, for both large and small companies, the post-event coefficient on *ABSDEV* is negative (one of which is significant at the 10% level). The corresponding coefficients for negative signals are, as expected, negative, but are not significant. In all four cases the coefficient on *UNCERTAINTY* is positive (one of which is significant at the 5% level), whereas a negative sign was expected. None of the 16 dummy variable coefficients is significant at the 5% level. The R^2 statistics are extremely low.

Table 3 presents the results of the same regressions for positive signals, except that broker market shares are now calculated using buy volumes and sell volumes separately. In this table it is expected that post-event, the coefficients on *ABSDEV* will be positive using buy volumes (Panel A) and negative using sell volumes (Panel B). In Panel A, one of the two coefficients is positive and one is negative; neither is significant. In Panel B, both coefficients are negative; in the case of small companies, this coefficient is significant at the 1% level. Therefore, there is some evidence that, in the case of small companies, a positive signal from a broker can deter clients who might otherwise have sold shares in the company.

Table 4 reports the same tests as Table 3, except that now the tests are applied to negative signals. As expected, both coefficients using post-event buy volumes are negative; in the case of small companies, this coefficient is significant at the 1% level. One of the two corresponding coefficients in Panel B of Table 4 is positive as expected but the other is significantly negative at the 10% level. Therefore, there is some evidence

that, in the case of small companies, a negative signal from a broker can deter clients who might otherwise have bought.

As was observed in Table 2, the dummy variables in Tables 3 and 4 proved non-significant in nearly all cases, and the R^2 statistics are extremely low. Taken together, the results in Tables 3 and 4 are stronger than those reported in Table 2 but remain quite weak.

5. CONCLUSION

Irvine (2004) is the only published study of the short-term reaction of a brokerage firm's market share to the release of its analysts' earnings forecasts. This evidence refers to one year's experience in Canada. Moreover, the time period of the data used in that study (1993-94) predates the recent expansion of discount broking. We study approximately 3500 earnings forecasts released by analysts on Australian stocks in the period 1998 to 2004. We follow Irvine's methodology but, unlike Irvine, we find little evidence of a consistent reaction of market share to the release of analysts' earnings forecasts. However, there is some evidence that, in the case of small companies, a positive signal discourages clients from selling, while a negative signal discourages clients from buying. Further analysis is ongoing.

References

Agrawal, A. and Chen, M.A., 2006, "Do Analysts' Conflicts Matter? Evidence from Stock Recommendations", working paper, University of Alabama, July.

Barber, B., Lehavy, R., McNichols, M. and Trueman, B., 2001, "Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns, *Journal of Finance*, vol. 56, pp. 531–563.

Barber, B. and Loeffler, D., 1993, "The 'Dartboard' Column: Second-hand Information and Price Pressure", *Journal of Financial and Quantitative Analysis*, vol. 28, no. 2, June, pp. 273–284.

Barron, O., 1995, "Trading Volume and Belief Revisions that Differ among Individual Analysts", *The Accounting Review*, vol. 70, no. 4, October, pp. 581–597.

Barron, O., Kim, O., Lim, S. and Stevens, D., 1998, "Using Analysts' Forecasts to Measure Properties of Analysts' Information Environment", *The Accounting Review*, vol. 73, no. 4, pp. 421–434.

Carleton, W.T., Chen, C.R. and Steiner, T.L., 1998, "Optimism Biases among Brokerage and Non-brokerage Firms' Equity Recommendations: Agency Costs in the Investment Industry", *Financial Management*, vol. 27, no. 1, Spring, pp. 17–30.

Conrad, J., Johnson, K. and Wahal, S., 2001, "Institutional Trading and Soft Dollars", *Journal of Finance*, vol. 56, no. 1, pp. 397–416.

Dhiensiri, N., Mandelker, G. and Sayrak, A., 2005, "The Information Content of Analysts Recommendations", Financial Management Association conference paper, Chicago.

Dugar, A. and Nathan, S., 1995, "The Effect of Investment Banking Relationships on Financial Analysts' Earnings Forecasts and Investment Recommendations", *Contemporary Accounting Research*, vol. 12, no. 1, Fall, pp. 131–160.

Francis, J. and Soffer, L., 1997, "The Relative Informativeness of Analysts' Stock Recommendations and Earnings Forecast Revisions", *Journal of Accounting Research*, vol. 35, no. 2, Autumn, pp. 193–211.

Green, T.C., 2006, "The Value of Client Access to Analyst Recommendations", *Journal of Financial and Quantitative Analysis*, vol. 41, no. 1, March, pp. 1–24.

Hayes, R., 1998, "The Impact of Trading Commission Incentives on Analysts' Stock Coverage Decisions and Earnings Forecasts", *Journal of Accounting Research*, vol. 36, no. 2, pp. 299–320.

Ho, M.J. and Harris, R.S., 2000, "Brokerage Analysts' Rationale for Investment Recommendations: Market Responses to Different Types of Information", *Journal of Financial Research*, vol. 23, no. 4, Winter, pp. 449–468.

Irvine, P.J., 2001, "Do Analysts Generate Trade for their Firms? Evidence from the Toronto Stock Exchange", *Journal of Accounting and Economics*, vol. 30, pp. 209–226.

Irvine, P.J., 2004, "Analysts' Forecasts and Brokerage-Firm Trading", *The Accounting Review*, vol. 79, no. 1, January, pp. 125–149.

Jackson, A.R., 2005, "Trade Generation, Reputation, and Sell-side Analysts", *Journal of Finance*, vol. 60, no. 2, April, pp. 673–717.

Karpoff, J.M, 1986, "A Theory of Trading Volume", *Journal of Finance*, vol. 41, December, pp. 1069–1087.

Kim, S.T., Lin, J.C. and Slovin, M.B., 1997, "Market Structure, Informed Trading, and Analysts' Recommendations", *Journal of Financial and Quantitative Analysis*, vol. 32, no. 4, December, pp. 507–524.

Lin, H.W. and McNichols, M.F., 1998, "Underwriting Relationships, Analysts' Earnings Forecasts, and Investment Recommendations", *Journal of Accounting and Economics*, vol. 25, pp. 101–127.

Ljungqvist, Alexander, Malloy, Christopher J. and Marston, Felicia C., "Rewriting History" (February 20, 2007). AFA 2007 Chicago Meetings Paper Available at SSRN: http://ssrn.com/abstract=889322

Michaely, R. and Womack, K.L., 1999, "Conflict of Interest and the Credibility of Underwriter Analyst Recommendations", *Review of Financial Studies*, vol. 12, no. 4, pp. 653–686.

Michaely, R. and Womack, K.L., 2005, "Market Efficiency and Biases in Brokerage Recommendations", chapter 11 in R.H. Thaler (ed.), *Advances in Behavioral Finance*, vol. 2, Princeton University Press, Princeton, pp. 389–419.

Michaely, R. and Womack, K.L., 2006, "Analyst Recommendations and Concurrent Earnings Forecast Changes", working paper, Dartmouth College, September.

Palmon, O., Sun, H.L. and Tang, A.P., 1994, "The Impact of Publication of Analysts' Recommendations on Returns and Trading Volume", *The Financial Review*, vol. 29, no. 3, August, pp. 395–417.

Stickel, S.E., 1995, “The Anatomy of the Performance of Buy and Sell Recommendations”, *Financial Analysts Journal*, vol. 51, no. 5, September / October, pp. 25–39.

Womack, K.L., 1996, “Do Brokerage Analysts’ Recommendations Have Investment Value?”, *Journal of Finance*, vol. 51, no. 1, March, pp. 137–167.

Table 1: Descriptive Statistics for the Sample

ABSDEV is the absolute value of the difference between the forecast and the consensus forecast, scaled by the stock price. *UNCERTAINTY* is the measure of forecast uncertainty proposed by Barron et al (1998). *MCAP* is the market capitalisation of the stock. *BUYSUM*(t_1, t_2) [*SELLSUM*(t_1,t_2)] is the sum of the daily market shares of broker *j* calculated using buy (sell) volumes in stock *k* around the release of an earnings forecast for stock *k*. The event times are denoted by t_1 and t_2. *SUM*(t_1, t_2) is the sum of the daily market shares of broker *j* calculated using buy and sell volumes in stock *k* around the release of an earnings forecast for stock *k*.

	Mean	Median	Minimum	Maximum	Standard Deviation
ABSDEV	0.0693	0.0039	0.0000	114.5161	1.7627
UNCERTAINTY	0.1043	0.0008	0.0000	101.7497	1.9882
MCAP (A$mil)	4,001	1,109	16	58,400	7,806
BUYSUM(0, +5)	0.3146	0.1464	0.0000	3.9305	0.4404
BUYSUM(–5, –1)	0.2643	0.1147	0.0000	3.5159	0.3860
SELLSUM(0, +5)	0.3294	0.1566	0.0000	3.9959	0.4639
SELLSUM(–5, –1)	0.0055	0.0000	1.4343	0.1015	0.0055
SUM(0,+5)	0.9129	0.1819	0.0000	509.2265	11.0386
SUM(–5, –1)	0.5642	0.1440	0.0000	305.5285	6.4884

Table 2: Results of estimating Equation (5) for positive and negative signals using total volume

The dependent variable is the sum of the daily market shares of broker *j* for all trades (buys plus sells) in stock *k* around the release of an earnings forecast for stock *k*. The event times are (a) the 5 days prior to the release and (b) the day of the release and the 5 subsequent days. The table shows estimated coefficients for the constant and the independent variables. *ABSDEV* is the absolute value of the difference between the forecast and the consensus forecast, scaled by the stock price. *UNCERTAINTY* is the measure of forecast uncertainty proposed by Barron et al (1998). *DFIN* is a dummy variable for the finance sector. *DIND* is a dummy variable for the non-finance non-resource industry sector. *SUMSHARE*(t_1, t_2) is the sum of the daily market shares of broker *j* calculated using trading volumes in stock *k* around the release of an earnings forecast for stock *k*. Prob values are shown in brackets. The regression used the Newey-West adjustment.

*, **, *** indicate significance at the 1%, 5% and 10% levels respectively.

	Large companies		Small companies	
Dependent variable:	*SUMSHARE* (–5, –1)	*SUMSHARE* (0, +5)	*SUMSHARE* (–5, –1)	*SUMSHARE* (0, +5)
PANEL A: Positive signals (forecast is above consensus)				
CONSTANT	0.2794 (0.0000)*	0.2667 (0.0000)*	0.2468 (0.0000)*	0.2117 (0.0000)*
ABSDEV	–0.4817 (0.1761)	–0.4626 (0.2345)	–0.2600 (0.1644)	–0.1869 (0.0671)***
UNCERTAINTY	0.0071 (0.0014)*	0.0069 (0.3131)	0.0989 (0.3557)	0.1931 (0.7043)
DFIN	–0.229 (0.4161)	–0.1362 (0.5413)	0.0105 (0.8344)	0.0497 (0.0999)***
DIND	–0.0407 (0.0511)***	–0.0242 (0.1919)	0.0064 (0.8985)	–0.0043 (0.8160)
Sample size	936	936	787	787
R^2	0.0046	0.0031	0.0005	0.0081
PANEL B: Negative signals (forecast is below consensus)				
CONSTANT	0.2416 (0.0000)*	0.2582 (0.0000)*	0.2413 (0.0000)*	0.2522 (0.0000)*
ABSDEV	0.3746 (0.0907)***	–0.1345 (0.6401)	–0.1534 (0.0739)***	–0.1373 (0.1051)
UNCERTAINTY	–0.0012 (0.7442)	0.0125 (0.0121)**	–0.0056 (0.2790)	0.0116 (0.2291)
DFIN	–0.0031 (0.9057)	–0.0085 (0.6919)	–0.0005 (0.9908)	–0.0450 (0.1522)
DIND	–0.0066 (0.7457)	–0.0148 (0.3995)	0.0016 (0.9564)	–0.0343 (0.0920)***
Sample size	918	918	855	855
R^2	0.0010	0.0039	0.0016	0.0059

Table 3: Results of estimating Equation (5) for positive signals using buy and sell volumes

In Panel A (B) the dependent variable is the sum of the daily market shares of broker *j* calculated using buy (sell) volumes in stock *k* around the release of an earnings forecast for stock *k*. The event times are (a) the 5 days prior to the release and (b) the day of the release and the 5 subsequent days. The table shows estimated coefficients for the constant and the independent variables. *ABSDEV* is the absolute value of the difference between the forecast and the consensus forecast, scaled by the stock price. *UNCERTAINTY* is the measure of forecast uncertainty proposed by Barron et al (1998). *DFIN* is a dummy variable for the finance sector. *DIND* is a dummy variable for the non-finance non-resource industry sector. *SUMSHAREBUY*(t_1, t_2) is the sum of the daily market shares of broker *j* calculated using buy volumes in stock *k* around the release of an earnings forecast for stock *k*. *SUMSHARESELL*(t_1, t_2) is the sum of the daily market shares of broker *j* calculated using sell volumes in stock *k* around the release of an earnings forecast for stock *k*. Prob values are shown in brackets. The regression used the Newey-West adjustment.
*, **, *** indicate significance at the 1%, 5% and 10% levels respectively.

	Large companies		Small companies	
PANEL A: Using buy volumes only				
Dependent variable:	*SUMSHAREBUY* (–5, –1)	*SUMSHAREBUY* (0, +5)	*SUMSHAREBUY* (–5, –1)	*SUMSHAREBUY* (0, +5)
CONSTANT	0.2841 (0.0000)*	0.2861 (0.0000)*	0.1888 (0.0000)*	0.1879 (0.0000)*
ABSDEV	0.3198 (0.4953)	0.1834 (0.7801)	–0.1705 (0.2743)	–0.1675 (0.3586)
UNCERTAINTY	0.0117 (0.0014)*	0.0073 (0.0733)***	0.1072 (0.1709)	0.0525 (0.4453)
DFIN	–0.0308 (0.3206)	–0.0267 (0.3046)	0.0622 (0.2063)	0.1414 (0.0007)*
DIND	–0.0350 (0.1463)	–0.0198 (0.3645)	0.0471 (0.1082)	0.0365 (0.1228)
Sample size	936	936	787	787
R^2	0.0033	0.0019	0.0045	0.0180
PANEL B: Using sell volumes only				
Dependent variable:	*SUMSHARESELL* (–5, –1)	*SUMSHARESELL* (0, +5)	*SUMSHARESELL* (–5, –1)	*SUMSHARESELL* (0, +5)
CONSTANT	0.2832 (0.0000)*	0.2910 (0.0000)*	0.2356 (0.0000)*	0.2359 (0.0000)*
ABSDEV	–0.8498 (0.0484)**	–0.3475 (0.6553)	–0.0738 (0.5603)	–0.2893 (0.0010)*
UNCERTAINTY	0.0050 (0.0020)*	0.0045 (0.0041)*	–0.0488 (0.3596)	–0.0667 (0.0405)**
DFIN	–0.0309 (0.2962)	–0.0556 (0.0830)***	–0.0124 (0.7664)	0.0363 (0.3867)
DIND	–0.0284 (0.2053)	–0.0384 (0.1366)	–0.0331 (0.2624)	–0.0189 (0.4261)
Sample size	936	936	787	787
R^2	0.0033	0.0011	0.0024	0.0108

Table 4: Results of estimating Equation (5) for negative signals using buy and sell volumes

In Panel A (B) the dependent variable is the sum of the daily market shares of broker *j* calculated using buy (sell) volumes in stock *k* around the release of an earnings forecast for stock *k*. The event times are (a) the 5 days prior to the release and (b) the day of the release and the 5 subsequent days. The table shows estimated coefficients for the constant and the independent variables. *ABSDEV* is the absolute value of the difference between the forecast and the consensus forecast, scaled by the stock price. *UNCERTAINTY* is the measure of forecast uncertainty proposed by Barron et al (1998). *DFIN* is a dummy variable for the finance sector. *DIND* is a dummy variable for the non-finance non-resource industry sector. *SUMSHAREBUY*(t_1, t_2) is the sum of the daily market shares of broker *j* calculated using buy volumes in stock *k* around the release of an earnings forecast for stock *k*. *SUMSHARESELL*(t_1, t_2) is the sum of the daily market shares of broker *j* calculated using sell volumes in stock *k* around the release of an earnings forecast for stock *k*. Prob values are shown in brackets. The regression used the Newey-West adjustment.
*, **, *** indicate significance at the 1%, 5% and 10% levels respectively.

	Large companies		Small companies	
PANEL A: Using buy volumes only				
Dependent variable:	*SUMSHAREBUY* (–5, –1)	*SUMSHAREBUY* (0, +5)	*SUMSHAREBUY* (–5, –1)	*SUMSHAREBUY* (0, +5)
CONSTANT	0.2444 (0.0000)*	0.2825 (0.0000)*	0.2384 (0.0000)*	0.2685 (0.0000)*
ABSDEV	0.5726 (0.4336)	–0.2162 (0.5234)	–0.1101 (0.4428)	–0.2810 (0.0000)*
UNCERTAINTY	–0.0015 (0.6933)	0.0122 (0.0055)*	–0.0066 (0.4540)	0.0309 (0.0003)*
DFIN	0.0098 (0.7241)	–0.0093 (0.7169)	–0.0373 (0.3990)	–0.0622 (0.1523)
DIND	–0.0117 (0.5855)	–0.0270 (0.1883)	–0.0383 (0.2235)	–0.0743 (0.0071)*
Sample size	918	918	855	855
R^2	0.0025	0.0046	0.0031	0.0161
PANEL B: Using sell volumes only				
Dependent variable:	*SUMSHARESELL* (–5, –1)	*SUMSHARESELL* (0, +5)	*SUMSHARESELL* (–5, –1)	*SUMSHARESELL* (0, +5)
CONSTANT	0.2529 (0.0000)*	0.2673 (0.0000)*	0.2488 (0.0000)*	0.2831 (0.0000)*
ABSDEV	0.8410 (0.0518)***	0.1817 (0.6257)	–0.01534 (0.0696)***	–0.1817 (0.0634)***
UNCERTAINTY	–0.0039 (0.2729)	0.0062 (0.2096)	–0.0069 (0.1915)	0.0054 (0.6589)
DFIN	–0.0229 (0.4293)	–0.0131 (0.5568)	0.0181 (0.7643)	–0.0729 (0.1268)
DIND	–0.0025 (0.9172)	–0.0169 (0.3853)	–0.0018 (0.9530)	–0.0333 (0.2525)
Sample size	918	918	855	855
R^2	0.0043	0.0018	0.0019	0.0047